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# Introduction and overview

Since its original formulation in the 1940s (Davis 1945; Notestein 1945), the phenomenon known as ‘the global demographic transition’ has been used to understand the trend of structural population ageing, and with it, the slowing and ultimately the ending of population growth – now anticipated globally around the end of the present century (Lutz, Sanderson & Sherbov 2004). However as originally conceptualised, the theory pertained to ‘closed’ populations, in which the only dynamics were births and deaths. Falling death rates cause populations to first become younger and to grow in size, while falling birth rates eventually cause them to become older, and growth to slow – the increased numbers of survivors at older ages becoming an increased proportion of the population (Coale 1972; Chesnais 1990).

Increasingly, migration has made the progression of population ageing much more difficult to study, as the majority of those who move are at young adult/reproductive age, and their leaving and arriving affects the age structures of the populations from which they left and to

which they arrive (Bedford & Pool 2001; World Bank 2009; Dyson 2011). By and large, leavers of youthful ages cause the population to age; arrivals cause it to become younger.

But there is also the growing trend of older people moving, typically for

retirement and/or to be close to family, services and facilities (Champion 1992; Rogers & Raymer 2003). Older people moving out of an area slow its structural ageing, older people moving in accelerate it. Similarly, the movement of families affects the age structure across the childhood and reproductive ages – leavers cause populations to age, arrivals cause them to become younger.

The question, then, is to what extent overall migration is accelerating or ameliorating structural ageing, and with it hastening or slowing the theorized shift to the ending of population growth; and, does the situation unfold differently at national and subnational level?

We examine these questions in this Supplementary Issue of *Policy Quarterly*, with a focus on subnational New Zealand. Compared to other developed countries, New Zealand’s total fertility rate is relatively high – although having recently fallen below 2.0 it is now somewhat below the intergenerational replacement level of 2.1 births per woman. There is also considerable international and domestic (internal) migration, per capita. Simultaneously, the national population aged 65+ years has continually increased, from 9 percent around 1976, to 12 percent in 2001 and almost 15 percent in 2016. At subnational level, that figure exceeds 20

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percent in 41 percent of towns and 29 percent of rural centres (see Jackson and Brabyn *infra*). However, rather than these differences reflecting either ultra-low birth rates or overly large subnational discrepancies in birth and death rates, they are primarily explained by differences in 'age-selective' migration, as indicated above. This age-selective migration is causing many areas to age far more rapidly than they would from demographic transition alone. They have the same outcome as advanced structural ageing, and therefore need appropriate policies,

evidence shows that the onset of depopulation begins sub-nationally, at different times, in different ways. For many of New Zealand's depopulating areas, the trend has long been and currently remains the direct outcome of net migration loss – although in the majority of cases, that loss was reduced through natural increase (more births than deaths). Increasingly, however, subnational decline will be driven by a new set of dynamics: the onset of natural decrease, and in a more potent form, combining with net migration loss.

the same time being relatively youthful and growing strongly at national level, are there broader theoretical implications? We noted that the mainstay of demographic theorising about population change and the ending of population growth – global demographic transition theory, as outlined above – pays scant attention to migration, while mobility transition theories that assist in understanding the migration movements of people pay equally little attention to demography (among the few exceptions are Zelinsky 1971; Skeldon 1997; Bedford & Pool 2001; Dyson 2011). Specifically, as noted above, we argued that migration is by definition age- and sex-selective, and therefore alters the age and sex structure of both origin and host regions. If migration is in fact *interacting with* the structural ageing of some regions, and, in some cases, causing or accelerating that structural ageing, a study drawing the two together would provide a new basis for understanding contemporary and future population change, and potentially have the power to contribute to a theory of depopulation.

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We felt that it was timely that such a study be done, as early reports on depopulation were overwhelmingly negative, such as: '*... reduced local tax revenues and reductions in redistributed income from urban regions; obsolete public infrastructure and reduced investment in the rural economy; ... abandonment of residential and business properties; decline in the quality of the built environment; and severe damage to the natural environment*' (Matanle & Raush 2011: 37-38; see also Haartsen & Venhorst 2010; Matanle 2014, 2017a). At the same time, the idea that depopulation will have many positive benefits is also beginning to emerge (Demeny 2009; Reher 2011), as is the concept of a possible 'depopulation dividend' (Matanle 2017a, 2017b). For these opportunities to be successfully converted to beneficial outcomes, it will be necessary to engage with them long before local councils and similar agencies are overwhelmed with depopulation that they had not been anticipating (Matanle & Sato 2010; Audirac 2012; Martinez-Fernandez, Kubo, Noya & Weyman 2012; Jackson 2014; McMillan 2016).

planning, resources and facilities, but they are ageing from a very different cause to that conventionally understood as the primary driver of structural ageing: low fertility. In this regard subnational New Zealand is following its Japanese, United States and European counterparts (Matanle & Rausch 2011; Johnson, Field & Poston 2015).

Because migration is not conventionally understood as a driver of structural ageing, there is a danger that affected areas will not see the timely policy development that is required: in New Zealand, policy development on advanced structural ageing is not yet on the agenda.

*We hasten to note that the ageing-driven end of national population growth and onset of national level depopulation is still well over the horizon in New Zealand.* With one of the developed world's highest birth rates and per capita international migration intakes, total New Zealand is assured of relative youth and growth for many years. However, reflecting international findings, our empirical

Bucher and Mai (2005, cited in Matanle & Rausch 2011: 19-20, 46-47) propose that the trends represent a fundamental shift from what they refer to as the 'old' form of depopulation, where there was positive natural increase but it was insufficient to offset net migration loss, to this 'new' form, net migration loss and natural decrease in tandem, increasingly intractable, self-reinforcing, and, for many areas, permanent.

#### **Is youthful New Zealand following its older counterparts?**

Faced with empirical evidence of widespread subnational depopulation in New Zealand across the period 1996 to 2006, the six authors of this issue wished to know the extent to which subnational New Zealand might be following its international counterparts – and therefore, if there might be a tipping point which would provide early warning of the onset of national level depopulation. Moreover, if subnational New Zealand is following its international counterparts, while at

examine *'The subnational mechanisms of the ending of population growth. Towards a theory of depopulation'*. We felt that its Māori title, *Tai Timu Tangata. Taihoa e?* in English, 'the ebbing of the human tide - what will it mean for the people?' sustained our motivation for the three years of subsequent research, and have titled this issue accordingly.

We report here on a selection of the project's main findings, with additional analyses available from the reference lists accompanying each article. Each member of the research team worked on a different strand of the research, although in many cases they worked in pairs.

#### The 'when', 'how' and 'why' of New Zealand's new demographic regime

Ian Pool was the team's historian and research advisor, guiding the project's conceptual, theoretical and interpretive aspects. His article in this issue, *'The when, how and why of New Zealand's population and development path'*, provides the backdrop to today's spatial and demographic setting. In particular he asks whether urbanisation and 'rurbanisation' (a form of peri-urban growth where previous rural functions have been replaced by lifestyle blocks, from which people may commute long distances into cities, through to retirement zones that may be relatively isolated) unfolding since the 1970s and 1980s, coupled with the longer-term trend to low fertility, are continuities – or accelerations – of past trends, or are period-bound, or represent a major demographic and social disjuncture that will see New Zealand's population growth slow and eventually end, as elsewhere. He proposes that New Zealand may well have entered what has been termed elsewhere a 'low fertility trap', but one that is unfolding in New Zealand for contradictory reasons, and differs spatially. On the one hand, reflecting long-term migration patterns and trends, today's rural areas have fewer young adults and children, and relatively old age structures. Peri-urban and 'rurban' settlements, similarly, are the destination of many more recent retirees, also resulting in fewer children. On the other hand, the majority of young adults and potential parents move to and

live in or near the cities and large towns, but will paradoxically produce low birth numbers because of prolonged education, subsequent career-development, work-family life imbalances and high housing costs. Partially offsetting these outcomes are the *probably temporary* effects of subnational ethnic differences in family formation and fertility (see Cochrane & Pool *infra* on the important role of Māori reproduction in New Zealand's development; also Cochrane & Maré *infra*). Drawing on Italy's unsuccessful attempts to reverse ultra-low fertility trends in its southern *Mezzogiorno*,

#### Ten key observations

The second article in this issue, by Natalie Jackson and Lars Brabyn (*Subnational mechanisms of population growth and decline 1976-2013*), is really three inter-related articles condensed into one compact story. The first paper expanded on Grimes and Tarrant (2013) to examine overall trends in population size for 143 New Zealand towns and 132 rural centres, for the period 1976-2013 (Jackson, Brabyn & Maré 2016). It found similar clustering to Grimes and Tarrant, and in particular, the presence of 'runaway' growth and decline areas that had

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Pool suggests that even undocumented migrants attempting to enter the country are seeking a different life, and are more likely to adopt local demographic regimes than bolster declining birth numbers. Instead, he argues, today's subnational population growth and decline differentials were foreshadowed years ago in the theory of *total social production* (Cordell, Gregory & Piché 1994), which holds that people must both produce (on a daily basis) and reproduce (generationally) if populations are to survive. That the factors of production increasingly involve migration is leading us to a very different demographic regime (see Jackson and Pool forthcoming). Migration defined as a movement from one place to another includes commuting. This is not only a statistically significant phenomenon (Cochrane & Maré *infra*), but is a key factor in widely separating place of work from residence, a trend of increasing importance, the downstream effects of which include peri-urbanisation and even rurbanisation that are dramatically changing NZ's population geography.

previously been similarly sized, at our baseline in 1976; however, our analysis went further to examine the extent to which growing and declining areas have been doing so because of natural increase and/or net migration. By and large, net migration loss was widespread across most years of the period, while natural increase was almost everywhere positive, resulting in the latter offsetting the former in the majority of cases, or alternatively, augmenting net migration gain. The second paper (Jackson et al, forthcoming) applied these data to a new framework – developed as part of the project – which explicitly recognizes three interactions between natural increase and net migration that result in growth, and three that result in decline. These interactions showed clearly the role of natural increase in offsetting past net migration loss, while projections at territorial authority area (TA) level 'extended' the analysis to show that natural decrease will soon become much more widespread, leaving towns and rural centres declining from net migration, increasingly 'unprotected'. That paper also showed that subnational

New Zealand's shift to natural decrease thus far has been more strongly related to the proportion of women aged 15-44 years in each jurisdiction, and thus to net migration loss at those ages, than to the conventional harbinger of natural decrease, very low fertility. The third paper explored the related issue of 'age-selective migration', developing further indices for analysing the extent to which net out-migration at younger ages and net in-migration at older ages are accelerating structural ageing (Jackson & Brabyn forthcoming). Using experimental modelling, the analysis was further able to distinguish between population change

combined with childbearing at younger ages than non-Māori, have resulted in the number of births that are identified as Māori making an ever-increasing contribution to overall birth numbers. With a time-lag, their sequel is increasing numbers in the working age population, which have played an increasing role in ensuring labour supply, most importantly in some low growth regions. Indeed, this contribution differs markedly by region, which in many cases is synonymous with *iwi*. Cochrane and Pool use the Northland and Gisborne-Hawke's Bay regions to illustrate the case. Between 1976 and 1996 the Māori share of the total population

the more youthfully abundant Māori population to disproportionately replace older Pākehā reaching 'retirement age'. The policy implications of this situation are clear. Today's young Māori (and Pasifika) will play an increasing role in determining New Zealand's economic future, and far greater attention to their education, training, health and wellbeing needs is an imperative.

### Looking back – migration and the role of amenities

Lars Brabyn's article, *'Declining towns and rapidly growing cities in New Zealand – developing an empirically based model that can inform policy'*, returns our focus to the role of migration in determining the relative 'fortunes' of New Zealand's regions, or more specifically of the 275 towns and rural centres referred to above. Linking migration by age data from the Jackson and Brabyn database (above) with a comprehensive time-series database containing social, economic and natural amenity data, Brabyn employs a range of analytical techniques and modelling to explore why some towns grow and others don't. He finds that age is a particularly important factor in determining which variables have the most influence. Younger people, especially around labour market entry age, are moving to more populated places and close to tertiary education facilities and, by implication, to jobs, while people approaching 'retirement age' have a preference for lifestyle drivers, such as warm temperatures and coastal towns, as well as access to international airports and tertiary hospitals. Although some of these drivers have been documented before, much understanding has been based on anecdotal evidence and weighted towards traditional drivers of employment and essential services. Brabyn's research has substantiated this anecdotal evidence, but also demonstrated that lifestyle choice, both nature-based (mountains, climate and water views) and possibly cultural (access to large cities) are just as influential as employment drivers and access to essential services. Importantly for policy purposes, towns close to airports and with natural amenity value are especially favoured by those at labour-market exit age. With population ageing this group's

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'with' and 'without' migration, finding for example, that the vast majority of New Zealand towns, rural centres and territorial authority areas are somewhat older as a result of migration – rather than younger as many would expect. In order to summarise these findings, the article in this issue is structured around a set of ten key observations.

### Māori in contemporary and future development

Also drawing attention to the all-important role of natural increase, the article by Bill Cochrane and Ian Pool (*Māori in New Zealand's contemporary development*) focuses attention on the contribution of Māori reproduction to New Zealand's population growth, and to its economic development in terms of subsequent share of the working age, and employed, population. With a substantially younger age structure than that of the total population, especially that of the Pākehā (European-origin) population, the slightly higher fertility rates of Māori,

in each region rose markedly, before stabilizing at around twice the national share. In 2013, Māori in the Northland Region accounted for 55 percent of the region's 0-4 year olds, up from 28 percent in 1976; in the Gisborne-Hawke's Bay region the proportions were 67 and 21 percent respectively. By comparison, the Māori proportion of the 0-4 year-old population at national level increased from just 13 to 27 percent – although in each case this is also somewhat greater than the total Māori share. Similarly, the proportion of Māori in the working age population in both regions increased from around 18 percent in 1986 to close to 30 percent in 2013, by comparison with their national level counterparts increasing from 10 to 13 percent, roughly equal to their population share. Sadly, as Cochrane and Pool show, these substantially greater proportions at working age have not resulted in greater employment rates for Māori, depriving both Māori and all of New Zealand of a potential 'collateral' economic dividend – the potential of

size will increase and there is likely to be increased movement of people to these towns – potentially ameliorating some of the projected declines for those towns. As he argues, knowing what characteristics are favourable, declining towns can examine how they can better capitalise on these factors.

#### Looking ahead – migration and (un)certainly

Assisting us to look further ahead and to do so with an increased level of confidence, Michael Cameron's article presents key findings from one of New Zealand's first full sets of TA-level stochastic population projections, developed during the course of this project. By comparison with deterministic projections (the classic 'high', 'medium' and 'low' variants that users of population projections are familiar with), the stochastic approach involves running a projection model a large number of times – in this case, 1,000 times. On each run, the fertility, mortality and migration assumptions are randomly applied, in the process generating both future size and accompanying levels of (un)certainly. Cameron's model also uniquely uses a 'gravity' model of migration – one which allows migration flows in each direction to be made explicit, and which will assist end users of these data to understand a little more about where their migrants come from and go to. For this issue, Cameron has used the model to explore the probability of TAs declining across the periods 2023-2033 and 2043-2053 (see also Jackson & Cameron 2017). The progression from growth to decline is clearly charted for a number of TAs (and for a few, continued decline) as time passes, particularly for rural and peripheral areas. Between 2023 and 2033, 20 TAs (30 percent) have a 90 percent or greater chance of declining, increasing to 26 TAs (39 percent) between 2043 and 2053. Less likely to decline, but still having a probability of decline of between 50 and 90 percent, are a further six TAs between 2023 and 2033, increasing to seven between 2043 and 2053. At the lowest end of the scale are five TAs with a probability of decline between 2033 and 2043 of between 5 and 50 percent, increasing to seven TAs between 2043 and 2053. These findings refine, but

generally accord with, the medium variant deterministic projections used by Jackson and Brabyn (this issue) to extend their analysis of towns and rural centres. They also strengthen the proposition that New Zealand is facing a very different set of growth and decline dynamics to those extant in the past.

#### Looking ahead, looking back – the role of urban influence

Cochrane and Maré's article, '*Population change and urban influence*', concludes the issue by looking at the relationship between the degree of urban influence and population change – and at the possibility that commuting may partially

these high growth/high urban influence areas, in these areas the fastest growing age group is that aged 65 years and over, with the next fastest growing being those aged 45-64 years. A summary measure based on area rankings of Population Growth (2001-2013), Employment Rate (2001), Percent Employed in High Skill Jobs (2001) and Percent Growth in High Skilled Jobs (2001-13) indicates that areas subject to high levels of urban influence are the best performing group, being the highest ranked on three of the outcome variables (population growth, employment rate and growth in high skilled jobs) and second on employment in high skill jobs. Further, for the other

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resolve some of the issues outlined herein. The article itself sits within the tradition of conceiving of urban-rural relationship in terms of an urban core/rural periphery and seeks to find evidence of backwash (negative) or spread (positive) effects using a descriptive approach based on the Statistics New Zealand experimental urban-rural classification and census data for the 2001 and 2013 census years. This classification schema classifies areas on the basis of their level of urban influence where influence is determined by travel to work commuting. A number of variables are considered: population distribution and growth, age, ethnicity, employment rate, level and growth of skilled employment, and place of residence 5 years ago. Starting with the distribution of the population they confirm that although population is strongly concentrated in urban areas, the most rapidly growing areas are those outside the urban areas which are subject to high levels of urban influence. This relationship between population growth and urban influence attenuates as the level of urban influence declines. Turning to the characteristics of

non-urban areas performance declines with the degree of urban influence, that is, high > moderate > low > rural/remote corresponding to a clear pattern of level of urban influence equating to the ranking of the area. The overall finding is that, on the basis of the descriptive evidence considered, areas of high urban influence benefit from their close connection with urban areas and that some areas can improve their growth performance by developing or strengthening their ties with urban areas.

#### What have we learned, what do we need to do?

In this issue we have outlined a selection of the findings from just one project in one small country. We have argued that the ending of population growth and onset of depopulation is 'over the horizon' for New Zealand, at national level. However we have also shown that the majority of New Zealand's subnational areas are ageing at a faster rate than might be otherwise appreciated in a country with a relatively high birth-rates and typically high levels of international migration; and that

migration, international and internal combined, has in many cases caused this accelerated ageing. We have shown that people are moving for different reasons than in the past, and that these movements are highly differentiated by age. Migration has also caused many areas to grow but to be smaller than they would have been in the absence of migration, their growth due to natural increase offsetting underlying net migration loss. We have shown the important role of Māori in contributing to population growth and maintaining natural increase well in excess of their national population share in some areas; but we have also shown that natural increase *per se* is now becoming vulnerable, and projected to become natural decrease in an increasing proportion of TAs (and the towns and rural centres that comprise them), as the increased numbers at older ages result in an increase in the number of deaths, and as fewer people have children. This shift may be especially hastened if industrial closures continue to ravage and displace populations in which Māori are present in disproportionate numbers. We have developed confidence levels around a new set of projections, which confirm that subnational New Zealand will soon see a different set of growth and decline dynamics than in the past. Increasingly, population growth will become concentrated in fewer TAs, towns and rural centres. We have shown that work-related commuting is likely to sustain some areas for longer, particularly those near relatively large centres.

Not included in this collection, our research has also led us to propose that all

areas – sub-nationally, nationally, and internationally, face diminishing *replacement capacity*: the capacity of births to offset a) the increased numbers of deaths arising from increased numbers at older ages, and b) any net migration loss, as a result of interactions between the demographic transition and the mobility transition (Jackson & Pool forthcoming). Specifically, we argue that areas losing young migrants simultaneously lose their replacement capacity to areas gaining them, in effect ‘watering the neighbour’s garden’ (Attané & Guimoto 2007) and indicating the need for compensatory-type policy development.

As we note, all of this can occur while population growth continues at national level, and for New Zealand we expect this to be the case until somewhat later this century. At the same time, the subnational ending of growth and likely onset of sustained depopulation has not yet been theorized, and certainly not operationalised, to assist policy responses. As Matanle (2017a, 2017b) proposes, there are many plausible opportunities on offer under the auspices of a ‘depopulation dividend’, among them new economic innovations, less environmental damage, a renewed sense of community, and greater collaboration. However, similar to its classic ‘cousin’, the ‘demographic dividend’ (Bloom, Canning & Sevilla 2003; Pool 2007), the depopulation dividend must be engaged with in a timely manner. With the demographic dividend, there is a short-term window of opportunity during which proactive policies to ensure the health and education

of the future labour force must be developed and implemented. With the depopulation dividend, the window of opportunity is also short-term, as, if left to ‘the market’, depopulating areas will wither and die.

Pre-empting the emergence of such policy development, we supervised, as part of this project, a Masters student to undertake an evaluation of policy responses to depopulation across seven OECD countries (McMillan 2015). Too detailed to cover here, Rachael’s invaluable work is summarized in McMillan (2016). In sum, she categorized a vast array of policy responses as either a) ‘do nothing’ (ignore the problem and let the market decide), b) ‘counter’ (continue to seek economic and population growth by increasing the competitiveness of regions or key agencies), and c) ‘accept and adapt’ (continue to seek out opportunities which maximise economic and population growth, while adapting both them and policy development to the acceptance of low/zero/negative population growth). We note that this work has recently been picked up by the Maxim Institute and a set of recommendations developed, prioritizing the ‘accept and adapt’ model for regions facing the end of growth (Wood 2017: 31). Rather than repeat the exercise we conclude this introduction by endorsing that recommendation, with the added caveat that adaptation involves fully understanding the local dynamics, such as we have outlined in this issue, and orienting solutions towards them.

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