

## Exercises in New Zealand's Demography and Economic History

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Population change is a central element in economic history, and the Malthusian analysis is never too far from consideration of the development of long-established economies. More recently-settled nations such as Aotearoa New Zealand require a different approach however, as they commence with a surplus of land (and other resources) relative to population. During the course of writing *Not in Narrow Seas: New Zealand History from an Economic Perspective*, I found myself not only reporting demographic history, but also using demography as a lens to investigate some economic questions. The lens maker is of course, Ian Pool, and I refer particularly in this contribution to the seminal work undertaken in his 1991 publication – *Te iwi Maori: a New Zealand population, past, present and projected*.

**T**he study of economic development – and therefore economic history – has been intimately tied up with demography, at least since Thomas Malthus put forward his theory in the late eighteenth century that combined the law of diminishing returns with the less diminishing forces of procreation to conclude that humankind was in a poverty trap, because any increase in production would be absorbed by population growth (Malthus, 1798).

The Malthusian analysis is never far from consideration of the path of long established societies. However, more recently settled societies, such as Aotearoa New Zealand, require a different approach, because they commence with a surplus of land (and other resources) relative to population. This paper draws on the analysis I have undertaken to prepare *Not in Narrow Seas: New Zealand History from an Economic Perspective* (forthcoming) to explore the Malthusian theory as it relates to the economic development of New Zealand.

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## Pre-Contact Māori

Proto-Māori morphed into what may be called the ‘classical’ Māori without any sharp technological or external changes. The pace of technological change was slow, long ocean voyaging seemed to have ceased for some reason – perhaps a change in climate – from early in the fourteenth century, and with the exception of Abel Tasman in 1642, there were no known visitors that connected to them for 450 years, until the arrival of Cook and Tupaia.

Describing the population path of early New Zealand is fraught with difficulties. There is no documented evidence about Māori life in Aotearoa New Zealand until the arrival of Captain James Cook and the Tahitian chief and priest Tupaia, in 1769. It is not clear how many Pacific Islanders arrived - an estimate, based on DNA evidence, is 70 to 100 females. (Murray-Mcintosh et al., 1998) The population in Cook’s time is also uncertain; he estimated 100,000. (Pool, 1991: 42)

As a starting point I will propose that there was a population of 255 in 1269 - 85 women, 85 men and 85 children, assuming a child-to-women ratio of 100 percent. If this population grew at 1.2 percent per annum for the next 500 years, there could have been around 100,000 in 1769.

That would appear to be a very high population growth rate in Pool’s judgement; in 1991 he noted that a “rate of 0.5 percent would be a rather rapid growth figure for antiquity, and even for much of history” (Pool, 1991: 37). Perhaps we could allow a slightly higher rate because there was more than adequate food, but to double Pool’s rate would seem improbable.

It is also possible that the fifteenth century tsunamis destroyed as much as half the population (McFadgen, 2007:262). Oral tradition suggests that at least one occurred during daylight hours when those who worked on the shores, mainly women and children, would have been relatively vulnerable. If so, we need to double the number of canoes which first arrived, or raise the fertility rate fractionally. But I am reticent to keep increasing the number of canoes (the more there were, the more likely that

one would have brought breeding pigs). I am inclined to the view that Cook may have overestimated the late eighteenth century population, but that suggests a lower rate of population decline through to 1840 than Pool has suggested.<sup>3</sup>

We are left with the conclusion that the available data is not entirely consistent - hopefully the future will find a resolution.

The population story is important for an economist, because at some stage the Māori population would have grown to the point where available resources were fully utilised by the available technologies, as predicted by Malthus. But what was the limit, and was it reached?

Pool reports that the Māori population density was low at the time of European arrival, compared to other Polynesian Island groups (1991: 41). Even if the numerator is arable land, the New Zealand figure is a sixth of the next lowest (Easter Island and the Marquesas). It could be argued that New Zealand did not have the crops to make full use of its arable land, but even so, one might conclude that the Māori population was not near its Malthusian limit in the late eighteenth century (for example, there is no evidence of a protein shortage at that time).

It is sometimes argued that the increasing number of pā (fortified villages) demonstrates a response to rising to population pressures. The first sites begin to appear shortly after the tsunami (although the serious building program seems to be in the seventeenth century). Are the two events connected? McFadgen thinks so, but it is not obvious (McFadgen, 2007).

Was the rise of the pā driven by population pressures? Given our fragmentary understanding of the historic population dynamics, this is conjecture. An alternative is that the capital base had reached the stage where it had to be protected. Or perhaps with increasing affluence and with opportunities for discovery exhausted, adventuring now meant raids on other communities – but this is also conjecture.

## Nineteenth Century Māori

Throughout the nineteenth century, Māori faced a rising European population, that had passed the Māori number in 1858, was five times as great at the end of the wars in 1872, and seventeen times as great near the Māori population nadir in 1896.<sup>1, 2</sup> These are national totals however, and Māori made up a significant proportion of the population in some regions.

Some commentators saw eventual extinction of the 'Māori race'. For example, Isaac Featherston, who was a doctor before he became a politician and land dealer, said in Parliament in 1856 (before the main wars):

...[t]he Maoris are dying out, and nothing can save them. Our plain duty, as good compassionate colonists, is to smooth down their dying pillow. Then history will have nothing to reproach us with. (Foster, 1966).

In 1882 (after the wars), Alfred K. Newman, a doctor who also took up commercial pursuits, gave an address to the Wellington Philosophical Society titled '*A Study in the Causes Leading to the Extinction of the Maori*' (Newman, 1882). Both of these examples are reminders of the standard warning to economists that they should not make predictions, especially about the future (to borrow a phrase from the American baseball-playing philosopher 'Yogi' Berra).

The decline of the Māori population was slower after 1874 than it was before 1858.<sup>3</sup>

Pool (1991) used the child-to-woman ratio as a measure of the 'demographic health' of iwi. The ratio reflects fertility rates and morbidity, the likelihood that those born would reach adulthood, and that the adults would survive. It is not a familiar statistic but a sense of its magnitude can be gained from the 2006 Census, which reported – when the fertility rate was near replacement – the New Zealand ratio was about 85 percent.<sup>4</sup> Given the higher child mortality, a higher child-to-woman ratio would be necessary for Māori fertility to be at the replacement level.

Pool (1991) estimated that the child-to-woman ratio for Māori was 70 percent in 1844, 87 percent in 1857/58, and 116 percent in 1874. The growth broadly flattened out to 120 in 1891, and then the ratio began to climb again to over 150 percent in 1921. The stagnation period can be

largely attributed to measles and whooping cough epidemics which killed more children.<sup>5</sup>

There was, however, considerable regional variation. In 1874, while the average child-to-woman ratio was 116 percent, it was a healthy 154 percent in Northland and a struggling 81 percent in the Whanganui-Rangitikei region (Pool, 1991: 245). The regional patterns are complicated (especially if one is cautious – as Pool is – because of measurement error). On the whole, all regions experienced gains in the ratio over the second half of the nineteenth century, although some dropped in the period before 1874, especially in the Thames-Coromandel and the Waikato-King Country, recovering by the end of the century.

Since the two regions mentioned above were central in the New Zealand Wars, it is tempting to use the coincidence to explain their demographic decline. Yet it is unlikely the war directly caused the low ratio, since that would involve the British troops killing a higher number of Māori children than their mothers. Perhaps it could be explained by starvation after the war, and greater mortality among children due to less hygienic living as they retreated to less healthy pa, and lower fertility of the women (although it is usual to assume fertility rises with warfare). But there were some iwi who did not suffer confiscation, but who also experienced a low ratio.

Pool focused on the 'immunological virginity' of the pre-European Māori populations, pointing to the increase in death rates as new diseases were introduced, the lowering of fertility due to disease, for example, gonorrhoea, and increasing child mortality. Those iwi who lived where the European had arrived earlier suffered their population decline earlier, recovered from the disease onslaught earlier, and so later ended up with the above average ratios. Thus in 1857 the Northland and Auckland regions' ratios were among the lowest, although they showed a rapid recovery in the following 17 years. The deceleration (slowing down of the decline) was probably due to better resistance to disease, in part because the more vulnerable had died off, in part because of better hygiene and medical care (including vaccination against smallpox).

Thus, the after-the-war explanation of poor living conditions among Māori is not particularly supported by the demographic evidence. While the declining Māori population was noted, the underlying recovery was not

foreseen, although it was underway decades before the nadir of the early 1890s.

In 1956, Keith Sorrenson proposed that the population decline was explained better by the loss of land, irrespective of the cause of the loss, rather than just the land that was confiscated (Sorrenson, 1956). Māori land had been alienated from the arrival of the settlers, as confirmed by the Spain Commission in 1841.<sup>6</sup> The entire South Island, excluding Nelson, had been bought by the Government by 1860 (Stewart Island in 1863), although the reserves promised to Māori were not set aside for them. However, most of North Island land was still Māori in 1860, the main exceptions being around the European settlements, most of the Wairarapa, much of Hawkes Bay and about half of Northland (Miller, 1966). The confiscated lands were only a part of an alienation which accelerated in the 1860s.

In 1840, the entirety of New Zealand – all 66.4 million acres – was possessed by Māori (although some Europeans had some property rights). By 1870, Māori owned just over a quarter (27.6 percent); it was a sixth (16.6 percent) at the population nadir in 1891, and kept falling, to 7.1 percent in 1920.

**Table 1: Land Holdings**

	POPULATION			LAND OWNED		
	Māori	European	Māori % of total	Māori % of total	Acres per Māori	Acres per European
1840	80,000	2,050	97.5	100	830	-
1850	65,651	22,108	74.8	-	-	-
1860	54,877	79,711	40.8	-	-	-
1870	49,374	248,400	16.6	27.6	371	194
1880	45,549	482,518	8.7	22.1	320	107
1890	44,127	623,350	6.6	16.6	249	89
1900	44,862	763,270	5.6	12.0	178	77
1910	52,240	998,170	5.0	12.0	153	59
1920	56,189	1,201,422	4.7	7.1	84	51

Sources: Population - Statistics New Zealand long term data series (Māori population interpolated in non-census years, where not available). Land - Brooking (1996: 136).

Pool (1991) set out a framework to explain the demographic changes in the Māori population. It begins with growth of the non-Maori population and has four channels to high mortality:

- the introduction of pathogens;
- court hearings which increased exposure to pathogens;
- land alienation which led to a decline in Māori food production and malnutrition; and
- social disorganisation from land purchases and confiscation.

Pool clearly showed that there was an association between land alienation and low child-to-woman ratios. However, as he regularly reminds us, correlation is not causation. The land alienation would have brought in the European population which spread the pathogens. He gives no indication of the importance of each channel, although the weight of his text leans towards the introduction of pathogens. At best it might be interpreted that the land alienation and the concomitant social disorganisation accelerated the decline, as well as possibly delaying the population recovery.

We should be sceptical that there was necessarily lower food production following the land alienation. If there was malnutrition, it may have been partly a result of the depletion of sea, estuarine and shore resources, and the soils, from environmental degradation.<sup>8</sup>

There is another problem with the claim that land alienation was the most damaging factor. Certainly Māori lost land, but they also retained a lot (albeit as noted below, not the better quality land; although the non-Maori average includes not very productive land in the Southern Alps. In 1870 there were around 371 acres per Māori, less than the 830 acres each had in 1840, but almost double the settler share of 194 acres per head. (A small holding, sufficient for a family of four, might be about 40 acres.) Per capita land holdings continued to fall as more land was alienated and as, after 1896, the Māori population grew. At the population nadir there were 249 acres per Māori, almost three times the 89 acres per settler. By 1930, it was down to 54 acres per Māori. These are averages, so there would have been some who were much worse off for land, and some who were better off.

By 1870, almost all the valuable urban land was in settler hands. Much of the farm land that Māori were left with is highly productive today, but only after much developmental labour and capital. More damaging to Māori aspirations was the fact that the transport network which opened the land was often not there for theirs in the nineteenth century and was even slow to arrive in the twentieth.

The difficulty with the land alienation hypothesis on Māori mortality is that while land was certainly alienated – and too often unjustly – it does not readily fit the regional and timing patterns. In the end, one is left with the explanation of the arrival of pathogens from an alien population impacting on immunologically virgin populations. The direct impact of land loss seems to have been more on the Māori standard of living and developmental path, than on the population.

## Conclusion

Even given the uncertainties and lack of solid information, demography has helped us think more systematically about the economics of pre-contact and late nineteenth century Māori. There are perhaps two conclusions to be drawn.

The first is that Malthus would have been fascinated by the pre-contact Māori story. It did not end in stagnation, despite the assumptions of his model being almost exactly applicable. That was because it took more than 500 years to get there. When we present the model based on his analysis we usually compare the disequilibrium and equilibrium states, but we do not discuss how long it takes to get from one of the other. There is a demographic limit on the speed of this change. Of course Malthus was writing about economies which were close to their stagnationist equilibria, but it is well to observe that it has not always been like that, including for some settler colonies.

Second, while we should respect that Sorrenson was progressing an analysis by identifying a correlation between land loss and mortality which applied irrespective of the form of alienation, Pool offered a mechanism to explain the underlying causal process, as he has done in so many other areas of demography that extend into economics and history.

## Notes

1. From the middle of the nineteenth century, regular census enumerations provide estimates on the Māori population, although there was almost a certainly an undercount in the early ones. There is very little economic data across all Māori before the 1951 census - income questions were not asked until 1926, even of non-Māori.
2. The numbers used here exclude 'half castes living as Europeans'. In 1891 they would have added about 5 percent of the Māori population, The totals include a similar number of 'half castes living as Māori'.
3. Phil Briggs (2003) has a lower decline rate after 1858, but Pool (1991) does not observe the decrease until 1875 (p.76). Neither implies that the wars accelerated the Māori decline outside the war period. The difference between the two may be that Pool allows for the deaths as a direct consequence of the wars.
4. That is, there were 85 children under the age of 15 for every 100 women aged 15 to 49 (the upper age being chosen to reflect the shorter Māori life span in the nineteenth century)
5. Some commentators had the insensitivity to report of the 1875 epidemics that they were 'mild' because few Māori 'succumbed' to the disease 'except for children' (Pool, 1991:245).
6. In 1841 William Spain became a Land Claims Commissioner in New Zealand. His task was to investigate the New Zealand Company's claims that it had purchased a total of some 20 million acres (8 million hectares) in 1839. Even though most of these purchases were hotly disputed by Maori, hundreds of settlers had arrived to take up the land. Refer to <http://www.nzhistory.net.nz/people/william-spain>.
7. It should also be emphasised that these calculations in no way justify the illegality or quasi-illegality of the way that much of the land was alienated. Nor should we forget that spiritual and ancestral links with particular parts of the land were torn asunder. But if this impacted on the population it is but the demoralisation thesis in another guise – as may be the thesis that social disorganisation directly led to mortality.
8. Depletion of the forests would have reduced the available edible bird life.

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