Estimating international population movements by ethnicity

Matthew Skiffington (Undergraduate Student, Data Analytics & Psychology) under the supervision of
Kirsten Nissen (Senior Population Analyst at Statistics New Zealand) & Michael Cameron (Associate Professor at The University of Waikato)

Introduction

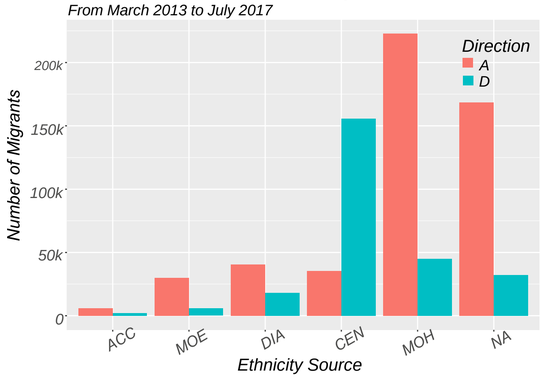
We sought to develop and assess the viability of a method to attach ethnicity records to records of migrant arrivals and departures. These would aid inter-censual ethnic population estimates and projections, previously limited by an inability to directly measure ethnicity at the border. The initial focus was applying this to the Maori ethnic group.

This was primarily conducted using the Integrated Data Infrastructure (IDI) a powerful tool developed by Statistics New Zealand. The IDI is a large, de-identified unit-record database. It spans micro-data from health, education, justice, tax and other areas. The core data set was derived from records of PLT (permanent and long term) arrivals and departures.

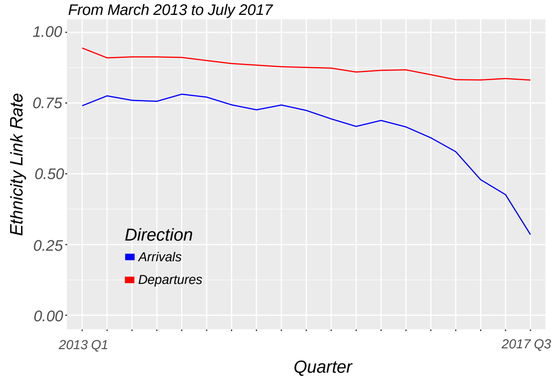
Methods

Confidentiality training was provided on how to use the IDI. Remote access to the Stats NZ datalab was facilitated at NIDEA. Tables of migration, customs, geographic and ethnicity data were imported, transformed and linked to produce a central table. Visualisations were created to explore the data and GLM imputation was used to replace missing ethnicity values. These were consolidated into a dynamically generated report for Statistics NZ using R markdown. R and R Studio were used as the language and IDE for Analysis.

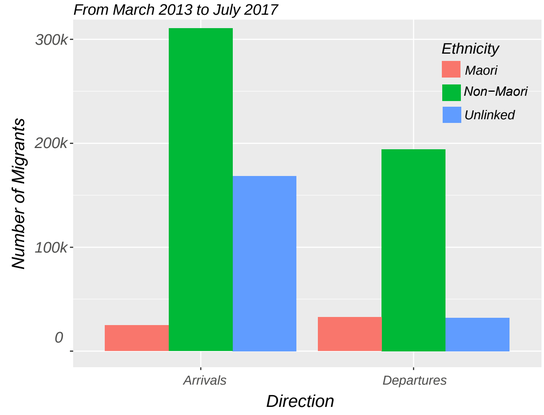
Ethnicity Sources for PLT data by Direction
From March 2013 to July 2017



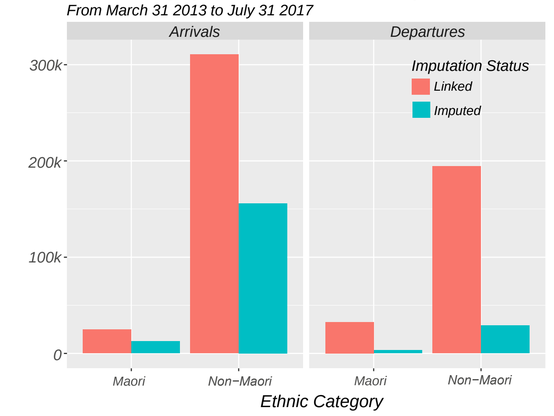
Quarterly Ethnic Link Rates Overall
From March 2013 to July 2017



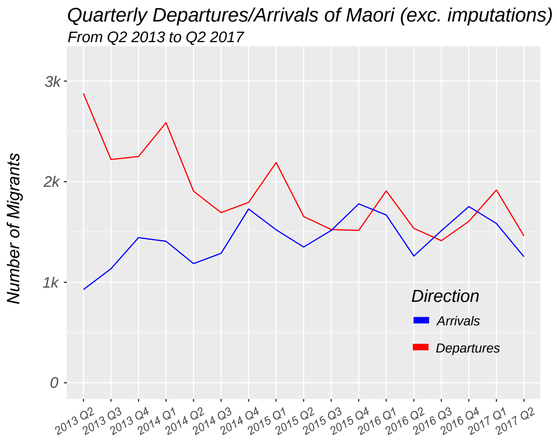
Ethnic Category and Direction
From March 2013 to July 2017



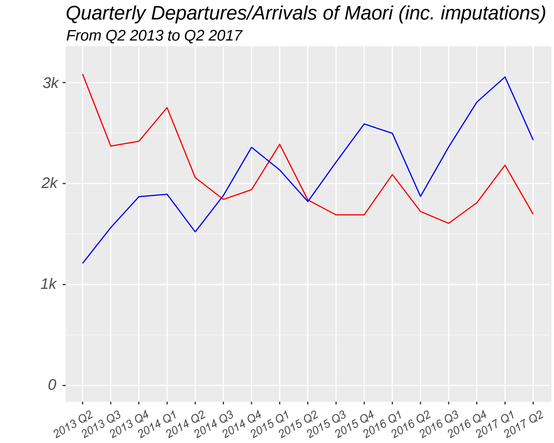
Ethnic Category, Direction and Ethnic Imputation Status
From March 31 2013 to July 31 2017



Quarterly Departures/Arrivals of Maori (exc. imputations)
From Q2 2013 to Q2 2017



Quarterly Departures/Arrivals of Maori (inc. imputations)
From Q2 2013 to Q2 2017



Quarter

Findings

There has been net emigration of Maori until mid 2017. Without imputation, net migration of Maori has been close to zero until recently. After imputation, there is a reversal in trend with immigration surpassing emigration in mid 2014. Inferentially, Maori migrants are almost all New Zealand or Australian citizens, as very few use any other passport. The geographic distribution of Maori arrivals and departures follows existing demographic patterns of Maori populations (e.g. large North/South population differentials).

Link rates, while reasonably high, vary significantly across a number of factors. Particular populations (e.g. German and French citizens) have a low ethnicity link rate.

Discussion

Considering the limitations of imputation is important when assessing estimates, particularly for arrivals. Earlier estimates are likely to be more accurate than recent estimates, as administrative data sources are updated and as migrants interact with agencies (DIA, MOH, etc). Limitations are inherent in the data (e.g. coding differences between MOH and MOE), but practices are being increasingly standardised between agencies. While unlikely to supplant census data, administrative ethnicity data have strong utility.