Regional demographic and economic challenges for sustaining growth in Northern Australia

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ABSTRACT
Stimulating economic and population growth in northern Australia has been a long-term pursuit for the Australian Government, where the north has historically been the focus for centrally derived regional development policies. Most refer to untapping the purportedly vast opportunities of the resources and tourism sectors, and growth in the Asian middle-class in Australia’s proximate north. In 2015 the Australian government detailed an ambitious policy for ‘developing the north’ during the period 2015–60. This includes targets to dramatically grow the population and a list of five industries with ‘bright growth prospects’. However, regional development literature underscores there have been many impediments to generating sustained growth in northern regions of developed countries. This study is the first to evaluate baseline conditions and progress towards the aims and targets in the Australian regional growth policy. We develop key analytical indicators and provide analysis by 11 subregions within Northern Australia to ascertain the extent and implications of indicator diversity. The results highlight challenges for the policy’s aims as well as regional differences in the compositions of economies and populations. In demonstrating the incorrect and implied assertion of regional homogeneity, and by demonstrating that some targets were destined to fail from inception, we underscore the importance of knowledge about localized demographic and economic conditions in policy formulation. This brings into play the important question of whether high-growth policies for northern regions is desired by the longer term resident population, and most particularly the relatively large population of Indigenous northern residents.

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1. INTRODUCTION

For national governments in developed nations, sustaining economic and population growth in northern realms has long been a priority with some enacting national policies specific to this purpose, including in Australia (Australian Government, 2015) and Canada (Government of Canada, 2019). Meanwhile, academics have consternated, theorized and attempted to explain barriers for more widespread successes as evidenced by sustained growth in northern
jurisdictions. A variety of historical studies and epistemological approaches have attempted to understand the complex and interconnected factors for their often erratic and unforecasted demographic and economic trajectories (Dax & Fischer, 2018; Huskey & Taylor, 2016; Thurmer et al., 2019). Interdisciplinary approaches that recognize transcending and complex institutional, physical, economic and human systems in northern regions in Australia, Canada and the Arctic north have recently gained momentum (e.g., Breen & Vodden, 2019) and trans-disciplinary government and scientific institutions such as the Office of Northern Australia and Arctic, Remote and Cold Territories Interdisciplinary Center, have been established. However, northern development remains a ‘wicked’ problem for governments (European Union, 2017; Land and Water Taskforce, 2009), including in Australia’s north where historical policies have set grandiose expectations and targets around its growth potential (Taylor et al., 2015).

In 2015 an Australian Government policy was released aiming to stimulate considerable economic and population growth in Northern Australia during the period 2015–60. Called Our North, Our Future: White Paper on Developing Northern Australia (Australian Government, 2015), this policy is by no means the first outlining growth plans for Australia’s north (e.g., Coombs, 1947; Harris, 1992). Similar strategies pre-existed in Canada, such as the correspondingly titled Canada’s Northern Strategy: Our North, Our Heritage, Our Future (Government of Canada, 2019). The Australian policy, and other examples, have partly derived from the geopolitical significance of its northern jurisdictions (e.g., Roucek, 1983), their history as settlement ‘frontiers’, as well as from aspirations for resource and agriculture-led expansion (James & Aadland, 2011).

The Australian northern regional development policy targets significant population growth by four-fold to reach between 4 million and 5 million by 2060. At the time of writing, the population of the region was just 1.2 million. Likewise, the policy calls for several cities to grow to more than 1 million in population by the same, but in 2021 the largest city in the region was Townsville at 198,800 residents (Australian Bureau of Statistics (ABS, 2021a). Economic goals in the policy are scaffolded around themes which are characterized as ‘pillars’ for growth (Australian Government, 2015, p. 123). These are:

- Establishment of Northern Australia as a trade and investment gateway.
- A more diversified northern economy with increased ability to attract the required labour.
- Stimulation of Indigenous participation through reform of land arrangements.
- Developing world-class infrastructure.
- Improving governance and government presence in Northern Australia.
- Water infrastructure investment.

In effect, these pillars emphasize the predominant barriers to growth in the north: failing economic diversity, land development barriers, labour and skills shortages, as well as water supply issues. These, along with the boom–bust nature of global resource prices and demand, have inhibited ongoing, distributed, and stable economic and population growth in Northern Australia. Thus, despite significant growth in some regions of the north at discrete times, all subregions within were identified in a recent study as having low adaptive capacity for transitioning out of Australia’s prolific mining boom of 2003–12 (Productivity Commission, 2017).

It is within this context that we critically analyse the development policy’s targets and aspirations through indicators signalling the direction and scale of recent changes in Northern Australia as measured against the key economic and demographic goals and targets listed in the policy. In the six years since its inception there has been no evaluation of progress. Importantly, the policy speaks about the region singularly, rather than recognizing inherent economic and demographic diversity found in studies on northern peripheries (e.g., Carson et al., 2011a). Therefore, to grow an understanding of regional trends and issues relating to the overarching
policy, we provide analysis for 11 subregions in the north of Australia. Before outlining the characteristics of the region as a whole, we situate the policy and its goals within the regional development literature and theories, before a short overview of the detailed aims of this northern development policy.

1.1. Regional development in northern regions

The northern half of the Australian continent is amongst the most sparsely populated regions in the world (Karácsonyi et al., 2021; Karacsonyi & Taylor, 2022; Woinarski et al., 2007). While there are strategic and political benefits to having a larger and more distributed population in the north (Huskey & Taylor, 2016), government efforts have over time faced major difficulties due to its physical isolation from major centres and markets (Kuhmonen et al., 2016), difficult environmental conditions, and lack of political autonomy (Carson, 2011a). A body of literature has highlighted that there are similar economic and demographic challenges for northern and sparsely populated areas in Australia, Canada, the Arctic north and elsewhere (e.g., Carson, 2011b; Carson & Koster, 2012). Included in this literature is an emphasis on the drag to growth created by institutional and governmental frameworks (e.g., Huskey, 2006). In many respects, these are legacies of ongoing quests for development in northern regions, which in turn reflect their historical importance as nationalistic frontiers and places where nature was overcome, resources extracted and settlements emerged. Alaska’s development, for example, was inextricably tied to the strategic development of the Alaskan Railway (Huskey & Taylor, 2016), while in the north of Australia, some of today’s largest settlements such as Darwin were established for strategic and nationalistic purposes (Taylor, 2016).

In a further similarity, populating the north in colonially settled nations has also meant ‘overcoming’ Indigenous peoples – the original inhabitants in (what are now distinguishable as) Western nations. In doing so, many atrocities were committed, disempowerment was prioritized, and the ownership of lands and importance of culture pushed aside, with negative impacts felt today still (e.g., Lowitja Institute, 2021). It is incongruent, therefore, to precis northern development without acknowledging the ongoing impacts and challenges that settling populations have inflicted on First Peoples. Not least, ongoing disadvantages require reflection about what growth might actually mean in the contemporary northern milieu.

Despite these challenges, Australian national governments have repeatedly expressed their desire for development in the north. Against such ideals, recent data highlight the boom-bust nature of growth evident from the long cycle of growth during Australia’s great ‘mining boom’ during the period 2002–13. This drove substantial wealth, wages and population growth (Reserve Bank of Australia, 2014), but when it ended, these fell sharply. Some commentators have argued the boom went on for so long that policymakers and others simply assumed it would continue indefinitely (Reserve Bank of Australia, 2014). While generating wealth for some, overall its legacy was economically fragile regions (Productivity Commission, 2017). Moreover, the boom did not deliver widespread or identifiable socio-economic gains for remote living Indigenous populations (Dale, 2014).

The incentive and desire to increase Northern Australia’s long-term population and economic growth faces several major obstacles. The capability for government policy to influence an area’s desirability and encourage internal migration is dependent on the particular area’s deficiencies which might be addressed by policy (Eriksson & Hansen, 2013). The regional development literature has concluded, for example, that migrant attraction is dependent on a combination of good economic conditions and attractive amenities, and that a lack of one cannot be completely compensated for by the other (Chen & Rosenthal, 2008). This is due in part to the influence of life-stages on migration drivers, with the attraction of younger migrants primarily determined by economic opportunities and amenities and lifestyle more so for attracting and retaining older residents (Dyrting et al., 2020; Rickman & Rickman, 2011). European
studies have also denoted the importance of amenity for migration, particularly nice weather (Rodriguez-Pose & Ketterer, 2012). The role of amenity is often contrasted with the role of economic policies, as the former are specific to the area, while the latter are dependent on larger and more systemic factors.

These dynamics mean the influence of economic policy on population growth may depend on the commitment of governments to improving lifestyle and amenity conditions in northern regions, in contrast to dominant views on developing regional economies (Drabenstott, 2005). As an example, efforts to reduce regional unemployment in Germany emphasized options to encourage people to move away from areas with high unemployment to where jobs were more readily available (Arntz & Wilke, 2009). Alternatively, governments may invest in local training and jobs to reduce unemployment while attempting to prevent migration outflow from a particular region. One is cheaper and easier in the short-term, while the other is an economic policy that specifically benefits both the local economy and its longer term population prospects (Iammarino & Marinelli, 2015).

Although growth is desired in northern regions, there is usually little conceptualization or delineation about what might constitute sustainable growth. Many conceptualizations are possible. Sustainability might, for example, require more meaningful accounting of environmental impacts from desired population growth and economic expansion (Environmental Protection Agency, 2014); it may be greater economic independence from the rest of Australia; or indeed greater interdependence with export markets nearby in Asia, seen in the White Paper as key to the region’s economic opportunities (Australian Government, 2015; Wheeler, 2009). Sustainable growth might also be evidenced by an absence of large swings in population or economic growth rates historically observed (Portnov & Pearlmutter, 1999; Taylor & Carson, 2017). Certainly, this definition was favoured in the regional development literature for the United States (Allcott & Keniston, 2018) and Norway (Larsen, 2006).

In deliberating what sustainable regional growth for northern regions might look like, ongoing poor socio-economic outcomes for the significantly sized First Nations residents must be broached (Blanch, 2008). In Northern Australia, Indigenous Australians comprised 20% of the population in 2016 (Taylor et al., 2011). Despite decades of targeted policies and investments, gaps in the determinants of health and well-being between First Australians and others in the north continue to be glaring (Valeggia & Snodgrass, 2015). Sustainable growth must, therefore, be envisioned with greater parity in economic rents, well-being and important demographic indicators, such as life expectancy, for First Nations residents (Biddle & Swee, 2012). While in Australia improvements have been recorded for many indicators, such as infant mortality (Taylor & Barnes, 2013; Wilson, 2014), significant gaps remain (Lowitja Institute, 2021).

Economic diversification is one indicator widely cited as representative of sustainable economic growth (Miller et al., 2012). For northern regions this is invariably discussed in the context of a reduced reliance on mining and resource extraction (e.g., Productivity Commission, 2017). There is an extensive literature on the historical role of resource industries in driving high growth in northern and sparsely populated areas, and conversely its causal relationship to periods of economic and population stagnation or decline (e.g., Huskey, 2017; Jacobsen & Parker, 2016). As well as susceptibility to global resource markets and economic shocks, resource industries have come in for heavy criticism for their negative impacts on natural ecosystems in the north (Environmental Protection Agency, 2014), which are highly significant to Aboriginal residents and have been identified in recent research as important drivers for attracting new residents and retaining existing ones (Dyrting et al., 2020). The economic significance of fossil fuels and ongoing land clearing for agriculture are both factors targeted by critics of ‘high-growth’ pathways, a mantra clearly evident in the current Australian policy (Panayotou, 2016). The path towards a more diversified and less volatile economy may, therefore, be
impeded by economic conditions that encourage regions to focus on their economic strengths, which are concentrated in the industries of resource extraction and tourism (Bohlin et al., 2016). Notably, the immediate future of tourism investment and growth is uncertain subsequent to the COVID-19 global pandemic.

Finally, a section of the regional development literature preferences localized and holistic approaches to addressing flagging regional growth. The focus here is on community and social capital, rather than on jobs, economic growth or sectoral growth. Examples include generating thriving sporting participation, supporting religious facilities and fostering community networks more broadly. These approaches draw on the factors that attract people to specific regions or towns (Marre, 2020) and on tailoring attraction, retention and re-attraction (in the case of those who have left) to life-stages (Dyrting et al., 2020). Leick and Lang (2018) described this ‘beyond growth’ approach to development as social constructivism in highlighting the problematic and institutionally entrenched pro-growth nature of planning in non-core regions. Similarly, in addressing regional depopulation in Europe, Dax and Fischer (2018) argued for a re-envisioning of growth by focusing on local issues and garnering local input to build social innovation and trust: ‘Future approaches for regional development have to go beyond strategies for targeting economic growth, but have to address issues of local participation, social innovation and establishing trust as preconditions to effectively impact well-being dimensions’ (p. 1).

In the context of Northern Australia, however, there is scant literature grounded in this school of thought. Nevertheless, studies on Indigenous economic development more readily do recognize the importance of social and cultural (including access to and use of traditional lands) determinants of health and well-being (e.g., Australian Government, 2021; Chenhall & Senior, 2018).

1.2. A brief overview of the White Paper for developing Northern Australia

Released in 2015, the White Paper defined the entire Australian landmass north of the Tropic of Capricorn and the whole of the Northern Territory as comprising Northern Australian. Under this definition, the region accounts for 40% of the national landmass but just 4.7% of the population (ABS, 2021a; Australian Government, 2015). As it includes large segments of the states of Queensland and Western Australia and the whole jurisdiction of the Northern Territory, significant geopolitical differences between these encompassing jurisdictions are at play. Not least, at various points the governing parties of the three states were politically polarized between Labour and Liberal governments. Such political differences, and the inevitable drive to garner maximum benefits for their own jurisdictions, were acknowledged in the process of defining the boundaries for ‘the North’ (Australian Government, 2015, p.152).

The policy itself highlights there are ‘bright prospect’ industry sectors in the region which harbour potential for growth. These were identified as the resources and energy, tourism and hospitality, food and agribusiness and international education sectors (Australian Government, 2015, p. 56). Against each are a range of aspirations or targets, such as a doubling in the number of international students in the region between 2015 and 2035, development of a range of new hotels and establishing large-scale aquiculture farms. However, the region has experienced unfavourable demographic trends in recent years, including low growth, an increasing male bias and seemingly low capacity to retain women in their mid and late career life-stages (Dyrting et al., 2020). Population turnover is exceedingly high, creating direct costs (including attracting and retaining workers in the bright prospect sectors) and indirect costs like inhibiting social capital formation.

In light of this context, it is rather surprisingly that our research is the first to analyse baseline and changing demographic and economic conditions in Northern Australia since the implementation of the White Paper in 2015. Importantly, we deconstruct the region into 11 subregions to demonstrate its demographic and economic heterogeneity. Spatial diversity of
place, people and economies in Northern Australia has been the subject of a growing body of literature advocating for more grounded and nuanced policy (e.g., Carson, 2011b). In practicality, examples of intra-regional northern heterogeneity abound (Taylor, 2016). The Pilbara region in Western Australia, for example, is Australia’s powerhouse for iron ore production (itself the nation’s largest export product) and significant nationally for petroleum and natural gas. Its population of around 60,000 grows notably when global resource demand and prices are burgeoning, but declines when these subside (Reserve Bank of Australia, 2014). By contrast, tropical northern Queensland exhibits a more stable growth trajectory through its relatively diverse economy focused on agriculture, tourism and resources, but without the extreme reliance on the latter as evident in the Pilbara. North Queensland also has the two largest cities in Northern Australia: Townsville and Cairns. The former is a centre for defence (particularly the army) and the latter a service hub for agriculture and a base for visitors to the Great Barrier Reef. Therefore, while the White Paper defines Northern Australia singularly and has targets set accordingly, areas within have distinctively different baseline economic and demographic characteristics, reflected in their past heterogeneous growth and development trajectories.

2. MATERIALS AND METHODS

In this section we outline a set of demographic and economic indicators we apply that collectively speak to the veracity of and progress towards aspirations in the current northern Australian development policy. Indicators are based on a range of secondary datasets that provide data for small geographical units. They include single indicators (such as population numbers or growth rates) and composite indicators (such as indicators of economic diversity) using data sourced from a range of Australian Bureau of Statistics (ABS) collections including small-scale population estimates, census data (extracted using Table Builder Software) and data from the ABS.Stat and ABS.

Figure 1. Subregions within Northern Australia and the rest of Australia (ROA) (white). Source: Developed by the authors using SA2 boundaries in ArcGIS.
Data Explorer facilities. The indicators are primarily designed to inform progress towards headline targets in the policy, and are not necessarily definitive or exhaustive.

Our subregions are state and territory government reporting and ‘growth’ regions (Figure 1), which we replicated by amalgamating Statistical Area Level 2 geographical units (ABS, 2021b). These regions are the basis for regional policymaking, reporting and service delivery by the Queensland, Northern Territory and Western Australian governments, and while we address only the northern located regions here, the region structure does cover the whole of their respective state/territory. We considered these regions to be appropriate and more suitable than other possible options because they represent and highlight the diversity of the economic and demographic baselines across the north and align with policymaking activities. This diversity would have been lost at the state/territory level (for example) and for other possible boundaries such as local government administrative regions or federal government electoral boundaries. There are too many of the former to be practicable (e.g., 17 in the Northern Territory alone), and too few of the latter (e.g., only two covering the vast land area of the Northern Territory). Neither these nor other regions are foundations for policy formation and growth planning by their respective institutions, whereas the regions we selected are very much so, with their numbers and boundaries designed to capture the differential and main economic activities within as well as their differing demographic characteristics. For these reasons, and after weighing up the merits of several types of subregions, we settled on producing analysis for the regions outlined in Figure 1.

Aside from the northern subregions, we treat the whole of the Rest of Australia (herein ROA) outside of Northern Australia as a separate singular region to enable comparisons and contrasts to Northern Australia using our indicators. We mapped some of our results using ArcGIS software.

To understand the factors driving population change in Northern Australia and its subregions, we provide analysis for directions in the components of change: natural increase – the excess of births over deaths; net internal migration – net outcomes from migration to and from a region; and net overseas migration – immigration from overseas minus emigration to overseas. We augment this with two migration indices – the net migration rate (NMR) and migration effectiveness ratio (MER). The NMR is the difference between the numbers of people moving to and leaving a region as a ratio of the mid-year population. It shows the degree to which internal and interstate migration is driving population change in a region. The MER, meanwhile, indicates the relative influence of migration in redistributing population. It compares the total net gain or loss with the gross number of moves, expressed as a percentage. Their respective equations are as follows:

- \[ \text{NMR} = \frac{\text{In-migration} - \text{out-migration}}{\text{mid-year population}} \times 1000. \]
- \[ \text{MER} = \frac{\text{Net migration}}{\text{total migration}} \times 100. \]

Success in White Paper initiatives will in part depend on workforce, business and industry profiles in the north. We analysed the changing workforce composition for the ‘bright prospects’ listed in the policy to assess their emergent industry share. We developed indicators to assess and compare the relative diversity of jobs and industries within the region and contrasted with the ROA by applying a Herfindahl–Hirschman index (HHI), a commonly accepted measure of market concentration often applied to assess company market shares in product, finance and other markets. We apply the HHI to track jobs concentration and diversity across industries from 2006 to 2016. The formula for the HHI adapted to this research is:

- \[ HHI = \sum_{i=1}^{n} (S_i^2) \]
where \( n \) is the number of jobs in total in the region; and \((Si)\) is the industry share of full-time jobs.

We also calculated the index of concentration in the top four employing industries, known as the C4 Index, to measure diversity levels for employment in each region.

3. RESULTS

3.1. Population growth and targets

The White Paper set a desired target of a four-fold population increase for Northern Australia between 2015 and 2060. Using population estimates from the ABS, Figure 2 shows financial-year population growth comparing Northern and the ROA from the year 2001/02 (the base year of 100) to the year 2019/20.

While growth in Northern Australia outstripped the ROA during the mining boom, it stagnated from 2013 onwards. Annual growth rates were highest during 2004/05-2008/09, reaching as high as 2.7% in 2007/08, but was negative in 2016 and remained below 1% in subsequent years. By contrast, the ROA region was 34% larger by 2019/20 than in 2001/02, compared with 27% for Northern Australia. Consequently, to achieve the targeted White Paper population of 4.5 million residents by 2065, an unprecedented average annual growth rate of 6% from 2020/21 onwards would be required. However, growth from 2001/02 to 2019/20 averaged only 1.4% per annum, but if we exclude the mining boom years, it was just 0.3%. These data signify that obtaining the required growth in the timeframe targeted will be extremely unlikely.

3.2. Subregional population growth and change

None of the 11 subregions within Northern Australia grew at above the rate for the ROA during the period 2012/13, although Far North Queensland, with Northern Australia’s two largest cities of Townsville and Cairns, grew by 5.2%. By contrast, the adjacent North-West Queensland region declined in absolute size by −7.5% (Table 1). Notably, the resources region of Pilbara in Western Australia, with almost 35% of its workforce in mining, grew by around 60% from 2001/02 to 2014/15, but declined by −0.3% in the five years to 2020. Despite this, the

![Figure 2](image)
### Table 1. Summary indicators of population growth and change, Northern Australian subregions.

| Region                   | Growth rate, 2015/16–2019/20 | Growth rate, 2001/02–2019/20 | Average annual growth rate, 2001/02–2019/20 | Indigenous population (% in 2016) | Gender ratio 2016 (male/female per 100) | Region % of total Australian population, 2019/20 | % employed in mining, 2019/20 |
|--------------------------|-------------------------------|-------------------------------|--------------------------------------------|-----------------------------|-----------------------------------------|---------------------------------------------|-----------------------------|
| Central Australia        | −0.9%                         | −2.0%                         | −0.11%                                     | 40%                         | 98                                      | 0.15%                                       | 0.72%                       |
| Far North Queensland     | 5.2%                          | 32.8%                         | 1.73%                                      | 17%                         | 100                                     | 1.14%                                       | 2.41%                       |
| Greater Darwin           | 1.6%                          | 36.0%                         | 1.89%                                      | 10%                         | 108                                     | 0.57%                                       | 2.10%                       |
| Katherine                | −0.3%                         | 8.1%                          | 0.43%                                      | 59%                         | 106                                     | 0.11%                                       | 1.63%                       |
| Kimberley                | −2.7%                         | 10.1%                         | 0.53%                                      | 46%                         | 100                                     | 0.14%                                       | 2.32%                       |
| Mackay-Isaac-Whitsunday  | 0.2%                          | 30.6%                         | 1.61%                                      | 5%                          | 103                                     | 0.74%                                       | 14.80%                      |
| North Queensland         | 2.3%                          | 28.0%                         | 1.47%                                      | 8%                          | 99                                      | 0.93%                                       | 2.67%                       |
| North-West Queensland    | −7.5%                         | −11.3%                        | −0.60%                                     | 27%                         | 108                                     | 0.12%                                       | 23.26%                      |
| Pilbara                  | −0.3%                         | 58.5%                         | 3.08%                                      | 16%                         | 146                                     | 0.24%                                       | 34.34%                      |
| Rockhampton              | 2.0%                          | 26.9%                         | 1.42%                                      | 7%                          | 99                                      | 0.45%                                       | 6.40%                       |
| Top End                  | −1.3%                         | 15.0%                         | 0.79%                                      | 72%                         | 103                                     | 0.13%                                       | 10.32%                      |
| Northern Australia       | 1.7%                          | 27.4%                         | 1.44%                                      | 16%                         | 103                                     | 4.71%                                       | 7.42%                       |
| Rest of Australia        | 8.2%                          | 33.6%                         | 1.77%                                      | 2%                          | 97                                      | 95.3%                                       | 1.3%                        |
| Australia                | 7.9%                          | 33.3%                         | 1.75%                                      | 3%                          | 97                                      | 100.0%                                      | 1.7%                        |

Sources: Authors’ calculations from the Australian Bureau of Statistics (ABS) Regional Population Growth, ABS Table Builder and ABS.Stat.
mining boom produced the highest subregional average annual growth rate for the Pilbara during 2001/02–2019/20 of 3%.

Stark regional differences in population growth in Northern Australia are emphasized in Figure 3 showing the Far North Queensland (5.2%) and North Queensland (2.3%) regions grew during 2014/15–2019/20, while conversely North-West Queensland (−7.5%) and Kimberley (−2.7%) declined. Data for sub-areas of our regions showed Northern Australia regions that exhibited relatively strong growth during this period was largely driven by urban expansion northwards from Cairns (9.5%) and in the city of Townsville (3.6%) during 2014/15–2019/20.

3.3. Demographic composition

Table 1 also shows Northern Australia had a higher male balance in its population at 103 males per 100 females in 2019/20 compared with 97 for the ROA. While higher overall than for ROA, there was substantial intra-regional variations with the Pilbara having 146 men per 100 women and regions with a high Indigenous population share such as Central Australia (98) or hubs for retirees such as Rockhampton and North Queensland (both at 99), having lower gender ratios. Indeed, a high (Pearson’s $r$) correlation of 0.8 existed between the proportion of the workforce employed in mining and gender ratios in subregions in Northern Australia.

The Indigenous population share overall in Northern Australia was 20% in 2016, compared with 2% for the ROA. However, the Top End region (encompassing Arnhem Land) had 72% of its population Indigenous, with Katherine (59%), Central Australia (40%) and Kimberley (46%) also having high Indigenous population shares, while the coastal tourism, mining and agricultural region of Mackay–Isaac–Whitsunday had the lowest (5%). The population pyramid on the left side of Figure 4 compares Northern Australia with the ROA, while the right the pyramid is solely for Northern Australia and shows the Indigenous population age structure compared with the
non-Indigenous population. Collectively, the pyramids emphasize the relatively young population in Northern Australia, with a ‘deficit’ of seniors (left-hand pyramid) and a higher concentration of young people, notably those less than 15 years of age and those aged 25–35 years. The pyramid comparing Indigenous and Non-Indigenous residents (on the right side of Figure 4) reveals the very different age structure for Indigenous people. The latter is still a very young population, reflecting historical fertility and migration patterns to the region, while the Indigenous population remains younger through higher fertility and death rates in comparison with other residents.

3.4. Drivers of population change
NMRs and MERs for Northern Australia’s regions and the ROA are shown for the years 2016/17–2019/20 in Figure 5. These demonstrate that diversity exists in the drivers of change between regions, but the overall picture is of a high impact from internal migration on population change in Northern Australia compared with the ROA. While the MER for ROA shows that region gained five people per 100 migration events (the sum of in and out migration), North West Queensland lost 11 per 100, the Kimberley almost eight, and Top End seven. These regions, along with Darwin and Central Australia, had conspicuously high NMRs. The median NMR for North-West Queensland was almost a quarter of the median population for those years, although the population of this very remote area was only 30,000 in 2019/20, such that relatively small migration flows produced relatively high NMRs and MERs. Far North Queensland, the most populous subregion in Northern Australia (circa 300,000) was the only one with a positive MER and NMR during 2019/17–2019/20.

3.5. Economic indicators
The participation rate and employment-to-population ratio are indicators of workforce capacity, population dependency (the relative size of the workforce in comparison with the population) and workforce engagement levels. The policy calls for a significant ramping up of employment in a number of sectors, while the region has long struggled to attract and retain skilled and other workers (Dyrting et al., 2020). The labour force participation rate of 63% for
Figure 5. Net migration rates (NMRs) and migration effectiveness ratios (MERs) for Northern Australian regions during the period 2016/17–2019/20. Source: Authors’ calculations using data extracted from ABS.Stat.

Figure 6. Scatterplot of sub-regional employment-to-population ratios and participation rates, 2016. Source: Authors’ calculations based on Australian Bureau of Statistics (ABS) Census of Population and Housing data.
Northern Australia in 2016 was slightly higher than for the ROA at 60%, masking underlying regional variations driven by population compositions and industry mix. There were large variations in both indicators across sub-regions and a high rate of correlation ($r^2 = 0.95$) between them. Top End had the lowest participation rate (an exceedingly low 43%) and employment-to-population ratio (26%), while the Pilbara and Greater Darwin had the uppermost ratios (Figure 6). Both indicators were negatively correlated with the proportion of the population identifying as Indigenous in 2016; in particular, the employment-to-population ratio (at $r^2 = -0.72$). This reflects both poor employment outcomes and the young Indigenous population age profile with a high proportion aged under 15 years (45% compared with 24% for the non-Indigenous population) and, therefore, not in the labour force.

Meanwhile, jobs growth from 2011 to 2016 in the ‘Bright Prospect’ industry sectors identified in the White Paper was in general very poor in the resources and energy, international education and food and agribusiness sectors (Table 2). In almost all regions the numbers of jobs in these sectors fell with the exception of North-West Queensland which performed well across all ‘bright’ sectors. On a positive note, jobs in the tourism and hospitality and healthcare, medical research and age care sectors grew in most regions and for Northern Australia as a whole. However, jobs growth in the identified sectors was significantly lower (and negative in most) compared with the ROA (last two rows in Table 2).

Our analysis of the relative diversity of industry sectors is based on two measures of concentration; the C4 ratio (the proportion of all jobs accounted for by the top four employing

|              | Resources and energy | Tourism and hospitality | International education | Food and agribusiness | Healthcare, medical research and aged care |
|--------------|----------------------|-------------------------|------------------------|-----------------------|--------------------------------------------|
| Central Australia | $-27\%$ | $7\%$ | $-18\%$ | $-25\%$ | $22\%$ |
| Far North Queensland | $9\%$ | $13\%$ | $-28\%$ | $-13\%$ | $2\%$ |
| Greater Darwin | $-3\%$ | $11\%$ | $1\%$ | $-7\%$ | $25\%$ |
| Katherine | $-13\%$ | $0\%$ | $-33\%$ | $-20\%$ | $6\%$ |
| Kimberley | $-13\%$ | $5\%$ | $5\%$ | $-12\%$ | $19\%$ |
| Mackay–Isaac–Whitsunday | $-15\%$ | $4\%$ | $-13\%$ | $-7\%$ | $15\%$ |
| North Queensland | $-4\%$ | $8\%$ | $-13\%$ | $-1\%$ | $17\%$ |
| North-West Queensland | $49\%$ | $25\%$ | $7\%$ | $1\%$ | $25\%$ |
| Pilbara | $-62\%$ | $-2\%$ | $-56\%$ | $-22\%$ | $11\%$ |
| Rockhampton | $86\%$ | $-20\%$ | $-10\%$ | $-66\%$ | $-16\%$ |
| Top End | $-19\%$ | $8\%$ | $-24\%$ | $-24\%$ | $18\%$ |
| Northern Australia | $-5\%$ | $9\%$ | $-5\%$ | $-11\%$ | $19\%$ |
| Rest of Australia | $1\%$ | $16\%$ | $4\%$ | $-2\%$ | $23\%$ |

Source: Authors’ calculations based on Australian Bureau of Statistics (ABS) Census of Population and Housing data.
Table 3. Indicators of industry and jobs diversity and industry concentration, 2006–16.

| Indicator          | Region       | 2006 (%) | 2016 (%) |
|--------------------|--------------|----------|----------|
| Full-time jobs     | Northern Australia | 39%      | 43%      |
|                    | ROA          | 39%      | 39%      |
| C4 all jobs        | Northern Australia | 41%      | 41%      |
|                    | ROA          | 41%      | 42%      |
| HHI full-time jobs | Northern Australia | 722%     | 751%     |
|                    | ROA          | 733%     | 711%     |
| HHI all jobs       | Northern Australia | 736%     | 753%     |
|                    | ROA          | 738%     | 747%     |

Note: HHI, Herfindahl–Hirschman index; ROA, rest of Australia.
Source: Authors’ calculations based on Australian Bureau of Statistics (ABS) Census of Population and Housing data.

industries) and the HHI. Three main points emerge from summarizing Table 3 in which the results are shown:

- Industry concentration in Northern Australia is approximately the same as in the ROA. However, concentration in the top four employing industries increased from 39% to 43% in Northern Australia in the ten years to 2016, but remained at 39% for the ROA.
- The HHIs for both Northern Australia and ROA cannot be considered to be indicative of a high concentration of jobs despite the top four industries accounting for more than 40% of employment.

Figure 7. Herfindahl–Hirschman index (HHI) and industry size for Northern Australia subregions, 2016. Source: Authors’ calculations based on Australian Bureau of Statistics (ABS) Census of Population and Housing data.
Across both measures, and for both full-time and all jobs, concentration in the north is increasing; albeit at a relatively slow rate.

While the extent of industry concentration in Northern Australia was broadly equivalent to the ROA, both the C4 and HHI varied considerably across subregions in the North. In 2016, the Pilbara had the highest C4 (60%) and HHI (1668) and its HHI in 2016 was more than double that of the three regions with the lowest concentration of jobs across industries — the Queensland regions of Far North Queensland, Rockhampton and Mackay–Isaac–Whitsunday (Figure 7).

4. DISCUSSION

Evaluating demographic and economic trends for and within Northern Australia against aspirations in the Our North, Our Future policy raises questions about the efficacy of some of the targets and, indeed, the policy itself. Notably, the population targets were ill-conceived because, even at the release of the policy, it was abundantly clear they were and still are not attainable. While even strident optimists must question the political motivations for such targets, grandiose northern development aspirations are perhaps emblematic of central government tendencies to focus on the supposed untapped ‘potential’ for growth in the north. Although the policy argues that a set of bright prospect industries are primed for significant jobs growth, our research shows these have not been so ‘bright’ in generating employment growth in recent years. The policy also proclaims the burgeoning middle-class in Asia as reason enough for the north to boom without due consideration of the poor transport networks inhibiting sufficient timeliness and quantities in the flows of products between Northern Australia and Asia. The quantum leaps in population and economic growth proposed in the policy can therefore be reasonably described as at best aspirational and at worst fanciful.

A very significant barrier to the aforementioned quantum shift is the inability of the region to attract and retain population. Despite recent growth in the three largest cities of Cairns, Townsville and Darwin, net migration exchanges with the ROA remain firmly in the negative. Without the stabilizing effects of Northern Australia’s high proportion of Indigenous Australians, whose out-migration rates are far lower than other residents, these would be starker. Non-Indigenous migration flows emphasize early career entry into the region and mid-to-late career exits for career escalation and family formation purposes (Dyrting et al., 2020; Martell et al., 2013). Furthermore, in spite of its younger population, the fastest growing segment proportionally in the north is seniors (aged 55+), and in particular Indigenous seniors. In the Northern Territory these are projected to grow by 5% per annum over the next decade (Northern Territory Treasury, 2019). Population ageing is reflected in the only growing ‘bright prospect’ sector listed in the White Paper Healthcare, Medical Research and Aged Care.

One positive demographic story for Northern Australia has been the emergence and growth of overseas-born residents from source countries not previously present in large numbers, including the Philippines and India. Ongoing growth over 15 years suggests positivity for retention, despite the dour findings in many past studies about this. Consequently, the proportion of the population born overseas is climbing quickly, bringing benefits over and above population growth. The Northern Territory government, in particular, has emphasized the importance of attracting and retaining new migrant communities in its recent Population Growth Strategy, 2018–2028 (Northern Territory Government, 2018).

Turning to the economic analysis presented here, the workforce variables demonstrate great diversity in workforce engagement and capacity across sub-regions (Figure 7) when comparing participation rates and workforce to population rates. Both were relatively high in those regions with prominent urban populations. The patterns of regional variations are correlated to the
proportion of the population which is Indigenous, reflecting ongoing lower employment and workforce engagement outcomes for Indigenous residents in the north (Figure 6) and the young age of the Indigenous population.

As indicated, jobs growth in most of the ‘bright prospect’ sectors are turning out to be not-so-bright at all, with all but tourism and hospitality declining across most sub-regions. This may have affected the population growth rate, although the availability of jobs, is just one of a range of factors determining northern migration patterns (e.g., Taylor & Carson, 2017). While significant falls in the resources sector might have been anticipated following the end of the mining boom, there were also large declines in the numbers of jobs in international education and food and agribusiness. In the meantime, the tourism and hospitality along with healthcare, medical research and aged care sectors have fared much better since the end of the mining boom, with the latter driven by population ageing across the region.

Part of the issue for jobs growth in the north is in the identified sectors themselves because emphasis is placed on resources and energy sector jobs. In contemporary times, these sectors require only relatively small operational workforces with profits leaking to exogenous economies (Cust & Poelhekke, 2015). As an example, the Pilbara region produces as much as A$60 billion through iron ore extraction (Government of Western Australia, 2017), yet, as our results demonstrate, this has not lead to the development of non-mining sectors of the economy in the region, nor to sustained population growth. This is a strong indication of the unsustainability of dependence on mining for jobs and population growth. Despite the enormous wealth created by mining in regions such as Pilbara, its demographic outlook is no better than its neighbour the Kimberley where mining is considerably less significant. Concerningly, the long-term trend to digitization of mining operations, including the operation of equipment at remote mines by workers in major cities far away, is likely to continue to decrease the number of non-resident (including fly-in-fly-out) workers required in-situ when compared with the past (e.g., Ellam, 2017) which may stifle positive impacts on population growth from mining. In addition, State and Territory governments in Australia have attempted to coerce mining companies to source workers locally, although they lack the legislative ‘teeth’ to do so. With the viability of larger projects still dependent on non-resident workforce models, this may accelerate investments in remote technologically based operations, and place at risk the very large royalty inflows governments generally receive from such projects (e.g., Department of State Development, 2015).

It is clear that potential growth sources for jobs and economic growth in the north have not materialized to date. For example, aquaculture, one of the focuses for developing agribusiness in Northern Australia, is only expected to add 2000 jobs across all of Northern Australia over a 10-year period in a best-case scenario (Cobcroft et al., 2020). Additionally, the few already successful industries, such as cattle grazing, are expected to ‘expand’, but by how much and through what process are not made clear. At the same time, there is ongoing urbanization within the north, in both population and investments, in part reflecting dependence and large role of government actors discussed above. Almost all long-term growth has been in the cities of Cairns, Townsville and Darwin. These are an order of magnitude larger than any other centre, with gaps increasing over time. This trend puts at risk notions of more distributed growth models in the north, accentuating margins between have and have nots, and likely further entrenching the role of government which itself is administratively concentrated in these cities. This economic landscape is noted to ‘lock-in’ poor growth trajectories and social outcomes by some authors such as Carson (2011a) and Carson and Carson (2014). Scholars such as Lea (2008) have gone further in arguing that governments have, in spite of the altruistic intentions of individuals within, collectively ‘learnt’ to become dependent on Aboriginal disadvantage, thus creating an intractable co-dependence, but with a complete imbalance in power in favour of the institutions of government (e.g., Taylor et al., 2011). The conundrum for the north is of course that any
reduced levels of government jobs or investment will jeopardise future overall growth. The north as defined in the policy also suffers from political and governance constraints. The bringing together of three partisan State and Territory governments under the umbrella of Northern Australia creates conflicts over governance, already observed in positioning between the three jurisdictions for some key aspects of the policy such as where the Office of Northern Australia should be located, with political differences are likely to be an ongoing impediment.

These consternations lead us to question how sustainable growth or sustainability in terms of population or economic growth might be defined by different groups in the north? This important question is poorly addressed in the policy’s documents with its heavy focus on high-growth, led by the expansion of certain industries which, at best, can be described as low growth in recent years. Certainly, long-term residents, including Indigenous people in the north, may have very different perceptions about the policy’s aspirations. Given the susceptibility of the overall region, and regions within, to large fluctuations in population and economic growth, it is difficult to argue that the ongoing high-growth mantra serves the true interest of the fabric of the north including its rich but fragile cultural, environmental and social heritage. This brings us to note the importance of locally and ground-up focused policies, of the sorts described under the banner of social constructivism earlier. Policy initiatives in this direction would look to build social capital, community stability and networks, community participation and general societal cohesion first and foremost. Such attributes may indeed work to attract further innovation, different types of communities, and to reduce boom–bust cycles (Huskey, 2017).

Furthermore, other more economically directed policy responses might include developing a greater reliance on local employment and knowledge generation to ensure increased benefits from prosperous periods remain in northern regions (Larsen, 2006), distribute investment across a broader range of local industries to prevent the economy becoming too reliant on a particular sector (Jacobsen & Parker, 2016), and develop infrastructure and amenity to encourage population retention; a greater challenge than population growth and the inability to attract migrants (Thurmer et al., 2019). Following these measures may lead to a more stable population and a greater degree of financial independence from external labour and finance streams.

But perhaps what limits ‘progress’ most for Northern Australia are preconceived notions of what success in terms of ‘development’ might materially look like. The White Paper is, after all, a document conceived in the ‘south’, for the north, and by politicians with particular philosophical orientations in relation to the ‘role’ of the north in the national economic and political arenas. Clearly, the population targets in the White Paper cannot and were never going to be reached. Their impossibility from the start is emblematic of the grandiose ambitions and plans seen in all iterations of ‘developing northern Australia’ policies over the past 100 years or more. This classical high-growth approach of overreaching or over-promising on the potential of the north to be ‘big and important’ is seen in similar historical documents and policies for other nations including Canada and the United States. The current Australian iteration is also focused on the large ‘potential’ (this time homing in on the growth of the middle class in Asia) but with inevitable ‘opt-out’ disclaimers associated with the political responsibility of others to just ‘fix’ a few things (water, land access and transport to name a few). In this sense, the White Paper offers opportunities to regather and rethink policy specifics, and indeed policymaking, for northern jurisdictions to enable the complex interregional dynamics in population and economic change to be informed by experts who live in and study the north. Most importantly this group of experts includes and should include Indigenous residents and their representative groups.

Finally, the COVID-19 pandemic commencing in early 2020 fundamentally altered patterns of migration and economic activity for Northern Australia and globally. Most significantly, it has sent population growth in Australia to historically low levels from the shutting of international borders. There are uncertainties about whether and to what extent growth in
the north will be impacted in the long-term, but the consensus from demographers is certainly for a lower national population than previously projected. Ironically, international prices and demand levels for key resources such as iron ore have strengthened during the pandemic and the resources industry has not suffered as significantly as service and other sectors, notably tourism, hospitality and international education. Even after the epidemiological impacts of the virus are quelled, it remains very unclear what trajectory a recovery might take and whether past migration and economic trends will resurface or be fundamentally changed, thus further challenging the aspirations of developing Northern Australia.

**DISCLOSURE STATEMENT**

No potential conflict of interest was reported by the authors.

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