THE EFFECT OF FIBRE BROADBAND ON STUDENTS' ACADEMIC PERFORMANCE

An Executive Summary

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Students with access
to fibre broadband learn more,
thousands benefit.

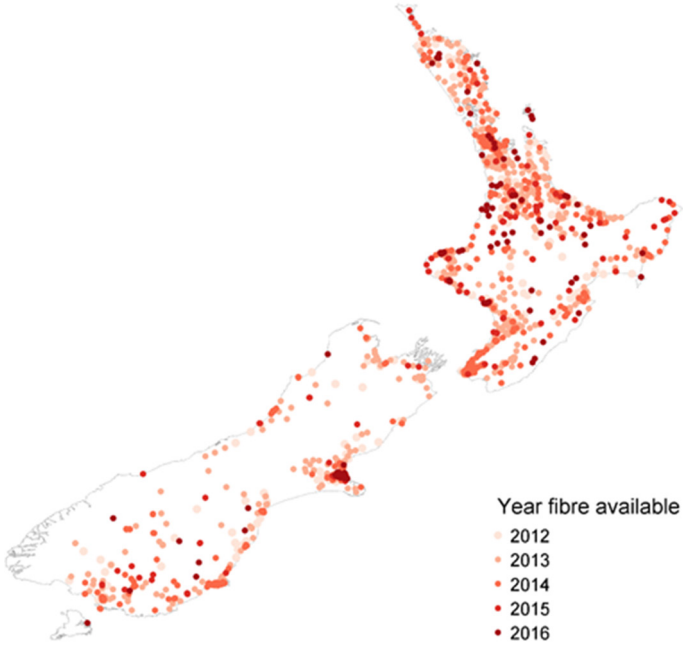
INTRODUCTION

The New Zealand Government has spent over $1 billion since 2008 developing an 'ultra-fast broadband' network that prioritised school connections. This paper evaluates that investment using a difference-in-difference study of schools' academic performance. It is the first research anywhere in the world to specifically evaluate fibre broadband's effect on educational achievement.

We exploit differences in the timing of broadband availability to study the effects of broadband provision on two measures of student ability:

- National Standards (an assessment of primary school students for mathematics, reading and writing)
- National Certificate of Educational Achievement (an assessment of secondary school students).

Figure 1: Geographical distribution of fibre availability dates



METHODOLOGY

Data on fibre broadband access is provided by the Ministry of Education and covers 86% of state schools (data on private schools is generally unavailable). Annual school results from 2011, disaggregated by gender and ethnicity, are also provided by the Ministry of Education alongside school demographic data, which we use as a control in some of our specifications.

Figure 1 shows the spatial and time variation of schools' access to fibre broadband. The substantial time variation, even within geographical regions, allows us to supplement our difference-in-difference specification with specifications which control for year-region interactions, making our estimates robust to regional trends.

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RESULTS

We find that the availability of fibre broadband increases National Standards passing rates in each of the three subjects by about one percentage point per year, i.e. by about 2 students at the average-sized primary school who are at or above the requisite standard. This equates to about 4600 students per annum across all the schools within our sample. The effects on the percentage of students recorded as being above each standard are substantially smaller and statistically insignificant, though they remain positive.

We find no evidence that Māori and Pasifika students generally benefit more from fibre broadband than do other students. However, we do find weak evidence suggesting that students at low decile schools benefit more than students at higher decile schools. If the most optimistic estimate, that for the effect on the writing National Standard at Decile 1 schools, was correct it would mean that on average providing fibre broadband allowed an additional 7 people at each Decile 1 school to pass that standard.

We find no evidence that suggests isolated schools benefit more from fibre than schools in cities.

Because of the smaller number of secondary schools, our analysis of NCEA passing rates is imprecise and we cannot meaningfully conclude whether they were affected by fibre broadband. An exception occurs for level 1 numeracy where we find evidence of an improvement in pass rates.

We also examined the dynamic effects of fibre broadband. By checking whether fibre appears to increase school performance in the year before fibre is implemented we performed a robustness check on our difference-in-difference estimator. We also checked whether the estimated effects of fibre increase in later years. Our results suggest that neither effect occurs.

POLICY ISSUES

As increasing educational performance was a policy justification used for the Ultra-Fast Broadband Initiative, the programme can be considered a success in this respect.

Our data do not enable us to identify the mechanism through which fibre broadband increases school performance. The increase may be because fibre broadband expands the set of technologies available to educators, which may allow teaching to be more individualised and more engaging, or may facilitate better monitoring of student performance. Alternatively, traditional academic skills could be complementary to computer skills, and thus if broadband provision results in greater computer skills, broadband may induce students or their families into greater investments in academic skills. Broadband may allow schools to perform previously-expensive tasks cheaply, reallocating their resources towards academic achievement. Data on the ways that schools are using fibre broadband or further evaluations of more specific interventions would help elucidate which of these mechanisms are important.

CONCLUSION

The availability of fibre broadband seems to have a reliable, small, positive effect on National Standards pass rates in primary schools. The effect is similar on each of mathematics, reading and writing.

The effect size we estimate is small. Nevertheless we can distinguish it from zero because of the size of our data. Because we have fewer data points for secondary schools, we found no evidence for fibre broadband affecting NCEA pass rates. We also find no large differences in effect sizes among ethnic groups or genders, or between urban schools and those which are more isolated. We find some evidence that low-socioeconomic schools benefit more than those with wealthier students.

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