

Galt, Margaret

**Research Report**

## An update to estimates of human capital in New Zealand. Background paper to Te Tai Waiora: Wellbeing in Aotearoa New Zealand 2022

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## **Note on estimates of human capital for New Zealand 1986-2018 by ethnic group**

By Trinh Le ([trinh.le@motu.org.nz](mailto:trinh.le@motu.org.nz)), Motu Economic and Public Policy Research

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This note accompanies estimates of human capital for New Zealand 1986-2018 by ethnic group provided in Excel file [ap23-02-detailed-tables.xlsx](#).

The Excel file contains output that replicates Tables 1-5 in Le et al. (2006), except that the current output is further disaggregated by 2 ethnic groups: Māori and non-Māori.

- Table 1: Distribution of the population aged 18–64
- Table 2: Probabilities of Undertaking Paid Work for the population aged 18–64
- Table 3: Average Annual Income for Employees
- Table 4: Average per Capita Lifetime Labour Income
- Table 5: Aggregate Value of Human Capital Stock

For Tables 3-5 we have provided two versions: one in 2001 prices to match Le et al. (2006), and one in 2018 prices which is the latest year in the current analysis.

### **Modelling assumptions**

The current estimates are based on the same modelling assumptions specified on pages 596-599 of Le et al. (2006):

- The model is estimated separately for males and females.
- The potential working life extends from age 18 to 64, a common age range of the workforce in developed countries.
- We distinguish four levels of educational attainment: (i) unskilled (less than 12 years of schooling), (ii) non-degree (including all post-school, non-degree qualifications), (iii) Bachelors degree, and (iv) higher degree.
- Income is subject to an average real growth rate of 1.5 per cent a year.
- Present value is calculated using a real discount rate of 6 per cent a year.
- Individuals can only study for a higher qualification than what they already have. If Bachelors degree holders study for, say, an undergraduate diploma, their extra study counts for nothing. Due to the lack of information, we assume that university students who hold a Bachelors degree are studying towards a higher degree. No further enrolment is allowed for higher degree holders, because they have reached the highest educational level.
- A higher degree takes two years to complete, conditional on holding a Bachelors degree.
- Unskilled and non-degree qualified individuals take four and three years respectively to complete a Bachelors degree.
- The study time for a non-degree qualification is two years.
- Except for certain young ages, students enrolled in any qualification that requires more than one year are evenly distributed across different study stages.
- Direct costs of study are offset by part-time earnings, so that there is no need to apply negative values of current earnings while studying.
- Nominal values have been deflated by the Labour Cost Index LCI001AA (All Sectors Combined, All Salary and Wage Rates) to arrive at real values.

- Data on survival rates are from New Zealand Period Life Tables, which are disaggregated by age and gender.
- Since New Zealand Censuses do not collect data on earnings, we have to use (gross) income as a proxy for earnings. Income in New Zealand Censuses counts all sources. Hopefully by using only the income of employees, for whom earnings are likely to predominate, we eliminate obvious biases. The annual income for paid employees is applied to employers and self-employed persons with the same gender–education–age profile. This adjustment keeps the focus on the price of labour services, because the reported income of employers and self-employed people may include returns to non-labour inputs. Since the data are in (varying) intervals, we use the mid-point of the closed intervals. For the open-ended interval at the top of the income distribution (e.g. >\$100,000) the mean income is set at 30 per cent above the lower bound, while for the lowest income interval it is set at 80 per cent of the upper bound.

Since the current analysis is further disaggregated by ethnicity, the following changes were made:

- We distinguish two broad ethnic groups: Māori and non-Māori, where a person is defined as Māori if they ticked Māori to the ethnicity question in each census.
  - 1986: What is your ethnic origin?
  - 1991: What ethnic group do you belong to?
  - 1996: Tick as many circles as you need to show which ethnic group(s) you belong to
  - 2001-2018: Which ethnic group do you belong to?

Note that the ethnicity questions in the above censuses allow multiple answers. Thus, in our analysis the Māori group includes both full Māori and part Māori. This categorisation is consistent with the prioristied ethnicity definition used by Statistics New Zealand in many publications in the last two decades.

In 2006, due to an email campaign which encouraged people to answer ‘New Zealander’ to the ethnicity question (Middleton, 2006), an unprecedented number of people reported ‘New Zealander’ as their ethnicity in that Census.<sup>1</sup> In the current analysis we have recoded ‘New Zealander’ to ‘New Zealand European’, which will be counted as non-Māori unless the person reported any Māori ethnicity. Data analysis (e.g. Kukutai and Didham, 2012) confirms that the vast majority of people who identified as ‘New Zealander’ tended to be New Zealand European. We have high confidence in our ethnicity categorisation, given our result that the share of the working-age population who identified as Māori in Censuses 1996, 2001, 2006, 2013 are respectively 12.6%, 12.3%, 12.3% and 12.6% (Table 1 in the Excel file).

- The model is estimated separately for four gender-ethnic groups: Māori males, Māori females, non-Māori males, non-Māori females.
- Data on survival rates are disaggregated by age, gender and ethnic group (Māori and non-Māori). For the period 2017-2019, multiple estimates of survival rates have been provided (lower quartile, median, upper quartile); we use the median estimates.

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<sup>1</sup> According to Kukutai and Didham (2009) 429,429 people (11.1% of the population) identified as New Zealander in the 2006 Census, compared with 85,300 (2.4% of the population) from the 2001 Census.

## Differences from Le et al. (2006) results

Comparing 'gender sub-total' or 'total' from the current analysis to Tables 1-5 in Le et al. (2006), there can be some small differences. Those differences can be attributed to (in order of importance):

- Confidentialisation rule regarding random rounding: The Census data have been provided to us as population counts, which have been randomly rounded to base 3 (RR3) to protect confidentiality. The previous data were disaggregated by gender, age and education while the current data are further disaggregated by ethnic group. Combined with RR3 this disaggregation introduces some errors. For example, if there are nineteen 60-year-old females with a higher degree, the data that are released for us to use will be 21 or 18 (due to RR3). If those 19 include 14 males and 5 females the data we use will be 12 or 15 males and 6 females or 3 females.
- Confidentialisation rule regarding suppression: Previously financial data (average income from all sources) were suppressed if the underlying raw count was less than 6. Currently suppression applies where the underlying raw count is smaller than 20.
- Data analysts: the Census data used in Le et al. (2006) and in the update provided to the Treasury in 2017 were customised tables purchased from Statistics New Zealand, prepared by their analysts. The data used in the current analysis were prepared by Trinh Le based on unit-record data available through the Treasury's data lab project "MAA2013-16 Citizen pathways through human services", making use of David Maré's work on uniformly coding Census data. Different analysts tend to have different ways of interpreting and treating data, which can cause some differences in the results.
- Rounding: entries in the tables have been rounded.
- Revisions in the raw data provided Statistics New Zealand

## References

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