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TE TĀHUHU O TE MĀTAURANGA

Developing indicators of international student wellbeing: A scoping exercise with the IDI

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Summary

There is substantive evidence on the importance of the international education sector to NZ, with regard to both the social and economic impact. Policy makers play a key role in both attracting international students, as well as ensuring the wellbeing of these students while in their host country. With the latter of these aims in mind, the Ministry of Education (MoE) released an International student wellbeing strategy in June 2017.

This strategy includes four broad domains of interest – economic wellbeing; education; health; and inclusion. To monitor outcomes in each of these spaces, there are a number of possible data sources – both subjective and objective; with varying themes covered; as well as age groups targeted.

The aim of this study is to identify what value is offered in the form of administrative data – specifically the Integrated Data Infrastructure (IDI). While not directly part of our scope, we also discuss alternative data sources to the IDI (including the Youth 2000 survey, Graduate longitudinal survey, and the International student barometer survey), which can be used to carry out future analyses based on research questions the current study introduces.

We use MoE data from the IDI over the most recent six years to create annual samples of students enrolled in (a) primary and secondary schools; and (b) tertiary education. Within each of these samples we identify our two populations of interest – domestic and international students. We employ a further six datasets from the IDI to construct indicators (based on information from extant literature and data availability) that are aligned to each of the four domains identified by MoE in their new International student wellbeing strategy.

In terms of economic wellbeing, we find that international students (in the tertiary sector) are much less likely to be participating in the labour market, relative to their domestic counterparts. It is noteworthy that this improves markedly if these students stay in NZ post-completion of their qualification; and in such circumstances are only marginally behind domestic students.

For the education domain, we purview both school and tertiary outcomes. For the former, international students are less likely to complete qualifications levels 1 through to 3 (generally undertaken by students aged 15 to 18) relative to domestic students. Despite this, in terms of achievement scores, they are performing on par with the domestic population. In comparison, international tertiary students well outperform the domestic sample in qualification completion rates, with the gap generally larger the higher the level of qualification.

Within the health domain we examine the propensity for three types of health events – any hospital admission; an acute admission; and a mental health referral. In all three cases, and regardless of whether the focus was on the likelihood of an event, or frequency of event, international students were less likely to experience these outcomes.

For the final domain of social inclusion, there were two areas of interest – accidents / injuries (in general, and those resulting from criminal acts and physical violence); and crime victimization rates recorded by the police. In both respects, international students were much less likely to experience these threats to personal safety.

While the measures constructed within each domain provide a useful starting point for continual measurement (and benchmarking) of wellbeing of international students relative to the domestic population, there are a number of subjective aspects that need to be investigated in the future, to complement these initial findings. For instance, investigating the experience of international students as they try to enter the labour market; and delving into assessing the extent to which they search for job opportunities is imperative to understanding whether the lower level of employment propensity (found in this study) is due to barriers they face or reduced demand on their part.

Finally, future work in this space can also utilise fixed effects regression models (where the outcome of interest is for instance qualification completion trends between international and domestic students) while controlling for demographic characteristics and year, study region, and country of citizenship. This type of framework will ensure maximum advantage is taken with the longitudinal data available in the IDI.

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1. Introduction

There is extensive literature across various academic disciplines that emphasize the social and economic significance of international students. In general, internationalising education enhances an economy's global competitiveness by promoting economic growth, contributing to research activities, incentivizing growth in domestic students' human capital outcomes through increased competition, and incorporating socio-cultural diversities in host societies (Altbach 2004; Harman 2005; Altbach & Knight 2007; Lee & Rice 2007; Pandit 2007; Vickers & Bekhradnia 2007; Sawir 2013).

Recent figures published by Education New Zealand (2016) suggest that the overall economic contribution (to GDP) made by international students in New Zealand (NZ) grew from $2.5 billion in 2012 to $4.0 billion in 2016. This growth is primarily due to a sizeable increase (approximately 25%) in the number of international students across the education hierarchy, from primary school through to tertiary level. Further, in 2015, the international education sector in NZ generated approximately 30,000 jobs in the economy (Education NZ, 2015).

Globally, there has been a growing recognition of the importance of international students, and this has prompted policy makers to design policies specifically aimed at attracting greater numbers of international students (Ball 1998; Blight et al. 1999; Van der Wende 2001; Altbach 2004). These policies are primarily implemented through strategic partnerships between education service providers (such as universities) and government agencies at various levels (Blight et al. 1999).

A number of studies also argue that along with efforts aimed at further internationalizing of domestic education, in order to fully realise the long term socio-economic goals of this endeavour, policy makers should also direct efforts towards ensuring the well-being of international students once they are in the host country (Mori 2000; Butcher & McGrath 2004). With that in mind, the Ministry of Education (MoE) released an International student wellbeing strategy in June 2017.

The aim of this project is primarily a scoping exercise to identify how useful administrative data can be in producing benchmark indicators, which can be used to monitor outcomes for international students under MoE's new wellbeing strategy. The next section provides further background regarding the international education sector in NZ; after which Section 3 briefly summarises relevant literature; Section 4 then outlines the linked administrative data we focus on in our empirical work (including the process used to construct our populations of interest), as well as points to other sources of information; after which Sections 5 through 8 detail estimates of potential indicators within each of the domains that fall under the wellbeing strategy.

2. Background context

International education is NZ's fourth largest export earner (Education NZ, 2015) . Figures from the most recent (2015) full year report for Education NZ illustrate that total enrolment of international students across the major education sectors and agencies (i.e. schools, ITPs[1], PTEs[2], and universities) was estimated above 125,000 - with students from India, China, and Philippines recording the highest growth rates in overall enrolment. Furthermore, placing the lens over the tertiary education sector, there was a 14 percent increase in the number of international students' enrolled between 2014 and 2015.[3]

Since the early 1990's, both the government and education service providers in NZ have adopted various policies and government-sponsored programs to promote the economy as a popular destination for international students (Butcher & McGrath 2004; Martens & Stark 2008). The primary aims of these policies range from commercializing NZ education to source countries to supporting institutional developments for ensuring international students' wellbeing in NZ. In particular, inflow of international students is facilitated by immigration policies (such as the Immigration Act 2009, country-specific student and working holiday visa arrangements[4]) and student mobility programs (through student exchange programs and academic scholarships[5]) with foreign countries (Daly & Barker 2005; Martens and Stark 2008). Additionally, various public interventions, aimed at developing the academic infrastructure and education systems, strive to offer international students a positive learning experience. Some important examples of such recent policy interventions include the Code of Practice for the Pastoral Care of International Students (2002) (see Ward & Masgoret 2005; Lewis 2005; Deumart et al. 2005), and the Education Amendment Act 2017[6].

Most recently, and of direct relevance to this study, the MoE released a strategy document in June 2017 outlining focus areas for government agencies that are working with international students. The International student wellbeing strategy is portrayed in Figure 1 below and provides further detail pertaining to the four key areas of interest – economic wellbeing, education, health and wellbeing, and social inclusion. The aim of this new strategy is to "protect and enhance New Zealand's reputation as a safe and welcoming study destination"[7]. Further to this, the MoE also earmarked $750,000 from the Export Education Levy to fund initiatives aimed at improving international student wellbeing.

[1] Institutes of technology and polytechnics.
[2] Private training establishments.
[3] See http://www.educationcounts.govt.nz/statistics/indicators/main/student-engagement-participation/1967
[4] See https://www.immigration.govt.nz/new-zealand-visas/options/study/all-student-visas
[5] See https://www.educationcounts.govt.nz/publications/international/19688 and https://enz.govt.nz/support/funding/scholarships/
[6] See https://education.govt.nz/ministry-of-education/legislation/the-education-update-amendment-act/#quick
[7] See https://education.govt.nz/ministry-of-education/overall-strategies-and-policies/wellbeing-strategy/

Figure 1 International Student Wellbeing Strategy

Overarching strategy outcome

International students are welcome, safe and well, enjoy a high quality education and are value for their contribution to New Zealand

ECONOMIC WELLBEING	EDUCATION	HEALTH AND WELLBEING	INCLUSION
International students are able to support themselves.	**International students achieve educational outcomes that support their future pathways and choices.**	**International students are safe and well/.**	**International students are welcome, valued and socially connected.**
• International students have accurate information about the costs of living and studying, including regional variations in costs. • International students understand their rights to work in New Zealand, their rights as employees and do not experience exploitation in the workplace. • International students know their rights relating to accommodation and how to access services to resolve accommodation disputes. • International student understand the pathways to employment and residency that are available to them. International students can access services that provide financial advice.	• International students know that the providers and course they enrol in are high quality. • International students have appropriate English language skills to undertake planned study. • International students achieve good educational outcomes and can access services to support pathways to further study. • International students experience culturally responsive services from education providers.	• International students can achieve effective healthcare that is culturally appropriate. • International students know how to keep safe in New Zealand. • International students understand New Zealand laws relating to crimes and violence, their legal rights, rights to services and how to report crime. • International students can access safe and reliable transport.	• International students feel welcomed in New Zealand and know their contribution is valued. • International student voices are heard and considered when relevant government policies and strategies are developed. • International students have access to information about social, cultural and religious services available to them. • International students feel integrated into their communities and their diversity is celebrated.

Source: https://education.govt.nz/ministry-of-education/overall-strategies-and-policies/wellbeing-strategy/.

3. Literature summary

The majority of the extant literature focusses on challenges faced by international students in their host nation, and often includes little mention (if any) of the positive outcomes they may experience, relative to their domestic counterparts. As a consequence empirical evidence related to international students' wellbeing tends to be dedicated to challenges related to social, economic, and cultural differences between the origin and host countries (Hofstede 1986; Niles 1995; Lee & Rice 2007; Marginson 2012; Kukatlapalli 2016). A review of the existing literature indicates that these challenges can be broadly classified under three key themes (which are often closely interlinked with each other): financial constraints and economic instability; health; and social inclusion.

In Table 1, for each key theme, we provide a succinct summary of the relevant literature, including areas of focus, potential deterrent factors to a positive outcome, and likely implications for students if they face these obstacles. For instance, with respect to economic wellbeing, potential challenges can be lack of employment opportunities and being exploited in the labour market via the informal sector. Ward (2001) finds survey evidence that only half of international students felt they had enough financial resources for their stay in NZ.

The second theme evident in the literature is health and this is highly interrelated to other aspects of students' wellbeing. For example, lack of English proficiency which is a key barrier influencing social inclusion also presents as a barrier to accessing mental health services (Ho, 2003). With respect to the third theme shown in Table 1 (social inclusion), other potential challenges include lack of social interaction and experiencing racial discrimination. Implications of these issues include feeling lonely and homesick (as well as other mental health concerns), and leaving the host country part way through the qualification or diminished willingness to stay on post-completion of their education.

Crime and threats to personal safety also fall under the theme of social inclusion. Personal safety has regularly been touted as an important concern considered by students when choosing destination countries for their international study (Mazarrol & Soutar 2002). It is useful to note at this point that compared to some of the major destination countries (including the US, Australia, the UK, and Canada), available evidence indicates that international students tend to feel much safer in NZ due to a relatively low incidence of crime and racial discrimination (Lee & Rice 2007; Sawir et al 2008; Nyland et al. 2009; Ministry of Social Development 2012; Houshmand et al. 2014).

While each of the three themes identified in the literature can be linked back to domains outlined by the MoE in their wellbeing strategy (Figure 1), it is interesting to note the lack of literature on the education domain. This may be due to the fact that some of the outcomes in this space are positive in nature and as such are of diminished interest for researchers. This can be further investigated in the empirical work that follows.

Table 1 Key themes from relevant literature

Theme	Focus	Potential deterrent factors	Implications	International studies	NZ studies
Economic wellbeing	Relates to economic stability and financial conditions of students. Also relates to long-term labour market opportunities.	• Higher cost of living and strict visa requirements (e.g. expensive health insurance, restrictions on employment) in host countries. • Lack of employment opportunities for international students in host countries.	• Lack of access to adequate financial support leading to poor quality of life. • Engagement in low-wage risky jobs in informal sectors.	Mazzarol & Soutar 2002; Baas 2006; Hazen and Alberts 2006; María et al 2006; Shanka et al 2006; Lee & Rice 2007; Forbes-Mewett et al. 2009; Pechar & Andres 2011; Munro 2011; Kato & Sparber 2013; Gribble 2014.	Ward 2001; Butcher & Mc Grath 2004; Zhang & Brunton 2007; Sawir et al. 2009; Anderson & Naidu 2010.
Health	Relates to physical, mental, emotional well-being of international students in host countries.	• Social exclusion, difficulties in adaptability in home country's environment, and language barriers. • Imperfect information regarding host country's health care services. • Expensive health insurance.	• Emotional and psychological disorders, mental stress, low self-esteem, academic difficulties. • Weight loss, insomnia, digestive problems.	Cole et al. 1980; Furnham & Trezise 1983; Burns 1991; Furukawa 1997; Mori 2000; Poyrazli & Grahame 2007; Brown 2008; Sawir et al. 2008; Marginson et al. 2010; Sherry et al. 2010; Forbes-Mewett & Sawyer 2011; Poljski et al. 2014; Clarke & Isphording 2017.	Ward & Kennedy 1993; Kypri et al. 2002; Ho & Ho 2003; Butcher & Mc Grath 2004; Silva et al. 2015.
Social Inclusion	Relates to the process of how individuals can participate in economic, cultural, social and political aspects of the host society.	• Status as non-citizens, temporary migrants, outsiders. • Language barriers. • Threats to personal safety in forms of violent crimes, racial discrimination. • Lack of social interaction and inability to make friends in the host country.	• Lack of social connectedness. • Fear and vulnerability with respect to personal safety and security. • Feeling lonely, homesick, and other emotional problems. • Leaving host country after education completion.	Barker et al. 1991; Niles 1995; Leung 2001; Mazzarol & Soutar 2002; Yeh & Inose 2003; Coston 2004; Alberts & Hazen 2005; Deumert et al 2005; Lee & Rice 2007; Rosenthal et al. 2007 Sawir et al 2008; McLachlan & Justice 2009; Babacan et al. 2010; Marginson et al. 2010; Graycar 2010; Piller & Takahashi 2011; Paltridge et al. 2012; Xiong and Smyrnios 2013.	Lewthwaite 1996; Butcher & Mc Grath 2004; Ward & Masgoret 2004; Ward et al. 2005; Collins 2006; Zhang & Brunton; 2007; Johnson 2008; Li & Li 2008; Sawir et al 2009; Marginson 2012; Ministry of Social Development 2012; Ramia et al. 2013; Kukatlapalli 2016; Collins 2016.

Source: Author's compilation.

4. Data

As stated earlier, the primary objective of this study is to explore the usefulness of administrative data in producing indicators of international students' wellbeing. The relevant data source is therefore Statistics NZ's Integrated Data Infrastructure (IDI)[8].

In the following sub-sections we explain what information is encompassed by the IDI, and the value of linked administrative data. We then detail the process used to construct the relevant populations of interest for the forthcoming empirical work. We end this section outlining alternative data sources, which can be used in conjunction with evidence from the IDI, but are unfortunately unable to be linked to our core populations of interest, and are out of scope for this particular study. These alternatives are mostly surveys and provide useful subjective information related to wellbeing.

4.1 IDI

The IDI is a large research database containing microdata about both individuals and households in NZ. It includes numerous Statistics NZ surveys, as well as data derived from both government and non-government agencies. Each individual in the IDI is assigned a unique identifier (snz_uid) that permits linkages across datasets. We are consequently able to link subgroups of interest from MoE data (such as international students) with other datasets, to better understand their non-education outcomes, such as health for instance.

The datasets employed from the IDI include:

- Personal details
- Primary and secondary schools
- Tertiary education
- Tax data from Inland Revenue
- Programme for the Integration of Mental Health Data (PRIMHD)
- Publicly funded hospital discharges – from the National Minimum Dataset (NMDS)
- Accident Compensation Corporation (ACC) injury claims
- Recorded crime victims data from New Zealand Police.

The variables chosen and constructed from each of these data sets are based on those highlighted from prior NZ surveys and international studies (see Table 1), and then aligned with each of the four domains identified by the MoE in their new International student wellbeing strategy (see Figure 1).

[8] For more information on the IDI, see www.stats.govt.nz/idi

4.2 Population(s) of interest

We use MoE data (from the IDI) over the most recent six years to create annual samples of students enrolled in (a) primary and secondary schools; and (b) tertiary education. Within each of these samples, we identify two groups – domestic and international students.

At the primary and secondary school-level, international students include all international fee paying students and students who are classified under 28-day waiver (or extended 28-day waiver) category (subject to provision of satisfactory evidence of efforts undertaken to obtain a visa that will allow students to enrol in NZ schools).[9] At the tertiary level, international students are identified based on country of citizenship, residency status, and attendance. NZ and Australian citizens and/or residents are treated as domestic students.

It is important to note however, that the tertiary education data are collected from a system known as Single Data Return (SDR) which may not include information from providers who don't receive government funding (from the Tertiary Education Commission). Therefore, qualifications that are completed by students (both domestic and international) at a non-government funded provider (such as private training establishments) are not included in the IDI.[10]

There are two other noteworthy points of clarification. International students include PhD students, even though they pay domestic fees. We also only classify a student as international if they fall into that category whilst studying (during our time period of interest), and don't look ahead to see if their status changes in later years, e.g. if they gain domestic status over time after obtaining NZ residency.

A summary of the relative proportions of the two populations of interest (domestic and international) are provided in Table 2.

[9] See specific details in https://education.govt.nz/ministry-of-education/publications/education-circulars/2017-circulars/circular-201701/appendix-d/; Retrieved on November 18, 2017.

[10] See http://www.educationcounts.govt.nz/__data/assets/pdf_file/0004/179959/Moving-Places-Destinations-and-earnings-of-international-graduates.pdf; Retrieved on November 27, 2017.

Table 2 Domestic and international populations of interest

Years	2010	2011	2012	2013	2014	2015
Primary and secondary schools						
Domestic	673,881	690,852	704,352	717,018	-	-
International	12,729	14,325	15,831	17,265	-	-
International %	1.85	2.03	2.20	2.35		
Tertiary education						
Domestic	489,069	437,166	425,661	411,576	407,946	402,060
International	45,795	48,183	48,609	49,215	56,010	64,785
International %	8.56	9.93	10.25	10.68	12.07	12.88

Notes: School enrolment and school leaver data are used to create the school samples; Tertiary course enrolment data is used to create the tertiary samples. All data sourced from MoE tables in the IDI.

To create the school sample, we begin by utilizing school enrolment information from the MoE. It captures the year of school enrolment, such as those starting their first year of school, or changing to a new school. Unfortunately, this data does not indicate information after a student has enrolled; and as such we use the school leavers data set[11] to filter out those that leave school prior to Year 13 (the final year of high school). As the school leavers data is only available up to 2014, our school sample ends in 2013. For each annual school sample, we use the enrolment data to ascertain whether an individual is a domestic or international student. As shown in Table 2, across the primary and secondary school spectrum, international students account for approximately 2% of the student body.

In terms of the tertiary data, we construct our annual samples based on students who were enrolled in at least one course in year *t* (where *t = 2010 to 2015)*. Based on our research objectives at hand, we excluded all extramural students. As evident in Table 2, both the nominal figure for total international students[12], as well as their proportion of the tertiary population, has been increasing in recent years. It is important to note, the samples sizes are not mutually exclusive in the sense that there are overlaps of students across the annual samples.

The populations of interest identified in Table 2 are next linked to multiple data sets in the IDI to obtain trends in terms of economic wellbeing, education, health and social inclusion.

[11] See www.educationcounts.govt.nz/data-services/data-collections/national/school-leavers for more information.
[12] This is consistent published estimates by Education Counts (2017). Note that our estimates marginally vary from those as we include those who continue tertiary education from prior years as well as new enrolments.

4.3 Alternative data sources

The following suggested sources of alternative information were out of scope for this project. This is due to the focus on how administrative data could be used in determining relevant indicators with respect to the MoE international student wellbeing strategy. Nonetheless, we have briefly summarised them below as they will likely be key for future work in this space, as a complement to what findings are provided by the IDI.

Each dataset listed appears to be available upon application to the relevant host organisation. In terms of what information is currently publicly available with respect to each source, many key findings are only provided at the aggregate level. There is a definite lack of disaggregate analysis (such as comparing domestic versus international students) of wellbeing indicators.

Youth 2000 Survey series

The Youth2000 survey series is the largest comprehensive health and well-being survey undertaken of secondary school aged children. While not a longitudinal study, it is a repeated cross-sectional survey that asks a large, representative sample of secondary school students from over approximately a third of all high schools in NZ a wide range of questions that contribute to health and wellbeing. These include questions about ethnicity & culture, physical health, food & activities, substance use, sexual health, injuries and violence, home and family health, school achievement and participation, neighbourhood environment, spirituality and access to healthcare.

Of particular importance to this project, the 2012 survey also asked questions regarding residency status (NZ citizen or permanent resident) and their feelings of being settled in NZ and their sense of belonging. These questions, linked with other questions could support some high level descriptive data on patterns that may exist across regions and schools (for domestic versus international students). Of further interest is that the 2017 version of this study is currently being developed and could enable the inclusion of specific questions to support greater analysis by student status in the future.

Further details about this survey can be found at:
https://www.fmhs.auckland.ac.nz/en/faculty/adolescent-health-research-group/youth2000-national-youth-health-survey-series.html

Graduate Longitudinal Study New Zealand (GLSNZ)

The GLSNZ replaces the 35-year-old Graduate Destination Survey that questioned all NZ university graduates about their employment outcome six months after graduation. This study is designed to be longitudinal and follow almost slightly over 8,700 students (approximately 25% of all 2011 graduates) who were in their final year of study at a NZ University in 2011. Of those students recruited into this study approximately one in nine was an international student (GLSNZ, 2017).

The baseline survey of 2011 captured a broad range of information including demographics; university expectations, experience and satisfaction; employment plans and career aspirations; academic beliefs/attitudes; current financial circumstances; physical health, disability and functional impairment; health risk behaviours; emotional wellbeing; personality type; social support/social integration; and community involvement (www.glsnz.org.nz). They were then re-surveyed 2 years (2014) and five years (late 2016) after graduation and will be surveyed again in 2021, ten years post-graduation.

While some high level summary fact sheets have been released there has only been one on international students (See GLSNZ, 2017). This was focussed on the career plans of these students, and key findings from this will be highlighted in Section 5.

International Student Barometer Surveys (ISB)

The ISB is an online semi-standardised survey questionnaire designed by i-graduate and used by over 1,400 institutions in 28 countries around the world. It has over 150,000 respondents each year, with over two million unique responses since its inception in 2005. The ISB tracks decision making, expectations, perceptions and experiences of international students. Institution-specific results can be compared against sector, national and international benchmarks (where available). Reporting is confidential and customised to each institution.

Within NZ this survey is undertaken at the tertiary level through Private Training Establishments (PTEs) and English Language Providers (ELPs). The ISB asks international students questions in the following areas (though topics may vary by sector):

- the student decision-making process, including key influencers and reasons for choosing NZ and their NZ institution
- satisfaction with their arrival experience
- learning experience – satisfaction with their course of study, subject choice, learning environment and resources
- living experience – satisfaction with for example their accommodation
- students' experience in getting to know New Zealanders
- support services – satisfaction with and availability of support services
- future plans.

The NZ results of the ISB surveys track decision making, expectations, perceptions and experiences of international students that can be compared against sector, national and international benchmarks (where available) at the institutional level. These findings and comparisons are confidential to each institution involved but high level reporting has been made available via their summary reports. This provides an indication as to how NZ compares to internationally across some variables. For example:

> "New Zealand [international] students were more likely than the global average to consider work-related factors as important; 92% considered opportunities for full-time work in this country following their studies as important (12% above the global average), 92% considered opportunities to work while studying as important (10% above the global average) and 90% considered opportunities for long-term employment or permanent residence in this country as important (12% above the global average)." (i-Graduate International Insight, 2014 p3)

Further details of this type of international comparison through the 2016 summary report on PTEs is available at:
https://www.enz.govt.nz/news-and-research/ed-news/2016-pte-international-student-experience-survey/

Other Resources

There are other studies that attempt to measure and report student wellbeing such as the PISA2015 Wellbeing Report[13] and the Trends in International Mathematics and Science Study Reports (https://timssandpirls.bc.edu). Both of these studies, report on students' sense of belonging in school and other measures of wellbeing especially around bullying, however neither of them allow for the breakdown of results by domestic or international student status. This is perhaps an indication of how a single additional question would allow for greater analysis to be undertaken and for a triangulation of wellbeing measures across multiple collection forms in the future.

The integration of any of these alternative data sources into the IDI would also greatly improve the ability future analyses of student wellbeing.

[13] See https://www.educationcounts.govt.nz/__data/assets/pdf_file/0005/181544/PISA-2015-NZ-Students-Wellbeing-Report.pdf

5. Economic wellbeing

International students' academic performance and decisions to pursue employment opportunities in their host countries are found to be closely associated with their overall experience in host countries (Stoynoff 1997; Mazzarol & Soutar 2002; Misra et al. 2003; Hazen & Alberts 2006; Verbik & Lasanowski 2007; Ammermueller 2007; Neri & Ville 2008; Arkoudis et al. 2009; Li, et al. 2010). One of the potential sources in the IDI to measure economic wellbeing of international students is tax data from the Inland Revenue, namely the Employer Monthly Schedule (EMS).

In particular, we use EMS data to estimate annual proportions of domestic and international students who are employed- i) while enrolled in tertiary education, and ii) after completing tertiary education. This allows us to study the extent of employment opportunities that international students can avail in NZ subject to immigration requirements applicable during pursuit (and after completion) of tertiary education.

Income data provided in the EMS is linked with seven potential sources: wages and salary; withholding payment; benefits; student allowance; paid parental leave; pensions; and claimants compensation. To identify if a person is employed, we check if they have received any wages and salary over the relevant timeframe under study. Based on the samples provided in Table 2 for our domestic and international populations of interest, we first identify the proportion of these subgroups that received any wages and salary during their study time. To check the intensity of employment, we also repeat this exercise and raise the threshold to earning a minimum of $100 in atleast one month in the relevant calendar year. As shown in Table 3, we find that domestic tertiary students are much more likely to be earning (and therefore be in employment) while studying, relative to their international counterparts – regardless of the wage and salary threshold utilised.

Table 3 Employment rates for tertiary population (while studying)

Year	Proportion employed while studying %			
	W&S > 0		W&S > 100	
	Domestic	International	Domestic	International
2010	85.08	48.39	69.60	34.45
2011	85.74	50.59	69.92	36.24
2012	85.42	52.08	69.98	37.29
2013	84.53	53.58	70.42	39.79
2014	82.26	54.54	70.85	43.38
2015	79.22	50.72	70.53	45.54
Average annual sample size	428,913	52,099	428,913	52,099

Notes: MoE data used to create tertiary population, as described in Section 4 and Table 1. Employment information sourced from the EMS in the IDI, and based on individual earning positive wages and salary (W&S) for at least one month in the relevant calendar year. The alternative threshold provided is earning wages and salary of minimum $100 for at least one month in the relevant calendar year.

The proportion of international students earning any wages or salary, whilst undertaking their tertiary study, hovers at approximately half their population during the time period of interest. The comparable figures for domestic students range from just over 79% to 85%. When we raise the threshold to a minimum of $100 for atleast one month in the particular year, the employment propensity calculated drops for both domestic and international students. For domestic students, the proportion meeting the higher wage threshold is a steady 70% across the sample timeframe; while the comparable numbers for the international population range from 34% to 45%.

Furthermore, we find that the average number of months a student is earning any wages or salary is 8.91 and 7.22 for domestic and international students respectively[14] (based on the last year of the timeframe under study = 2015).

It is of course important to note that the lower prevalence and frequency of employment among international students may also reflect potential visa restrictions they face[15].

We next identified individuals who finished their final tertiary qualification in the time period under study and examined their likelihood of receiving wages and salary one year, and two years post completion. We excluded from our samples individuals who appear to be based overseas for the particular year under investigation. We follow the methodology used in Ministry of Education (2017) whereby an individual is classified as overseas if based nine months or more overseas overall in a year. To make this determination, we use information on border movements from the IDI.

Table 4 Employment rates for tertiary population (after completion)

Year of completion	Proportion employed after study completion %			
	Domestic		International	
	One year later	Two years later	One year later	Two years later
2010	97.76	94.59	93.19	85.14
2011	95.97	92.44	90.68	83.98
2012	94.72	90.96	90.72	84.00
2013	93.32	88.62	89.50	82.67
Average annual sample size	82,002	80,676	11,871	12,390

Notes: MoE data is used to create school and tertiary populations (as described in Section 4 and Table 1) and derive information on qualification completion. Individuals who have spent at least nine months of the relevant year overseas are excluded from the samples. Employment information is sourced from the EMS in the IDI, and based on the individual earning positive wages and salary for at least one month in the relevant year.

[14] These figures change to 7.16 and 8.84 when using the $100 threshold for wages and salary.

[15] It is common for student visas to permit part time work up to 20 hours a week. However, such conditions often must meet requirements such as being enrolled in a study programme for atleast two years; studying a qualification that gains points under the Skilled Migrant Category, etc. The full list of requirements and further information is available at http://nzstudywork.immigration.govt.nz/work-rules-for-students/working-on-a-student-visa/

The post qualification employment indicators are reported in Table 4. We find that international students are much more likely to be employed in NZ after completion of their tertiary qualification compared to the likelihood of being employed while pursuing education. In terms of comparing domestic and international students, the former group usually has a higher probability of being employed relative to the latter group, and the difference ranges from four to eleven percentage points. Recent research by Park (2017) also finds that young international bachelor's degree graduates who stay in NZ after completion of their studies earn less than comparable domestic graduates, except for those that have studied nursing or medical studies.

Interestingly, as shown in Table 4, for both domestic and international students, their likelihood of receiving wages and salary drop two years after their study completion. Speculatively, this may be related to these individuals heading back to the education sector for further study.
As a further measure of economic wellbeing, future research could also examine average gross monthly earnings (via wages and salary and other sources) of individuals in a year during which they were employed. However, the difficulty with interpreting such figures is that IR data does not provide information on the number of hours worked. As such the monthly figures cannot be converted into hourly wage rates, which would provide a more accurate benchmark for comparison purposes.

To supplement the employment indicators from the IDI, we can utilise an alternative data source – the GLSNZ (description provided in Section 4.2). In the baseline survey of the GLSNZ we find that where graduates planned to work was in part dependent on the level they were studying at. GLSNZ (2017) disaggregated findings for PhD versus non-PhD students and found that the latter were more likely to be planning to work in NZ after their qualification completion (62.8% versus 49.1%). Additionally, in terms of employment fields students were planning to enter into, the GLSNZ baseline data shows that education and training was highest ranked amongst amongst domestic and international students (with respect to non-PhD students).

Future research could apply for full access to this data enabling these employment plans and location to be tracked over time for these students. This is outside of the scope of this project however. It is also important to note that this supplementary data is only relevant for those who studied at university level so excludes all non-university tertiary courses.

6. Education

Measures related to educational outcomes of international students in foreign countries can be used as indicators for how well they adapt to the new learning environment offered by the host country (Robertson et al. 2000; Grayson 2008). To see how international students in NZ are performing academically compared to domestic students, we explore MoE data in the IDI.

School-level educational outcomes

We focus on school students' aged between 15 and 18 to estimate the proportion of students of relevant age cohorts who completed qualification levels 1 to 3. This equates to the national qualification framework (NQF) levels for the final three years of high school in NZ. This corresponds to the National Certificate of Educational Achievement (NCEA) levels 1 to 3, and are usually studied in Years 11 to 13.

As shown in Table 5, domestic students have higher levels of completing each NQF level. The first level is usually completed in Year 11 when a student is aged 15-16, which is the last year of compulsory schooling in NZ[16]. For domestic students, the completion rate ranges from 76.81% to 82.97% depending on which point in the 2010 to 2013 timeframe is of interest. There is a however a noticeable drop in completion rates for international students at this level, from 59% in 2010 to 51.95% in 2013. It is worthy to note here that unlike the tertiary sector, it is likely that many international students join the school system in NZ with a focus on the experience of living in NZ, rather than educational outcomes per se. Different motivations may therefore underlie the apparent gap in qualification completion rates.

Table 5 Qualification completion for school population

Year	Proportion completing qualification by age group %					
	Domestic			International		
	NQF 1	NQF 2	NQF 3	NQF 1	NQF 2	NQF 3
2010	78.50	84.47	79.57	59.00	62.26	58.32
2011	76.81	85.35	86.84	54.25	64.32	65.90
2012	83.51	86.56	86.12	52.86	61.01	69.18
2013	82.97	87.03	89.04	51.95	58.33	66.26
Average sample size	109,402	80,442	35,475	4,511	4,478	3,206

Notes: MoE data used to create school population, as described in Section 4 and Table 1. For NQF 1 the population of interest are those aged 15-16; for NQF 2 it is those aged 16-17; and for NQF 3 it is those aged 17-18.

For those students that continue to enrol in school past age 16, Table 5 reports NQF 2 and 3 completion rates for students aged 16-17 and 17-18 respectively. For the latter qualification level, while domestic students again outperform international students in this respect, the trend is similar for both; rising between 8 to 10 percentage points across the sample timeframe.

[16] Schooling is compulsory in NZ from age 6 to 16.

MoE data in the IDI also provides a variable for measuring how well a student performed, it is labelled 'expected percentile score'. Ussher (2008) provides a useful description of this variable, and prior research has also shown that those with higher scores are more likely to study at bachelors level (Engler, 2010).

Table 6 presents the average expected percentile scores (also known as student achievement scores) at each NCEA level for the relevant age-cohort of international and domestic students. The sample is only based on those that undertake at least one NCEA standard in the particular year.

Table 6 Expected percentile score for school population

Year	Average expected percentile score					
	Domestic			International		
	NCEA 1	NCEA 2	NCEA 3	NCEA 1	NCEA 2	NCEA 3
2010	0.42	0.40	0.40	0.41	0.39	0.43
2011	0.41	0.40	0.40	0.39	0.41	0.43
2012	0.42	0.40	0.40	0.39	0.38	0.42
2013	0.43	0.41	0.41	0.40	0.40	0.42
Average sample size	109,402	80,442	35,475	4,511	4,478	3,206

Notes: MoE data used to create school population, as described in Section 4 and Table 1. Analysis based on the individuals who undertake atleast one NCEA standard in a particular year. For NCEA 1 the population of interest are those aged 15-16; for NCEA 2 it is those aged 16-17; and for NCEA 3 it is those aged 17-18.

To interpret the findings in Table 6, an expected percentile score of 0.40 for instance implies that a students' score is better than 40 percent of their peers. It is important to note that similar values for expected percentile at NCEA 2 and NCEA 3 does not necessarily reflect similar levels of achievement, as more of the poorer performing students will have left the education sector after NCEA 1, which therefore lowers the average score at higher NCEA levels.

The main finding from Table 6 is that regardless of the NCEA level, we find no evidence of differences in the average expected percentile scores for domestic versus international students.

Tertiary-level educational outcomes

In the tertiary sector we focus on qualification completion rates (QCR) and use Education Counts methodology[17] to construct the relevant estimates. More specifically, we follow particular cohorts, which are defined as students who enrol in tertiary qualification A in a given year T. We then compute the fraction of that cohort who successfully complete A in a certain number of years *j*.[18] Note that estimation of *j*-year completion rate varies by qualification level. We follow the year thresholds proposed by Education Counts[19] for each qualification level.

As shown in Table 7 we identify seven qualification levels (Certificates, Diplomas, Bachelors, Graduate certificates/ diplomas, Honours/ Post-graduate certificates & diplomas, Masters, and Doctorate) and the year 2015. We also expanded our time horizon beyond the six years of data used in other sections of this report, to accommodate qualification levels that have longer completion windows. For example, to examine the 8-year completion rate of a Bachelors by the year 2015, we focus on students who were enrolled in such a qualification in 2007.

Table 7 Qualification completion for tertiary population

Year = 2015	Proportion completing tertiary qualification %					
	Domestic			International		
	All	Full-time	Part-time	All	Full-time	Part-time
Certificates	62.08	65.18	49.18	61.68	64.79	48.38
Diplomas	48.22	55.51	25.80	48.97	50.11	37.85
Bachelors	51.14	53.53	30.10	62.29	64.97	39.60
Grad cert/Diplomas	80.40	87.33	57.20	86.47	87.30	81.35
Honours/PG	71.94	75.47	75.47	77.09	78.07	78.07
Masters	76.12	81.85	60.38	86.98	87.31	82.92
Doctorate	74.48	75.39	56.78	75.80	75.55	82.09
Sample size	253,419	159,693	93,726	28,815	22,431	6,384

Notes: For Certificates and Graduate certificates and diplomas = 4 year QCR applies; for Diplomas and Honours/PG, and Masters = 6 year QCR applies; and for Bachelors and Doctorate = 8 year QCR applies. Certificates are qualification levels 1 – 4; while Diplomas are qualification levels 5 – 7.

Interestingly, when viewing results for the full sample (irrespective of full or part time status), it is clear that completion rates are fairly similar (between domestic and international students) at the two lowest qualification levels – Certificates and Diplomas. Moving up the qualification level hierarchy, the QCR for international students becomes substantially higher than their domestic counterparts (except for at the doctorate level). This general pattern also holds for the subsamples of full-time and part-time students, i.e. the higher the qualification level, the more likely the QCR by international students will be higher than that by domestic students.

We also compare QCR across different age-groups for the full sample timeframe of 2011 to 2015. As evident in Table 8, we have five age categories ranging from 20-24 through to 40 and over. Age wise patterns differ by both level of qualification and type of student. For instance,

[17] See http://www.educationcounts.govt.nz/statistics/tertiary-education/retention_and_achievement
[18] See https://www.educationcounts.govt.nz/publications/80898/6347
[19] See https://www.educationcounts.govt.nz/statistics/indicators/main/education-and-learning-outcomes/1895

at the lowest qualification level (Certificates), we see that the older the domestic student the higher the QCR, with the reverse pattern holding true for international students. On the other hand, for Graduate certificates and diplomas the QCR declines with age for domestic students, and remains fairly static for international students[20].

Table 8 Qualification completion for tertiary population by age group

Years = 2011 - 2015	Proportion completing tertiary qualification %				
	Age groups				
	20-24	25-29	30-34	35-39	40 +
Certificates	55.58	58.33	62.19	64.36	66.49
	(66.70)	(66.55)	(61.16)	(61.04)	(53.26)
Diplomas	46.52	41.78	41.35	41.60	44.98
	(31.98)	(48.40)	(58.12)	(61.41)	(54.61)
Bachelors	50.09	44.08	44.66	47.19	45.56
	(61.52)	(58.70)	(54.73)	(61.72)	(51.94)
Grad cert/Diplomas	84.65	77.93	75.07	73.26	67.15
	(81.33)	(81.86)	(83.72)	(79.70)	(81.73)
Honours/PG	77.11	71.83	67.27	64.63	64.25
	(76.54)	(80.69)	(81.37)	(80.61)	(78.22)
Masters	82.86	75.60	71.23	66.95	65.22
	(82.30)	(85.98)	(85.34)	(82.15)	(82.60)
Doctorate	81.10	77.28	71.57	62.72	61.30
	(73.79)	(80.10)	(75.73)	(80.20)	(81.10)
Total sample size	134,952	70,149	56,982	57,306	194,925
	(37,575)	(15,882)	(4,590)	(2,394)	(2,190)

Notes: For Certificates and Graduate certificates and diplomas = 4 year QCR applies; for Diplomas and Honours/PG and Masters = 6 year QCR applies; and for Bachelors and Doctorate = 8 year QCR applies. Certificates are qualification levels 1 – 4; while Diplomas are qualification levels 5 – 7. Figures provided are for domestic students, with estimates for international students shown in parenthesis.

It is also worth noting that while not shown in Table 8, the pattern with regard to sample sizes by age-group and qualification level vary substantially between domestic and international students[21]. For example, while the largest number of domestic students completing Certificates and Diplomas are aged 40 and above, the number of international students completing the same qualification level are highly skewed towards students in the age-group 20-24.

In addition to age, there can also be variations in students' choices of enrolling in a particular tertiary qualification based on their quality, socio-economic background, and future expectations. Conditional on having sufficient data, these variations may be worth exploring in future research to explain trends / differences in educational outcome by domestic versus international student. For example, future work in this space can utilise regression models where the outcome of interest is qualification completion trends (between international and domestic students) while controlling for demographic characteristics and year, study region, and country of citizenship specific fixed effects.

[20] In results not provided here, we have repeated similar calculations for course completion rates, and find that the general patterns are similar to those found for QCR in Tables 7 and 8.
[21] The sample size information are available upon request.

7. Health and wellbeing

International students' difficulties in the adjustment process in host countries can lead to various health-related disorders and psychological stress (emotional problems, homesickness, loneliness) (Furnham & Trezise 1983; Xu 1991; Li & Kaye 1998; Furukawa 1997; Wang & Mallinckrodt 2006; Ho et al. 2007; Hyun et al 2007; Ammermueller 2007).

In this section we focus on both physical and mental well-being indicators utilizing Ministry of Health data to estimate annual proportions of international and domestic students who access health-care services in NZ in our study period. In particular, we use two relevant health data sources that are related to publicly funded hospital discharges events via the National Minimum Dataset (NMDS), and the Programme for the Integration of Mental Health Data (PRIMHD) (to capture mental health-related and addiction problems).

For both data sources (NMDS and PRIMHD), we examine the likelihood of having an event (a binary indicator), as well as the frequency of said events. We also disaggregate results for both school and tertiary students, based on the samples described in Table 1.

Our findings are illustrated in Table 9. The main estimates relate to the likelihood of having any hospital admission; an acute hospital admission; or a mental health referral. The figures in parenthesis relate to the likelihood of having multiple events. It is clear that the propensity for health events (whether singular or multiple) is lower for international students relative to their domestic counterparts. For instance, international students in the tertiary sector have about a tenth of the likelihood of experiencing a hospital admission compared to domestic students; with similar magnitudes for having an acute admission or mental health referral.

Unfortunately what our indicators cannot tell us is whether the lower use of health services by international students is truly due to their reduced likelihood of experiencing physical and mental health issues, or whether they face barriers in accessing public services. For instance, cost may be a strong barrier, as access to the majority of public health and disability services are only free or subsidised if the individual is a NZ citizen or permanent resident and for a minority of other circumstances[22]. Other potential roadblocks in accessing relevant healthcare include language and social barriers (see evidence on this front by Mori (2000) and Hyun et al. (2007))[23].

[22] Other groups that can access free or subsidised health care include Australian citizens who lived in NZ for atleast 2 years, those who hold a work visa and who are eligible to be in NZ for 2 years or more, those under 17 where the parent or guardian is eligible, interim visa holders, those on a NZ aid programme, or commonwealth scholarship student, refugees or protected people, and victims of people trafficking (Ministry of Health, 2017).
[23] The estimates in Table 9 may also be affected by selection bias. There are health requirements for individuals who apply for a student or work visa to minimize the cost of the healthcare in NZ over the duration of their stay in the country. For more information, see https://www.govt.nz/browse/immigration-and-visas/get-a-new-zealand-student-visa/health-requirements-for-a-student-visa/.

Table 9 Health events for school and tertiary populations

Year	Proportion of sample with any hospital admissions %			
	Primary and secondary school		Tertiary	
	Domestic	International	Domestic	International
2010	6.04 [1.11]	0.43 [0.07]	10.24 [2.55]	1.44 [0.21]
2011	5.94 [1.11]	0.36 [0.07]	10.27 [2.57]	1.46 [0.21]
2012	6.03 [1.12]	0.37 [0.05]	10.28 [2.56]	1.71 [0.25]
2013	5.94 [1.12]	0.37 [0.06]	10.39 [2.63]	1.98 [0.36]
2014	-	-	10.63 [2.76]	2.09 [0.35]
	Proportion of sample with acute hospital admissions %			
	Primary and secondary school		Tertiary	
	Domestic	International	Domestic	International
2010	0.68 [0.12]	0.04 [0.00]	2.94 [0.41]	0.33 [0.03]
2011	0.64 [0.11]	0.08 [0.01]	2.77 [0.37]	0.34 [0.04]
2012	0.65 [0.11]	0.06 [0.00]	2.67 [0.39]	0.41 [0.03]
2013	0.65 [0.12]	0.05 [0.00]	2.55 [0.37]	0.48 [0.08]
2014	-	-	2.63 [0.40]	0.49 [0.05]
	Proportion of sample with mental health referral %			
	Primary and secondary school		Tertiary	
	Domestic	International	Domestic	International
2010	2.09 [0.47]	0.07 [0.02]	2.78 [0.96]	0.25 [0.06]
2011	2.39 [0.60]	0.06 [0.02]	3.21 [1.15]	0.31 [0.09]
2012	2.58 [0.70]	0.06 [0.03]	3.34 [1.26]	0.29 [0.07]
2013	2.62 [0.67]	0.09 [0.02]	2.84 [1.52]	0.29 [0.08]
2014	-	-	4.02 [1.55]	0.31 [0.11]
Average sample size	696,526	15,038	434,284	49,562

Notes: MoE data used to create school and tertiary populations, as described in Section 4 and Table 1. Estimates provided are the proportion of each sample that had any health event. Figures in parenthesis illustrate the proportion of each sample that experienced multiple events.

Not shown in Table 9 (for the sake of brevity[24]) we also broke down the analysis by age group. For school students the age classifications were up to 12 and over 12, while for the tertiary sample the age groupings were under 20; 20-29; 30-39; and 40 and above. In general, over 12 year olds were equally as likely to experience a hospital admission, compared to the under 12 year olds (for both domestic and international students). For the case of acute admissions and mental health referrals, over 12 year olds were at least two to three times more likely to experience these health events, relative to their younger counterparts; and again irrespective of

[24] Available from the authors upon request.

whether they were domestic or international students. When we switched the focus to tertiary students, the results were mixed across the type of events and age classifications. For instance, for both domestic and international students, 30-39 year olds were the age group most likely to have an acute hospital admissions. In contrast, the age wise patterns for mental health referrals differ for domestic and international students. For the former group, the likelihood of mental health referrals drop as we move up the age classifications, while the reverse is the case for the latter group

The shortcoming with all of these potential measures within the IDI is that they are recorded on the student experiencing a negative outcome. They are therefore too late to prevent such outcomes from occurring. In contrast, the student experience surveys such as the Youth2000 series and the ISB surveys attempt to capture these experiences, attitudes and concerns early in the lifecycle, before they have escalated to clinical diagnoses. As such future research in this space should utilise these alternative data sources in order to fill in the background context for the outcomes recorded in Table 9. This would be particularly useful at school level through the Youth2000 series where future work could conduct an analysis of risky behaviours and the description of those mostly likely to display these behaviours and/or depressive symptoms. As indicated earlier, it would of course, be useful to have these alternative data sources linked within the IDI.

8. Inclusion

Crime and threats to personal safety are key aspects to be considered under the theme of social inclusion. As indicated earlier, personal safety has regularly been touted as a key concern when individuals choose destinations to study at (Mazarrol & Soutar 2002). We therefore, begin our analysis with information from the Accident Compensation Corporation (ACC) regarding injury claims. We focus on the subset of accidents / injuries that have been a result of criminal acts, shooting, and physical violence (pushed, pulled or struck by person).

Table 10 ACC events (criminal acts or violence) for school and tertiary populations

Year	Proportion of sample with ACC event %			
	Primary and secondary school		Tertiary	
	Domestic	International	Domestic	International
2010	3.27 [0.24]	0.71 [0.02]	3.10 [0.29]	0.75 [0.04]
2011	3.56 [0.28]	0.63 [0.06]	3.36 [0.36]	0.74 [0.04]
2012	4.06 [0.37]	0.66 [0.09]	3.75 [0.45]	0.95 [0.07]
2013	4.12 [0.38]	0.64 [0.10]	4.11 [0.47]	0.97 [0.05]
2014	-	-	4.02 [0.47]	0.88 [0.07]
Average sample size	696,526	15,038	434,284	49,562

Notes: MoE data used to create school and tertiary populations, as described in Section 4 and Table 1. Estimates provided are the proportion of each sample that had any ACC event due to criminal acts, shooting or physical violence. Figures in parenthesis illustrate the proportion of each sample that experienced multiple events.

As shown in Table 10, in a similar vein to the analysis of health events presented in the earlier section, we examine the likelihood of having an ACC event (a binary indicator), as well as likelihood of having multiple events. Also similar to the findings in Section 7 on health outcomes, we find that international students are much less likely to experience an ACC event as a result of criminal acts and physical violence. The magnitude of difference ranges from approximately four to six times greater likelihood for domestic students relative to international – with primary and secondary school students faring closer to the top end of that range[25].

When we broaden our analysis to all cases of injury covered by ACC[26], we see the same pattern of domestic students being more likely to experience any ACC event compared to their international counterparts. They are atleast five times more likely if in the primary and secondary school population, and between 2 to 3 times more likely if in the tertiary population – as shown in Table 11.

[25] We also broke down the analysis by age group (not reported for brevity sake). We find that regardless of whether the individual was a domestic or international school student, over 12 year olds were more likely to have had an ACC event, relative to under 12. For tertiary students, 2014 estimates indicate that 30-39 year olds were most likely; while under 20 year olds filled that role for domestic students.

[26] International students cannot study at an institution that is not a signatory to the Code of Practice for Pastoral Care (2016) and one of the elements of this code is that international students are safe. Therefore, it is important to assess overall risk of injury (indicated by experiencing any ACC event).

Table 11 ACC events (any) for school and tertiary populations

Year	Proportion of sample with ACC event %			
	Primary and secondary school		Tertiary	
	Domestic	International	Domestic	International
2010	26.15 [6.99]	5.44 [1.04]	26.82 [7.35]	8.82 [1.24]
2011	26.15 [7.19]	4.49 [0.85]	26.65 [7.28]	8.93 [1.35]
2012	27.02 [7.51]	4.02 [0.92]	27.02 [7.60]	9.78 [1.59]
2013	27.23 [7.52]	3.60 [0.87]	27.23 [7.76]	10.36 [1.68]
2014	-	-	27.60 [7.93]	10.69 [1.78]
Average sample size	696,526	15,038	434,284	49,562

Notes: MoE data used to create school and tertiary populations, as described in Section 4 and Table 1. Estimates provided are the proportion of each sample that had any ACC event. Figures in parenthesis illustrate the proportion of each sample that experienced multiple events.

Further indicators of student safety in NZ are available via police data in the IDI. We investigate incidence of crime victimization for both domestic and international students in 2015. Unfortunately police data is only available for the period July 2014 to July 2016, and as such we focus on the last full calendar year available (2015), and are not able to examine time trends over our sample timeframe. Due to this data constraint we also cannot consider crime victimization rates for the school sample, which ended in 2013.

We create a binary indicator for being a victim of any crime, as well as disaggregated indicators for four types of crimes: (i) violent crime; (ii) sexual offence; (iii) property crime; and (iv) other crimes. As Table 12 shows, international students appear to be at a lower risk of being victimized by crime in NZ, compared to domestic students (assuming the rates of reporting by both groups are similar); and these findings hold regardless of whether we look at the aggregate measure or subcategories of offence types.

Table 12 Crime victimization rates for tertiary population

Year = 2015	Proportion experiencing crime victimization %	
	Domestic	International
Any crime	5.11	3.66
Violent crime	1.26	0.41
Sexual offence	0.18	0.05
Property crime	3.18	2.64
Other crime	0.83	0.71
Average annual sample size	402,060	64,785

Notes: MoE data used to create tertiary population, as described in Section 4 and Table 1. Crime victimization data sourced from Ministry of Justice information in the IDI. Any crime is an all-encompassing indicator. Violent crimes = murder, attempted murder, manslaughter, serious assaults, and common assaults; Sexual offences = both aggravated and non-aggravated sexual assaults; Property crimes = robbery, extortion, burglary and theft; and Other crimes = all remaining types of crime, such as abduction and kidnapping, illegal use of property, etc.

9. Disclaimer

The results in this paper are not official statistics, they have been created for research purposes from the Integrated Data Infrastructure (IDI), managed by Statistics New Zealand. The opinions, findings, recommendations, and conclusions expressed in this paper are those of the authors, not Statistics NZ, or MoE.

Access to the anonymised data used in this study was provided by Statistics NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business, or organisation, and the results in this paper have been confidentialised to protect these groups from identification. Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI.

The results are based in part on tax data supplied by Inland Revenue to Statistics NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form, or provided to Inland Revenue for administrative or regulatory purposes. Any person who has had access to the unit record data has certified that they have been shown, have read, and have understood section 81 of the Tax Administration Act 1994, which relates to secrecy. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

10. References

Alberts, H. C., & Hazen, H. D. (2005). "There are always two voices…": International Students' Intentions to Stay in the United States or Return to their Home Countries. International Migration, 43(3), 131-154.

Altbach, P. G. (2004). Higher education crosses borders: Can the United States remain the top destination for foreign students? *Change: the magazine of higher learning*, *36*(2), 18-25.

Altbach, P. G., & Knight, J. (2007). The internationalization of higher education: Motivations and realities. *Journal of studies in international education*, *11*(3-4), 290-305.

Ammermueller, A. (2007). Poor background or low returns? Why immigrant students in Germany perform so poorly in the programme for international student assessment. *Education Economics*, *15*(2), 215-230.

Anderson, D., & Naidu, K. (2010). The Land of Milk and Honey? The contemporary working lives of contingent youth labour. *New Zealand Journal of Employment Relations (Online)*, *35*(3), 61.

Arkoudis, S., Hawthorne, L., Baik, C., Hawthorne, G., O'Loughlin, K., Leach, D., & Bexley, E. (2009). The impact of English language proficiency and workplace readiness on employment outcomes and performance of tertiary international students. *Melbourne: Centre for the Study of Higher Education, University of Melbourne*.

Baas, M. (2006). Students of migration: Indian overseas students and the question of permanent residency. *People and Place*, *14*(1), 8.

Babacan, H., Pyke, J., Bhathal, A., Gil, G. K., Grossman, M., & Bertone, S. (2010). The community safety of international students in Melbourne: A scoping study.

Ball, S. J. (1998). Big policies/small world: An introduction to international perspectives in education policy. *Comparative education*, *34*(2), 119-130.

Barker, M., Child, C., Gallois, C., Jones, E., & Callan, V. J. (1991). Difficulties of overseas students in social and academic situations. *Australian Journal of Psychology*, *43*(2), 79-84.

Blight, D., Davis, D., & Olsen, A. (1999). The internationalisation of higher education. *Higher education through open and distance learning*, 15-31.

Brown, L. (2008). The incidence of study-related stress in international students in the initial stage of the international sojourn. *Journal of Studies in International Education*, *12*(1), 5-28.

Burns, R. B. (1991). Study and stress among first year overseas students in an Australian university. *Higher Education Research and Development*, *10*(1), 61-77.

Butcher, A., & McGrath, T. (2004). International students in New Zealand: Needs and responses. *International Education Journal*, *5*(4), 540-551.

Clarke, A., & Isphording, I. E. (2017). Language Barriers and Immigrant Health. *Health economics*, *26*(6), 765-778.

Code of Practice for Pastoral Care (2016). Retrieved from http://www.nzqa.govt.nz/providers-partners/education-code-of-practice/.

Cole, J. B., Allen, F. C., & Green, J. S. (1980). Survey of health problems of overseas students. *Social Science & Medicine. Part A: Medical Psychology & Medical Sociology*, *14*(6), 627-631.

Collins, F. L. (2006). Making Asian students, making students Asian: The racialisation of export education in Auckland, New Zealand. *Asia Pacific Viewpoint*, *47*(2), 217-234.

Collins, F. (2016). Temporary Migration and Urban Incorporation in Auckland–Living, Working, Finance and Aspirations. *Auckland, New Zealand*.

Coston, C. (2004). Worries about crime among foreign students studying in the United States. *Victimizing vulnerable groups: Images of uniquely high-risk crime targets*, 161-176.

Daly, A. J., & Barker, M. C. (2005). Australian and New Zealand university students' participation in international exchange programs. *Journal of Studies in International Education*, *9*(1), 26-41.

Deumert, A., Marginson, S., Nyland, C., Ramia, G., & Sawir, E. (2005). Global migration and social protection rights: The social and economic security of cross-border students in Australia. *Global Social Policy*, *5*(3), 329-352.

Education New Zealand (2016). The Economic Impact of International Education in New Zealand 2015-2016. Retrieved from https://enz.govt.nz/assets/Uploads/The-Economic-Impact-of-International-Education-in-New-Zealand-2015-2016.pdf.

Education New Zealand (2015). "New Zealand international education snapshot: 2015 full year report." Retrieved from https://www.enz.govt.nz/assets/Uploads/2045-ENZ-SnapShot-Full-Year-Report-VISUAL.pdf.

Education Counts (2017). "International students enrolled in tertiary education". Retrieved from https://www.educationcounts.govt.nz/statistics/indicators/main/student-engagement-participation/international_students_enrolled_in_formal_tertiary_education.

Forbes-Mewett, H., Marginson, S., Nyland, C., Ramia, G., & Sawir, E. (2009). Australian university international student finances. *Higher Education Policy*, *22*(2), 141-161.

Forbes-Mewett, H., & Sawyer, A. M. (2011). Mental health issues amongst international students in Australia: perspectives from professionals at the coal-face. *University of Newcastle New South Wales*.

Furnham, A., & Trezise, L. (1983). The mental health of foreign students. *Social Science & Medicine*, *17*(6), 365-370.

Furukawa, T. (1997). Sojourner readjustment: Mental health of international students after one year's foreign sojourn and its psychosocial correlates. *The Journal of nervous and mental disease*, *185*(4), 263-268.

GLSNZ (2017). "GLSNZ Baseline Survey 2011". Retrieved from https://www.glsnz.org.nz/files/144943525081.pdf

Graycar, A. (2010). *Racism and the tertiary student experience in Australia*. Academy of the Social Sciences in Australia.

Grayson, J. P. (2008). The experiences and outcomes of domestic and international students at four Canadian universities. *Higher Education Research & Development*, *27*(3), 215-230.

Gribble, C. (2014). Employment, work placements & work integrated learning of international students in Australia. *International Education Association of Australia, Research Digest*, *2*.

Harman, G. (2005). Internationalization of Australian higher education: A critical review of literature and research. In *internationalizing higher education* (pp. 119-140). Springer Netherlands.

Hazen, H. D., & Alberts, H. C. (2006). Visitors or immigrants? International students in the United States. *Population, Space and Place*, *12*(3), 201-216.

Ho, E., Li, W., Cooper, J., & Holmes, P. (2007). The experiences of Chinese international students in New Zealand.

Ho, E., & Ho, E. (2003). *Mental health issues for Asians in New Zealand: A literature review*. Wellington: Mental Health Commission.

Hofstede, G. (1986). Cultural differences in teaching and learning. *International Journal of intercultural relations*, *10*(3), 301-320.

Houshmand, S., Spanierman, L. B., & Tafarodi, R. W. (2014). Excluded and avoided: Racial microaggressions targeting Asian international students in Canada. *Cultural Diversity and Ethnic Minority Psychology*, *20*(3), 377.

Hyun, J., Quinn, B., Madon, T., & Lustig, S. (2007). Mental health need, awareness, and use of counseling services among international graduate students. *Journal of American College Health*, *56*(2), 109-118.

i-Graduate International Insight (2014). New Zealand PTE Sector. International Student Barometer 2014, New Zealand Education. Retrieved from https://enz.govt.nz/assets/Uploads/2014-PTE-sector-ISB-Summary-report.pdf.

Johnson, E. M. (2008). An investigation into pedagogical challenges facing international tertiary-level students in New Zealand. *Higher Education Research & Development*, *27*(3), 231-243.

Kato, T., & Sparber, C. (2013). Quotas and quality: The effect of H-1B visa restrictions on the pool of prospective undergraduate students from abroad. *Review of Economics and Statistics*, *95*(1), 109-126.

Kukatlapalli, J. (2016). A study of the adjustment experiences of Indian international students in New Zealand universities. Victoria University of Wellington. Retrieved from http://hdl.handle.net/10063/4967

Kypri, K., Langley, J. D., McGee, R., Saunders, J. B., & Williams, S. (2002). High prevalence, persistent hazardous drinking among New Zealand tertiary students. *Alcohol and Alcoholism*, *37*(5), 457-464.

Lee, J. J., & Rice, C. (2007). Welcome to America? International student perceptions of discrimination. *Higher education*, *53*(3), 381-409.

Leung, C. (2001). The psychological adaptation of overseas and migrant students in Australia. *International Journal of psychology*, *36*(4), 251-259.

Lewis, N. (2005). Code of practice for the pastoral care of international students: making a globalising industry in New Zealand. *Globalisation, Societies and Education*, *3*(1), 5-47.

Lewthwaite, M. (1996). A study of international students' perspectives on cross-cultural adaptation. *International Journal for the Advancement of Counselling*, *19*(2), 167-185.

Li, M., & Li, M. (2008). Keeping them safe: A review of Chinese students' safety issues in New Zealand. In *ANZCA 08 conference, Power and Place, Wellington, July*.

Li, G., Chen, W., & Duanmu, J. L. (2010). Determinants of international students' academic performance: A comparison between Chinese and other international students. *Journal of Studies in International Education*, *14*(4), 389-405.

Li, R. Y., & Kaye, M. (1998). Understanding overseas students' concerns and problems. *Journal of Higher Education Policy and Management*, *20*(1), 41-50.

María Cubillo, J., Sánchez, J., & Cerviño, J. (2006). International students' decision-making process. *International Journal of Educational Management*, 20(2), 101-115.

Marginson, S., Nyland, C., Sawir, E., & Forbes-Mewett, H. (2010). *International student security*. Cambridge University Press.

Marginson, S. (2012). Including the other: regulation of the human rights of mobile students in a nation-bound world. *Higher Education*, *63*(4), 497-512.

Martens, K., & Starke, P. (2008). Small country, big business? New Zealand as education exporter. *Comparative Education*, *44*(1), 3-19.

Mazzarol, T., & Soutar, G. N. (2002). "Push-pull" factors influencing international student destination choice. *International Journal of Educational Management*, *16*(2), 82-90.

McLachlan, D. A., & Justice, J. (2009). A grounded theory of international student well-being. *Journal of Theory Construction & Testing*, *13*(1), 27.

Ministry of Education (2017). Young graduate outcomes methodology factsheet June 2017. Retrieved from http://www.educationcounts.govt.nz/__data/assets/pdf_file/0006/181779/Young-graduate-outcomes-methodology-factsheet-June-2017.pdf

Ministry of Health (2017). Guide to eligibility for publicly funded health services. Retrieved from https://www.health.govt.nz/new-zealand-health-system/eligibility-publicly-funded-health-services/guide-eligibility-publicly-funded-health-services

Ministry of Social Development (2012). Settling In: International Students Auckland. Social Services Report, 2012.

Misra, R., Crist, M., & Burant, C. J. (2003). Relationships among life stress, social support, academic stressors, and reactions to stressors of international students in the United States. *International Journal of Stress Management*, *10*(2), 137.

Mori, S. C. (2000). Addressing the mental health concerns of international students. *Journal of counselling & development*, *78*(2), 137-144.

Munro, L. (2011). 'It's a lot of hard work': the experiences of student-workers in university term-time employment. *Australian Bulletin of Labour*, *37*(1), 33.

Neri, F., & Ville, S. (2008). Social capital renewal and the academic performance of international students in Australia. *The Journal of Socio-Economics*, *37*(4), 1515-1538.

Niles, F. S. (1995). Cultural differences in learning motivation and learning strategies: A comparison of overseas and Australian students at an Australian university. *International Journal of Intercultural Relations*, *19*(3), 369-385.

Nyland, C., Forbes-Mewett, H., Marginson, S., Ramia, G., Sawir, E., & Smith, S. (2009). International student-workers in Australia: a new vulnerable workforce. *Journal of education and work*, *22*(1), 1-14.

Paltridge, T., Mayson, S., & Schapper, J. (2012). Covering the gap: Social inclusion, international students and the role of local government. *Australian Universities' Review*, *54*(2), 29.

Pandit, K. (2007). The importance of international students on our campuses. *Yearbook of the Association of Pacific Coast Geographers*, *69*(1), 156-159.

Park, Z. (2017). Moving places: Destinations and earnings of international graduates. Ministry of Education, February 2017. Retrieved from http://www.educationcounts.govt.nz/publications/tertiary_education/education-outcomes/moving-places-destinations-and-earnings-of-international-graduates

Pechar, H., & Andres, L. (2011). Higher-education policies and welfare regimes: International comparative perspectives. *Higher Education Policy*, *24*(1), 25-52.

Piller, I., & Takahashi, K. (2011). Linguistic diversity and social inclusion. *International Journal of Bilingual Education and Bilingualism*, *14*(4), 371-381.

Poyrazli, S., & Grahame, K. M. (2007). Barriers to adjustment: Needs of international students within a semi-urban campus community. *Journal of Instructional Psychology*, *34*(1), 28-46.

Poljski, C., Quiazon, R., & Tran, C. (2014). Ensuring rights: Improving access to sexual and reproductive health services for female international students in Australia. *Journal of International Students*, *4*(2), 1

Ramia, G., Marginson, S., & Sawir, E. (2013). *Regulating international students' wellbeing*. Policy Press.

Robertson, M., Line, M., Jones, S., & Thomas, S. (2000). International students, learning environments and perceptions: A case study using the Delphi technique. *Higher Education Research & Development*, *19*(1), 89-102.

Rosenthal, D. A., Russell, J., & Thomson, G. (2007). Social connectedness among international students at an Australian university. *Social indicators research*, *84*(1), 71-82.

Sawir, E., Marginson, S., Deumert, A., Nyland, C., & Ramia, G. (2008). Loneliness and international students: An Australian study. *Journal of studies in international education*, *12*(2), 148-180.

Sawir, E., Marginson, S., Nyland, C., Ramia, G., & Rawlings-Sanaei, F. (2009). The pastoral care of international students in New Zealand: Is it more than a consumer protection regime? *Asia Pacific Journal of Education*, *29*(1), 45-59.

Sawir, E. (2013). Internationalisation of higher education curriculum: the contribution of international students. *Globalisation, Societies and Education*, *11*(3), 359-378.

Sherry, M., Thomas, P., & Chui, W. H. (2010). International students: A vulnerable student population. *Higher education*, *60*(1), 33-46.

Shanka, T., Quintal, V., & Taylor, R. (2006). Factors influencing international students' choice of an education destination–A correspondence analysis. *Journal of Marketing for Higher Education*, *15*(2), 31-46.

Silva, Kawshi de, Kun Yao, Ershad Ali, Rubaiyet Hasan Khan, and Saida Parvin (2015). "Study on Mental Health of International Students in New Zealand." PHA Conference.

Stoynoff, S. (1997). Factors associated with international students' academic achievement. *Journal of Instructional Psychology*, *24*(1), 56.

Van der Wende, M. C. (2001). Internationalisation policies: about new trends and contrasting paradigms. *Higher education policy*, *14*(3), 249-259.

Verbik, L., & Lasanowski, V. (2007). International student mobility: Patterns and trends. *World Education News and Reviews*, *20*(10), 1-16.

Vickers, P., & Bekhradnia, B. (2007). *The economic costs and benefits of international students*. Oxford: Higher Education Policy Institute.

Wang, C. C. D., & Mallinckrodt, B. (2006). Acculturation, attachment, and psychosocial adjustment of Chinese/Taiwanese international students. *Journal of Counseling Psychology*, *53*(4), 422.

Ward, C., & Kennedy, A. (1993). Psychological and socio-cultural adjustment during cross-cultural transitions: A comparison of secondary students overseas and at home. *International Journal of Psychology*, *28*(2), 129-147.

Ward, C. A. (2001). *The impact of international students on domestic students and host institutions: A literature review*. Export Education Policy Project, Ministry of Education.

Ward, C., & Masgoret, A. M. (2004). The experiences of international students in New Zealand. *Report on the Results of a National Survey. Wellington: Ministry of Education*.

Ward, C., Masgoret, A. M., Newton, J., & Crabbe, D. (2005). New Zealand students' perceptions of and interactions with international students. *Interactions with international students*, 2-42.

Xiong, L., & Smyrnios, K. X. (2013). Social, Cultural, and Environmental Drivers of International Students' Fear of Crime: A Cognitive Behavioral Perspective. *Copyright 2013 International Association for Cross-Cultural Psychology ISBN: 978-0-9845627-3-2*, 102.

Xu, M. (1991). The impact of English-language proficiency on international graduate students' perceived academic difficulty. *Research in Higher Education*, *32*(5), 557-570.

Yeh, C. J., & Inose, M. (2003). International students' reported English fluency, social support satisfaction, and social connectedness as predictors of acculturative stress. *Counselling Psychology Quarterly*, *16*(1), 15-28.

Zhang, Z., & Brunton, M. (2007). Differences in living and learning: Chinese international students in New Zealand. *Journal of Studies in International Education*, *11*(2), 124-140.