

Student Mobility Across Schools and its Links to Under-achievement

Sylvia Dixon

New Zealand Treasury Working Paper 18/01

April 2018

DISCLAIMER

The views, opinions, findings, and conclusions or recommendations expressed in this Working Paper are strictly those of the author(s). They do not necessarily reflect the views of the New Zealand Treasury, Statistics New Zealand, or the New Zealand Government. The New Zealand Treasury, Statistics New Zealand, Ministry of Justice and the New Zealand Government take no responsibility for any errors or omissions in, or for the correctness of, the information contained in this Working Paper. The paper is presented not as policy but with a view to inform and stimulate wider debate.

The results in this report are not official statistics – they have been created for research purposes from the Integrated Data Infrastructure (IDI) managed by Statistics New Zealand. Ongoing work within Statistics New Zealand to develop the IDI means it will not be possible to exactly reproduce the data presented here.

Access to the anonymised data used in this study was provided by Statistics New Zealand in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business or organisation. The results in this report have been confidentialised to protect these groups from identification.

Careful consideration has been given to the privacy, security and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the privacy impact assessment for the Integrated Data Infrastructure available from Statistics New Zealand.¹

The results are based in part on tax data supplied by Inland Revenue to Statistics New Zealand under the Tax Administration Act 1994. These tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form or provided to Inland Revenue for administrative or regulatory purposes.

Any person who has had access to the unit-record data has certified that they have been shown, have read and have understood section 81 of the Tax Administration Act 1994, which relates to secrecy. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes and is not related to the data's ability to support Inland Revenue's core operational requirements.

¹ http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure/privacy-impact-assessment-for-the-idi.aspx

NZ TREASURY WORKING PAPER 18/01	Student Mobility Across Schools and its Links to Under-achievement
MONTH/YEAR	April 2018
AUTHOR	<p>Sylvia Dixon The Treasury PO Box 3724 Wellington NEW ZEALAND</p> <p>Email sylvia.dixon@treasury.govt.nz Telephone 64-4-472-2733 Website www.treasury.govt.nz</p>
ISBN (ONLINE)	978-1-98-853482-4
URL	<p>Treasury website at April 2018: https://treasury.govt.nz/publications/wp/wp-18-01 Persistent URL: http://purl.oclc.org/nzt/p-2015</p>
ACKNOWLEDGEMENTS	The author would like to thank Barclay Anstiss, Lis Cowey, Margaret Galt, Marian Loader, Jennie Marjoribanks, Rosanne Mulder, Rachel Robson and Cathy Wylie for their feedback and helpful comments on earlier drafts of this paper.
NZ TREASURY	<p>New Zealand Treasury PO Box 3724 Wellington 6008 NEW ZEALAND</p> <p>Email information@treasury.govt.nz Telephone 64-4-472 2733 Website www.treasury.govt.nz</p>

Abstract

This paper provides information on the extent of student mobility between schools in New Zealand, measuring mobility rates at both the student and school level. It explores the characteristics of mobile students, the extent to which they become disengaged from school, and their NCEA level 1 achievement rates. It also compares the student turnover rates of different types of schools.

We find that mobile students make up a sizeable sub-group within the set of students who do not achieve NCEA level 1. Analysing data for the 1998 birth cohort, we find that mobile students (defined as those attending five or more schools while aged 8-14 years) represented 9% of all students, but 26% of those who did not achieve NCEA level 1. The association of mobility with poorer attainment means that strategies to raise student achievement must work well for children who change schools frequently, as well as for children with more stable schooling patterns.

At the school level, we find large variations between schools in student turnover rates and in the proportion of students who are frequent movers. Because high student turnover increases a school's workload and costs and the complexity of teaching, it could have implications for the schooling system in areas such as resourcing, learning support and information exchange.

JEL CLASSIFICATION I21

KEY WORDS Transience, mobility, achievement, schools

Executive Summary

This paper provides information on the extent of student mobility between schools in New Zealand, measuring mobility rates at both the student and the school level. The paper focuses particularly on students who change schools at non-standard times and do so relatively frequently.

Moving between schools is not necessarily bad – children can benefit when they move to a different school. But the international evidence indicates that moving schools frequently is correlated with, and likely to be one of the causes of, poorer academic achievement.

Using data from the Integrated Data Infrastructure (IDI), the paper describes the characteristics of students who were more mobile than average, the extent to which they become disengaged from education and their NCEA level 1 achievement rates. It also compares the student turnover rates of different types of schools.

The main purpose of the paper is to provide new information on student mobility that can be used to discuss its practical implications, for the schooling system and for policies to reduce under-achievement.

Measures of non-structural student mobility within a single year, 2015

We begin by measuring non-structural student mobility within a single year, 2015. We count all movements between schools that were not necessitated by the structure of the schooling system.² In 2015, around 10% of students made at least one non-structural movement to a new school. Within this group, around 5% changed schools at the start of the schooling year, and 6% moved to a new school at least once during the schooling year.³

The comparable figures for Māori⁴ students were higher than the national averages. Nearly 15% of Māori students made at least one non-structural movement to a new school during 2015. Younger students (years 1-6) had higher non-structural mobility rates than older students. Students at low decile schools had substantially higher mobility rates than those at high decile schools.

Annual measures of non-structural student mobility were calculated for each year from 2008 through to 2015. These show that in aggregate, student mobility rates were flat or declining slightly during this period, aside from an upward spike in 2011 that was probably caused by population movements following the Canterbury earthquakes.

Measures of student mobility over a 10-year period

A longer-term perspective is needed to understand the cumulative impact of changing schools repeatedly. We examined the 10-year school mobility patterns of all children who were born in 2000, focusing on the period from their 5th to their 15th birthday.⁵ About 13% of students in this birth cohort attended 5 or more schools, and 2% attended 8 or more

² We use data on domestic students at all New Zealand schools, including private schools.

³ The two sub-groups overlap, with about 1% changing schools at the start of the year and also moving later in the year.

⁴ The 'Māori' group includes all individuals with Māori as one of their ethnicities, alone or in combination with other ethnicities.

⁵ We focus on the 2000 birth cohort initially because the data on enrolments within IDI is most comprehensive for this cohort.

schools. We used these thresholds to define 'mobile' and 'very mobile' students within this birth cohort.

Among Māori students who were born in 2000, about 25% attended 5 or more schools and 5% attended 8 or more schools.

Reflecting higher mobility within the Māori population, students who were more mobile than average during their first 10 years of schooling were disproportionately likely to be Māori. Nearly 45% of the students who attended 5 or more schools and 61% of the students who attended 8 or more schools were born in 2000 were Māori, compared with 23% of the birth cohort as a whole.

Characteristics of students with higher mobility rates

High mobility is associated with lower socio-economic status. Our analysis of IDI data showed that children with the following characteristics were more likely than average to attend a large number of schools:

- Those born to younger mothers
- Those whose mothers had limited educational qualifications
- Those who were living in private or social rented accommodation
- Those who were supported by a parent's benefit for some of their childhood
- Those who came to the notice of CYF's care and protection services, through a notification, confirmed finding, or care and protection placement
- Those whose mothers and/or fathers had long periods of non-employment
- Those whose mothers and/or fathers worked for a large number of different employers
- Those whose mothers and/or fathers had relatively low annual earned incomes.

Student mobility is associated with lower school retention and higher disengagement

To explore the relationships between school mobility, disengagement, retention and NCEA achievement, we studied the cohort of children who were born in 1998.⁶ For this cohort, high mobility was defined as attending 5 or more schools while aged 8-14 years, and 9% of students were in the 'high mobility' subgroup.

These 'high mobility' students were much more likely to leave school early and much more likely to have truancy, stand-downs and suspensions recorded. While 2.6% of all students left school before 16 years, 10.6% of the most mobile students did so. While 9% of all students had an episode of truancy recorded in the national data before their 15th birthday, 43% of the most mobile students did so.

⁶ Studying the 1998 birth cohort means that we have data on NCEA level 1 achievement as well as data on the schools attended from age 8 onwards. We restricted the study population to students who were living in New Zealand for most of their schooling history.

Student mobility is associated with lower NCEA attainment

The NCEA level 1 achievement rates of the most mobile children were substantially lower than those of children with more stable schooling histories.⁷

The average NCEA level 1 attainment rate for all students in the 1998 birth cohort was 85%. By number of schools attended, the achievement rates were:

- 90% for students who attended 1-3 schools while aged 8-14 years (79% of the total),
- 78% for students who attended 4 schools while aged 8-14 years (12% of the total) and
- 57% for students who attended 5 or more schools while aged 8-14 years (9% of the total).

Within the latter ‘high mobility’ group, students who remained in school at least until their 17th birthday and had no truancy or disciplinary action recorded did substantially better on average than students who left early or became disengaged. Whether or not mobility is accompanied by disengagement from learning appears to shape its impact on student outcomes.

Is changing schools frequently one of the main causes of lower achievement?

Very mobile students tend to come from lower income households and have a range of other characteristics that are also associated with a higher risk of not completing NCEA. Teasing out the causal impact of changing schools frequently is not a simple matter.

We ran regression models to estimate the effect of attending multiple schools on the likelihood of achieving NCEA level 1, controlling for the influence of a large number of other personal, family and school characteristics. In the results obtained, changing schools frequently continued to be associated with higher risk of non-achievement, even when a large number of other measured factors were controlled for. This is consistent with there being a causal effect, but it does not prove that there is one, because other factors that we do not have information about could also be playing a role.

The key message of this paper is that the strong association between mobility and poorer achievement has practical implications, regardless of whether or not student mobility is one of the main causes of lower achievement. This is because mobile students make up a substantial sub-group within the set of children who do not complete NCEA level 1. Within the 1998 birth cohort, for example, the most mobile students (those attending 5 or more schools at ages 8–14) made up 9% of all students, but 26% of the students who did not complete NCEA Level 1. Similarly, the most mobile Māori students made up 18% of all Māori students but 35% of those who did not complete NCEA Level 1.

The implication is that policies and programmes that are intended to improve student engagement and academic achievement need to work well in a context where some of the students with greatest need are changing schools frequently. This poses some practical challenges for the way educational assistance is delivered.

⁷ We focused on NCEA level 1 and not level 2 because the data for level 2 were not yet complete.

Challenges of high student turnover for schools

Schools with high student turnover are likely to face additional teaching and student support demands, as well as additional administration costs. Teachers in these schools need to assess, support and develop learning plans for a greater number of students than would be the case if the school roll was more stable, increasing their teaching workload. Schools with high turnover rates also tend to have higher numbers of ‘frequent movers’ on their rolls – students who are more likely to have gaps in their learning, and may need additional support for other reasons.

We calculated school-level measures of student turnover in 2015 for all schools with at least 20 students⁸. Consistent with the measures used internationally, we counted student departures from schools at non-standard times as well as enrolments at non-standard times when calculating measures of total student turnover.

The schools in our sample had a total turnover rate of 32.2% on average (or 25.4% when weighted by each school’s relative size). The proportion of a school’s students who were ‘frequent movers’ was 11.5% on average (or 9.5% when weighted by each school’s relative size).

There were wide variations across schools in total turnover rates and in the proportion of students who were frequent movers. On average, small schools had higher student turnover rates than larger schools, and primary schools had higher turnover than secondary.

Decile 1 primary schools had student turnover rates that were more than two times higher than those of decile 10 primary schools, on average (51.5% compared with 22.8%). In addition, students who were ‘frequent movers’ made up around 20% of the total student roll in an average decile 1 primary school, compared with just 4% of the student roll in an average decile 10 primary school.

Implications of student mobility

Student mobility poses a number of challenges for the schooling system. For example, it has been suggested in the literature that:

- schools are better able to integrate newly-enrolling mobile students if the flow of information from school to school on students and their learning progress is fast and effective
- the systems that provide additional learning support to the students who need additional assistance must be flexible enough to ensure that children who change schools frequently get the assistance they need, without too much delay
- student turnover imposes significant costs on schools, and therefore schools with higher than average rates of student turnover may need additional resources.

The best way to respond to these challenges requires further discussion.

⁸ Only continuing schools were included in these figures, and not schools that were opening or closing. Special schools and the Correspondence School were excluded. Private schools were included.

Table of Contents

Abstract	ii
Executive Summary	iii
1. Introduction	1
2. Literature review	3
2.1 International research on mobility and student outcomes	3
2.2 New Zealand research.....	4
3. Methods	7
3.1 Editing the enrolment spells data.....	7
3.2 Measures of student mobility	8
3.3 Information on students' characteristics and living circumstances	9
3.4 Identification of children's parents or caregivers	9
4. Student mobility	11
4.1 Student mobility within a single year.....	11
4.2 Student mobility over a 10-year period	17
4.3 Characteristics of students who were mobile between ages 5 and 15.....	19
5. Student mobility, disengagement and achievement	25
5.1 Mobility data for students in the 1998 birth cohort.....	25
5.2 Disengagement and retention rates of mobile students in the 1998 birth cohort	26
5.3 NCEA achievement rates of mobile students in the 1998 birth cohort	27
5.4 Estimating the effects of school mobility on NCEA attainment using regression models	29
6. School-level measures of student turnover	35
6.1 Measures of student turnover	35
6.2 Factors that are associated with higher student turnover.....	40
7. Issues raised by student mobility	42
8. Further research	44
References	45
Appendix	46

List of Tables

Table 1 – Records in our cleaned enrolment dataset compared with the official school rolls	8
Table 2 – Sources of parental or caregiver data	10
Table 3 – Student mobility statistics, 2015.....	12
Table 4 – Number of schools attended by the 15 th birthday, 2000 birth cohort	18
Table 5 – Mobility rates of students with different characteristics and statistical profile of mobile students, 2000 birth cohort.....	19
Table 6 – Rates of truancy, suspensions and stand-downs for all students and mobile students in the 2000 birth cohort.....	23
Table 7 – Measures of disengagement and retention for students in the 1998 birth cohort.....	26
Table 8 – NCEA level 1 achievement rates for students in the 1998 birth cohort	28
Table 9 – Marginal effects from logistic regressions modelling NCEA level 1 non-attainment, using the number of schools attended but no other controls	31
Table 10 – Marginal effects from logistic regressions modelling NCEA level 1 non-attainment, using the number of schools attended and a full set of other controls.....	31
Table 11 – Measures of student turnover for schools in 2015	36
Table 12 – Measures of student turnover by school type, 2015	38
Table 13 – Measures of student turnover for primary schools, by size of school, 2015	38
Table 14 – Measures of student turnover for primary and secondary schools, by decile, 2015.....	39
Table 15 – Regression of student and school characteristics on turnover rate	41
Table 16 – Student mobility rates by parental characteristics, and parental characteristics of mobile and very mobile students, 2000 birth cohort	46
Table 17 – Marginal effects from the full regression models of NCEA level 1 non-achievement.....	49

List of Figures

Figure 1 – Percentage of students making a non-standard move to a new school in 2015, by level and school decile	15
Figure 2 – Student mobility rates through time	16
Figure 3 – Number of schools attended by the 15 th birthday, 2000 birth cohort	18
Figure 4 – Truancy rates of all students and mobile students, 2000 birth cohort	22
Figure 5 – NCEA level 1 attainment rates of students in 1998 birth cohort by number of schools attended at ages 8-14 years	27
Figure 6 – Distribution of schools by their total turnover rates, 2015.....	37
Figure 7 – Relationship between turnover rate and size of school, primary schools only, 2015	39
Figure 8 – Correlation between turnover rates in 2014 and 2015, at school level.....	41

Student Mobility Across Schools and its Links to Under-achievement

1. Introduction

This paper uses national administrative data to document the numbers and characteristics of children who change schools frequently, and to explore the relationship between high mobility and NCEA achievement.

Moving between schools is not necessarily bad – children can benefit when they move to a different school. But the international literature on student mobility indicates that children who change schools frequently tend to have poorer schooling outcomes, leaving the schooling system earlier and acquiring fewer secondary school qualifications.

The relationship between mobility and achievement has been investigated in many overseas studies but is less well researched in New Zealand. The main purpose of this paper is to provide new information on the extent of student mobility that can be used to discuss its practical implications.

The paper considers the following questions:

1. What proportion of students change schools frequently and what are their characteristics?
2. How do the mobility patterns of Māori students differ from those of other students?
3. How does high mobility affect students' engagement, retention and NCEA attainment?
4. What types of schools have high levels of student mobility?

The analysis reported in this paper was initially begun to support policy work being undertaken by Treasury and the Ministry of Education on raising Māori educational achievement.⁹ To increase the value of the data analysis, we generated parallel measures of student mobility for both the full student population and the Māori student population. This paper presents and discusses these parallel results for the two populations.

Changing schools frequently has long been identified as potentially detrimental to a child's learning and academic achievement. Some New Zealand research has been undertaken on this issue, mostly using case study methods or small surveys and drawing data from a

⁹ There is a long-standing government policy objective of raising the educational attainment of Māori children and youth.

small number of schools. The development of the Integrated Data Infrastructure (IDI), linking school enrolment data for all schools in New Zealand with data from many other administrative sources, means it is now much easier to study student mobility patterns. IDI also provides a range of information on the characteristics and family backgrounds of the children who move schools frequently, facilitating research on the factors that may influence mobility rates or the relationships between mobility and schooling outcomes.

The measures used in this paper and the interpretations provided build on earlier work by the NZCER researchers Jane Gilbert and Ally Bull (2005, 2007). The scope and focus of the analysis were also influenced by recent work by Lucy Lu and Karen Rickard on student mobility in New South Wales (Lu and Rickard, 2016).

Section 2 provides a literature review. Section 3 discusses our measures of student mobility and the data and study populations that are used in this paper. Section 4 presents results describing student mobility, including measures of movements between schools within a single year, and longitudinal measures of student mobility over 10 years. Section 5 investigates the relationship between student mobility, disengagement and NCEA level 1 achievement. Section 6 presents school-level measures of student turnover and mobility, showing how student turnover varies across different types of school. Section 7 briefly discusses the issues that student mobility poses for the schooling system, and points to some possible implications for other areas of government policy.

2. Literature review

Researchers have noted that students move between schools for a range of different reasons, and the effects of the move may differ according to the reason. Four main categories of move have been distinguished:

- Structural moves – moves that occur because of school system requirements, such as moving from a primary school to an intermediate
- Moves prompted by residential moves by parents or caregivers, which in turn may be prompted by relationship changes, job changes, or changes of housing
- ‘Strategic’ moves that are instigated by parents, seeking better schools or a better match for their children
- Moves prompted by the child’s behaviour, such as a new school enrolment following expulsion.

Although it would be desirable to distinguish between these different types of move, to allow for the fact that some may have positive effects on schooling outcomes and others negative effects, information on the reasons for a change of school is not normally available.

However, the majority of studies that measure student mobility deliberately exclude all ‘structural’ moves (and focus on non-essential movements), or distinguish between structural and non-structural moves. Non-structural moves can be identified as moves that are made before the student reaches and completes the final year of schooling at their current school.

The period of time over which mobility is measured varies. Some studies have measured mobility per student over a school year, while other have measured movements over a child’s schooling history to estimate the cumulative effects of repeated moves (Lu and Rickard, 2016, p8). Different time frames are useful for different purposes.

2.1 International research on mobility and student outcomes

In general, studies of the effects of mobility indicate that frequent school moves can have a significant negative impact on both student retention in upper secondary school and student achievement (Lu and Rickard, p9). The literature gives a number of reasons for this. Students who move during the school year or move repeatedly may miss key curriculum material or learning stages, and then experience difficulty with their lessons. Changing schools disrupts relationships with peers and teachers, which means mobile students may lack social support or lack a sense of belonging. Disruption to the learning process and/or disruption to their social relationships may negatively affect a child’s attitudes to school, in turn reducing their effort or their attendance, or making them more likely to misbehave. While one or two additional school movements will not necessarily impede learning or undermine social integration, changing schools repeatedly is likely to have cumulative negative effects.

A meta-analysis of research carried out in the US (Reynolds, Chen and Herbers, 2009) identified 16 ‘well controlled’ studies that measured non-structural moves, provided

measures of academic achievement (typically reading or mathematics test scores), and included measures of pre-mobility achievement along with other control variables such as socio-economic status. According to this meta-analysis, mobility has a consistent and significant negative impact on achievement, with the effects increasing with the number of moves. The adjusted effect size associated with each additional move was approximately -0.07 to -0.08 of a standard deviation in reading and mathematics achievement. The effect on school drop-out rates was -0.10 of a standard deviation for each additional move (Reynolds, Chen and Herbers, 2009, p 9).

Establishing that there is a causal link from mobility to achievement is complicated by the fact that mobility is known to be strongly correlated with other factors that also influence achievement, such as low income or low socio-economic status, and may also be correlated with a range of unmeasured factors (such as the attitudes of parents towards education or their own health and well-being) that influence a child's attainment but are difficult to control for in statistical studies.

Swartz, Stiefel and Cordes (2015) argue that credible studies need to use empirical methods that address the influence of unobserved student and family characteristics that may influence both the likelihood of moving and student achievement. These researchers use longitudinal data and include student fixed effects in their models to lessen the potential biases due to unobserved and time-invariant differences between movers and non-movers. They also estimate the effects of structural as well as non-structural moves between schools. They find evidence that both structural moves (those built into the schooling system) and non-structural moves (those not required by the schooling system) have modestly-sized negative effects on students' academic progress (p19).

In general, the use of more sophisticated methods to estimate the impacts of movements across schools on children's learning and achievement has led to smaller estimates of the size of the impacts, but has not discredited the idea that causal effects can occur.

2.2 New Zealand research

The published studies of student mobility in New Zealand include work by the New Zealand Council for Educational Research (NZCER) (Gilbert 2005, Bull and Gilbert 2007), Education Review Office (ERO 1997, ERO 2007, Mutch, Rarere and Stratford 2011), and the Ministry of Education (MOE 2015). (See also Wynd 2014). New Zealand researchers have analysed the student mobility patterns of selected schools and gathered information about the causes of mobility, the issues posed by it, and the way schools are responding to those issues.

In the most substantial study of the issue, researchers from the NZCER studied student mobility in 20 schools within four 'case study' communities in 2003 and again in 2006 (Gilbert 2005; Bull and Gilbert 2007). The communities were Waitangirua/Cannons Creek (an urban area in Porirua), Amuri (a rural area in North Canterbury), Opotiki district and the town of Kawerau. The researchers analysed the records of these schools to estimate the proportion of students in three selected years (years 5, 8 and 11) who were frequent movers. They analysed the attendance records and learning progress or achievement records of those students to see if frequent movers had poorer attendance and poorer progress in learning. They also interviewed principals, staff and students to understand the issues posed by mobility for students and schools.

The measures of student mobility focused on non-structural movements between schools: that is, movements that were not required by the schooling system. The mean non-structural student movement rate over three years for the schools studied was 32 percent in the Waitangirua/Cannons Creek schools; 29 percent in the Amuri schools; 45 percent in the Opotiki schools; and 39 percent in the Kawerau schools (2007, p.viii). Thus, a third or more of the student roll in the schools studied was turning over each year at non-standard times. Behind these averages was a wide spread of rates found in individual schools (ibid, p.viii).

Bull and Gilbert found no statistically significant differences in attendance between mobile and non-mobile students in any of the areas. They also found few statistically significant differences in achievement, although there was a consistent pattern of slightly lower performance by mobile students in some areas. Thus, they found little solid evidence that high mobility adversely affects attendance or achievement.

An important caveat to the Bull and Gilbert results is that the number of mobile students for whom reading and mathematics achievement data were obtained was very low, reducing the likelihood that statistically significant differences between the mobile and non-mobile students would be found (see pages 48-52). The results presented show that the mean and median reading and maths achievement scores of the mobile students were consistently lower than those of the non-mobile students, suggesting that a study with larger samples and greater statistical power might have found clearer evidence of a negative association.

It was also clear from the qualitative information gathered in this study that schools were concerned about student mobility and saw it as a significant issue. The researchers interviewed the principals of all the schools in their study and report that:

... all the principals said that frequent moving definitely affects children's educational achievement. Almost all commented that the children are also affected socially—they have a reduced sense of belonging and being part of a stable network of friends and/or a school community. All said that learning was affected. When a child transfers from one school to another in the middle of the school year, there is almost always a delay in assessing them, putting them into an appropriate programme, and arranging any support they might need in their new school. Some said that when a child moves several times, these delays quickly add up, to the point where it is very hard for the child *not* to get behind. Eventually, according to the primary school principals, this impacts on the child's behaviour. (Bull and Gilbert, 2008, p69.)

The research also highlighted the impact of student movements on the workloads of teachers and principals.

Schools with large numbers of students moving in and out have administrative overheads they cannot budget for. (p62)

All the principals in the phase 1 interviews said that frequent movement by students disrupts school programmes and routines. (p62)

At the primary level, the arrival of a new student takes the teacher away from the rest of the class while s/he establishes the learning needs of the newcomer and reorganises instructional groups within the class. (p63)

Issues were also identified regarding the continuity of support services provided for students with special needs. Mobile students who need additional learning support may also be subjected to repeated needs assessments but delayed interventions, if information about them is not passed from one school to the next quickly, or if the funding system does not allow support to be offered promptly to newly-enrolled students.

More recent evidence of school concerns is provided by the NZCER's national survey of primary and intermediate schools (Wylie and Bonnie, 2013). The survey included questions on student mobility and transience. Fifty-six percent of the principals said that student mobility and transience posed issues for their school: 17 percent generally and 39 percent sometimes. Student mobility was reported as being a *general* issue for 43 percent of the decile 1–2 schools, but none of the decile 9–10 schools (ibid, p8).

Comments made by just under half the principals on the issues arising from student mobility and transience were mainly about the additional work for the school, the learning or behaviour challenges students who were highly mobile could bring with them, and the negative impact they could have on the school's achievement results, the need to re-allocate resources to meet these students' needs, and frustration that the work done to meet these students' needs could seem wasted if they moved again. (ibid, p.9)

Turning back to measures of mobility at the student level, a recent short paper by the Ministry of Education (2015) reports statistical measures of transience using national school enrolment data for the 2009-15 period. 'Transience' is defined as being enrolled at 3 or more schools between 1 March and 1 November in a given calendar year. Using this measure, approximately 0.5% of students are transient, and the rate has been relatively stable over the 2009-15 period. The rate is higher for students at low decile schools than at higher decile schools (2.5% for students at decile 1 schools, for example). A table of cumulative movements over the first 6 years of schooling for children who started school in 2010 shows that 15% had attended three or more schools by the end of their 6th year (compared with the norm of one school).

While Bull and Gilbert (2007) is the only published New Zealand study to look at the impact of student mobility on achievement in depth, the Competent Learners study provides some limited evidence of a significant relationship between changing schools frequently and leaving school at an early age (Wylie and Hodgen, 2011). The Competent Learners study tracked the educational progress of a birth cohort of children in Wellington from age 4 to adulthood, conducting repeated interviews with these children and their parents. In their analysis of outcomes during the teenage years, the authors report that the early school leavers within this cohort had attended a much higher number of schools by age 14 than their counterparts who remained at school for longer. Nearly 40% of the early school leavers had attended four or more schools by age 14, compared with 21% of the later school leavers (ibid, p.23).

3. Methods

3.1 Editing the enrolment spells data

The school enrolment spell data in IDI contain a number of anomalies that must be dealt with before student mobility rates can be calculated. For example, there are records that appear to be duplicates (because they have the same student and school IDs and dates). Some records overlap with another record for the same child, so that the child appears to be enrolled at more than one school at the same time (which is not permitted). Our approach was as follows:

- Duplicate enrolment records were deleted.
- Students with complex enrolment histories, involving more than 6 months of overlaps in total, were dropped from the sample. About 750 students were excluded over the entire period from 2005 to 2016. These cases may reflect mistakes in identity matching (for example, two people being associated with the same identity number) or serious errors in the enrolment records.
- Other, shorter overlaps in a child's enrolment spells were eliminated by: (a) dropping any short spells that started after the start another spell and finished before the end of that first spell, and (b) setting the end of the first spell to the day before the start of the second spell.
- Short breaks between two successive enrolment spells at the same school, when a child left a school but re-enrolled within 90 days without enrolling at a different school in the interim period, were eliminated. The 90 day threshold allows for situations in which the child left earlier than usual at the end of a calendar year or enrolled later than usual at the start of a year. If they returned to the same school in less than 90 days, we make their enrolment spell continuous. If they were away for more than 90 days, the second spell is counted as a new school enrolment. In the latter situation, it is possible that the child attended a school in another country in the intervening period.
- Enrolment spells lasting for less than 5 days were deleted.

The purpose of these steps was to create a consistent enrolment record history for each child, consisting of a non-overlapping series of records, with one (and only one) record for each new school that was attended.

Other methods of 'cleaning' the enrolment spell data could lead to results that are slightly different from those reported in this paper. We have explored the effects of variations in cleaning methods and found that although they affect the final numbers slightly, they do not seem to change the substantive findings.

Table 1 gives the number of current domestic student enrolments in our 'cleaned' dataset as at 1 July of each year, and compares them with the Ministry of Education's published enrolment statistics. The figures exclude international students and home schooled students. Our dataset coverage is only 59% in 2005 and 85% in 2006, years when the national enrolment data capture system was still being implemented. From 2007 onwards it is close to 100%, but slightly lower than the published figures.

Table 1 – Records in our cleaned enrolment dataset compared with the official school rolls

Year	Dataset used in this paper	Published school roll statistics	Ratio (%)
2005	439,299	751,500	58.5
2006	630,246	741,100	85.0
2007	736,107	749,700	98.2
2008	741,177	748,300	99.0
2009	746,094	751,300	99.3
2010	749,736	754,700	99.3
2011	748,146	752,800	99.4
2012	741,186	751,000	98.7
2013	749,886	753,100	99.6
2014	753,552	757,800	99.4
2015	763,227	766,900	99.5

Notes: The figures shown are the number of domestic students as at 1 July of each year, excluding students in home schooling. The numbers in the first column are randomly rounded.

3.2 Measures of student mobility

We use measures used by the NZCER in its research on mobility in 20 New Zealand schools (Bull and Gilbert, 2007), and more recently, by the Department for Education in New South Wales (Lu and Rickard, 2016).

The standard approach is to measure school movements *excluding* those that are caused by normal movements through the schooling system (where a child who has completed all levels offered by one school moves to another school offering higher levels). We use this approach in our student mobility and school-level student mobility measures for 2015 and other recent years. We use the entry year level variable, which is filled in at the start of the enrolment, along with the school type, to decide if a new enrolment coincides with the normal entry year for that school or not. The ‘entry year level’ field was often left empty in enrolment records starting before 2008, but has a low missing rate for enrolments starting from 2008 onwards.

We also distinguish between new enrolments coinciding with the start of the year (defined as those starting before 1 March) and new enrolments involving a delayed start (defined as those starting from 1 March onwards). The latter are likely to be more disruptive to teaching programmes. Note that we don’t include children who are enrolling at school for the first time in year 0 or year 1 in the measure of ‘delayed starts’, because it is standard practice for 5 year olds to start school part way through the year. Nor do we include children who moved schools because of closures or mergers of their previous schools.

When measuring the school mobility of children over their full schooling histories, we use a simpler approach and simply count the total number of schools attended. This is because the ‘entry year level’ variable isn’t complete enough to be useful before 2008. We analyse the enrolments of children who were born in 2000 between their 5th and 15th birthdays, and define these children as ‘mobile’ if they attended 5 or more schools, and ‘very mobile’ if they attended 8 or more schools.

Note that this approach treats children who have attended different types of primary school (contributing, full, area/composite) somewhat inconsistently. For example a child who went to a composite school, which provides education for all years, will tend to have fewer changes of school than one who attended a contributing primary, intermediate and secondary. We decided that the benefits of simplicity in the measure outweighed the cost of this inconsistency.

If a child moves from one school to another and later moves back again, both moves are counted. In other words, we are measuring movements rather than the number of unique schools that were attended. Our cumulative life-time counts will also include any movements that were caused by school closures and mergers. However, it is unlikely than any child would be affected by a school closure or merger more than once during their schooling history, as closures and mergers are relatively rare.

3.3 Information on students' characteristics and living circumstances

We use a variety of sources of administrative data to build up an in-depth picture of the characteristics of the children in the 1998 and 2000 birth cohorts. (These cohort samples are used for our analysis of long-term mobility patterns and the relationship between mobility and achievement.)

- Gender, birthdate / age and ethnicity were taken from the Ministry of Education's student records.
- Data on school characteristics were taken from the Ministry of Education's data sources.
- Data on residence status was constructed using the birth and visa records in IDI.
- Data on dwelling tenure as at March 2013 was taken from the child's 2013 Census record.
- Data on the child's recent address history and the New Zealand Deprivation Index associated with their residential address at a particular age was taken from the address history records that have been developed within IDI using multiple administrative sources.
- Data on a child's history of benefit receipt (through their parents) or Child, Youth and Family contacts was obtained from the administrative sources that are available within IDI.

3.4 Identification of children's parents or caregivers

To study the relationship between parental characteristics and child mobility, there were two steps: identifying the parents and constructing measures of their characteristics and employment patterns and incomes.

We used linked 2013 Census data wherever possible to identify a child's likely mother and father (or female and male caregivers) when they were about 15 years of age. Parental or caregiver relationships can change over time, and the 2013 census provides the closest available snapshot of those relationships.

Birth records and residence approval records were then used as secondary sources to obtain parent identities for the children who did not have both mother and father identified from the Census. If a parent identity was available from a birth record or residence approval record we used it, regardless of whether or not we have evidence that the child was still living with that adult in 2013 or 2015. Essentially, our goal was to obtain information on a child's family background. If we didn't have data from the 2013 Census on the parent/caregiver at that time, we used the birth certificate parent or residence approval parent as a reasonable substitute. Even if they were not living with the birth or visa approval mother or father at the time of the 2013 Census, they were likely to have been living with them for some period of their childhood, and their school mobility patterns from age 5 to 15 are likely to have been influenced (to some degree at least) by the characteristics and economic activities of that adult.

Even with these additional sources, we lack parent identities for a small fraction of children. Table 2 shows the proportion of students in our 2000 and 1998 cohort samples who have parents/caregivers identified in our dataset, and where the identities were sourced from.

Table 2 – Sources of parental or caregiver data

Source	1998 cohort sample		2000 cohort sample	
	Mothers	Fathers	Mothers	Fathers
Census 2013	79.8	63.1	80.0	64.0
Birth records	18.6	30.3	15.7	26.7
Residence approval records	0.6	0.8	1.7	2.0
Missing	1.0	5.8	2.6	7.2
Total	100.0	100.0	100.0	100.0

The mother's identity was available from the Census for about 80% of children, and for most of the rest, we used their birth mother as a proxy for their current mother/ female caregiver. The father's identity was available from the Census for about two-thirds of students, and for another 25-30%, we used their birth father as a proxy for their current father / male caregiver.

There are several reasons why parental data were not always available from the 2013 Census. The child or their parents may not have been resident in New Zealand at the time of the 2013 Census; they did not fill in Census forms; or the details provided on the Census forms were not complete and accurate enough to allow a link to be made to other data sources.

4. Student mobility

We begin by presenting measures of the frequency of student mobility within a single year, 2015, in Section 4.1. These can be compared with statistics recently generated for New South Wales.¹⁰ It is also possible to generate a time series of annual mobility statistics and consider whether the rates are rising.

In Sections 4.2 – 4.3, we adopt a longer-term perspective and look at the number of schools a child attends over a 10-year period. Using these longer-term mobility measures, we describe the personal and family characteristics of the students who changed schools more frequently than normal. We also summarise the available data on their engagement or disengagement.

4.1 Student mobility within a single year

The following results are for all students who were enrolled as domestic students during 2015, who were aged 4-19 years on 1 January 2015, and have administrative records that are linked to other data in IDI. There are approximately 814,600 students in total in this sample.¹¹

Table 3 shows that 10.3% of students made at least one non-structural movement to a new school during 2015.¹² Within this group, 4.9% moved to a new school at the beginning of the year, but started at a non-standard year level (ie higher than the normal entry level for that school). Six percent moved to a new school after the start of the schooling year (ie from 1 March onwards).¹³ Of the latter group, the majority (5.3%) only moved once during the year, 0.5% moved twice and 0.1% moved three or more times.

The comparable movement rates for Māori students were higher. 14.7% made at least one non-structural movement to a new school during 2015. 6.4% moved to a new school at the beginning of the year, but started at a non-standard grade level. 9.4% started at a new school during the year (from 1 March onwards). Of the latter group, the majority (8.0%) only moved once during the year, 1.2% moved twice and 0.3% moved three or more times.¹⁴

Our estimate of the percentage of students who changed school twice or more during the year (0.54%) is similar to, but slightly higher than, the figure of 0.49% reported by the Ministry of Education (2015) in a note on student transience. The most likely reason our number is slightly higher is that we count students who enrolled at a new school in November or December, while they do not.

¹⁰ We focus on New South Wales rather than Australia as a whole because of the availability of comparable measures.

¹¹ This is higher than the number who were enrolled at a particular point in time, because it includes students who were enrolled for only part of the year. On 1 July 2015, the dataset contains around 763,200 domestic student enrolments, which is similar to the figure reported by the Ministry of Education for this date. Note that we are using a 'cleaned' enrolment dataset as described above in the methods section

¹² As discussed in the methods sections above, structural movements are those that are required by the structure of the schooling system. Non-structural changes of school are non-essential movements

¹³ Some students made both types of move, and therefore the total of 4.9 and 6.0 adds to more than 10.3%

¹⁴ Note that these figures include children who arrived from overseas to start school in New Zealand and children who re-enrolled after a gap in their school enrolment history of more than 90 days, as well as children who moved directly from one New Zealand school to another

Table 3 – Student mobility statistics, 2015

	Percent of students in each category	All students						Māori students					
		At least one non-structural move	Enrolled at a non-standard level	Moved school during the year	Moved school during the year			At least one non-structural move	Enrolled at a non-standard level	Moved school during the year	Moved school during the year		
					1 move during the year	2 moves during the year	3+ moves during the year				1 move during the year	2 moves during the year	3+ moves during the year
%	%	%	%	%	%	%	%	%	%	%	%	%	%
All students	100.0	10.3	4.9	6.0	5.3	0.5	0.1	14.7	6.4	9.4	8.0	1.2	0.3
Gender													
Male	51.1	10.0	4.6	5.8	5.2	0.5	0.1	14.3	6.2	9.3	7.8	1.2	0.3
Female	48.9	10.6	5.1	6.1	5.4	0.6	0.1	15.1	6.7	9.6	8.2	1.2	0.2
Ethnic groups													
European	62.5	8.2	4.1	4.4	4.1	0.3	0.0	11.6	5.3	7.0	6.1	0.8	0.1
Māori	23.3	14.7	6.4	9.4	8.0	1.2	0.3	14.7	6.4	9.4	8.0	1.2	0.3
Pacific	12.0	12.3	6.0	7.0	6.1	0.7	0.1	14.5	6.4	9.2	7.7	1.2	0.3
Asian	11.4	10.7	4.7	6.2	5.9	0.3	0.0	12.0	6.3	6.7	5.6	1.0	0.3
Level													
Year 1	8.1	4.5	4.5	4.5	4.0	0.4	0.1	7.6	7.6	7.6	6.3	1.0	0.3
Year 2	8.3	13.8	5.6	9.1	7.9	1.0	0.2	18.8	7.5	13.2	10.7	2.0	0.5
Year 3	8.3	13.4	5.9	8.3	7.2	0.9	0.2	17.8	7.7	11.9	9.7	1.8	0.4
Year 4	8.0	12.5	5.6	7.6	6.7	0.8	0.1	16.9	7.5	11.1	9.1	1.6	0.4
Year 5	7.6	12.0	5.5	7.2	6.3	0.7	0.1	15.9	7.4	10.1	8.3	1.5	0.3
Year 6	7.3	10.8	5.2	6.2	5.6	0.6	0.1	14.7	7.1	9.1	7.8	1.1	0.3
Year 7	9.2	8.7	4.1	4.9	4.4	0.4	0.0	10.4	3.9	7.1	6.0	0.9	0.2
Year 8	7.3	8.5	4.5	4.5	4.0	0.4	0.1	12.9	6.8	7.4	6.2	1.0	0.2
Year 9	7.3	11.5	6.6	5.2	4.7	0.5	0.1	15.2	6.9	9.0	7.7	1.2	0.2

	Percent of students in each category	All students						Māori students					
		At least one non-structural move	Enrolled at a non-standard level	Moved school during the year	Moved school during the year			At least one non-structural move	Enrolled at a non-standard level	Moved school during the year	Moved school during the year		
					1 move during the year	2 moves during the year	3+ moves during the year				1 move during the year	2 moves during the year	3+ moves during the year
%	%	%	%	%	%	%	%	%	%	%	%	%	%
Year 10	7.3	10.6	5.1	6.2	5.6	0.5	0.1	17.2	7.8	10.9	9.5	1.2	0.2
Year 11	7.3	10.7	6.4	4.8	4.4	0.4	0.0	16.3	8.4	9.2	8.1	1.0	0.1
Year 12	6.7	8.7	5.1	3.9	3.7	0.2	0.0	13.9	7.7	6.9	6.3	0.5	0.1
Year 13	5.8	9.0	5.0	4.2	4.1	0.1	s	15.4	7.8	8.1	7.8	0.3	s
Schooling level													
Primary / Intermediate	58.7	10.3	4.2	6.6	5.9	0.7	0.1	14.3	5.8	9.8	8.1	1.4	0.3
Secondary	33.5	9.1	5.1	4.3	4.0	0.3	0.0	13.9	7.0	7.7	6.8	0.8	0.1
Composite and other	5.7	15.3	10.5	5.5	4.9	0.5	0.1	17.8	10.0	9.1	7.9	1.1	0.2
Urban or rural (primary and composite schools only)													
Main urban	41.3	10.6	5.0	6.1	5.4	0.6	0.1	14.3	6.3	9.4	7.7	1.4	0.3
Secondary urban	3.4	11.0	4.6	7.2	6.4	0.7	0.1	14.8	5.7	10.4	8.7	1.3	0.4
Minor urban	5.8	12.5	5.3	8.0	6.9	0.9	0.2	15.7	6.9	10.2	8.3	1.5	0.4
Rural	7.3	13.5	5.5	8.9	7.7	1.0	0.2	18.3	7.8	12.1	10.3	1.5	0.4
Kura Kaupapa Māori schools													
Full primary, not KKM	22.9	11.3	5.0	6.9	6.1	0.7	0.1	15.8	6.7	10.6	8.8	1.4	0.4
Full primary, KKM	0.2	14.7	7.8	8.3	6.9	1.1	s	14.5	7.7	8.2	6.8	1.1	s
Composite (1-15), not KKM	5.0	15.3	10.7	5.2	4.6	0.5	0.1	19.7	11.0	10.2	8.7	1.4	0.2
Composite (1-15), KKM	0.7	15.2	8.6	7.7	6.8	0.8	0.2	15.1	8.5	7.5	6.7	0.8	0.2

	Percent of students in each category %	All students						Māori students						
		At least one non-structural move %	Enrolled at a non-standard level %	Moved school during the year %	Moved school during the year			At least one non-structural move %	Enrolled at a non-standard level %	Moved school during the year %	Moved school during the year			
					1 move during the year %	2 moves during the year %	3+ moves during the year %				1 move during the year %	2 moves during the year %	3+ moves during the year %	
School decile														
Decile 1	7.9	16.2	7.3	10.3	8.5	1.5	0.3	18.8	8.2	12.6	10.1	2.1	0.5	
Decile 2	7.1	14.0	6.0	9.1	7.8	1.1	0.2	16.6	6.9	11.2	9.3	1.6	0.3	
Decile 3	8.1	12.4	5.2	8.0	7.1	0.8	0.2	14.4	6.1	9.4	8.0	1.1	0.2	
Decile 4	8.8	10.7	4.8	6.5	5.8	0.6	0.1	13.9	6.4	8.5	7.3	1.0	0.2	
Decile 5	8.8	9.5	4.0	6.0	5.4	0.5	0.1	13.0	5.4	8.6	7.4	1.0	0.2	
Decile 6	9.6	9.5	4.5	5.4	4.9	0.5	0.1	11.9	5.6	7.2	6.2	0.8	0.2	
Decile 7	10.8	8.4	3.9	4.8	4.5	0.3	0.0	11.8	5.1	7.3	6.6	0.7	0.1	
Decile 8	11.3	7.2	3.5	4.0	3.7	0.3	0.0	10.1	4.8	6.0	5.2	0.7	0.1	
Decile 9	12.0	7.9	4.4	3.7	3.5	0.2	0.0	11.5	5.9	6.3	5.6	0.5	0.2	
Decile 10	13.3	8.9	5.4	3.6	3.4	0.2	0.0	11.4	7.0	5.0	4.5	0.5	s	

Notes: Each ethnic group is counted separately, and therefore the percentages in each group sum to more than 100%. The 'European', 'Pacific' and 'Asian' rows in the results for Māori students capture students who were members of these ethnic groups as well as Māori. The schooling level, urban vs rural, Kura Kaupapa Māori and school decile breakdowns classify students on the basis of the first school they were enrolled in during 2015.

Other results in Table 3 show mobility rates by gender and ethnic group (counting all people who identified with each ethnic group). Female students moved slightly more often than male, and European students moved less often than Māori, Pacific and Asian students.

The proportion of students making non-structural movements was highest at year 2 (with 13.8% making a non-structural move). It declined across subsequent levels of school, and was lowest at years 7 and 8, and also relatively low at upper secondary school.

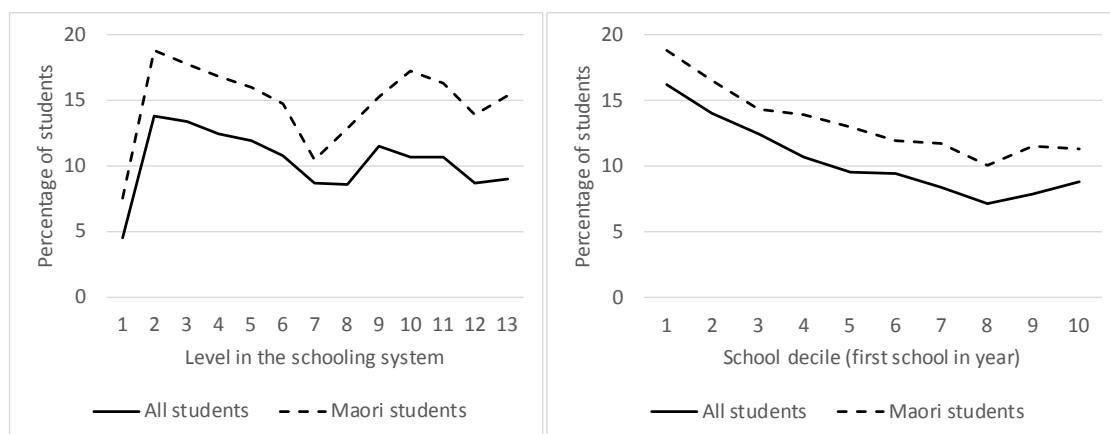
The fact that the student mobility rates were lower at years 7 and 8 than in the prior or latter years is probably because structural movements between schools (which are not counted in the table) are more common during this stage of childhood, with many children moving to intermediate schools at year 7 and then on to secondary schools at year 9. There is likely to be a partial trade-off whereby structural moves reduce the need for non-structural moves.

Turning to differences by location, we find that students who attended primary or composite schools in minor urban or rural areas moved more often than students who attended these types of schools in urban areas, although the differences are not very large. This ‘location’ comparison is restricted to students at primary and composite schools because very few intermediate or secondary schools are situated in rural areas.

Māori students who were enrolled at Kura Kaukapa Māori (KKM) schools had somewhat lower mobility rates than Māori students who were enrolled at the same type of school but not in a KKM school. The mobility rate for Māori students in KKM composite schools (covering years 1-15) was 15.1%, but 19.7% for Māori students in non-KKM composite schools. There was a smaller difference between Māori students in KKM primary schools and non-KKM primary schools, of only 1.3 percentage points.

Finally, there is a strong relationship between a child’s school decile (in this case, the decile of their first school in 2015) and their mobility rates, particularly over the lower and middle deciles. Mobility rates were highest for students in decile 1 schools (16.2%) and lowest for students in schools at decile 7–10 (which had mobility rates of 7-9%). For Māori students, mobility rates varied from 18.8% for students in decile 1 schools to 10-11% for students in schools at deciles 8–10.

Figure 1 – Percentage of students making a non-standard move to a new school in 2015, by level and school decile



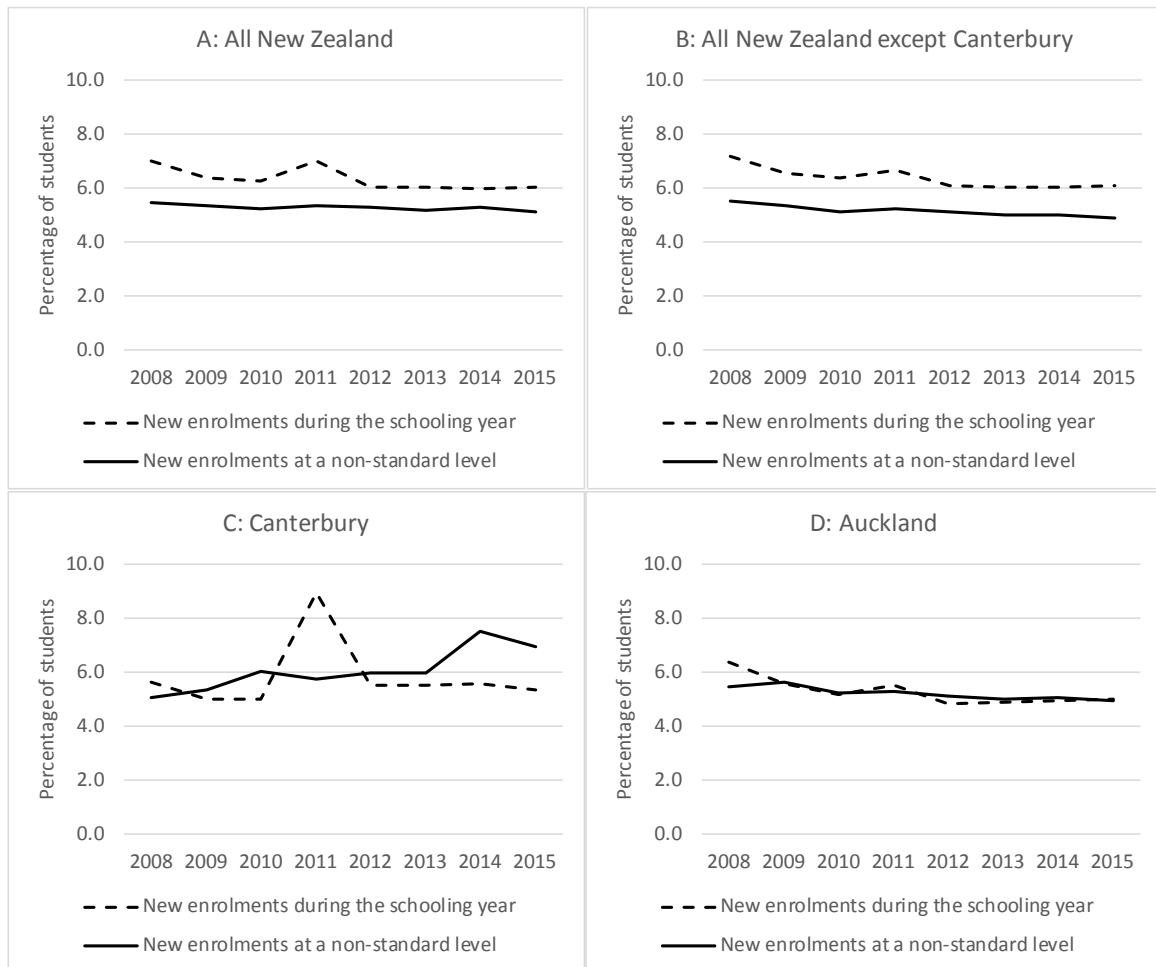
Comparisons with other countries

We can compare these NZ figures for 2015 with the results for students at schools in New South Wales (NSW), Australia, that are reported in Lu and Rickard (2016, page 15). Lu and Rickard calculate that 7% of all students in state schools in NSW made one or more non-structural movement in 2014. Of these, 45% were made at the start of the school year.

By comparison, we estimate that 10.3% of New Zealand students made one or more non-structural movement in 2015. Of these, 47% were moves made at the start of the school year. Comparing the New Zealand student mobility measures by year of schooling with the results presented in Lu and Rickard, it appears that we have higher student mobility in years 1-6 in particular.

The fact that the New Zealand estimate is higher than the NSW estimate could be partly because our measures of mobility are more comprehensive. Lu and Rickard note that they have not been able to count movements between government sector and private schools, or movements between schools in different states (p15). It is unclear whether their figures include the enrolments and withdrawals of international migrants (which are included in our figures). If the measures were fully comparable the difference between New Zealand and NSW might be smaller.

Figure 2 – Student mobility rates through time



Time trends

We constructed annual measures of student mobility for each year from 2008 through to 2015 for all New Zealand; all regions excluding Canterbury; Canterbury and Auckland. The results are shown in Figure 2.

Panel 2A, for all New Zealand, indicates that annual student mobility rates were declining in 2008-10 but since 2010 have been fairly flat, apart from a temporary increase in 2011, which was probably due to school closures and population movements following the Canterbury earthquakes. Panel 2B, showing student mobility rates for schools in all regions except Canterbury, shows similar patterns but a smaller spike in 2011 (reflecting, perhaps, the enrolment of students who migrated from Canterbury to other regions). Panel 2C gives results for schools in Canterbury and shows larger movements.

Panel 2D, giving results for schools in the Auckland region, indicates that student mobility rates in that region have been fairly constant since 2012. The shortage of affordable housing in Auckland in recent years could have led to higher housing mobility on the part of families living in rental accommodation and in turn, higher student mobility between schools. These results suggest that either there is no such effect, or there are other offsetting factors (such as demographic trends) that are working to reduce the student mobility rates of schools in Auckland and offsetting the effects of the housing market.

4.2 Student mobility over a 10-year period

We now consider school mobility patterns over a child's years of compulsory schooling. For this purpose, we select all children who were born in 2000. Because the time period covered by the school enrolment data does not yet support an 11-year longitudinal analysis (ie from the 5th to the 16th birthday), we focus on the period from the 5th birthday (during 2005) to the 15th birthday (during 2015). We count the number of schools that each child was enrolled in during this 10-year period.

We include within this study population all children born in 2000 who attended a New Zealand school in 2015¹⁵. Some of these children were born overseas, but the mobility history data only include their New Zealand school enrolments. In addition, because the school enrolment records held in IDI are not fully comprehensive until 2008, the school attendance figures reported in this section of the paper are likely to be a little lower than the true numbers.¹⁶

Table 4 and Figure 3 show the distribution of the number of schools attended (from age 5 to the end of age 14) for all students and Māori students. The modal number of schools attended was 3, and most students attended 2, 3 or 4 schools.

About 13% of students attended 5 or more schools, and just under 2% attended 8 or more schools. We use these thresholds to define 'mobile' and 'very mobile' students in the rest of this section. Among Māori students, about 25% attended 5 or more schools and 5% attended 8 or more schools.

¹⁵ As a domestic student. They also had to be linked to other data in IDI.

¹⁶ By comparing our enrolment numbers as at 1 July with the published Ministry of Education figures, we estimate that the enrolment spell coverage of our dataset was about 58% in 2005, 85% in 2006 and 98% in 2007.

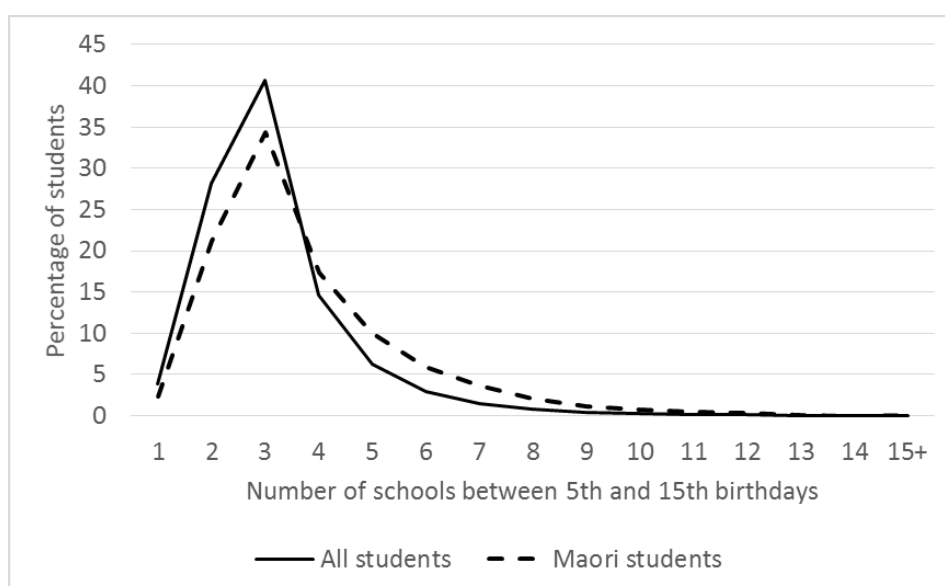
The students who were more mobile than average during their first 10 years of schooling were disproportionately Māori. Nearly 45% of 'mobile' students and 61% of 'very mobile' students were Māori, compared with approximately 23% of all students in this birth cohort.

Table 4 – Number of schools attended by the 15th birthday, 2000 birth cohort

Number of schools	All students	% all students	Māori students	% Māori students
1	2,271	3.9	318	2.4
2	16,563	28.2	2,829	21.1
3	23,856	40.6	4,596	34.4
4	8,610	14.7	2,325	17.4
5	3,648	6.2	1,338	10.0
6	1,743	3.0	792	5.9
7	882	1.5	483	3.6
8	474	0.8	282	2.1
9	261	0.4	153	1.1
10	168	0.3	108	0.8
11	117	0.2	72	0.5
12	69	0.1	48	0.4
13	27	0.0	15	0.1
14	9	0.0	0	0.0
15+	30	0.1	18	0.1
Total	58,728	100.0	13,377	100.0
Mobile: 5 or more	7,428	12.6	3,312	24.8
Very mobile: 8 or more	1,155	2.0	696	5.2
Percent of mobile students who were Māori		44.6		
Percent of very mobile students who were Māori		60.8		

Notes: The numbers of students have been randomly rounded.

Figure 3 – Number of schools attended by the 15th birthday, 2000 birth cohort



4.3 Characteristics of students who were mobile between ages 5 and 15

We describe the characteristics of mobile students and their families in this section, using the available data on the child's demographic characteristics and their parents' employment history, earnings and income, history of benefit receipt, criminal history, and contact with Child Youth and Family. In addition, we describe the association between mobility and disengagement, using data on rates of truancy, suspensions and standdowns.

4.3.1 Student characteristics and experiences

We start with data on student characteristics in Table 5. In the left-hand side of Table 5, we show the proportion of students with a particular characteristic (eg, boy or girl) who were mobile or very mobile. On the right-hand side, we show the proportion of students that fell into each sub-group.

Table 5 – Mobility rates of students with different characteristics and statistical profile of mobile students, 2000 birth cohort

	Mobility rates				Profiles of all students and mobile students			
	% students who were mobile: 5+ schools	% students who were very mobile: 8+ schools	% Māori students who were mobile: 5+ schools	% Māori students who were very mobile: 8+ schools	% of all students in each group	% of mobile students in each group	% of very mobile students in each group	% of mobile Māori students in each group
All students	12.6	2.0	24.8	5.2	100.0	100.0	100.0	100.0
Gender								
Male	12.4	2.0	23.6	5.2	51.3	50.4	51.2	49.0
Female	12.9	2.0	25.9	5.3	48.7	49.6	48.8	50.9
Ethnic groups*								
European	9.7	1.2	18.5	3.2	62.8	47.9	39.7	18.8
Māori	24.8	5.2	24.8	5.2	22.8	44.6	60.8	100.0
Pacific	16.6	2.3	28.2	5.4	11.5	15.1	13.8	9.5
Asian	6.3	0.1	21.6	s	10.8	5.4	0.8	0.7
Tenure of dwelling in 2013								
Missing	15.1	2.8	32.3	8.2	29.2	34.9	41.6	38.9
Owned	5.9	0.6	11.2	1.8	42.0	19.6	11.9	13.0
Private rental	19.1	2.9	27.5	5.0	23.0	34.8	34.0	34.1
Social rental	23.2	4.1	32.2	6.9	5.8	10.7	12.2	13.8
Proportion of childhood with benefit income								
None	5.4	0.5	10.6	2.1	53.3	22.5	12.7	10.9
1-10%	10.5	0.8	14.5	1.2	12.0	10.0	4.7	6.6
11-25%	15.7	1.8	20.5	2.7	7.9	9.8	7.3	8.1
26-50%	20.8	3.0	26.3	4.1	10.1	16.6	15.3	17.3
50-75%	29.3	5.6	36.0	7.7	7.1	16.4	20.0	20.4
75+%	32.4	8.1	39.0	10.9	9.6	24.7	39.7	36.6

	Mobility rates				Profiles of all students and mobile students			
	% students who were mobile: 5+ schools	% students who were very mobile: 8+ schools	% Māori students who were mobile: 5+ schools	% Māori students who were very mobile: 8+ schools	% of all students in each group	% of mobile students in each group	% of very mobile students in each group	% of mobile Māori students in each group
CYF care and protection notification								
No	7.9	0.7	14.7	1.8	80.4	50.2	27.5	37.3
Yes	32.2	7.2	41.5	10.9	19.6	49.8	72.2	62.6
CYF care and protection finding								
No	10.0	1.1	18.8	3.1	91.0	71.6	52.7	61.3
Yes	40.0	10.4	49.4	14.2	9.0	28.4	47.3	38.7
CYF care and protection placement								
No	11.7	1.6	22.8	4.4	97.7	90.6	81.3	87.1
Yes	51.7	16.0	59.2	19.7	2.3	9.4	18.7	12.8
N students	7,428	1,155	3,312	699	58,728	7,428	1,155	3,312

Notes: *multiple ethnic groups can be counted for each individual. The 'European', 'Pacific' and 'Asian' rows in the results for Māori students capture students who were members of these ethnic groups as well as Māori. Students' mobility is measured over the 10 years from their 5th to their 15th birthday. The tenure of dwelling data are from the 2013 Census. The benefit and CYF data are from MSD's administrative records. The numbers of students have been randomly rounded.

Looking at the left hand side of the table, we can see that student mobility rates are similar for males and females but higher for Māori and Pacific students than for European or Asian students.¹⁷ Note that the data allow each individual belong to multiple ethnic groups, so the proportions in the 5th column of the table add to more than 100. The entries for 'European', 'Pacific' and 'Asian' in the 3rd, 4th and final columns are for students who were members of these ethnic groups as well as the 'Māori' category.

Children who were living in a privately-owned dwelling at the time of the 2013 census were much less likely to be mobile than children living in a rented dwelling. Around 23% of children were known to be living in private rental accommodation,¹⁸ and 19% of these were mobile and 3% very mobile over the 10 year period (compared with 5.9% and 0.6% of the children in owned dwellings).

Children who were supported by a benefit for at least some of their childhood also had much higher school mobility rates than children who were never supported by a benefit. About 46% of these children were (ever) supported by a parent's or caregiver's benefit before their 15th birthday. Of those who were supported by a benefit for at least 50% of the time, more than 30% were mobile and more than 6% were very mobile.

¹⁷ Note, though, Asian students are more likely than the other ethnic groups to be migrants and therefore may have incomplete schooling histories in New Zealand.

¹⁸ Note this is an underestimate of the true proportion living in rental housing due to the incomplete coverage of the 2013 census data for our study sample.

The same is true of children who came to the notice of CYF's care and protection services, and had a notification, confirmed finding, or care and protection placement. The proportion who were mobile across schools was particularly high among the 1.8% of children who experienced a care and protection placement, with 51% mobile and 16% very mobile.

The data in the right-hand columns show the percentages of all students, mobile students, very mobile students and mobile Māori students with the different characteristics. As noted above, nearly 45% of 'mobile' students and 61% of 'very mobile' students were Māori, compared with approximately 23% of all students. However, students of Pacific ethnicities were only slightly over-represented in the 'mobile' and 'very mobile' groups.

The results also show that the vast majority of both mobile and very mobile students were supported by a benefit for some of their childhood. Half of the mobile students and 72% of the very mobile students had been the subject of at least one CYF care and protection notification by their 15th birthday (compared with around 20% of all students in this birth cohort).

4.3.2 Parent characteristics and experiences

Table 16 in the Appendix provides data on *parents'* characteristics, labour market activity and incomes for children with different school mobility patterns. It is organised in a similar way. As for Table 5, the left-hand side of the table gives the mobility rates of children with different parental characteristics, while the right-hand side of the table gives the percentages of students, mobile students and very mobile students that had different parental characteristics. We are not attempting to 'explain' mobility or identify its causes, but simply to describe the family backgrounds of mobile students.

Students whose mother was relatively young had higher mobility rates. For example, 38% the children whose mother was aged 18-19 at their birth were mobile (ie they attended 5 or more schools), compared with 12.6% of the total. It seems likely that younger mothers change addresses more often than older mothers, causing their children to have higher school mobility.¹⁹ There is also a relationship (but a weaker one) between student mobility and the educational attainment of the mother, showing higher mobility among children whose mother had low qualifications than those whose mother was more highly educated.

Children whose parents had prior convictions were more likely to be mobile. Nearly half of the 'mobile' and more than half of the 'very mobile' students had a father with at least one prior conviction (as shown in columns 6 and 7). A relatively high proportion of their mothers also had prior convictions.

Parents' employment patterns are likely to be one of the causes of mobility. We calculated the proportion of time that each parent was in waged or salaried employment during the 10 years when the reference child was aged 5-14; their total number of employers during this period; and their average annual earnings from wage and salaried employment and/or self-employment. These results can also be found in Table 14 in the Appendix.

Children whose parents worked for a relatively high number of employers (and presumably, moved more often to start new jobs) were more likely to be mobile or very mobile than children whose parents had relatively few employers. For example, 31% of

¹⁹ This age pattern in mobility is true of adults in general.

the children whose mother worked for 10 or more employers were mobile, and 8% were very mobile.

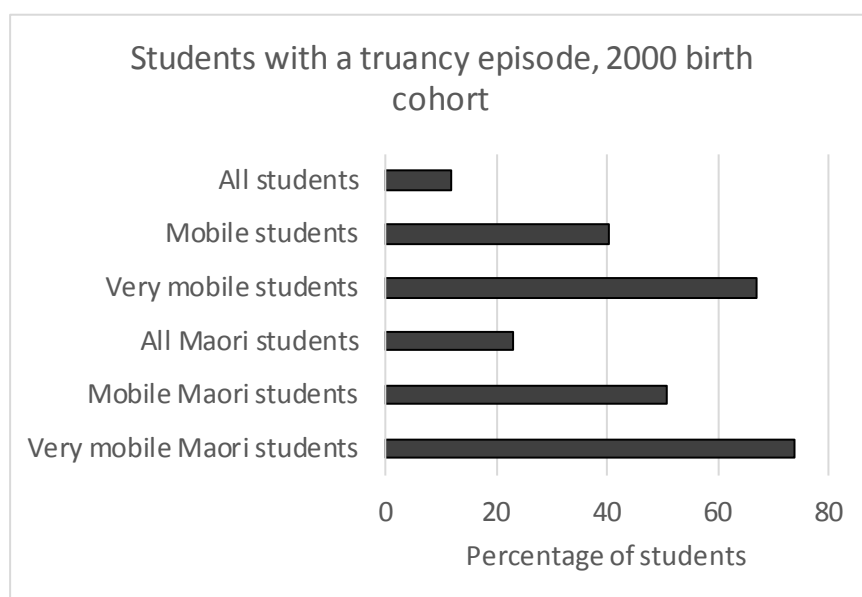
At the same time, children whose parents weren't employed for a high proportion of the 10-year period also had higher rates of school mobility than children whose parents were regularly employed, indicating that there are other factors at work, such as the association between low incomes and frequent changes of residence.

School mobility rates were also substantially higher for children whose parents had low incomes from employment or self-employment than for those whose parents had higher incomes. For example, 23% of students whose mother's average annual income from employment was under \$5000 were mobile, compared with 4.2% of students whose mother's earnings were in the top income band of \$100,000 plus.

4.3.3 Student mobility and disengagement

In Table 6 and Figure 4 we turn to the issue of disengagement and look at the relationship between children's school mobility and their truancy or misbehaviour at school. We have data on the number and timing of recorded truancy episodes, stand-downs and suspensions, allowing us to calculate the child's age at their first recorded truancy, stand-down or suspension.²⁰

Figure 4 – Truancy rates of all students and mobile students, 2000 birth cohort



There is a fairly strong correlation between frequent changes of school and disengagement. Nearly twelve percent of students in this cohort had at least one recorded truancy episode by their 15th birthday, but this was much higher among mobile children (40.2%) and among very mobile children (66.8%). If we consider suspensions and stand-downs as well as truancy, around 17% of all students had at least one of these indicators

²⁰ These measures are imperfect indicators of whether or not a child attends school regularly and whether they behave well. There have been significant changes in the coverage of the truancy data over time, but because we are considering children who were all born in the same year, they were exposed to the changes in data collection practices at approximately the same time. Note that we were not able to identify exclusions at the time the analysis was done

of 'disengagement' recorded before their 15th birthday, but 50% of the mobile students and 75% of the very mobile students did so.

Table 6 – Rates of truancy, suspensions and stand-downs for all students and mobile students in the 2000 birth cohort

		All students %	Mobile students: : 5+ schools at ages 5-14 %	Very mobile students: 8+ schools at ages 5-14 %	All Māori students %	Mobile Māori students: 5+ schools at ages 5-14 %	Very mobile Māori students: 8+ schools at ages 5-14 %
First truancy at...	Ages 5-9	2.8	10.8	20.5	5.0	13.1	22.7
	Ages 10-12	2.8	9.9	18.4	5.2	12.4	20.5
	Ages 13-14	6.2	19.5	28.2	12.6	25.2	31.0
	None before 15th birthday	88.2	60.2	34.5	77.1	49.7	27.9
First stand-down or suspension at...	Ages 5-9	1.2	4.3	8.2	2.6	5.5	9.6
	Ages 10-12	2.6	8.3	15.8	6.2	11.8	17.9
	Ages 13-14	4.9	11.7	16.1	10.2	15.5	18.3
	None before 15th birthday	91.2	76.1	60.8	80.9	67.4	56.3
Any truancy by 15 th birthday		11.7	40.2	66.8	22.8	50.7	73.8
Any truancy, stand-down or suspension by 15 th birthday		17.3	49.8	75.3	33.0	61.3	81.7
None before 15th birthday		82.7	50.2	24.5	67.0	38.7	18.3
All		100.0	100.0	100.0	100.0	100.0	100.0
% of students with truancy recorded who were mobile or very mobile			43.2	11.1		54.8	16.6
% of students with any indicator of disengagement who were mobile or very mobile			36.2	8.4		45.7	12.7
N Students		58,728	7,428	1,155	13,377	3,312	696

Notes: The numbers of students have been randomly rounded. Note that there have been changes in the coverage of the truancy data over time, but the children in our single-year birth cohort were exposed to the changes in data collection practices at approximately the same time.

The figures are similar but higher among Māori students. For example, 23% of Māori students had at least one recorded truancy episode by their 15th birthday. The proportions were 51% among mobile children and 74% among very mobile children.

The final rows of the table provide information on the overlap between mobility and disengagement viewed from the other direction, asking what proportion of all students who had a truancy episode or any misbehaviour recorded were mobile. We calculate that 43% of the students who had a least one truancy episode recorded before their 15th

birthday, and 36% of those with any indicator of disengagement recorded, were mobile students.

Among Māori students, 55% of the group that had at least one truancy episode were mobile students, and 46% of those with any disengagement recorded were mobile students.

Although changing schools frequently is likely to be one of the causes of disengagement, disengagement could also lead to higher school mobility. This could happen, for example, if a misbehaving student is asked to leave a school or is excluded from it, or decides to leave because they do not feel included or fairly treated within their school. Another possibility is that both disengagement and high mobility are jointly caused by a combination of other factors, such as family poverty, unsupportive parents or negative peer influences. The effects of these factors are likely to accumulate over time.

5. Student mobility, disengagement and achievement

In this section we consider the impacts that changing schools frequently may have on students' NCEA achievement.

To explore the relationship between mobility and academic achievement, we need to move to a different population sample, comprising all children who were born in 1998. This is because the children in the 2000 birth cohort are too young to have a full set of NCEA outcomes recorded in the administrative data (even for level 1).

The children who were born in 1998 turned 17 during 2015, and by the end of 2015, they had largely completed their NCEA level 1 attainment. The data show that most of the children in this birth cohort completed the NCEA level 1 qualification in either 2013 or 2014, with a much smaller number of additional completions (7.7% of students) being added in 2015.²¹

To ensure that the administrative records for each individual are complete (or very close to complete), we exclude those who were away from New Zealand for two or more years in total when aged 5-16, those who were away from NZ for 3 months or more when aged 14-16 inclusive (the age range when most children are acquiring NCEA level 1 credits), those with no record of attendance at a New Zealand secondary school, and those who attended secondary schools that offer non-NCEA qualifications. The latter qualifications are not currently recorded in IDI. These exclusions reduce the size of the analytical sample from around 60,000 to around 45,800 children.

5.1 Mobility data for students in the 1998 birth cohort

To measure the mobility of students in the 1998 birth cohort, we focus on the total number of schools attended at ages 8-14. We don't include schools attended at ages 5-7 in our mobility measure because the enrolment data covering the period when these children were aged 5-7 are incomplete in IDI. We choose not to count schools attended at age 15 because early departures from school are increasingly common at this age, and leaving school early is one of the outcomes of interest.

Attending three schools while aged 8-14 is the norm for children who attend separate primary, intermediate and secondary schools. Those who attend full primary schools (covering years 1-8) would normally attend two schools in this age range while those who are enrolled in a composite school could potentially attend a single school only.

In our 1998 cohort sample, 79% of students attended 1-3 schools while they were aged 8-14, 12% attended 4 schools, and just under 9% attended 5 or more schools (note these figures are shown in the bottom row of Table 7). Considering Māori students, 65% attended 1-3 schools, 16% attended 4 schools and 18% attended 5 or more schools.

In this part of the research we focus mainly on the most mobile group: the 9% of students who attended at least 5 schools while aged 8-14 years.

²¹ The NCEA level 1 attainment rate for this birth cohort may rise a little further in 2016 and subsequent years, but the completion rate by the end of 2015 is close enough to the final completion rate to be useful for research purposes.

5.2 Disengagement and retention rates of mobile students in the 1998 birth cohort

Mobile students in the 1998 birth cohort were more likely than other students to leave school early²² and were more likely to have truancy, stand-downs and suspensions recorded, indicating disengagement with school. Table 7 gives the results.

Table 7 – Measures of disengagement and retention for students in the 1998 birth cohort

	All students				Māori students			
	Number schools attended at ages 8-14				Number schools attended at ages 8-14			
	1-3 %	4 %	5+ %	All %	1-3 %	4 %	5+ %	All %
Left school before 16	1.5	4.0	10.6	2.6	3.5	6.9	14.4	6.1
Left school at 16	9.4	18.1	28.8	12.2	15.2	24.1	32.2	19.8
Left school at 17+	89.1	77.8	60.6	85.2	81.3	69.0	53.4	74.2
Truancy before 15th birthday	4.3	18.1	43.1	9.4	7.9	25.0	53.1	18.9
No truancy before 15th birthday	95.7	82.0	56.8	90.6	92.1	75.2	46.9	81.1
Stand-down or suspension before 15th birthday	1.9	7.0	16.7	3.8	4.8	11.3	21.3	8.9
No stand-down or suspension	98.1	93.0	83.3	96.2	95.2	88.5	78.7	91.1
Left school before 16	1.5	4.0	10.6	2.6	3.5	6.9	14.4	6.1
Left school at 16, has indicator of disengagement	1.4	7.2	17.2	3.5	3.6	12.1	21.9	8.3
Left school at 16, no indicator of disengagement	8.0	11.0	11.6	8.7	11.7	12.1	10.3	11.5
Left school at 17, has indicator of disengagement	3.9	13.0	24.2	6.8	6.5	15.1	26.7	11.7
Left school at 17, no indicator of disengagement	85.2	64.9	36.4	78.4	74.7	53.8	26.6	62.5
N students	36,189	5,505	4,059	45,753	7,614	1,908	2,124	11,646
% of students	79.1	12.0	8.9	100.0	65.4	16.4	18.2	100.0

Notes: The numbers of students have been randomly rounded.

Just 2.6% of all students left school before 16 years; 12% left school at 16; and 85% left school at 17 or above. The early leaving rates were much higher among the most mobile students, with 10.6% leaving school before 16 years, and 29% leaving at 16.

Nine percent of all students in this sample had an episode of truancy recorded in the national data before their 15th birthday, but this was 43% among the mobile students. Four

²² When calculating age at leaving school, we disregard individuals who left within two months of their birthday, to allow for the fact that children who reach 16 during the summer holidays do not need to return to school the following year.

percent of students had a suspension or stand-down recorded, but 16.7% of the mobile students did so.

The lower section of Table 7 shows different combinations of leaving school early and disengagement. The final row shows that 78% of all students stayed at school until they were at least 17 and had none of these indicators of disengagement recorded before they were 15 years of age. Among the ‘mobile’ students (ie the 9% of students who attended 5 or more schools), only 36% were in this position.

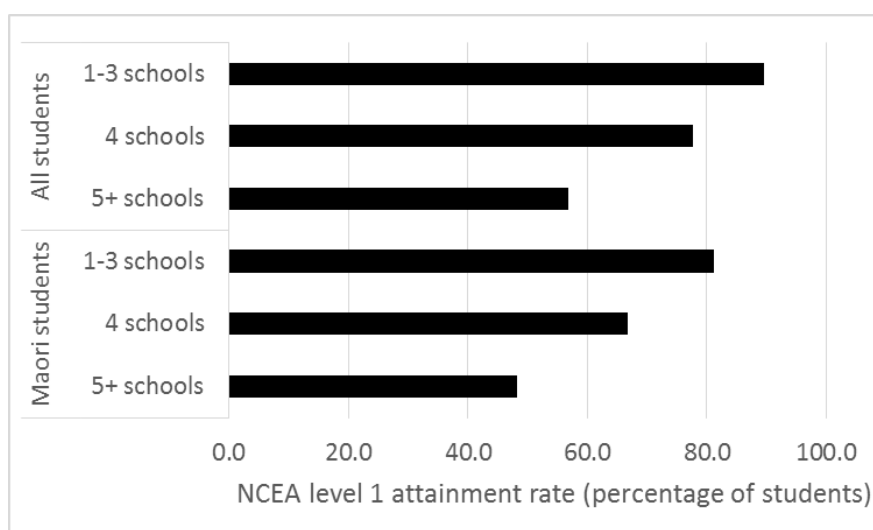
The results for Māori students, shown in the right-hand columns of Table 7, are broadly similar, although the numbers are higher. 14% of mobile Māori students left school before 16 and 32% at 16 years. While 63% of Māori students stayed at school until they were at least 17 and had none of these indicators of disengagement before 15 years of age, among the mobile students, only 27% were in this position.

5.3 NCEA achievement rates of mobile students in the 1998 birth cohort

The NCEA level 1 achievement rates of students in this birth cohort are summarised in Table 8 and Figure 5.

The first row of the table shows that NCEA level 1 attainment rates are much lower for students who attended a greater number of schools while aged 8-14 than for those with more stable enrolment histories. The average NCEA level 1 attainment rate for this sample is 85.2%.²³ The achievement rates are 87.8% for students who attended 1-3 schools, 77.6% for those who attended 4 schools, and 56.9% for those who attended 5 or more schools.

Figure 5 – NCEA level 1 attainment rates of students in 1998 birth cohort by number of schools attended at ages 8-14 years



The remaining rows of the table show the NCEA level 1 attainment rates for students grouped by their school leaving age and ‘disengagement’ indicators, if any.

²³ Ministry of Education statistics report that 88% of school leavers in 2015 had completed NCEA level 1. Note that our study population is restricted to those who were born in a single year and excludes some individuals, as discussed above, leading to a slightly different average achievement rate.

Across all groups, it is universally the case that the mobile students had lower levels of attainment than those with more stable schooling histories. Typically, their achievement rates are 10-15 percentage points lower than those of students who only attended 1-3 schools.

But the differences in attainment rates are larger if we compare across school retention and disengagement sub-groups than when we compare students with different levels of mobility. Focusing on the most mobile students, we can see that those who stayed at school until 17 and did not have any truancy or disciplinary actions recorded before their 15th birthday had an average NCEA level 1 attainment rate of 85.4% – only 10 percentage points below the attainment rate of the students who attended only 1-3 schools (94.9%). The attainment rates of those who left school early or became disengaged are far lower. For example, the achievement rate for those who left school at 16 was 33%, and the achievement rate for those with an episode of truancy before their 15th birthday was 40%.

Table 8 – NCEA level 1 achievement rates for students in the 1998 birth cohort

	All students Number schools attended at ages 8-14				Māori students Number schools attended at ages 8-14			
	1-3 %	4 %	5+ %	All %	1-3 %	4 %	5+ %	All %
Total	89.5	77.6	56.9	85.2	81.2	66.8	48.3	72.9
Left school before 16	16.4	17.6	11.9	14.8	20.2	18.2	13.7	17.0
Left school at 16	55.9	42.0	33.4	48.7	44.2	34.0	27.2	37.0
Left school at 17+	94.3	89.0	75.9	92.6	90.8	83.4	70.4	87.0
Truancy before 15th birthday	63.4	55.1	40.0	51.9	52.2	44.0	35.4	42.0
No truancy before 15th birthday	90.7	82.5	69.8	88.6	83.7	74.3	63.0	80.1
Stand-down or suspension before 15th birthday	51.5	38.0	25.2	38.5	48.4	36.1	24.5	35.1
No stand-down or suspension	90.3	80.6	63.3	87.1	82.9	71.0	54.9	76.6
Left school before 16	16.4	17.6	11.9	14.8	20.2	18.2	13.7	17.0
Left school at 16, has indicator of disengagement	30.8	25.8	23.2	26.4	28.6	22.1	19.4	22.7
Left school at 16, no indicator of disengagement	60.3	53.2	48.4	57.9	49.0	45.5	42.5	47.2
Left school at 17, has indicator of disengagement	80.5	75.7	61.5	73.3	75.9	68.8	59.8	67.3
Left school at 17, no indicator of disengagement	94.9	91.7	85.4	94.2	92.1	87.4	81.9	90.7
N students	36,189	5,505	4,059	45,753	7,614	1,908	2,124	11,646
% of students in each column	79.1	12.0	8.9	100.0	65.4	16.4	18.2	100.0
% of non-achieving students in each column	56.0	18.2	25.8	100.0	45.3	20.0	34.8	100.0

Notes: The numbers of students have been randomly rounded.

The patterns are similar for Māori students. The average NCEA level 1 attainment rate for the Māori students in the sample was 73%. When we compare children who differed in their school mobility at ages 8-14, the attainment rate varies from 81% (1-3 schools while aged 8-14) down to 48% (5 or more schools).

Māori students who do not have any recorded truancy, stand-downs or suspensions have relatively high attainment rates, even if they were mobile at ages 8-14. Among the most mobile Māori students, the attainment rates range from 14% (for the 14% who left before their 16th birthday) to 82% (for the 27% of who stayed at school until at least 17 years and had no truancy or disengagement recorded).

The final two rows of the table show the distribution of students across the three mobility-level categories and the distribution of *non-achieving* students across the same categories, so that the two can be compared. While just under 9% of all students were in the highest mobility category (attending 5 or more schools at ages 8-14), nearly 26% of the students who did not achieve NCEA level 1 were in this category. Similarly, 18% of all Māori students attended 5 or more schools at ages 8-14 (the highest mobility category), but nearly 35% of the Māori students who did not achieve NCEA level 1 did so.

The evidence presented here suggests that the effect of changing schools frequently on attainment is at least partly mediated by other factors, and particularly whether or not the child becomes disengaged from learning. High mobility is one of the potential causes of disengagement from learning and therefore poor achievement in upper secondary school, but low disengagement and lower achievement are not inevitable. A sizeable minority of students in the mobile group were not disengaged in school to the extent that they were truanting or had stand-downs or suspensions, and had relatively good NCEA level 1 outcomes. The literature on both student disengagement and under-achievement indicates that both are complex processes and have multiple causes.

5.4 Estimating the effects of school mobility on NCEA attainment using regression models

Mobile students tend to come from lower income households and have a range of other characteristics that are associated with a higher risk of not completing NCEA. Teasing out the causal impact of changing schools frequently on NCEA achievement is not a simple matter.

We ran regression models to estimate the effect of attending multiple schools on the likelihood of achieving NCEA level 1, controlling for the influence of a large number of other personal, family and school characteristics. Because we are relying on cross-sectional regressions without any strategy to control for the effects of unmeasured characteristics or events, we can't claim that we have correctly identified the size of the causal effect of mobility. Nevertheless, the following evidence does suggest that the correlation between the number of schools attended and the probability of NCEA level 1 attainment can't be easily dismissed as simply a by-product of differences in socio-economic status between mobile and non-mobile children. It also provides insights into the factors that are most strongly associated with non-achievement, within the set of factors we have data about.

Using our 1998 birth cohort sample, we model the likelihood of NCEA level 1 attainment (a dichotomous variable) using logistic regressions. To represent the number of schools attended, we use dummy variables indicating attendance at 1, 2, 3, 4, 5 and 6 or more

schools at ages 8-14 years. We include the following control variables for personal, family and school characteristics:

- Gender
- Each main ethnic group (European, Māori, Pacific, Asian, other ethnic group)
- Migrant category (permanent resident, temporary resident, other)
- Country of birth (grouped into 11 regions)
- Whether more than 10% of childhood was spent overseas (however, note we have already excluded from the sample anyone who was overseas for more than two years during their period of compulsory schooling)
- NZ Deprivation Index score associated with the child's residential address at their 15th birthday
- Whether additional funding for learning support was received at school at ages 5-14. This funding includes the Ongoing Resourcing Scheme and is provided for a small percentage of children who have severe barriers to learning.
- The proportion of time at ages 0-14 that the child was supported by the benefit of a parent or caregiver
- CYF care and protection notification at ages 0-14
- CYF care and protection finding of abuse or neglect at ages 0-14
- CYF care and protection placement at ages 0-14
- CYF youth justice referral at ages 13-14
- CYF youth justice placement at ages 13-14
- Mother's / father's highest qualification (from the 2013 Census)
- Mother's age when she gave birth to the reference child
- Whether mother / father has had convictions or served a Department of Corrections sentence
- Mother's / father's number of employers during the decade that the reference child was aged 5-14 years
- Mother's / father's proportion of time in employment during the decade that the reference child was aged 5-14 years
- Mother's / father's average annual income from employment during the decade that the reference child was aged 5-14 years
- Mother's / father's average annual income from benefits during the decade that the reference child was aged 5-14 years
- Measures of the type of school the child was enrolled in at their 9th, 12 and 15th birthdays (for example, full primary, contributing primary, composite school, intermediate, or special school)
- Measures of the decile of the school the child was enrolled in at their 9th, 12 and 15th birthdays
- A measure of the student turnover rate of the school the child was enrolled in at their 15th birthday (in 2013, the year these children turned 15).

We begin by showing the estimated marginal effects of number of schools attended from a model without controls for anything else, in Table 9. These numbers essentially show the ‘unadjusted’ differences in NCEA level 1 non-attainment rates between children who attended different numbers of schools. Positive effects indicate a higher likelihood of non-attainment and negative effects a lower likelihood. Attending two schools is the baseline omitted category. Students who attended one school only at ages 8-14 (a very small group) had an estimated 7.7 percentage point higher likelihood of not achieving NCEA level 1 than those who attended two schools. Students who attended 3 or more schools also had slightly higher or substantially higher likelihoods of non-achievement compared with the base category, ranging from 2.8 percentage points (for those who attended 3 schools) up to 28.1 percentage points (for 6 or more schools).

In Table 10, we show the estimated marginal effects of the number of schools attended after adding the full set of control variables (listed above). These marginal effects are now much smaller. Students who attended one school only (that is, a composite school) are estimated to have a 2.6 percentage point higher likelihood of non-attainment than students who attended two schools. The estimated marginal effects of attending 4, 5, and 6+ schools on the likelihood of non-achievement are 6.1, 8.5 and 10.5 percentage points respectively.

Table 9 – Marginal effects from logistic regressions modelling NCEA level 1 non-attainment, using the number of schools attended but no other controls

Selected results	All students				Māori students			
	% of students	Marg. effect	Std. error	Sig.	% of students	Marg. effect	Std. error	Sig.
1 school	2.6	0.077	0.011	*	2.3	0.124	0.026	*
2 schools (ref. cat.)	31.5				24.0			
3 schools	45.0	0.028	0.004	*	39.0	0.036	0.011	*
4 schools	12.0	0.131	0.005	*	16.4	0.164	0.012	*
5 schools	4.7	0.205	0.006	*	8.4	0.257	0.014	*
6 or more schools	4.2	0.281	0.006	*	9.8	0.343	0.013	*

Notes: See notes for Table 10.

Table 10 – Marginal effects from logistic regressions modelling NCEA level 1 non-attainment, using the number of schools attended and a full set of other controls

Selected results	All students				Māori students			
	% of students	Marg. effect	Std. error	Sig.	% of students	Marg. effect	Std. error	Sig.
N. schools attended at ages 8 to 14								
1 school	2.6	0.026	0.012	*	2.3	0.018	0.034	
2 schools (ref. cat.)	31.5				24.0			
3 schools	45.0	0.025	0.005	*	39.0	0.026	0.012	*
4 schools	12.0	0.061	0.005	*	16.4	0.092	0.013	*
5 schools	4.7	0.085	0.006	*	8.4	0.134	0.015	*
6 or more schools	4.2	0.105	0.006	*	9.8	0.164	0.014	*

Selected results	All students				Māori students			
	% of students	Marg. effect	Std. error	Sig.	% of students	Marg. effect	Std. error	Sig.
Turnover rate of school attended at 15th birthday								
0-<10%	3.6	-0.068	0.016	*	1.1	-0.081	0.066	
10-<20%	25.4	-0.023	0.005	*	12.6	-0.039	0.017	*
20-<30% (ref. cat.)	30.8				23.9			
30-<40%	18.0	0.017	0.004	*	20.6	0.024	0.012	*
40-<50%	8.4	0.012	0.006	*	12.7	0.002	0.015	
50-<60%	6.4	0.029	0.006	*	11.9	0.038	0.015	*
60-<70%	2.0	0.030	0.009	*	4.3	0.030	0.021	
70-<80%	2.2	0.031	0.008	*	5.5	0.039	0.019	*
80-<90%	0.6	0.080	0.013	*	1.9	0.094	0.027	*
90-<100%	0.2	0.021	0.021		0.7	0.038	0.040	
100%+	0.9	0.007	0.012		2.3	0.004	0.026	

Notes: The dependent variable in the underlying regressions was 1 for not achieving and 0 for achieving. Therefore positive marginal effects represent a higher likelihood of non-achievement, compared with the base category, while negative marginal effects indicate a lower likelihood. The regression models also included controls for school decile at the 9th, 12th and 15th birthdays; the type of school that was attended at the 9th, 12th and 15th birthdays, and gender, ethnic group, immigration status, country of birth, the NZ Deprivation Index of the neighbourhood lived in at age 15, tenure of dwelling at the time of the 2013 Census, proportion of time overseas during childhood, proportion of time supported by benefits during childhood, CYF care and protection notifications, findings and placements, youth justice referrals, whether a recipient of additional learning support, mother's age at birth; and measure of the mother and fathers' justice sector history, highest qualification, number of employers in the past 10 years, months of waged employment in the past 10 years, average annual earnings in the past 10 years, and average annual benefit income in the past 10 years.

We also show the marginal effects associated with the student turnover rate of the school attended at the student's 15th birthday in Table 10. These results indicate that students who were attending schools with low student turnover rates had substantially lower non-achievement likelihoods than the reference case (of 20-30 percent turnover), while students at schools with higher turnover rates had higher likelihoods of not attaining NCEA level 1 themselves. Whether these apparently negative effects of high student turnover at the level of the school capture a true causal effect, or simply the effects of other correlated school characteristics, is something that could be investigated in future research.

The full set of marginal effects from the regressions behind the results in Table 10 are set out in Table 17 in the Appendix.

We find significant effects for the following variables:

Student characteristics and experiences

- Gender – female students are estimated to have a lower likelihood of non-attainment than males.
- Ethnic group – Māori students have a slightly higher likelihood of non-attainment than European students, and Pacific students a slightly lower likelihood, although these effects are very small at 2 percentage points. Asian students also have a lower likelihood of non-attainment than European students.

- Proportion of time overseas during childhood – is negatively associated with non-attainment, indicating that students who were overseas for part of their schooling were slightly less likely to be non-achievers.
- CYF care and protection notifications, findings and placements – are all associated with positive effects on the likelihood of non-attainment
- CYF youth justice referral – associated with a large increase in the likelihood of non-attainment
- Whether any additional learning support funding was received at ages 5 to 14 – this is associated with a large increase in the likelihood of non-attainment.

Parental and family characteristics

- New Zealand Deprivation Index score associated with the residential address at 15 years – low deprivation neighbourhoods are associated with a lower risk on non-attainment while high deprivation neighbourhoods are associated with a higher risk of non-attainment.
- Tenure of the dwelling in 2013 – living in rental housing is associated with a higher risk of non-attainment.
- The proportion of time the child was supported by a parent's benefits during childhood – which is associated with positive effects on the likelihood of non-attainment
- Mother's and father's highest qualification – lower parental qualifications are associated with a higher risk of non-attainment.
- Mother's and father's annual earned income during the past decade – lower parental incomes are associated with a higher risk of non-attainment.
- Mother's benefit income during the past decade – higher benefit income is associated with a higher risk of non-attainment.

School characteristics

- The decile of the schools attended. Compared with the omitted decile 5 category, students at lower decile schools have a higher estimated likelihood of non-achievement and the opposite is true of students at higher decile schools.
- The type of school attended. Students at special schools are estimated to have a significantly higher likelihood of non-achievement.
- The student turnover rate of the school attended at age 15. Students at high turnover schools are estimated to have a higher likelihood of non-achievement than students at schools with lower turnover.

We can conclude from these results that the true causal effect of attending multiple schools on NCEA level 1 achievement is likely to be much smaller than the unadjusted differences in NCEA level 1 attainment rates between students attending different numbers of schools – but it could still be large enough to have a material impact on attainment. The marginal effects we have estimated imply that students who attended 4, 5, and 6+ schools while aged 8–14 years were 6.1, 8.5 and 10.5 percentage points more likely to leave school without NCEA level 1, than a student who only attended two schools.

Our estimates of the marginal effects of multiple school attendance could be confounded by unmeasured factors, so we don't claim to have presented definitive evidence of the size of these effects. However, these results do seem to indicate that the association between the number of schools attended and attainment can't be easily dismissed as simply a by-product of differences in students' socio-economic status.

The international research evidence also supports the hypothesis that changing schools frequently can impede learning and lead to lower achievement (see Section 2 above).

6. School-level measures of student turnover

Schools with high student turnover are likely to face additional teaching and student support challenges. Teachers in these schools will need to assess, support and develop learning plans for a greater number of students than would be the case of the school roll was more stable, increasing their teaching workload. Schools with high turnover rates also tend to have higher numbers of ‘frequent movers’ on their rolls, students who are more likely to have gaps in their learning and are more likely to need additional support for other reasons.

6.1 Measures of student turnover

School-level measures of student turnover in 2015 are given in Tables 11–14. The sample of schools included in this analysis is restricted to:

- contributing primary schools, full primaries, intermediates, secondary schools and composite schools. Special schools and the correspondence school are excluded
- schools that had at least 20 students throughout 2014, 2015 and 2016. Schools that opened or closed or merged in this period or had rolls falling below 20 are excluded.

There were approximately 2,328 schools that met these criteria in 2015.

Table 11 sets out a number of different measures of student turnover, covering enrolments and withdrawals at non-standard times of the schooling year or non-standard levels of the schooling system. The purpose of the table is show how measures of the different types of student movement relate to each other and can be used to construct a summary measure of total turnover.

To keep things simple, we select four of the measures in Table 11 (the ones shown in bold font) and focus on them in the rest of this analysis. These are:

- The late enrolments rate – the number of students who enrolled after the start of the year (from 1 March onwards), as a percentage of the school’s average roll.
- The non-structural enrolment rate – the number of non-structural enrolments (summing late enrolments and enrolments at non-standard levels), as a percentage of the school’s average roll.²⁴
- The total turnover rate – the total number of non-structural enrolments and non-structural withdrawals, as a percentage of the school’s average roll.
- The frequent mover rate – the number of students who were frequent movers during their previous schooling history (ie before 2015), as a percentage of the school’s average roll. Frequent movers are defined in the following way:

²⁴ Consistent with the turnover measures used internationally, we count student departures from schools at non-standard times as well as enrolments at non-standard times in the total turnover measure. This means that a single student enrolment can be counted *twice* in the total turnover statistics within the same year, if the student starts *and* finishes at non-standard times.

- Children who were enrolled in years 1-6 are classified as ‘frequent movers’ if they had attended 3 or more schools in their prior schooling history
- Children in years 7-8 are classified as ‘frequent movers’ if they had attended 4 or more schools in their prior schooling history
- Children in years 9-13 are classified as ‘frequent movers’ if they had attended 5 or more schools in their prior schooling history.

Table 11 – Measures of student turnover for schools in 2015

Measure	Average percentage of students	Weighted average percentage of students
Enrolments after the start of the schooling year (1 March or later)	9.4	6.7
Enrolments at a higher level than the school's normal entry level	5.6	5.2
All non-structural enrolments	15.0	11.9
Withdrawals before the end of the schooling year (before 1 November)	10.7	8.6
Withdrawals before the highest level offered by the school has been reached	6.6	4.9
All non-structural withdrawals	17.3	13.5
Total turnover – the sum of all non-structural enrolments and withdrawals	32.3	25.4
Frequent mover rate – the proportion of students that had attended a relatively high number of schools before the reference year*	11.5	9.5
N schools	2,328	2,328

Note: *The definition of frequent movers is given in the text. Enrolments of 5-year-old new entrants and withdrawals of students who are aged 16+ are not included in the measures. Each turnover measure is expressed as a percentage, using the school's mean roll in 2015 as the denominator. The weighted averages in the second column weight each school by its size.

The total turnover rate is the measure that is most often reported in the published literature. From the viewpoint of the school, however, it might be the late enrolments rate (the first measure discussed above) that is most important. This is because students who enrol part-way through the academic year cause greater disruption to teaching programmes and are more likely to experience gaps in curriculum coverage than students who move schools between academic years, while early departures of students simply shift responsibility to another school.

The first column Table 11 gives the average of each measure for all 2,328 schools. It shows an average ‘late enrolments’ rate of 9.4%; a non-structural enrolments rate of 15.0%; and a total turnover rate of 32.3%. The average proportion of students who were frequent movers (based on their enrolment histories prior to 2015) was 11.5%.

These simple averages give every school the same weight. But it is easier for small schools to have high measures of student turnover. To reflect this, we weighted each figure by the size of each school (using the school's average student roll during the year). The weighted averages, shown in the right-hand column of the table, are lower. Weighted by their size, schools had an average 'late enrolments' rate of 6.7%, a non-structural enrolment rate of 11.9%, a total turnover rate of 25.4%, and a frequent mover rate of 9.5%. The weighted 'late enrolment' and 'non-structural enrolment' rates are similar to the comparable student-level mobility figures that we reported above.²⁵ The weighted figures better represent the turnover of the school that is attended by the 'average' student.

The data reveal that there is wide variation across schools in rates of student turnover. Figure 6 shows the distribution of all schools, primary schools and secondary schools, by their total turnover rate. Fifty-five percent of all schools had turnover rates up to but below 30%. The remaining 45% were spread over a wide range of higher turnover levels.

Figure 6 – Distribution of schools by their total turnover rates, 2015

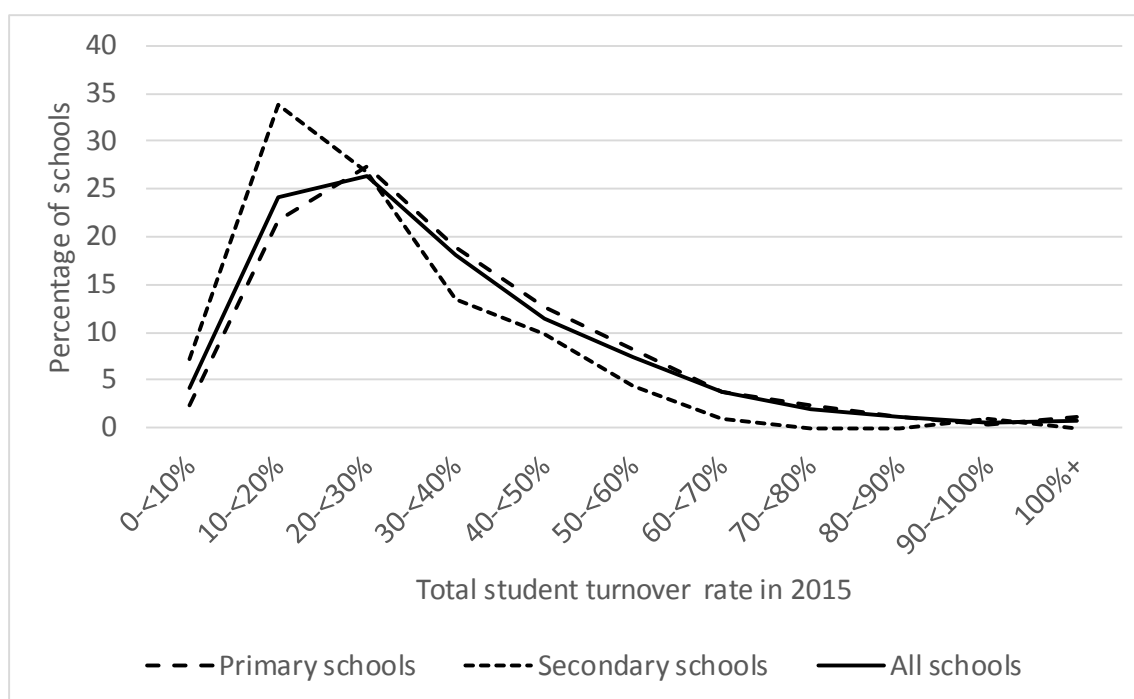


Table 12 shows the four main turnover measures by school type. Primary schools and composite schools (covering years 1-15) had higher average turnover rates than intermediate and secondary schools. This is consistent with the fact that younger students change schools more often than older students (as shown above in Table 3). It is also a reflection of the fact that schools covering a greater span of years will tend to have more arrivals and departures at non-standard times than schools covering relatively few years, such as intermediates. When parents move, they may be able to arrange for their child to remain at their old school, but there is likely to be a limit to the period of time over which this will be feasible.

²⁵ 6.7% can be compared with the figure of 6.0% in the top row of Table 3. 11.9% can be compared with the figure of 10.3% in the top row of Table 3. The school-level figures are slightly higher because all non-structural moves leading to new enrolments during 2015 are now being counted rather than one per student.

Table 12 – Measures of student turnover by school type, 2015

School type	N schools	Late enrolments %	All non-structural enrolments %	Total turnover %	Percentage of students who are frequent movers %
Composite (Year 1-15)	153	8.8	18.8	38.9	13.5
Contributing (Year 1-6)	747	9.5	14.3	30.0	9.3
Full Primary (Year 1-8)	969	11.2	16.9	36.8	11.7
Intermediate (Year 7-8)	117	6.1	8.2	16.7	15.8
Secondary (Year 7-15)	105	5.4	14.1	28.1	12.1
Secondary (Year 9-15)	228	5.8	11.1	26.0	13.6
All	2,328	9.4	15.0	32.3	11.5

Note: The numbers of schools have been randomly rounded. Other, less common types of schools are included in the total but not shown in the rows.

Table 13 – Measures of student turnover for primary schools, by size of school, 2015

Size of school	N schools	Late enrolments %	All non-structural enrolments %	Total turnover %	Percentage of students who are frequent movers %
20-<50	237	16.6	22.5	50.7	17.3
50-<100	264	13.1	19.2	41.3	13.7
100-<200	441	10.4	15.7	33.1	10.9
200-<300	273	8.9	13.9	29.5	8.9
300-<400	207	7.6	12.3	26.0	7.4
400+	300	6.9	11.4	24.2	6.2
All	1,722	10.5	15.7	33.8	10.7

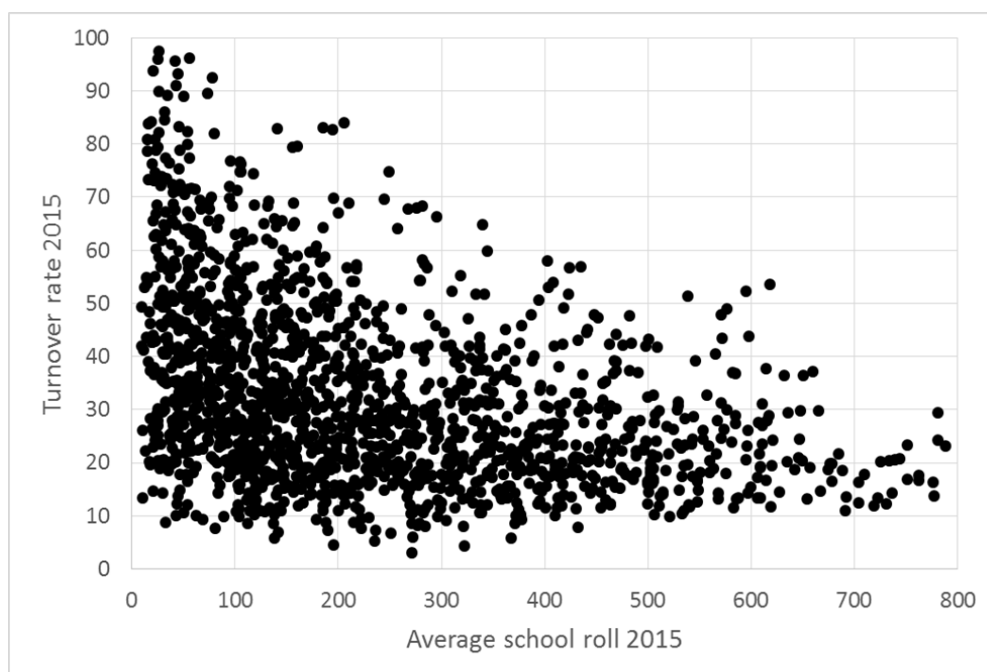
Note: Full primaries and contributing primaries are included. The numbers of schools have been randomly rounded.

Small schools have higher average turnover rates than larger schools, as shown in Table 13, which focuses on primary schools only, and shows schools' mean total turnover rates varying from about 51% for schools with 20-49 students to 24% for schools with 400 or more students. However, these averages hide a great deal of variation between the schools in each size group. This is illustrated in Figure 7, a scatterplot showing the relationship between size and turnover. The variation among small schools is particularly large.

Low decile schools also have much higher student turnover than high decile schools, on average. Table 14 gives figures for primary and secondary schools separately, by decile. Decile 1 primary schools had an average total turnover rate of 52% in 2015, while decile 10 primary schools had an average total turnover rate of 23%. Decile 1 primary schools had a delayed enrolment rate of around 16%, compared with 6% for decile 10 primary schools. 'Frequent movers' comprised 20% of the students of decile 1 primary schools, but just 4% of the students of decile 10 primary schools. Generalising across measures, the turnover of decile 1 primary schools was typically more than twice that of decile 10

primary schools. Similar patterns exist if low and high decile secondary schools are compared.

Figure 7 – Relationship between turnover rate and size of school, primary schools only, 2015



Note: The data for each school has been modified by adding a small amount of random noise so that individual schools cannot be identified. Some outliers have been removed.

Table 14 – Measures of student turnover for primary and secondary schools, by decile, 2015

Type of school and decile	N schools	Late enrolments %	All non-structural enrolments %	Total turnover %	Percentage of students who are frequent movers %
Primary schools					
1	177	16.4	23.6	51.5	19.8
2	162	14.6	21.8	47.0	17.4
3	159	12.9	19.0	40.1	13.9
4	153	11.8	17.3	36.2	12.0
5	174	10.8	15.5	33.8	10.5
6	153	9.8	14.7	31.4	10.0
7	171	8.5	12.6	28.3	8.0
8	174	7.6	11.8	26.0	6.6
9	183	7.2	11.1	24.1	6.0
10	210	6.4	11.3	22.8	4.4
Secondary schools					
1	21	11.5	22.8	48.5	24.6
2	30	9.3	18.1	42.1	22.8
3	33	7.9	15.0	35.9	21.1
4	36	6.9	13.3	30.8	16.4
5	30	5.1	10.0	24.0	13.2

Type of school and decile	N schools	Late enrolments %	All non-structural enrolments %	Total turnover %	Percentage of students who are frequent movers %
6	48	4.5	9.8	23.4	11.6
7	36	3.7	8.9	19.9	8.2
8	33	3.6	7.9	17.6	6.8
9	36	2.7	8.1	15.3	5.5
10	27	2.6	10.2	16.8	4.0

Note: The numbers of schools are randomly rounded.

Presumably, these patterns reflect the fact that low decile schools tend to draw their students from neighbourhoods with the most residentially mobile students, while high decile schools tend to draw their students from neighbourhoods with the most stable students.

6.2 Factors that are associated with higher student turnover

The factors that influence a school's rate of student turnover in 2015 were explored using regression models. Table 15 shows results obtained from some simple regression models, estimated separately for primary and secondary schools.²⁶ The dependent variable is the school's total turnover rate. The explanatory variables capture student characteristics or school characteristics, as follows:

- The percentage of students who were frequent movers prior to 2015
- The percentage of students who were female, Maori, Pacific, Asian, or members of other non-European ethnic groups
- An indicator variable for whether the school was located in a rural area
- A measure of the school's size
- The school's decile ranking.

Nearly all of these variables are statistically significant in the regressions. Schools with a higher proportion of frequent movers among their students have higher turnover, as do schools with higher proportions of girls, Maori students, and Pacific students. Schools in rural areas have higher student turnover rates. Smaller schools have higher turnover rates than larger schools. Schools with higher decile rankings have lower turnover than those with lower decile rankings. These effects are all consistent with patterns we have already seen in the descriptive statistics.

²⁶ Intermediates and composite schools are not included.

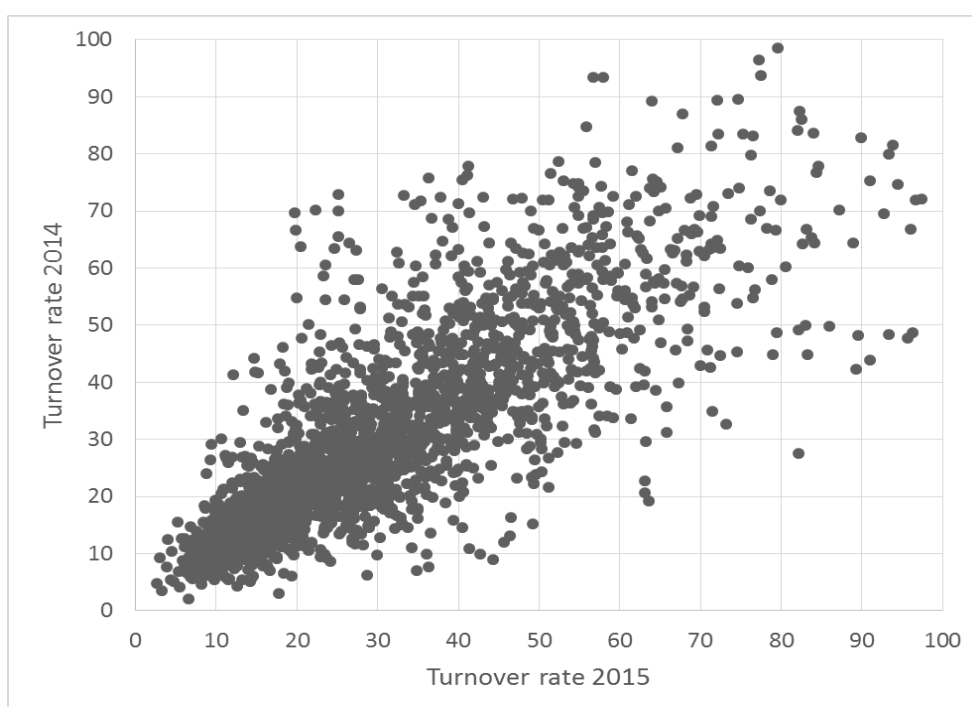
Table 15 – Regression of student and school characteristics on turnover rate

	Primary schools			Secondary schools		
	Coeff.	Std. error	Signif.	Coeff.	Std. error	Signif.
Intercept	1.41	0.86	*	6.27	1.62	*
Proportion of students who are frequent movers	155.28	5.94	*	131.48	18.55	*
Proportion female	117.72	1.41	*	105.42	0.84	*
Proportion Māori	2.95	0.55	*	3.07	1.79	
Proportion Pacific	-184.61	7.13	*	-150.43	20.87	*
Proportion Asian	119.38	0.97	*	129.34	2.48	*
Proportion other non-European ethnic groups	6.13	3.24		-26.95	9.82	*
Rural location	1.86	0.22	*	-0.69	1.03	
Size/100	-0.44	0.06	*	-0.25	0.05	*
Decile	-0.36	0.05	*	-0.66	0.17	*
N schools	1716			333		
Adjusted R squared	0.942			0.980		

Note: The numbers of schools are randomly rounded.

We have shown that student turnover rates vary widely across different schools. One question this raises is whether the patterns are persistent over time. Figure 8, which plots the 2014 turnover rate of each school against its 2015 turnover rate, indicates that there is a fair amount of persistence. Many schools are bunched near to the 45% degree line (where the school's turnover rates in the two years are equal). But there is a greater spread of the data points at high turnover rates, suggesting that very high turnover is a bit more random, and is less likely to be repeated in the following year in the same school.

Figure 8 – Correlation between turnover rates in 2014 and 2015, at school level



Note: The data for each school has been modified by adding a small amount of random noise so that individual schools cannot be identified. Some outliers have been removed.

7. Issues raised by student mobility

Past research on student mobility in New Zealand and other countries has identified a fairly consistent set of issues that it poses for schooling systems.

- **Information flows:** The speed and quality of information flows between schools is important. Schools benefit from having easy access to comprehensive and reliable data on the child's educational history and learning progress. Obtaining information from the previous school through manual processes or getting it through repeated assessments of the student creates a significant additional workload.
- **Non-enrolment and attendance systems:** There is a correlation between mobility and higher rates of non-attendance. Some transient families have life circumstances that are not conducive to regular attendance. Communities and countries with high student mobility are likely to need particularly good systems for tracking students who move and for responding to non-enrolment and non-attendance.
- **Learning support systems and interventions for students who are at risk of underachievement:** Students who require additional learning support are at risk of losing that support when they change schools, at least for a while, unless the delivery systems are designed to ensure that the support rapidly follows the student.
- **Funding to schools:** Student turnover creates additional administrative costs for schools. If they don't have sufficient funding for those additional costs they will have fewer resources available for other purposes.
- **Additional teaching burden in schools with high turnover:** Student turnover increases the complexity of classroom teaching and increases teachers' workloads. It takes time to get to know new students, assess their abilities and needs and integrate them into classrooms and learning activities.
- **Assessing the performance of schools fairly:** Student mobility can have a detrimental effect on measures of school performance in situations where low achievers are not in a school for long enough for the school to have a positive influence. School performance assessment systems need to recognise the effects of high student turnover if they are to avoid giving some schools unfairly negative assessments.
- **The need to ensure that schools do not encourage poorly-achieving students to 'move on', thereby raising student mobility:** In some systems, schools are incentivised to encourage poorly-performing students to move on to other schools. These perverse incentives can contribute to unnecessary turnover. Other school policies, such as the strict enforcement of fees, may have the unintended effect of triggering mobility if parents decide it is easier to move their child to another school.

The New Zealand literature in which these issues are discussed includes ERO (1997), Bull and Gilbert (2007), and Wynd (2014). Useful international references include Dobson et al (2000) for the UK, Lu and Rickard (2016) for Australia.

The New Zealand and international literature also discusses responses to the issues posed by student mobility. There is relevant information in Bull and Gilbert (2007), ERO (2007), Mutch et al (2011), and Rumberger (2015). The responses discussed include programmes to improve the integration of new students in a school, improvements in schools' capacity to share information with other schools about mobile students, funding

changes for schools with large numbers of mobile students, and changes in suspension and expulsion policies.

The policy issues raised by student mobility may extend beyond the schooling or educational system. This paper has identified higher rates of school mobility among children who have been placed under state care and protection; children whose parents are receiving income support through the benefit system; and children whose families are living in rented accommodation. The current evidence is only associational. But it is worth considering whether some of the regulations and policies of government in areas such as housing, income support and child welfare may be having the unintended consequence of raising the mobility of families with school-aged children, or children who are in foster care, with adverse consequences for their continuity of school attendance. For example, it has been suggested that rental housing regulations in New Zealand do not give tenants much security of tenure, leading to higher residential and school mobility than occurs in other countries. Further investigation of whether current policy settings are genuinely having a material impact on the residential and school mobility of families may be helpful.

8. Further research

By measuring and documenting the extent of student mobility across schools, particularly among students who fail to complete NCEA level 1, this paper has outlined the scale of the issues.

Further research could be done to better understand the issue and its implications, or to develop responses. For example:

- The Ministry of Education could:
 - more actively monitor student mobility at a national level, using the currently available administrative data and more comprehensive measures than those it has used in the past
 - investigate whether mobile students with additional learning needs are receiving the available forms of learning support, and whether this support is continuously received or frequently disrupted
 - more actively gather data from schools on the impacts and costs of student mobility.
- The Ministry of Education could encourage research on measures to mitigate the harmful effects of student mobility. Internationally, there are examples of school-level initiatives that are designed to support transient students and reduce the likelihood that they will become disengaged from learning.
- By the end of 2018, data will be available within IDI to investigate the relationship between school mobility and achievement in NCEA level 2 and level 3, as well as level 1, for children who were born in 1998. This could provide the basis for a more complete assessment of the impacts of mobility on student achievement. Further work could also be done in future using data for other birth cohorts.

References

- Bull, Amy and Gilbert, Jane (2007) 'Student mobility and schools – what are the issues?' Wellington: New Zealand Council for Educational Research.
- Dobson, Janet, Henthorne, Kirsty and Lynas, Zoe (2000) *Pupil mobility in schools: Final report*. Migration Research Unit, University College London.
- Education Review Office (1997) 'Students at risk: Barriers to learning'. Education Evaluation Reports, Reports No 7.
- Education Review Office (2007) 'Managing transience: Good practice in primary schools.' Wellington: ERO.
- Gilbert, Jane (2005) 'Educational issues for communities affected by transience and residential mobility'. Wellington: New Zealand Council for Educational Research.
- Lu, Lucy and Karen Rikard (2016) 'Mobility of students in NSW government schools'. Centre for Education, Statistics and Evaluation, Department of Education.
- Ministry of Education (2016) 'Transient students'. Wellington, Ministry of Education. <https://www.educationcounts.govt.nz/statistics/indicators/main/student-engagement-participation/transient-students>
- Mutch, Carol, Rarere, Vivienne and Stratford, Robert (2011) 'When you looked at me, you didn't judge me: Supporting transient students and their families in New Zealand primary schools'. *Pastoral Care in Education*, 29:4 231-245.
- Reynolds, Arthur, Chin-Chih Chen and Janette Herbers (2009) 'School mobility and educational success: A research synthesis and evidence on prevention'. University of Minnesota, unpublished paper.
- Rumberger, Russell (2015) 'Student mobility: Causes, consequences and solutions'. National Education Policy Centre, University of Colorado Boulder.
- Schwartz, Amy Ellen; Stiefel, Leanna; Cordes, Sarah A. (2015) "Moving Matters: The Causal Effect of Moving Schools on Student Performance" Institute for Education and Social Policy, Working Paper 01-15, 2015. [|http://files.eric.ed.gov/fulltext/ED556782.pdf](http://files.eric.ed.gov/fulltext/ED556782.pdf)
- Wylie, Cathy and Hodgen, Edith (2011) 'Forming Adulthood: Past, present and future in the experience and views of the Competent Learners @ 20'. Wellington: New Zealand Council for Educational Research.
- Wylie, Cathy and Bonnie, Linda (2013) 'Primary and intermediate schools in 2013: Findings from the NZCER national survey.' Wellington: New Zealand Council for Educational Research.
- Wynd, Donna (2014) 'The revolving door: Student mobility in Auckland schools.' Auckland: Child Poverty Action Group

Appendix

Table 16 – Student mobility rates by parental characteristics, and parental characteristics of mobile and very mobile students, 2000 birth cohort

	Mobility rates				Profiles of all students and mobile students			
	% students who were mobile: 5+ schools	% who were very mobile: 8+ schools	% Māori who were very mobile: 5+ schools	% Māori who were very mobile: 8+ schools	% of all students in each group	% of mobile students in each group	% of very mobile students in each group	% of mobile Māori students in each group
All students	12.6	2.0	24.8	5.2	100.0	100.0	100.0	100.0
Mother's age at birth of reference child								
Missing	11.8	1.7	29.7	7.7	3.0	2.8	2.6	2.4
Less than 18	37.8	11.9	47.7	18.1	1.4	4.2	8.6	6.4
18-19	31.9	7.2	37.8	9.5	3.0	7.6	10.9	10.0
20-24	22.6	3.8	30.8	6.3	14.6	26.2	28.3	30.3
25-29	12.3	1.6	22.2	4.0	26.0	25.3	20.8	23.3
30+	8.3	1.1	18.0	3.4	51.9	33.9	28.6	27.3
Mother's highest qualification								
Missing	20.2	4.1	33.9	8.7	21.7	34.5	44.7	41.3
No qualifications	19.0	3.4	27.1	5.9	13.7	20.5	23.9	23.6
Level 1-3	9.9	1.2	18.8	3.2	32.7	25.5	20.0	20.6
Level 4-6	9.1	1.1	18.5	2.8	14.2	10.2	7.8	8.5
Level 7-8	6.7	0.4	15.2	1.5	15.5	8.2	3.4	5.5
Level 9-10	6.0	s	14.7	s	2.3	1.1	s	0.5
Mother's prior convictions (highest)								
None	10.2	1.2	19.9	3.4	87.3	70.5	55.3	56.8
Custodial sentence	45.4	15.3	50.0	18.2	0.9	3.4	7.3	6.0
Other Corrections sentence	33.9	8.0	38.6	9.9	6.4	17.1	26.0	25.9
Proven charge	21.3	4.1	28.5	6.9	5.4	9.0	11.2	11.2
Mother's number of employers over 10 years when child aged 5-14								
Missing or none	12.6	2.2	28.6	7.1	19.9	19.8	22.1	19.3
1-2 employers	9.1	1.3	20.3	4.0	37.0	26.7	23.9	27.1
3-4 employers	11.9	1.6	21.8	4.4	23.5	22.1	19.0	22.0
5-9 employers	18.6	2.9	29.3	5.4	17.2	25.4	25.5	25.2
10+ employers	31.1	7.6	39.4	11.1	2.4	6.0	9.4	6.4
Mother's months W&S employment over 10 years when child aged 5-14								
Missing or none	12.6	2.2	28.6	7.1	19.9	19.8	22.3	19.3
<12 months	19.5	4.4	37.7	10.9	8.7	13.4	19.5	16.8
12-<36 months	18.5	3.3	33.2	7.8	12.5	18.3	21.3	20.1
36-<72 months	16.1	2.3	28.6	4.9	16.6	21.2	19.5	20.5
72-<108 months	11.2	1.3	18.9	2.8	19.9	17.5	12.7	15.0
108-<120 months	6.8	0.4	12.1	1.1	13.1	7.0	2.9	6.1
120 months	3.6	0.3	7.3	0.9	9.3	2.7	1.6	2.2

	Mobility rates				Profiles of all students and mobile students			
	% students who were mobile: 5+ schools	% who were very mobile: 8+ schools	% Māori who were very mobile: 5+ schools	% Māori who were very mobile: 8+ schools	% of all students in each group	% of mobile students in each group	% of very mobile students in each group	% of mobile Māori students in each group
Mother's avg annual earned income over 10 years when child aged 5-14								
Missing	15.8	2.9	31.3	7.9	13.8	17.3	20.5	18.3
Less than \$5,000	23.3	5.6	38.0	11.1	10.0	18.5	28.6	24.1
\$5-\$10,000	18.3	3.1	30.7	6.3	9.3	13.4	14.5	14.7
\$10-\$20,000	13.7	1.9	24.3	4.6	18.0	19.5	17.1	18.5
\$20-\$30,000	10.8	1.2	20.5	2.8	14.3	12.2	8.6	10.5
\$30-\$50,000	8.0	0.8	14.6	2.0	19.4	12.3	7.8	9.4
\$50-\$75,000	5.9	0.3	10.6	0.6	10.0	4.6	1.3	3.2
\$75-\$100,000	5.7	0.3	11.2	s	3.2	1.5	0.5	1.0
\$100,000+	4.2	s	9.5	s	2.1	0.7	s	0.4
Mother's years of benefit income over 10 years when child aged 5-14								
Missing or none	6.5	0.6	14.6	2.6	51.7	26.4	16.6	17.7
1-3 years	10.9	1.1	15.2	1.9	14.2	12.2	7.8	9.5
4-6 years	17.7	2.4	25.8	4.1	10.9	15.3	13.5	15.2
7-10 years	25.2	5.2	35.7	8.9	23.2	46.1	61.8	57.6
Father's highest qualification								
Missing	19.3	3.6	31.3	7.3	37.6	57.6	69.6	67.5
No qualifications	14.8	2.5	23.1	4.7	12.1	14.2	15.3	15.8
Level 1-3	8.5	0.8	14.8	2.1	20.3	13.7	8.3	8.8
Level 4-6	6.9	0.6	14.1	2.2	16.6	9.1	5.2	5.9
Level 7-8	5.1	0.2	9.8	s	10.4	4.2	1.3	1.5
Level 9-10	5.2	s	12.5	s	3.0	1.2	s	0.4
Father's prior convictions (highest)								
None	9.4	1.2	20.7	4.2	71.3	53.2	44.4	41.4
Custodial sentence	33.4	8.4	38.6	10.5	6.2	16.4	26.8	26.1
Other Corrections sentence	21.8	3.6	26.9	5.2	10.7	18.5	19.5	22.5
Proven charge	12.7	1.5	18.7	2.4	11.7	11.8	8.8	9.9
Father's number of employers over 10 years when child aged 5-14								
Missing or none	13.0	2.4	29.1	6.9	26.3	27.0	31.7	29.1
1-2 employers	8.0	1.0	17.1	3.3	36.2	23.0	18.7	19.0
3-4 employers	11.6	1.3	20.9	3.6	19.8	18.2	13.2	17.0
5-9 employers	20.5	3.4	28.9	6.4	14.2	23.0	24.4	23.6
10+ employers	32.4	6.8	37.7	8.0	3.4	8.8	11.9	11.1
Father's months W&S employment over 10 years when child aged 5-14								
Missing or none	13.0	2.4	29.1	6.9	26.3	27.0	31.7	29.1
<12 months	16.9	3.9	33.8	10.1	5.5	7.3	10.9	8.5
12-<36 months	16.8	3.0	31.9	8.2	8.2	10.9	12.5	12.3
36-<72 months	16.7	2.6	28.7	5.7	11.6	15.3	15.1	15.8
72-<108 months	15.3	2.1	25.5	4.4	15.0	18.2	16.4	17.4
108-<120 months	11.2	1.3	18.0	3.0	12.7	11.2	8.3	9.9
120 months	6.2	0.5	11.0	1.3	20.8	10.1	5.5	6.8

	Mobility rates				Profiles of all students and mobile students			
	% students who were mobile: 5+ schools	% who were very mobile: 8+ schools	% Māori who were very mobile: 5+ schools	% Māori who were very mobile: 8+ schools	% of all students in each group	% of mobile students in each group	% of very mobile students in each group	% of mobile Māori students in each group
Father's avg annual earned income over 10 years when child aged 5-14								
Missing	17.8	3.5	32.4	7.9	16.2	22.8	28.8	27.5
Less than \$5,000	26.3	7.8	37.9	13.3	2.5	5.2	9.9	7.0
\$5-\$10,000	24.8	5.0	40.1	9.9	2.5	5.0	6.5	7.0
\$10-\$20,000	20.1	3.5	32.8	7.5	6.1	9.7	10.9	11.9
\$20-\$30,000	17.8	2.7	28.2	5.2	7.8	11.0	10.9	11.8
\$30-\$50,000	13.7	1.9	22.5	4.0	20.4	22.1	19.5	20.6
\$50-\$75,000	9.0	0.9	14.9	1.9	21.6	15.3	9.9	10.7
\$75-\$100,000	5.5	0.4	8.6	1.1	10.8	4.7	2.3	2.2
\$100,000+	4.4	0.2	9.3	0.5	12.1	4.2	1.3	1.5
Father's years of benefit income over 10 years when child aged 5-14								
Missing or none	9.1	1.2	19.5	3.7	70.3	50.3	41.8	42.0
1-3 years	15.6	2.2	23.0	4.1	13.3	16.4	14.8	15.9
4-6 years	23.7	4.2	33.2	7.0	7.7	14.4	16.4	16.7
7-10 years	27.4	6.1	36.9	9.8	8.7	18.9	27.0	25.4
N students	7,428	1,155	3,312	696	58,728	7,428	1,155	3,312

Notes: The numbers of students have been randomly rounded. The data for mothers includes female caregivers who were not birth parents and the data for fathers includes male caregivers who were not birth parents.

Table 17 – Marginal effects from the full regression models of NCEA level 1 non-achievement

		All students			Māori students		
		Marg. Effect	Std. Err.	z	Marg. Effect	Std. Err.	z
Number schools at ages 8-14	1 school	0.026	0.012	2.14	0.018	0.034	0.53
	3 schools	0.025	0.005	5.53	0.026	0.012	2.15
	4 schools	0.061	0.005	12.05	0.092	0.013	7.09
	5 schools	0.085	0.006	14.07	0.134	0.015	9.09
	6+ schools	0.105	0.006	16.94	0.164	0.014	11.37
School decile at 9th birthday	1	0.011	0.007	1.71	0.013	0.016	0.82
	2	0.011	0.006	1.83	0.011	0.015	0.69
	3	0.003	0.006	0.45	0.007	0.016	0.43
	4	0.000	0.006	-0.04	0.000	0.017	-0.02
	6	-0.001	0.007	-0.16	-0.015	0.020	-0.75
	7	-0.005	0.007	-0.76	-0.019	0.020	-0.91
	8	0.000	0.007	0.01	0.003	0.023	0.15
	9	-0.008	0.007	-1.09	0.003	0.023	0.13
	10	-0.013	0.008	-1.60	-0.046	0.030	-1.53
	Missing	-0.001	0.025	-0.05	0.137	0.100	1.38
School decile at 12th birthday	1	0.005	0.007	0.69	0.017	0.016	1.01
	2	-0.011	0.006	-1.78	-0.003	0.015	-0.21
	3	-0.003	0.006	-0.48	0.015	0.016	0.91
	4	-0.009	0.005	-1.67	-0.005	0.014	-0.33
	6	-0.011	0.006	-1.93	0.005	0.016	0.30
	7	-0.020	0.007	-2.75	-0.017	0.021	-0.83
	8	-0.007	0.007	-1.04	0.019	0.020	0.92
	9	0.000	0.008	-0.06	0.043	0.024	1.84
	10	-0.006	0.010	-0.57	0.014	0.036	0.39
	Missing	0.044	0.015	3.05	0.065	0.046	1.42
School decile at 15th birthday	1	-0.004	0.008	-0.48	-0.005	0.019	-0.25
	2	0.000	0.007	-0.07	0.005	0.016	0.34
	3	0.001	0.007	0.21	0.003	0.016	0.19
	4	0.019	0.006	3.19	0.033	0.015	2.22
	6	0.028	0.006	5.03	0.053	0.015	3.57
	7	0.019	0.007	2.88	0.024	0.019	1.27
	8	0.016	0.007	2.37	0.047	0.019	2.51
	9	0.015	0.008	1.78	-0.003	0.026	-0.12
	10	-0.014	0.011	-1.23	-0.017	0.042	-0.40
	Missing	-0.086	0.030	-2.83	-0.264	0.118	-2.23
School type at 9th birthday	Composite	0.008	0.010	0.83	0.007	0.022	0.33
	Contributing	0.007	0.004	1.86	0.027	0.010	2.79
	Special School	0.003	0.026	0.12	-0.129	0.100	-1.28
	Other	0.056	0.044	1.28	0.003	0.177	0.02
School type at 12th birthday	Composite	-0.008	0.008	-0.97	-0.033	0.020	-1.64
	Full primary	0.019	0.004	4.31	0.022	0.011	2.02
	Special School	0.018	0.005	3.61	0.024	0.014	1.75
	Other	0.053	0.036	1.45	0.422	0.185	2.28
School type at 15th birthday	Composite	0.013	0.008	1.66	0.019	0.018	1.03
	Special School	0.398	0.028	14.28	0.594	0.113	5.25
	Other	0.265	0.037	7.12	0.257	0.106	2.43

		All students			Māori students		
		Marg. Effect	Std. Err.	z	Marg. Effect	Std. Err.	z
Schools' turnover rate at 15th birthday	0-<10%	-0.068	0.016	-4.35	-0.081	0.066	-1.24
	10-<20%	-0.023	0.005	-4.27	-0.039	0.017	-2.30
	30-<40%	0.017	0.004	3.98	0.024	0.012	2.10
	40-<50%	0.012	0.006	2.08	0.002	0.015	0.15
	50-<60%	0.029	0.006	4.85	0.038	0.015	2.57
	60-<70%	0.030	0.009	3.35	0.030	0.021	1.48
	70-<80%	0.031	0.008	3.68	0.039	0.019	2.07
	80-<90%	0.080	0.013	5.94	0.094	0.027	3.44
	90-<100%	0.021	0.021	1.01	0.038	0.040	0.95
	100%+	0.007	0.012	0.59	0.004	0.026	0.15
	Missing	-0.073	0.015	-4.82	-0.059	0.035	-1.68
Gender	Female	-0.037	0.003	-12.99	-0.044	0.007	-6.08
Ethnic group	Māori	0.015	0.003	4.45	-0.013	0.010	-1.30
	Pacific	-0.020	0.005	-4.05	-0.027	0.015	-1.79
	Asian	-0.049	0.009	-5.33	0.023	0.046	0.49
	Other	-0.013	0.015	-0.92	0.064	0.057	1.11
Visa group if not born in NZ	Permanent resident	0.046	0.131	0.35			
	Temporary resident	-0.021	0.116	-0.18			
	Other	-0.014	0.111	-0.12			
Country of birth if not NZ	Central Asia	-0.057	0.105	-0.54			
	Europe	-0.043	0.109	-0.39			
	MELAA	-0.036	0.101	-0.36			
	Mainland SE Asia	-0.085	0.119	-0.72			
	Maritime SE Asia	-0.036	0.109	-0.33			
	Missing	0.037	0.110	0.34			
	NE Asia	-0.049	0.114	-0.43			
	North America	-0.067	0.114	-0.59			
	Polynesia	-0.004	0.100	-0.04			
	South Asia	-0.012	0.105	-0.12			
UK	-0.024	0.101	-0.24				
Years since approval (if born overseas)	0-3 years	-0.053	0.107	-0.50			
	4-8 years	0.018	0.087	0.20			
	9-12 years	0.002	0.086	0.02			
	13+ years	-0.033	0.088	-0.37			
Lived overseas for >10% of childhood	10-49%	-0.034	0.010	-3.42	-0.036	0.030	-1.21
Proportion of childhood on benefit	1-10%	0.000	0.005	-0.05	-0.033	0.017	-1.91
	11-25%	0.006	0.006	1.06	0.016	0.016	0.96
	26-50%	0.017	0.005	3.15	0.019	0.014	1.30
	50-75%	0.024	0.006	4.22	0.022	0.015	1.49
	75+%	0.032	0.006	5.68	0.037	0.014	2.58
CYF notification		0.044	0.004	12.10	0.050	0.009	5.45
CYF finding		0.009	0.005	1.88	0.018	0.011	1.64
CYF placement		0.025	0.007	3.65	0.025	0.015	1.66
CYF youth justice referral		0.118	0.011	10.94	0.173	0.022	7.94
CYF youth justice placement		0.002	0.031	0.06	0.064	0.063	1.03
Additional learning support received in school		0.216	0.008	26.61	0.281	0.024	11.77

		All students			Māori students		
		Marg. Effect	Std. Err.	z	Marg. Effect	Std. Err.	z
Neighbourhood NZ							
Deprivation Index at 15 years	1	-0.018	0.009	-2.05	-0.025	0.034	-0.74
	2	-0.008	0.008	-1.00	-0.046	0.028	-1.62
	3	-0.013	0.007	-1.73	-0.017	0.025	-0.69
	4	-0.011	0.007	-1.56	0.005	0.023	0.21
	6	-0.007	0.007	-1.02	-0.005	0.020	-0.25
	7	-0.004	0.006	-0.67	-0.009	0.019	-0.47
	8	0.013	0.006	2.16	0.038	0.018	2.18
	9	0.001	0.006	0.13	0.010	0.017	0.56
	10	0.005	0.006	0.75	0.015	0.017	0.89
	Missing	-0.029	0.018	-1.65	0.010	0.040	0.24
Dwelling tenure at 2013 Census	Missing	0.014	0.005	3.03	0.031	0.013	2.42
	Private rental	0.012	0.004	2.94	0.011	0.011	1.02
	Social rental	0.026	0.006	4.63	0.048	0.013	3.56
Mother's justice sector history	Custodial sentence	0.011	0.009	1.17	0.018	0.018	1.02
	Other sentence	0.016	0.004	3.60	0.019	0.010	1.98
	Proven charge	0.018	0.005	3.52	0.023	0.012	1.96
Father's justice sector history	Custodial sentence	0.020	0.005	3.88	0.022	0.012	1.88
	Other sentence	0.015	0.004	3.57	0.008	0.011	0.74
	Proven charge	0.007	0.005	1.56	-0.004	0.013	-0.27
Mother's age at birth	Missing	0.003	0.011	0.26	-0.032	0.028	-1.15
	<18	-0.001	0.009	-0.12	-0.007	0.020	-0.33
	18-19	-0.012	0.007	-1.67	-0.023	0.016	-1.42
	20-24	0.003	0.004	0.78	-0.004	0.011	-0.39
	25-29	-0.001	0.004	-0.23	0.001	0.010	0.09
Mother's highest qualification	Missing	0.021	0.005	4.67	0.028	0.012	2.31
	No qualifications	0.035	0.004	8.59	0.053	0.011	4.89
	Level 4-6	-0.002	0.005	-0.45	0.000	0.014	0.01
	Level 7-8	-0.024	0.007	-3.65	-0.011	0.019	-0.57
	Level 9-10	0.000	0.017	-0.01	-0.030	0.063	-0.47
Mother's number of employers in last 10 years	Missing	0.000	0.010	-0.02	-0.052	0.036	-1.43
	3-4 employers	0.002	0.004	0.61	-0.005	0.010	-0.50
	5-9 employers	0.001	0.004	0.18	-0.009	0.011	-0.79
	10+ employers	0.004	0.008	0.52	-0.013	0.018	-0.73
Mother's months of W&S employment in last 10 years	Missing	0.000	0.010	-0.02	0.000	0.000	0.00
	<12 months	-0.002	0.009	-0.26	-0.016	0.025	-0.64
	12-<36 months	-0.002	0.008	-0.32	-0.020	0.022	-0.89
	36-<72 months	0.007	0.007	0.92	0.010	0.021	0.47
	72-<108 months	0.003	0.007	0.45	-0.010	0.019	-0.51
	108-<120 months	-0.005	0.007	-0.80	-0.037	0.020	-1.85
Mother's average annual earned income	Missing	0.041	0.010	4.26	0.126	0.035	3.62
	Less than \$5,000	0.022	0.007	3.14	0.055	0.019	2.91
	\$5-\$10,000	0.009	0.006	1.46	0.044	0.017	2.52
	\$10-\$20,000	0.002	0.005	0.32	0.028	0.015	1.88
	\$20-\$30,000	0.003	0.005	0.65	0.023	0.015	1.52
	\$50-\$75,000	-0.007	0.007	-0.96	-0.017	0.021	-0.84
	\$75-\$100,000	-0.017	0.013	-1.27	-0.047	0.042	-1.12
	\$100,000+	-0.007	0.019	-0.36	-0.103	0.075	-1.37

		All students			Māori students		
		Marg. Effect	Std. Err.	z	Marg. Effect	Std. Err.	z
Mother's average annual benefit income	Less than \$5,000	0.034	0.004	7.97	0.033	0.012	2.68
	\$5,000-<\$10,000	0.030	0.005	6.11	0.035	0.013	2.72
	\$10,000+	0.034	0.006	5.52	0.049	0.015	3.19
Father's age at birth	Missing	-0.004	0.012	-0.31	0.031	0.026	1.20
	<18	0.003	0.010	0.25	0.010	0.023	0.42
	18-19	-0.013	0.007	-1.71	-0.032	0.017	-1.85
	20-24	-0.012	0.007	-1.77	-0.010	0.017	-0.58
	25-29	-0.009	0.007	-1.33	-0.004	0.016	-0.28
Father's highest qualification	Missing	0.020	0.005	4.25	0.035	0.014	2.57
	No qualifications	0.030	0.005	5.93	0.062	0.015	4.27
	Level 4-6	0.000	0.006	0.05	0.013	0.019	0.72
	Level 7-8	-0.021	0.009	-2.24	-0.037	0.033	-1.11
	Level 9-10	-0.007	0.017	-0.42	-0.081	0.094	-0.86
Father's number of employers in last 10 years	Missing	-0.021	0.008	-2.67	-0.003	0.027	-0.10
	3-4 employers	0.004	0.004	0.87	0.003	0.012	0.25
	5-9 employers	0.007	0.005	1.56	0.013	0.013	1.02
	10+ employers	0.007	0.007	1.01	0.017	0.017	0.98
Father's months of W&S employment in last 10 years	Missing	-0.021	0.008	-2.67	0.000	0.000	0.00
	<12 months	-0.004	0.008	-0.45	0.000	0.024	0.01
	12-<36 months	-0.004	0.007	-0.56	0.002	0.020	0.10
	36-<72 months	-0.009	0.006	-1.43	-0.004	0.018	-0.21
	72-<108 months	0.005	0.006	0.80	0.019	0.017	1.13
	108-<120 months	0.003	0.006	0.51	0.032	0.016	1.98
Father's average annual earned income	Missing	0.027	0.008	3.37	0.047	0.026	1.80
	Less than \$5,000	0.020	0.009	2.24	0.065	0.022	2.95
	\$5-\$10,000	0.000	0.009	0.05	0.035	0.021	1.69
	\$10-\$20,000	0.002	0.006	0.32	0.023	0.016	1.41
	\$20-\$30,000	-0.003	0.006	-0.58	0.013	0.015	0.89
	\$50-\$75,000	-0.009	0.005	-2.03	-0.012	0.013	-0.87
	\$75-\$100,000	-0.023	0.007	-3.18	-0.036	0.024	-1.52
	\$100,000+	-0.022	0.009	-2.60	-0.018	0.034	-0.53
Father's average annual benefit income	Less than \$5,000	0.002	0.004	0.46	0.001	0.011	0.05
	\$5,000-<\$10,000	-0.002	0.007	-0.37	-0.012	0.016	-0.72
	\$10,000+	1.041	0.154	0.27	-0.004	0.029	-0.15

Notes: The dependent variable in the underlying regressions was 1 for not achieving and 0 for achieving. Therefore positive marginal effects represent a higher likelihood of non-achievement, compared with the base category, while negative marginal effects indicate a lower likelihood