INDEPENDENT SCHOOLS
OF NEW ZEALAND

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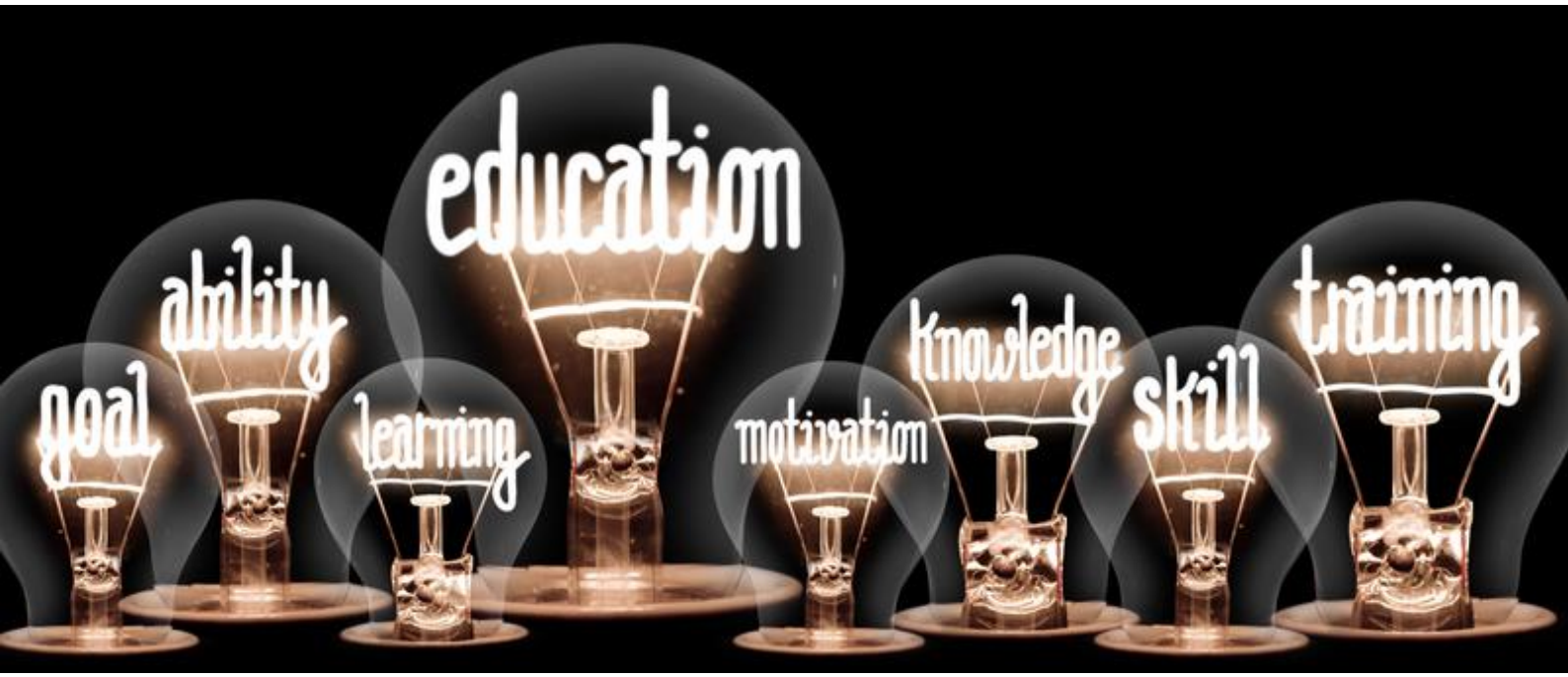

Independent schools

What would a smart state do?

NZIER report to Independent Schools New Zealand

June 2020

About NZIER

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice.

We undertake and make freely available economic research aimed at promoting a better understanding of New Zealand's important economic challenges.

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NZIER was established in 1958.

Authorship

This paper was prepared at NZIER by Mieke Welvaert, Prince Siddharth and Derek Gill. It draws on an earlier NZIER report prepared in 2003 by Preston Davies and John Beckett.

It was quality approved by John Yeabsley.

The assistance of James Hogan and Sarah Spring is gratefully acknowledged.

Registered office: Level 13, Willeston House, 22–28 Willeston St | PO Box 3479, Wellington 6140
Auckland office: Ground Floor, 70 Shortland St, Auckland
Tel 0800 220 090 or +64 4 472 1880 | econ@nzier.org.nz | www.nzier.org.nz

Key points in a nutshell

Independent schools:

- offer genuine educational *choice* by catering for diverse social and educational needs
- improve student *outcomes* with higher PISA scores and NCEA endorsement rates (around 10% more students attain excellence at Level 3) and all *at lower fiscal costs*
- *save the Government* at least $175 million p.a. in operating expenses but only by making some parents pay twice for their children's schooling
- face a *widening gap* between their funding and that for state or integrated-schools which exposes Government's already stretched fiscal position to further risk.

A smarter strategy would be to increase the subsidy for independent schools so it is linked to the cost of the most efficient state system schools.

Summary

Independent schools' market share is shrinking

Independent schools in New Zealand accommodate over 30,000 pupils across 91 schools. At the same time, the national school roll is increasing, and capacity pressures are growing for state schools in key urban areas where there is limited space to expand. While funding for the state school network is growing, funding for independent schools has been capped since 2009.

Increasing long-run cost risk facing the government

The boost to teacher salaries at state and independent schools as well as increased capital funding for state schools puts increasing pressure on independent schools to continue providing a tailored service at the same fees.

The widening gap between independent school funding and state or state-integrated school funding means that independent schools are becoming less viable. The impact of Coronavirus will only increase the financial challenges facing independent schools due to reduced enrolments and fundraising capability.

Other countries fund and regulate independent schools differently…but some fund state and independent equally

Some countries, such as the Netherlands, Belgium, and France treat purchasing education the same as providing education, and thus fund independent and state provided education equally. In contrast, countries which have a longer standing culture of communities funding

education often have less state involvement in funding and regulating independent education.

In New Zealand, funding for independent education is low relative to the countries that fund education in any way.

Supporting independent schools is in the New Zealand community's best interests

There are several arguments for increasing funding to independent schools:

- Optimising government expenditure of schooling in total. Increasing the number students that attend independent schools, would reduce the cost of system expansion for the government and deliver high levels of achievement at a lower cost to the public purse.
- Offering stability to the sector – the current pooled funding creates uncertainty for independent schools and families, making both more cautious to participate in independent schooling.
- Offering genuine educational choice – independent schools are better placed to provide for diverse learning needs and preferences.
- Supporting innovation – which comes at a lower cost to the government because independent schools' parents and donors co-fund the innovation costs, limiting government exposure to risk.
- Ensuring horizontal equity – parents who send their children to independent schools pay twice. Once through taxes, which largely go to state or state-integrated schools and again through independent school fees because funding to independent schools is as low as 20% of state school salary and operating funding.

We analysed the data from the state school network to assess the performance of efficient state schools

In order to assess the cost running an efficient school, we used a technique called Data Envelopment Analysis (DEA). DEA is a ground-up technique that finds the maximum outputs in terms of educational achievement at different schools for varying levels of inputs. This gives an empirically based benchmark for comparing independent school funding with the funding for the most efficient state and state-integrated schools.

A smart state focused on maximising wellbeing would increase the Private School Subsidy Funding

If the state wants to minimise the risk of future long-run costs, it would ensure that funding of independent schools is adequate to keep the sector viable. The fiscal analysis provided in this paper suggests increasing the subsidy to independent schools would paradoxically save the government money.

A state concerned about promoting educational achievement and overall wellbeing would pay more than this fiscal breakeven value. Linking the subsidy to independent schools to that of the most efficient state and state-integrated schools, would increase the funding from around $2,000 per secondary student in 2017 to between $8,600 per secondary student (based on direct costs) and $11,600 per student (using full costs).

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1 Introduction – a brief history of schooling in New Zealand

New Zealand has three main types of schools: state schools, state-integrated schools, and independent schools.

For the most part, we have these different schools because of history. Initially all schools were independent from the government, unregulated, and funded by attendants or their communities. Māori have long had whare wānanga (houses of learning) (Swarbrick 2012a). Many schools set up by European settlers were faith-based.

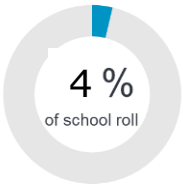
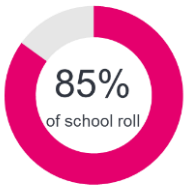
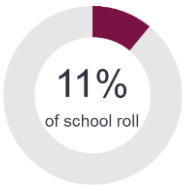
As the state began expanding its functions, it began funding existing schools and setting up schools – providing education itself. By 1877 New Zealand had free, secular and compulsory education (Swarbrick 2012a). But independent (often Christian-based) schools remained. From this point we had two established types of schools: state schools and independent (otherwise known as private) schools.

However, as the New Zealand economy hit a rough patch in the 1970s, the government began to partially fund independent schools. By 1975, the then quite large body of independent schools, particularly Catholic schools, negotiated with the government to integrate into the state system (Swarbrick 2012b). This was the beginning of state-integrated schools, which receive similar funding to state schools but can also ask for attendance dues and additional donations from parents for their 'special character' buildings (e.g. chapels) and education features.

As a result, we now have three main different types of schools with three different arrangements for regulating, funding, and providing education (see Figure 1)

Figure 1 The Government's role in different school types in New Zealand

More of the building filled in (dark) indicates more government involvement

	INDEPENDENT SCHOOLS	STATE SCHOOLS	STATE-INTEGRATED SCHOOLS
			
REGULATION			
	Government oversight of school and teaching	Government oversight of school, teaching, and curriculum	Government oversight of school, teaching, and curriculum
FUNDING			
OPERATIONS AND STAFF FUNDING	>80% from parent fees or donations <20% from government	Government funded	Operational funding equivalent to state schools
CAPITAL FUNDING	100% parent fees or stakeholder contributions	Government funded	Most new buildings need to be funded by the school proprietor (sometimes eligible for government funding) Government funding for capital maintenance and modernisation
PRODUCTION			
	Schooling provided privately	Schooling provided by the state	Schooling provided by the state

Source: NZIER, Education Counts 2019, Ministry of Education 2019b, Office of the Auditor-General 2014

Our report discusses first the role of the state in education, then the role of independent schools in education and how independent schools support economic objectives of equity and choice and government objectives of innovation and being fiscally prudent.

We then discuss the impacts of the recent hike in state school teacher salaries on independent schools and how this can negatively impact government objectives in the long term. If the government wants to maintain the current ratio of independent schools to state and state-integrated schools, and the benefits this provides, it should re-assess its funding for independent schools in light of their long-term viability and capacity to absorb student roll pressures in their local area.

We then look at the question of how much, and what is an efficient level of funding. We have undertaken some empirical analysis to determine an efficient level of funding for state and state-integrated schools. This research can form an empirical basis for any decisions the government wishes to make about funding independent schools.

We then conclude what a smart state could do given the economic objectives of equity and choice, and government objectives of building wellbeing, innovation, and maintaining fiscal efficiency.

2 The state has a pivotal role in education

Schooling creates health, wealth, and wellbeing benefits for New Zealanders. This comes in the form of fulfilment and a sense of self-worth for the individual, integration into wider society (social capital), reduced burden of care for parents raising children which combined with skills development, increases earning ability for both the individuals receiving education and their communities.

However, because these benefits do not always accrue directly to the person engaging in schooling, or the people paying for education, education requires government intervention. As a result, governments often assume the responsibility for addressing the challenges of education *in such a way that total wellbeing is enhanced to the greatest extent possible* (The Treasury 1987, 2:272).

2.1 The challenges of education

Government intervention helps mitigate key difficulties associated with education:

- Who pays (concerns about equity)?
- Who chooses (the agency problem)?
- Who benefits (how benefits disperse among society)?
- Who is accountable (efficiency concerns)?

(The Treasury 1987)

We discuss these in more detail below.

Who pays?
Not everyone has the same level of income to pay for the same level of suitable education. *Hence the net benefits that society and individuals draw from education may not be fairly distributed to all* (The Treasury 1987, 2:272).

Who chooses?
Most people who engage with education are not adults and also not in a position to know the best program of education for them. Furthermore, often parents do not have all the information to make the best educational choices for their child. At the same time, education providers have more information, but also have a stake in how much they share with the parents (the consumers). This is known as asymmetrical information (discussed further in Appendix A).

As a result, those receiving education are exposed to agency failure – where the people responsible for a child's educational decisions and the consequences for that child's future, lack adequate information to act in the child's best interests.

Who benefits?

Individuals receiving education and agents delivering education do not always capture the full benefits (or costs) of the education transaction. As a result, market settings often lead to sub-optimal education consumption (see positive externalities in Appendix A for more detail).

Who is accountable?

Customers may not be able to hold providers satisfactorily to account (The Treasury 1987, 2:272). Families paying for education may not be able to seek adequate recompense if that education is not up to scratch. Governments mitigate this efficiency risk by regulating the education sector for quality and quantity (see Section 2.2 for how).

2.2 Types of state intervention

To address these challenges, governments intervene in education through regulation, funding, and provision.

Regulation

Government regulation of education markets comes in two forms – quality and quantity.

Regulating quality helps maintain efficiency and horizontal equity. The government regulates curriculum content, provides information through reviews undertaken by the Education Review Office, and sets standards for teacher behaviour. All these regulations help ensure that all students receive at least a minimum level of education appropriate to their age.

Regulating quantity helps ensure that the students leave school with the tools to survive, thrive, and contribute to New Zealand society. The government achieves this by requiring that all students aged from six to sixteen attend school (Ministry of Education 2019a).

Funding

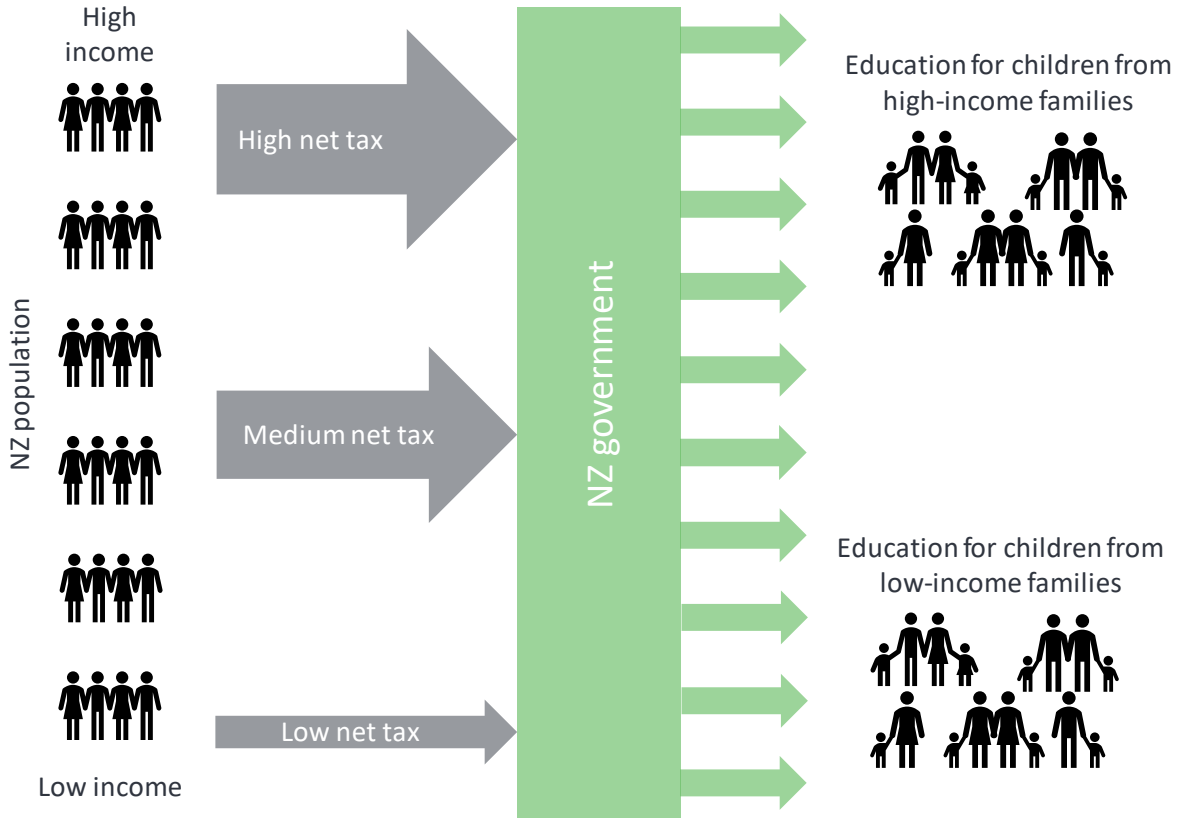
The amount of funding provided from government for education is significant. In the 2019 Budget, the government allocated $14.3 billion to education alone (Treasury 2019). This represents about 16% of core Crown expenses (Treasury 2019). Of this amount, around 46% is allocated to secondary and primary education (Treasury 2019). Schools, therefore, are a major expenditure destination for the revenue raised by general taxation.

The government uses taxes and subsidies to redistribute education funding so that those with different means and needs have access to education (vertical equity). Although various other regulatory (deciles, zoning, rankings and ratings) and economic (competition for good teachers) drivers interfere with creating vertical equity,[1] the underpinning redistribution helps even out school funding access. This in turn raises educational outcomes for more of the New Zealand population – improving our human and social capital. A more educated population is more productive, earns more, and is more socially cohesive. Redistributing funding for education so that more people are educated to a higher standard ensures a more even and equitable distribution of outcomes (see Figure 2).

[1] In some locations, people pay premiums for some state school zones that are similar to or greater than private school fees.

Figure 2 Vertical equity in theory

The government redistributes tax revenue to fund wider access to education



Source: NZIER

Production

In the case of production, the state effectively bypasses large parts of the market and produces education goods and services itself. The state school sector is an example of large-scale state production.

School education provision does not need to be concentrated in the state sector. States can purchase education from providers, such as the private sector. Some governments, such as the Netherlands and Denmark, weigh purchasing education from an independent provider equally against providing education themselves. We discuss different countries' approaches to regulating, funding and providing education below in Section 3.5.1.

2.2.1 Conclusion

The state plays a pivotal role in schooling. This means how intervention occurs is important for an efficient and effective sector. The following section discusses why interventions that support independent school-based education are both effective and cost saving from a government perspective.

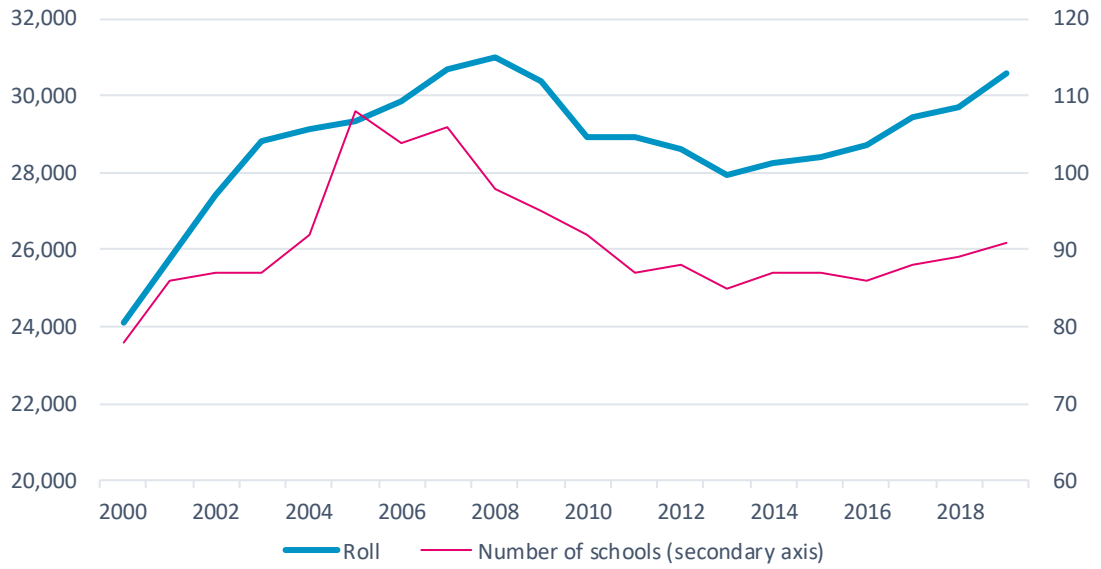
3 Independent schools in New Zealand

The relationship between private and publicly funded education has changed over the history of education in New Zealand. In this section we discuss what independent schools look like now, how they accommodate emerging education needs in New Zealand, and how they help the government provide education equity and efficiency.

3.1 Independent schools sector is small but significant

Independent schools currently make up 3.7% of the total school roll, which is equivalent to just over 30,000 students across 91 schools (Education Counts 2019). Independent school rolls have fluctuated over the past two decades. At the same time, state and state-integrated schools have grown consistently. Factors affecting the number of students attending independent schools are population growth, the state of the New Zealand economy, family preferences and needs, as well as supporting funding from the New Zealand government.

Figure 3 Number and roll size of independent schools in New Zealand

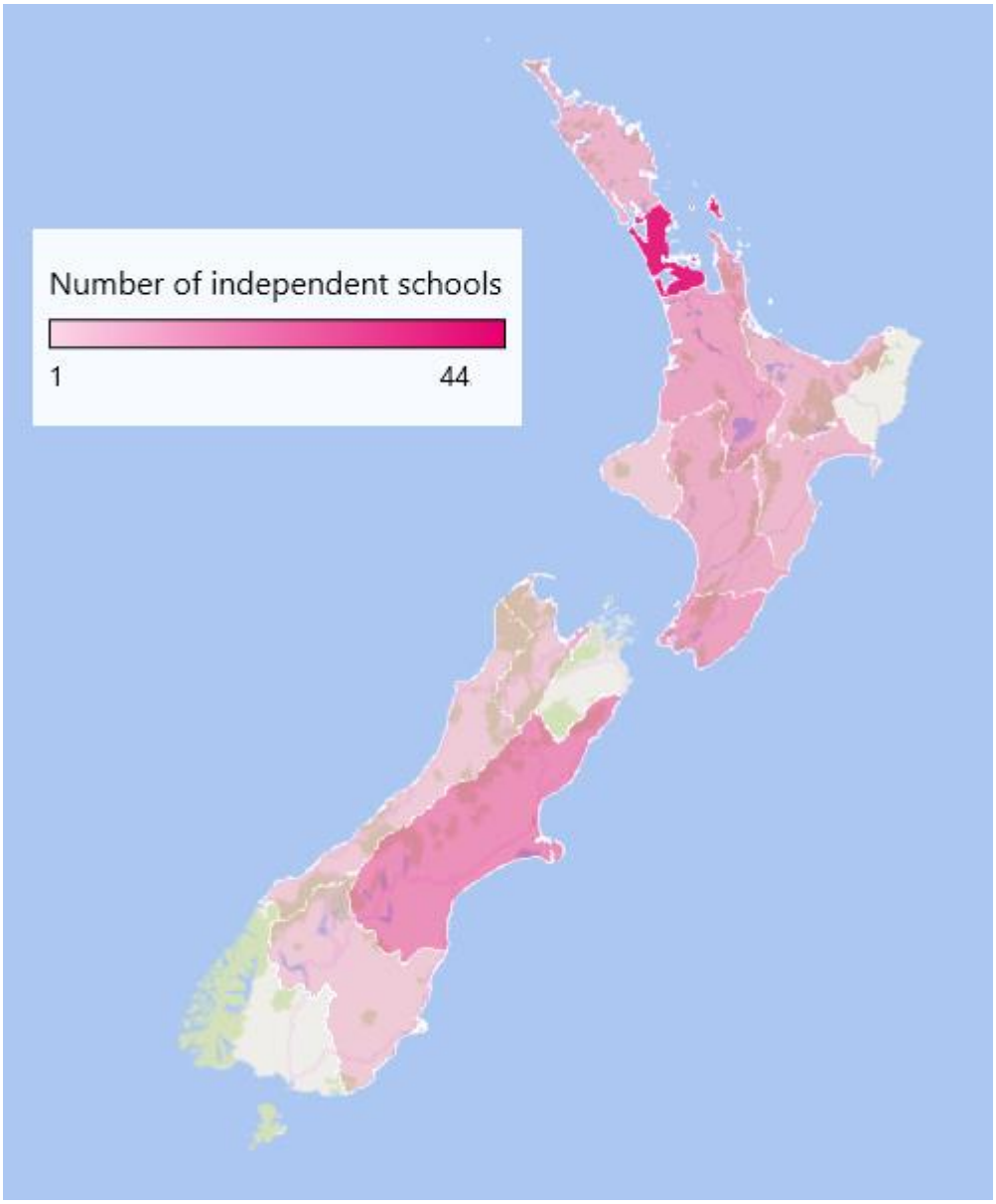


Source: Education Counts 2019

3.2 Independent schools are mostly in main centres

More than half (52%) of students attending independent schools are in Auckland (Education Counts 2019). Much of the rest of the independent school roll is focused in the main urban centres of Canterbury (16% of independent school students), Wellington (10%) and Waikato (10%). Independent schools need a critical mass of families wanting the educational experience independent schools offer within a reasonable catchment, and therefore independent schools are more common in more densely populated urban areas.

Figure 4 Independent school locations



Source: Education Counts 2019

3.3 Independent schools cater for diverse social, cultural, and educational needs

The independent and public education sectors can be viewed as complementary systems. The key difference between the independent and public education sectors, however, relates to how education is delivered. A high degree of influence is exerted by union groups, particularly in the secondary sector, which has a stifling effect on innovation and flexibility. Free of such constraints, independent schools have more ability to innovate, and cater for diversity.

Independent schools cater for a wide range of community and schooling needs

Independent schools cater to a wide range of communities. *Many independent schools provide a religious or values-based education. Others promote a particular educational philosophy or interpretation of mainstream education* (Independent Schools Council of Australia 2019). Some examples of education variation and diversity supported by the private schools in New Zealand are:

- Schools with extensive sections for Learning Support, e.g. Summit Point School, ADDI Enrichment Academy, Diocesan School for Girls, Scots College, King's College.
- Schools with extensive bursary support for low income families, e.g. Dilworth School, Diocesan School for Girls, St Cuthbert's College, Saint Kentigern College, Christ's College, Scots College, to name just a few.
- School for Gifted and Talented students, e.g. AGE School.
- Schools with Special Character, e.g. Diocesan School for Girls, King's College, St. Cuthbert's College, St. Mark's Church School, Scots College, St Margaret's College.
- Schools with mostly International Students e.g. Auckland International College, ACG Schools.
- Faith-based schools: e.g. Muslim Schools, e.g. Iqra School and Christian denominational and non-denominational schools, e.g. Samuel Marsden Collegiate School, Scots College, Rangi Ruru Girls' School, Hereworth School.
- Montessori schools, e.g. Harbour Montessori College, Meraki Montessori School, Nova Montessori School, Waikato Montessori Education Centre, Peace Experiment.
- Steiner schools, e.g. Motueka Rudolf Steiner School, Titirangi Rudolf Steiner School, Waiheke Island Steiner School.
- Schools that cater for students who come from disadvantaged backgrounds, e.g. Dilworth, or are recovering from traumatic experiences or addictions, e.g. Odyssey House School Auckland.

Why do families choose independent schools?

Consumers' demand for independent school services is dependent on several variables, including:

- Characteristics of the household, such as income, attitudes to risk, family size, requirement for boarding, health status, and whether the household lives in a rural or urban area (or parts of urban areas).
- Characteristics of the school, its reputation, the facilities available, its objectives and philosophy, and extra-curricular activities such as sport and the arts.
- The price of attending an independent school (i.e. fee levels).
- Characteristics of the state school system. These include perceptions around academic integrity, quality, price and location relative to comparable state schools.

The differences between independent and public education affect parents' demand

People choose independent schools in New Zealand to cover a gap between their or their children's preferences or needs and what the public system provides. This gap changes as both public and independent systems evolve:

- Public expenditure priorities change, some services become more obtainable in the public system and others become less obtainable (such as class size).
- New technologies emerge and the relative speed of uptake of these technologies in the public and independent sectors, such as devices in schools, will influence the demand for education services in either sector.
- General preferences and cultural attitudes change, such as preferences for single sex or co-ed schools.

- Economic conditions change, for example house price growth and enrolment schemes ("zoning") means that some state schools are outside of the (house) price range for some families. Independent schools are a way for these families to access their preferred choice of education without being constrained by where they can afford to live.

If the public system does not keep up with service expectations, people will look for independently provided alternatives. Independent schools can be more agile than their state counterparts.

In a society with ever-widening tastes, preferences and cultures, such flexibility is important in ensuring the best delivery of the educational outcomes sought by increasingly eclectic consumers.

3.4 Independent schools provide competitive stimulus

The presence of a strong independent sector can have direct effects on the academic achievement of those attending independent schools and may have instrumental effects through the competitive effect on state schools – both of which contribute to improving outcomes.

Higher achievement by independent schools in many countries

A consistent finding across a range of countries is that students attending independent schools have higher achievement rates than students attending public schools. Using PISA[2] data for 16 OECD countries (including New Zealand) and 10 partner countries, the OECD found

> *the typical private school student outperforms the typical public-school student. This private school "advantage" shows itself in PISA reading scores that are 30 points higher – the equivalent of three-quarters of a year's worth of formal schooling – among private school students.* (OECD 2011, 1)

This OECD research concluded that three quarters of this difference is explained by advantages in the socio-economic backgrounds of students attending independent schools, with the balance explained by the degree of autonomy over curriculum and resourcing (OECD 2011).

New Zealand data also shows higher achievement by independent schools but attribution is a problem.

The evidence for New Zealand, using both PISA scores and achievement measured through NCEA data, suggests higher achievement by independent schools.

An analysis of 2011 PISA data undertaken for the Independent Schools of New Zealand compared New Zealand independent schools PISA scores with their international counterparts and schools in the state system network. Compared to their international private counterparts, New Zealand independent schools PISA scores were ranked third in Mathematics and second in both Reading and Science. Students from NZ Independent Schools also scored significantly better in PISA tests than their counterparts in the NZ state system schools: 17.3% higher in Mathematics, 16.5% higher in Reading and 15.6% higher in Science (Hock Gan 2012).

An analysis of the most recently available NCEA achievement data found independent schools achieved significantly higher rates of Excellence endorsements under NCEA than their state and integrated school counterparts and generally higher rates of Merit as well. Table 1 **Error! Reference source not found.** shows the achievement rates for all students attempting NCEA qualifications in 2019 for all three types of schools. It is broken down by the year level as well as the qualification endorsements.

[2] Programme for International Student Assessment (PISA) is a worldwide study by the OECD that evaluates educational systems by measuring 15-year-old school pupils' scholastic performance on mathematics, science, and reading.

Table 1 NCEA endorsement attainment across schools

Percentage of those attempting NCEA who achieved endorsements in 2019

School type	Level 1 Merit	Level 1 Excellence	Level 2 Merit	Level 2 Excellence	Level 3 Merit	Level 3 Excellence
State Schools	32.7%	17.7%	23.6%	14.7%	25.1%	12.9%
Integrated schools	38.9%	25.3%	31.7%	23.0%	29.8%	18.6%
Independent schools	**42.4%**	**38.9%**	**39.4%**	**30.2%**	**36.6%**	**26.8%**

Note: Bold denotes the highest rate of achievement of Merit and Excellence endorsement by type of school.

Source: NZIER, NZQA

Table 1 shows that independent schools have significantly higher rates of Merit and Excellence endorsements. Table 2 provides a similar comparison but for Decile 10 schools only.

Table 2 Decile 10 NCEA endorsement attainment across schools

Percentage of those attempting who achieved in 2019

School type	Level 1 Merit	Level 1 Excellence	Level 2 Merit	Level 2 Excellence	Level 3 Merit	Level 3 Excellence
State schools	41.5%	29.0%	32.3%	25.7%	32.2%	20.3%
Integrated schools	**44.7%**	36.2%	**43.5%**	29.0%	36.1%	13.2%
Independent schools	41.7%	**42.8%**	39.9%	**34.1%**	**39.1%**	**28.3%**

Note: Bold denotes the highest rate of achievement of Merit and Excellence endorsement by type of school.

Source: NZIER, NZQA

It shows that Decile 10 independent schools significantly outperformed state and integrated schools in Excellence endorsements at all levels, while also achieving higher rates of Merit endorsements at Level 3.

Combining Decile 10 Merit and Excellence endorsements together, independent schools' achievement rates for Level 1 are between 5% and 9% higher than those integrated and state schools respectively. Similarly, at Level 2 independent schools' endorsement rates are 1.5% and 16% higher, while at Level 3 the gap widens to 15% for state schools and 18% for integrated schools. Using combined data on attainment of endorsements for all schools – not just Decile 10 schools – the gap is an order of magnitude greater again.

However, comparisons using NCEA data such as simple school-by-school league tables or aggregates such as those shown in Table 1 and 2 *need to be interpreted extremely carefully*. The data doesn't simply speak for itself because the schools' performance isn't fully captured by NCEA data.

Firstly, this is because some 'single pathway' schools use international assessments such as Cambridge International Examinations (CIE) or the International Baccalaureate (IB) as an assessment framework. Other schools have a dual pathway approach, with some students using NCEA but the top students are

encouraged to sit the CIE or IB. Participation in other forms of assessment will tend bias downwards those schools' NCEA results so simple league tables don't adequately capture relative performance.

Secondly, private schools often offer a wider variety of co-curricular activities. The additional strengths of extensive sport, performing arts, cultural and after-school activities are often a reason why parents select a private school. The investment of funds into co-curricular activities is a strength of private schools as it is seen as a value-added contribution to the development of well-rounded individuals. However, these effects are not directly captured in NCEA data.

Thirdly, achievement measured by NCEA data is not the same as learning. John Hattie's research highlights that the greatest influence on learning is the expectations of students and teachers and the largest barrier to student learning is within-school variability. He argues *"in the course of my Visible Learning research, I have found that the greatest influence on learning is the expectations of the students and the teachers. Further, recent research by Rubie-Davies (2014) shows that a teacher typically has high, medium or low expectations for all the students in their class, with the students of high-expectation teachers being very successful in achieving their teachers' expectations and the students of teachers with low expectations being similarly successful at making lower gains"* (Hattie 2015, p. 11).

There are numerous factors (such as teacher's expectations, and student characteristics such as innate ability, family background, environment, income levels, etc.) that could explain the relatively better performance of independent versus state system schools. Our empirical research (discussed in Section 6) also shows that there is uneven NCEA performance among state and state-integrated schools.

Educational researchers have used a range of research tools to remove or account for the socioeconomic factors in private schools that might account for the higher levels of achievement observed. One conclusion is that when interpreting the results of any of these analyses, it should be borne in mind that private schools constitute a heterogeneous category and may differ from one another as much as they differ from public schools. Public schools also constitute a heterogeneous category. A typical finding is that the variation in achievement within a school, and between schools of the same type, is greater than the differences between public and private schools (US Department of Education National Centre of Education Statistics 2006). Consequently, while the data is consistent with higher achievement by independent schools, an overall comparison of the different broad types of schools is of modest utility.

Some country studies show that the presence of independent schools raises outcomes for all schools

The independent sector provides important benchmarks against which public schools can measure themselves in areas such as innovation, diversity, and curriculum delivery. This acts as a stimulus for state schools. The existence of private schools could affect those 'left behind' in public schools. For instance, (Hepburn and Robson 2002) cite evidence of average test scores being higher in Canadian provinces that fund independent schools than those in provinces that do not. This differential is made up of higher absolute test scores for those who attend independent schools, and higher average test scores for those in state schools relative to state school students in other provinces. Robson and Hepburn explain the latter point by claiming that when faced with competitive pressures from the independent schools, public schools improve their programmes and performance.

The report also showed that children from low-income families attend independent schools in greater numbers and form a higher percentage of total independent school enrolment than they do in provinces that do not fund independent schools. There is also a weaker correlation between socio-economic status and achievement in those provinces that fund independent schools. A larger independent school sector did not appear to 'skim' the more advantaged students from the public system. Funding independent schools seems helpful, rather than harmful, to the pursuit of educational equity.

Similar results were reported for Sweden. Sandström and Bergström (2005) looked at how individuals in public schools perform, after controlling for the tendency for private schools to enrol more children from higher income and immigrant families. They found that the presence of greater competition from independent schools' results in better public school performance in standardised tests. More recently, Böhlmark and Lindahl (2015) found the presence of a strong independent sector resulted in positive development of the state sector.

By contrast, other country studies found no positive impact on the overall performance of national education system. Looking at US experience for example, Urquiola (2016) concludes the literature "*has produced mixed results rather than a distinct sense that greater competition raises achievement*".

Overall the empirical literature finds mixed results. Independent schools do appear to benefit the individual students who attend them, and these results are achieved at lower cost to the public purse. However, there is no systematic evidence that independent schools help to raise the level of performance of the national school system as a whole across countries.

3.5 Independent schools reduce government spending on education

Independent schools divert those willing to pay away from the publicly financed system, freeing up funds for those remaining, without compromising outcomes. In 2018, government funding for independent schools was equivalent to 19% of the per pupil operating and salary costs of educating children in the state sector. Independent schools covered the remaining 81% of operating costs as well as all their own capital costs. This provides considerable savings for the government including $174m in operating and salary expenses calculated from the 2018 roll and funding data (Education Counts 2019 and Ministry of Education 2019c).[3]

For a full account of the fiscal effects of independent schools see Appendix C.

Benefiting government resource allocation

As a result, the independent sector diverts pupils away from the public system, freeing up valuable resources. Channelling individuals into the independent sector is one way to redirect resources to other parts of the public education system.

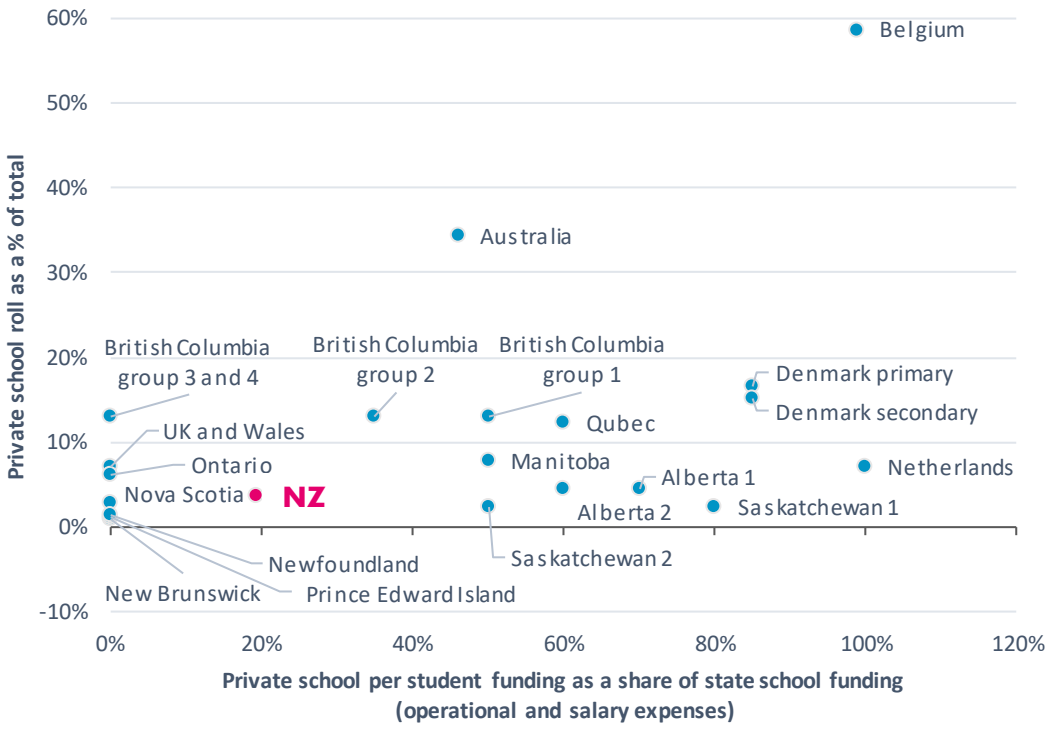
3.5.1 Other countries approach independent education differently

A variety of funding and regulatory arrangements exist for non-government schools around the world, often shaped by constitutional and historical factors (Nesdale 2003). In this section we discuss government intervention in schools from several countries that we compare to ourselves, with a focus on funding arrangements. Figure 5 shows the diversity of funding and independent schools' roll share among our counterparts.

[3] Operating and salary expenses saved = Student roll at independent schools × (Operating and salary expenses per student at state schools - Per student funding to independent schools)

Figure 5 Private school roll compared to funding

Funding for private schools compared to public school funding, per student operational and salary expenses



Notes

1 New Zealand is highlighted in pink.

2 Canadian provinces' data is the total private school roll – roll breakdowns for different funding groups were unavailable.

3 Groups for British Columbia refer to group definitions of private schools in the province.

4 The private school roll for Denmark is separated into primary and secondary schools.

Source: NZIER using data from Independent Schools Council of Australia 2019, Independent Schools Council 2019, Milke 2014, MacLeod 2018, OECD 2017, OECD 2014c, OECD 2014a, The World Bank 2019a, The World Bank 2019b

Australia

Without state integration, arrangements for independent schools in New Zealand would probably look a lot like Australia's. Independent schools (including catholic schools) also make up a higher share of the school roll in Australia with 34% of school enrolments (Independent Schools Council of Australia 2019) compared to 3.7% in New Zealand (Education Counts 2019).

Independent schools in Australia also receive more funding than in New Zealand. Australian state and central governments pay for 46% of school's operational costs and 10% of capital expenses (Independent Schools Council of Australia 2019). Australia reflects a number of factors in its funding allocation formula, including community income and diversity (Department of Education 2019).

England and Wales

In England and Wales, independent schools do not receive general government subsidies, and run on fees and donations alone (GOV.UK n.d.). Although many independent schools do follow the national curriculum and assessment schedule (Independent Schools Council 2019), the government does not require independent schools to do so (GOV.UK n.d.). As in many countries, funding is often tied to government involvement in school regulation (Nesdale 2003).

United States

Funding and regulation of independent schools varies from state to state in the United States (US) (U.S. Department of Education, Office of Innovation and Improvement, and Office of Non-Public Education 2019).

Although independent schools are traditionally funded through tuition fees, donations, grants, tax credits, and other endowments (Nesdale 2003), school voucher programmes are becoming more common in the US (Fiddiman and Yin 2019).

Voucher programmes are an effort to enable more access to independent schools (Fiddiman and Yin 2019). The state provides families with a voucher covering the equivalent fees of a public education to use at an independent school (Fiddiman and Yin 2019). Milwaukee and Ohio adopted voucher programmes to improve educational outcomes in their states by shifting students from "low performing" public schools to (in this case) more resourced independent schools (DeAngelis and Hoarty 2018).

However, as independent schools are often less regulated, many opponents argue that the voucher system empowers independent schools to discriminate among pupils on a racial basis. Meanwhile many proponents are also minorities and people from disadvantaged communities who don't feel well-serviced by public schools in their area. Voucher programmes currently operate in 29 states (Fiddiman and Yin 2019).

Canada

As with the United States, regulation and funding for independent schools varies from province to province in Canada. Alberta provides independent schools with grants covering 60-70% of public-school operating expenses (Van Pelt and Clemens 2015), so long as the schools have certified teachers and a certified principal (Government of Alberta 2019). British Columbia sits in a middle ground and provides independent schools with funding if more than 50% of their students are Canadian citizens (Government of British Columbia 2019). Funding in British Columbia is also higher if the independent school has operating costs lower or equal to public schools in the province (Government of British Columbia n.d.). Meanwhile none of the Atlantic states nor Ontario provide government funding to independent schools (Milke 2014).

Netherlands

In the Netherlands, all schools are funded the same way, regardless as to whether they are public or independent schools (OECD 2014c). Equal funding has been in place since 1917 and ties in with the Dutch Constitution which sets out that schools should have the freedom to set their own educational, philosophical, and religious principles, their own content and teaching methods, and do not need prior approval from the government to exist (Ministerie van Onderwijs 2014).

The Netherlands has high rates of student achievement but also one of the longest periods of compulsory primary and secondary education. Education in the Netherlands is compulsory for everyone between the ages of five and 18 (inclusive) (OECD 2014c).

Belgium

Belgium has a similar approach to regulating schools as the Netherlands (OECD 2017). Most (99%) of the private schools in Belgium receive funding equal to public schools (OECD 2017).

Denmark

Education is compulsory for children, but the Danish constitution purposefully does not to specify what that education might be. As a result, parents can home-school their children (unrestricted) or send their children to private or municipal public schools (Nesdale 2003).

The Danish Ministry of Education administers national and international assessments for both private and public schools, but generally school regulation takes place at the municipal level (OECD 2014a). Like New Zealand state schools, schools are governed by boards of parents, teachers, and student representatives (OECD 2014a).

Government funding for private schools is set to ensure that total funding (government plus parental or other external contributions) for private and public schools is the same (OECD 2014a). Older research indicates that funding for private schools is high at 80-85% of school expenses (Nesdale 2003).

France

Almost all private schools receive state funding for teacher salaries (OECD 2014b). A core goal is maintaining education equity between territories in France and public funding is distributed more to schools and areas where education is falling behind – regardless of whether the school is public or private (OECD 2014b).

How do these arrangements compare?

The large variety of arrangements makes a general comparison difficult. Differences in the scale of the respective economies, and responsibility for education provision, may also make comparisons difficult.

Larger economies are likely to have proportionally more wealthy individuals and more entrenched fundraising and donating networks that may generate larger sums to donate to private schools, reducing the need for government funding (see Figure 5). These factors all affect how likely parents are to send their child to an independent school, given costs – their elasticity of demand (see Appendix C for further discussion).

Nevertheless, some relevant themes do emerge. Funding arrangements in the US, England, Wales and eastern parts of Canada are less generous than those in New Zealand. However, the growing adoption of voucher systems in some US states suggest a shift to more funding for private schools to improve access to education. The Local Education Authorities in England have experimented with contracting some school operating functions to private concerns. Both of these actions are in response to concerns with the public system about diversity in provision, school improvement, innovation and parental choice.

In contrast, funding arrangements in countries such as Australia, France, the Netherlands, Belgium, Denmark, and parts of Canada aim to equalise access to education and thus fund private education as much or close to as much as public schools.

Nesdale (2003) also observed a positive relationship between the level of government funding for independent schools and the extent of regulation imposed on such schools. This is especially evident in the case of France and the Netherlands where funding is tied to private schools agreeing to provide a certain standard of education or curriculum. In the case of New Zealand, private schools must be registered.[4] The criteria for registration states that a private school must have:

- Suitable premises, staff, equipment, and tuition standards
- A curriculum
- Fit and proper managers
- At least nine students.[5]

[4] Section 35A of the Education Act 1989.

[5] Section 35C of the Education Act 1989.

3.6 Summary

Independent schooling makes a significant contribution to the government's goals by enabling public resources to go further, by improving individuals' access to quality education, and by more efficient allocation of resources. A well-struck balance between the two sectors can improve the overall performance of the education sector as a whole.

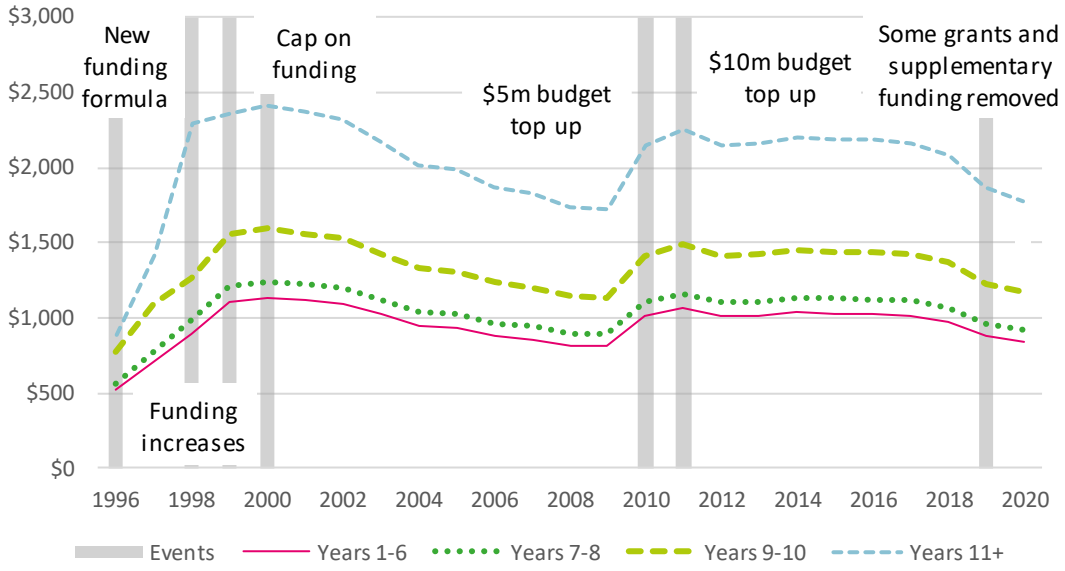
4 Funding for independent schools in New Zealand

Funding for independent schools in New Zealand has ebbed and flowed over time.

Historically, New Zealand has not witnessed the kind of bipartisan political support for government funding of independent schools seen in Australia (Nesdale 2002). Although not always, government funding rates to independent schools tend to relate to the government of the time. Episodes of lower-level funding generally coinciding with 'centre-left' governments and higher levels generally coinciding with governments of the 'centre-right'.

Figure 6 Per student funding for independent schools 1996–2017

Nominal funding over time, unadjusted, with key policy changes in grey

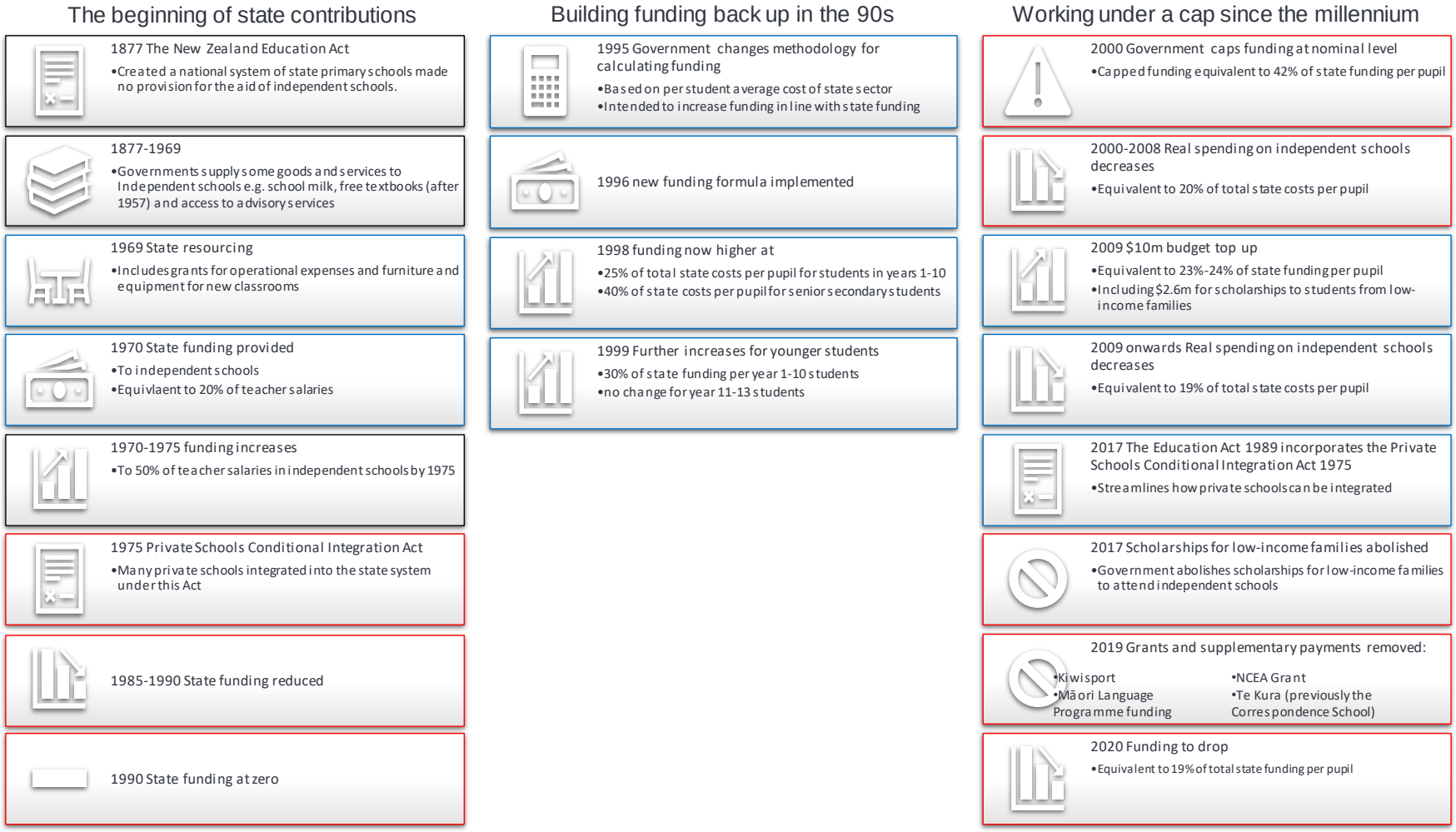


Source: Education Counts 2019, Ministry of Education 2019c, Secretary of the Cabinet 2009

Figure 7 and Figure 8 show the different policy changes affecting increases and decreases in funding for independent schools (without any adjustment for inflation). In contrast, Figure 9 shows how inflation further erodes any funding for independent schools particularly since funding has been under a nominal cap since 2000.

Figure 7 How did we get here?

A history of funding for independent schools on New Zealand, borders represent Labour (red), National (blue), or both (black) governments, respectively



Notes

1 RE: 2019 Grants and supplementary payments removed. Te Kura funding continues for Ambury Park Centre, Odyssey House and Hohepa School.

Source: Cook 2012a, New Zealand Government 1975, Ministry of Education 2017, Ministry of Education 2019a, Board of Trustees of Te Aho o Te Kura Pounamu 2018, The Treasury 2009, The Treasury 2019b

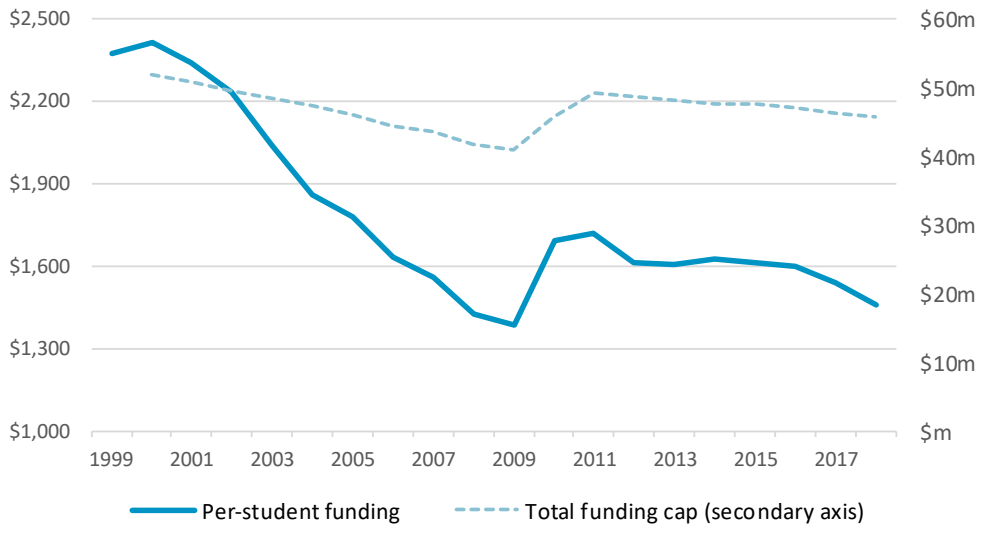
There is a risk that current funding arrangements for private schools will lead to a continued gradual decline in the share of total enrolments in the private school sector and ongoing pressure by a number of private schools for integration into the state sector (Ministry of Education 2016, 4)

The pooled funding for independent schools has been under a cap since 2000. This cap has placed a fiscal limit on how much the government spends on independent schools in New Zealand, but also creates a large degree of uncertainty for independent schools (around the viability of their business) and for families (around whether they can afford to send their children to independent schools). This is because per student funding depends on how many students attend independent schools (see Figure 8).

As funding is no longer strictly benchmarked against state school expenses, the real value of funding decreases in real terms until *concerns build around the overall financial viability of the sector and a specific decision is made to increase the value of the funding pool* (Ministry of Education 2016, 4), as in 2009.

Figure 8 Funding for independent schools varies under a cap

Per-student funding vs. funding cap, both GST exclusive and inflation adjusted

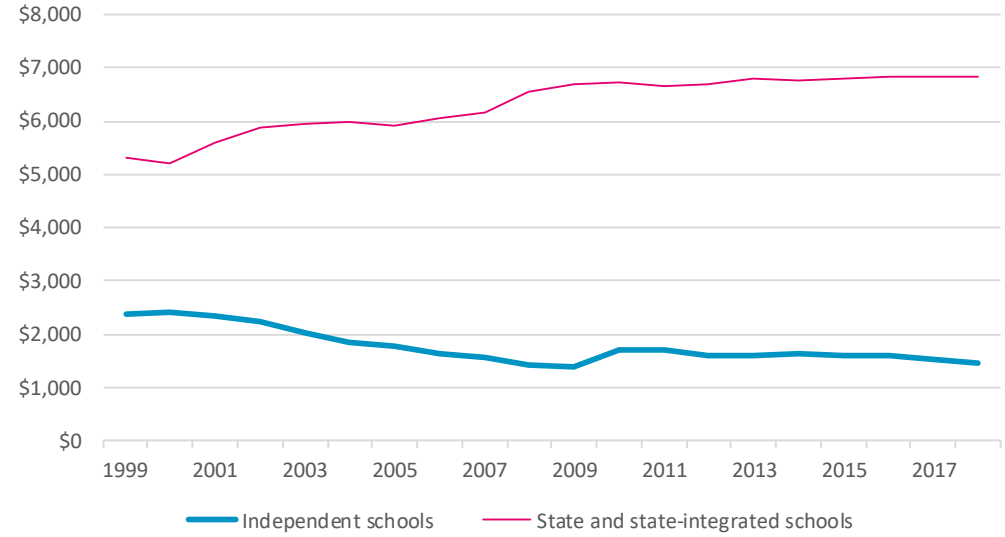


Source: Various, including Education Counts 2019, Ministry of Education 2019c, The Treasury 2009

Meanwhile per student funding for state and state-integrated schools has increased steadily since 2005 (see Figure 9).

Figure 9 Per student funding growth comparison

Funding over time (inflation adjusted), GST exclusive



Notes

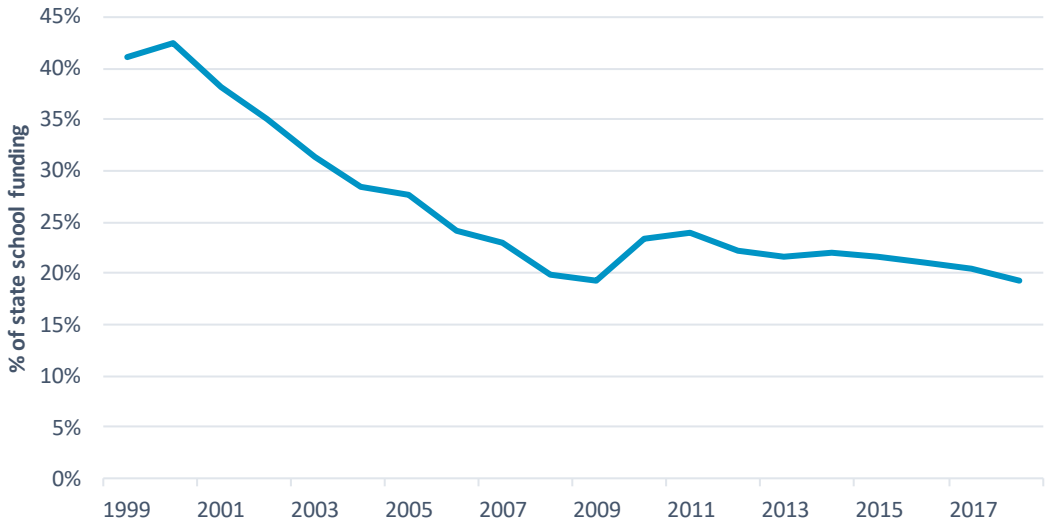
1 Note: 1999-2005 state and state-integrated school funding derived from independent school funding as a share of state and state-integrated funding and independent school funding levels due to lack of directly available (funding level) data.

Source: Education Counts 2019, Ministry of Education 2019c

As a result, the relative funding for independent schools relative to the state school network has dropped (see Figure 10). This places increased pressure on independent schools to remain viable and to continue to provide the fiscal savings to the New Zealand government.

Figure 10 Funding for independent schools compared to state school funding

Per student funding, for operating and salary expenses



Source: Education Counts 2019, Ministry of Education 2019c

4.1 Rationale for funding independent schools

The paper has developed the economic rationale for funding of independent schools. However, governments sometimes adopt political or philosophical rationale for funding independent schools. We discuss the current rationale below.

The current arrangement seems to be that those on higher incomes should pay taxes to cover state-provided schools, as well as paying additional tuition fees if they choose to send any of their children to an independent school. This vertical equity proposition is a form of 'double taxation' on those sending their children to an independent school and conflicts with the principle of horizontal equity, which is concerned with the equal treatment of equals.

Consider two households with identical income levels, but one household chooses to send its children to an independent school and the other to a state school. Despite having the same income, the household which sends its children to independent schools is effectively subsidising the other, while incurring additional individual costs. Nevertheless, even though both households have similar income levels and may share similar educational goals, one is transferring income to the other via the tax system simply for exercising choice in the delivery of their children's education.

5 Changes afoot

The government has raised salaries for state and state-integrated school teachers which has unintended consequences for the role of independent schools in keeping costs down for education spending.

Higher teacher salaries in state schools threaten independent school staffing

Parents paying for independent schooling do so for a reason – be it access to more flexible schooling, desire for education that aligns with their social, cultural or religious preferences, or to accommodate their child's special abilities or disabilities. To accommodate these preferences, independent schools often need to attract higher skilled teachers, and therefore pay a premium for their staff. The pay rise for state and state-integrated school teachers undermines independent schools' ability to attract these staff and to therefore provide the unique services that drive parents to seek independent schools in the first place.

Under these circumstances independent schools have two options:

- Raise fees to maintain the specialised services that some parents want or need for their children.
- Allow their service level to drop – through reduced teacher numbers, less experienced teachers, or lower investment in school facilities or materials.

Both these actions will encourage parents to send their children to state schools instead of independent schools. Raising fees is particularly problematic as this increases the likelihood that only independent schools with students from wealthy backgrounds remain open, engendering elitism.

But the main problem occurs when a large number of students move from independent schools and into the state school system. Although state schools are set up to absorb some students coming from independent schools, few state schools can absorb the hundreds of students that might arrive at their doors after an independent school closes in their area without significant capital investment and additional operational expense.

Reduced staffing or higher fees at independent schools can lead to further closures

Once a critical mass of students leaves an independent school, continuing to run the school becomes unfeasible. This was the case for the Queen Victoria School for Girls in Parnell in 2001 whose roll dropped from 157 in 1998 to 58 in 2001 (Walsh 2001).

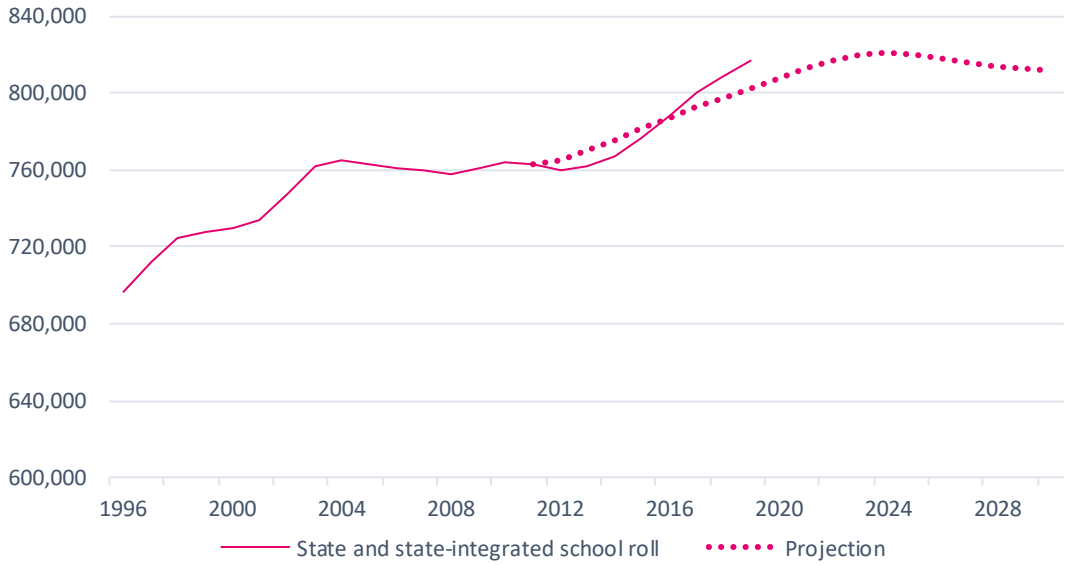
State and independent schools do not always have the capacity to absorb large numbers of students – both in terms of having enough teachers, and in terms of classroom space.

State and state-integrated school rolls are growing

The state and state-integrated school rolls are increasing, particularly in the last three years, where student numbers have accelerated beyond projections (Ministry of Education 2011). Statistics NZ (2016) National population projections suggest that the school age population will continue to grow until 2025, when the numbers aged below 15 years will level out at around 1 million.

These projections predate the Coronavirus. Looking ahead, in the short run, New Zealand's Coronavirus free status could increase pressure on school rolls as New Zealand has become a more attractive destination for foreign students, and for the New Zealand diaspora living overseas. In the medium term, it is not yet clear what the net effect of Coronavirus on immigration flows and hence the school aged population in New Zealand will be. However, the pressure of total school roll growth is likely to continue until the middle of the decade, even if population growth from net migration slows due to Coronavirus.

Figure 11 State and state-integrated school rolls are increasing faster than forecast



Source: Education Counts 2019, Ministry of Education 2011

The state school network has limited scope to adapt to a shift in students moving from one school to another, particularly in the main urban centres which often have little physical space to expand school grounds without incurring large costs. Independent schools are also more concentrated in main urban centres, meaning that their pupils are most likely to move to a state school close by. This geographic distribution compounds the problem of accommodating large roll increases at state schools.

Considering the long-run marginal cost

When considering adequate funding for independent schools the government needs to account for the impact on long-run capital and other costs. In the short run, the gradual shift of students from independent schools to state and state-integrated schools makes very little difference to government's immediate costs (although the government will temporarily lose out on GST income[6]) for reasons set out in Appendix C. However, if further independent schools were to close as a result of the economic downturn triggered by Coronavirus, the state school network will require significant additional capital and operational funding to support this shift. This is because the state school network is experiencing rapid roll growth and independent schools are located in the centres experiencing rapid population growth. These state schools are likely to lack the physical capacity to accommodate large numbers of students from independent schools.

One alternative at the point of independent school closure is integration. The government has adopted this option in the case of Hamilton Christian School. Hamilton population growth has significantly outstripped the national average particularly among young families as Auckland has become too expensive for people to live (Patterson 2019). But state integration is also expensive, with the government taking on the full operating and salary cost for the school (instead of less than 20% of the costs) as well as all the school building

[6] The government's GST income will decrease in the short run when more students move to state schools. This occurs as families paying for independent school education pay GST on those transactions, and when students move to state schools this GST income ceases. However, in the long run these families spend this money instead on other things, which in turn may incur GST.

maintenance and modernisation (see Figure 12). The fiscal costs of meeting the operating and salaries cost of Integrated Schools, would be around an extra $600 million per annum above what would be paid in the Independent Schools subsidy. (This cost is understated as it ignores property related cost). For example, integrating Wanganui Collegiate into the state system costs the Government over $3.325m a year, compared to the $800,000 per year it cost the government prior to integration (Radio New Zealand 2013). Similarly Parliamentary Questions revealed it will cost $3.1 million per annum in 2020, rising to $4 million per annum by 2023, to integrate Hamilton Christian school whereas with 440 students (at $2048 per student) the independent school subsidy would have cost around $0.9 million in 2020.

Figure 12 Integrating private schools into the state system is expensive

Funding arrangements for independent and state-integrated schools

	INDEPENDENT SCHOOLS	STATE-INTEGRATED SCHOOLS
FUNDING		
OPERATIONS AND STAFF FUNDING	~80% from parent fees or donations ~20% from government	Operational funding equivalent to state schools
CAPITAL FUNDING	100% parental fees or stakeholder contributions	Government funding for capital maintenance and modernisation Most new buildings need to be funded by the school proprietor (sometimes eligible for government funding)

Source: NZIER, Education Counts 2019, Ministry of Education 2019b

However, we understand the government has indicated that it will not allow any other independent schools to integrate. This further increases the risk of any independent school closures putting pressure on the state system.

5.1 What would a smart state do?

Although fiscally-oriented decisions may point towards higher funding for independent schools (see Appendix C), we acknowledge that the government may have non-Budget driven preferences for more students in public education (as discussed in Section 4).

However, the recent lift in funding for state and state-integrated school teachers, along with a boost in infrastructure funding for state schools (Radio New Zealand 2019), undermines the independent school offering (Section 5). Although in the short run, this may appear to have little effect on the government's education spending, a return to the drift in students out of independent schools could threaten the viability of independent schools.

Even if the government found that they can afford the extra $174m in additional teaching and operating expenses (see Appendix C), the change in capacity demands will also put pressure on existing state and state-integrated school infrastructure. Independent schools have the physical capacity to accommodate their students, but the state school network is

unlikely to have the space for the significant roll increases that any independent school closures would cause.

If the government wants to mitigate this long-run risk, it should re-assess its funding for independent schools in light of their long-term viability and capacity to absorb student roll pressures in their local area.

6 What is an efficient level of funding?

In previous sections we discussed why funding for independent schools should increase. This section discusses how high funding should be if the state were to fund all secondary schools efficiently. Using empirical analysis of data from the state school network, we have found an independent benchmark for the efficient funding of secondary schools.

Governments should be "no less concerned with the effectiveness and 'profitability' of its expenditure on education, in relation to the state's aims, than any private provider would be in relation to their own aims."
(The Treasury 1987, 2:271)

This research looks at the degree of efficiency among state and state-integrated secondary schools and how this can help determine funding decisions for all secondary schools. In our model, efficiency is defined as the share of inputs (costs) to outputs (number of secondary students qualifying with NCEA level 1, NCEA level 2, NCEA level 3 and University Entrance (UE)).

This research provides an evidence base of funding estimates, should the government choose to fund secondary schools based on outputs and outcomes rather than inputs.

6.1 The task

We were asked to determine the efficiency of state and state-integrated (integrated) secondary schools in New Zealand. In particular, we were asked to:

- Identify overall school efficiency.
- Identify the relative school-level efficiencies.
- Identify the 'peers' between schools – the efficient schools that are peers to other schools.
- Estimate the efficient 'price' – the per student cost of education associated with most efficient secondary schools.
- Estimate 'rurality' or 'scale' level cost adjusters.

This piece of work goes beyond the purely fiscal analysis of determining return on investment in independently provided education discussed in Appendix C.

Instead we use Data Envelopment Analysis (DEA) (Cooper, Seiford, and Tone 2007) to determine the efficient 'price' for school funding in general.

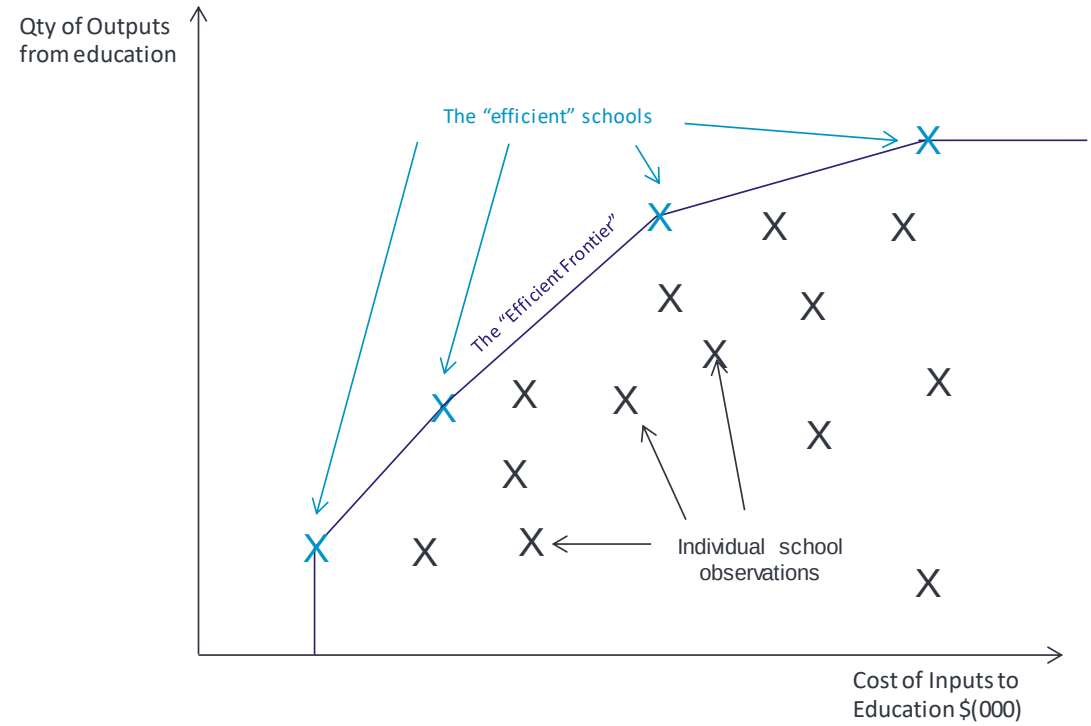
6.2 What is funding efficiency?

Efficiency is defined as the rate of inputs (costs) secondary schools use to outputs (number of secondary students qualifying with NCEA level 1, NCEA level 2, NCEA level 3 and UE).

This approach to data analysis is from the ground-up. Rather than having a hypothesis about what is efficient and what isn't efficient, we use data to find the maximum output achieved by different state and state-integrated schools at different levels and combinations of inputs.

As Figure 13 shows, the secondary schools that make up the efficient frontier – the maximum achieved outputs at different levels of inputs – make up our definition of the 100% efficient schools.

Figure 13 100% efficient schools are on the "efficient frontier"



Source: NZIER

The definition of 100% efficient schools in turn determines how we calculate the other secondary schools' efficiency. We do this by summing the economic costs of production of all 100% efficient schools and dividing by the total number of qualification attainments of 100% efficient schools[7].

To find this efficient frontier, we used a sample of 214 New Zealand secondary schools who offer the NCEA curriculum and compared their output results to their input components

[7] Per student subsidy = (∑〖Economic costs of production of all 100% efficient schools〗)/(∑〖NCEA levels 1,2, 3 and UE qualification attainments of all 100% efficient schools〗)

which include teacher numbers, spending on learning resources, and depreciation expenses. Our sample also included schools which cater for students from Year 7 to Year 13 and composite schools, which cater for students from Year 1 to Year 13. However, we were not provided with the cost structures between primary, intermediate and secondary schools. Thus, we excluded these schools from our sample.

We then use these results to determine how much funding schools should receive based on the outputs they produce. Rather than paying for inputs the government should subsidise outputs. One way to do this is to fund schools based on the number of qualifications they produce and not simply the number of secondary students enrolled. This research discusses where funding levels should sit if the government chose to fund outputs.

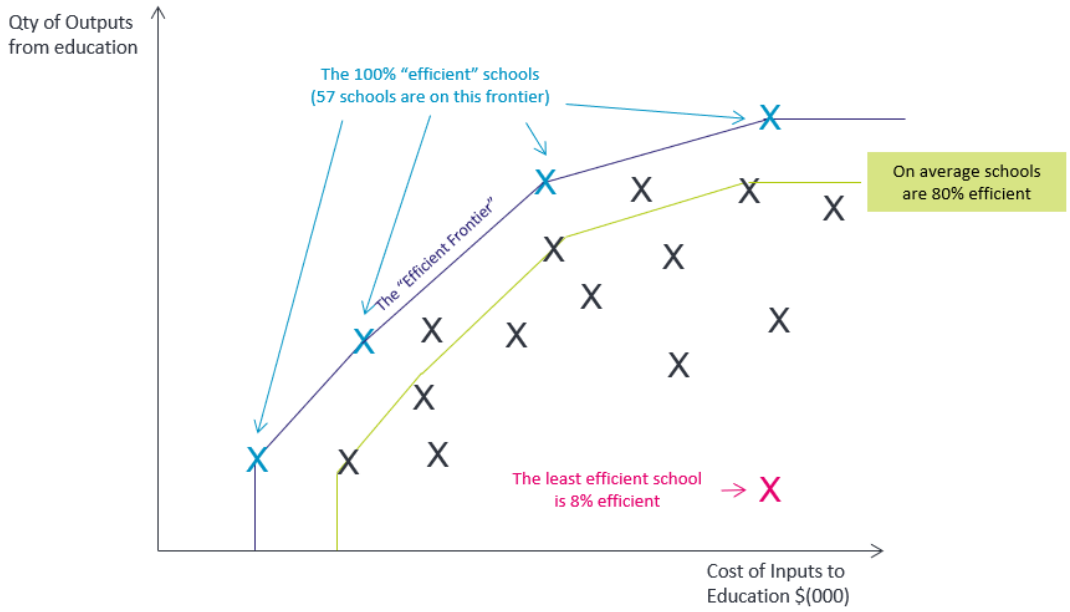
We discuss our analysis methodology and approach further in Appendix A.

6.3 Results

Our key results are as follows:

- 57 out of 214 schools (27% of schools) are on the efficiency frontier shown in Figure 11. These 57 schools are most efficiently using their costs for secondary student qualification attainment and are the benchmark against which we measure the remaining 157 schools which are not 100% efficient.
- The overall average school level efficiency is 78%. This means that schools on average perform almost four-fifths as well as the most efficient schools in the country.
- The lowest efficiency score is 8%, which means that with the same inputs as an 100% efficient school, this school only produced 8% of the output. Only one school had an efficiency score this low.

Figure 14 Results in concept



Source: NZIER

Of course, the secondary student qualification attainment is also affected by other factors, which we describe in Appendix A.

Single-sex schools are more efficient than co-educational schools

Our analysis demonstrates prima facie evidence that single-sex schools perform better than co-educational schools. Additionally, we find that on average, state-integrated schools are more efficient than state schools. If we rank the average efficiency scores of schools by their various types, we find that, from highest to lowest, the ranking is:

- Integrated girls' school: 89%
- Integrated boys' school: 88%
- Integrated co-educational schools: 83%
- State girls' school: 83%
- State boys' school: 80%
- State co-educational schools: 74%.

Efficient schools to cover costs should receive between $8600 and $11,600 per secondary student

The costs of running a school include the direct cost of meeting teachers' salaries, school administration, and learning resources as well as the indirect costs such as local fund raising expenses, property, and depreciation. Our analysis separated out the direct and indirect costs as they differed significantly between state and state-integrated secondary schools.

The per student direct cost of operational funding for state system secondary schools on the efficiency frontier is $8,600. For efficient state schools (i.e. excluding integrated schools) the direct cost is $7,300 per secondary student.

The total cost of educating a student needs to reflect the indirect as well as the direct costs. We estimate that per secondary student funding to each efficient secondary school should be **$11,600**. This includes the additional per student costs for efficient state system secondary schools such as local fund raising expenses ($496), depreciation expenses ($324) and property expenses such as rates, power, repairs & maintenance of property ($2,200). (Note this does not include allowance of any return on capital deployed. The capital charge on state schools was $1.1 billion or around $1,400 per student in 2018/19). Meanwhile funding for independent schools is well below this efficient rate and was at $2,395 for year 11 and above secondary students in 2017.

The total funding to schools ranges from $3.5m (rural) to $13.7m (urban)

Urban state and state-integrated schools tend to be larger than rural schools. Using the estimated funding per secondary student, we find that the average funding per school in rural areas is just over $3.5m whereas the average funding per school in main urban areas is nearly $13.7m.

This suggests that, on average, main urban area schools receive around four times the funding of rural area schools.

Since the funding is output based, this greater funding requirement could be due to the larger number secondary students in schools mostly found in main urban areas, or greater relative efficiency of main urban area schools, or both.

We accounted for other environmental variables when calculating efficiency
To investigate this further, we conducted additional analysis by regressing the efficiency scores against some 'environmental' variables, which included rurality of the schools and the number of secondary students in the schools among others.

Our results suggested that secondary schools with larger student numbers had a negative effect on efficiency and schools in rural areas had a negative effect on efficiency.

Both these effects were statistically significant. These results were consistent with the DEA study of secondary schools in New South Wales (Haug and Backburn 2013), which suggested rurality has a negative effect on efficiency, but student numbers could affect efficiency both positively and negatively.

6.4 Limitations

We were not provided with the cost structures of the requirements to achieve the three qualifications. But it is not unreasonable to assume that the cost structures for the three qualifications will be different. If we were provided with cost structures, then an approach could be to apply weightings for each qualification. However, DEA allows for relative efficiencies without imposing a priori weights on the inputs and outputs (Alexander, Haug, and Jaforullah 2010).

While we have kept our approach in line with previous research, which use of NCEA Level 1, 2 and 3 qualification attainments as measures of secondary student achievement. Since the inception of NCEA in 2002, the Programme for International Student Assessment (PISA) has shown declining reading, math and science scores and a widening distribution of students' scores. In contrast with the NCEA data showing a narrowing distribution and an increased number of NCEA Levels 1, 2 and 3 attainments. Added to this was evidence of about 40% of NCEA Level 2 secondary students failing to meet literacy and numeracy international benchmarks (Lipson 2018).

Secondly NCEA allows secondary students to achieve the Level 1, 2 and 3 qualifications through subjects which are 'easier' as opposed to those subjects that suit the students' abilities (Crampton and Udahemuka 2018). A suggested alternative measure of secondary student achievement is the UE, which we have included in our analysis (Hernandez 2019b). However, due to lack of suitable data, we could not find replacements for NCEA Level 1, 2 and 3.

7 Conclusion

This report looks at the fiscal and wider economic arguments for amending the government funding arrangements for independent schools. We find that there are sound public policy arguments in support of an increase in the level of government funding to independent schools and provide an empirical evidence base for setting an efficient rate of per student funding. Increasing the funding to independent schools, somewhat paradoxically, is fiscally beneficial.

The government has an important role in intervening in the education market as it can help redistribute the benefits and costs of education more fairly than what would happen otherwise. The government needs to ensure that education is available for all, and it facilitates this by regulating attendance, setting minimum standards and subsidising the cost of providing education.

The government, however, need not actually provide all services itself, even though it may provide the majority of funding. Arrangements where independent providers receive public funding are commonplace in other sectors and around the world. In terms of education provision, an independent sector complements and stimulates the public sector. Efficiency enhances when an appropriate balance is struck between the two.

Allowing education providers to respond to the increasing diversity of tastes and preferences enhances efficiency. An education system that includes a vibrant and robust independent sector is responsive to the needs of an increasingly diverse New Zealand population.

There are also equity considerations in relation to the independent sector. Households who effectively 'pay twice' for sending their children to independent schools, are unfairly treated relative to households which are similar in other respects except in their choice to send their children to a state school. Horizontal equity requires equal treatment of equals.

"I don't care if the cat is black or white, so long as it catches mice."
Deng Xiaoping

A government that was indifferent between different providers of education — so long as they meet or exceed the outcomes expected by the government — would provide a similar level of funding per pupil to independent schools as to state schools.

We have therefore examined the current funding arrangements. Real per student funding for independent schools is in decline, and the gap between independent and state or state-integrated per student funding is widening. Our analysis indicates that the government has an opportunity to improve the overall performance of school education and reduce its own expenditure on school education by raising the funding rate to independent schools above its present level.

Our empirical research shows that if the government were to fund independent schools based on the cost of their most efficient counterparts in the state system, it would increase the independent schools funding by 3.6 (direct costs) to 5.2 times (all costs).

The recent decision to raise funding for teacher salaries, as well as provide additional capital funding for state schools has put independent schools at further disadvantage. Independent schools now only have choices that will ultimately reduce their roll size. Eventually, some independent school rolls may become too low for the schools to remain viable. This means that, the state school network will need to accommodate larger volumes of students. The fiscal cost will be high, particularly in areas where schools are at capacity, if funding for independent schools doesn't rise.

The research was largely completed before the coronavirus outbreak, so the findings reflect the situation just before the pandemic was declared. The impact of Coronavirus strengthens that case for increased state funding as the financial pressure on independent schools is likely to increase due of lost enrolments and reduced fund raising capacity.

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Appendix A Theoretical concepts

A.1 Positive externalities

Education creates positive externalities and as a result people under-consume education in the free market. Taxing the population to subsidise education ensures a higher total social benefit to New Zealand.

Education creates positive externalities – benefits accrue to people who are neither consuming the education (students) nor producing the education (schools). These positive externalities include:

- Higher net tax revenue because people are more productive and thus also earning more
- Lower reliance on government-run financial support systems as more people are in employment
- Reduced crime (affecting those not receiving education)
- Less spread of infectious diseases (affecting those not receiving education)
- Lower fertility rates
- Better social cohesion
- Increased voter participation (Münich and Psacharopoulos 2018).

But because the people paying for education in a free market system don't directly receive these benefits, some don't see education as worthwhile to them personally. As a result, individuals are likely to consume less than the socially desirable amount of education in the absence of government intervention (see Figure 15). This offers a rationale for government funding for education. However, this does not mean that the government needs to provide education.

Figure 15 Education in a free market = lower consumption

Government intervention helps people to consume a socially efficient quantity of education

Source: NZIER 2010

A.2 Asymmetric information

The theory of competitive markets assumes that all consumers and producers are aware of the price and quality of all goods – perfect information. Although this rarely occurs in practise, information is especially asymmetric in education. Education providers know significantly more about the price and quality of education than consumers.

- Parents are often the ones who make education decisions for their children, even though they may not be fully aware of the child's preferences or needs, or they have preferences themselves that differ from the child.
- Parents may not have perfect information about the nature of the education products on offer and the prices of those products.

These hinder parents' ability to make efficient economic decisions as education consumers.

Governments can intervene to help correct these information asymmetries. This does not assume that governments are omniscient and can make better education decisions than parents or individuals. However, governments might have more scope to produce information to enable better decisions, or the ability to create regulations designed to compel institutions to provide more information.

Appendix B The DEA approach

B.1 What is DEA?

DEA is a technique that uses optimisation techniques to determine the relative efficiencies for a group of similar observations. Efficiency for each observation can be defined as the maximisation of outputs for a fixed level of inputs. DEA has the advantage of being able to determine efficiencies from the complex relations between multiple inputs and multiple outputs (Demerjian, n.d., Cooper, Seiford, and Tone 2007).

We follow a similar methodology to two previous DEA studies conducted for New Zealand secondary schools (Alexander, Haug, and Jaforullah 2010) and secondary schools in New South Wales (Haug and Backburn 2013).

B.2 Data

The data was obtained through a customised request from the Information Requests team at the Ministry of Education. This data included student qualification attainment (NCEA Level 1, NCEA Level 2 and NCEA Level 3), financial data, student and teacher numbers, demographic data and socio-economic data per secondary school for the years 2013 to 2017. The financial data was only available for state and state-integrated schools. Each school is taken as a unit of observation in our analysis.

We use the last year's available data (2017) for our analysis. There were 417 state and state-integrated secondary schools in our dataset in 2017. After removing schools with errors and incomplete data points, we were left with 389 schools.

B.2.1 DEA inputs

In our DEA model, we consider six input variables. From the financial data and teacher numbers, we use the following input variables:

- Administration expenses
- Depreciation expenses
- Expenditure on learning resources
- Expenditure for raising local funds
- Property management expenses
- Number of full-time equivalent teachers.

These inputs are assumed to be economic costs of production, i.e. the raw materials which get transformed into the outputs (discussed below) measured by qualification attainment.

B.2.2 DEA outputs

We consider three output variables. Using the student qualification attainment data, we use the following output variables:

- Number of students achieving NCEA Level 1 qualification
- Number of students achieving NCEA Level 2 qualification

- Number of students achieving NCEA Level 3 qualification.
- Number of students achieving UE qualification.

B.2.3 DEA approach

DEA can be sensitive to outliers, so we inspected the data for any errors. Secondly, DEA can be sensitive to differing magnitudes of input and output variables. There is a difference in magnitude between the five expenditure types and the number of full-time equivalent teachers as inputs. To control for this, we mean-normalised all input variables such that the mean of each input variable across all schools was equal to one. Thirdly, DEA can be sensitive to non-positive values. While there were no negative values in our dataset, there were some zero values in the outputs. For example, if a school produced no students that received the NCEA Level 3 qualification, then that data point would be recorded as zero. To account for this, we added one to all output variables.

It's important to note that DEA is an art as well as a science. Having too many input and output variables can inflate the number of 100% efficient schools predicted by the approach. So, a balance between necessary and nice-to-have variables has been made here.

The general approach has two stages and is known as the "double-bootstrap" approach (Simar and Wilson 2007). The first stage is to bias-correct the efficiency scores. The bias arises due to the efficiency estimates being serially correlated and are thus overestimated. Of course, the efficiency scores are not solely dependent on the input and output variables of the model. So, the second stage is to regress the bias-corrected efficiency scores against environmental variables to determine the effects of various differentiating factors for New Zealand secondary schools.

Similar to previous studies, we follow Algorithm No. 2 in (Simar and Wilson 2007). We program this algorithm in the R programming language making use of the "Rdea" and "Benchmarking" packages. The algorithm is as follows:

1 Use the standard DEA procedure to estimate Shephard's efficiency scores for each school.

2 Carry out a truncated normal regression by maximum likelihood regression by maximum likelihood estimation, regressing estimated efficiency scores that are larger than one[8] on the environmental variables.

3 We program a bootstrap, drawing 100 samples each of size 389, from the truncated empirical normal distribution of the estimated efficiency scores.

4 We calculate bias-corrected efficiency scores with the bootstrap method.

5 We use the bias-corrected efficiency scores to re-estimate the marginal effects of the environmental variables in the second stage regression.

6 We apply a second, the so-called double bootstrap using the empirical distribution of the bias-corrected second stage regression. We obtain 2,000 replications for each parameter estimate of the marginal effect of environmental variables.

7 We calculate bootstrap-based 95% confidence intervals for each parameter estimate.

[8] We report Farrell's efficiency scores in the report which are the inverse of Shepard's efficiency scores.

We report the inverse of the Shephard's efficiency scores from this algorithm. Steps 1 to 4 of the above algorithm represent Stage 1 of the double bootstrapping approach and steps 5 to 7 represent Stage 2 of the approach.

There were ten environmental variables considered in our analysis:

- A dummy variable that takes 1 if a school is a state school and 0 otherwise (integrated)
- A dummy variable that takes 1 if a school is boys-only (base is co-educational schools)
- A dummy variable that takes 1 if a school is girls-only (base is co-educational schools)
- A dummy variable that takes 1 if a school is in a secondary urban area (base is main urban area)
- A dummy variable that takes 1 if a school is in a minor urban area (base is main urban area)
- A dummy variable that takes 1 if a school is in a rural area (base is main urban area)
- A custom deprivation index based on school decile. A higher deprivation index means a lower decile school
- Total school roll.

Of these variables, we find seven to be statistically significant, including the number of students and whether a school is in a rural zone, as discussed earlier in the report.

Appendix C A framework for assessing the fiscal effects of government funding of independent schools

This Appendix provides an approach to determining the impact on the government's overall fiscal position from a change in the subsidy rate to independent schools. Determining the value for money from changing the subsidy is not straightforward to calculate. The overall impact will depend on a number of factors in addition to the subsidy rate itself, including the level of avoided costs due to spare capacity in the state school network and behavioural response such as the rate of switching to independent schools. There are also technical factors such as the effect on GST revenue.

C.1 Avoided or additional costs

The extent of spare capacity in the state school network will influence the immediate fiscal costs of students switching between independent and state schools. In the short run, a gradual shift of students from independent schools to state and state-integrated schools (or vice versa) make very little difference to government's immediate costs as the money doesn't follow the student. This is because the school funding formula for teaching staff positions used in the state school system has wide flat zones. So long as there is adequate capacity, there are limited avoided or additional costs – so short run marginal costs are low.

In the long run, or in a system with capacity constraints due to growing school rolls, state and state-integrated schools are likely to lack the physical capacity to accommodate students switching due to the closure of an independent school. As a result, the state school network will require significant additional capital and operational funding to support any reduction in the market share of independent schools.

New Zealand is currently facing rapid growth in school rolls. In addition, independent schools are concentrated in the main cities and provincial centres which are facing the most rapid population growth. This suggests capacity constraints are particularly important. In the DEA modelling, discussed in Appendix B, we included depreciation and capital charges to capture the long run marginal cost of the state and state-integrated school system.

C.2 GST

One complication with assessing the fiscal impact is the change in GST collections due to switching between school systems. This arises because GST is levied on independent school fees, but public funding of schooling doesn't attract GST. So, if a student switches from an independent to a state or state-integrated school, the immediate effect is a loss in GST revenue. Over time this effect washes out, however, as the fees saved are spent on other consumption items that attract GST.

C.3 Fiscal impact

The independent schools sector diverts those willing to pay away from the publicly financed system, freeing up funds for those remaining, without compromising outcomes. In 2018, government funding for independent schools was equivalent to 19% of the per pupil operating and salary costs of educating children in the state sector. Independent schools covered the remaining 81% of operating costs as well as all their own capital costs. This

provides considerable savings for the government each year, including a direct saving of $174m in operating and salary expenses (calculated[9] from 2018 roll and funding data from Education Counts (2019) and Ministry of Education (2019c)).

C.4 Behavioural responses to subsidy changes

In this section we will present a model that could be used to estimate the effect of an increase in the rate of subsidy to independent schools on the government's fiscal position expenditure. The model illustrates the impact on expenditure from a subsidy change, including the extent to which independent schools pass the subsidy increase to reduce fees and how sensitive demand for independent education is to fee level changes. However, we do not provide empirical results for the likely extent of schools passing on the subsidy or price elasticity with New Zealand data due to data availability constraints.

Nevertheless, given the sensitivity of demand for independent schooling to fee levels indicated by the literature, we think it possible that an increase in the rate of subsidy from its present level could increase the demand for independent schooling sufficiently to reduce the total cost of schooling to the government. The saving from the switching of pupils from the state sector to the independent sector could then exceed the cost of increasing the subsidy to those who are already at independent schools.

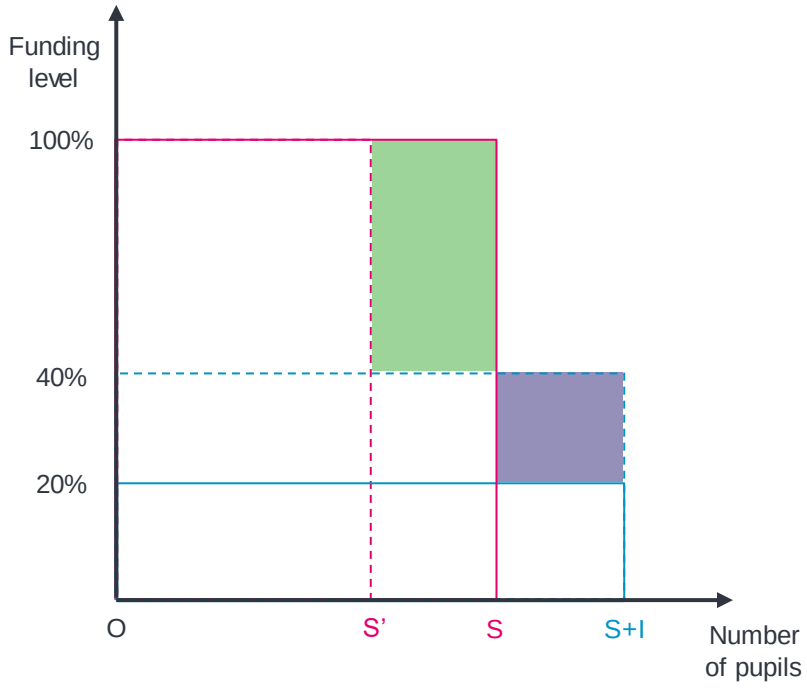
Using some economic tools, we can make an estimate of what the least cost subsidy rate might be. The base model we have used to determine the 'least cost' subsidy rate is demonstrated in Figure 16 below.

The starting point is a situation where the number of pupils attending a state or state-integrated school, O to S, are 100% funded, and those who attend an independent school, S to S+I, are 20% funded on average. Assume now that the government decides to increase subsidy levels to independent schools to 40%, for example.

[9] Using the formula:

Operating and salary expenses saved = Student roll at independent schools × (Operating and salary expenses per student at state schools - Per student funding to independent schools). However, this formula is static and parents and pupils respond to incentives.

Figure 16 Level of government funding for independent schools



Key

- Pupils at state and independent schools (total)
- Pupils at state schools
- Pupils at state and independent schools after funding increase
- Pupils at state schools after funding increase
- Savings
- Deadweight loss

Source: NZIER 2010

Three effects would become apparent:

- The increased subsidy rate induces an effective reduction in independent school fee levels, prompting an increase in demand. Hence there is a 'switching effect' from the state system into the independent system as those children who choose the independent sector at the increased rate of subsidy, but who would have chosen the state sector at the lower level of subsidy, react to the drop in relative price of independent schools. The state sector is now O to S' and the independent sector S' to S+I.

- The increased subsidy rate applies to all pupils at independent schools, and so we have several pupils who would have attended independent schools at the lower subsidy rate receiving a 'windfall gain'. This is called 'deadweight' expenditure as it doesn't change behaviour.
- There are fiscal savings to the government from those who 'switch' from government funding levels of 100% in the state sector to a lower level (40%) in the independent sector.

Following these effects, we are left with O to S' pupils in the state sector and S' to S+I pupils in the independent sector. The overall effect is an increase in the numbers who attend independent schools, with a corresponding reduction in the numbers in the state system.

The effect on the government's budget is a saving from those who 'switch' from the state school network to the independent schools, less the additional cost of the deadweight loss arising from higher subsidies to those already at independent schools.

As the proportion of the costs of independent schooling met by subsidy, p, rises:

- The proportion of pupils in independent schools rises.
- The savings to the government from the pupils who switch from state or state-integrated schools to independent schools rises.
- The deadweight loss of reducing fees paid by pupils who are already in the independent schools also rises.

As p continues to rise, it reaches a stage where the deadweight loss grows faster than the savings.

The government's least cost fiscal position occurs when further increases in p reduce the net reduction in costs

The position from the point of view of the government's budget is where the net reduction in cost as p rises ceases, and further increases in p reduce the net reduction in cost. That occurs where the growth in the deadweight loss starts to exceed the growth in savings from the pupils switching.

As shown in Table 3 below this occurs when $p = ke/(1+ke)$ where e is the elasticity of demand for independent schooling in response to subsidy, p, and k is the ratio of independent schools' costs and public schools' costs.

This relationship indicates the level of subsidy from the point of view of the government's budget. The more sensitive that demand for independent schooling is in relation to price, the higher e is, and the higher the subsidy rate should be to achieve the fiscal optimum. The next question then is the level of e.

Estimating the elasticity

As mentioned above, we need an estimate of the elasticity as an intermediate input into the calculation of the optimal government subsidy rate. Ideally, we would like to be able to specify an appropriate model, use available data on factors influencing demand for independent schools, and run the model using that data. Unfortunately, there are data limitations and a lack of an 'off the shelf' model in New Zealand that we can use. Construction of such a model would be resource-intensive, requiring perhaps months of

work in specification and testing to derive robust estimates. In the circumstances, we will do our best without such a model, by using alternative methods of obtaining the elasticity.

We have surveyed the literature in this area. While this literature is not voluminous, there is quite a range of estimates of the price elasticity of demand for independent education. These (North American) estimates range from 0.5 to 3.3 (Keeler and Kriesel 1994), indicating a quite widespread. Despite this wide range, most scholarly opinion puts the price elasticity of demand for independent education at about 1 (Ellig 2000). Anderson et al. (1997) used an estimate of 1.1 for the price elasticity of demand for alternative (independent) schools in Michigan. Their estimate considered two important influences.

First, schooling itself is considered an essential service by most parents, and better schools are so desirable to many parents that they undertake considerable sacrifices to send their children to independent schools. This would tend to produce a highly inelastic demand. However, there is also a widely available substitute for independent schools, namely traditional public schools. For most goods and services, the availability of substitutes produces an elastic demand. Given the combination of available substitutes and high importance to many parents, Anderson et al conclude that it is not surprising that the existing research places the demand elasticity for independent schools at or around 1.

Demand in New Zealand likely to be more elastic than in the US

In our view, various factors combine to make an estimate of 1 too low for New Zealand. For instance, we consider that the long history of government interaction with independent schools (principally through subsidy arrangements) in New Zealand means that a perception of quality performance and academic and teaching standards in independent schools has become more ingrained in community attitudes over time. This contrasts with the relatively 'new' focus on the presence of alternative/independent schools in the United States.[10] Moreover, the reform period of the late 1980s and early 1990s and the advent of Tomorrow's Schools both had an impact in New Zealand that the North American estimates perhaps do not pick up.

Tomorrow's Schools indicated that, at that time, a measure of disquiet at the performance of the state education system existed, both at parental and administrative level. In some respects, debate on the merits of state-provided schooling and possible alternatives in New Zealand preceded the United States, where debate has grown since about 1990 (Fiske and Ladd, 2000). In our view, the effect of these factors is to make New Zealand parents a lot more willing than their North American counterparts to forego state schools and send their children to an independent alternative that better meets their children's needs.

Around this time, there was also an increased emphasis on schools being seen as human capital providers and conduits to tertiary studies, signalling a shift in attitudes toward education in New Zealand serving more of an economic than a social need. Therefore, New Zealand parents would be more likely to enrol their children where the economic returns were seen as greater. Independent schools provide such avenues. It is the combination of these factors – a more discerning consumer, wanting more than the current state-provided education offers, but with a well-established (albeit more expensive) alternative, that leads

[10] The US has always had a history of private fee-paying schools, but the history of interaction of government and private interests is not nearly so rich as in New Zealand.

us to believe that the elasticity estimate appropriate for New Zealand is higher than that used in the North American literature. (For more on elasticities see Table 3.)

Some experts in the field hold the opinion that the demand elasticity of 1.2 is a significant underestimate, and that, in their opinion, an estimate upwards of 3 is more appropriate.[11] While there is no empirical support currently available for this proposition, the opinions expressed were based on other empirical work showing that over time elasticities had risen sharply in other areas of New Zealand life.

It is entirely conceivable that the price elasticity of demand for independent schooling in New Zealand is above 1. Indeed, anecdotal reports of unmet demand for places in some independent schools would tend to support the hypothesis of demand being very elastic. In addition, some of the North American estimates in the literature are over 3.

The calculation of the optimal subsidy, in terms of minimising the fiscal cost to the government given current subsidy levels, depends strongly on both the total number of students at independent schools and the elasticity of demand. Local research on the elasticity of demand, particularly given the wide ranges indicated by the literature, is crucial for developing cost minimising strategies by the government.

Table 3 Calculating elasticity

Assume that the total number of pupils in the school system is fixed at N with a proportion r attending independent schools.

Assume that public funding of the cost of attending independent schools is proportion p of the per pupil average cost in the independent sector, of kC, where C is the per pupil cost in the state sector, and k>1.

Assume the multiple of the public costs k is exogenous - at least initially.

The total cost to the government is B, where:

$$B = (1-r)NC + rNpkC$$

= Cost of state schools + Cost of independent schools

So, $B/NC = (1-r) + rpk$

Changing p will alter the numbers going to independent schools. The marginal effect on the budget of a change in p is:

$$(1/NC)dB/dp = -dr/dp + pk.dr/dp + rk$$

or $(1/NC)dB/dp = r - k(1 - p).dr/dp$

As $e = (dr/r)/(dp/p)$

We have

$$(1/NC)dB/dp = r - ke(r/p)(1 - p)$$

This final equation shows that the change in the budget proportional to the total potential cost (NC) is:

- made up of the original proportion going independent, r^1
- offset by an effect which depends on the elasticity, *e*, of the proportion going independent, r, relative to the share of costs that the government funds p (also known as the "switching effect").

This elasticity, *e*, is important in determining the size of both the "switching effect" and thus the overall "savings".

For large values of *e* the budget effect will be negative – the shifting effect (and consequent savings) outweighs the deadweight effect.

[11] Pindyck and Rubinfeld (1991) have suggested that, in the absence of data, or when data is thought to be mis-specified, relying on expert opinion is often the best method available.

For small values of *e* the deadweight effect outweighs the savings.
The maximum net savings as p rises occur where dB/dp = 0 Or r = k*e*(r/p)(1 - p) Or 1 = k*e*(1 - p)/p So p = k*e*/(1 + k*e*) The last equation above shows that after determining *e* we can determine from what the value of p (the proportion of government funding to per pupil costs in the independent sector) is that minimises fiscal costs.
Empirical estimates of the elasticity of demand for independent schooling in relation to fee levels are not the same as the elasticity of demand for independent schooling in relation to the level of subsidy as indicated here. For example, if fees are twice as great as the subsidy, a decrease in fees of 5% will have the same effect on demand as an increase in subsidy of 10%. To convert the elasticity with respect to fee levels found in the literature into an elasticity with respect to subsidy levels we multiply it by the ratio of subsidy to fee levels.

Source: NZIER