

NEW ZEALAND POPULATION REVIEW

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SPECIAL EDITION:
Festschrift to D. Ian Pool

Special Editors
T. Kukutai
N. Jackson



Population Association of New Zealand

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Editorial Note

The editors of this issue of the *New Zealand Population Review* (NZPR), and the Council members of the Population Association of New Zealand (PANZ), are delighted to release this special issue, or *estschrift*, honouring Emeritus Professor Ian Pool. We would also like to acknowledge and thank Dr. Tahu Kukutai and Professor Natalie Jackson, former students of Professor Pool and, since 2010, foundational faculty members of the National Institute of Economic and Demographic Analysis (NIDEA), at the University of Waikato for co-editing the journal and making this happen.

Ian is often referred to as New Zealand's 'father of demography', an epithet which emphasises his central role in the development of demography in this country. The first paper in this special issue, written by the guest editors, reviews the nature and significance of Ian's research, teaching and institutional contributions, in New Zealand and world-wide. Subsequent papers have been written by colleagues and former students who elaborate on some of his work, as well as developing themes that they have been pursuing in their own work.

From an institutional point of view, we would like to emphasise the importance of Ian in the ongoing survival and success of PANZ. Ian has been a long-term supporter of PANZ, including his roles as President, council member, and being a frequent keynote speaker at PANZ conferences. In 2007 he was elected a Life Member of PANZ, just one of many honours he has received, both nationally and internationally. Ian has also made significant contributions to this journal over the years on topics including population momentum, demographic and social policy, the history of New Zealand population trends, and Māori demography.

It is our honour to recognise the vital contribution that Ian has made to the field of demography and to New Zealand, and we wish him all the best in his future endeavours.

Introduction - Essays Honouring D. Ian Pool

TAHU KUKUTAI *
NATALIE JACKSON **

This special festschrift issue of the New Zealand Population Review is to honour the enormous contribution that Emeritus Professor Ian Pool has made to the discipline of demography, and social science more broadly, both in New Zealand and further afield.

Since graduating with a PhD in demography from the Australian National University in 1964, Ian has published more than 150 academic papers, books and monographs (including several written in French), spanning the gamut of demographic research. His work has significantly influenced the choice of topics in the field, particularly in relation to age-structural transitions and cohort approaches to mortality. Ian's scholarly contribution to Māori population history is well-known and his seminal work *Te Iwi Maori* (1991) remains the only systematic study of Māori population dynamics. Twenty years on, it continues to be widely cited in New Zealand and throughout the Pacific, and featured as a course text in universities. Similarly, his more recent book *The New Zealand Family from 1840: A Demographic History* (2007), written with Janet Sceats and Arunachalam Dharmalingam (a contributor to this volume), provided a comprehensive study of the transformation of this central institution.

The significance of Ian's work has been recognised through numerous awards, honours, and appointments over the decades including the Te Rangi Hiroa medal for excellence in the social sciences (2009), appointment to the International Union for the Scientific Study of Population (IUSSP)

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Scientific Committee on Age Structures and Policy (1998-2002), and election to Fellowship of the Royal Society of New Zealand (1994).

Ian's professional career traces a personal demographic and mobility history. After graduating with an MA in geography at the University of Auckland, and a short stint working as a sociologist at the Victoria University of Wellington, Ian took up a postgraduate scholarship in demography at the Australian National University (ANU). This proved to be a turning point in Ian's academic career – the ANU in the early 1960s was a very exciting university in which to work; the only one in Australasia offering demography as a specialist discipline at postgraduate level. Here he worked with the founder of ANU's demography programme, New Zealander Mick Borrie, and the late Norma McArthur who effectively 'launched' Pacific demography. One of her fellow students at the ANU in the early 1960s was John (Jack) Caldwell, who went on to become Australia's most eminent demographer and president of the IUSSP. This was the beginning of a long association between Ian and Jack – one that was cemented in West Africa soon after Ian completed his PhD.

Following graduation from ANU, Ian and his wife, epidemiologist Janet Sceats, moved to North America where he held various teaching and research positions at the United Nations Population Council, University of Western Ontario, Cornell University, and Carleton University (see paper by Bedford, Didham & Hugo, this volume). It was during this time that Ian carried out pioneering work on fertility in West Africa with Jack Caldwell, including the development of innovative survey methodologies, producing a body of work which remains an important contribution to African historical demography (see Piché, this volume). In 1978 Ian and his family returned to New Zealand where he accepted a Professorship in the Sociology and Anthropology department in the fledgling University of Waikato. Within three years Ian had established the university's Population Studies Centre (PSC), which he directed for more than 20 years.

Under Ian's leadership the PSC became an influential player in New Zealand's academic and policy circles. Through the 1980s Ian was a member of the New Zealand Planning Council's Population Monitoring Group, and during this decade he commissioned and edited the two volume Country Report on New Zealand's population for the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).

This was a landmark publication – the most comprehensive study of New Zealand’s population completed to that date. Ian also acted as an adviser in several capacities for New Zealand government agencies. In 1994, for example, he was technical adviser to the New Zealand delegation to the UN International Conference on Population and Development in Cairo. The Cairo conference was a turning point in the development of population policy, with the programme of action subsequently providing the steering document for the United Nations Population Fund (UNFPA). Ian’s commitment to research on population and development has been life-long. During the 1980s and 1990s he continued to work as a consultant with the UNFPA completing ‘Population Needs Assessment’ missions in many countries throughout Africa, Asia and the Pacific. His experience with fertility survey research gained while working with the World Fertility Survey was also put to good use in New Zealand when he oversaw the country’s only large-scale national fertility survey (New Zealand Women: Fertility, Employment and Education) in the late 1990s – another milestone in the study of fertility, families and contraceptive use in New Zealand.

Ian is responsible for a large proportion of the corpus of literature on the demography of New Zealand, and in particular of Māori. His work provided the platform for much of the evidence base on which many health and social policy interventions have since been initiated and evaluated. Ian was the first demographer to examine Māori and non-Māori data in a historical and comprehensive manner, and to highlight the extent to which colonial antecedents had resulted in temporal differences in the onset and pace of the demographic, and especially the health, transitions, as well as many related social indicators. Since then, his work has both expanded and deepened these understandings, culminating in the development of a globally significant demographic principle - that of age structural transitions. Ian’s expertise in Māori demography means that he has appeared before the Waitangi Tribunal several times over the years to give expert evidence on a variety of issues including the demographic impacts of Māori land alienation. His historical work (with Tahu Kukutai and Janet Sceats) on the Central North Island claim – a landmark claim that subsumed nearly 200 claims in Rotorua, Taupo, and Kaingaroa – formed an important part of the body of evidence submitted to the Tribunal during the Central North Island hearings.

During his PSC tenure Ian served on numerous national and international advisory committees, and fostered collaborations with key population agencies overseas, notably the Committee for International Collaboration in National Research in Demography (CICRED) in Paris and the UNFPA. He also maintained a wide range of collaborations with other researchers working in the field of population research including Richard Bedford (migration, see this volume), Shripad Tuljapurkur (longevity and ageing), Arunachalam Dharmalingam (families, see this volume), and Janet Sceats (family and fertility).

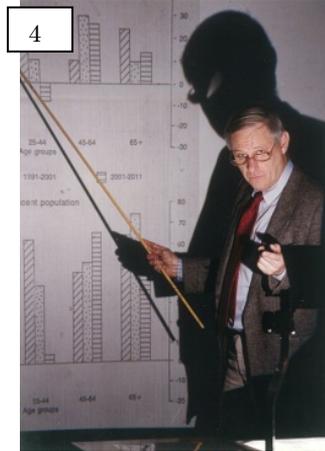
Ian was a very generous colleague to work with in terms of his willingness to share ideas, his support for junior colleagues as they built their national and international networks, and his infectious enthusiasm for research and teaching on population issues. He has always been a passionate communicator and interpreter of complex ideas about population change, and his views have been regularly reported in the media as he has worked continuously to raise the level of public understanding of population issues.

While Ian's research papers have had a lasting influence on the field's scholarship, his legacy as teacher, adviser and mentor has also been substantial. Ian played a significant and unique role in the building of capacity in demography, first stimulating and encouraging the interest of students, and then delivering to them a solid grounding in the discipline. As the only Professor of Demography at Waikato, Ian essentially single-handedly trained a generation of demographers, from New Zealand as well as from overseas, notably Africa. The 1990s in particular was a period of great activity at the PSC with a lively and diverse postgraduate community. As each student proceeded through their studies Ian was instrumental in drawing employment opportunities to their attention, often pursuing these further on their behalf. Today his former students hold senior positions in universities, government departments and businesses across the world. Ian has co-published with many of them including five of the contributors to this special issue (Cheung, Jackson, Johnstone, Kukutai, and Piché). The deep regard and affection that Ian's former students have for him was evident at a special celebratory dinner they held for him during the 2007 Population of Association of New Zealand conference, where he was elected a PANZ Life Member.

Upon retirement in 2010 Ian was appointed an Emeritus Professor of the University of Waikato where he remains a prominent member of the research team at the University's National Institute of Demographic and Economic Analysis (NIDEA). The appointment was in recognition of his foundational role in creating and driving the PSC and of his status as a champion of demography in New Zealand. In his alleged retirement, Ian continues to be prolific, attending international conferences, writing papers, finishing off two books (including a successor to *Te iwi Maori*), and being a transnational grandad to his four beloved mokopuna. This special festschrift issue, edited by two of Ian's former students and foundational NIDEA members, is intended as an homage to the defining role he has played in shaping demographic research in New Zealand and its relationship to policy and development.

The festschrift begins with a short discussion piece by Victor Piché, who was one of Ian's doctoral students at Cornell University during the late 1960s, and is now Honorary Professor of Demography at the University of Montréal. Piché reflects on Ian's work in the development of fertility surveys in Ghana, Niger and Burkina Faso (then Upper Volta) and recalls how, in the heyday of technical and formal demography, Ian's social demography approach was innovative and much needed.

Ian's long-time collaborators Richard (Dick) Bedford, Robert Didham and Graeme Hugo begin the substantive contributions with a piece entitled 'Migration and Urbanisation in west Africa and the Western Pacific: Reflections on a Legacy, 1960-2010'. Dick and Ian both began their research careers in Kenneth Cumberland's Department of Geography at the University of Auckland, and this paper returns to Ian's 'academic roots' to set the scene for some speculative inquiry into aspects of the recent demographic history of west Africa and the western Pacific (Melanesia). Although he never published extensively on Pacific populations, Ian brought his African experience to bear in many conferences and assessments of population trends and issues in the islands. This essay draws attention to his substantial contribution to demographic research in west Africa and begins to lay a foundation for a larger project on contemporary and future Melanesian migration and urbanisation that will be informed by Ian's contributions into historical demography and some of his insights into west Africa's demographic developments since the 1960s.





Photos of Professor Ian Pool

1. Third Asia and Pacific Population conference, Sri Lanka, 1982.
2. Meeting on inter-country study on family structures, Bangkok, 1982.
3. Heading a UNFPA Mission, in Zaire, now Democratic Republic of the Congo, 1991
4. Teaching at the University of Waikato, 1990
5. Launch of *Te iwi Maori*, photo courtesy of Waikato Times, 1991.
6. With Marie Simonen, Mission on Population and Development, Senegal, 1983
7. Writing a report for CICRED on Population, Land Tenure and Agricultural production, Bohol, Philippines, 1998.
8. CICRED Seminar on Mortality as Both a Determinant and a Consequence of Poverty and Hunger, Trivandrum, India (Ian is front right), 2005.
9. Emeritus Professor Ian Pool , University of Waikato, New Zealand, 2010.

The following four articles all honour, in different ways, Ian's contribution to Māori and Indigenous demography. Ian's paper 'When is a Maori a "Maori"?', published in the *Journal of the Polynesian Society* (JPS) in 1963, provides the inspiration for Tahu Kukutai's piece on Māori demography. Using key insights from the JPS paper, Kukutai reflects on contemporary practices of demography in relation to Māori, critiquing both the construction of Māori as a discrete population for demographic research, and the use of Māori ethnic identification as an independent variable. Her analyses highlight the limitations of relying solely on measures of self-reported ethnicity, and the need for more careful theorising and interpretation of ethnicity variables in analyses linking Māori identity to socio-demographic and wellbeing outcomes. She concludes with some thoughts on how official statistics might be changed to better reflect the aspirations and needs of Māori in a post-settlement context.

Using Ian's work on the first and second demographic dividends as her starting point, Natalie Jackson proposes a third interpretation of this fascinating phenomenon. She argues that the relatively youthful age structure of the Māori population - median age 23 years - has the potential to deliver a 'collateral demographic dividend' as it completes its demographic transition alongside the much older European-origin population (median age 38 years).

In their piece, 'Fertility, Ethnic Diversification and the WEIRD paradigm: recent trends in Māori fertility in New Zealand', Robert Didham and Bill Boddington question the validity of continuing to apply the 'Western, Educated, Industrialised, Rich and Democratic (WEIRD) model to the fertility regime of Indigenous populations. They show that Māori fertility change is not conforming to the expected pattern, birth rates having fallen to relatively low levels but not to the very low levels of non-Indigenous populations, and not having shifted to older ages. Their conclusion is that there may well be an Indigenous model of fertility.

Supporting this argument with substantive findings from her recent PhD, former PSC graduate student Kim Johnstone writes on contemporary Indigenous fertility among minority, colonised peoples in New Zealand, Australia, Canada and the United States. Johnstone's work further elaborates this continuing paradox: low fertility (which is lower for

Indigenous Australians than for Māori), but age at childbirth seemingly entrenched at younger ages.

We then shift from Māori and indigenous demography to family, mortality and mobility. Reflecting on Ian's work on changing family forms, Genevieve Heard and Arunachalam Dharmalingam examine socioeconomic differences in family formation in the context of Australia. Analysing rates of marriage and age-specific fertility by indicators of socio-economic status, they find considerable support for the argument, expressed in the United States and other developed countries, of a widening socioeconomic divide in family circumstances. In their conclusion they argue that attention to such inequalities should be a feature of Australian demography in the 21st century.

Applauding Ian's meticulous attention to methodological issues and his strong belief in the use of cohort analysis for examining trends in survivorship, Robert Didham and Jit Cheung outline New Zealand's life expectancies from a cohort perspective. Locating their findings in a global context, they confirm Ian's pioneering arguments in this field: that New Zealand's early and much-heralded advantage in life expectancy was - and has largely remained - concentrated at the younger ages. Their contribution here helps to explain why New Zealand gained and subsequently lost its leading edge in life expectancy.

Similarly noting Ian's sensitivity to the importance of accounting for regional diversity, John Bryant examines recent innovations in spatial data visualisation, exploring how an existing graphic, the 'corrgram', can be used to visualise internal migration flows. Working through progressively complex versions, Bryant shows that the trade-off between complexity of information and clarity of interpretation can be tricky, but argues that such graphics nevertheless offer a useful complement to demographers' traditional tool of choice, the table.

The festschrift concludes as it began with a reflection that takes inspiration from Ian's work, this time from noted New Zealand economic historian and commentator Brian Easton. Easton articulates the pivotal role that Ian's work has played in assisting New Zealand's social scientists to ground their conceptual and theoretical models of social and economic transformation in solid empirical data. Ian has been a 'lens-maker' of extraordinary worth. His accolades, and those of others in this volume, well attribute to Ian the status of New Zealand's 'father of demography'.

Understanding Fertility in West Africa: the Pioneering Work of Ian Pool

VICTOR PICHE^{*}

In the 1960s, very little was known with respect to African demography. In the absence of classical data sources such as censuses and vital registration, quantitative population studies had to rely on indirect techniques of estimation. The seminal book published in 1968 by the Princeton Group, *The demography of tropical Africa*, represented an exemplary illustration of what demographers can accomplish with incomplete data (Brass et al., 1968). However, only very basic and crude estimates of fertility levels were available. The knowledge of the factors of African fertility was, to say the least, very little understood.

Two major breakthroughs, one conceptual and one methodological, provided an impetus to fertility studies in what were then called 'Third World' countries. On the conceptual level, the now famous Davis-Blake (1956) analytical framework offered a neat series of factors directly influencing fertility levels. On the methodological ground, sample surveys became a key source for the study of fertility. Ian Pool's early work took advantage of these two advances as he developed a series of fertility surveys in three West African countries, Ghana, Niger and Burkina Faso (then Upper Volta). This was pioneering and innovative work in three senses: it was part of the first generation of fertility surveys in Africa; it highlighted the intermediate factors of fertility; and it included key methodological innovations.

Ian was one of the first researchers to apply sample survey techniques to the study of fertility in Africa. These surveys were carried out in very difficult environments. His wife, Janet, played a very important role in these surveys. Having been involved in the rural part of the Niger survey, I witnessed the incessant efforts made by Ian to guarantee the quality of the

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data collection process. Much time was devoted to discussions with village chiefs in order to gain support for, and permission to, interview villagers. Each interview was scrutinized by Ian and survey supervisors (mostly his Cornell students), and many times interviewers were asked to go back and complete the information and/or check for inconsistencies. This rigorous approach to data collection is but one of the many legacies that he has endowed upon his students. In particular, three of us, Sidiki Coulibaly, Joel Gregory and myself, applied the same rigor when we became involved as directors of the first national migration survey in Africa, namely in Burkina Faso (Coulibaly, Gregory and Piché, 1975).

The first generation of fertility surveys, labelled Knowledge, Attitude and Practice (KAP) surveys, saw the light within the overwhelming family planning ideology of the time (this was well before the revisionist turn of the mid 1980s, see Hodgson, 1988). Ian's analysis of African fertility and marriage stood almost alone in its endeavour to operationalise the Davis-Blake framework, highlighting other relevant factors of fertility besides contraception. It was now possible to document and measure quantitatively key factors in African fertility such as age at marriage, polygamy, divorce, breastfeeding, birth intervals, intra-uterine mortality, all of which were to become common research topics in the decades to come (see bibliography for a selection of Ian and Janet's publications on African fertility and marriage). In the heyday of technical and formal demography, Ian's social demography approach was certainly original and welcomed.

Over and above substantive issues, Ian's approach to survey techniques involved many methodological innovations, some of which, unfortunately, have been abandoned since. The main innovation was the re-interviewing, one month later, of a sub-sample of women in Niger. When asked, for example, about the number of children that they considered ideal, comparing answers showed the extent of response shifting from one survey to the other with respect to the answers: "I don't know"; "As many as God wants"; and unrealistically high figures such as 30 or 40.¹ A second innovation involved tape-recording of interviews with a sample of husbands and wives (Pool and Pool, 1971). Again, such qualitative material allowed in-depth analysis of key variables. One important variable in the modernization paradigm applied to fertility research was communication between spouses. If there was communication, the couple was considered 'modern' and thus desired lower fertility. However, the analysis of tape-

recorded interviews yielded a very different picture: it turned out that when couples did communicate, it was because there were fecundity problems (actually, the couple wanted more children). A final point deserves mention - as questionnaires were handed to us in the field, Ian developed a quick assessment technique which allowed us to produce on-the-spot fertility estimates that decision-makers were quite happy to obtain (see for instance Pool & Piché, 1971).

Finally, Ian's important contribution to African historical demography, both in terms of his research and in building capability in the field, needs to be stressed. In a period when most demographers thought it impossible to progress historical demography in Africa, Ian argued otherwise. An important paper that he presented in Edinburgh in 1977, along with a 1980 paper by Cordell and Gregory, set the pace for future historical research in Africa (Pool, 1977, Cordell & Gregory, 1980). Ian's ongoing support for his former students working in the field of historical demography has also been important (see, for example, Cordell, Gregory & Piché, 1996; Ittmann, Cordell, & Maddox, 2010). Ian's support for the 1996 book that I authored with Cordell and Gregory was a welcome endorsement. In it he wrote:

Hoe and Wage's innovative methodology should be an inspiration for those of us who would like to do research in a particular domain, but in the absence of conventional data sources give up the struggle. No longer can we say that Africa before independence is not studiable except for what we can glean from the official colonial archives.

For many of us, Ian Pool was (and still is) a role model. I have tried to give a sense of the great influence that he has had on approaches to data collection in West Africa and to social demography generally. As a teacher, he was also thought-provoking, innovative, supportive, tolerant, and warm.

Notes

1. This was the subject of my doctoral dissertation (see Piché, 1974).

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Migration and Urbanisation in West Africa and the Western Pacific: Reflections on a Legacy, 1960-2010

RICHARD BEDFORD *
GRAEME HUGO †
ROBERT DIDHAM ‡

Abstract

(David) Ian Pool's research career began in New Zealand but took off in west Africa in the 1960s. His research on population dynamics in New Zealand, and most recently his major contributions to demographic theory about age structural transitions (ASTs), are frequently cited in the contemporary literature. Less frequently mentioned is his extensive research on fertility and family formation in west Africa – research which has recently been recalled in writing about population change during the colonial era.

This paper picks up a theme that Pool touched on in his 1960s research – migration and urbanisation - in a brief review of urbanisation in west Africa and the western Pacific (Melanesia) between 1960 and 2010. In the 1960s west Africa was considered to be one of the least urbanised regions in the world. Fifty years later, Melanesia qualifies for this (dubious) distinction and a major question challenging politicians and planners, especially in western Melanesia (Papua New Guinea, Solomons and Vanuatu), is whether their burgeoning youthful populations will find their livelihoods in rural areas or increasingly in towns.

West Africa and the western Pacific are vastly different regions in many ways, not least in the scale of their populations and land resources. But there are also some similarities in their demographics, and recalling aspects of Pool's African research in the 1960s and 1970s provides an opportunity to engage in a bit of lateral thinking about the relevance of the experience of urbanisation in west Africa between 1960 and 2010 for Melanesia's demographic development in the early 21st century.

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‡ Robert Didham is Senior Demographic Analyst at Statistics New Zealand.

In the late 1970s, Dennis Cordell, Karl Ittmann and Gregory Maddox began the introductory essay to their book, *The demographics of empire - The colonial order and the creation of knowledge* (Ittmann et al. 2010), with a statement by Ian Pool about the challenges of African demography:

African historical demography may depart significantly from classical historical demography. ... The African historical demographer will probably be forced to build upon the existing methodology and perhaps may have to create his own new tools. In this we would be following what is becoming almost a tradition in African studies and is certainly true of the two parent disciplines of history and demography (Pool, 1977a, cited in Cordell et al., 2010, 1)

Wherever he has carried out his research, Pool has left an enduring legacy in the literature on population change. This is widely appreciated in the context of New Zealand's demographic history generally (Pool, 1985; Pool et al., 2007), and in particular with reference to the history of Māori population change (Pool, 1977b, 1991). Recognition of the excellence of this scholarly contribution has come most recently from the Royal Society of New Zealand through the award in 2009 of the prestigious Te Rangi Hiroa Medal for research "of great merit in historical approaches to societal transformation and change".

Less well known (or remembered) in New Zealand is the major contribution he has made to African demography throughout his career. It is this contribution that Cordell and his colleagues recalled in their introductory essay mentioned above - it set the scene for a collection of provocative assessments of how historians, demographers and other social scientists understood colonial populations, and how demographic theories that had evolved in Europe shaped colonial policies and systems of administration and control.

At the same time Pool commenced his research in west Africa in 1965, some of his graduate student contemporaries from the University of Auckland, where he completed his Masters thesis in social geography in 1959 (Pool, 1959), were carrying out pioneering research on aspects of the demography of the island countries in the Pacific (Bedford, 2011). Peter Pirie (1964) had just completed a PhD thesis in western Samoa that challenged conventional wisdom on fertility and mortality in the pre-colonial Pacific; R. Gerard Ward's (1965) PhD thesis on land use and population in Fiji had just been published, and Murray Chapman was

commencing his fieldwork for a doctoral dissertation in the Solomon Islands that pushed the boundaries of contemporary thinking about population movement in Melanesia (Chapman, 1970). In the western Pacific, as in West Africa, the 1960s was a decade of great debate about the history, contemporary dynamics and potential futures of populations in colonies that were approaching the transition to independence (Bedford 1980). One of the leaders of this debate, in so far as it concerned the histories of Pacific populations, was a contemporary of Pool's at the Australian National University (ANU) in the early 1960s, the late Norma McArthur, whose book *Island Populations of the Pacific* was the first substantive study by a demographer of several of the region's populations (McArthur, 1967). Finally, John (Jack) Caldwell also a student contemporary in demography at ANU, was to make his name in research on the demography of West African countries, especially Ghana. Pool joined Caldwell in Africa in the early 1960s, once they had both completed their PhDs.

A major question that population specialists were addressing in both regions in the 1960s was the relevance of the theory of 'The Demographic Transition', which had been developed to explain the shift from high birth and death rates to low birth and death rates in European countries, for the future transformation of populations in other parts of the world. Key drivers of the fall in birth rates in Europe were a sustained decline in infant and child death rates and, somewhat later, the accelerating urbanisation of their populations during the 19th and early 20th centuries (see, amongst many others, Notestein, 1945; van de Kaa, 1996; Caldwell, 1976; Caldwell & Caldwell, 1997; Dyson, 2001).

In the 1960s West Africa and the western Pacific both had very low levels of urbanisation. According to the United Nations Population Division's estimates of total and urban populations only 15 percent (12.7 million) of west Africa's estimated total population of 85.6 million residents in 1960 were living in urban areas while the share in towns and cities in Melanesia was even lower – only 9 percent (237,000) of the estimated 2.6 million residents (UN Department of Economic and Social Affairs (UNDESA) 2010, 2011). Pool's (1977a) caution about assuming that what happened to populations in the west would inevitably happen to the rest was a caution that was being repeated by contemporaries in Melanesia in the 1960s, especially with reference to the urbanisation of their

populations (Brookfield with Hart, 1971; Ward, 1971; Bedford 1973; Chapman, 1975).

The next section of the paper reflects briefly on Pool's African research, particularly the work he did on fertility in the 1960s and 1970s. This is followed by an overview of the urbanisation transitions in west Africa and the western Pacific between 1960 and 2010, by which time half of the world's population was estimated to be urban-resident (UNDESA, 2010). By 2010, 45 percent (137.3 million) of West Africa's estimated 304.3 million people were living in towns and cities. In the western Pacific, on the other hand, only 18 percent (1.6 million) of the region's estimated 8.7 million residents were living in urban places - just three percent more than the level of urbanisation in West Africa 50 years earlier.

Melanesia remains one of the least urbanised regions in the world despite significant economic and social change in the lead up to independence in the 1970s (Fiji, Papua New Guinea and Solomon Islands) and early 1980s (Vanuatu) and 20 to 30 years of post-colonial transformation. A major question which will challenge the region's politicians and planners during the early decades of the 21st century is: how long will it take for Melanesia to follow the pathway of West Africa and other parts of the world towards urban futures for most of the region's peoples? This question is touched on briefly in the final section with reference to prospects for urban futures for Melanesians over the next 40 years.

Pool's African Research, 1960-2010

Soon after completing his PhD thesis on Māori demography at the ANU (Pool, 1964), Pool was employed by the Population Council in New York to direct the Ghana Fertility Survey, one of several that were carried out in west Africa in the 1960s and elsewhere, as part of the World Fertility Survey. He joined Jack Caldwell, who was teaching at the University of Ghana at the time, and quickly became a contributor to a veritable explosion of research publications by demographers, geographers, anthropologists, sociologists and historians about Africa's populations in the late colonial era and the early years of independence. Pool's major interests at this time were fertility and family formation, and in 1967 and

1968 he published five papers on aspects of the Ghana fertility survey (Pool 1967a, 1967b, 1967c, 1968a, 1968b).

His term as Director of the Ghana Fertility Survey was followed by appointments, also funded by the Population Council, as Director of the Upper Volta Fertility Survey in 1969 and the Niger Fertility Survey in 1970-71. During these years he continued to explore attitudes towards fertility, family limitation and family size in Ghana (1970b, 1970c) and urbanisation and fertility in Ghana and in Africa more generally (1969, 1971a, 1971b). He also published a series of reports in French on fertility and family formation in Ghana, Upper Volta and Niger (Pool, 1970a, 1975; Pool and Piché, 1971).

From the mid-1960s until his move to the University of Waikato in 1978 Pool held various academic appointments at North American universities including the University of Western Ontario, Canada (1966-68), the International Population Program at Cornell University in New York (1968-71) and Carleton University, Canada (1971-77). During this period most of his publications addressed African population issues, especially issues relating to fertility, family planning, urbanisation and development. Between 1967 and 1977 he published 27 articles, book chapters, monographs and reports on aspects of African demography, as well as his book *The Maori Population of New Zealand, 1761-1971* (Pool, 1977b) and several articles on aspects of Māori mortality and Canadian fertility.

His African research did not stop following his return to New Zealand in the late 1970s. In 1978 he was commissioned by the United Nations Fund for Population Activities (UNFPA) to write a population policy for the Government of the Gambia. This was followed by commissions to carry out UNFPA Basic Needs Missions, Evaluation Missions, or Reviews of Population Planning in several African countries (as well as countries in Asia and the Pacific) between 1980 and 2005 including: Nigeria and the Gambia (1980), Senegal (1983), Burkina Faso (formerly Upper Volta, 1986), Mali (1988 and also Senegal again), Malawi (1989), Zaire (1989), and Namibia (2005). Each of these missions was followed by a substantial report and a host of side-activities, often funded by UN agencies, addressing population and development issues.

Pool's African research broke new methodological ground, especially in the analysis of fertility and family planning (see Piché in this special issue). In addition to designing and implementing several major field surveys, he was a consultant to the International Statistical Unit and the World Fertility Survey in the mid-1970s and contributed to the development of the report that defined the strategies for analysing country surveys. His ability to communicate in French as well as English meant he could work across west Africa's former French and British colonies and build a very comprehensive assessment of factors influencing changes in fertility and mortality patterns. He also explored dimensions of migration, especially the impact of urbanisation on fertility. A paucity of reliable, written records of demographic events meant that much of the quantitative analysis relied on the use of new techniques of indirect estimation that were being developed and promoted in the 1960s. Pool was cautious about the uncritical application of these techniques, which often assumed that the population had been subject to consistent rates of fertility and mortality for a very long period ("stable populations"). He observed in the paper which Cordell et al. (2010) cite that:

... in Africa conclusions will probably have to be even more tentative than they are, say in Europe. Often they will have to be based on qualitative rather than quantitative data, on circumstantial or contextual evidence rather than on information computed from or drawn from the society under review. Moreover, even where numerical data are available for different periods the imputing of change over time must be handled with caution because of the very high probability of differences in the quality of the data (Pool, 1977a, 55).

Modernisation, Migration and Urbanisation, 1960-2010

The 1960s and 1970s were exciting decades to be carrying out research in both west Africa and the western Pacific. These were the decades when most of colonies in these two regions gained independence. In west Africa all of the French colonies with the exception of Guinea (1958) gained (or declared) independence in 1960, and all of the British colonies, except Ghana (1957), gained their independence between 1960 and 1965 (see Table 1 and Figure 1). The last colonies to gain independence were the two Portuguese ones (Guinea-Bissau, 1973/74 and Cape Verde, 1975) and the only colonial territory in 2012 remains the small off-shore island of St Helena (British).

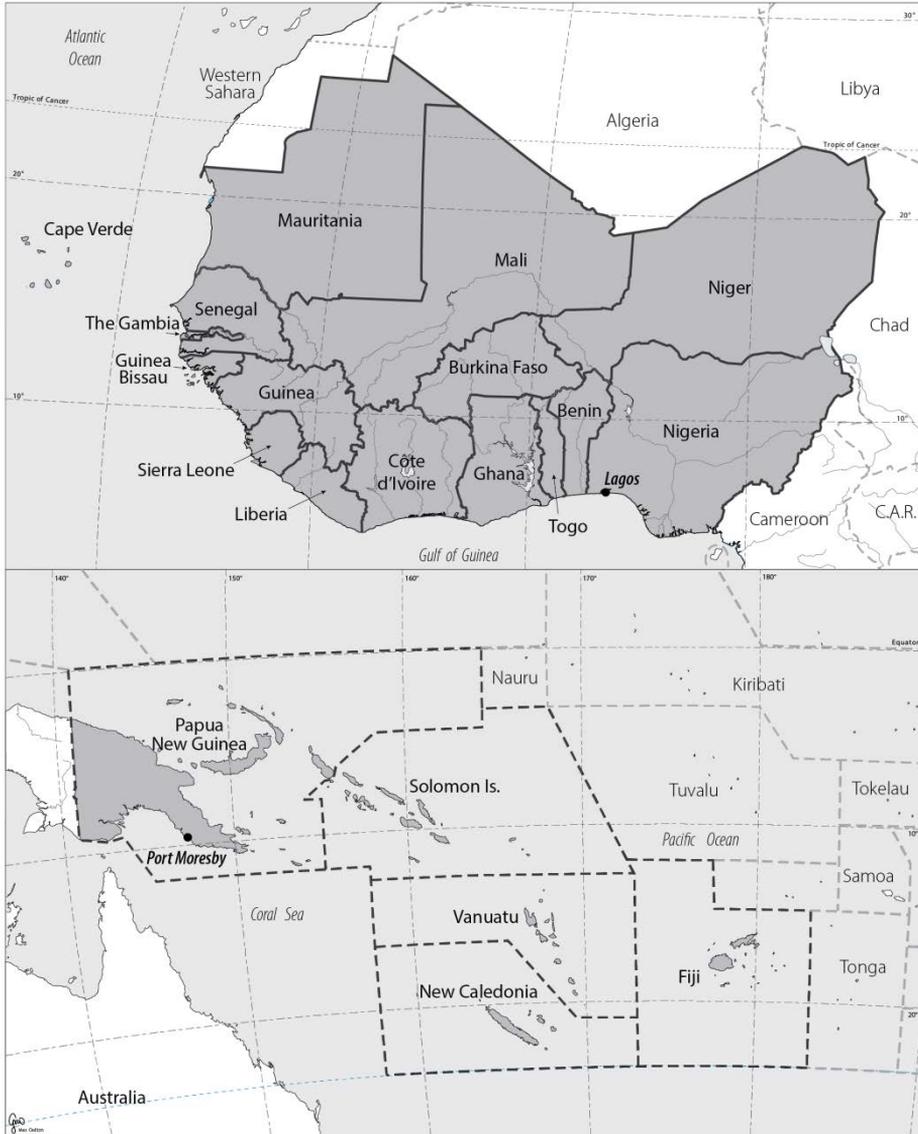
The 1970s was the decade of independence in the western Pacific, beginning with Fiji in 1970, followed by Papua New Guinea (1975), the Solomon Islands (1978), and Vanuatu (1980). One French colony (New Caledonia) remains in the western Pacific while the western part of the island of New Guinea is included within the national boundaries of Indonesia.

Table 1: West Africa and the western Pacific: some background statistics

Country	Area (km ²) (‘000s)	Population 1960 ⁽¹⁾ (‘000s)	Colonial power	Year of independence
<i>West Africa</i>	<i>6,143.4</i>	<i>85,611</i>		
Benin	112.6	2,420	France	1960
Burkina Faso	274.2	4,882	France	1960
Cape Verde	4.0	211	Portugal	1975
Côte d'Ivoire	322.5	3,638	France	1960
The Gambia	11.3	373	UK	1965
Ghana	238.5	6,742	UK	1957
Guinea	245.9	3,541	France	1958
Guinea-Bissau	36.1	593	Portugal	1972/73
Liberia	111.4	1,116	US freed slaves	1847
Mali	1,240.2	5,248	France	1960
Mauritania	1,030.7	854	France	1960
Niger	1,267.0	3,250	France	1960
Nigeria	923.7	45,926	UK	1960
Saint Helena	0.1	5	UK	n/a
Senegal	196.7	3,048	France	1960
Sierra Leone	71.7	2,178	UK	1961
Togo	56.8	1,578	France	1960
<i>Western Pacific</i>	<i>542.4</i>	<i>2,620</i>		
Fiji	18.3	393	UK	1970
New Caledonia	18.6	78	France	n/a
PNG	462.8	1,967	Australia	1975
Solomon Islands	30.4	118	UK	1978
Vanuatu	12.3	64	UK and France	1980

(1) United Nations Department of Economic and Social Affairs (2011)

Figure 1: West Africa and the western Pacific: countries in the early 21st century



These two regions are clearly vastly different in scale (land area, population, resources), cultures, colonial and post-colonial histories and contemporary development issues. Yet, despite these differences, there are some similarities at a high level of generalisation in aspects of their populations in the mid-1960s. Two of these similarities are introduced below to provide a backdrop to a brief examination of changes in levels of urbanisation in the two regions between 1960 and 2010. In both regions, Pool (Africa) and his New Zealand contemporaries (Melanesia) played a major role in laying foundations for several innovative developments in the study of African and Pacific populations as they emerged from colonial domination.

The situation in the 1960s and early 1970s

The 1960s and 1970s saw the initiation of the first comprehensive census enumerations in most countries in the two regions. There had been administrative censuses of various types before the 1960s, but the round of enumerations that commenced in 1960 in west Africa and 1965 in Melanesia had much more input from demographers and tended to have far greater coverage of the rural as well as the urban populations compared with some of the earlier censuses (Caldwell, 1968; McArthur, 1967). In several countries their first national census was held during these decades – a factor which added considerably to a sense of anticipation and excitement for demographers as well as politicians in newly independent countries.

In west Africa the 1960s round of censuses was of considerable interest because of the link between population counts and the allocation of seats across regions and ethnic groups in the countries' post-colonial legislatures. Nigeria's census in 1962, for example, was challenged before the results were ever released and a new enumeration was held in 1963 (Okonju, 1968; Udo, 1968). Numbers enumerated tended to be lower than expected in some regions or even some countries, producing scepticism about the level of coverage. It was during this period that a range of techniques were developed for estimating fertility and mortality in African populations by William Brass, Ansley Coale, Frank Lorimer and Etienne van de Walle, amongst others (Brass, 1968; Brass and Coale, 1968; Coale and Lorimer, 1968; van de Walle, 1968). Pool was actively engaged in collecting data on fertility and family formation through sample surveys in

west Africa from the mid-1960s - surveys that contributed significantly to the evidence base that was used to calibrate the new indirect estimation techniques.

This was also the decade when the theory of modernisation was at its peak in the social sciences, and measurement of the diffusion of western style urban-industrial development, and its associated demographic, social, economic and political transitions, was at the heart of much research in what were then termed the 'developing countries', or the 'Third World' (Eisenstadt, 1966; Brookfield, 1975). Celebrated contributions to this literature were Rostow's (1964) stages of economic growth, Soja's (1968) geography of modernisation in Kenya, Zelinsky's (1971) hypothesis of the mobility transition, and Caldwell's (1976) restatement of demographic transition theory with reference to intergenerational transfers within the family.

Much of the thinking about modernisation theory in the 1960s was informed by research into diffusion processes in Africa, especially the roles of internal migration, urbanisation and the development of road and rail networks in the transformation of society and economy (Gould, 1970; Riddell, 1970). Research on migration in west Africa in the 1960s - a region with a history of urban places that long pre-dates European intervention from the sixteenth century - was making a major contribution to the development of theory in migration studies. Included here are Caldwell's (1969) study of rural-urban migration in Ghana, Mabugunje's (1971) hypothesis about migration systems in Nigeria, and Amin's (1974) research on modern forms of migration in west Africa. Notwithstanding a tradition of pre-colonial towns in west Africa especially, Caldwell (1968, 22) noted that tropical Africa was probably the least urbanised region in the world in the early 1960s. But the situation was changing rapidly - a quickening of the urbanisation process was almost universal. He went on to observe that:

By 1960, one quarter of Ghana's population was in towns with over 5,000 inhabitants which developed rapidly between 1948 and 1960 when these towns absorbed two-fifths of the country's population increase (Caldwell, 1968, 24).

In the western Pacific, Harold Brookfield's highly innovative book *Melanesia: a geographical interpretation of an island world* set the scene for some provocative debates about migration and the development of towns in another region with very low levels of urbanisation in most countries (Brookfield with Hart, 1971). New Caledonia (around 37 percent urban) and Fiji (29 percent urban) were exceptions in Melanesia in 1960 - the other three countries had 10 percent or less of their people living in towns and in Papua New Guinea it was estimated that only four percent were urban resident (Table 2). There were two schools of thought at the time about migration and urbanisation in the western Pacific with one, epitomised in the writings of Chapman (1975) and Bedford (1973), focussing on circular migration from rural bases in the Solomon Islands and Vanuatu respectively, while the essence of the other, emphasizing the inevitability of urbanisation in countries like Papua New Guinea, Solomon Is and Vanuatu, was captured in the writings of Ward (1971).

The UNDESA's (2010) estimates of levels of urbanisation in different parts of the two regions in 1960, along with rates of total and urban population growth between 1960 and 1965, are shown in Table 2. While both regions are characterised by considerable variability in levels of urbanisation and rates of total and urban population growth, a distinguishing feature everywhere, is the relatively low share of the population living in towns and cities. Only two of the 16 countries (excluding Saint Helena) in west Africa had levels of urbanisation exceeding 20 percent, with Ghana being the most urbanised at this stage. Burkina Faso (formerly Upper Volta) and Niger, where Pool conducted fertility surveys following his work in Ghana, had the lowest levels of urbanisation in west Africa in 1960 - levels that were close to those in Papua New Guinea and the Solomon Islands at the time (Table 2). Conducting sample surveys in these populations was no mean feat; these were very different situations to those found in New Zealand and Australia at the time where over 75 percent of their populations were already urban-resident.

Table 2: Urbanisation and population growth in west Africa and the western Pacific, early 1960s

Country	% Population urban 1960	Population Growth (%) ¹ Total	Population Growth (%) ¹ Urban
<i>West Africa</i>	<i>14.8</i>	<i>2.20</i>	<i>6.40</i>
Benin	8.7	1.46	7.76
Burkina Faso	4.5	1.58	3.62
Cape Verde	15.5	2.61	4.68
Côte d'Ivoire	16.7	3.91	10.61
The Gambia	10.3	1.89	6.61
Ghana	23.4	2.94	5.20
Guinea	9.2	1.53	6.30
Guinea-Bissau	13.6	0.15	1.22
Liberia	17.7	2.46	6.47
Mali	10.7	1.29	4.37
Mauritania	6.9	2.83	10.58
Niger	5.8	2.95	6.23
Nigeria	15.9	2.17	6.58
Senegal	23.3	2.79	5.55
Sierra Leone	17.9	1.63	4.67
Togo	10.0	1.49	9.60
<i>Western Pacific</i>	<i>9.0</i>	<i>2.22</i>	<i>6.95</i>
Fiji	29.7	3.30	5.13
New Caledonia	37.4	3.12	6.72
PNG	3.9	1.88	9.60
Solomon Islands	5.8	2.98	7.56
Vanuatu	10.4	3.07	4.80

1. Average annual rate of population growth between 1960 and 1965

Data source: UNDESA (2010, 2011)

In both regions a demographic and geographic ‘giant’ had, and continues to have, a profound impact on regional averages. Nigeria accounted for 54 percent of the west African region’s estimated 85.6 million people in 1960 and 15 percent of the total land area. Nigeria’s population was much more urbanised (15.9 percent) than those of Burkina Faso (4.5 percent) and Niger (5.8 percent). In the case of the western Pacific, Papua New Guinea (PNG) is the ‘giant’ accounting for 75 percent of the region’s population in 1960 and 85 percent of its total land area. PNG was the least

urbanised of the Melanesian countries with just under 4 percent of its very diverse population living in towns and cities (Table 2). The UNDESA estimates of urban population growth have PNG's very small urban population growing at just under 10 percent per annum in the early 1960s, ahead of the much more urbanised populations in Fiji and New Caledonia (Table 2).

Total and urban population change, 1960-2010

Between 1960 and 2010, the total populations of west Africa and the western Pacific grew by 255 percent and 233 percent respectively (Table 3). The two giants had very similar total percentage increases in their populations – 245 percent in Nigeria and 248 percent in PNG. Nigeria's population of 158.4 million in 2010 was almost twice as large as the region's total population 40 years earlier, while PNG's 6.9 million was over two and a half times the size of the region's estimated population in 1960. Population growth in both regions, while variable across countries, had been amongst the fastest in the world, especially between 1980 and 2010. By the late 2000s rates of natural increase in most of the countries exceeded those that were common in the early 1960s (Table 3).

Table 3: Population growth and natural increase in west Africa and the western Pacific, 1960-2010

Country	Total population (000's)			Natural increase (%)	
	1960	2010	% incr	1960-65	2005-10
<i>West Africa</i>	<i>85,611</i>	<i>304,261</i>	<i>255.4</i>	<i>2.2</i>	<i>2.6</i>
Benin	2,420	8,850	265.8	1.6	2.8
Burkina Faso	4,882	16,469	237.3	2.2	3.1
Cape Verde	211	496	135.1	2.6	1.7
Côte d'Ivoire	3,638	19,738	442.5	2.9	2.2
The Gambia	373	1,728	363.8	2.0	3.0
Ghana	6,742	24,392	261.8	2.9	2.4
Guinea	3,541	9,982	181.9	1.6	2.6
Guinea-Bissau	593	1,515	155.4	1.5	2.2
Liberia	1,116	3,994	258.0	2.3	2.9
Mali	5,248	15,370	192.9	1.5	3.2
Mauritania	854	3,460	305.0	2.9	2.5
Niger	3,250	15,512	377.3	3.0	3.6
Nigeria	45,926	158,423	245.0	2.2	2.5
Senegal	3,048	12,434	308.0	2.5	2.9
Sierra Leone	2,178	5,868	168.3	1.6	2.4
Togo	1,578	6,028	282.1	2.4	2.2
<i>Western Pacific</i>	<i>2,620</i>	<i>8,748</i>	<i>233.9</i>	<i>2.2</i>	<i>2.3</i>
Fiji	393	861	118.8	3.2	1.6
New Caledonia	78	251	221.6	2.4	1.1
PNG	1,967	6,858	248.7	1.9	2.4
Solomon Islands	118	538	355.8	2.6	2.7
Vanuatu	64	240	276.2	3.0	2.5

Data source: UNDESA (2011)

Urban population growth between 1960 and 2010 was much faster than total population growth in all of the countries in the two regions (Table 4). Increases in urban populations exceeded 1,000 percent in half of the 16 countries in west Africa (over 2,000 percent in the Gambia and Mauritania), and in two of Melanesia's five countries (Table 4). By 2010 45 percent of west Africa's population was urban-resident according to UNDESA estimates and in 4 of the 16 countries more than 50 percent of their populations were living in towns and cities. In the case of the western Pacific, the overall percentage of the population that was urban-resident remained very small (18 percent), although two countries had more than half of their populations living in towns and cities (Fiji and New Caledonia)

(Table 4). The very small percentage of people living in urban areas in Papua New Guinea (just under 13 percent) pulled the regional average down; in the comparable country in west Africa, Nigeria, the percentage urban was just under 50 percent in 2010 – higher than the regional average (45 percent) (Table 4).

Table 4: Urbanisation and urban population growth, 1960-2010

Country	Urban populations (000s)		% increase	% urban
	1960	2010	1960-2010	2010
<i>West Africa</i>	<i>12,660</i>	<i>137,271</i>	<i>984.3</i>	<i>45.1</i>
Benin	210	3,873	1740.3	43.8
Burkina Faso	222	4,184	1785.7	25.4
Cape Verde	33	313	856.1	63.1
Côte d'Ivoire	609	10,906	1690.9	55.3
The Gambia	39	1,018	2540.5	58.9
Ghana	1,579	12,524	693.4	51.3
Guinea	327	3,651	1016.4	36.6
Guinea-Bissau	81	494	511.8	32.6
Liberia	197	1,961	894.4	49.1
Mali	560	4,777	753.2	31.1
Mauritania	59	1,395	2258.7	40.3
Niger	188	2,719	1347.7	17.5
Nigeria	7,296	78,818	980.2	49.8
Senegal	709	5,450	668.9	43.8
Sierra Leone	392	2,241	472.2	38.2
Togo	158	2,945	1762.1	48.9
<i>Western Pacific</i>	<i>237</i>	<i>1,614</i>	<i>580.7</i>	<i>18.4</i>
Fiji	117	443	278.8	51.5
New Caledonia	29	146	399.4	58.0
PNG	77	863	1013.4	12.6
Solomon Islands	7	99	1356.5	18.5
Vanuatu	7	63	846.2	26.2

Data source: UNDESA (2010)

There were countries in west Africa where the shares of their populations in urban areas were much closer to those found in Melanesia. Niger (17 percent) and Burkina Faso (25 percent), for example, had levels of urbanisation in 2010 that were very similar to those found in the Solomon Islands (18 percent) and Vanuatu (26 percent). The two countries

in the western Pacific that had more than half of their populations living in towns and cities (New Caledonia, 58 percent and Fiji, 51 percent) were similar in population distribution terms to the Gambia (59 percent) and Ghana (51 percent). However, notwithstanding some similarities in levels of urbanisation, countries in west Africa (even the ones with low levels of urbanisation) tended to have much faster growth in their urban populations between 1960 and 2010 than most of the western Pacific countries (Table 5). Whereas the index numbers in 2010 for the total populations of the two regions were relatively similar (3.6 in west Africa; 3.3 in the western Pacific compared with an index number of 1 in both regions in 1960), the index numbers for urban populations in 2010 diverged quite significantly (10.8 in west Africa and 6.8 in Melanesia).

Table 5: Index numbers in 2010, total and urban population growth (1960=1)

Country	Index numbers 2010	
	Total pop	Urban pop
<i>West Africa</i>	<i>3.6</i>	<i>10.8</i>
Benin	3.7	18.4
Burkina Faso	3.4	18.9
Cape Verde	2.4	9.6
Côte d'Ivoire	5.4	17.9
The Gambia	4.6	26.4
Ghana	3.6	7.9
Guinea	2.8	11.2
Guinea-Bissau	2.6	6.1
Liberia	3.6	9.9
Mali	2.9	8.5
Mauritania	4.1	23.6
Niger	4.8	14.5
Nigeria	3.4	10.8
Senegal	4.1	7.7
Sierra Leone	2.7	5.7
Togo	3.8	18.6
<i>Western Pacific</i>	<i>3.3</i>	<i>6.8</i>
Fiji	2.2	3.8
New Caledonia	3.2	5.0
PNG	3.5	11.1
Solomon Islands	4.6	14.6
Vanuatu	3.7	9.5

The two giants – Nigeria and Papua New Guinea – had almost the same index numbers in 2010 (10.8 and 11.1 respectively), notwithstanding the fact that they had very different overall levels of urbanisation (49.8 percent and 12.6 percent respectively) (Table 5). The largest city in west Africa – Lagos in Nigeria – had an estimated urban population of over 16 million in 2010, in a country where the total urban population exceeded 78 million; this megacity’s population was not far from the total population for west Africa in 1960 (Table 4). In Papua New Guinea (PNG) the largest city is Port Moresby with an estimated population of somewhere around 500-600,000 in 2010 out of a total of 860,000 living in urban areas in the country as a whole. PNG’s urban population in 2010 was almost four times larger than the total urban population in the western Pacific 50 years earlier (Table 4). Nigeria’s urban population in 2010, on the other hand, was over six times larger than it had been in 1960, and there was no sign that the rate of population growth was slowing by the late 2000s (Table 3). Indeed, in Nigeria, the estimated annual rate of natural increase in the total population between 2005 and 2010 (2.5 percent) was higher than it had been in the early 1960s (2.2 percent per annum). PNG’s population also had a much faster rate of natural increase in the late 2000s than it had had in the early 1960s guaranteeing that urban population growth in subsequent decades would continue to be rapid.

Urbanisation in west Africa and Melanesia between 1960 and 2010 has produced cities that are very different from the classical western city. Many are what Saunders (2010) has termed “arrival cities” in his provocative assessment of prospects for the urbanisation of at least another three billion people world-wide by 2050. Cities like Lagos and Port Moresby are forcing town planners to re-think contemporary patterns of urban growth and settlement. There is little about the development of these two cities that conforms to European models of urban form and function (Connell, 2011).

Regional migration systems and population movement

In some respects the west Africa that Pool knew in the 1960s and 1970s has changed much more dramatically than the western Pacific that his Auckland contemporaries knew 40 to 50 years ago. Of course, both regions have undergone very major social, economic and political transformation since the 1960s and, in the process, their populations have changed significantly in terms of structure and distribution.

In west Africa population movement between different parts of the region was widespread before colonial intervention, continued through the colonial era, and has been allowed to persist in the 16 independent countries that comprise the Economic Commission of West African States (ECOWAS) which was set up in 1975 (Makina-Adebusoye, 1992; Skeldon, 1997; Swindell, 1995; Adepoju, 1995). Using data compiled by Skeldon and his colleagues at the University of Sussex's Development Research Centre (DRC) in the early 2000s it can be seen that the destinations for most of the emigrants from and sources of immigrants to countries in west Africa are other countries in the region (Table 6). There are also some extensive diaspora beyond Africa of people born in countries in west Africa, especially in the European countries to which they were linked as colonies. Half of west Africa's countries had more than a third of their locally-born emigrants living in countries outside of continental Africa around 2002 (Table 6).

Table 6: West Africa's migrant stock: sources and destinations, 2002/3
(percentages)

Country	Birthplace of migrants to west Africa			Destinations of west African-born		
	Within west Africa	Other Africa	Other countries	Other west Africa	Other Africa	Other countries
Benin	97.1	1.1	1.8	81.3	10.3	8.4
Burkina Faso	83.0	6.2	10.7	91.4	2.6	6.0
Cape Verde	10.2	59.2	30.7	18.6	15.2	66.2
Côte d'Ivoire	90.7	6.0	3.2	44.8	2.9	52.3
Gambia	94.6	1.3	4.1	42.1	2.6	55.3
Ghana	58.9	22.9	18.1	72.0	2.8	25.2
Guinea	81.5	8.8	9.7	86.8	3.5	9.7
Guinea-Bissau	88.4	5.5	6.0	60.7	4.3	35.0
Liberia	78.9	1.6	19.5	32.1	2.8	65.1
Mali	78.6	10.2	11.2	85.5	5.5	8.9
Mauritania	87.8	6.3	5.9	67.4	8.5	24.1
Niger	89.7	2.3	6.0	89.4	3.8	6.7
Nigeria	75.8	9.8	14.4	20.6	41.7	37.7
Senegal	83.6	5.4	11.1	44.0	11.7	44.3
Sierra Leone	88.8	6.0	5.2	38.1	2.9	59.1
Togo	83.5	4.9	11.6	73.3	10.5	16.2
Total	83.5	4.9	11.6	69.3	10.1	20.6

Data source: DRC (2007)

In the western Pacific, there was very little intra-regional mobility by comparison with west Africa, and a poorly developed migration system linking the five countries around 2002 (Table 7). Unlike west Africa, indigenous patterns of population movement across colonial boundaries tended to be contained rather than promoted (Bedford, 1992). There was extensive migration of Melanesians from Vanuatu, the Solomon Islands and Papua New Guinea to Australia in the second half of the 19th century, but this ended soon after the creation of the Commonwealth of Australia in 1901. The major sources of migrants into countries in the western Pacific, and destinations for emigrants from these countries, were outside the Pacific Islands in the early 2000s. Australia and New Zealand were important 'nodes' in migration networks for these countries, as was France for its colony, New Caledonia. Only Fiji had almost 50 percent of its emigrants living outside of Oceania. Part of the explanation for the small diaspora of indigenous peoples of PNG, the Solomon Islands and Vanuatu

is that they do not have any privileged access to residence in the countries that they were linked to through colonial rule (Bedford & Hugo, 2012).

Table 7: Melanesia's migrant stock, 2002/3 (%)

a) Sources of overseas-born immigrants (%)				
Country	Other Melanesia	Other Pacific Is	Australia/New Zealand	Other countries
Fiji	6.4	21.2	18.4	54.0
New Caledonia	11.7	11.9	0.3	76.1
PNG	0.5	1.3	67.4	30.7
Solomon Islands	34.6	26.3	11.9	27.1
Vanuatu	8.4	2.3	43.3	46.1
Total Melanesia	8.6	11.2	23.1	57.1
b) Destinations of Melanesia-born emigrants (%)				
Country	Other Melanesia	Other Pacific Is	Australia/New Zealand	Other countries
Fiji	2.0	0.6	48.9	48.4
New Caledonia	9.7	10.2	68.9	11.2
PNG	6.1	0.6	66.8	26.5
Solomon Islands	33.3	0.7	43.3	22.7
Vanuatu	12.4	24.8	28.2	34.6
Total Melanesia	3.8	1.3	52.0	42.9

Data source: DRC (2007)

Until 2007 there was no formally recognised equivalent of ECOWAS in the western Pacific. The Melanesian Spearhead Group (MSG), comprising the four Melanesian states of Fiji, Papua New Guinea, Solomon Islands and Vanuatu as well as the FLNKS (Le Front de Libération Nationale Kanak et Socialiste) of New Caledonia was established in 1983 and was formalised under international law in 2007 (Valemei, 2012; Hugo & Bedford, 2010). In 2012, the MSG proposed a Skills Movement Scheme that would allow at least 400 people from each country in the western Pacific to work in other MSG countries. For example, if Fiji had a surplus of primary school teachers while other MSG countries had shortages, then there could be a flow of teachers from Fiji into other MSG countries. The Skills Movement Scheme also was seen as a mechanism for Papua New Guinea's expanding mining sector to access skilled workers in the western Pacific (Valemei, 2012). By comparison with the extensive population

movement between many of the countries in ECOWAS, migration flows between MSG members have been small.

The per capita flows of migrants into and out of countries in west Africa and the western Pacific are shown in Table 8. In general, there are much larger flows of international migrants (per 1000 total population) into west African countries than is the case in the western Pacific, although the French colony of New Caledonia, with its large nickel industry, had the highest per capita immigration rate of any of the countries listed in Table 8 (185.7 overseas-born residents per 1000 in the estimated population in 2002). Only the Ivory Coast and the Gambia had immigration levels in excess of 130 per 1000 in 2002.

Table 8: Per capita international migration flows 2000/2002 (000s)

Country	Pop estimate (UNDESA)	Immigrants (DRC)	Emigrants (DRC)	Per capita flows (per 000)	
				Immigrants	Emigrants
<i>West Africa</i>	<i>247,893</i>	<i>6,781.1</i>	<i>8,130.40</i>	<i>27.4</i>	<i>32.8</i>
Benin	6,938	100.9	576.3	14.5	83.1
Burkina Faso	13,015	1,124.3	1,348.7	86.4	103.6
Cape Verde	453	10.4	199.6	23.0	440.9
Côte d'Ivoire	17,181	2,336.4	176.7	136.0	10.3
The Gambia	1,376	185.1	51.7	134.5	37.6
Ghana	20,114	613.7	957.9	30.5	47.6
Guinea	8,605	741.2	583.6	86.1	67.8
Guinea-Bissau	1,290	19.3	128.2	15.0	99.4
Liberia	2,996	159.6	85.8	53.3	28.6
Mali	12,002	48.1	1,578.7	4.0	131.5
Mauritania	2,800	62.5	116.9	22.3	41.7
Niger	11,706	119.2	496.8	10.2	42.4
Nigeria	129,832	751.1	1,041.3	5.8	8.0
Senegal	10,023	283.7	479.5	28.3	47.8
Sierra Leone	4,506	46.7	94.4	10.4	21.0
Togo	5,051	179.0	214.3	35.4	42.4
<i>Western Pacific</i>	<i>7,323</i>	<i>84.5</i>	<i>190.4</i>	<i>11.5</i>	<i>26.0</i>
Fiji	816	15.9	143.1	19.5	175.3
New Caledonia	220	40.8	1.8	185.7	8.2
PNG	5,660	23.0	37.1	4.1	6.6
Solomon Islands	432	3.5	4.2	8.1	9.7
Vanuatu	195	1.3	4.2	6.7	21.6

Data sources: UNDESA (2011); DRC (2007)

In the case of emigration the same situation applied, with countries in west Africa generally experiencing higher levels of outmigration than was the case in the western Pacific (Table 8). Four countries had more than 100 emigrants per 1000 residents, namely Cape Verde, Mali, Burkina Faso and Fiji. In the cases of Burkina Faso and Mali, other countries in west Africa were the main destinations, while for Cape Verde countries in north Africa and Europe were preferred destinations. The only 'country of emigration' in the western Pacific, Fiji, lost equal shares of its emigrants to Australia and New Zealand on the one hand, and other countries outside the region (especially the United States of America and Canada) on the other (Table 7). Fiji's diaspora has been the largest from Melanesia in Australia and New Zealand since the 1940s, and its growth has been greatly stimulated by a succession of coups d'état in Fiji since 1987. Military coups and civil disorder have also stimulated major population flows in several west African countries, and a major challenge for planners and politicians in both regions in the early 21st century is dealing with increasing flows of people seeking opportunities to improve their livelihoods in urban areas.

Looking Ahead: Population Growth and Urbanisation, 2010-2050

It has already been noted that by 2010 the estimated share of west Africa's population living in towns and cities (45 percent) was approaching the world average of 50 percent. Ten of the 16 countries had levels of urbanisation in excess of 40 percent (Table 4) and three exceeded the world average. In the western Pacific two of the five countries had more than 50 percent of their populations in towns and cities, but the other three had much lower levels of urbanisation. They were amongst the least urbanised populations in the world, at least as far as the shares of their peoples living in rural and urban areas.

The UN Population Division's most recent medium variant projections of total and urban populations for countries in these two regions suggest there will be very significant growth in both of them between 2010 and 2050 (UNDESA, 2010, 2011). West Africa's population is projected to increase by 144 percent with one country (Niger) possibly having over 250 percent growth in number of residents (Table 9). Such increases are well

above the global average of 35 percent for total population growth over the 40 years. Only Cape Verde in west Africa is projected to have a smaller percentage increase (27 percent) in its population than the global average. The other 15 will all have increases that are more than double this at 80 percent or more (Table 9). In the case of the western Pacific two distinctive patterns of population growth are evident in the projections: slow growth in Fiji and New Caledonia and much faster growth in PNG, Solomons and Vanuatu, although none of the countries in this part of the world are projected to have increases that match west Africa's average of 144 percent (Table 9).

Table 9: Total and urban population growth, 2010-2050

Country	Estimated pop. (000s)		% change	% urban	
	2010	2050	2010-50	2010	2050
<i>West Africa</i>	<i>304,261</i>	<i>743,850</i>	<i>144.5</i>	<i>45.1</i>	<i>57.5</i>
Benin	8,850	21,734	145.6	43.8	67.3
Burkina Faso	16,469	46,721	183.7	25.4	51.3
Cape Verde	496	632	27.4	63.1	89.9
Côte d'Ivoire	19,738	40,674	106.1	55.3	79.6
The Gambia	1,728	4,036	133.5	58.9	75.5
Ghana	24,392	49,107	101.3	51.3	69.6
Guinea	9,982	23,006	130.5	36.6	65.6
Guinea-Bissau	1,515	3,185	110.2	32.6	58.9
Liberia	3,994	9,660	141.9	49.1	63.2
Mali	15,370	42,130	174.1	31.1	43.8
Mauritania	3,460	7,085	104.8	40.3	55.1
Niger	15,512	55,435	257.4	17.5	38.7
Nigeria	158,423	389,615	145.9	49.8	56.0
Senegal	12,434	28,607	130.1	43.8	59.4
Sierra Leone	5,868	11,088	89.0	38.2	70.1
Togo	6,028	11,130	84.7	48.9	82.8
<i>Western Pacific</i>	<i>8,748</i>	<i>16,585</i>	<i>89.6</i>	<i>18.4</i>	<i>32.9</i>
Fiji	861	1,017	18.2	51.5	64.6
New Caledonia	251	344	37.0	58.0	75.8
PNG	6,858	13,549	97.6	12.6	28.3
Solomon Islands	538	1,163	116.0	18.5	38.4
Vanuatu	240	513	113.9	26.2	50.3

Data source: UNDESA (2010, 2011)

Projected urban populations suggest that over two thirds (68 percent) of the world's inhabitants could be living in towns and cities by 2050 (UNDESA, 2010). Over half of west Africa's countries could have urbanisation levels at or exceeding this level, with a regional average of around 57 percent. Only one country, Niger (38 percent), has less than half of its residents living in urban places by 2050 in these projections, and this is the only west African country than has a level of urbanisation that might be similar to that found in Papua New Guinea and the Solomon Islands at mid-century. Because of the impact of Papua New Guinea on regional averages in the western Pacific, the share of people living in towns (33 percent) by 2050 is likely to remain well below the global and west African averages. Indeed, these two countries could still have levels of urbanisation that are below those that were found in most countries in west Africa in 2010 (Tables 8 and 9).

Between 2010 and 2050 populations in the western Pacific, especially those in PNG, Solomons and Vanuatu, are going to experience similar transitions to those that most west African countries have experienced since the 1960s and will continue to experience if the population growth that the UN Population Division's medium variant projections suggest does occur. Dealing with the implications of this growth for development in both regions will be a very significant challenge especially given the ambivalent attitudes local politicians, planners, non-government organisations and donor agencies have had towards urbanisation. In a hard-hitting comment in the run-up to the Pacific Forum in New Zealand in August 2011, the Pacific Institute of Public Policy (2011, 1) observed that: "with few exceptions urbanisation has been ignored or viewed as a negative trait to be stopped as governments and development agencies have tended to focus their attention on rural development. Trying to keep people out of cities and towns is futile, and stands in the way of initiatives to ensure growing populations have access to the services and facilities required to sustain and improve people's quality of life."

Urban futures for the majority of Melanesians are inevitable longer-term, just as they are inevitable for the rest of the world's population. Recent censuses in PNG, the Solomon Island and Vanuatu suggest the pace of rural-urban migration is accelerating and pressure has been building in these countries for increased access to employment opportunities in Australia and New Zealand (World Bank, 2006). Recent

policy initiatives in the latter have seen the introduction of managed circular migration programmes for seasonal workers from several Pacific countries, including PNG, the Solomon Islands and Vanuatu (Ramasamy et al., 2008; Gibson and McKenzie, 2010, 2011). Such schemes offer little scope for relieving pressure for longer-term emigration for work in towns and cities in Australia and New Zealand, but they are increasing the awareness Melanesians have of alternatives to residence in villages and towns in their home countries.

West Africa's migration and urbanisation experiences since the 1960s, have relevance for the western Pacific, just as the sort of research Pool and his colleagues were doing on fertility, family formation, migration and urbanisation in west Africa in the 1960s remains very relevant for the analysis of population dynamics in the western Pacific in the 21st century. Pool's more recent research on the conceptualisation of age structure transitions in the context of population momentum as a 'missing link' in demographic transition theory, is another contribution that has great significance for future inquiry into migration, urbanisation and development in both regions (Tuljapurkar et al., 2005; Pool et al., 2006). The legacy of New Zealand's pre-eminent demographer is certain to continue to be very prominent in writings by his colleagues on population transformations in a wide range of settings, including west Africa and the western Pacific. As Cordell et al. (2010, 1) noted with regard to Pool's African research, his comments on challenges facing demographic research "still hold true more than a quarter of a century later". It is highly likely that they will remain relevant for the next quarter of a century as well.

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Māori Demography in Aotearoa New Zealand: Fifty Years On

TAHU KUKUTAI *

Abstract

Writing in the *Journal of the Polynesian Society* fifty years ago, budding demographer Ian Pool asked: “When is a Maori a ‘Maori’”? His assertion that cultural self-identification was the only credible way to define Māori collectively in official statistics was in stark contrast to the prevailing institutional practice of defining Māori by ‘degree of blood.’ In this article I use key insights from Ian’s paper to reflect on contemporary practices of demography, focusing specifically on the construction of Māori as a discrete population for demographic research, and the use of Māori ethnic identification as an independent variable. I conclude with some thoughts on how official statistics might be changed to better reflect the aspirations and needs of Māori in a post-settlement context.

Introduction

Writing in the *Journal of the Polynesian Society* (JPS) almost fifty years ago, budding demographer Ian Pool asked: “When is a Maori a ‘Maori’”? (Pool, 1963). The question was a direct response to the 1961 Hunn Report which documented, in detail, the inconsistent usage of blood quantum and ancestry to define Māori for statistical and statutory purposes. In contrast to the report’s proposal that the threshold for defining Māori be progressively increased to limit the number able to benefit from public policy, Ian argued that ethnic self-identification was the only credible way forward. The statistical definition of Māori is a topic to which Ian has returned throughout his career (Pool, 1977, 1991; Pool & Pole, 1987), laying the foundations for an interesting and, at times prickly, debate (see, for example, Chapple, 2000; Durie, 2005; Gould, 2000; Kukutai, 2004, 2011; Robson & Reid, 2001).

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While drawing clear parameters around what constitutes a population is integral to the practice of demography, Ian recognised a much broader, and important, set of issues were at stake. One was that the statistical definition of Māori in forums such as the census (e.g., ‘half or more Maori blood’) bore little resemblance to how Māori, as a people, saw themselves. Blood quantum was conceptually problematic for Ian because it derived from a flawed notion of biologically distinct races and obscured the role of cultural processes in understanding demographic behaviours and outcomes. What mattered was that “in New Zealand there are two distinct cultural groups” and that “some persons feel that they are Maori, others that they are Pakeha – regardless of their exact biological make-up”.¹ Self-identification was more likely to yield data on “those people whose behaviour patterns are Pakeha-oriented or Maori-oriented and whose problems are different because of their different cultural backgrounds, living conditions, child-rearing practices, etc.” (p. 209).

In this article I use key insights from Ian’s JPS paper to reflect on contemporary practices of demography in relation to Māori. Much has changed since Ian’s paper appeared. New Zealand has undergone major transformations in population and economy, with implications for the praxis and substance of Māori demographic research. Notable changes include the shift from a tightly controlled to an open market economy, rapid ethnic diversification, rising inequality, the legacy of the Māori cultural renaissance and ongoing efforts to address, through the Wāitangi Tribunal or direct negotiations, historical grievances relating to the alienation of resources. Within the discipline of demography, there is a growing awareness of the need to move beyond the well-worn paradigm of demographic transition theory and to embrace a “comprehensive demography” (Charbit & Petit, 2011) which explicitly addresses questions of causality at the intersection of population and development (also see Rallu, Piché & Simon, 2006). The emergence of a critical indigenous demography has also highlighted the epistemological and methodological shortcomings of applied demographic research on indigenous peoples while expanding its scope to include mixed methods models incorporating ethnographic approaches alongside conventional analyses utilising official statistical data (Altman, 2009; Andersen, 2008; Johnstone, this volume; Kukutai, 2011; Prout, 2011; Axelsson et al., 2011; Taylor, 2008, 2009, 2011; Yu, 2011; for pioneering work in New Zealand, see Douglas, 1977). An

evaluation of the demography of Māori, situated within a broader indigenous context, is thus both timely and relevant. Given the broad scope of such a task, and the inclusion of several papers in this volume addressing aspects of Māori demographic change, I focus specifically on the construction of Māori as a discrete population for demographic research, and the use of Māori ethnic identification as an independent variable. I conclude with some thoughts on how official statistics might be changed to better reflect the aspirations and needs of Māori in a post-settlement context.

Constructing the Māori Population

Ian's observation that the categories used to classify and count Māori in official statistics were disconnected from Māori self-concepts of identity and belonging raises deeper questions about the relationship between statistics, population and institutional power arrangements. The role of statistics as a tool of modern administration has long been the subject of social science inquiry. Theorists have linked census-taking technologies and population statistics to bureaucratic control and surveillance; state-facilitated interventions upon the national citizenry; and elite goals of nation-building through the use of legal or cultural criteria to forge "imagined communities" (Anderson, 1983).

The relationship between the presumed rational, scientific nature of official statistics and the politically informed and socially constructed nature of the categories underpinning those inquiries produces a particular set of challenges for applied demography. In *The use of official statistics in sociology: A critique of positivism and ethnomethodology*, Hindess (1973) argued that the evaluation of social statistics could not be reduced to a purely technical evaluation. Dismissing "true" categories as a "figment of the empiricist imagination" (p.40), he argued that the use of social statistics for scientific purposes was unavoidably a theoretical exercise. As such, "... different theoretical problematic must produce different and sometimes contradictory evaluations of any given set of statistics" (p. 47; also see Caldwell, 1996 for a critique of the conflation of statistical categories with the underlying social reality). Since then various scholars have illustrated how official categories portray a particular vision of social reality that tends to privilege the discourses and concerns of those in power. Such discourses include what an ideal society ought to look like;

how it ought to function; and who should be included within the bounds of nationhood and citizenship (Andersen, 2008; Kertzer & Arel, 2002).

It is hardly contentious to state that data collection by governments or elites has often been undertaken with a view to providing numerical proof of pre-existing hypotheses about social mechanisms (Woolf, 1989, p. 590). Certainly one does not have to look far for examples of how population data were integral to efforts to civilise, assimilate and integrate indigenes. In New Zealand, for example, the statistical interest in so-called Māori-European 'half-castes' was clearly linked to colonial policies of racial amalgamation. With time and effort it was anticipated that Māori would eventually lose their separate identity and become absorbed into what one government minister described as a "...white race with a slight dash of the finest coloured race in the world" (cited in Belich, 2001, p. 190). The relative proportion of half-castes to Māori full-bloods was seen as an important indicator of the rate of amalgamation. As the Under Secretary of Native Affairs observed in the 1906 census report (Registrar-General, 1907, p. lv).

It is an idea of many people that the ultimate fate of the Māori race is to become absorbed in the European. Whether any tendency is shown in this direction must be gathered from the increase or decrease in the number of half-castes.

The Hunn Report (Hunn, 1961) marked a deliberate shift away from an explicit focus on civilising and amalgamating Māori to an emphasis on helping Māori to meet the demands of a changing economy and society. Rural population pressure and post-war labour demands provided compelling incentives for change of tack towards the Māori 'problem'. The emphasis on the benefits of European culture, habits and style of life were supplanted by an emphasis on economic integration and productivity.

Nowadays it is less common for Māori to be framed as a problem to be solved, than as a population with particular kinds of problems (Kukutai, 2011). In the Australian context, Taylor (2009) has argued that the relationship between the data and methods of demography and indigenous affairs policy has never been stronger, with Closing the Gaps (CTG) policies developed largely around a discourse of policy failure and deficit (for critiques see Altman, 2009; Jordan, Bulloch & Buchanan, 2010; Kowal, 2008; Taylor, 2008, 2009, 2011; Prout, 2011; Yu, 2011). Though CTG has been disbanded in New Zealand, much of the analysis of social and

economic wellbeing continues to position Māori as a homogeneous, disadvantaged ethnic group. For Māori, the main criticism of gaps-oriented research is that it implicitly positions the outcomes of non-Māori, and Pākehā/European specifically, as the ideal to which Māori ought to aspire. This is problematic when statistical inequalities are interpreted as evidence of Māori deficiencies – in terms of deviant families, culture, lifestyles and so forth – with little cognisance of the ongoing impacts of inequalities in past and present institutional arrangements.

To that end demographers in New Zealand elsewhere have shown little interest in complex theoretical arguments about indigeneity and rights-bearing *indigenous peoples*, focusing instead on the analysis of statistically or administratively defined *indigenous populations* (Andersen, 2008; Taylor, 2009).² This is unsurprising. Key historical experiences such as colonisation are difficult to operationalise in ways that are amenable to demographic theory and conventional demographic techniques (see Johnstone, this volume). Increasingly, however, there is a growing recognition of the need to do so, both within demography (Axelsson et al., 2011) and within related disciplines (e.g., population health, see Gracey & King, 2009). Within the demographic literature, Ian's work is somewhat unique in that it has tried to account for the impacts of colonisation, notably land alienation processes, on Māori demographic outcomes (Pool, 1991; also see Kukutai, Sceats & Pool, 2002).

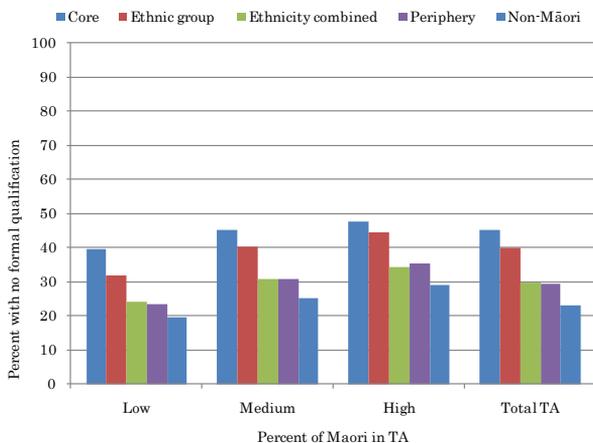
Māori as an Independent Variable

Having explored the ways in which Māori are constructed as a discrete population and object of scientific inquiry, it is useful to consider how indigenous identity categories are deployed in demographic research. This topic gains importance in the context of the widespread practice of using Māori ethnicity (or, more specifically, Māori ethnic identification) as an independent variable in statistical research on wellbeing and health. The meaning and significance of ethnicity and race in statistical research has been the subject of much debate in the social sciences (Brunsma & Rockquemore, 2002; Zuberi, 2001), and in the sciences generally (Kaufman & Cooper, 2001; LaVeist, 1994; Koenig, Lee & Richardson, 2008). Recent studies have highlighted how such categories are used as proxies for an assortment of historical or current social, political or environmental factors. Biomedical researchers, for example, may be more inclined to see

ethnic and racial identification as a proxy for an endogenous quality of individuals while sociologists typically look for social structural explanations such as concrete political and economic conditions and relationships. In many instances, there is a lack of clarity about what ethnicity ‘stands for’ when used as an independent variable, or the mechanisms linking it with the outcome of interest.

Here I return to Ian’s observation that identification as a Māori provides insights into underlying cultural differences in behaviour, living conditions and outcomes. Studies from the last decade suggest the boundaries between Māori and Pākehā/European have become increasingly complex, influenced by many decades of intermarriage, New Zealand’s rapid ethnic diversification, changing ideologies about the nature of ethnicity (broadly construed), and what it means to be Māori (see, for example, Webber, 2008). There is also considerable ethnic, cultural and socio-economic difference between Māori, with those most strongly identified as Māori appearing to have the least favorable outcomes (Callister & Blakely, 2004; Chapple, 2000; Cunningham et al., 2002; Kukutai, 2004). In my doctoral dissertation I further explored this association (Kukutai, 2010), combining census indicators to construct a spectrum of Māori sub-group categories, ranging from those identified as Māori solely on the basis of ancestry (the ‘periphery’), to those identified as Māori by ancestry, tribe, and exclusive ethnicity (the ‘core’). The use of a core-periphery model was not tied to any socially meaningful distinction (i.e., the sort of categorical reification that Hindess cautions against), but was merely a heuristic device for conceptualising Māori identification in more complex ways beyond the usual Māori/ Pākehā binary. The analysis yielded compelling evidence of ethnic and socio-economic segmentation between Māori. In each census, those in the ‘core’ were the most disadvantaged across a wide range of socio-economic indicators; while those on the ‘periphery’ were the most advantaged. Pronounced differences in Māori language ability and intra-Māori partnering were also evident, even after controlling for residence in a proportionately low (< 10 percent), medium (10 – 19.9 percent) or high (20 percent or more) Māori area (Figures 1 to 3).

Figure 1: Percentage of adults with no formal qualification,^a by percent of Māori in territorial authority,^b Māori categories and non-Māori, 2006



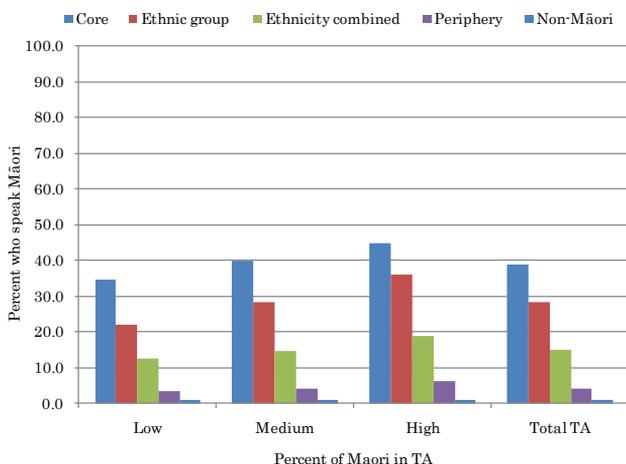
Source: Statistics New Zealand: Census of Population and Dwellings

Notes: a) People aged at least 15 years with recorded education.

b) Low TA = 0 to 9.9 percent; medium TA = 10.0 to 19.9 percent; high TA = 20 percent and more.

Key for Figures 1 to 3: Core - Māori by exclusive ethnicity, descent & iwi; Ethnic group - Māori by ethnicity, alone or in combination; Ethnicity combined - Māori by ethnicity combined with at least one other ethnicity; Periphery - Māori only by descent; Non-Māori - not Māori by ethnicity or descent.

Figure 2: Percentage of adults able to speak Māori,^a by percent of Māori in territorial authority,^b Māori categories and non-Māori, 2006



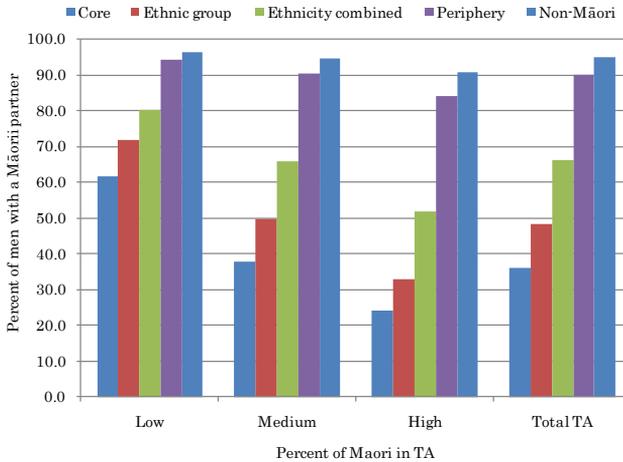
Source: Statistics New Zealand: Census of Population and Dwellings

Notes:

a) People aged at least 15 years with recorded language.

b) Low TA = 0 to 9.9 percent; medium TA = 10.0 to 19.9 percent; high TA = 20 percent and more

Figure 3: Percentage of partnered adult males with a Māori partner,^a by percent of Māori in territorial authority,^b Māori categories and non-Māori, 2006.



Source: Statistics New Zealand: Census of Population and Dwellings

Notes: a) People aged at least 15 years in a cohabiting relationship with a person of the opposite sex with ethnic group recorded for both people.

b) Low TA = 0 to 9.9 percent; medium TA = 10.0 to 19.9 percent; high TA = 20 percent and more.

The association between Māori identification, cultural ties, and socio-economic status (SES), suggested that the statistical relationship between Māori ethnicity and SES might be better explained by costs and opportunities associated with specific kinds of ties to Māori identity, rather than identification with an ethnic category *per se*. This proposition was explored using data from the unique longitudinal study of Māori households, *Te Hoe Nuku Roa*. The Massey University study, which began 1995 and is ongoing, was developed in conjunction with Statistics New Zealand (for more detailed reports about *Te Hoe Nuku Roa* see Durie 1995; Fitzgerald et al., 1996). Data were collected over a wide range of domains including lifestyle, cultural identity, Māori language, health, education, employment, income, housing, and household. Due to time and resource constraints, the scope was initially limited to four Regional Council areas: Auckland, Gisborne, Manawatu, and Wellington. The baseline cohort comprised 461 households and 950 individuals, of whom 880 were aged at least 15 years. Households were eligible for inclusion if they contained at least one permanent householder of Māori ancestry (the filter question asked: Are you of Māori ancestry?)

Table 1 shows descriptive variables from the first three waves, covering the period 1995 to 2002. Respondents were classified into one of three identity categories based on a question asking about the identity that best described them. The original response options (Kiwi, New Zealander, Māori /Pākehā, part Māori, a Polynesian, a Māori and Other) were collapsed into three categories: Māori alone, New Zealander/Kiwi, and Māori /Other (for details of coding, see Kukutai, 2010). The results clearly showed that people choosing Māori as their preferred identity label had stronger ties to Māori identity in terms of network ties, financial interests in Māori land, Māori language capability and so forth, than those choosing some other label. There were also modest associations between preferred identity label and SES indicators although the marked attrition across the first three waves appeared to diminish SES variation within the sample over time.

In more complex multivariate modelling not shown here, several SES outcomes (e.g., attaining at least a secondary school qualification) were modelled as a linear function of a set of variables representing individuals' preferred ethnic label, ties to Māori identity, and demographic controls. In general Māori identification was a less salient predictor of variation in outcomes than specific ties to Māori identity. However, while some ties to Māori identity appeared to be associated with high socio-economic costs (e.g., being raised in a Māori-speaking household prior to the 1970s), other ties were inconsequential, or advantageous (e.g., being able to speak Māori well). Taken together, the analyses highlighted the limitations of relying solely on measures of ethnic self-report, and the need for more careful theorising and interpretation of ethnicity variables in analyses linking Māori identity to socio-demographic and wellbeing outcomes.

Table 1: Cross-tabulation of select variables by preferred ethnic label, Te Hoe Nuku Roa survey of Māori Households, Waves 1 to 3, 1995 - 2002

Wave One (n=656)			
	Māori n=337	Māori /Other n=148	New Zealander n=174
<i>Demographic</i>			
Age (yrs)	36.1	32.8	37.8
Male	35.5	23.5	30.7
<i>Region</i>			
Auckland	53.4	54.7	39.8
Gisborne	13.3	11.1	21.7
Manawatu	14.9	13.5	27.6
Wellington	17.0	20.7	10.8
Main urban area **	70.2 **	73.3	49.5
<i>Principal householder</i>			
Couple with children	54.4	51.2	61.1
Sole parent	26.9	26.9	24.9
Other family type	18.6	17.9	14.3
Wave Two (n=452)			
	Māori n=229	Māori /Other n=102	New Zealander n=121
<i>Demographic</i>			
Age (yrs)	37.9	35.2	41.1
Male	32.7	26.7	31.3
<i>Region</i>			
Auckland	43.1	45.5	27.8
Gisborne	19.1	21.3	26.6
Manawatu	21.8	16.8	27.5
Wellington	15.9	16.5	18.1
Main urban area **	55.8	61.5	45.2
<i>Principal householder</i>			
Couple with children	58.5	52.3	52.5
Sole parent	28.6	31.3	26.3
Other family type	12.9	16.4	21.2
Wave Three (n=422)			
	Māori n=238	Māori /Other n=85	New Zealander n=99
<i>Demographic</i>			
Age (yrs)	39.2	35.2	39.2
Male	32.1	15.3	36.1
<i>Region</i>			
Auckland	47.5	64.5	46.6
Gisborne	19.1	15.6	15.8
Manawatu	12.8	9.2	26.9
Wellington	20.7	10.7	10.8
Main urban area **	67.3	73.8	57.3
<i>Principal householder</i>			
Couple with children	56.5	44.6	68.4
Sole parent	37.8	29.4	21.1
Other family type	11.8	13.0	10.5

Wave One (n=656)			
	Māori n=337	Māori /Other n=148	New Zealander n=174
<i>Māori Identity</i>			
Knows sub-tribe name	63.7 ***	47.6	32.4
Knows ancestry genealogy (3 gens)	34.2	32.6	30.7
Financial interest in Māori land	64.2 **	46.7	45.3
Contacts mainly Māori	65.0 ***	50.4	31.4
Raised in Māori speaking h.hold	46.9 ***	26.4	27.3
Māori language is good to excellent	49.9 ***	38.9	23.1
Māori electoral roll ⁽¹⁾	50.7 ***	35.7	28.4
<i>Socio-economic status</i>			
Has secondary qual.	38.6	49.1	47.4
Employed	55.4 *	51.5	69.3
Is a home owner	38.9 **	36.5	60.1
Wave Two (n=452)			
	Māori n=229	Māori /Other n=102	New Zealander n=121
<i>Māori Identity</i>			
Knows sub-tribe name	71.7 *	56.2	48.5
Knows ancestry genealogy (3 gens)	37.8	44.8	31.3
Financial interest in Māori land	66.5 *	55.7	45.9
Contacts mainly Māori	50.5 **	46.7	27.2
Raised in Māori speaking h.hold	66.6 ***	31.2	36.5
Māori language is good to excellent	45.3 ***	24.6	18.2
Māori electoral roll ⁽¹⁾	75.8 **	70.0	44.2
<i>Socio-economic status</i>			
Has secondary qual.	41.6	57.1	49.8
Employed	66.0	61.0	77.5
Is a home owner	51.6	37.6	60.0
Wave Three (n=422)			
	Māori n=238	Māori /Other n=85	New Zealander n=99
<i>Māori Identity</i>			
Knows sub-tribe name	66.7 *	65.7	33.9
Knows ancestry genealogy (3 gens)	33.8	26.7	15.2
Financial interest in Māori land	50.9 *	29.1	28.1
Contacts mainly Māori	74.1 **	66.2	34.9
Raised in Māori speaking h.hold	48.1***	17.7	22.7
Māori language is good to excellent	35.2***	14.3	7.2
Māori electoral roll ⁽¹⁾	79.3 **	60.4	40.5
<i>Socio-economic status</i>			
Has secondary qual.	39.4 *	57.1	55.4
Employed	71.0	76.5	77.3
Is a home owner	45.9	30.6	56.6

Notes: *** p <.001 ** p <.01 * p <.05 + p <.10. Two-tailed test. Weighted and adjusted for survey design. (1) In wave 1, those not on the Māori electoral roll included people who were eligible for enrolment but did not specify which roll they were on.

For Whom are the Categories Intended?

Notwithstanding the tarnished legacy of state enumeration, and foregoing critiques of the statistical treatment of Māori in population research, Māori continue to generally seek inclusion in official statistics, both to address long-standing inequalities and self-determining aspirations, and to cement their position in the national imagination. Many Māori organisations and communities have a strong interest in, and ongoing need for, high-quality statistical data to inform decision-making and well-being initiatives, particularly in a post-settlement context (Walling, Small-Rodriguez & Kukutai, 2009). Some iwi (tribes), such as Whakatohea and Waikato-Tainui have engaged in their own data collection activities. However, while Māori-driven statistical initiatives are both worthwhile and necessary, they also face considerable challenges relating to resources, capabilities, diasporic migration (particularly iwi where the majority of their members lives outside the rohe, or customary homeland), and internal politics. For various reasons, not the least of which is the need to maintain visibility, opting out of official statistics is not an option. Instead, finding ways to indigenise official statistics in tandem with building robust statistical practices within indigenous communities seems to be a more fruitful path. I conclude with a brief consideration of some key principles that might inform such an endeavour.

Framing

A key theme explored in this paper is the relationship between how collective identities are classified and counted in official statistics and the consequences of those constructions. How indigenous peoples are framed can occur at various points in the data process – from high-level principles embedded in official documents; to the nomenclature and categories used on census forms; the classification and coding schemas used to aggregate responses; decisions about which data and comparators to use; and the dissemination of official data in public reports and media releases. Combined, these decision-making points shape how Māori are constructed and reported in the public domain.

In terms of changing how Māori identities are framed or represented in forums such as the census, the work of Mason Durie (2005b) and Linda

Smith (1999), combined with the various reviews of the official ethnicity statistical standard, provide two clear pointers. First, Māori want to be explicitly and meaningfully recognised as rights-bearing indigenous peoples, rather than one of many ethnic minority populations with special needs (Department of Statistics, 1988; Mako, 1998; Robson & Reid, 2001). Though the Treaty of Waitangi and the unique status of Māori are recognised in Statistics New Zealand's strategic policy documents, the term 'indigenous' (or any equivalent term such as *mana whenua* or *tangata whenua*) is noticeably absent from the many statistical products that the agency creates and disseminates. The majority of statistical and policy formulations continue to rely solely on ethnicity, despite the expansion of census definitions in 1991 to include ancestry and *iwi* identification.³

The indigenous status of Māori could be readily acknowledged in a number of ways in official statistics including the use of an indigenous identifier in the census and on other administrative forms; wider and more flexible dissemination of *iwi* and Māori ancestry data; and the use of indigenous nomenclature to frame statistics about Māori in public forums. This argument is not unique to Māori. In Canada, for example, Andersen (2008) has argued that racialised categorisations of Métis identity in the Canadian census ought to be replaced with a definition that explicitly recognises this group's status as a distinctive indigenous nation (also see, Taylor 2009, for a critique of the construction of Australian Aboriginal identities in official statistics).

Relevance

A second guiding principle is that of relevance. In short, practices of counting, classifying and dissemination ought to reflect the diverse realities of Māori, and be relevant in terms of their evolving needs. Flexible data disaggregation practices are especially important. The default to national scales and other administratively defined spatial boundaries tends to mask, and even distort, dynamics within and across localised communities. As a thoroughly urbanised indigenous people (85 percent of Māori live in administratively defined urban areas), issues relating to remote or rural demography are less of an issue perhaps than issues around data disaggregation pertaining to *iwi*.

The iwi identification question in the census comes closest to approximating customary Māori conceptions of group membership based on whakapapa which connects individuals to a specific place and locates them within a broader network of kin relations. As more iwi have reached financial settlements with the Crown and moved more decisively into development mode, their governance bodies have expressed an urgent need for timely, relevant and accurate data about their populations (Walling, Small-Rodriguez, & Kukutai, 2009). However, current statistical practices do not offer a great deal of flexibility in terms of data disaggregation. For some iwi authorities, the official Statistical Classification of Iwi is ill-suited because it constitutes iwi populations with little regard for their internal definitions (e.g., relating to constituent marae and hapū/sub-tribes etc.) or the legislative definitions that iwi must adhere to. The iwi question in the census is based entirely on self-report and is thus distinct from the concept of registered or enrolled tribal status. In the case of Waikato-Tainui, for example, the result is a significant mismatch in the size and characteristics of its register and census populations (Walling, Small-Rodriguez & Kukutai, 2009). While Statistics New Zealand compiles basic iwi profiles from each quinquennial census, access to more detailed data is restricted and can incur significant costs.

Some commentators have questioned whether iwi data should be exclusively owned and controlled by the government (Robson & Reid, 2001). Indeed, in terms of self-determining aspirations, Māori continue to remain largely peripheral to the main channels of power through which consequential decisions about Māori statistics are made. Others argue that the census question on iwi should be changed to include an additional prompt for registered tribal status, and that iwi data should be more closely aligned with iwi aspirations and strategies (Mako, 1998; Walling, Small-Rodriguez, & Kukutai 2009). The inaugural Māori Social Survey, to be held after the 2013 census, will greatly improve the relevance of cultural data collected in official statistics, and provides some options for exploring wellbeing at the level of whānau/family. However the sample size of about 5,000 will preclude iwi-specific analysis for all but the largest groupings.

Inclusiveness

A third guiding principle for indigenising official statistics is that of inclusiveness. As the preceding section showed, Māori are internally diverse with regards to demographic characteristics, class, and identification with group norms and symbols. Māori are not just an “imagined community”, but a constellation of communities based on shared descent or whakapapa (e.g., hapū), interests, values, experiences, status, culture or propinquity. These overlapping boundaries evoke diverse Māori realities that require different approaches.

As I have written elsewhere with my colleague, Melinda Webber (Kukutai & Webber, 2011), the potential to reify or exclude arises when core symbols of Māori identity are treated as fixed characteristics of individuals, rather than flexible, evolving entities able to accommodate change. In seeking to undertake research befitting Māori communities or subjects, care must be taken not to conflate “model” Māori (i.e, those who fit the symbolic core criteria) with modal Māori. For example, though the innovative Māori Statistics Framework emphasises well-being from a Māori world view, it does not impose a tight definition on what capabilities Māori, as individuals or collectives, ought to value, or what Māori identity ought to look like. Rather, Māori development is seen as a process of enablement which extends people’s scope for improving their own lives through expanding opportunities, choices, and participation (for a more detailed description of the framework, see Wereta & Bishop, 2006).

Capability

A fourth principle that is integral to the task of indigenising official statistics is that of capability. Transformative change will not be effected without attending to building capabilities within key government departments, as well as within Māori organisations committed to advancing Māori development and wellbeing. For the latter, there is little point in pouring a great deal of effort into changing how data are categorised, collected and disseminated if there is no capability to engage with those data on their own terms. Over the last decade, iwi and urban Māori authorities have been quick to recognise the value of lawyers, project managers and financial managers in negotiating settlements and managing the financial assets that have flowed from them. But there has

been little effort to build capability in terms of managing and analysing information flows, or developing the requisite skills to use statistics in ways that meet strategic and aspirational goals related to collective wellbeing. This is important if tribes wish to lessen their dependence on external consultants and government agencies, and begin to build a robust and relevant statistical evidence base with which to make informed decisions.

Conclusion

Using insights from Ian Pool's earlier writing on Māori population dynamics, this paper has sought to reflect both on his contribution to Māori demography, and to engage in critical thinking on what remains to be done in order to move forward. It is indicative of Ian's legacy as a scholar that the questions he raised at the beginning of his career remain relevant half a century later. While not shying away from tackling the hard, and sometimes unpopular, issues, Ian's work was first and foremost underpinned by a commitment to and passion for demography. For that, we have much to be grateful.

Acknowledgements

The author wishes to thank Sir Mason Durie and Chris Cunningham for their permission to use data from Te Hoe Nuku Roa longitudinal study of Māori households. Any errors or omissions are entirely my own. Darrin Bishop's insightful comments, particularly on aspects relating to official statistics, were also gratefully received.

Notes

1. Pākehā is a historical term that evolved to describe British settlers and their descendants. Though a popular colloquial term, Pākehā has not been institutionalised as a statistical term. In the census, for example, the majority group is labelled New Zealand European, and simply European at Level 1 of the Statistical Standard for Ethnicity.
2. Most definitions of indigeneity invoke four criteria: historical precedence, non-dominance, cultural distinctiveness and self-ascription. Historicity denotes a group's prior occupation of a geographic area that is partly or wholly subsumed, but not necessarily aligned with, the boundaries of the nation-state. Non-dominance is usually understood in the political rather than demographic sense though, in the settler states of North America and

Australasia, the two are synonymous. Colonialism and the attendant diminution of indigenous sovereignty are central features of non-dominance, usually underpinned by contemporary political claims for some form of self-determination (Maaka & Fleras, 2005). Cultural distinctiveness refers to patterns of social organisation, beliefs and customs that have an historical basis but which have typically been affected by colonialism. Self-identification denotes the power for groups to define their own parameters using criteria that are meaningful to them.

3. The introduction of Māori descent and iwi questions in the 1991 census illustrates the political nature of ethnic counting. The descent question was introduced to meet legal requirements under The Electoral Act (1993) for determining electoral representation. The iwi question was influenced by the proposal to devolve resources to Māori via iwi, and the attendant need to monitor the status of iwi over time. While the initiative and related legislation (Iwi Runanga Act 1990) was subsequently repealed, the iwi question remained in the census.

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Māori and the [potential] Demographic Dividend

NATALIE JACKSON *

Abstract

Throughout his esteemed career, Ian Pool has drawn attention to differences in the timing and speed of demographic transition between New Zealand's Māori and Pākehā (Anglo-Celtic origin) populations. Today we observe these 'dual transitions' as marked differences in age structure – in 2011, the median age of the Māori population was just 23 years, while that of the European/New Zealander/Other population was almost 40 years.

This paper outlines the implications of these disparities in terms of a recently articulated concept: the 'Demographic Dividend', to which Pool (2003, 2007a, 2007b) has contributed a unique ethnic dimension. The dividend arises – or has the potential to arise – as the maximum proportion of the population moves into the working age groups and then through the higher income earning years.

The paper argues that these windows of opportunity have not been capitalised and are thus already coming to an end for Māori. But it also argues that a third opportunity is arising, as the relatively youthful Māori population co-exists alongside its structurally older, primarily Anglo-Celtic counterpart; together comprising an economic dividend system that produces the potential for a collateral dividend.

In 2011 the median age of New Zealand's Māori population was approximately 23 years; that of the European/New Zealander/Other (hereafter European) population, just on 40 years (Statistics New Zealand, 2010).¹ These demographic disparities, arising from differences in the timing and speed of demographic transition (Pool, 1991), have been argued to have many negative implications for Māori, for example disproportionately exposing young Māori to the risk of unemployment (Jackson, 2002; Pool, 2003).

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However, the same disparities have potentially positive implications. For example, a far greater proportion of the Māori population is now located at the ages at which most educational qualifications are gained. Not only does this situation proffer well for Māori in absolute terms, but long-standing gaps in educational attainment between Māori and European have the potential to reduce simply because of the underlying differences in age structure (Jackson, 2002, 2008). As the total New Zealand labour supply dwindles due to projected population ageing, there is significant potential for Māori to enjoy increased employment and prosperity in both absolute and relative terms (Jackson, 2011a-c).

Converting this opportunity to reality, however, requires foresight, strategic planning, and investment - it will not happen of its own accord. Central to the argument is the increasingly acknowledged concept of the 'demographic dividend' (sometimes referred to as the demographic 'bonus' or 'gift') (Higgins & Williamson, 1997; Bloom & Williamson, 1998; Birdsall, Kelly & Sinding, 2001; Mason, 2003; Bloom, Canning & Sevilla 2003; Bloom & Canning, 2003; Jackson & Felmingham, 2004; Pool, 2003, 2007a, 2007b; Ogawa, Chawla & Matsukura, 2010).

In its present formulation the demographic dividend refers to two consecutive windows of opportunity which occur during demographic transition (the journey from high to low mortality and fertility rates). The first potential dividend arises as the proportion of the population in the younger working ages rises *vis-à-vis* the proportion that is notionally dependent (0-14 and 65+ years); the second as increasing proportions of older workers pass through the (potentially) higher income earning and saving age groups.

This paper will argue that a third interpretation, not previously spelled out in existing literature, may also exist for Māori, and thus for New Zealand. This is a collateral demographic dividend which has the potential to emerge from opportunities arising where a structurally younger population (Māori) co-exists alongside a much older population (European). However, it is acknowledged that the dividend concept has thus far been conceptualised and examined as occurring at national level only, because it is primarily concerned with national level labour forces and economies. Challenging this notion, the paper will argue that, if it is legitimate to see adjacent older and younger populations within (for example) Asia as collectively comprising an overall economic dividend system (Ogawa et al.,

2010: 115), it is equally relevant to apply the concept to a relatively large sub-population such as Māori, which is at a markedly different stage of its demographic transition to the national population, of which it is part (Pool, 1991, 2003, 2007a; see also Jackson, 2008: 9 on Australia).

Three other caveats exist. The first is that currently several approaches are being used to explore the tempo and quantum of the dividend and none is yet considered definitive; here I also use more than one approach. The second, as indicated above, is that the classification 'Māori' has been subject to many changes over New Zealand's history. The present 'multiple ethnic origin' classification means that a sizeable proportion of the current and projected Māori population is enumerated in both the Māori and non-Māori populations – and vice versa. This does not greatly affect the relative age structures of each population, nor the argument presented herein, but it does to some extent compromise its rigour (see Pool, 1991: 11-25). Thirdly and relatedly, the assumption of Māori fertility falling from its present 2.8 births per woman but remaining a relatively high 2.5 across the projection period underpins the discussion. This decline may or may not eventuate – see Didham & Boddington, also Johnstone, in this Issue. However, even the high variant (TFR remaining at 2.8) makes little difference to the proportions in each age group in 2026. It would also enhance the central proposition of a collateral dividend.

The structure of the paper is as follows. First the demographic dividend concept is outlined in a little more detail. Māori demographic trends are then considered in that context, and in the context of overall demographic trends unfolding across New Zealand. The argument for a collateral dividend is then outlined. The paper concludes by echoing comments made by most scholars investigating the dividend's opportunities. All are emphatic that just having the demographic dividend present does not ensure it will result in an economic dividend. The economic gains of the first dividend can be realised only if employment opportunities expand as rapidly as the number of persons seeking new jobs (Ogawa et al, 2010: 114) and there is *a priori* investment in human capital, particularly education and related institutions. Those of the second dividend are founded on a successfully managed first dividend, and similarly require a pro-active policy environment which facilitates productivity and saving – and not least, adequate incomes from which to save. The proposed third dividend (Jackson, 2011a, 2011b) requires

elements of both. In sum, as Pool (2003, 2007a, 2007b), Ogawa et al. (2010) and many others have argued, the demographic dividend period defines a number of possibilities, but their outcome is heavily dependent on non-demographic factors, the most pertinent of which is the creation of an appropriate policy environment for capitalising on the opportunities.

The Demographic Dividend

The demographic dividend first appeared in the literature during the 1990s when economic demographers looking at developing countries began to use the term 'demographic bonus' (Ogawa et al., 2010: 97). Scholars came to realise that the correlation between economic growth and population growth in these countries was not as strong as that between economic growth and changes in the age structure; specifically, changes in the ratio of the working age population to those at younger and older ages, being driven by demographic transition (beginning with Chesnais, 1990).

At first only one dividend was identified – that is now understood as the first. Initially it was understood to be present when the maximum proportion of the population was at the working ages (15-64 years) and the minimum proportion was thereby notionally dependent (Higgins & Williamson, 1997; Bloom & Williamson, 1998; Fink & Findlay, 2007; Bloom, Canning & Sevilla, 2003). It is now considered to comprise two distinct and consecutive phases – the first arising as the proportion of the total population in the working ages increases, thereby increasing the Potential Support Ratio (PSR – the ratio of people at working age to those notionally dependent); the second as the proportion in the working age population passes its peak, and the support ratio begins to decline.

During the first dividend years – which may last two or three decades - the working age / primary income-earning population grows at a faster rate than the total population. The growth is pronounced at the younger working ages which receive the increased waves of labour market entrants. The second dividend begins – or has the potential to begin - when prime working age adults, who now anticipate longer life expectancy, save more to provide for their retirement (Ogawa, et al., 2010: 103, 114). This stage is characterised by an increase in the share of individuals who are reaching the end of their income-generating and childrearing years. During this phase, a greater proportion of the working age population moves through

the (potentially) higher income earning and/or saving age groups. It occurs approximately from the point that the maximum proportion of the population in the working ages is reached, but significant proportions have not yet arrived at the oldest ages where they are notionally dependent – and/or begin to use their accumulated savings.

Of critical importance, the period of the first dividend is argued to be finite, because it is primarily demographically driven, while that of the second dividend is potentially permanent, if there has been appropriate investment in the first dividend (Ogawa et al., 2010: 103):

... Unlike the first demographic dividend, the second demographic dividend is not transitory, and may lead to a permanent increase in capital deepening and income per effective customer. The second dividend, however, does not occur spontaneously but can [only] be bought about if consumers and policy makers are sufficiently forward-looking and respond effectively to forthcoming demographic changes – in particular by encouraging the old-age support system that substitutes capital for transfer wealth [my insertion].

Indeed Ogawa et al. (2010: 115) caution that the monetary value of the second demographic dividend may be compromised in a pay-as-you-go form of welfare state, such as New Zealand's. They show that its magnitude differs markedly among the Asian countries they examine, because the choice of financing method [for income support in old age] affects the accumulation of capital available to be utilised (see also Lee & Mason, 2011). The model is also challenged as cohorts of different sizes move through the age structure (Pool, 2003, 2005; 2007a, 2007b), a point returned to below.

Finally, it has been proposed that both developing and developed countries can mutually benefit from their bifurcated demography:

People from ... countries where the first demographic dividend has already disappeared can invest their assets accumulated in the form of the second demographic dividend in dynamically growing economies ... that are enjoying the first demographic dividend and, by doing so, bring a sizeable amount of financial gain back to their home countries. (Ogawa et al., 2010: 115).

It is the central proposition of this paper that precisely the same 'dividend system' argument can be made for New Zealand. Specifically, proactive investment in a sub population that remains relatively youthful (Māori) by its co-existing sub population, which is significantly older and

for which the first dividend has definitely ended (European-origin New Zealanders), could be mutually beneficial.

Indeed, as each successively larger cohort from the (European-origin) Baby Boom generation retires, it will be replaced by a successively smaller cohort at labour market entry age (outlined below). This situation will usher in a demographically-tight labour market, in which youthful cohorts will be in short supply and great demand – prominent among Māori youth.

A further characteristic of the total New Zealand age structure that will ensure this tightness is the existence of a largely migration-driven 'bite' out of the age structure across ages 25-39 (Jackson, 2011c). Located between the two broad age groups at either end of the age structure, the three dynamics are together creating a vacuum in the labour market which can be expected to draw in younger and older workers alike.

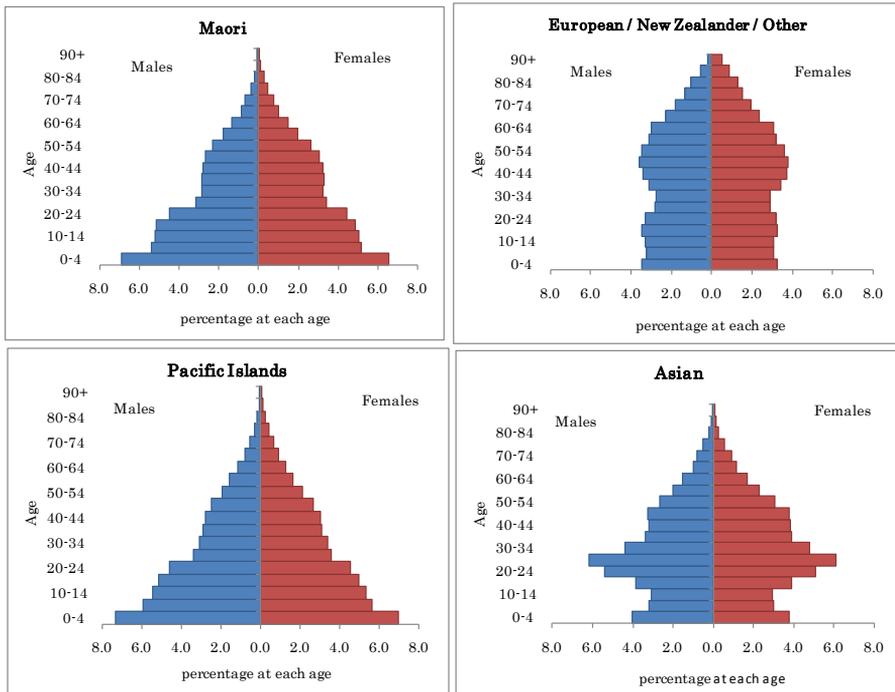
Given this situation, the importance of recognising and proactively investing in the dividend years for Māori in order to transform them to economic windfalls cannot be over-emphasised. As Pool (2007a, 2007b) and others argue, the dividend years are more appropriately termed 'windows of opportunity'. The phenomenon was not at all well understood by the developed countries at the time they entered their first dividend phase, despite it delivering to them empirically verifiable economic benefits (Mason, 2003). As a result many, such as New Zealand, squandered their first dividend by not assisting their large 'baby boom echo' cohorts into the labour market – for example during the high structural unemployment of the early 1990s (Pool, 2003, 2007a, 2007b). Ironically, it appears to be only with the emergence of the first dividend in the developing countries and its simultaneous loss in the developed countries that the phenomenon is being afforded the recognition it deserves (Jackson, 2003).

The Demographic Transition and Māori

Projected data for 2011 illustrate New Zealand’s current demographic disparities by major ethnic group (Figure 1). The relative youth of the Māori population means that the proportion in the key working age groups 15-64 years (61 percent in 2011) is somewhat lower than for European (65 percent), because a greater proportion of Māori has yet to reach that age.

These disparities also convert into significantly different proportions of the total population accounted for by Māori at different ages, compared with their 14 percent national share (Table 1). Māori account for approximately 21 percent of all 0-14 year olds, and for 18 percent of all 15-24 year olds. By comparison, they account for less than 5 percent of the nation’s elderly. Due to their relative youth, Māori also comprise a smaller proportion of the total working age population (13 percent) than their total population share.

Figure 1: Age-sex structure by major ethnic group* (2011 on 2006 Base)



Source: Statistics New Zealand (2010) Projected ethnic population of New Zealand, by age and sex, 2006 base - 2026 update, Series 6.

* Based on multiple count ethnicity.

Table 1: Population share (%) by major ethnic group* and broad age group, projected 2011

	Māori	European/ New Zealander	Pacific Island	Asian	Total
0-14 years	21	58	11	9	100
15-24 years	18	61	9	13	100
25-54 years	13	68	6	13	100
55-64 years	9	80	4	7	100
65+ years	5	87	2	5	100
Total	14	69	7	10	100
Working Age	13	69	7	12	100

Source: Statistics New Zealand (2010) Projected ethnic population of New Zealand, by age and sex, 2006 base - 2026 update; Series 6.

*Based on multiple count ethnicity.

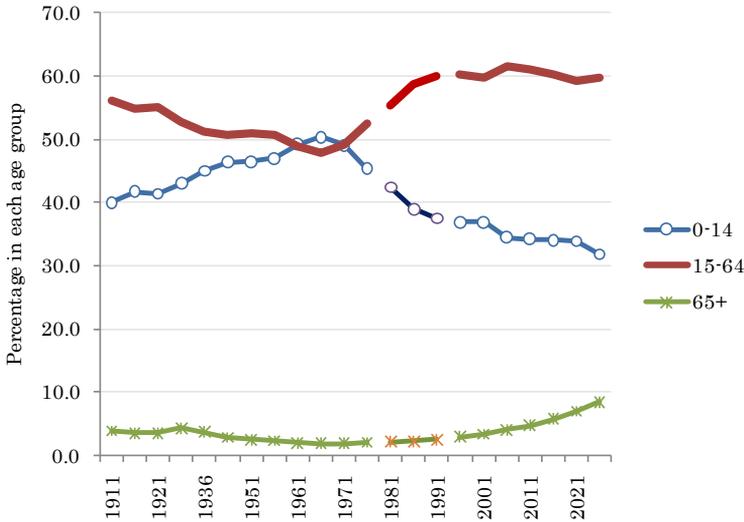
Continuing demographic transition is causing each of the age structures in Figure 1 to age, but not yet significantly for Māori, due to a relatively high birth rate (2.8 births per woman in 2009) combined with a large proportion of the population at the key reproductive ages. Nevertheless, medium case projection assumptions indicate that the proportion of Māori aged 65+ years will have doubled by 2026, to 8.5 percent, while that at 0-14 years will have fallen from its present 34.2 percent to 31.9 percent, and in the key working age groups, from 61.0 to 60.0 percent – a proportion which will by then be almost identical for the Māori, European, and Pacific Island populations. However, the latter similarity will be superficial only. The bulk of Māori will still be at, or approaching, the younger working ages, while for European the largest proportion of workers will be close to retirement. Indeed, by 2026 the median age for Māori is projected to be just above 25 years, compared with 42 years for European. These trends portend well for the opportunities indicated above, as the European population ages and Māori retains its relative youth.

The Demographic Dividend and Māori

Figure 2 shows changes for the three broad age groups on which the demographic dividend argument is premised (0-14, 15-64, and 65+ years). It should be noted that changes in the classification of Māori over the period depicted (1911-2026) introduce an unknown but unavoidable element of error. Broken trends lines are shown for the period 1981-1991 during which a number of classificatory changes were introduced. What is important is that the trends follow a similar trajectory, and thus any error will be in terms of quantum rather than direction.

The proportions of Māori aged 0-14 and 15-64 years diverged from the early 1960s, when Māori fertility rates began to fall dramatically, as Māori experienced one of the fastest fertility declines ever recorded (Pool, 1991: 166-175). By the turn of the 21st century the 0-14 year old population had declined from 49 percent to 37 percent, while the working age population had increased from 49 to 60 percent. As is typical at that stage of demographic transition, the divergence did not yet involve any notable increase in the proportion of the population aged 65+ years, while such movement clearly began soon after. In 2006, the proportion aged 15-64 years peaks at around 61 percent, followed by modest (projected) decline. The data indicate that this drop off in the working age population will remain modest throughout the projection period, due to the proportion aged 0-14 years remaining above 30 percent.

Figure 2: Relative changes in size of broad age group for Māori*, 1911-2006 and projected 2006-2026



Source: Statistics New Zealand (various years) Census populations; Statistics New Zealand (2010) Projected ethnic population of New Zealand, by age and sex, 2006 base - 2026 update, Series 6.

Notes: * Māori classification has been subject to many changes over time. These compromise the rigor of longitudinal analysis (see Pool, 1991: 11-25). In Figure 2, data until 1986 are based on various measures of 'blood fraction'. Significant changes were introduced between 1976 and 1986, following which the present multiple count classification was introduced.

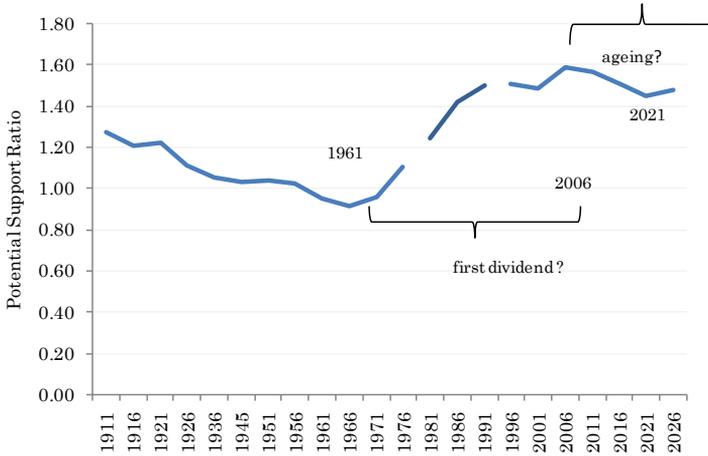
In order to relate these changes more directly to the way in which the demographic dividend is measured from an economic perspective, we turn to the Potential Support Ratio (PSR), an index which expresses the population at the working ages as a ratio to the population which is notionally dependent (0-14 and 65+ years). That is, it converts the three trend lines in Figure 2 to a single index:

$$\text{PSR} = \text{Population aged 15-64 years} / (\text{Population 0-14 years} + \text{Population 65+ years}).$$

Figure 3 shows the PSR for the observed period 1911-2006 and projected to 2026. Following the argument of Ogawa et al. (2007) the initial decline in the PSR ending in 1961 can be interpreted as reflecting the substantially increasing proportions at 0-14 years shown across the same period in Figure 2. Those increases were driven by both rapidly improving childhood mortality and sustained high pre-transition birth rates (Pool, 1991: 112-121, 140-152; Pool & Cheung, 2003; Statistics New Zealand, 2009), while the improvements in life expectancy were still many years off

showing up at older ages. By the mid-20th century, the significantly increased proportions at the younger ages reduced the proportions at both working age and older age.

Figure 3: Potential Support Ratio, 1911-2006 and projected 2006-2026, Māori*



Source: Statistics New Zealand (various years) Census; Population Statistics New Zealand (2010) Projected ethnic population of New Zealand, by age and sex, 2006 base - 2026 update, Series 6.* See notes to Figure 2.

The subsequent rise in the PSR from 1961 through to 2006 correlates with the declining proportion at younger ages as fertility rates fell and increasing proportions moved into the working age groups, while life expectancy-related increases at older ages (65+ years) were still having a limited impact. This illustrates the classic (one dividend) version of the demographic dividend, which is held to begin as the working age population begins to increase, *vis-à-vis* those ‘notionally dependent’.

Before considering the subsequent decline in the PSR beginning in 2006, it is worth reflecting for a moment on the almost identical PSRs occurring around 1911 and 1981. The direction of the trends aside, the data indicate that at both observations there were between 1.2 and 1.3 people of working age per person notionally dependent. Indeed for the entire period 1911 to 1956 there were more people at working age than totally dependent, so why might those years not have translated into a dividend for Māori? The answer is well recorded - Māori were an impoverished population at the time, living at subsistence level and largely outside the mainstream economy (e.g., Pool, 1991). The fact that today’s

middle-aged and older Māori are relatively disadvantaged (Pool, 2003: 35) shows a continued failure on the part of successive governments to invest in that opportunity while it existed, while at the same time the European-origin population was benefitting greatly from its own dividend years.

As we see from Figure 3, the PSR for Māori begins to fall from 2006, driven now by the increasing proportions at older ages shown previously in Figure 3. The situation is projected to continue until 2021, when the PSR again indicates a small increase, this time seemingly because of accelerated decline at 0-14 years, or posed alternatively, a corresponding inflow into the working age population.

It could be argued that the anticipated increase in the PSR between 2021 and 2026 might represent a second bite at the first dividend. However, as will be outlined below, the underlying data indicate otherwise, suggesting that Māori age dependency will quickly inhabit the space left by its youth, and the increase in the PSR will be short-lived.

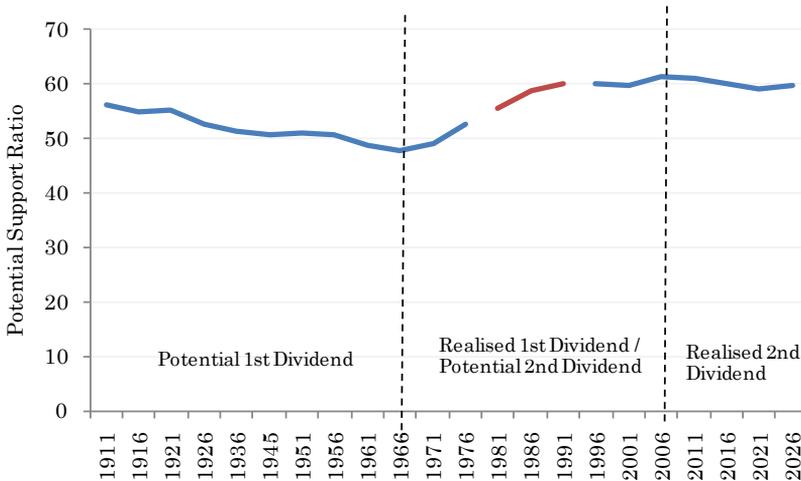
From this perspective then, the 'classic' first demographic dividend for Māori began around 1961, when the proportion at younger ages began to fall and the working age population (and PSR) began to increase, and ended around 2006, when the PSR began to decline as age dependency began to increase. Such a brief window of opportunity would correlate with the rapidity with which the Māori fertility rate declined during the 1970s (Pool, 1991: 170): the more rapid the decline, the more rapid the pace of structural ageing, and the more rapid the loss of the first dividend years.

However, both Figures 1 and 2 also indicate very clearly that the Māori population will remain extremely youthful for the foreseeable future, and that large cohorts will continue to enter the working ages for many years yet, thus the indices illustrated here do not tell the whole story. Indeed, Pool (2007b, 2007c) proposes that a more relevant indicator for the first dividend period is the period that the proportion aged less than 15 years remains above 30 percent, since it is timely investment in that youthful population that has the potential to bring about the dividend. By contrast, the dividend is realised during what is presently observed as the dividend period. As Figure 2 shows, the proportion of Māori aged less than 15 years may have fallen significantly from its 1961 peak of almost 50 percent, but is still above one-third (34.2 percent in 2011), and is projected to remain above 30 percent for the foreseeable future (31.8 percent in 2026).

With these methodological limitations and conundrums in mind, Figure 4 uses the above data for Māori to again depict the classic demographic dividend model, but in a way that emphasises the all-important need to ensure timely investment in the youthful bulge before it reaches labour market entry age. It posits a first dividend potential' stage, followed by a stage in which the dividend is realised (assuming successful management of the first stage) - and during which the potential second dividend also emerges. Finally (with the same caveat as the second stage), it depicts a third stage, during which the second dividend may be realised (demographers will note the similarity to Notestein's three-stage model of demographic transition).

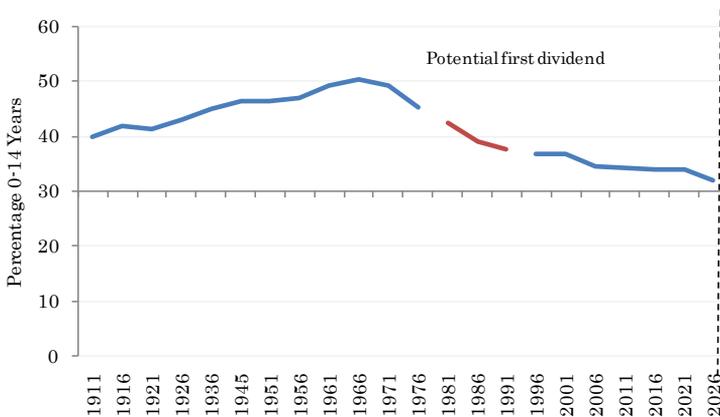
What makes this index useful is that the declining PSR across the first stage, as the proportion aged 0-14 declines, can also be interpreted as 'time running out' for investment in those youth. However, from that perspective, it could also be thought that it is already 'too late' to invest in young Māori in order to capitalise on the dividend, a proposition that is countered by Figure 5 below.

Figure 4: PSR-based schematic model of potential and realised demographic dividend



By comparison, Figure 5 shows what the model would look like if the ‘potential first dividend’ stage was understood to span the period during which the proportion aged 0-14 years remained above 30 percent. Under these conditions, the peak has also passed, but the potential clearly remains viable, although its declining trajectory should evoke the same sense of urgency: the remaining period in which to invest, so that the first dividend – and ultimately a second - can be realised, is rapidly running out, ending in a little over a decade. As Pool and others have long argued, this is a one-off, finite opportunity. To squander it now that we understand the phenomenon would be untenable.

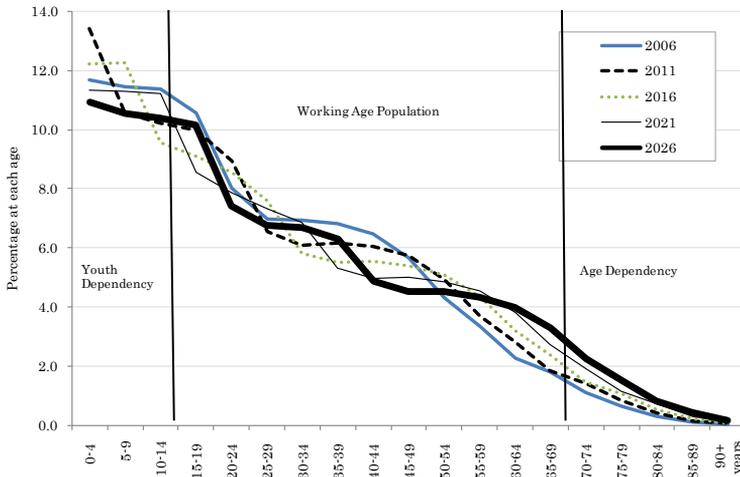
Figure 5: Youth-based schematic model of potential demographic dividend



It can also be argued that a youth-based index is more appropriate for anticipating the dividend period than changes in the proportion at working age, because of other equally dramatic changes which occur as the demographic transition draws towards its end, namely the development of age structural transitions (ASTs) (Pool, 2003, 2005, 2007a, 2007b; Tuljapurkar, Pool & Prachuabmoh, 2005). As these ‘disordered cohort waves’ flow through the age structure (see Figure 6) they will cause the working age population to wax and wane in size, as, for example, a large wave enters and a small one leaves. Such a wave is present in Figure 3 and explains why the proportion of Māori at working age, and thus the PSR, is projected to shift from a decline to increase between 2021 and 2026. The period marks the arrival at labour market entry age of the large cohort born since 2003 (shown in Figure 1). But as Figure 6 indicates, the related

increase in the PSR is likely to be short-term, because of the distended wave which will by then be at 50-64 years and about to move into the ‘age dependency’ population.

Figure 6: Disordered cohort waves, Māori population (percentage at each age 2006-2026)



Source: Statistics New Zealand (2010) Projected ethnic population of New Zealand, by age and sex, 2006 base - 2026 update.

These disordered waves become especially important when the focus shifts to the potential second dividend, when cohorts of different size pass through each income-earning age group. They make it clear that anticipating the quantum and tempo of the second dividend can no longer be based on the relative size of the working age population *per se*, but must instead take into account changes in cohort size.

For Māori to be in a position to reap the second dividend, however, depends on the extent to which the remaining first dividend *potential* is invested in, here proposed (reflecting Pool, 2007b, 2007c) as the period during which the proportion of Māori aged less than 15 years remains above 30 percent. For this reason, further discussion of the second dividend and its potential is left to a future paper. In the interim, the third or potential ‘collateral’ dividend alluded to earlier holds equally – if not more - certain opportunities.

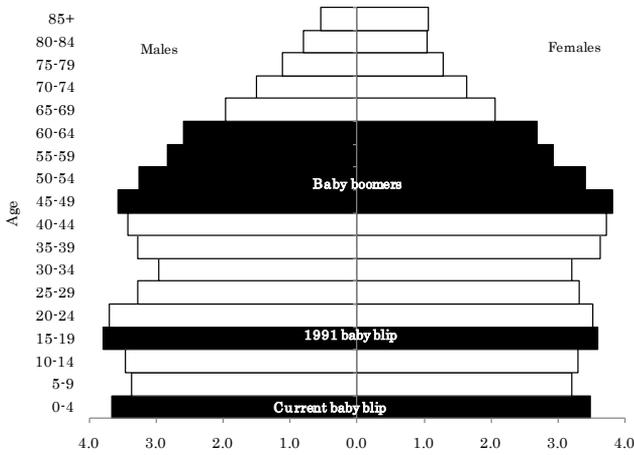
Māori, the New Zealand Labour Market and the ‘Collateral’ Demographic Dividend

The ‘third’ potential dividend awaiting the Māori population – and thereby all New Zealand – arises from the coincidence of living alongside the European population which is substantially further advanced in the structural ageing process. To illustrate this argument some unique features of New Zealand’s current experience of population ageing are briefly outlined, and then the coincidence of the two differently unfolding transitions for Māori and European is returned to.

New Zealand’s structural ageing is not [only] of the conventional kind (Jackson, 2011c). Rather, it is being accelerated through a largely migration-driven bite in the age structure at young adult ages which is causing the median age to increase at a faster rate than would otherwise be expected given New Zealand’s relatively high birth rate. This bite – which in many sub-national areas is resulting in a pronounced hour-glass structure – ushers in a very profound problem for the labour market. As the nation’s Baby Boomers start entering the retirement zone *en masse* this year, who will replace them?

Figure 7 illustrates the unfolding scenario. As the first significantly distended baby boom cohorts born during the 1940s retire they will be more than replaced by the cohorts currently aged 20-29 years and the even larger 15-19 year old ‘blip’ that was born around 1991 (1989-1993).² However, unless net international migration is very strong, the deep bite above the baby blip will create a vacuum that will reinforce an increasingly demographically tight labour market. Thereafter, as each successively larger wave of boomers retires, it will be ‘replaced’ by a successively smaller cohort. There will be little excess labour supply until the large recently born baby blip³ arrives at labour market entry age in the mid- to late- 2020s, and even that (excess) will be debateable as its arrival will coincide with the retirement of the largest boomer cohorts.

Figure 7: New Zealand age-sex structure, 2010

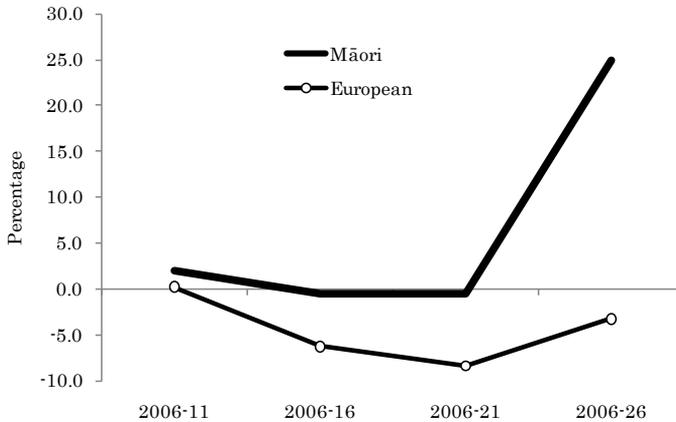


Source: Jackson 2011a/ Statistics New Zealand

If realised, the assumption of a net international migration gain of 10,000 per year in Statistics New Zealand’s medium case projections will to some extent offset these dynamics at the national level, the numbers of ‘entrants’ to ‘exits’ not expected to reach one for one until the mid-2020s. But it may scarcely be noticed in the non-urban areas, where 42 percent of New Zealand’s 67 territorial authorities (TAs) already have fewer people at labour market entry than exit age because of even deeper bites in their age structures (Jackson, 2011c).⁴

As proposed above, for Māori this situation contains many potential opportunities, *vis-à-vis* European. For the period 2006-2011 the 15-19 year old Māori population will grow by 2.0 percent; its European counterpart by just 0.2 percent (Figure 8). Between 2011 and 2016, the 15-19 year age group will decline in size for both populations, but more so for European (-6.5 percent) than Māori (-2.4 percent). Growth will then resume, the legacy of recent increases in fertility, with that for Māori between 2021 and 2026 substantially greater than for European. By 2026 the absolute size of the Māori 15-19 year old age group will be around 25.0 percent greater than in 2006; for European it will be 3.2 percent smaller. Significant differences in absolute size will of course remain, but the 15-19 year old Māori population will by then be around 38 percent the size of its European counterpart, compared with 29 percent in 2006.

Figure 8: Projected change in 15-19 year age group, 2006-2026, Māori and European*



Source: Statistics New Zealand (2010) Projected ethnic population of New Zealand, by age and sex, 2006 base - 2026 update, Series 6.

*Based on multiple count ethnicity.

While New Zealand's young will be in shorter supply and greater demand over the next few decades, an increasingly larger proportion will be young Māori. The relative youth deficit will almost certainly result in an increase in competition for young workers – between industries, regions and countries – including across the Tasman where more than half of Australia's local government areas (LGAs) already have similar hour glass age structures to New Zealand, and there are fewer labour market entrants than exits (Jackson, 2009). It should be remembered that on a daily basis, labour supply is needed locally, not nationally. A growing literature indicates that the end to excess labour supply in the non-urban regions is spreading inexorably and is unlikely to reverse (Pool, Baxendine & Cochrane, 2004; Pool et al., 2005a-f; Jackson, 2011c). This is a major opportunity for Māori who have strong cultural and economic attachment to many of the regions where labour supply is short. Clearly a nation's regions comprise its labour market system, albeit one located within a global system. This paper argues that its sub-populations also comprise a labour market system, and, in New Zealand's case, come replete with collateral opportunities for economic growth.

Summary and Discussion

This paper has outlined significant demographic differences between New Zealand's Māori and European-origin populations, and has linked them to the concept of the demographic dividend. The dividend arises – or has the potential to arise – as each population passes through a particular point in its demographic transition. During these years, the maximum proportion of the population moves into the key working and income-earning age groups, and the minimum (comprised of youth and the elderly) is notionally dependent. With proactive and timely investment in the youthful base of the population, there is potential to convert the demographic dividend into two successive economic windfalls, the first arising as fertility decline causes youthful dependency to fall and the last large waves of young adults flood into the working age population, the second as the latter age and move on into the higher income earning age groups. However, the window of opportunity to invest in the first dividend is shown to be fleeting, while failure to invest in that stage seriously compromises the second.

Reflecting these theoretical propositions, this paper has shown that the first window of opportunity for Māori is all but over, and with it at least some of the potential gains of the second. It has confirmed this situation from the perspective of two different indices – the classic Potential Support Ratio (PSR – the ratio of people of working age to those notionally dependent), and the period of time that the proportion of the population aged 0-14 years remains above 30 percent. Importantly, the latter index extends the period of opportunity for maximum return on investment (as in two potential economic windfalls) until approximately 2021. Age structural transitions accompanying the trends further reinforce the value of the youth-based index, with disordered cohort waves in some years causing the PSR to expand, and in others to contract, making it difficult to be certain when the classic first dividend period begins and ends.

But the paper also argues that there is a third window of opportunity which holds particular promise for Māori. Similar to the first dividend potential, the period will also be fleeting, but it is arising in both absolute and relative terms as the relatively youthful Māori population co-exists alongside its structurally older counterpart. Together, the demographic

disparities can be seen as comprising an ‘economic dividend system’ which contains the potential for a ‘collateral dividend’ for Māori.

The collateral dividend will arise as the total population ages. Young New Zealanders, disproportionately Māori, will be in ever-shorter supply and ever-greater demand, as each successively larger cohort of baby boomers retires and is replaced by a successively smaller cohort of labour market entrants. A deep, largely migration-driven, ‘bite’ in the present New Zealand age structure across the young adult age groups will compound increasing competition for labour market participants (both nationally and globally) and will arguably result in higher wages – and also higher labour and consumption costs that will need to be factored in. This demographic bite is already pronounced in the non-urban areas where Māori have a high level of social, cultural and economic interest, and will provide Māori with many opportunities: already 42 percent of New Zealand’s territorial authorities have fewer people at labour market entry than exit age.

Overarching the arguments presented in this paper is the imperative to recognise the opportunities offered by the dividend years and to capitalise on them in a timely and proactive manner, by investing strategically in the education and training of young Māori, and in the related infrastructure. The third potential dividend, the collateral dividend, has similar characteristics to the first window of opportunity, and if successfully managed, could see a second economic dividend realised.

Notes

1. The ethnic concept used in the projections in this paper is defined by Statistics New Zealand as ...the ethnic group or groups that people identify with or feel they belong to. Ethnicity is self-perceived and people can belong to more than one ethnic group. For example, people can identify with Māori ethnicity even though they may not be descended from a Māori ancestor. Conversely, people may choose to not identify with Māori ethnicity even though they are descended from a Māori ancestor' (Statistics New Zealand, 2010). Of the 565,329 people identifying with Māori ethnicity at the 2006 Census, 47 percent (266,934) also identified with non-Māori ethnicities (Statistics New Zealand, 2010: 19). This resulted in a total population 'overcount' of 9.5 percent.
2. It should be noted that New Zealand's Baby Boom began earlier (late 1930s), peaked higher and lasted longer than its counterparts in the United States and Europe (Pool 2007d). Here I am referring to the increasingly large cohorts born from the early 1940s.
3. I have elsewhere termed this generation 'Gen TGYH' ('Thank God You're Here') – see Jackson, 2011.
4. Until 2010, there were 73 territorial authorities – this number was reduced with the amalgamation of Auckland local government into one council in 2010.

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Fertility, Ethnic Diversification and the WEIRD Paradigm: Recent Trends in Maori Fertility in New Zealand

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Abstract

Rapidly increasing ethnic diversity within New Zealand's Māori and Pacific childbearing populations, combined with increased inter-ethnic partnering, may result in a tempering of fertility extremes and convergence to the fertility of the majority group.

Seeing fertility through a WEIRD (Western, Educated, Industrialised, Rich and Democratic) paradigm may be clouding judgment on which fertility regime is likely to dominate. The fertility of Māori and Pacific women of mixed ethnicity is rapidly rising to match that of other Māori and Pacific women. Increased ethnic diversity and inter-ethnic partnering appears to be delaying, but not reducing, the fertility of Māori and Pacific populations.

Seminal work on the history of the family and on fertility in New Zealand by Ian Pool and Janet Sceats over the last few decades has provided significant progress in the understanding of family formation and fertility. This paper draws on many of their perceptive observations on the complexity of historical fertility in New Zealand. It considers the wider picture, and also considers the implications of colonialism, as encapsulated in this passage:

It is necessary to entertain another hypothesis: that the huge inflows of the Vogel period altered the colony's social fabric and normative systems by the wholesale infusion of new ideas reflective of the changes occurring in the British Isles at the time or immediately before. (Pool et al, 2007, 94)

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New Zealand's post-colonial society was formed largely within the crucibles of English, and to a lesser extent, Scottish, ideas, resulting in social transformations across the British Empire. These normative forces overwhelmed the developing syncretic transformations which had been occurring in the earliest days of the nascent colony. This scenario was played out in other parts of the British Empire and in the northern and western parts of the United States of America. One outcome of this history was the emergence of a set of societies built on the premises of Westminster-style humanism. Each have modified those premises over time, leaving them 'out of step' to some degree with the rest of the world - including other societies within their national borders.

There has been a view expressed that people from these WEIRD (Western, Educated, Industrialised, Rich and Democratic) countries (Henrich et al, 2010) often have an egocentric perspective on the world, are not representative of the broader human species, and consequently struggle to understand the drivers and motivations of other societies and cultures (Bang et al., 2007), especially of those societies that occupy the same geographic space as themselves (Herrmann, Thoni & Gächter, 2008; Nisbett, 2003). It is argued that behavioural and psychological differences include: reasoning styles; self-concept and related motivations; what constitutes fairness; cooperation; spatial and moral reasoning (Kohlberg, 1976; Hofstede, 2001). WEIRD societies increasingly acknowledge cultural diversity; nevertheless, they can struggle to accept that these differences extend beyond the superficial to affect economic, health, general beliefs and behaviours (Boyd & Richerson, 1985; Levinson, 2003). There still appears to be a common assumption of assimilation among many of those who aspire to WEIRD norms, in contrast to the "othered" populations' integrationist ambitions of retaining their own cultural identity (Fessler, 2007). This is particularly so for populations such as New Zealand's Pacific population, that have migrated to a WEIRD country or for populations such as New Zealand's Māori population, who were historically subsumed early in the industrialising and urbanising processes by a much larger immigrant population.

Almost without exception, over the last three decades western developed countries have had consistently low fertility (Pool, 2003), later timing and possibly wider birth spacing (Pool et al, 1999) (although the latter is by no means clear because of the limitations of the data sources

available). This fertility regime has long been attributed to the fact that these populations were educated, industrialised, and rich, had a growing rate of female work-force participation and had low mortality, with consequential changes to the value of children. However, as many developing and third world countries also made the transition to low fertility, wealth, labour market participation and education were seen as somewhat secondary to low mortality. Regardless of the drivers, WEIRD societal norms were regarded once again as setting the paradigm for others to follow.

As if to confirm the convergence to WEIRD norms, a “radical decline in family sizes” (Pool, 2005) accompanied the increasing urbanisation of Māori during the 1960s and 1970s. Official measures record the Māori TFR falling from 6.18 to 2.14 in just over two decades (between 1962 and 1986) (Statistics New Zealand, 2008). This fall in fertility was not unexpected given the rapid integration into an industrialised urban environment, changes in socio-economic positioning and levels of inter-ethnic partnering. The speed of the transition from very high fertility to almost replacement level fertility was somewhat unprecedented, although similar patterns have since been reported elsewhere (for example, in Thailand, which experienced almost the same decline over a similar period (Padthaisong-Chaipanich, 2006)).

This decline may be (in part) a result of the vagaries of the data, which have tended to overstate the change. Although almost all births are registered within a short period of the birth event in New Zealand, the correct assignment of these births to the Māori ethnic group or as “non-Māori” has historically been more problematic.¹ Prior to a question change in 1995, the failure to monitor ethnic non-response in New Zealand led to an understatement of Māori fertility. This was compounded by other methodological issues (Khawaja et al, 2007), as well as by rapid rises in the levels of inter-ethnic partnering (Howard & Didham, 2005). In short, although the downward trend in Māori fertility between the 1960s and mid-1980s is undoubtedly correct, the degree to which Māori and non-Māori fertility converged cannot be accurately determined. Moreover, the levelling of Māori fertility in the 1980s and 1990s as well as the slight increase post-1995 suggests that Māori fertility is no longer converging with that of non-Māori. A number of factors may have contributed to this shift in direction, which Pool (2005) noted as the “changes in the rhythm of

Maori childbearing” resulting in increases in Māori fertility during the late 1990s.

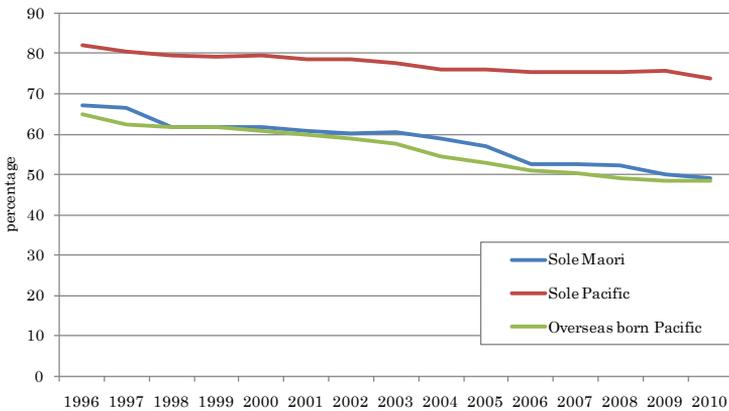
The analysis presented here looks more closely at these “changes of rhythm” using the consistent data from the post-1995 period. But first a caveat needs to be established - because population estimates are not available for sole ethnicity, mixed ethnicity or birthplace, most rates contained in this paper are based on enumerated census populations. Enumerated populations are smaller than the estimated populations because they do not include adjustment for estimated census undercount and ethnic non-response. Therefore, the resulting rates are slightly higher than the official series (Table 1). In an attempt to avoid random volatility for the smaller population groups, rates for 2001 and 2006 are based on three years births data centred around each Census. Given that ethnic questions on vital registrations forms were changed in October 1995, the 1996 rates are, however, based on just one year’s births data. The 1996 data is included to add time depth but does not specifically contribute to the argument being put forward here, and the period covered is not affected by questionnaire change. Therefore data has been collected in a consistent manner, classification changes do not affect the aggregations discussed here, and the major change is real-world response shift.

Māori and Pacific not conforming to the WEIRD norm

In general, if two populations of different fertility experiences mix, the fertility experience of the intersect might be expected to be modified in such a way as to lie between the two contributing groups. This should have an effect on the apparent fertility of both groups of which the mothers are members – the higher fertility group dropping in fertility and the lower group rising. The degree to which each group changes should be dependent on the relative group sizes and on resulting changes in contributing drivers in fertility decisions. The WEIRD paradigm points to the high cost of children in an industrialised society as a prime driver, implying that the shift would be strongly influenced by the norm of the more affluent group. For example, in the context of Māori, Pacific and European in New Zealand, the intersect would be expected to move further toward the European norm. This would be expected to reduce the apparent average fertility of the higher fertility groups (Māori and Pacific) and have a small effect on the much larger (European) group.

However, the levelling or slight increase in Māori fertility 1996-2006 is, in this scenario, an enigma, given the increasing proportion of Māori who are partnering with the lower fertility European and Asian ethnic groups (from 38 percent of Māori mothers in 1996 rising to 45 percent in 2006 and 46 percent in 2010) and more generally the increasing proportion of Māori mothers who identify as also belonging to other ethnic groups (33 percent in 1996 rising to 47 percent in 2006 and 51 percent in 2010) (Figure 1). Both of these factors might have been expected to further lower fertility.

Figure 1: Percentage of Māori and Pacific mothers of sole ethnicity, and percentage of Pacific mothers born overseas, 1996 to 2010



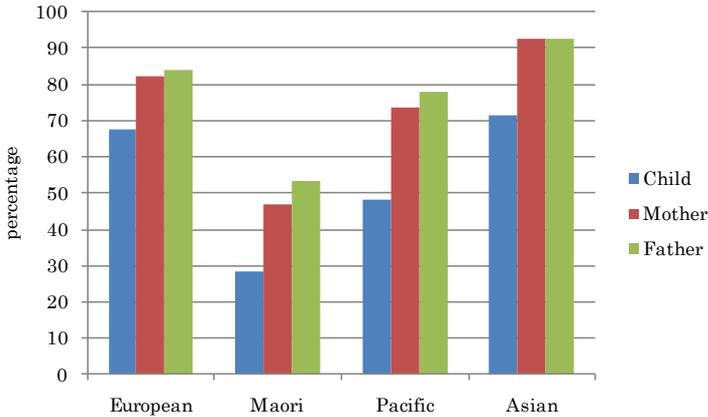
Source: Statistics New Zealand

The rate of ethnic diversification and complexity is striking. Simply examining the proportion of mothers, fathers and children who only identify with a single ethnic group confirms the speed at which the New Zealand’s ethnic groups are diversifying (Figure 2). Almost half of Māori new mothers in 2010 belonged solely to the Māori ethnic groups but only one-third of their new-born children did. In comparison, fathers are less ethnically diverse than mothers. In part this is related to the age profiles of multi-ethnic males - older males are more likely to report only one ethnicity, and fathers are, on average, three years older than mothers.

A simple extrapolation of the mother/child trend would suggest that the age difference probably accounts for about half the difference for European, Māori and Pacific (mother’s proxy responses for the father’s ethnicity may also be contributing to the observed patterns (Boddington & Didham, 2009a)). Implicated in this process are four aspects of ethnic

mobility: the adoption of Māori as ethnicity in place of a different ethnicity, the replacement of Māori by another ethnicity, the complexity of ethnicity from single to multiple responses, and vice versa. We do not differentiate these processes here, but note that they are elements in the chain of life-stage and partnering events that contribute to the identities chosen by people for themselves and for their babies.

Figure 2: Percentage of mothers, fathers and children belonging solely to selected ethnic groups*, 2010 births



Source: Statistics New Zealand

*. Based on cases where the ethnicity of the mother, father and child were all specified.

Māori who identify only with the Māori ethnic group (sole-Māori) traditionally have higher fertility than Māori who also belong to another ethnic group(s) (mixed-Māori). Simply partnering someone from a low fertility group might also be expected to reduce a woman's fertility outcomes, setting aside the hybridity effects, resulting largely from complexity of ethnic reporting noted elsewhere in interethnic partnering (Didham, 2004, 2005; Callister et al., 2005b, 2008). Given these implied compositional changes, if overall Māori fertility is not decreasing there must be an underlying rise in fertility in at least one of the intersections with people of Māori ethnicity and other ethnicities (e.g. mixed-Māori or Māori /non-Māori partnerships).

Comparing the period rates for Māori since 1996 (Table 1) suggests that any increases in overall Māori fertility have been driven largely by women of mixed ethnicity (including Māori) while the fertility of women belonging solely to the Māori ethnic group appears to have fallen slightly,

although remaining relatively high. The decline in fertility of sole-Māori females might in part be due to increases in the proportion of sole-Māori mothers partnered with fathers who are non-Māori or are Māori but also belong to another ethnic group, rising from 30 percent in 1996 to 34 percent in 2006. One of the areas recognised as under-researched is the fertility of males and the contribution of males to ethnic fertility differentials, though indications from cohort studies are that there are similarities between female and male patterns (Marie & Fergusson, 2011).

Table 1: Total fertility rates, Māori population, 1996-2010

Year	TFR Māori Estimated Based ⁽¹⁾	Census Based Measures ⁽²⁾		
		Total Māori	Sole Māori	Mixed Māori
1996	2.70	2.77	3.52	1.97
1997	2.77	..	..	..
1998	2.56	..	..	..
1999	2.69	..	..	..
2000	2.66	..	..	..
2001	2.64	2.89	3.30	2.48
2002	2.50	..	..	..
2003	2.60	..	..	..
2004	2.70	..	..	..
2005	2.67	..	..	..
2006	2.74	3.06	3.33	2.82
2007	2.94	..	..	..
2008	2.95	..	..	..
2009	2.80	..	..	..
2010	2.83	..	..	..

Notes

1. TFR for year ended December. The base resident population includes adjustment for Census undercount.

2. TFRs for 2001 and 2006 are based on three year's birth data, centered on Census. TFRs for 1996 are based on one year's births data. Base enumerated populations do not include adjustment for undercount in Census.

Examining post-1995 Pacific fertility (Table 2) would suggest that Pacific fertility remained fairly constant between 1996 and 2006, at just over 3.3 births per woman. Nevertheless, over the decade 1996-2006, the proportion of New Zealand born Pacific mothers has risen from 34 percent to 48 percent, while the proportion of Pacific mothers who also belonged to a non-Pacific group rose 18 percent to 25 percent. Both these groups have lower fertility than their Island born or sole ethnicity counterparts. The

TFR for island-born Pacific women actually fell from 4.0 to 3.8 births per women between 1996 and 2006, while that for sole-Pacific women fell slightly from 3.4 to 3.3, over the same period. Thus, if the TFR for the total Pacific women remained largely unchanged, the fertility of, respectively, New Zealand born Pacific women, and Pacific women of mixed ethnicity, must have increased since 1996.

Table 2: Total fertility rates for Pacific women, 1996, 2001 and 2006

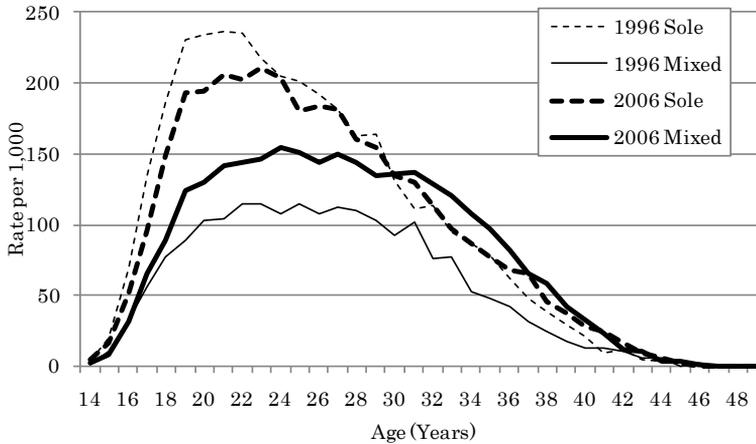
Ethnicity/Birthplace of Pacific Mother	TFR at Census date ⁽¹⁾		
	1996	2001	2006
Sole Pacific	3.90	3.46	3.44
Mixed Pacific	1.97	2.81	2.86
Overseas born	4.06	3.96	3.82
New Zealand born	2.48	2.61	2.84
Sole Pacific	3.18	2.64	2.85
Mixed Pacific	1.97	2.58	2.84
Total Pacific	3.37	3.31	3.30

Notes

¹. TFRs for 2001 and 2006 are based on three year births data centered on Census. TFRs for 1996 are based on one year's births data. Base enumerated populations do not include adjustment for undercount in Census.

Changes in Age Specific Fertility

Between 1996 and 2006 the median age for sole and mixed Māori women giving birth increased by around a year (from 25 to 26 years for sole and 27 to 28 for mixed), indicating a general, albeit slight, delaying in family formation. For sole Māori, decreases in fertility were concentrated at ages below 27 years, while for mixed Māori the increases were more general (see Figure 3). Thus it seems highly improbable that inter-ethnic mobility, at least in the unidirectional sense, between groups is driving patterns. Moreover, a general trend towards delaying fertility should result in a reduction in the period measures - as women who would have normally had children early in the reproductive life, delay fertility. This situation could be contributing to the observed reduction in rates for sole Māori, but not the increases for mixed and total Māori populations.

Figure 3: Age specific fertility of sole and mixed Māori populations, 1996 and 2006

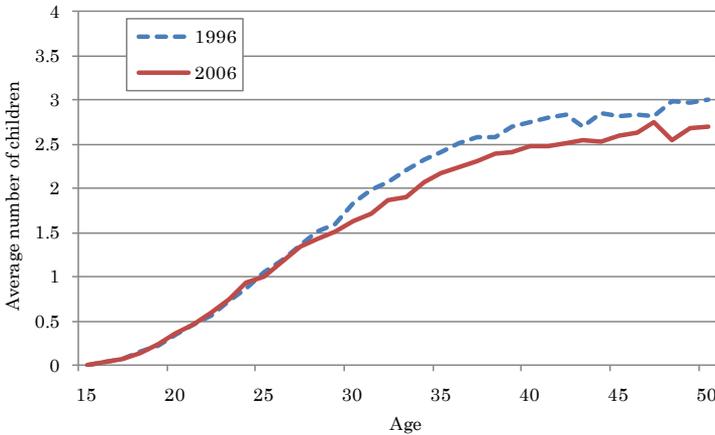
Source: Statistics New Zealand, Census of Population and Dwellings

A tempo effect could account for some of the observed pattern. If women of mixed Māori ethnicity were in the process of transitioning to older childbearing at the time of the 1996 Census, then many at older ages would have already completed their childbearing, while those at younger ages would have yet to begin. Period rates in 1996 would be suppressed by this delay, perhaps partly explaining their very low TFR in 1996. As census data on children ever born indicates that, historically, sole Māori have always had much larger families than mixed-Māori, a complete reversal of the trend to delayed childbearing, increasing the period rates at all ages, would be required to then explain the corresponding 2006 data. Since a flip-flop in fertility timing is theoretically possible, another census is probably needed to confirm that this is not the case. However, it is worth noting that under this scenario, period rates should have fallen again (as the population reverted back to a younger fertility regime), yet the TFR for Māori has remained high since the 2006 census. While all indications are that completed fertility rates for mixed Māori will rise for cohorts who started childbearing during the late 1990s and early 2000s, the alternative explanation posited above – that having shifted to later childbearing, women of mixed ethnicity are now reverting back younger childbearing – is equally deserving of further analysis and explanation. WEIRD logic favours delaying childbearing and particularly disapproves of teenage and very young adult fecundity.

Along with tempo effects, childlessness is implicated in observed fertility patterns as well as affecting the relationship between TFR and replacement fertility levels (Boddington & Didham, 2009b). It has been noted that 'zero parity women have a proportionally greater effect on fertility rates than women with children' (Didham, 2001, p11). The proportion of women who are childless increased significantly at all ages for the total population and for those women who identified as Māori only. The proportion also increased for those who were mixed-Māori for all ages over around 30 years. A combination of cohort effects, inter-ethnic partnering, ethnic mobility and changes in age at first birth contributed to the different pattern observed for mixed-Māori women under the age of 30 years. However, the data available does not easily allow us to separate timing effects from change in childlessness.

Analysis of 1996 and 2006 Census data on children ever born suggests that any upward shift in mixed-Māori fertility is a very recent phenomenon (Figure 4). Comparing equivalent age-groups at each census reveals that only at ages below 27 years are average family sizes of mixed-Māori women larger in 2006 than 1996. Differences are small and it is still possible that latest increases in period rates reflect a shift in timing, and that once they have completed their fertility, family sizes may not have increased overall. Above 30 years, the data suggest a strong trend to smaller family size, however it should be noted that these women will have completed a significant proportion of their childbearing prior to the 1996-2006 period (by 25 years of age Māori women have on average completed more than half of their childbearing). This would support the conclusion that, prior to the 1996 Census, fertility rates for both mixed and sole Māori were probably declining.

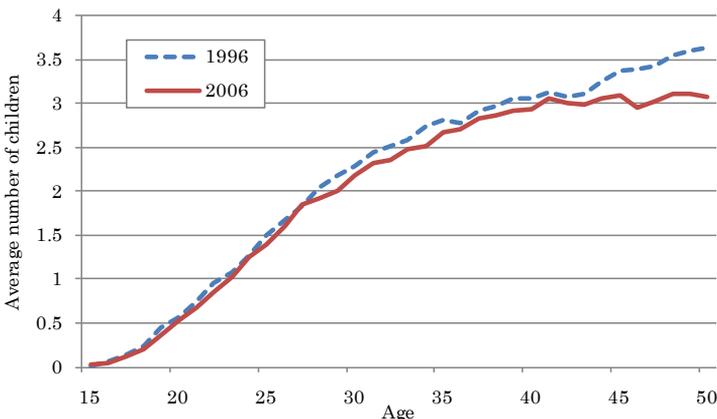
Figure 4: Average number of children born by age, women of mixed Māori ethnicity, 1996 and 2006



Source: Statistics New Zealand, Census of Population and Dwellings

In comparison to mixed Māori, the average number of children born to sole Māori women, at virtually every age, is lower in 2006 than in 1996. While the series diverge for mixed Māori from age 27, any significant divergence only occurs from about age 45 for sole Māori (see Figure 5). This would suggest that, while there has been a slight reduction in family size for sole Māori women, no single age group is responsible, and their overall age patterns of childbearing have been stable for some time.

Figure 5: Average number of children born, women of sole Māori ethnicity, by age, 1996 and 2006

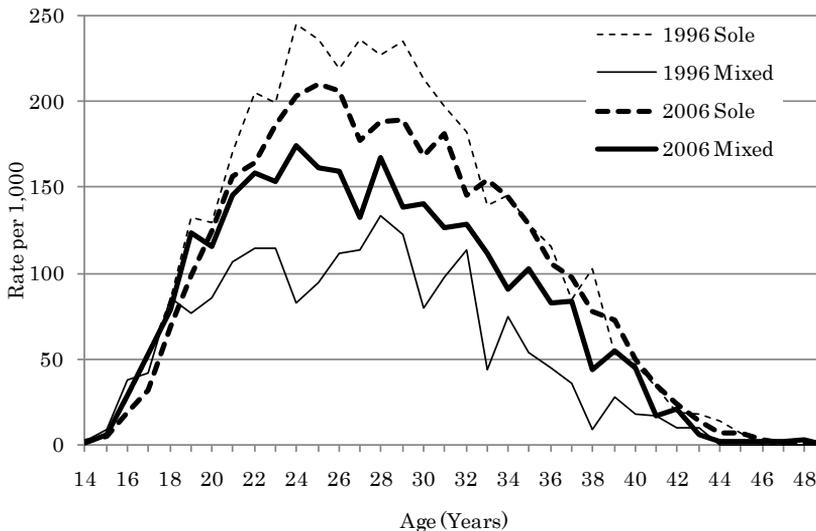


Source: Statistics New Zealand, Census of Population and Dwellings

Figure 6 shows the age specific fertility for women of sole and mixed Pacific ethnicity between 1996 and 2006. During that time, the median age for childbearing increased by only one-third of a year for both groups. However, as Pacific women of mixed ethnicity have increased as a proportion of Pacific mothers, and have a younger age structure than their sole counterparts, the increase in median age for all Pacific women was only 0.17 years (half the increase for either component group). The sole Pacific group has experienced a reduction of fertility at most childbearing ages up to 34 years, while increases for mixed Pacific women are more general between the ages 17 to 42 years.

Analysis of 1996 and 2006 Census data on children ever born for mixed Pacific women suggests a pattern very similar to that for mixed-Māori, and that any upward shift in fertility is a very recent phenomenon. Comparing equivalent age-groups at each census reveals that only at ages below 26 years are average family sizes of women of mixed-Pacific ethnicity larger in 2006 than 1996. Once again differences are small.

Figure 6: Age specific fertility of sole and mixed Pacific populations, 1996 and 2006

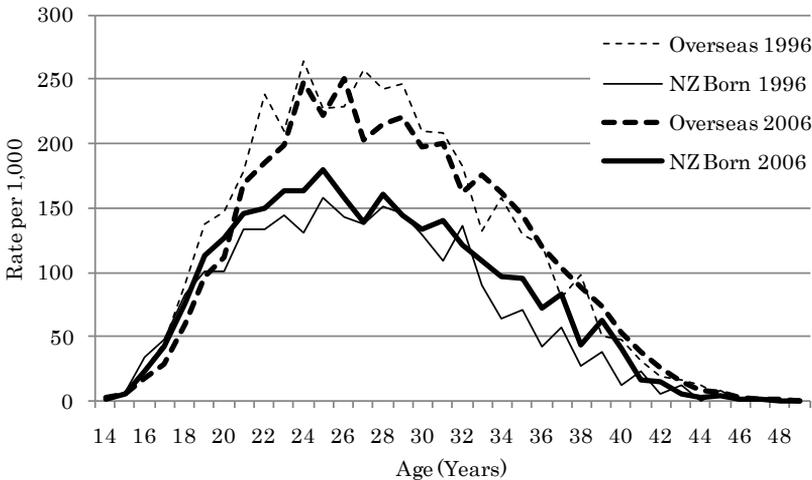


Source: Statistics New Zealand, Census of Population and Dwellings

Ethnicity is self-identified and often based on cultural affiliation, thus for some respondents it can alter over the life course or between collections. This situation raises the possibility that rather than measuring changes in

underlying Māori and Pacific fertility, the identified patterns are being largely driven by changes in ethnic reporting. The marked differences in change between sole and mixed-Māori would suggest that this is not the case. For Pacific women we are also able to analyse birthplace (Figure 7); this is an unchanging variable which is highly correlated with a person being of mixed-Pacific ethnicity (most inter-ethnic partnering has occurred within New Zealand). This finding also suggests that changes in ethnic reporting are not primarily driving these changes in Pacific fertility.

Figure 7: Age specific fertility of New Zealand born and overseas born Pacific populations, 1996 and 2006



Source: Statistics New Zealand, Census of Population and Dwellings

Conclusion

Stepping outside our WEIRD prejudices about fertility, one conclusion is that New Zealand's European and Asian populations may not be the trend setters for future New Zealand fertility. Under this scenario, the cultural, social and economic value of extra children more than offsets the WEIRD wisdom of having fewer children but investing more deeply in them. As Māori and Pacific populations intermarry and grow, the added cultural value these groups assign to children is likely to proliferate and may gradually lift fertility throughout the country.

Alternatively, if we accept the assumption that low fertility is not just a feature of WEIRD populations, but the natural outcome for population

groups which have low mortality and are deemed to be economically and socially successful, then persistent high fertility, high and increasing fertility, is a symptom of a population under stress and not only failing to achieve its full potential but also not improving in socio-economic standing (MacLeod, 2010). Under this scenario, the increasing fertility of Māori and Pacific of mixed ethnicity, as well as the increasing fertility of NZ born Pacific women, would be of concern.

The latter scenario - of a population under stress - is not supported by continued, if not accelerating, rates of inter-ethnic marriage. These would suggest both New Zealand men and women perceive no disadvantage in partnering and bearing children who, under the WEIRD paradigm, transcend the ethnic divide. Alternatively, this may well be a feature of the blurring of boundaries observed across the ethnic fabric of New Zealand society. Regardless of the cause, if large segments of New Zealand society are diverging from WEIRD fertility norms, it might require a revision of the assumptions made when projecting future populations.

Further investigation into the drivers of the observed patterns is needed. For example, the TFRs for mixed Māori and Pacific populations imply that those currently starting childbearing will have completed family sizes very similar to their sole Māori and Pacific counterparts. Nevertheless, the former retain a very much older pattern of childbearing. There would not appear to be evidence that these mixed groups are transitioning back to younger childbearing. There is some evidence that suggests gradual delays in childbearing among women of sole Māori and sole Pacific fertility. A shift in the tempo of childbearing for these groups could mean that the differential between mixed and sole persists, but is temporarily hidden in period measures. In short, we may be about to witness a corresponding rise in the TFRs for sole-Māori and sole Pacific women.

Note

1. The term “non-Māori” is used in this paper as shorthand for “people who have not reported themselves as having Māori ethnicity”. It in no way implies that “non-Māori” is in any respect a coherent ethnic group.

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Indigenous Fertility Transitions in Developed Countries

KIM JOHNSTONE *

Abstract

This paper explores contemporary indigenous fertility among minority, colonised peoples in developed countries. It compares the similar pattern in New Zealand, Australia, Canada and the United States of relatively low total fertility rates alongside childbearing that is heavily concentrated at the youngest ages. These patterns of early childbearing are more remarkable because they are taking place in countries where fertility has been deferred to much older ages among the colonising majority population. The paper considers whether the shared experience of colonisation and minority status have had demographic consequences that warrant exploration of indigenous-specific theories of population change.

Indigenous populations in the developed world have long been recognised as having distinct demographic profiles (Caldwell, 2002; Johnstone et al. 2011; Kuntiz, 1994; Pool, 1986, 1991; Robitaille & Choinière, 1987; Taylor & Bell, 1996). In Australia, New Zealand, Canada and the United States (the four British-colonised ‘neo-Europes’), indigenous populations share several key characteristics:

- each is a minority sub-population within the colonised nation state;
- there are difficulties defining who belongs to the minority, mainly because ethnic boundaries have become unclear due to exogamous relationships between the indigenous and colonising peoples;
- each population has suffered the impact of colonisation and experienced a decline in numbers;

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- each population has undergone a period of recuperation and subsequent rapid growth; and
- each population experienced rapid fertility declines during the 1960s and 1970s (Pool, 1986).

The need to understand these similarities across diverse geographic spaces is well recognised (Carson et al., 2011; Kunitz, 1994; Pool, 1986; Romaniuc, 1987).

The concurrent timing of fertility decline among these colonised, indigenous populations with rapid fertility declines throughout the developing world (many among indigenous majorities in colonised nation states) has been used to indicate a “globalization of fertility behaviour” (Caldwell, 2001, p. 23). The idea of globalized fertility behaviour contains inherent assumptions of convergence of fertility behaviour between different populations (Taylor, 2011), both in the number of children that women will have, and the age that women will have them (Caldwell, 2002; Ram, 2004). As this paper will show, however, despite assumptions of convergence between the indigenous and non-indigenous populations in the countries of Australasia and North America during the time of the rapid fertility declines (Blackwood, 1981; Robitaille & Choinière, 1988), important fertility differences remain between the colonising majority and colonised minority populations.

Numerous theories about fertility change have been developed (van de Kaa, 1996) but demographers agree that fertility decline is precipitated by mortality decline as posited by the demographic transition model, and that once fertility decline has started it is irreversible (Kirk, 1996; van de Kaa, 2002). Throughout Europe and the neo-Europes, the post-World War II period saw fertility decline to persistent levels well below replacement, a (then-new) phenomenon understood as a ‘second demographic transition’ (van de Kaa, 2002). The second demographic transition is characterised by postponed first births, separation of marriage and birth, and universal use of modern contraception. The deferred and low levels of childbearing are linked to socio-economic development and a shift in the value orientation of a population with a strong emphasis on individualism (van de Kaa, 2001).

This paper highlights contemporary fertility patterns for the indigenous populations of New Zealand, Australia, Canada and the United States. It shows that despite fertility declines being in evidence

throughout the latter half of the 20th century, fertility remains concentrated at young ages. Fertility patterns seen in the non-indigenous populations, characteristic of the second demographic transition, are not strongly in evidence. This persistent, young profile of childbearing among indigenous populations has implications for how the demographic transitions of colonised peoples should be understood. This paper explores some first principles of a theory of indigenous fertility transition.

A Data Caveat for Indigenous Fertility Rates

Indigenous demography is a specialised form of demography, recognised in postcolonial settler societies as an essential component of public policy making (Kukutai, 2004; Kukutai & Pool, 2008; J. Taylor, 2009). As noted, a unique feature of indigenous demography is the focus on defining who belongs to the indigenous group and what membership of that group as identified in population data sets means for demographic analysis (Eschback, 1995; Jackson, 1995; Johnstone, 2009; Kukutai, 2003; Pool, 1991; Robitaille et al., 2010; Snipp, 1986). Pool (1991) wrote that:

The definition of the boundaries of ethnic group membership is one of the more critical conceptual issues in many bicultural or multicultural societies, particularly where there are indigenous minorities seeking redress of wrongs originating in the period of colonisation (Pool, 1991, p. 12).

The definitions of indigenous group membership for the purposes of statistical measures are thus an ever-present feature of indigenous demography, and require recognition regardless of the analysis being undertaken. Investigating the data issues in detail for each of the countries included here is beyond the scope of this paper. Rather, a brief commentary on available data sources and the caveats that surround them is provided.

A common phenomenon among indigenous populations in Australasia and North America, especially since the fertility declines of the 1970s, is increasing population counts over time beyond what could be expected from births and deaths alone (Guimond et al., 2003; Passel, 1996; Pool, 1991; Ross, 1999). For each country included in this paper, national censuses provide the data for measuring indigenous populations, albeit with differing levels of accuracy and for varying lengths of time. In each country longitudinal population counts have been affected by the same

factors. Namely, different undercounts of the indigenous population at each census, changes in non-response to the question asking for respondents' indigenous status, and changes in the way the indigenous status question is both asked in the official form and answered by indigenous peoples (Kukutai, 2003; Pool, 1991; Ross, 1999). The birth of indigenous babies to non-indigenous women is also a contributing factor to these increasing population counts (Robitaille et al., 2010; Taylor & Biddle, 2008).

This issue of who is counted into an indigenous population adds a temporal component to time series data that reflects administrative practices and social change in attitudes (both towards indigenous peoples, and among indigenous peoples themselves). It highlights how investigations of demographic transition among indigenous populations, dependent as they are on longitudinal measures, may change because of data effects. In Australia, for example, where recent census counts provide more accurate Aboriginal and Torres Strait Islander population estimates than historical ones, reverse projections created by reverse cohort survival of the population must be used to understand any longitudinal trends based on a population denominator such as fertility (ABS, 2009; Johnstone, 2010, 2011; Wilson & Condon, 2006). Failure to account for this phenomenon leads to erroneous over-estimation of fertility rates (or any population-based measure) for the historical period and resultant downward trends through time (Johnstone, 2009, 2011).

The data included in this paper are all from secondary, published sources and represent births to indigenous mothers (indigenous babies born to non-indigenous mothers are thus excluded). Fertility rates based on vital registration data are reported for New Zealand, Australia and the United States. In Canada, however, indigenous status is not recorded in the vital registration data (Johnstone et al., 2011). Canadian Aboriginal fertility estimates reported here were derived from 2001 census household data using the 'own child' method (Ram, 2004), which requires matching of children to a likely mother in the household they are enumerated in (Cho et al., 1986). More recent indigenous fertility estimates were not available for Canada at the time of writing. Fertility rates based on the vital registration record for the Nunavut region of Canada are used to provide some indicator of more recent fertility rates in one of the comparisons. The Nunavut population is predominantly Inuit and this geographic approach

has been used to investigate indigenous life expectancy in Canada (Johnstone et al., 2011). The Nunavut rates are probably higher than for all indigenous Canadians as historical estimates showed Inuit to have higher fertility rates than Métis, Registered Indians or North American Indians (Ram, 2004).

The vital record for Māori in New Zealand, American Indians and Alaskan Natives in the United States and Aboriginal and Torres Strait Islanders in Australia must also be viewed with caution. In New Zealand, time-series of Māori fertility rates are affected by different ethnicity questions between numerator and denominator data sources before 1996 (Pool, 1991; Jackson et al., 1994; Statistics New Zealand, 2005). Since 1996, when the ethnicity question in New Zealand has been the same in both vital registration and census data collections, fertility rates have been influenced by the ethnic diversity among its residents, and the high level of ethnic intermarriage (Khawaja et al., 2007; Kukutai, 2004).

In the United States, there are issues of completeness in both the vital registration and census record (Snipp, 2011). From 2000, fertility rates are also affected by different ways of reporting of ethnicity between the vital registration (numerator) and census population (denominator) counts (Centers for Disease Control, 2008). In 1997 revisions to the national classification standards for race and ethnicity required programs in the United States to allow respondents to select one or more race category when such data were collected. The revised standards were used in the 2000 census and have led to the development of 'bridged-race' population estimates whereby multiple responses to the race question are revised to single ethnic group categories (Flowtow, 2004; Johnson, 2004). The longitudinal record is affected by states reviewing their birth certificates for compliancy at different times. This discrepancy between numerator and denominator will remain until all states are compliant. There are therefore similar issues currently in the United States for measuring fertility rates as were seen in New Zealand prior to 1996.

In Australia, national reporting of indigenous fertility is only available from 1998 (ABS, 1999), although some state-based data have been available from 1988 (ABS, 1994). Australia differs from the United States and New Zealand because indigenous status is a separate, specific question in all population records, with all individuals asked if they are of Aboriginal or Torres Strait Islander origin (Robinson et al., 2010). As

already noted, longitudinal analysis of indigenous fertility rates in Australia require back-projected denominator populations from the most recent and most accurate census-based estimates (Johnstone, 2010, 2011; Johnstone et al., 2011) and the results presented here reflect this.

Understanding the demographic dynamics of indigenous populations is thus fraught because the data on which we rely are not immutable. This does not mean the results are invalid. Demographic analysis in Australia, for example, has shown that where indigenous population measures can be calculated using different data sources or different definitions of indigenous status, the results show the same general patterns of demographic change (or stasis) (Condon et al., 2004; Johnstone, 2011; Smith, 1980). To quote Pool (1991, p. 13), “[we] must accept as a working hypothesis, that [indigenous] data will never be perfectly classified”. And as Brown et al. (2008, p. 31) write about indigenous population data issues in Australia, “...analysis must inevitably proceed with data that are available”. While the levels of fertility reported in this paper should be read as indicative rather than exact, it is the similarity in fertility patterns across Australasia and North America despite the data shortcomings that are the focus.

Contemporary Indigenous Fertility in Australasia and North America

Fertility declines during the 1970s have been documented for the indigenous populations of New Zealand, Australia, Canada and the United States (Gray, 1983; Pool, 1991; Romaniuc, 1987; Snipp, 1997). These declines were noteworthy because they were significantly later than fertility declines among the immigrant, colonising populations of these countries which began during the 1870s and 1880s (Caldwell, 2002; Jones, 1971; Pool et al., 2007). After a century of difference between the indigenous and colonising fertility rates of the countries of Australasia and North America these indigenous fertility declines indicated a convergence of total fertility rates, which were often interpreted as a convergence of broader demographic patterns. In the 21st century, however, indigenous total fertility rates remain higher than those for the total population, except in the United States (Table 1). These rates for American Indians or Alaskan Natives are somewhat anomalous compared to the other countries

but could reflect the numerator/denominator data differences outlined in the previous section. As Jackson (1995) showed for Māori in New Zealand, the construction of ethnic fertility rates from data sources which measure indigenous status in different ways can lead to different outcomes depending on how the numerator and denominator are matched.

The point to note about the indigenous total fertility rates shown in Table 1 is that neither the reported rates nor their differentials with total population fertility are high. In the case of New Zealand, the differential between Māori and total population fertility rates is influenced by the Māori population itself, because it is of a sufficient size to influence the national rate, the only neo-Europe country where this is the case (McDonald & Moyle, 2010).

Table 1: Total fertility rates, indigenous and total populations in New Zealand, Australia, Canada and United States

Country	Year	Population	
		Indigenous	Total
New Zealand	2001	2.64	1.96
	2006	2.78	2.05
Australia	2001	2.15	1.73
	2006	2.12	1.81
Canada	1996-2001	2.60	1.56
	2006	2.84 ⁽¹⁾	1.59
United States	2001	1.75	2.03
	2006	1.83	2.10

Sources: Australian Bureau of Statistics, Ram, 2004; Statistics Canada, Statistics New Zealand, US Department of Health and Human Services, Centres for Disease Control and Prevention, National Centre for Health Statistics.

Notes

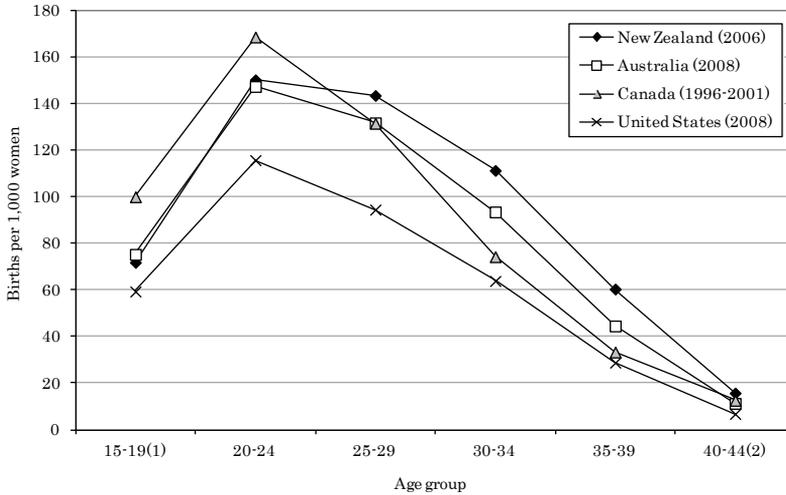
(1) This total fertility rate is for the Nunavut region of Canada, the population of which is predominantly Inuit.

In Australia and the United States, indigenous fertility rates are at or below replacement level (2.12 and 1.83 births per woman in 2006 respectively). More recent fertility data from Australia show higher Aboriginal and Torres Strait Islander total fertility rates (2.58 births per Indigenous woman in 2009). Much of this increase is attributable to improved identification of Aboriginal and Torres Strait Islander mothers in the Australian birth counts, rather than a real change in fertility behaviour (Evans & Johnstone, 2011). This highlights the difficulties associated with indigenous demography when the counting of events can contribute to changed outcomes as much as behaviour changes. Canadian and New Zealand total fertility rates are higher, 2.84 and 2.78 births per

woman in 2006 respectively (noting that the Canadian rate may be an over-estimate). These higher fertility rates are still not of an order commensurate with high fertility regimes such as those found in, for example, Sub-Saharan Africa where total fertility rates exceed five births per woman (Bongaarts, 2007; Garenne, 2008). In Canada, some indigenous sub-populations have lower fertility. During 1996-2001, for example, estimated total fertility rates for the Métis population was 2.15 births per woman compared to 2.60 births per woman for the total indigenous population (Ram, 2004). In Australia too, there are sub-population differences, with Aboriginal and Torres Strait Islander total fertility rates lower in the south-eastern states (in 2006, for example, 1.72 births per woman in Tasmania and 1.80 births per woman in Victoria) (ABS, 2007).

These relatively low measures of total fertility, however, conceal the dominant feature of contemporary indigenous fertility in Australasia and North America, namely the young age at which indigenous women have children. Figure 1 shows that the same pattern is in evidence for the indigenous populations in each of the countries considered here. All populations show peak childbearing at ages 20-24 years. All populations have high rates of teenage childbearing, ranging from 59 births per 1,000 American Indian or Alaskan Native females aged 15-19 years in the United States to 100 births per 1,000 Aboriginal Canadians. These rates are higher than the teenage fertility rates in each country's respective post-World War II baby booms, when early childbearing was a common feature for the total population. These high rates of early childbearing among indigenous women are also seen at the sub-population level where data are available. The Metis population in Canada, for example, had teenage fertility rates of 73 births per 1,000 females aged 15-19 years (Ram, 2004).

Figure 1: Indigenous age-specific fertility rates, New Zealand, Australia, Canada and United States (for year of most recent, available data)



Sources: Australian Bureau of Statistics; Ram, 2004; Statistics New Zealand; US Department of Health and Human Services, Centres for Disease Control and Prevention, National Centre for Health Statistics.

Notes

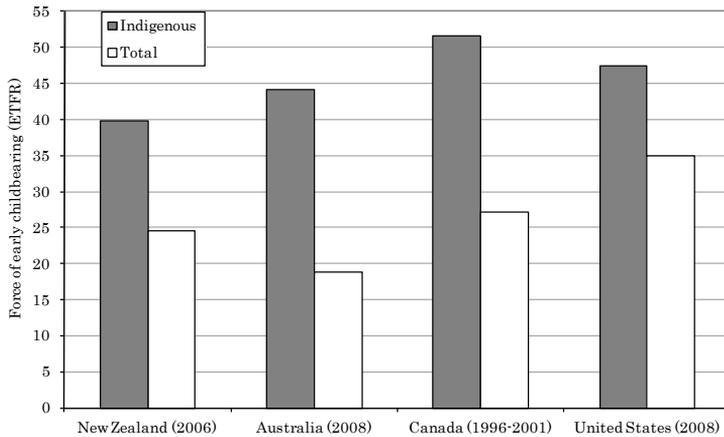
- (1) Includes births to women 10-14 years.
- (2) Includes births to women 45-49 years.

The youthful fertility profile of indigenous women in the countries of Australasia and North America is very recognisable for demographers familiar with the fertility transitions of the non-indigenous populations in those countries. It reflects the fertility patterns seen during the post-World War II baby booms of each country (Kippen, 2003; Pool and Sceats, 1981). It is one of the reasons that a common assumption has been that childbearing would move to older ages among indigenous women, as happened at the end of the post-World War II baby boom among the colonising majority populations when fertility declined (Gray, 1983; Ram, 2004).

This pattern of young childbearing is also apparent when parity data are looked at (where data are available). In Australia between 2001 and 2004, over half (53 percent) of first time Aboriginal and Torres Strait Islander mothers were teenagers (Leeds et al., 2007). In the United States, over one-third (39 percent) of first time mothers were under the age of 20 years in 2008 (Martin et al., 2010).

What makes this pattern of youthful fertility stand out is that in each case it occurs alongside notable shifts to older childbearing among the total population of each country. When the cumulative childbearing which takes place up to the age of 25 years, or the ‘force’ of early childbearing (ETFR), is considered, the difference between the colonising and colonised populations is readily apparent (Figure 2). In each country, indigenous populations had a much higher concentration of early childbearing compared to the total population. The force of early childbearing was highest in Canada, where 52 percent of all childbearing took place before the age of 25 years, while it was lowest for Māori in New Zealand, where 40 percent of childbearing occurred before women reached 25 years of age. The largest differential between indigenous total populations was seen in Australia where the Indigenous ETFR was 134 percent higher than that of the total population.

Figure 2: Early force of childbearing (ETFR)⁽¹⁾, indigenous and total populations in New Zealand, Australia, Canada and United States (for year of most recent, available data)



Sources: Australian Bureau of Statistics; Ram, 2004; Statistics New Zealand; US Department of Health and Human Services, Centres for Disease Control and Prevention, National Centre for Health Statistics.

Notes:

(1) $ETFR = (5 * (ASFR_{15-19} + ASFR_{20-24}) / TFR) * 100$

An Indigenous Demographic Transition?

As has been shown, a common feature of the fertility profiles of the indigenous populations in Australasia and North America is the relatively low total fertility rates alongside high rates of childbearing at young ages. The fertility declines of the 1970s were all characterised by a cessation of childbearing at the older ages among indigenous women (Gray, 1983; Pool, 1991). As already noted, it was generally assumed that these declines at older ages would be followed by declines in fertility at the younger ages. While there is evidence of deferred childbearing among indigenous women (Johnstone, 2011; Pool, 2005) the main childbearing ages for indigenous women remain young.

In countries where downward fertility trends change to flat or even increasing fertility, the phenomenon is known as 'fertility stall'. The fertility stall is typically observed at high fertility levels, in regions where women have five or more live births over their life time (e.g. Bongaarts, 2007; Ezech et al., 2009; Garenne, 2008; Shapiro & Gebreselassie, 2008). This model is not very useful for helping us understand fertility patterns characterised by relatively low parity. Yet, extremely high rates of adolescent childbearing alongside low (and for some sub-populations, sub-replacement) total fertility rates demands explanation.

The common feature among the populations under comparison here is their shared experience of colonisation. That colonisation has affected the demography of indigenous populations is almost self-evident (Kunitz, 2000; Smith et al., 2008). As Pool wrote for New Zealand in *Te Iwi Maori*:

...a history of Maori population should be a reminder that patterns and trends of the past, even in the period before colonisation, must be taken into account in resolving many contemporary constitutional and political issues. Moreover, these past trends will determine population structure and dynamics for the foreseeable future (Pool, 1991, p. 8-9).

Despite such recognition of the ongoing impact of colonisation on demographic outcomes there remain too few explicit frameworks for understanding indigenous populations (Kukutai & Pool, 2008). Douglas (1977) explored the cultural factors under colonisation that maintained high Māori fertility in New Zealand until the 1960s and which contributed to rapid fertility decline during the 1970s. These factors were explored in

more detail by Pool (1991). In relation to Māori childbearing patterns during the 1980s in New Zealand he wrote:

Family-formation patterns were thus still rather different from Pākehā even though the TFRs were very close. These patterns are clearly affected by a cultural difference in approaches to creating families, not in the overall dimensions of a family. Among Maori the debate today appears to center around the timing of the commencement and the limitations of childbearing, but not whether or not to have children (Pool, 1991, p. 167).

Johnstone (2011) reached a similar conclusion arising from an in-depth examination of contemporary Aboriginal and Torres Strait Islander fertility in the Northern Territory of Australia. Throughout the north of Australia there is little (if any) discussion about whether Aboriginal and Torres Strait Islander women will have children, or even about when to have them, while low fertility levels show active pursuit of family size limitation. Understanding why this might be so among colonised, indigenous populations across countries, however, is not well served by demographic theory because it fails to account for the impacts of colonisation. Demographic transition theory reflects neither the dramatic declines in population numbers immediately following colonisation (Pool, 1991; Smith, 1980) nor the relative stability of indigenous fertility since the 1980s (Johnstone, 2010, 2011; Ram, 2004).

Second demographic transition theory offers more promise because it is predicated on major changes in fertility alongside significant material improvement (van de Kaa, 2002). The well-recognised disadvantage of indigenous peoples compared to their non-indigenous counterparts may be an impediment to delayed childbearing. It could be argued that an improvement in socio-economic outcomes for indigenous peoples would lead to the same demographic patterns seen among the majority populations in each of the countries looked at here. Second demographic transition theory is founded on a redefinition of the model of the family (van de Kaa, 2002, p. 31), and culturally different approaches to creating families by indigenous peoples (Pool, 1991; Robinson, 1997) could explain why fertility has remained young. Yet such an assumption perpetuates the omission of colonisation from the demographic discourse. It also assumes western constructs of family, including marriage and living arrangements, are applicable to indigenous peoples. Even when indigenous family form appears the same as non-indigenous families, the anthropological evidence

shows that the underlying substance and concepts of kin may be different (Langton, 1981; Morphy, 2007; Musharbash, 2003; Penman, 2006; Robinson, 1997).

The persistent young profile of indigenous childbearing and an inability to understand it using existing theory or analytical frameworks led to two demographers on opposite sides of the globe developing conceptual frameworks for understanding contemporary indigenous fertility: Romaniuk (2008) for Canada and Johnstone (2011) for Australia. Both frameworks highlight the importance of colonisation history on indigenous fertility levels in the 21st century. Romaniuk (2008) conceptualised this history as creating conflict 'between two worlds', with this conflict influencing indigenous fertility outcomes in Canada. Johnstone (2011) identified colonisation history as an explicit and pervasive influence on all exogenous drivers of the proximate determinants of fertility, thus creating new social and political spheres for indigenous peoples in Australia and affecting demographic outcomes.

The two attempts to better understand indigenous fertility in a manner firmly based on colonisation history and the minority status of the indigenous peoples in the nation state (Johnstone, 2011; Romaniuk, 2008), alongside the common fertility patterns across Australasia and North America, suggest an indigenous theory for population change is needed. Such a theory should reflect the political economy of fertility, enabling explanation of contemporary fertility patterns among indigenous peoples that reflect social, economic, political, historical and cultural realities (Greenhalgh, 1990). Johnstone's (2011, p. 41) conceptual framework for explaining contemporary Aboriginal and Torres Strait Islander fertility in Australia recognises that there are continued, inequitable power relations between indigenous peoples and colonisers and continued marginalisation from the dominant society arising from the continued impost of history on the present (Altman, 2006; Pearson, 2007; Taylor and Bell, 2004; Trudgen, 2000). Johnstone's work also highlights the interactive nature of geography, gender and indigeneity in determining the impact of colonisation as well as socio-economic and health status outcomes. It echoes Kukutai & Pool's (2008) detailed work for New Zealand, which demonstrated the need for analytical tools that allow for multiple boundaries of indigenous identity.

While the features of fertility among the indigenous populations of Australasia and North America speak to the need for a demography of indigenous peoples, the shortcomings of broader demographic theory reiterate the need for an indigenous demography itself (Pool, 1991, p. 137; Taylor, 2009). Rigney (2001), writing for Australia, has argued that the need for indigenist theory is paramount to advance political sovereignty, self-determination and the maintenance of self-identity. The inherently political nature of indigenous demography (Gray, 1983; Pool, 1991) indicates that an indigenous theory of demographic transition would not only offer insights into contemporary fertility patterns among minority, indigenous populations, but also reflect an indigenisation of demographic theory and research practices.

Acknowledgement

I was introduced to demography in 1988 during two one-hour lectures by Ian Pool, and I was hooked. Since that time Ian, as my professor and colleague, has played a significant role in teaching me much of what I know – not only about populations, but also about how to write and to present demographic facts to non-technical audiences. This article is informed by my recent PhD research, but it has its genesis in my early demography training with Ian. It is an honour to be able to say thank you for his generosity in sharing his knowledge, expertise and support over the past 20 years. *Merci beaucoup.*

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Socioeconomic Differences in Family Formation: Recent Australian Trends

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Abstract

Ian Pool is known for his attention to social inequalities as revealed by demographic indicators. In Australia, since the turn of the century, marriages and divorces have stabilised, while births have increased. However, national statistics hide important sub-group differences in family formation practices. In this piece, we review current demographic trends determining family types in Australia, with particular attention to socioeconomic differences within the population. We argue that increasing differentials in marriage, divorce and childbearing behaviour by socioeconomic status may compound the potential for advantage and disadvantage to be transmitted from one generation to the next. We suggest that attention to such inequalities should be a feature of Australian demography in the 21st century.

Ian Pool is known for his attention to social inequalities as revealed by demographic indicators (for example, Pool, 1991). Throughout his work, he emphasizes that the functions of the family are of utmost importance, regardless of its changing forms (for example, Jackson & Pool, 1996). One of the most important functions performed within the family is reproduction, not only the bearing and raising of children, but also the transmission of social status.

When compared with a decade ago, current demographic indicators regarding family formation in Australia give a very different picture. In the year 2001, the crude marriage rate reached its lowest recorded figure of 5.3 marriages per 1,000; while Australia's total fertility rate (TFR) also reached its lowest recorded level of 1.73 babies per woman. Meanwhile, divorce was at its highest since the peak recorded following the

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introduction of no-fault divorce in 1976 (ABS, 2008). Statistics like these contributed to a view of a crisis in the family (e.g. Maley, 2001).

However, in the first decade of the 21st century, the number and rate of marriages and births rose, while the number and rate of divorces fell. In 2010, Australia recorded its highest ever number of marriages, while the crude marriage rate remained stable at 5.4 per 1,000. The divorce rate was also stable at 2.3 per 1,000 (ABS, 2011d). The TFR continued to increase until 2008, reaching 1.96 before dropping back to 1.89 in 2010 (ABS, 2011a). Having spent decades attempting to explain the 'baby bust' of the late 20th century, demographers have been scrambling to explain the recent 'boom'.

In short, the turn of the century also seems to have been a demographic turning point of sorts. However, these national-level indicators hide important differences at the sub-population level. In this piece, we review current demographic trends determining family types in Australia, with particular attention to socioeconomic differentials within the Australian population. Our discussion of marriage also refers to New Zealand, where patterns similar to those in Australia have been recorded.

Family Structures

According to the most recent census from which data is available (2006), there were 5.2 million Australian families in 2006, up from 4.7 million in 1996. Family structures are changing in ways which are by now familiar: the nuclear family no longer dominates, and household composition is increasingly diverse. By 2006, the proportion of families consisting of a couple with children had fallen well below half (45 percent, down from 50 percent in 1996). Couple families without children grew to account for 37 percent of all families, up from 34 percent in 1996. The proportion of one parent families was quite stable at around 16 percent, following steady growth in the decade prior (ABS, 2007b). Meanwhile, living alone has become increasingly common over the past two decades. Around two million Australians live alone, representing about 12 percent of the adult population (ABS, 2009) and, as at the 2006 Census, 23 percent of private households (ABS, 2007a).

It is widely accepted that certain types of households and families experience financial disadvantage as a consequence of their structure. One parent families are the obvious example, because the ratio of workers to dependents is low. Compared to other groups, lone parents have lower levels of employment, lower incomes, fewer assets and higher levels of financial stress (we return to this subject later).

Less well rehearsed, at least in Australia, is the way in which family types vary along socioeconomic lines. That is, the way in which economic disadvantage -or, more broadly, low socioeconomic status -determines the likelihood of ending up in one kind of family or another. In the following sections we review the way in which recent trends in family formation have varied across socioeconomic strata. Educational attainment is used as a relatively stable indicator of socioeconomic status.

In many societies, there is a significant racial and/or ethnic dimension to inequalities of family formation (e.g. Crowder & Tolnay, 2000; Lichter, Batson, & Brown, 2004). However, our focus here is the socioeconomic dimension. Where New Zealand is included in the discussion on marriage below, the analysis is restricted to those of European descent, to enable comparison with Australia. This is because the demographic characteristics of New Zealand's large Māori minority, in particular, differ considerably from those of the country's European population.¹ New Zealanders who claimed a combined non-European and European ethnicity are also excluded, reducing the population under analysis to between 53 and 70 percent of the New Zealand population in the age groups discussed.²

Marriage

The recent stabilisation in Australian marriage rates has occurred after three decades of decline, and in the last fifteen years or so, trends in marriage have been characterised by growing socioeconomic differences. Specifically, marriage rates have continued their long-term decline in lower socioeconomic strata, but have stabilised in higher socioeconomic strata. These trends have been described as a 'new socioeconomic pattern of marriage' by US commentators (Cherlin, 2009; Goldstein & Kenney, 2001; Lichter, Batson, & Brown, 2004; Rose, 2005) and have also been documented in Australia and among the European population of New Zealand (Birrell, Rapson & Hourigan, 2004; Callister, 2000; Heard, 2008, 2011).

As demonstrated in Heard (2011), Australia and New Zealand exhibited similar patterns of change across the educational spectrum in the decade to 2006 (see Table 1 and Table 2 below).³ In both countries, proportions married have decreased, but there is a clear gradient in change by educational attainment, with the decline being pronounced among those with lower qualifications and least pronounced among those with degrees.

Australian men and women with post-school qualifications still tend to delay marriage. However, as a result of the trends just described, by 30-34 years and over, the likelihood of being married increases with each additional level of post-school education. Similarly, in New Zealand, men and women with no formal qualifications are much less likely to be married than men and women with any qualification (high school, vocational, or degree).

Table 1: Per cent married by age, sex and educational attainment, Australia, 1996, 2001 and 2006

Level of post-school education	Men				Women			
	1996	2001	2006	Change 1996 to 2006	1996	2001	2006	Change 1996 to 2006
Aged 20-24								
Bachelor degree or higher	6	5	4	-2	13	10	9	-3
Diploma	7	5	4	-2	15	12	10	-5
Skilled vocational	12	8	6	-6	21	14	12	-9
Basic vocational / Other/ none	6	4	3	-3	17	12	9	-7
Aged 25-29								
Bachelor degree or higher	31	27	25	-6	41	38	35	6
Diploma	37	31	28	-9	48	42	38	-10
Skilled vocational	42	36	31	-11	53	43	37	-16
Basic vocational / Other/ none	32	25	21	-11	49	41	35	-13
Aged 30-34								
Bachelor degree or higher	61	56	56	-5	64	60	61	-3
Diploma	63	57	55	-8	66	61	58	-9
Skilled vocational	64	58	55	-10	67	60	54	-14
Basic vocational / Other/ none	52	46	41	-11	64	58	53	-11
Aged 35-39								
Bachelor degree or higher	75	71	70	-4	70	69	68	-2
Diploma	74	70	67	-7	73	67	64	-9
Skilled vocational	72	68	64	-8	72	66	61	-11
Basic vocational / Other/ none	62	56	52	-11	70	65	60	-9
Aged 40-44								
Bachelor degree or higher	79	77	76	-3	70	69	68	-2
Diploma	77	74	72	-6	73	68	66	-7
Skilled vocational	76	71	68	-8	73	67	62	-11
Basic vocational / Other/ none	68	62	57	-11	72	67	64	-8

Table 2: Percent married by age and educational attainment, New Zealand(a), 1996, 2001 and 2006

Level of post-school education	Men				Women			
	1996	2001	2006	Change 1996 to 2006	1996	2001	2006	Change 1996 to 2006
Aged 20-24								
Bachelor degree or higher	5	4	4	-2	8	7	7	-1
Diploma	8	5	4	-4	14	9	8	-6
Skilled vocational	5	4	3	-2	14	9	7	-7
Basic vocational / Other/ none	6	4	3	-3	16	9	6	-9
Aged 25-29								
Bachelor degree or higher	26	23	22	-4	34	30	29	-5
Diploma	37	30	23	-14	45	36	31	-15
Skilled vocational	30	24	22	-8	49	39	32	-18
Basic vocational / Other/ none	27	18	15	-13	39	26	21	-18
Aged 30-34								
Bachelor degree or higher	58	50	49	-8	59	52	53	-6
Diploma	62	54	51	-11	65	56	54	-11
Skilled vocational	54	46	44	-10	67	59	52	-15
Basic vocational / Other/ none	46	36	28	-18	53	43	32	-21
Aged 35-39								
Bachelor degree or higher	74	67	65	-9	68	63	61	-6
Diploma	72	66	64	-9	73	64	64	-9
Skilled vocational	65	59	56	-9	72	66	61	-11
Basic vocational / Other/ none	57	46	39	-18	62	50	44	-18
Aged 40-44								
Bachelor degree or higher	79	74	70	-9	69	65	63	-6
Diploma	77	71	69	-8	74	68	66	-8
Skilled vocational	71	64	61	-9	74	69	63	-11
Basic vocational / Other/ none	65	54	45	-20	68	57	49	-20

As in other developed countries, the decline in marriage rates in Australia and New Zealand has occurred alongside increased rates of cohabitation. However, rates of cohabitation are increasing gradually and at a fairly uniform pace across the population, regardless of education. For example, between 1996 and 2006, proportions of Australian men and women aged 30–34 years who were cohabiting increased between four and seven percentage points across the varying categories of educational attainment (Heard, 2011). Hence, marriage is the emerging focus regarding socioeconomic differences in partnership patterns.

Rates of separation and divorce also vary substantially by socioeconomic status. In Australia, proportions separated or divorced are consistently lower among women with degrees than among women with lower educational attainment, in every age group (Table 3). Among men there is a slight but distinct gradient in every age group, such that those with degrees are least likely to be separated or divorced and those with no post-school qualifications are most likely to be separated or divorced. Socioeconomic differences in rates of marital dissolution contribute to the disparate marriage outcomes described earlier; however, they cannot fully explain the socioeconomic differences in proportions married at the time of the census. Rather, there are different propensities to marry in the first place. Table 3 shows that men with no post-school qualifications are considerably less likely ever to have been married than their counterparts with more education, at every age. For women, those with an intermediate level of post-school education (a diploma or skilled vocational qualification) are most likely to have been married.

Table 3: Percent ever married, separated or divorced by educational attainment Australia, 2006.

Age (years)	Qualification	Ever married		Separated or divorced	
		Women	Men	Women	Men
20-24	Bachelor degree or higher	10	5	0	0
	Diploma or skilled vocational	12	6	1	0
	Other/None	10	4	1	0
25-29	Bachelor degree or higher	37	27	2	1
	Diploma or skilled vocational	42	32	5	2
	Other/None	41	23	6	3
30-34	Bachelor degree or higher	66	60	5	3
	Diploma or skilled vocational	67	60	10	6
	Other/None	64	47	11	7
35-39	Bachelor degree or higher	77	76	9	6
	Diploma or skilled vocational	80	75	16	10
	Other/None	77	62	16	12
40-44	Bachelor degree or higher	83	84	13	8
	Diploma or skilled vocational	86	83	21	14
	Other/None	84	72	20	16

Source: Census of Population and Housing, customised dataset from the Australian Bureau of Statistics

Notes: 'Diploma or skilled vocational' approximate International Standard Classification of Education Levels 4A, 4B and 5B (United Nations Educational, Scientific and Cultural Organization 2006).

'Other / none' includes basic vocational or other certificates and post-school qualifications that were unspecified or inadequately described, as well as no formal qualifications.

These trends appear to have been accompanied by a cultural shift in the meaning attached to the institution of marriage. Several decades ago, it seemed that educated men and (particularly) women were leading the shift away from traditional marriage. Now, far from diminishing along with the overall decline in marriage rates, the 'symbolic value' of marriage has increased, according to several commentators (Cherlin, 2004, 2005, 2009; Coontz, 2005). More so than ever, marriage connotes economic security and relationship success and has become a marker of social status (Gibson-Davis, Edin & McLanahan, 2005).

Heard (2011) has argued that the available explanations for growing socioeconomic marriage differentials fit the antipodean context as well as they do other developed societies. The literature suggests that the situation faced by unqualified men in a globalized post-industrial context is key to understanding the obstacles to marriage in low socioeconomic strata (Cherlin, 2009; Huston & Melz, 2004; Lichter et al., 2004; Qian, 1998; Rose, 2005). The decline in blue-collar work has left many men unemployed or underemployed in casual or part-time work. Those without

post-school qualifications are particularly vulnerable to inconsistent demand for unskilled or semi-skilled labour (Blossfeld & Buchholz, 2009). As a consequence, potential male partners in low socioeconomic strata lack the economic characteristics—namely, secure employment and a reliable income—that are conducive to marriage (Lichter et al., 2004).

Although the new socioeconomic marriage pattern has also emerged in countries including the US, Canada, and several European nations, it is arguably particularly surprising in the antipodean setting because Australia and New Zealand share such a deep cultural attachment to the idea of egalitarianism. Ian Pool and his colleagues have documented New Zealand's early status as a 'pioneer welfare state' that institutionalised an expectation of relative material and social equality (Pool, Dharmalingam, & Sceats, 2007). Over the past three decades, economic deregulation has facilitated participation in a global economy and considerable economic growth. However, there are social consequences. As in the US, economic restructuring has been blamed for the deterioration in partnering outcomes for low income men relative to other men in Australia and New Zealand (Birrell et al., 2004; Callister, 2000; de Vaus, 2004). Socioeconomic marriage differentials may be viewed as a social manifestation of the polarisation of the labour market.

Fertility

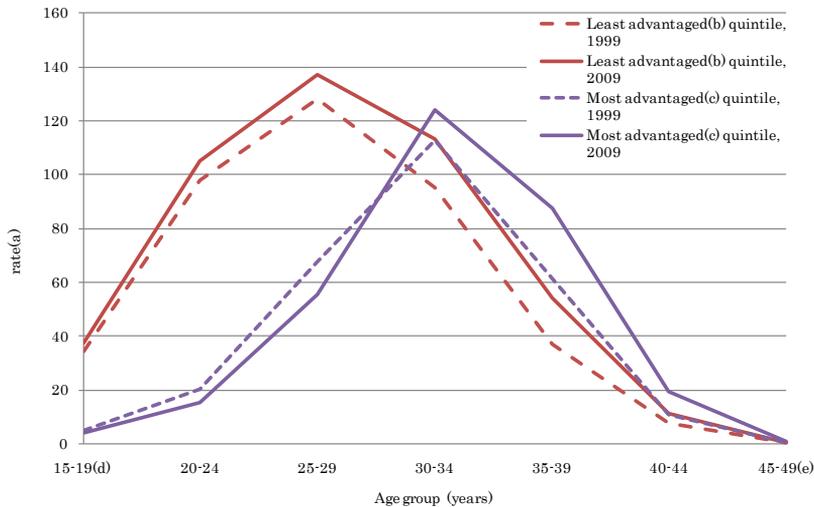
Ian Pool has written about "reproductive polarisation" (Pool et al., 2007, p. 330), by which he means "the existence of differentials in timing, spacing and completed fertility when the overall fertility is at sub-replacement level". In the New Zealand context, for example, he notes that the greatest fertility differential is no longer between Māori and non-Māori. Rather, childbearing outcomes are now polarised by women's workforce status, with those working full time far more likely to be childless than other women. Relatedly, education is also a strong determinant of childlessness by 30–34 years of age.

Education and workforce status are also strong determinants of fertility in Australia. It is well established that women with more education and/ or higher individual incomes have fewer children (ABS, 2001), and these women tend to be from higher socioeconomic backgrounds. In 2009, women in the most advantaged 20 percent of

Australia's Statistical Local Areas (SLAs) recorded a TFR of 1.5, compared to 2.3 among women in the least advantaged quintile (ABS, 2010b). Patterns of childbearing differ dramatically by socioeconomic status (see Figure 1). The fertility of women in the most advantaged areas peaks at 30–34 years, then 35–39 years. By contrast, women in the least advantaged areas have their babies younger, peaking at 25–29 years, then 20–24 years.

During Australia's recent fertility increase, some significant gains occurred in the most advantaged areas of Australia (ABS, 2007d). This was largely a function of age: the increase in Australia's TFR—a measure known to be sensitive to changes in the timing of childbearing—from 2001 to 2008 was largely attributable to births to women aged 30–39 years, 'recuperating' births delayed while they were in their twenties (Heard, 2010; Lattimore & Pobke, 2008). Women from higher socioeconomic backgrounds are largely the same women as those with higher educational attainment and higher median ages at first birth. It follows that such women should also be prominent in any 'catch-up effect'.

Yet, over the decade to 2009, the largest increases in fertility still occurred among women in the least advantaged 40 percent of Australia's SLAs (ABS, 2010b, p. 3). Figure 1 shows that fertility increased among thirty-something women in these SLAs, too—but also among women in each other age group. Indeed, while age-specific fertility rates have been declining overall among Australian women under 30 years, in the least advantaged areas there were increases in the fertility rates of women aged 20–24 and 25–29 years, and even among teenagers, in the decade to 2009.

Figure 1: Age-specific fertility rates by quintile of advantage/disadvantage, 1999 and 2009

Source: Australian Bureau of Statistics, upon request.

Notes:

- (a) Babies per 1,000 women
- (b) And most disadvantaged
- (c) And least disadvantaged
- (d) Includes births to mothers aged less than 15 years.
- (e) Includes births to mothers aged 50 years and over.

The commentary on recent fertility change generally fails to acknowledge the impact of socioeconomic status. Most of the ‘headline’ claims made with regard to Australia’s fertility increase since 2001 are, in fact, specific to certain socioeconomic groups. Certainly, the increase was largely attributable to births to women aged 30–39 years, ‘recuperating’ births delayed while they were in their twenties (Lattimore & Pobke, 2008)—but this describes a middle-class phenomenon (ABS, 2007d). At the other end of spectrum, it is also true that teenage fertility rose in the years 2007–2008 following decades of consistent decline (Browne, 2010)—but the evidence suggests this was entirely due to the fertility of women in the least advantaged quintile (ABS, 2010b, 2011a).⁴

It is interesting to reflect that the contemporary fertility behaviour of women in the least advantaged areas of Australia (Figure 1) resembles the fertility behaviour of all Australian women some decades ago: it was in 1986 that age-specific fertility rates for all Australian women last peaked in the age groups of 25–29 years and 20–24 years. In the quarter-century

since then, women from higher socioeconomic backgrounds have been delaying family formation whilst gaining educational qualifications and experience in the labour force. By contrast, it would seem that little has changed for women from lower socioeconomic backgrounds in recent decades. Clearly, where childbearing commences earlier and is sustained over a longer period of time, the opportunities for advancing education and career opportunities are limited.

One Parent Families

To reiterate the patterns described so far, men and women with lower educational attainment are considerably less likely to be married at any age. If they marry, they are more likely to separate or divorce. Nevertheless, women in this group have more children, and tend to have them earlier. As a consequence, women from low socioeconomic backgrounds are much more likely to become lone parents.

One-parent families may be formed in two ways. The majority are formed when couples separate or divorce (55 percent in 2003); however, a growing proportion (39 percent in 2003) of lone parents have never been married (ABS, 2007c). Most of these have instead experienced the breakdown of a de-facto relationship in which children were born (de Vaus, 2004). Indeed, the increasing popularity of cohabiting relationships and their higher rate of break down (when compared with marriages) is an important reason for the increase in one parent families over recent decades.

The socioeconomic disadvantage of those who become lone parents is clear from their educational profile (ABS, 2007c; de Vaus, 2004). This is evident at both extremes: lone parents are considerably less likely than partnered parents to hold a degree or higher; and much more likely to be without non-school qualifications. The younger the children, the greater the educational gap between partnered and unpartnered parents; indeed, lone mothers of adult children are just as likely to have degrees as partnered mothers of adult children, while proportions with no post-school qualifications are also comparable (de Vaus, 2004). This is partly because lone mothers may continue to pursue educational qualifications as they raise their children—lone parents with children under 15 years are almost twice as likely as partnered parents to be undertaking current study (ABS,

2007c). However, de Vaus (2004, p. 50) argues that it is mainly due to differences in the pathways in and out of lone parenthood: women with lower levels of education may become lone mothers earlier in life, but may repartner while their children are still growing up. Women with higher qualifications may become lone parents later in life when their children are older, and may be less likely to repartner.

Where lone mothers do have post-school qualifications, their rates of employment are similar to those of couple mothers once their children are of school age. However, lone mothers without post-school qualifications are considerably less likely to be employed than their partnered counterparts. De Vaus (2004, p. 51) suggests that this is because it is more difficult for poorly qualified lone mothers to find work which meets the cost of child care and offsets the loss of benefits.

Compared to partnered mothers and fathers, lone parents of either sex are less likely to be employed full time and more likely to be unemployed or not in the labour force. The mean disposable income of one-parent families with children under 15 years has been estimated at around 70 percent of that of couple families with children of this age, and their net worth is also considerably lower (ABS, 2007c). As a consequence, one parent families are much more likely to be renting their accommodation (59 percent) than couples with children, the majority of whom (62 percent) are buying their own homes (ABS, 2011c). Consistent with these objective measures, lone parents score more highly on subjective measures of financial stress (ABS, 2007c). Over sixty percent rely on Government pensions and allowances for their main source of income.

For all these reasons, the number of one parent families has been a focus of social concern and government policy for several decades now. In the last decade, changes to income support eligibility have aimed to contain the cost to government of supporting lone parents and their children, with some success (ABS, 2007c). It might be some comfort to policy makers that one-parent families have now been stable as a proportion of all families for more than a decade. As a proportion of families with children under 15 years, one parent families have even fallen slightly since the early 2000s, and now account for about 23 percent (ABS, 2007c, 2011b). The overall stabilisation of Australian marriage and divorce rates since 2001 has no doubt contributed to this. However, in keeping with Pool's emphasis on function over form, we would suggest that concern

regarding one parent families should extend beyond their sheer numbers to their make-up and their mobility. Has the growth in one parent families been stemmed across the population, or are trends at the lower end of socioeconomic spectrum simply being offset by trends at the upper end? Is there any sign of improved upward mobility among disadvantaged one parent families? While further research is needed to provide an answer to these questions, we would suggest that the marriage and fertility differentials described earlier do not offer much cause for optimism.

Unequal Families

The patterns described in this paper paint a picture of family formation trends that are determined in large part by socioeconomic status, as far as it can be measured by educational attainment. Pathways to family formation differ greatly, particularly for women. On the one hand, those from higher socioeconomic backgrounds tend to delay partnering and childbearing, choosing instead to gain post-school qualifications and work experience in their twenties. Marriage rates have stabilised in this group, pointing to the continuing, or perhaps renewed, appeal of this form of commitment for middle class couples. On the other hand, those with lower educational attainment are considerably less likely to be married at any age. If they marry, they are more likely to separate or divorce. Nevertheless, women in this group have more children, and tend to have them earlier. As a consequence, they are much more likely to become lone parents.

In the United States, divergent marriage trends, compounded by divergent trends in marital dissolution (Martin, 2006), have prompted concern about a widening socioeconomic divide in family circumstances (Cherlin, 2005; Hymovitz, 2006). This potential stems from the tendency for men and women to seek partners within their own social circles, leading to separate marriage markets. Educational attainment exerts a particularly powerful and increasing influence over mate selection (Blossfeld & Buchholz, 2009; Kalmijn, 1998), and educational homogamy compounds the potential for advantage and disadvantage to be transmitted from one generation to the next. In addition to the socioeconomic advantages enjoyed by the children of married and well-educated parents, these children are themselves more likely to marry (Goldstein & Kenney, 2001; Sassler, 2008). Conversely, in addition to the privation experienced

by children from low socioeconomic backgrounds, these children are more likely to live in one-parent families, with all the attendant disadvantages described earlier. In turn, they are less to form stable partnerships themselves, and more likely to become lone parents themselves.

Research such as this suggests that entrenched, multigenerational disadvantage is inextricably intertwined with patterns of family formation. Hymovitz (2006, pp. 16, 22) claims the polarisation of family formation trends by educational attainment has produced 'a yawning social divide' in the US, observing that 'separate and unequal families produce separate and unequal economic fates.' Social and economic inequalities in Australia, although arguably less stark, may yet be sufficient to produce divergent family outcomes such that the life chances of children vary according to the socioeconomic resources available to their parents. It would seem equally important that we monitor family formation trends for signs of stress in the fabric of our supposedly more egalitarian society.

Conclusion: Form vs Function

This paper has focussed on the way in which patterns of family formation differ by socioeconomic status. Ian Pool has argued that our concern should be for the functions served by the family, rather than the changing forms the family may take: despite so much change in family structures, the institution is remarkably resilient, and its traditional functions continue to be fulfilled (Jackson & Pool, 1996). This view is not unambiguously positive in its implications. If anything, the family seems to have an increased capacity to reproduce inequality, with diverging trends in marriage and divorce by socioeconomic status, and stark differentials in childbearing behaviour. The resultant family structures may serve similar purposes, but do so with very different resource constraints. Far from diminishing in this era of relatively prosperity, the patterns described suggest that socioeconomic disadvantage may become more entrenched.

Some of the socioeconomic differentials described above are well known, but all are downplayed or neglected in public discussion of demographic change. Increased birth numbers and stable rates of marriage and divorce have been celebrated to varying degrees by politicians and the media in Australia, but few acknowledge the very different patterns of family formation occurring at opposite ends of the socioeconomic spectrum.

In part this is because there is so little academic analysis of these differences informing the debate. We suggest—and we trust Ian Pool would approve—that attention to such inequalities should be a feature of Australian demography in the 21st century.

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Notes

1. Of particular relevance here, the tradition of community-sanctioned consensual unions is longstanding among the Māori and is reflected in consistently higher rates of cohabitation (Pool, Dharmalingam & Sceats 2007, p 228; Statistics New Zealand, 2007).
2. The Māori proportion of the New Zealand population (15 percent in 2006) is considerably greater than the indigenous (Aboriginal and Torres Strait Islander) proportion of the Australian population (2 percent in 2006).
3. Whereas the Australian Census of Population and Housing variable used in this analysis relates to post-school qualifications, the variable from the New Zealand Census of Population and Dwellings used here includes 'school qualification'; therefore, 'no qualification' includes those who did not complete secondary school. This difference matters little for the argument concerning trends in marriage by education.
4. There have been several assessments of the role that Australia's 'Baby Bonus' might have played in the upturn and sustained increase in fertility experienced in recent years. Economists have argued that the increase is unambiguously attributable to the baby bonus, on the basis that fertility intentions rose around the time of the announcement of the baby bonus (Drago et al., 2011; Risse, 2010). However, multivariate analysis by Parr and Guest (2011) demonstrates that the effects of the Baby Bonus and the Child Care Rebate have been slight. Rather, as indicated in this article, recent fertility increase is mostly attributable to the changing distribution of women of reproductive age by age and parity. Moreover, although there has been popular perception and academic speculation that young and poorly educated women in particular are having babies in response to the bonus (e.g. Risse, 2010), this claim lacks evidence.

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New Zealand's Cohort Life Expectancies in a Global Context

ROBERT DIDHAM *
JIT CHEUNG **

Abstract

Ian Pool has had a long and deep interest in human mortality and survivorship in New Zealand and internationally. His many contributions have enriched New Zealand's knowledge base in that regard, particularly his focus on the ethnic dimension and the distinct and contrasting models of epidemiological transition for Māori and Pākehā (Pool et al., 2009). In addition to the many technical papers and conference contributions that Ian has produced, his summary of mortality trends in New Zealand (Pool, 1985) continues to be used regularly as a starting point for ongoing general research and policy development in this country. In particular, Ian has been a strong advocate of research into cohort approaches to fertility and mortality (Pool & Cheung, 2003). One of the fruits of this interest culminated in the production of a set of cohort life tables (Dunstan et al., 2006) which, with regular updates being available, continues to provide a platform for ongoing research in New Zealand and has contributed a major resource to the international literature and databank.

Human mortality and survivorship have long held a fascination for social scientists, philosophers, health researchers and demographers. This interest extends, in Europe at least, back for more than 1,800 years to Ulpian's (born 211 CE) annuities work recorded by Aeminius Macer (Frier, 1982). The scientific interest in the relationship between health, diet and longevity precedes this period throughout Sanskrit and Chinese literature, and can be seen as an important component of Greek, Indian and Persian medicine, preserved in Arabic and eventually re-introduced to Europe by Arabic scholars with the rise of the first universities in the 12th Century CE. Of relevance to this paper, the

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work of these early scholars, and those who followed over the next four centuries, was directed at finding a robust quantitative method of measuring mortality rates and, thereby, to monitor change.

One of the early tools for quantifying mortality was the life table. Its invention in 1693 is generally credited to Edmund Halley, the astronomer, although it was based on an earlier idea by Petty, and possibly by Graunt (Graunt, 1662, Halley, 1693). Early interest, reflected in the work of de Moivre (1725) lay in the expectation of life with respect to annuities rather than to the length of life (O'Connell, 2012). In the Malthusian world (Malthus, 1798), not only was the number of people of interest, the survivorship of individual consumers was also an essential component of the sustainability of the population. Over a century later, Farr (1864) developed the cohort approach to the life table, recognising that both the sequence of life course environments and when a person was born had an influence on how long one might survive. This was a significant development. In contrast to the more common period life table, which refers to the experience of a group of people all dying within the same period of time, the cohort (or generation) table reflects the lifetime experience of a group of people all born in the same period of time (Jacobson, 1964, Goldstein & Wachter, 2006).

Since that time demographers have maintained an ongoing affair with life tables as the primary tool in pursuit of deeper knowledge on human survival. This was especially pertinent to concerns over the effect of disease, sanitation and exposure to violent and accidental death experienced by many children in the ensuing century. It was also a valuable tool with which to demonstrate improvements in the survivorship of children (Pool et al., 2007) and the long-term effects of health conditions in childhood on longevity (Hayward & Gorman, 2004). The core value of the life table is that it provides a reasonably robust measure of the expectancy that a person may have of their remaining period of life, from any point within their lifetime, whether measured at birth or at any other age. The elegance of life expectancy as a concept lies in its ability to reduce a vast array of mortality data into a simple summary index. Its popularity persists because at the same time as summarising a complex set of information, the term "life expectancy" communicates a straightforward interpretation of its meaning. Core to the notion of life expectancy, however, is the underlying assumption that it is about the survival of the

same person or group of people, in other words, members of the same cohort. That is, life expectancy is mostly intuitively understood as a characteristic of people who share a common feature such as year of birth. This implicit cohort interpretation of life expectancy is equally true for period (cross-sectional) life tables, which invariably postulate a hypothetical cohort who lives according to the mortality rates observed in a given period. More recently the life table technique has proliferated into other areas of interest, especially in other life sciences and in economics.

Despite the strong intuitive appeal of cohort-based analysis for understanding elements of demography such as family dynamics and life histories (Uhlenberg, 1969), cohort life tables are much less commonly found in practice. The situation contrasts sharply with the plethora of period life tables. Reasons for the dearth of cohort life tables, particularly those with a whole-of-population coverage (all ages, region and ethnic groups), are almost entirely attributable to the paucity of necessary data.

New Zealand is fortunate in that it is one of only a few countries with relatively complete population data coverage dating back to the mid-1800s. The availability of a historical data series has enabled the construction of cohort life tables by Statistics New Zealand using the more data intensive population component-based method (see below). The results were originally released in 2006 (Dunstan et al., 2006, Dunstan & Cheung, 2007) and continues to be updated regularly to provide an ongoing demographic resource. This paper compares the historical trends with those from other countries where data is available.¹

Data Source and a Methodological Note

Table 1 summarises countries selected for comparison and their respective sources. Countries are selected on the basis of the availability of information for the period from mid-late 1800s to early 1900s and their comparability with New Zealand's timing of mortality and demographic transitions. Information for Japan is also available but Japanese cohort life expectancy was then at a pre-transitional level, significantly below those for the countries selected. Despite its leading status in life expectancy today, Japan is therefore excluded from this analysis, although its experience could be used for a comparative study of the Māori population, which we are unable to undertake here.

Table 1: Data sources for international cohort life table comparisons

Country	Source	Internet address
New Zealand	Population, Statistics New Zealand	http://www.stats.govt.nz/browse_for_stats/health/life_expectancy/cohort-life-tables.aspx
Canada	Demography Division, Statistics Canada	www.statcan.ca/cgi-bin/downpub/
Germany	Federal Statistical Office, Germany	https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/Bevoelkerung/Sterbefaelle/Tabellen/TabellenLebenserwartung.html
United States	Actuarial Publications, Social Security Administration, US	www.ssa.gov/OACT/NOTES/
Denmark	The Human Mortality Database, University of California, Berkeley, US and Max Planck Institute for Demographic Research, Rostock, Germany	www.mortality.org/
England & Wales		
Italy		
Norway		
Sweden		

In contrast to period life table calculations, a diverse range of methods and approaches for compiling cohort data and constructing cohort life tables have been developed. The use of a combination of methods is the norm, often necessitated by the practicalities of data limitations.

The construction of the New Zealand cohort life tables followed the conventional population component-based data compilation. By using data on births, deaths and net migration, the cohort size, exposure-to-risk and mortality histories are reconstructed for each birth cohort and traced year by year from birth to death. This approach is by far the most data intensive, only made possible in New Zealand by the relatively complete historical data from multiple sources.

In situations where these sources are either not available or not complete, less conventional methods using model-based indirect estimations are commonly employed, as has been the case among the majority of countries selected for this comparison. Methodological

differences between countries would suggest caution in making detailed comparisons at fine levels of precision. On a broader level, however, comparing the relative positions and the wider trends can be very informative.

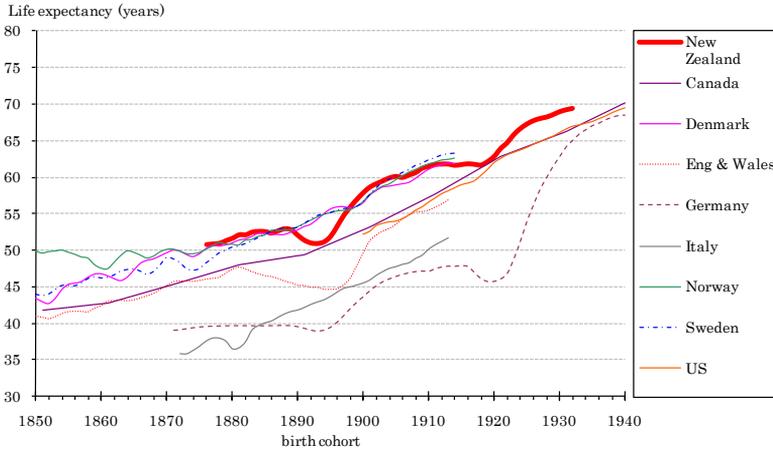
For New Zealand, Canada, Germany and United States, for example, the remaining cohort mortality experience at older adult ages for cohorts born after mid 1910s is projected by the statistical agencies in order to produce complete cohort measures such as life expectancy at birth and at young ages.

International Comparison

In New Zealand progressive mortality declines, including radical improvements in mortality, especially in infant mortality, have given rise to steady increases in cohort life expectancy. For males born in 1876, cohort life expectancy at birth was 50.4 years, and 57.8 years for those who survived their first year, a survival advantage after the first year of 7.4 years. In the space of just over half a century, cohort life expectancy at birth for males born in 1936 increased by nearly 21 years, to 71.3 years. However, the survival advantage after their first year dropped to 2.7 years, reflecting the improvements in male infant mortality rates, with males at age 1 year expecting on average a further 74.0 years of life. Even greater increases occurred among females, from 54.0 years for the 1876 cohort to 76.3 years for the 1936 cohort. Females born in 1876 had, at the age of one year, a life expectancy of 55.4 years, compared with the 1936 cohort with 78.5 years.

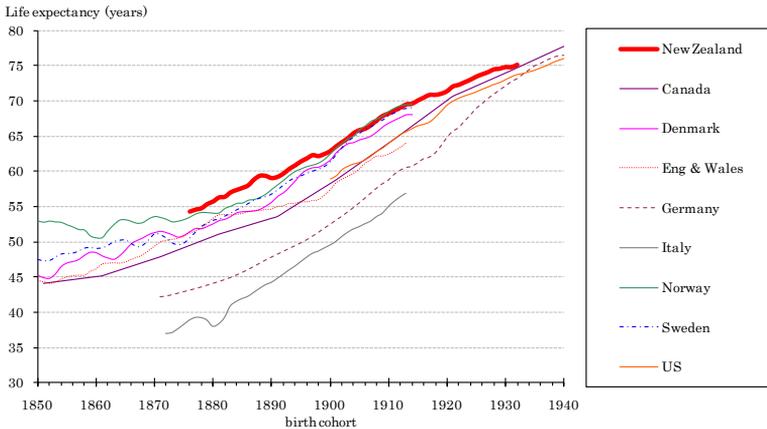
Between late 1870s and 1910, New Zealand cohort life expectancy at birth held the lead over other countries under comparison (Figure 1). The advantage by New Zealand female cohorts was most noticeable. Experience of their male counterparts has been complicated by war deaths in World Wars I and II. Indeed, the impact of war deaths has been hugely significant, such that life expectancy at birth would have been as much as five years higher for males born in the mid 1890s if the war deaths were excluded.

Figure 1a: Male cohort life expectancy at birth (three-term moving average), selected countries, for people born 1850-1940



Source: Refer to Table 1.

Figure 1b: Female cohort life expectancy at birth (three-term moving average), selected countries, for people born 1850-1940



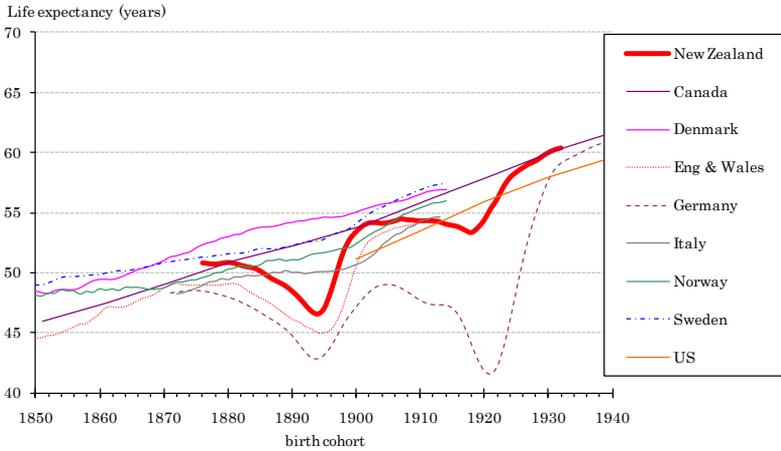
Source: Refer to Table 1.

Going further back in time to the mid-1800s, it is of interest that trends from Norway suggest a period of relative stability in the movement of life expectancy at birth, while other countries such as Sweden, Denmark, England and Wales, and Canada underwent a sustained period of improvement. Caution needs to be exercised, however, when interpreting these trends comparatively. Even with extremely high-quality direct data, there is a need for very careful and detailed validation

of mortality and longevity data. To that end, recent studies have investigated the contextual nuances of mortality data in relation to Japan and Okinawa (Poulain, 2011) and Sardinia (Poulain et al., 2006). Given the fragmented historical data on which the indirect estimates are based, these earlier trends of relative stability and sustained improvement ought not be regarded as conclusive without further investigation of the countries' respective social, environmental and economic histories.

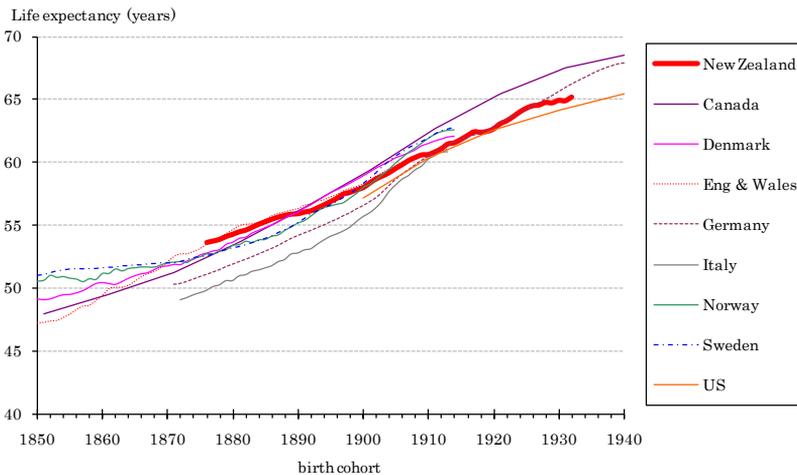
The advantage in cohort life expectancy at birth that New Zealand enjoyed over other countries in part reflects the relatively high nutritional advantages and associated low recorded infant mortality and, especially, better nutrition and labour conditions which reduced childhood losses in New Zealand when compared with these other countries. However, the advantage in cohort life expectancy did not extend to adult ages. By age 15, New Zealand cohort life expectancy for both males and females surrendered its lead and dropped right back into the middle of the main group (Figure 2). The impact of war deaths and epidemics was more pronounced on the male cohort trend, as would be expected, and some measure of this effect can be seen by contrasting the patterns of mortality of New Zealand with those of Canada and United States, both of which excluded offshore war deaths, and Sweden which had relatively few additional deaths as a result of war. Similarly, an analysis of cohort mortality in New Zealand with and without war deaths (Dunstan, 2006) reinforces the immense impact of New Zealand, German and British losses due to conflicts during the 20th Century.

Figure 2a: Male cohort life expectancy at age 15 (three-term moving average), selected countries, for people born 1850-1940



Source: Refer to Table 1.

Figure 2b: Female cohort life expectancy at age 15 (three-term moving average), selected countries, for people born 1850-1940



Source: Refer to Table 1.

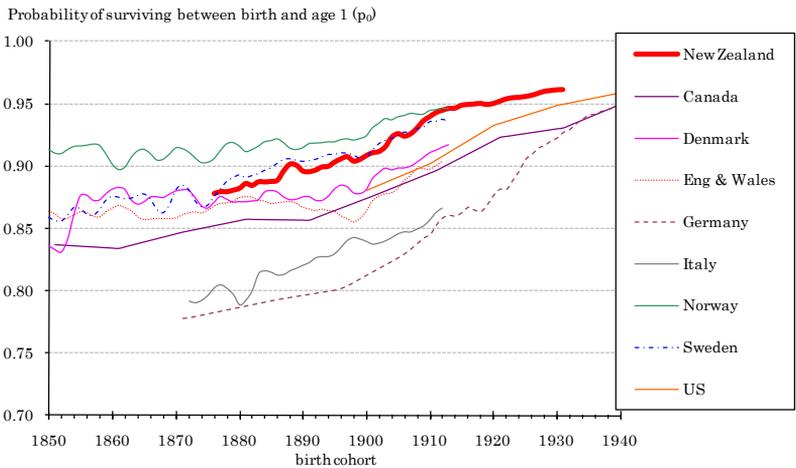
Between the mid-1800s and early 1900s the range of variation between countries in cohort life expectancy at age 15 was markedly narrower than at birth. In other words, differential mortality, defined as cross-country variations in the levels of mortality, was consistently greater at infancy and childhood than at adult ages. This occurred during the period when mortality at young ages had undergone rapid declines, though the timing and pace of decline differed between countries. As noted above, it was also

the basis on which New Zealand gained, and subsequently lost its early edge in cohort life expectancy.

To elaborate further the point on differential mortality at young ages, the following analysis looks specifically at cross-country comparisons in survivorship at infancy (Figure 3) and at childhood (Figure 4). For illustrative purposes, only results for female cohorts are presented here. Patterns for male cohorts were almost identical to those for females, differing only marginally in magnitude.

While New Zealand cohort infant survivorship was high historically, the level was comparable to Norway, England & Wales, Denmark and Sweden (Figure 3). Not surprisingly, New Zealand's advantage in cohort life expectancy over other countries increased at age 1 (data not shown here), particularly when compared to Denmark. That means New Zealand's early edge in its cohort life expectancy did not originate only in infant mortality differentials.

Figure 3: Female cohort probability of surviving between birth and age 1 (three-term moving average), selected countries, for people born 1850-1940



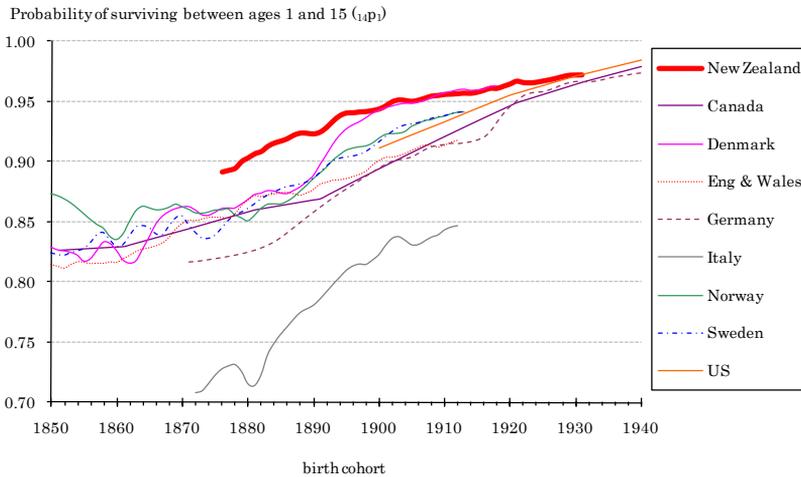
Source: Refer to Table 1.

Cross-country comparisons of childhood survivorship between ages 1 and 15 reveals the distinct advantage that New Zealand enjoyed over other countries under comparison (Figure 4). More significantly, this advantage was sustained over not 1 but 14 years at the start of the life history of a birth cohort, which constituted a significant survival advantage when measured over a life time and helped to propel New Zealand's cohort life

expectancy at birth to the world leading position. This vital gap in childhood survivorship persisted to the early 1900s, and the diminishing of the gap coincided with the New Zealand's convergence with other countries.

One further interesting observation in Figure 4 is how rapidly the countries converge, a pattern closely mirroring the convergence of cohort life expectancy at birth (Figure 1b). The experience of Italy differed markedly from the other countries in this group, reflecting the difference between northern and southern Europe during this period. However, here too there was convergence and the improvement was at a faster pace than others.

Figure 4: Female cohort probability of surviving between ages 1 and 15 (three-term moving average), selected countries, for people born 1850-1940



Source: Refer to Table 1.

Discussion

New Zealand mortality transition, starting in the mid-1800s, delivered massive gains in survivorship to the country's European-origin inhabitants. The 1870s female cohorts arguably were the first population in history to reach 55 years cohort life expectancy at birth, and again the 1890s female cohorts breaking the 60 years mark. The social and demographic context for that period of New Zealand history was well documented elsewhere (Pool & Cheung, 2005, Pool et al., 2007).

By comparing cohort survival experience from other similar countries, the above analysis highlights that New Zealand cohort survival advantage at childhood (to age 15) did not carry through to adult ages. The phenomenon was first investigated by Pool (1982) using period life table data, and this analysis adds a cohort dimension on an international scale. However, as intimated earlier, around the turn of the twentieth century New Zealand consisted of two vastly different populations in their demographic compositions: the indigenous Māori population, which accounted for around nine percent or less of the total population, and the numerically dominant non-Māori (here refers to all those other than Māori) or European population, predominately of British origins. Benefits stemming from survival gains largely missed the indigenous Māori population – a critical point that is well researched in the literature (see Pool, 1982, Pool & Cheung, 2005) but beyond the scope of this paper. Within the non-Māori population, however, another demographic division emerged over the cohort life history. The younger members of the cohort were mainly born in the colony with all the advantages that the environment had to offer; as the cohort aged the older members consisted increasingly of immigrants from the European continent carrying with them the “cohort morbidity histories of Europe” (Pool & Cheung, 2005). The dilution effect from these cohort morbidity histories of Europe would go some way to explain New Zealand's fall in the world ranking on cohort life expectancy at adult ages.

Finally, the above analysis singled out New Zealand's survival advantages at ages 1 to 14. The period coincided with rapid decline in the Total Fertility Rate, from among the highest levels in the industrialised countries, to one of the lowest (Pool & Cheung, 2005). Improved infant and childhood survival is said to have helped to fuel the decline in fertility, which in turn further boosted survivorship improvement at young ages. These improvements sit alongside continuing improvements in longevity (Pool et al., 2009a) though both the limits of these improvements (Oeppen & Vaudel, 2002) and the relationship between the many contributing components is highly complex and remains to be fully investigated (Cheung et al., 2005, Pool et al., 2009b).

Note

1. A previous version of this paper was published as a special article in *Demographic Trends 2006* (Cheung & Didham, 2007) and incorporates subsequent and continuing work on mortality.

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Visualising Internal Migration Flows

JOHN BRYANT *

Abstract

Studying internal migration requires extracting patterns from vast quantities of data. One of the best ways to extract patterns from data is to graph it. The paper shows how an existing graphic, the “corrgram”, can be used to visualise internal migration flows. The paper starts with a simple version of the graphic, and then introduces progressively more complicated versions. The more complicated graphics convey more information, but are more difficult to decode, as often happens with data visualization. The graphics are nevertheless a useful complement to demographers’ traditional tool of choice, the table.

Research by Ian Pool is distinctive for its sensitivity to regional variation - for its insistence that, even if Northland and Southland have much in common, their social, economic and cultural conditions nevertheless differ. The series of papers on regional diversity written by Ian Pool and colleagues, and published under the New Demographic Directions Programme, documents New Zealand’s regional variation in detail (Pool et al., 2005, 2006).

One of the challenges of studying regional variation is dealing with large quantities of data. Comparing a single indicator across 16 regions and three periods, for instance, requires 42 numbers; comparing age-sex profiles with 20 age groups and two sexes across 16 regions requires 640 numbers. Studying regional variation in internal migration patterns is more challenging still, because of the need to take both origins and destinations into account.

Demographers are known for their fondness for large tables of numbers. Recent advances in data visualisation have, however, led to new ways of exploring and displaying data that complement tables. This paper

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presents a new type of graph for examining migration flows among regions. The graph is a variation on the corrgram (Friendly 2002) and heatmap (Wilkinson & Friendly, 2009). Like any graph—indeed, like any analytical tool—the new type of graph requires tradeoffs between competing objectives, and has particular strengths and weaknesses. The paper includes a discussion of these tradeoffs.

Representing Internal Migration Flows

Table 1 shows data on numbers of people who moved between regional councils between the 2001 and 2006 censuses. It shows, for instance, that 7,773 people who lived in Auckland in 2006 had been living in Northland in 2001. There would be little point in graphing the data shown in the table, since most people can recognize patterns in six numbers. Expanding the table to include all 16 regional councils would, however, produce a table with 240 numbers.¹ Recognising patterns in tables with 240 numbers is difficult.

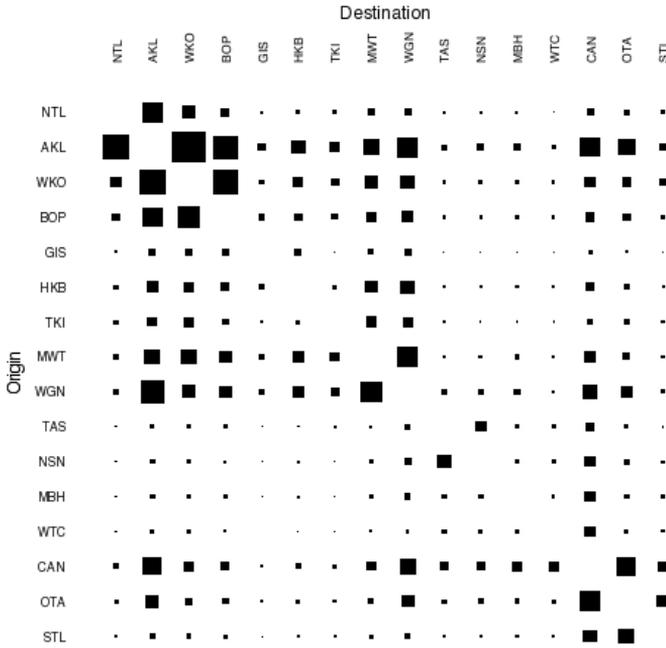
Table 1: Migration flows between three regional councils, 2001-2006

		Destination		
		Northland	Auckland	Waikato
Origin	Northland	-	7,773	2,973
	Auckland	11,193	-	18,783
	Waikato	2,262	12,936	-

Source - Customized extraction from 2006 census data, based on questions about current usual residence and usual residence 5 years earlier. The results exclude children under 5. All data have been confidentialised by random rounding to base 3.

Figure 2 represents all 240 numbers in a way that makes any patterns in the data stand out. The figure lays out the data in the same way as Table 1, but uses squares instead of numbers to encode the size of the flows. The area of each square is proportional to the size of the flow, so that, for instance, the square for flows between Auckland and Waikato (second row, third column) is 45 percent larger than the square for flows between Waikato and Auckland (third row, second column).²

Figure 2: Migration between regions, 2001-2006



Source – See Table 1.

Note – Migration flows are proportional to the areas of the squares. Regional acronyms are spelled out in Table 2.

Table 2: Acronyms used in Figures

Acronym	Region	Acronym	Region
NTL	Northland	TAS	Tasman
AKL	Auckland	NSN	Nelson
WKO	Waikato	MBH	Marlborough
BOP	Bay of Plenty	WTC	West Coast
GIS	Gisborne	CAN	Canterbury
HKB	Hawke's Bay	OTA	Otago
TKI	Taranaki	STL	Southland
MWT	Manawatu-Wanganui		
WGN	Wellington		

Note – The acronyms are taken from the ISO 3166-2.

The inspiration for the graph is the corrgram, which in turn was developed from the heat map (Friendly, 2002; Wilkinson & Friendly, 2009). Corrgrams were originally devised to show correlation matrices—that is, matrices of numbers measuring the relationships between variables. An Internet search failed to turn up any previous examples of corrgrams being used to represent migration flows. It is such a simple idea, however, that it would be surprising if it had not been done before. Corrgrams use many schemes for encoding values, such as colour, distorted ellipses, and directional shading. Squares were chosen here because they survive printing in black and white, and because, as discussed below, they can be extended in a useful way.

The graph was constructed using the statistical programming language *R* (R Development Core Team, 2011), and in particular function *symbols*. *R* was originally developed by Ross Ihaka and Robert Gentleman at the University of Auckland (Ihaka & Gentleman, 1996), but has since been taken over by an international community of programmers and statisticians. It is well on its way towards dominating the world of statistical computing. One of the particular strengths of *R* is graphics.

Humans are not particularly good at estimating areas. A graph such as Figure 1 is therefore not appropriate for communicating exact values: for that, it would be hard to improve on the old fashioned table. Humans are, however, excellent at extracting patterns from visual data. Figure 1, and graphics more generally, are better treated as a device for conveying patterns in the data than for conveying exact values. The sensible analyst uses graphs to generate ideas, and tables to verify them, possibly cycling between the graphs and the tables many times (Cleveland, 1985).

Observations prompted by Figure 1 include:

- Exchanges between Auckland and its immediate neighbours dwarf most other flows between regional councils in New Zealand.
- The graph is roughly symmetric on the diagonal, meaning that flows from region i to region j are typically of similar size to flows from region j to region i . An example of this symmetry is flows between Manawatu-Wanganui and Wellington; a counter-example is flows between Waikato and Auckland.
- The first nine regions appear to exchange more migrants with each other than they do with the remaining seven regions, and vice versa for the remaining seven regions. This is plausible, since the

first nine regions are all in the North Island, while the remainder are all in the South Island. Before forming any strong conclusions, however, it is important to allow for the fact that the nine North Island regions have larger populations, on average, than the seven South Island ones.

Adding Another Dimension

One of the most useful strategies in data visualization is the “small multiple”: repeating the same graph many times on varying subsets of the data (Tufte 1983). Once readers have decoded one of the graphs they can decode all of them, so the return to the initial interpretive effort is high. Parallel construction also facilitates comparison.

Figures 2a and 2b employ the idea of the small multiple, though, since the purpose is merely to illustrate the technique, with only two multiples. Both graphs use the same format as Figure 1, but Figure 2a is restricted to people aged 20-29 in 2006, while Figure 2b is restricted to people aged 60-69. Comparison of Figures 2a and 2b illustrates how migration patterns differ across the life cycle. Perhaps the most dramatic contrast between the younger and older age groups is the much greater migration into main urban areas by the young. Among the older group, for instance, flows to Auckland from the Waikato are much smaller than flows in the opposite direction.

Figure 3a: Migration flows between regions, people aged 20-29 in 2006

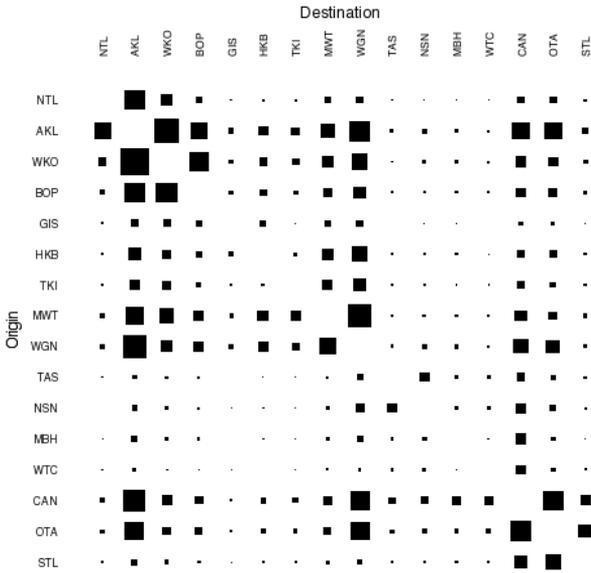
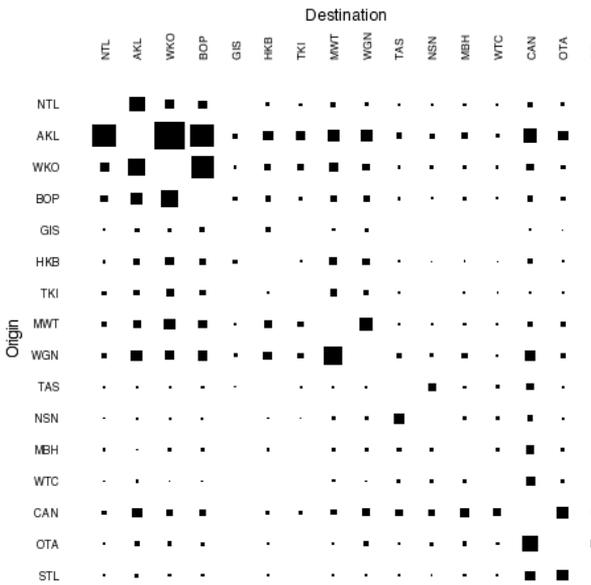


Figure 2b: Migration flows between regions, people aged 60-69 in 2006



Source for figures – See Table 1.

Note – Migration flows are proportional to the areas of the squares. Regional acronyms are spelled out in Table 2.

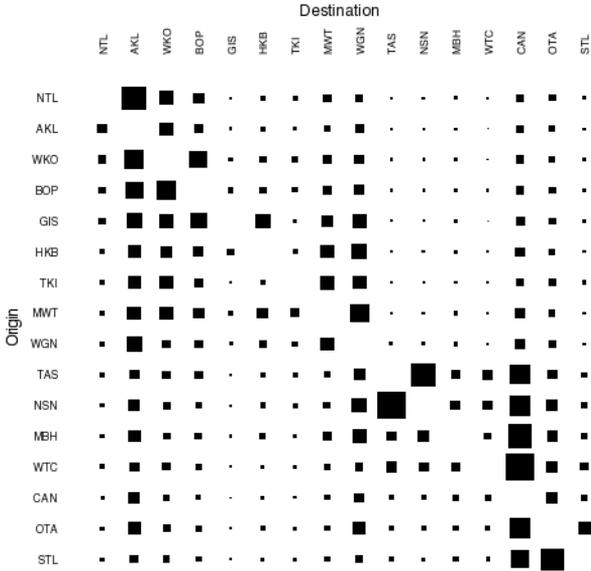
Representing Rates

The size of a migration flow out of a region equals the population of that region multiplied by the out-migration rate. Analysts are often more interested in the out-migration rate, which measures the underlying propensity to migrate, than they are in the size of the flow. A simple way of displaying migration rates is to use graphs with the same format as Figures 1 and 2, but with the area of the squares proportional to rates rather than flows. Figure 3 is an example.

Figure 3 is easy to understand, while imparting information not readily gleaned from Figures 1 and 2. Among other things, it confirms the impression from Figure 1 that New Zealanders tend to migrate within their own island rather than cross Cook Strait. Compare, for instance, the migration rates for Manawatu-Wanganui with those for Marlborough.

The strategy of omitting population sizes and just showing rates does, nevertheless, have disadvantages. The most prominent feature of Figure 3 is the migration rates from Tasman, Marlborough, Nelson and the West Coast into Canterbury. As can be seen from Figure 1, these flows are tiny in absolute terms. Figure 3 arguably gives these flows greater prominence than is warranted by their relatively small contribution to New Zealand's overall population dynamics. Moreover, population size is itself an important determinant of migration rates, with smaller populations generally having higher migration rates. By omitting population size, Figure 3 obscures this relationship.

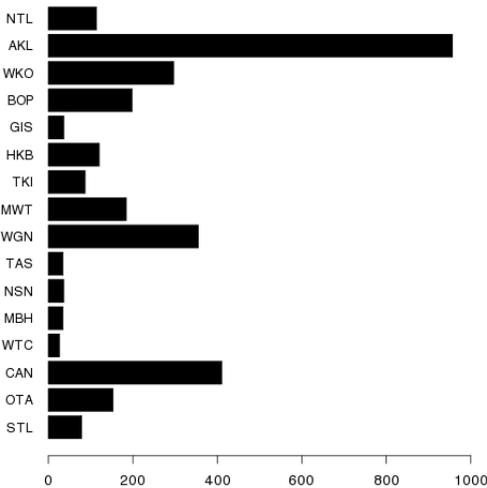
Figure 4: Out-migration rates



Source – See Table 1.

Note – Out-migration rates (migration flows divided by the size of the origin population) are proportional to the areas of the squares. Regional acronyms are spelled out in Table 2.

Figure 5: Populations of origin regions



Source – See Table 1.

Note – The populations shown here only include people who responded to the question about usual residence 5 years earlier in the 2006 census. They therefore differ from the actual regional populations in 2001. Regional acronyms are spelled out in Table 2.

One way of addressing these limitations would be to include a graph like Figure 4 along with Figure 3, or even attach it to the right hand margin of Figure 3. Figure 5 takes a more radical approach. It incorporates population size into the symbols themselves, the width of which is proportional to population size, while the height is proportional to rates. The symbol for migration from Northland to Auckland, for instance, is tall and thin, indicating a high migration rate from a small population, while the symbol for migration from Auckland to Northland is short and wide, indicating a low migration rate from a large population. As with Figures 1 and 2, the area of each symbol is proportional to the size of the flow.

In principle, Figure 5 should convey more information than earlier graphs, since each symbol represents two numbers rather than one. In practice, however, the variance in population sizes and migration rates is so great that most of the symbols are reduced to thin strips or dots that are difficult to read. Substantial variance in the data often creates problems for graphs. The standard solution is to transform the data. This is the approach taken in Figure 6, where the widths and heights of the symbols in Figure 6 are proportional to the square root of population size and migration rates. There is a dramatic improvement in readability, even if the values can no longer be taken at face value. As usual, if precision is important, then the graph should be used in conjunction with a table of values.

Figure 6: Out-migration rates and population sizes

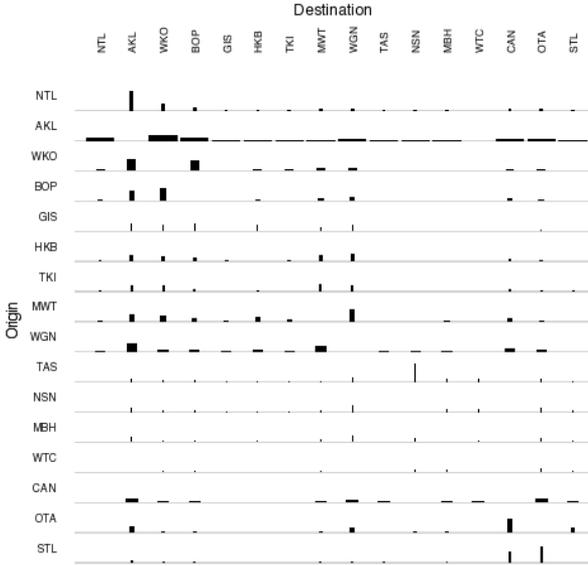
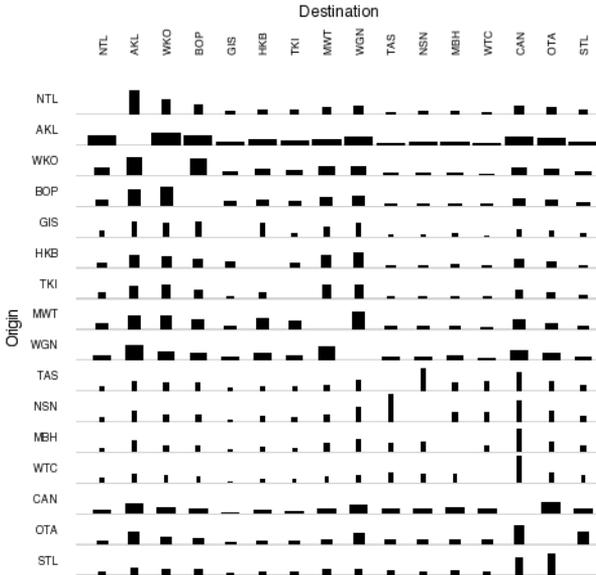


Figure 7: Out-migration rates and population sizes - rescaled

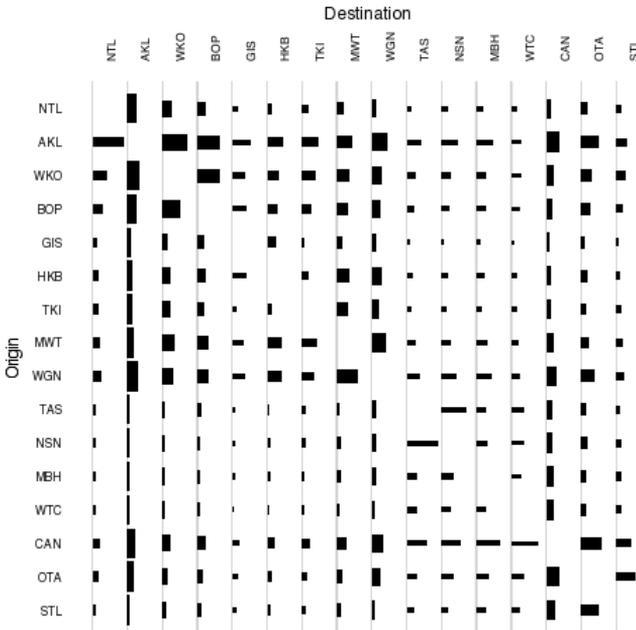


Sources – See Table 1.

Note – Out-migration rates are proportional to the (square root of the) heights of the rectangles, and origin population sizes are proportional to the (square root of the) widths. Regional acronyms are spelled out in Table 2.

Finally, Figure 7 displays complementary data to that of Figure 6. Rather than displaying out-migration rates and origin populations, it displays in-migration rates, and destination populations. To emphasise that the data refer to destinations rather than origins, the symbols have been rotated 90 degrees. Widths encode population size, and the heights encode migration rates. The graph shows, for instance, that migration flows from Auckland to Northland are large relative to Northland’s population, but that Northland’s population is small. Together, Figure 6 and 7 provide a detailed but concise description of New Zealand’s internal migration flows.

Figure 8: In-migration rates and population sizes



Source – See Table 1.

Note – In-migration rates are proportional to the (square root of the) width of the rectangles, and destination population sizes are proportional to the (square root of the) heights. Regional acronyms are spelled out in Table 2.

Discussion

Recent years have seen great strides in the digital display of migration data: see, for instance, the interactive graph of international migration stocks at www.peoplemov.in, the visualization of international refugee flows at www.visualizing.org/stories/visualizing-human-migration, and the CommuterView and MigrationView applications available at www.stats.govt.nz. Moreover, many older graphics such as the bar chart, the thematic map, and the time series chart are as useful for studying migration as they always were. Indeed, there is room for many more visualizations. Migration is a complex phenomenon, and there are numerous potential audiences, all interested in different things and seeking different levels of detail and sophistication.

The niche that the graphs in this paper aim for is presenting data for moderately large numbers of flows. Moderately large means hundreds or thousands of data points. Figure 1 is probably appropriate for a non-technical audience, provided that the audience is already comfortable with graphs such as the bar graph. Figures 6 and 7 require a greater investment to decode, in return for conveying more information. Plotting small multiples based on age, sex, or ethnicity, for instance, would increase the amount of information conveyed even further, but would probably only work with a technical audience.

The graphs could be extended in various ways. Symbols could be shaded to encode an additional attribute of the data. Darker shades could, for instance, be used for flows with greater sampling error, when displaying data from a survey. On an interactive display, mousing over a symbol could bring up data on the exact size of the flow. Moreover the graphs could be used for other types of flows besides migration flows, such as changes of health status or changes labour force status.

Even in their current form, however, the graphs presented in this paper do provide an example of how visualization techniques can help researchers discover patterns in large datasets and convey them to their readers. They allow researchers to deal with more complexity than would otherwise be possible. Indeed, there is a natural fit between data visualization and the tradition within demography of respecting local variation and real world detail, as exemplified by the work of Ian Pool.

Disclaimer

The opinions, findings, recommendations, and conclusions expressed in this paper are those of the author. They do not represent those of Statistics New Zealand, which takes no responsibility for any omissions or errors in the information in this paper.

Notes

1. Sixteen squared, minus 16 because of the blanks on the diagonal.
2. Let m_{ij} be migration between regions i and j , let s_{ij} be the square root of m_{ij} , and let k be a scaling factor measured in 'plotting units', where a plotting unit is the distance between two rows or two columns. Then each side of square i,j has length $ks_{ij}/\max(s_{ij})$. In Figure 1 and throughout the paper, $k = 0.9$.

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Exercises in New Zealand's Demography and Economic History

BRIAN EASTON *

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*.

The 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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During the course of writing the book – an extract which follows – I have 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

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.³

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.^{1, 2} 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 1858.³

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.⁴ 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.⁵

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 1841.⁶ 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.⁸

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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