Postgraduate Students and the Aotearoa New Zealand Research Workforce

Lucy C Stewart, W. Troy Baisden

One of the six major issues raised in the Te Ara Paerangi green paper is the research workforce. The green paper states that "We want to ensure the research workforce can be offered attractive and flexible careers and career pathways." It is also acknowledged that "Significantly more research-related doctoral candidates are coming out of New Zealand universities than permanent public research roles available".[1]

In light of this, we want to highlight some available data on employment in the research workforce over the last twelve years. Firstly, all discussion about the research workforce needs to be grounded in the fact that New Zealand has doubled the number of PhD students since 2008 (Figure 1).

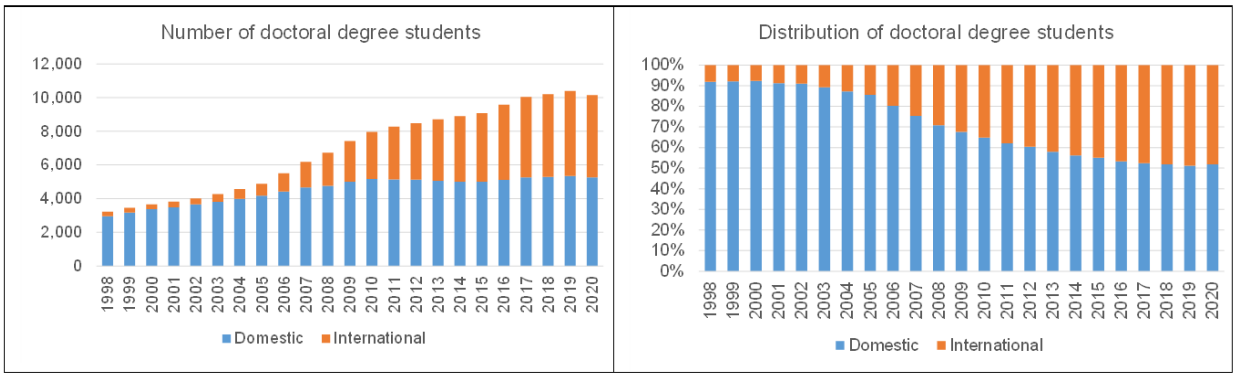


Figure 1: Number and distribution of doctoral degree students in New Zealand, divided between international and domestic students. Graphs are from the Education Counts website.[2]

It is obvious that the bulk of this growth has come from international students rather than domestic students. Domestic enrollment rose in the late 90s but has been largely stable since 2008. International student enrollment made up less than 10% of total doctoral student enrollment in 1998, but is now nearly 50% of total enrollment (which has itself tripled over the same time period). Although a New Zealand doctoral degree is usually expected to take three years, the total number of PhD graduates per year is less than ⅓ of this total enrollment figure, at approximately 1,500 graduates per year (Figure 2). This is probably partially due to

the average length to graduation now being four years or longer across all disciplines.[3] The rest of the mismatch can likely be attributed to non-completions.

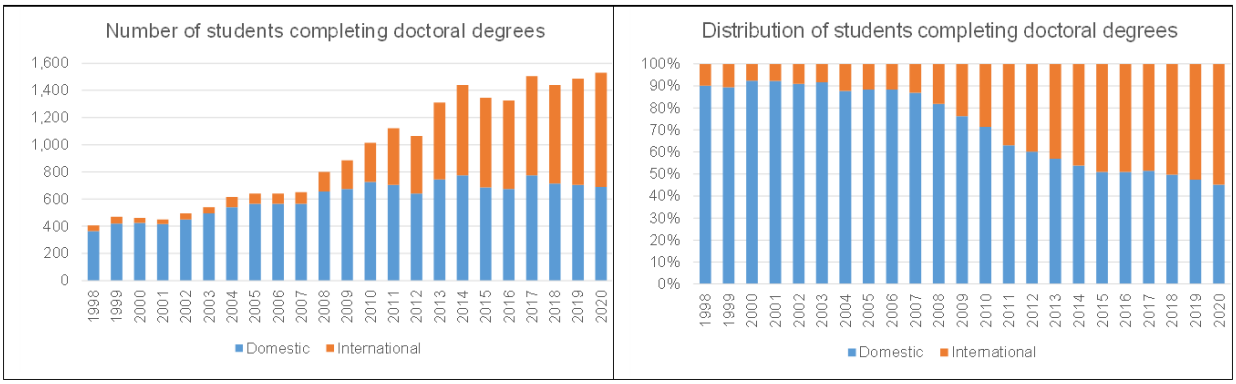


Figure 2: Students completing doctoral degrees annually and distribution between domestic and international enrollments. Graphs are from the Education Counts website.[2]

Meanwhile, total doctoral student enrollment now greatly surpasses the number of FTE PhD researchers across *all* sectors, not just "permanent public research roles" (Figure 3). The number of FTE PhD-holding researchers has been stable at approximately 4000 total FTEs since 2010. On average, this means that we are graduating approximately ⅓ as many PhDs per year as there is full-time work for our total PhD-educated R&D workforce. This ratio has worsened over time. In 2010 just over 1,000 people graduated with PhDs and there were just under 4,000 PhD-educated FTEs in R&D. By 2020 there were around the same number of employed FTEs, but 50% more graduates. Obviously FTEs are not headcounts and particularly in higher education many people will be employed in roles that are only partially attributable to R&D as a sector. Nevertheless, there is no scenario here where a PhD graduate can consider a research role in *any* sector in New Zealand a normative outcome of graduating with a PhD - a qualification which principally trains its holders to conduct research. The number of full-time roles in research, beyond study, is vastly lower than the number of people holding qualifications.

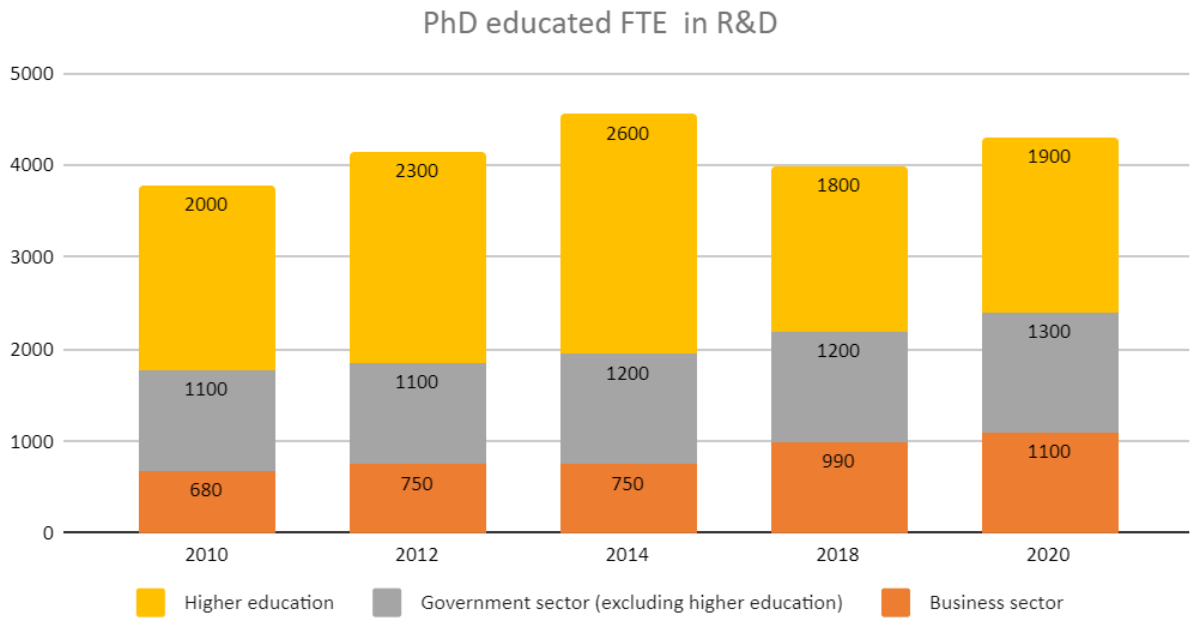


Figure 3: PhD-educated FTEs in research and development across all major sectors (higher education, government, and business). Data from Stats NZ Research and Development survey[4]

The final point that we would like to highlight is that MBIE highlights New Zealand (in its 2021 Research, Science, and Innovation report,[5] see Figure 4) as a highly efficient producer of research outputs on an international stage. We submit that it is very easy to be highly efficient when you have a large, internationally-recruited workforce who are not considered workers in legal terms and are effectively employed on fixed-term contracts, but are counted as part of the research workforce in terms of their outputs and for the purposes of determining productivity (as the RSI report does - the Figure 14 caption notes that Masters students are included for the purposes of determining productivity per researcher).

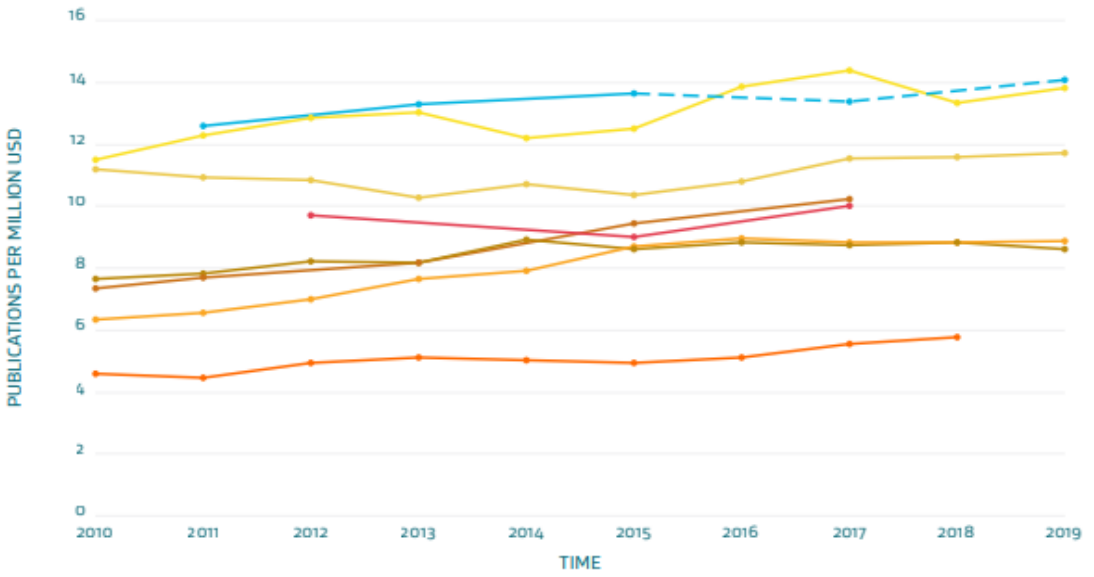
We believe that these graphs, taken together, show a fundamental imbalance in the New Zealand research system. We have vastly increased the number of people we are training for research roles, but that has not translated meaningfully into employment in research. We also believe that there is fundamental good in people learning how to become researchers and that these skills are transferable to many other non-research careers. The question we ask is: how stable can a research system be when the bulk of people involved in it are, by definition, temporary?

FIGURE 15

Publications per million dollars spent compared with other small advanced economies

New Zealand researchers consistently produce a high number of publications per dollar spent when compared to Australia and most small advanced economies (except for Ireland).

The number of New Zealand publications per dollar spent increased by 13 per cent from 2011 to 2019.



Data source:
Dimensions bibliometrics data See page 100
OECD main science and technology indicators See page 101
Stats NZ research and development survey See page 101

Publications per dollar spent are measured annually. The number of publications with authors affiliated to New Zealand research institutions is calculated with data from Dimensions[28]. The OECD offsets New Zealand data by 1 year for comparative purposes (ie 2018 Stats NZ R&D data is shown as 2017 OECD data). National currency data was converted to USD using the purchasing power parity[29] series from the OECD National Accounts Division. See further information[30]. Expenditure on research by business is excluded. Data for 2017 was recalculated based on revised 2020 Stats NZ R&D survey data and data for 2019 was approximated using 2020 Stats NZ R&D survey data. The dashed line leads through the approximated values.

Country/region

- New Zealand
- Ireland
- Israel
- Australia
- Switzerland
- Finland
- Denmark
- Singapore

Figure 4 (from MBIE Research, Science and Innovation Report - 2021): New Zealand publications per million dollars.

References

1. Ministry of Business, Innovation and Employment. *Te Ara Paerangi Future Pathways Green Paper 2021*. Wellington, Aotearoa New Zealand. October 2021.
2. https://www.educationcounts.govt.nz/statistics/research
3. Soar, M. et al. *Sweat Equity: Student scholarships in Aotearoa New Zealand's Universities*. SocArxiv, 2021. https://osf.io/preprints/socarxiv/y4t7c/
4. Data from Stats NZ Research and Development Survey, Table RAD011AA (Full-time equivalents involved in research and development by highest qualification (Annual-Jun)), https://infoshare.stats.govt.nz/
5. Ministry of Business, Innovation & Employment, "The Research, Science and Innovation Report - 2021." Wellington, Aotearoa New Zealand. October 2021.