Factors explaining the low income return for education among Asian New Zealanders

COMPASS Colloquium, Statistics New Zealand, Wellington

July 29th, 2015

Liza Bolton

Supervisors: Dr Barry Milne, COMPASS Research Centre, Professor Alan Lee, Department of Statistics
Outline

1. Introduction
2. Exploratory Analysis
3. Results
4. Conclusion

Disclaimer: Access to the data used in this study was provided by Statistics New Zealand under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented in this study are the work of the author, not Statistics New Zealand.
Project Origins

While creating the New Zealand Socio-Economic Index (NZSEI), it was noticed that at the 2006 Census, Asian New Zealanders had more than double the prevalence of university degrees compared to any other large ethnic group, yet tended to be in poorly paid jobs.
Common Features in Literature

Australia, Canada, USA and NZ

Observations

• Asians had double the prevalence of Bachelor’s degrees compared to the European population
• Migrants earn less
• The children of Asian migrants earn comparable incomes to the general population (2\textsuperscript{nd} generation)

Techniques

• Basic regression techniques used to consider factors comparing incomes
Context

- New Zealand is similar to Australia, Canada and the US in its at times tense relationship with migration from Asia

Source: Hocken Library, University of Otago

Asians dominate NZ immigration

5:30 AM Monday Apr 1, 2013

China far ahead in visitor and student arrivals, and in approvals for family-sponsored and parent categories.

Dong Suk Jang (right), 34, with her mum, Il Yeol Kim, and children, Sun Gyo Kwak, 4, and Suna Kwak, 2. Photo / APN

Source: The New Zealand Herald
Importance

- Skills shortages
- Asia is an important source of skills
- Our economy is at risk
The Big Picture

Our analysis focuses on New Zealanders:
• 21 - 69 years of age,
• with an ANZSCO rating,
  • i.e. in the workforce
• who responded to all relevant 2013 census questions.

A group of just under 1.7 million people were used in this analysis.

Of these, about 190,000 identify as Asian with 2/3 living in Auckland and 90% born overseas.
Exploratory Analysis
Income by Education (2013 Census)

Average Annual Income

- Euro
- Population Average
- Māori
- Pacifica
- Asian

$11,800

$19,500
Income by Education with Asian Subgroups

- No Qualification
- School Only
- Post School
- Bachelors
- Post Graduate

Average Annual Income

- Euro
- Population Average
- Māori
- Pacifica
- Other Asian
- Indian
- Chinese
- Filipino
- Korean
Born in NZ (Asian Population Only)

Average Annual Income

- Migrant
- Born in New Zealand
- Population Average

No Qualification  School Only  Post School  Bachelors  Post Graduate
Counterfactual Models
What if...?

• **Base:**
  • What if all ethnicities had the same age, sex and marital status distributions?

• **Education:**
  • What if all ethnicities had the same distribution of educational qualifications?

• **Migrant Status:**
  • What if all ethnicities had the same distribution of migrant status?

• **Language and Migrant Characteristics (3 variables):**
  • What if all ethnicities had the same distribution of language, age of arrival and length of residence?

• **Work Characteristics (2 variables):**
  • What if all ethnicities had the same distribution of occupation and workplace ethnic profile?
Base Model – Average Annual Income
Adjusting Age, Sex and Marital Status

Average Annual Income

- Euro
- Maori
- Pacific
- Indian
- Chinese
- Other Asian
- Filipino
- Korean
What if all ethnicities had the same distribution of educational qualifications?
What if all ethnicities had the same distribution of migrant status?
What if all ethnicities had the same distribution of language, age of arrival and length of residence?
What if all ethnicities had the same distribution of occupation and workplace ethnic profile?
Effect of each model compared to the previous model

Average Annual Income (Difference)

-6,000  -4,000  -2,000  0  2,000  4,000  6,000  8,000  10,000  12,000  14,000

Education - Base
Migrant Status - Education
Language and Migrant Characteristics - Migrant Status
Work Characteristics - Language and Migrant Characteristics

Euro  Maori  Pacific  Indian  Chinese  Other Asian  Filipino  Korean
Conclusions

• Migrant status
  • The biggest factor in the conversion of education into income for Asian New Zealanders

• Age at arrival, years of residence and language also important

• Occupation and workplace ethnic density were not as influential as expected

• Other factors of culture and background
  • Despite having access to some factors that once controlled for explain more of the ethnicity effects, we are still left with differences between our ethnicities.
Limitations

Of this data set
• Missing data
  • Where education or income data was missing, this may not be at random.
    • This was not found to be overly different between migrants and the overall population
• Accuracy of self-report
  • Especially for variables like language

Of the scope of this analysis
• Missing factors
  • What would we have liked to have but didn’t?
    • Sensitivity of measures, like language fluency
    • Where educational qualifications are from

• Non census style data about cultural differences or racism might hold the key
Questions and Comments?

liza.bolton@auckland.ac.nz


### Difference between population average and Asian averages (Based on Slide 11)

<table>
<thead>
<tr>
<th></th>
<th>No Qualification</th>
<th>School Only</th>
<th>Post School</th>
<th>Bachelors</th>
<th>Post Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Asian</td>
<td>$12,500</td>
<td>$14,500</td>
<td>$16,300</td>
<td>$17,300</td>
<td>$16,200</td>
</tr>
<tr>
<td>Indian</td>
<td>$9,500</td>
<td>$11,300</td>
<td>$13,700</td>
<td>$15,200</td>
<td>$18,900</td>
</tr>
<tr>
<td>Chinese</td>
<td>$12,900</td>
<td>$14,200</td>
<td>$15,400</td>
<td>$15,300</td>
<td>$19,200</td>
</tr>
<tr>
<td>Filipino</td>
<td>$9,700</td>
<td>$12,400</td>
<td>$16,100</td>
<td>$20,800</td>
<td>$26,400</td>
</tr>
<tr>
<td>Korean</td>
<td>$11,700</td>
<td>$19,000</td>
<td>$20,100</td>
<td>$26,500</td>
<td>$31,900</td>
</tr>
</tbody>
</table>
Born in NZ (Asian Population Only)
Age at Immigration (Asian Population Only)

Average Annual Income

Born in NZ

Population Average

No Qualification
School Only
Post School
Bachelors
Post Graduate
Age at Immigration (Asian Population Only)

Average Annual Income

- Born in NZ
- Arrived before 5
- Population Average

No Qualification | School Only | Post School | Bachelors | Post Graduate

27
Age at Immigration (Asian Population Only)

Average Annual Income

- Born in NZ
- Arrived before 5
- Arrived 5 - 12
- Population Average

Qualification Levels:
- No Qualification
- School Only
- Post School
- Bachelors
- Post Graduate

Population Average: 28
Age at Immigration (Asian Population Only)
Age at Immigration (Asian Population Only)

Average Annual Income

- Born in NZ
- Arrived before 5
- Arrived 5 - 12
- Arrived 13 - 17
- Arrived after 18 - 23
- Population Average

Qualifications:
- No Qualification
- School Only
- Post School
- Bachelors
- Post Graduate
Age at Immigration (Asian Population Only)

Average Annual Income

- Born in NZ
- Arrived before 5
- Arrived 5 - 12
- Arrived 13 - 17
- Arrived after 18 - 23
- Arrived after 24
- Population Average

No Qualification | School Only | Post School | Bachelors | Post Graduate
Years in NZ (Asian Population Only)

Average Annual Income

- Population Average
- Asian Avg Income

Qualifications:
- No Qualification
- School Only
- Post School
- Bachelors
- Post Graduate

Income Levels:
- 0
- 10000
- 20000
- 30000
- 40000
- 50000
- 60000
- 70000
- 80000
- 90000
Years in NZ (Asian Population Only)

Average Annual Income

- Before 1986
- Population Average
- Asian Avg Income

No Qualification | School Only | Post School | Bachelors | Post Graduate

0 | 10000 | 20000 | 30000 | 40000 | 50000 | 60000 | 70000 | 80000 | 90000
Years in NZ (Asian Population Only)

- Before 1986
- Between 1986 - 1991
- Population Average
- Asian Avg Income
Years in NZ (Asian Population Only)

Average Annual Income

- Before 1986
- Between 1986 - 1991
- Between 1991 - 1995
- Population Average
- Asian Avg Income

Qualifications:
- No Qualification
- School Only
- Post School
- Bachelors
- Post Graduate
Years in NZ (Asian Population Only)

Average Annual Income

- Before 1986
- Between 1986 - 1991
- Between 1991 - 1995
- Between 1995 - 1998
- Population Average
- Asian Avg Income
Years in NZ (Asian Population Only)

Average Annual Income

- Before 1986
- Between 1986 - 1991
- Between 1991 - 1995
- Between 1995 - 1998
- Between 1998 - 2002
- Population Average
- Asian Avg Income

No Qualification | School Only | Post School | Bachelors | Post Graduate
--- | --- | --- | --- | ---
Languages Spoken (Asian Population Only)

Average Annual Income

- English only
- Bilingual
- No English
- Population Average

Qualifications:
- No Qualification
- School Only
- Post School
- Bachelors
- Post Graduate
Means Adjustment - Example

What if...

Each ethnicity had the same proportion of migrants as the overall population?

Reality

Counterfactual
Means Adjustment - Example

What if...

Each ethnicity had the same proportion of migrants as the overall population, and each population had the same proportion of migrants who arrived before turning 18?

Reality vs. Counterfactual:

- **Migrant**
  - Asian: Real vs. Counterfactual
  - Population: Real vs. Counterfactual
  - Euro: Real vs. Counterfactual

**Born in NZ**

- Asian: Real vs. Counterfactual
- Population: Real vs. Counterfactual
- Euro: Real vs. Counterfactual
Steps

1. Perform multiple linear regression and extract estimates of effects.
   
   \[ \text{income}\_\text{adj} = \text{asian} \times \text{euro} \times \text{age} \times \text{sex} \times \text{married} \times \text{bornNZ} \times \text{bornNZ} \times \text{asian} \times \text{bornNZ} \times \text{euro} \]

2. Identify proportions for counterfactual population

3. Reweight using theoretical probabilities to get the ethnicity average incomes associated with the counterfactual.
Cumulative Model Ethnicity Stable Composition Adjusted Means

Average Annual Income

Factor Added to Model

Base

Education

Migrant Status

Asian

Euro/Other

Maori

Pacific

$48,400

$48,300

$48,300

$37,100

$37,000

$40,900

$45,200

$43,200

$40,400

$44,000

$43,700

$44,000

$48,000

$50,000

$50,000

$50,000

$30,000

$32,000

$34,000

$36,000

$38,000

$40,000

$42,000

$44,000

$46,000

$48,000

$50,000
Cumulative Model Ethnicity Stable Composition Adjusted Means

Factor Added to Model

- Migrant Status
- Age at Arrival
- Years of Residence
- Language

Average Annual Income

- Asian
- Euro/Other
- Maori
- Pacific

Adjusted Means:

- Asian: $45,200, $45,800, $46,000, $46,300
- Euro/Other: $48,300, $48,100, $48,100, $48,000
- Maori: $44,000, $43,100, $43,100, $43,000
- Pacific: $43,200, $42,900, $43,100, $42,700

- Language: $48,300, $48,000, $43,000, $42,800
Validity of Models

- Dealing with a whole population, not a sample
- All categorical explanatory variables
- Normal distribution of errors
  - Structure in the right tail – married, European, male, CEOs
Base Model – Average Annual Income Adjusting Age, Sex and Marital Status

Base

Chinese: $49,200
Filipino: $46,100
Indian: $49,400
Korean: $38,400
Other Asian: $46,600
Euro: $62,200
Maori: $53,000
Pacific: $46,800
What if all ethnicities had the same distribution of educational qualifications?
What if all ethnicities had the same distribution of migrant status?
What if all ethnicities had the same distribution of language, age of arrival and length of residence?
What if all ethnicities had the same distribution of occupation and workplace ethnic density?