Explaining Ethnic Disparities in Bachelor's Qualifications: Participation, Retention and Completion in NZ

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Disclaimer

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We combine 8 admin datasets for a population cohort born 1990 - 1994

Māori and Pasifika have lower bachelor’s degree participation, retention and completion rates than Europeans, while Asians have higher rates

Controlling for observables narrows Māori-European participation gap; completely eliminates Pasifika-European gap

For both Māori and Pasifika gaps:

  – School performance is the largest contributor
  – Lower socioeconomic status and parental education also matter, but to a much lesser extent

Our model doesn’t explain much of the higher participation, retention and completion rates of Asians relative to Europeans
Background

• This research was part of the ProdCom inquiry in 2016

• Boosting the achievement of Māori and Pasifika is one of the government’s higher education priorities

• Māori and Pasifika have similar levels of participation in tertiary education as Europeans, but much lower rates of enrolment in bachelor’s degrees

• The source/s of ethnic disparities could help inform policy responses.
Research questions

• How does bachelor’s degree participation, retention and completion among young people differ by ethnicity?

• How much of the ethnic gaps can be explained by differences in characteristics, such as prior school achievement, socioeconomic status, parental education, characteristics of the school attended etc.
Existing research

- 3 factors stand out as being important in explaining participation, retention and completion:
  - Socio-economic status
  - Prior academic performance
  - Parents’ level of education

- NZ research examples:
  - Maani (2005): Christchurch Study – higher parental income and education levels increase the likelihood of university enrolment
  - Strathdee & Engler (2012): for those who gained University Entrance, prior school achievement is a strong predictor of enrolment in higher education
Our contributions

• Newly linked admin data allows:
  – Inclusion of majority of covariates suggested by the literature
  – More refined measure of socioeconomic status (NZ Deprivation Index)
  – Population-level analysis

• Fairlie decompositions
  – To quantify the separate contributions of differences in observable characteristics between ethnic groups to differences in participation, retention and completion
Overview of NZ qualifications system

School:

• NCEA (National Certificate of Educational Achievement)

• 3 levels: Level 1 aged 15/16; Level 2 aged 16/17; Level 3 aged 17/18


Post-school education:

• Bachelor’s degrees: typically 3 years full time and can be completed at university, polytechnics or wānanga
Data: Statistics NZ’s IDI

- Individual-level data from StatsNZ’s Integrated Data Infrastructure (IDI)
- Several linked datasets used
  - MoE school (enrolments, qualifications, standards, interventions)
  - MoE tertiary (enrolments, courses, completions)
  - Overseas spells
  - Address spells
  - IR tax
  - DIA birth records
  - Enduring relationships (parent/child links)
  - Census
Population of interest

• 4 population cohorts: Born between July 1990 and June 1994
• Each cohort has around 47,400 individuals
• Enrolled at NZ high school during their 15\textsuperscript{th} and 16\textsuperscript{th} years
• Lived in NZ for at least 300 days during in each of their 15\textsuperscript{th} and 16\textsuperscript{th} years
• Lived in NZ for at least 200 days in one of the two years from their 18\textsuperscript{th} to 20\textsuperscript{th} birthdays
• IB/Cambridge schools excluded
Outcome variable definitions

- **Participation:** Enrolling in a bachelor’s degree before the age of 20
- **Retention:** For those who participated, enrolling in a 2\textsuperscript{nd} year of bachelor’s study
- **Completion:** For those who participated in a 3-year degree, completing a bachelor’s degree within 5 years of first enrolling
<table>
<thead>
<tr>
<th>Individual characteristics:</th>
<th>School characteristics:</th>
<th>Retention/Completion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Single sex school</td>
<td>Broad field of study</td>
</tr>
<tr>
<td>No. of times switched schools</td>
<td>State/state-integrated/private</td>
<td>Full-time/part time study status</td>
</tr>
<tr>
<td>Migrant</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Socio-economic status:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ deprivation index</td>
<td><strong>School achievement:</strong></td>
<td>Type of provider</td>
</tr>
<tr>
<td><strong>School engagement:</strong></td>
<td>NCEA L1 endorsement</td>
<td>Prior activity</td>
</tr>
<tr>
<td>Other:</td>
<td>School notifications</td>
<td>Earning status</td>
</tr>
<tr>
<td>Distance to nearest provider</td>
<td></td>
<td>1st year course pass rate</td>
</tr>
<tr>
<td>Parents’ highest qualification</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Method

• Probit regressions

\[ Y_i^* = X_i' \beta + u_i \]

where \( X_i \) is a vector of individual, family and school characteristics

• Fairlie decompositions

\[ \overline{P}_i^E - \overline{P}_i^M = \left[ \sum_{i=1}^{N^E} \frac{F(X_i^E \beta^E)}{N^E} - \sum_{i=1}^{N^M} \frac{F(X_i^M \beta^E)}{N^M} \right] + \left[ \sum_{i=1}^{N^M} \frac{F(X_i^M \beta^E)}{N^M} - \sum_{i=1}^{N^M} \frac{F(X_i^M \beta^M)}{N^M} \right] \]

Gap between Māori and European participation

Portion of gap that’s explained by differences in the distribution of measured variables, \( X \)

Unexplained portion of gap
Compared with Europeans, participation, retention and completion rates are:

- Lower for Māori and Pasifika
- Higher for Asians
Results: Participation in bachelor's degree by ethnicity

- European: 39%
- Māori: 16%
- Pasifika: 22%
- Asian: 71%
- Other: 51%

Bar chart showing raw participation rates.
After controlling for all factors:

- Māori still have lower participation rates than Europeans, but majority of gap is closed
- Pasifika have higher participation rates than Europeans (but not statistically significant)
## Key results – marginal effects

### School achievement

<table>
<thead>
<tr>
<th>NCEA Level 1</th>
<th>European</th>
<th>Māori</th>
<th>Pasifika</th>
<th>Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieved</td>
<td>0.129***</td>
<td>0.068***</td>
<td>0.125***</td>
<td>0.367***</td>
</tr>
<tr>
<td>Merit</td>
<td>0.657***</td>
<td>0.496***</td>
<td>0.590***</td>
<td>0.821***</td>
</tr>
<tr>
<td>Excellence</td>
<td>0.875***</td>
<td>0.729***</td>
<td>0.830***</td>
<td>0.883***</td>
</tr>
</tbody>
</table>

**Socioeconomic status:** Less likely in living in a more deprived meshblock (ranging from 1% to 5% points for Maori)

**Parental education:** Four/five fold increase from school qualification to postgraduate qualification (relative to no qual)
Fairlie decomposition: Participation – Māori vs. European

- Gap: 19.8 ppt
- Total explained: 17.2 ppt

Variables:
- School performance
- Deprivation
- Parent education
- Truancy
- School characteristics
- Migrant
- School switching
- Male
- Cohort
- Distance to provider
Fairlie decomposition: Participation – Pasifika vs. European

Gap: 11.4 ppt
Total explained: 14.4 ppt
School performance
Deprivation
Parent education
Truancy
School switching
Cohort
Male
School characteristics
Migrant
Distance to provider

Percent

-1 1 3 5 7 9 11 13 15
Fairlie decomposition: Participation – Asian vs. European

-37.0 ppt

Gap

-17.3 ppt

Total explained

School performance

Migrant

Parent education

Distance to provider

Truancy

Male

School switching

School characteristics

Cohort

Deprivation

-42 -38 -34 -30 -26 -22 -18 -14 -10 -6 -2 2

Percent

-17.3 ppt

-37.0 ppt
Robustness tests/ Extensions

• School fixed effects
• Measurement of school performance – removal of back crediting
• Multiple ethnic identities: sole Māori and sole Pasifika vs. sole European
• Interactions:
  • Socioeconomic status with school performance
  • Socioeconomic status with parental education
Summary

• Using IDI, we combine 8 admin datasets to follow a population cohort born between 1990 and 1994

• Māori and Pasifika have lower bachelor’s degree participation, retention and completion rates than Europeans, while Asians have higher rates

• Controlling for observables narrows Māori-European participation gap and completely eliminates Pasifika-European gap

• For both Māori and Pasifika gaps:
  – School performance is by far the largest contributor
  – Lower socioeconomic status and parental education also matter, but to a much lesser extent

• Our model doesn’t explain much of the higher participation, retention and completion rates of Asians relative to Europeans