

Regional economic resilience in New Zealand

A labour market perspective

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Abstract

Resilience is an increasingly sought after trait for economies facing frequent local and global shocks, as well as longer-term challenges. However, the concept and measurement of resilience continues to evolve in the still sparse economic literature, with resilience a largely implicit idea in economic development research and policy to date. This paper provides descriptive analysis of regional economic resilience in New Zealand during the Global Financial Crisis and COVID-19 pandemic using an approach popularised by Martin, Sunley, Gardiner, & Tyler (2016). We focus on the resilience of regional labour markets, and complement this with analysis of regional labour reallocation, two regional case studies, and discussion of longer-term drivers of change in the regions and their implications for government.

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The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes and is not related to the data's ability to support Inland Revenue's core operational requirements.

Executive Summary

Background

Resilience is an increasingly sought after trait for economies facing frequent local and global shocks, as well as longer-term challenges. The idea has attracted significant interest in small, isolated countries like New Zealand, that face comparatively greater exposure to natural disasters and other shocks (Pells, 2024). However, the concept and measurement of resilience continues to evolve in the still sparse economic literature. Fundamentally, regional economic resilience is aimed at sustaining economic success over the long term and depends on a region's capacity to adapt to changing circumstances and adjust to external shocks as and when these occur.

This report provides descriptive analysis of New Zealand's regional labour market resilience during the Global Financial Crisis (GFC) and COVID-19 pandemic (the pandemic) using an approach popularised by Martin, Sunley, Gardiner, & Tyler (2016). We complement this with analysis of regional labour reallocation, case studies of two regions, and discussion of longer-term drivers of change in the regions.

Regional resilience to short-term shocks

Analysing the regional labour market impacts of the GFC and pandemic-induced recessions in New Zealand we observed that few regions were both resistant and had relatively strong recoveries. Regions that resisted both shocks were generally agricultural regions, while regions that underperformed tended to be large cities with relatively small shares of public sector workers (e.g., Auckland and Christchurch). Similar patterns have been observed in parts of Europe.

On the other hand, some regions did well in one shock but not the other. For example, Otago's labour market was relatively resilient during the GFC but – due to its reliance on its tourism sector – saw relatively large employment losses during the pandemic period. This highlights both the risk of specialisation, and that regional resilience can be very shock specific.

Investigating labour market reallocation during the GFC and pandemic shocks we found these shocks had uniquely different impacts on regions. While the GFC depressed regional labour market reallocation, the pandemic shock triggered a flow of workers from the South Island to the North Island. This partially explains the observance of North Island regions (particularly Gisborne, Bay of Plenty, and Northland) recovering relatively well following the pandemic recession. We also observe some evidence of a relationship between regions' labour market flexibility and resilience, suggesting that labour market flexibility is advantageous during times of crisis.

Longer-term resilience is complex

Despite weathering some short-term shocks quite well, the regions face uniquely different growth prospects long term. In the context of New Zealand's unique features, including its small population size and distance from large markets, our analysis highlights the roles of initial endowments, historical development, and industry mix (path dependence), agglomeration and connectedness of the regions, as well as the importance of long-term trends like climate change and its associated policy response, for the development and resilience of regional economies.

Role of government

Governments (local and central) will continue to play a key role in the economic development and resilience of the regions as New Zealand navigates short-and longer-term challenges. However, balancing short-term goals with longer-term goals – which will include reducing the country's growing infrastructure deficit, as well as supporting the economy to adapt to the long-term challenges that climate change presents – will be a key challenge for governments. Striking a balance is particularly important given the potential trade-offs between building longer-term resilience and

supporting the economy to 'bounce back' from a short-term shock. Additionally, it may require making trade-offs across the regions, or between regional and national interests, but should be carefully considered to avoid undermining longer-term objectives. Importantly, building resilience will require longer-term thinking across the government system.

Developing an understanding of the impact of inevitable trends – e.g., ageing populations and climate change – will be key for all levels of government in developing a collective and forward-looking position on how to develop resilience to future disruptions. This collective understanding will be important in supporting future decision making, including infrastructure planning and financing, as well as around structural change in the economy that are likely to be important for the long-term resilience of the regions.

While traditional economic development tools are likely to remain important, developing regional resilience may require an increased use of more tailored solutions, i.e., place-based policy making as recommended by the OECD. This includes leveraging existing comparative advantages and the unique characteristics of the regions. While city and region deals are a tool that central government could use to support regional economies striving to build resilience, such deals can also risk accentuating regional disparities if information and resource asymmetries are not managed.

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1. Motivation & purpose

1.1. Motivation

New Zealand's regions have experienced significant and pervasive economic and social shocks over the past three decades. See Easton (2023) for a historical review of shocks in New Zealand. These shocks affected individuals, households, and businesses, and in turn, have reshaped regional labour markets and local economic structures. However, regional economic development was largely left to market forces during that period, with central government only re-engaging around 2015 (Nel, Connelly, & Bergen, 2019).

Analysis in the 2010s highlighting disparities in the growth of the regions – notably, *Growing Apart: Regional Prosperity in New Zealand* (Eaqub, 2014) – generated a public discourse that led to regional economic development becoming a focus of successive Governments' agendas. This public discourse ultimately led to the creation of the Provincial Growth Fund in 2017, as well as other initiatives aimed at supporting regional economic development, particularly as we transition to a low emissions economy.

While a largely implicit idea in economic development policy, resilience is increasingly front of mind for decision-makers in a world where shocks to economies and communities occur with increasing frequency (New Zealand Productivity Commission, 2024). In 2022 the government of the day tasked the New Zealand Productivity Commission with investigating the resilience of the economy to supply chain disruptions (New Zealand Government, 2023). The New Zealand Treasury's inaugural Wellbeing Report, *Te Tai Waiora* (New Zealand Treasury, 2022), also included a strong focus on the sustainability of and risk to wellbeing, i.e., the resilience of New Zealand and its people.

1.2. Purpose

The purpose of this paper is to provide insights into the economic resilience of New Zealand's regions. This includes developing an understanding of the potential sources of economic resilience, as well as how regions' economic resilience has changed over time. To do this we analyse the employment impacts of the Global Financial Crisis (GFC) and COVID-19 pandemic using a resilience framework popularised by Martin, Sunley, Gardiner, & Tyler (2016). We complement this analysis with case studies and discussion of longer-term drivers of change in the regions.

2. Defining and measuring regional economic resilience

While the concept of resilience has attracted fans and critics¹ within economics in recent years, the concept is well established in the domains of business, ecology, engineering, and psychology (Martin & Sunley, 2020). Common across these domains is the idea that resilience is desirable and supports growth and/or minimises the risks of disturbances or shocks (Martin & Sunley, 2020; Pells, 2023). For example, in the context of business, resilience generally captures a firm's ability to anticipate, respond to, and adapt to shocks, e.g., the increasingly uncertain global marketplace (Saad, Hagelaar, van der Velde, & Omta, 2021; Martin & Sunley, 2020).

For this paper, we focus on the concept as it has evolved within the geography economics literature. While largely implicit in Blanchard & Katz' (1992) *Regional Evolutions* and the existing geography economics literature that followed, regional resilience as a concept has gained traction, as evidenced by the Handbook of Regional Economic Resilience (Bristow & Healy, 2020).

2.1. Definition & conceptualisation of economic resilience

Despite the concept's recent popularity, there is little consensus around the definition and conceptualisation of economic resilience (Pells, 2023). This reflects the fact that resilience can pertain to numerous shocks, domains (e.g., environmental, economic, social, etc), and units of interest. That is to say, the resilience to what, of what, for what, and by what means, are important considerations (Martin & Sunley, 2020; Pells, 2023). As the authors note, researchers need to be explicit about what they are measuring, and not measuring, and how.

2.1.1. Equilibrium and evolutionary resilience

Expectations of what resilience looks like are important. For example, economic resilience could be interpreted as simply bouncing back to a pre-shock level of an outcome, e.g., the unemployment rate (an equilibrium approach). The equilibrium perspective emphasises the return to a previous state or equilibrium following a shock and is useful in situations where maintaining consistent performance is important.

Alternatively, resilience could allow for growth trajectories and rates to change following a shock (an evolutionary approach) – as was observed by Blanchard & Katz (1992) in the context of states in the U.S. The evolutionary perspective emphasises the capacity of a system to adapt and fundamentally change over time in the face of numerous disturbances and shocks. This perspective tends to be seen as the more valuable in an economic context, as it focuses on the ability of complex systems to cope with multiple challenges and change over the long term. For a region, the likelihood of economic success being sustained over the long term crucially depends on its ability to adapt to changing circumstances and adjust to external shocks as and when these occur.

Figure 2.1 demonstrates four scenarios of resilience. Scenario *c* demonstrates the equilibrium perspective, where the employment level drops following a shock, recovers to the pre-shock growth path, and continues to grow at the pre-shock growth rate. On the other hand, scenarios *a*, *b*, and *d* are more in line with the evolutionary perspective of resilience, i.e., a return to the previous growth path is not assumed or expected.

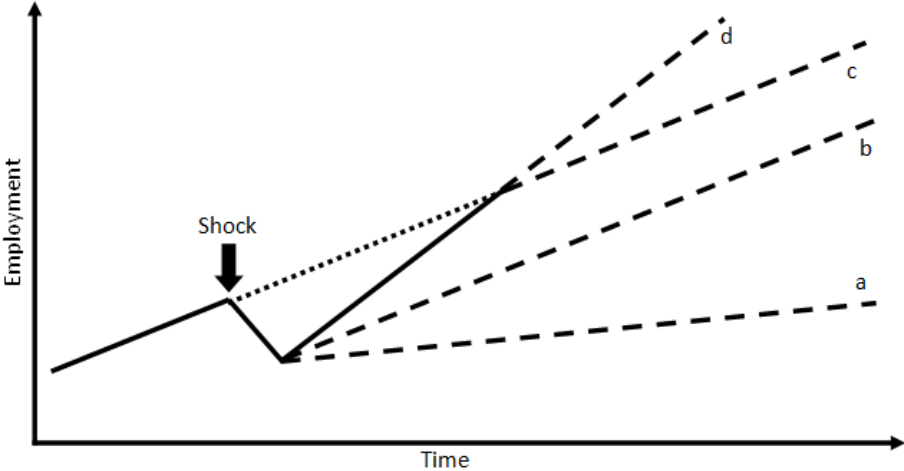
In scenarios *a* and *b*, the recoveries following a shock are, on the surface, more negative – for example, in scenario *b*, the employment maintains the pre-shock growth rate, but is a level shift below the pre-shock growth path. In scenario *a*, employment sees both a level shift down and a

¹ Some critics note that the concept is 'fuzzy' and ill-defined, while others question the distributional aspects of resilience outcomes – see (Bristow & Healy, 2020).

slower rate of growth. Scenario *d* demonstrates a relatively positive outcome where, following the shock, employment ‘bounces forward’ to a raised growth rate and growth path.

It’s important to acknowledge that while scenario *d* is likely to be considered as desirable from a regional economic development perspective, it is possible for this new growth path to be unsustainable, e.g., if housing and infrastructure fails to keep up with demand for workers – a scenario that played out in Queenstown in 2023 (Queenstown Lakes District Council, 2023). See Bristow & Healy (2020) and Pells (2023) for a review of the broader resilience literature and discussion on the merits of equilibrium and evolutionary approaches.

Figure 2.1. The evolution of regional economic resilience



Source: Adapted from Martin & Sunley (2020).

Notwithstanding the lack of agreement on the definition and conceptualisation of economic resilience, the literature on regional economic resilience has grown significantly. As Bristow & Healy (2020) note, many aspects of this complex concept warrant further research, e.g., structural determinants, human agency and choice, and the role of national stabilisers.

2.1.2. Our definition of regional economic resilience

For this paper we adopt Bristow & Healy’s Handbook on regional economic resilience’s definition of resilience (Bristow & Healy, 2020):

The capacity of a regional or local economy to withstand or recover from market, competitive and environmental shocks to its developmental growth path, if necessary, by undergoing adaptive changes to its economic structures and its social and institutional arrangements, so as to maintain or restore its previous developmental path, or transit to a new sustainable path characterized by a more productive and equitable use of its physical, human and environmental resources.

This definition captures three important characteristics of regional economic resilience:

- Regions require the ability to withstand and recover from traditional, emerging, and yet unknown, idiosyncratic shocks;
- Resilience may involve both operational and structural adaptation; and
- Resilience isn’t simply the ability to revert to a previous trend, as that developmental path may not have been sustainable or even desirable.

Martin & Sunley (2020) argue that there are five dimensions of resilience, and that it is a process. Namely, there is: the *risk* that regions have (vulnerability to or propensity for shocks); the *shock*; *resistance* (to the initial impact of the shock); *adaptability* (ability to reorient and adapt to shocks);

and *recoverability* (the extent and nature of the recovery of the region’s economy; and the nature of the path to which the region recovers).

This process interpretation of resilience is what the authors base their relative resilience measure approach on. We discuss these measurement approaches – as well as our approach to measuring regional adaptation – in the section that follows.

2.2. Measurement approaches

As with the definition of economic resilience, there are numerous approaches to measurement and little consensus about the optimal way to measure economic resilience, even in the relatively specific case of regions (Martin & Sunley, 2020). Common approaches to measuring regional economic resilience include case studies, indices of resilience, statistical time series models, and causal structural models – see Table 2.1, below.

Table 2.1 Common approaches to measuring regional economic resilience

Method	Focus	Examples
Case studies	Mainly narrative based, may involve simple descriptive data and interviews with key actors, interrogation of policies.	Munich (Evans & Karecha, 2014); Cambridge and Swansea (Simmie & Martin, 2010); Buffalo and Cleveland (Cowell, 2013) British Columbia mill towns (Lyon, 2014).
Resilience indices	Singular or composite, comparative, measures of (relative) resistance and recovery, using key system variables of interest.	UK regions (Martin, 2012); US cities and counties (Augustine, Wolman, Wial, & McMillen, 2013; Han & Goetz, 2015; Rockefeller Foundation/Arup, 2015); Australian functional economic regions (Productivity Commission, 2017).
Statistical time series models	Impulse response models; error correction models. These estimate how long it takes for impact of shock to dissipate (how much of the impact is subsequently eliminated per unit time period).	US regions (Blanchard & Katz, 1992); UK regions (Fingleton, Garretsen, & Martin, 2012); Recessional Shocks and Regional Employment, 2012).
Causal structural models	Embedding resilience in regional economic models to generate counterfactual positions of where system would have been in the absence of a shock.	US metropolitan areas (Doran & Fingleton, 2013); EU regions (Fingleton, Garretsen, & Martin, 2014; Sensier, Bristow, & Healy, 2016).

Source: Martin & Sunley (2020).

2.3. Our measurement approach

2.3.1. Measuring resistance and recoverability

Like Martin (2012), Martin, Sunley, Gardiner, & Tyler (2016), Dinh & Pearson (2015), Martini (2020), Ženka, Slach, & Pavlík (2019), Tan et al (2020), Hu et al (2022), and others, we focus on the relative economic resilience of regions². In particular, the resistance to, and recoverability from, exogenous, recession inducing shocks. While regional output could be utilised to measure economic resilience, we’ve focused on employment as workers generally bear the brunt of economic slowdowns due to layoffs or reduced hiring that can have both short-and long-term impacts on their careers, but also

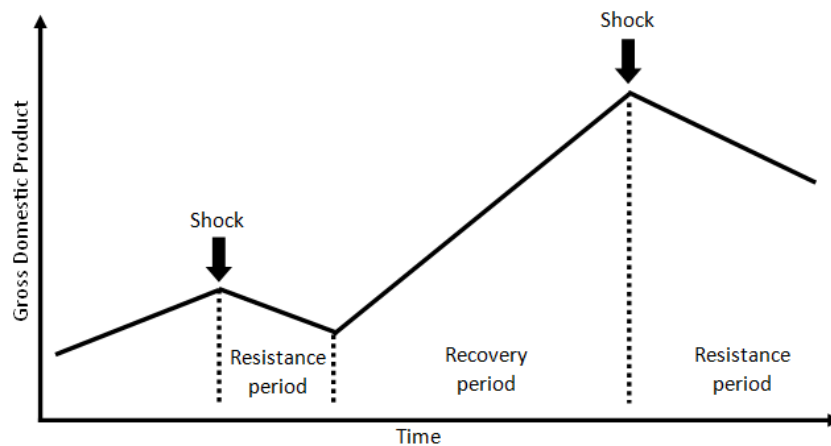
² We opt for Regional Councils due to the availability of regional data compared to territorial authorities and smaller geographic units. However, it’s important to acknowledge that New Zealand’s regions are large, and sub-regional outcomes are likely to vary significantly, e.g., employment opportunities are likely to be more abundant in Hamilton compared to a smaller, more rural town in the Waikato region.

wellbeing (Eberl, Collischon, & Wolbring, 2022; Sense Partners, 2021; New Zealand Productivity Commission, 2024). Further, regional output data has an annual frequency in New Zealand rendering it less suitable for this approach.

Specifically, we measure employment growth in the regions over the recessionary and growth periods that surround a national recession, i.e., between the peaks and troughs³ of quarterly Gross Domestic Product (GDP) – see Figure 2.2, below. We then compare regional employment growth rates to national employment growth over these periods to produce a measure of relative resistance and recoverability.

An alternative to using peaks and troughs of GDP to identify our resistance and recovery periods would be to use peaks and troughs of the employment level, or unemployment rate. This alternative approach can be particularly important where the labour market response to reduced demand is delayed, or gradual, as has happened during some of New Zealand’s economic cycles (Fabling & Maré, 2012). We identified turning points using employment, GDP, and the unemployment rate (see Figure A.1) – and having identified similar patterns, particularly between GDP and the unemployment rate – opted to continue using GDP as the basis for our resistance and recovery periods.

Figure 2.2. Resistance and recovery periods



Our indices are therefore calculated as follows:

$$Resistance_r = \frac{(\Delta E_r)_{recession} - (\Delta E_r)_{recession}^e}{(\Delta E_r)_{recession}^e}$$

$$Recoverability_i = \frac{(\Delta E_r)_{recovery} - (\Delta E_r)_{recovery}^e}{(\Delta E_r)_{recovery}^e}$$

Where ΔE_r represents the actual change in employment in region r over either the resistance or recovery periods, and $(\Delta E_r)^e$ is the expected change in employment in region r . The expected change in employment in region r is based on the national employment growth rate. For example, if during a recovery period a region grew from 100 to 110 workers (a 10% increase), but national

³ The approach therefore assumes that recessions affect the regions more or less at the same time. This is unlikely to be the case due to the varying nature of recessionary shocks, and regions’ exposure to specific shocks. However, these differences in exposure to certain shocks are important features of regional resilience, for example, an isolated region (e.g., a region that primarily produces food for the domestic market) may be relatively resistant to shocks but would likely also see slower long-term growth.

growth over the same period was 20%, the equation would give:

$$Recoverability_r = \frac{(110 - 100) - (120 - 100)}{(120 - 100)} = -0.5$$

The value of -0.5 can be interpreted as regional growth in that region being 50% of what it would have been had the region grown at the national growth rate. Consistent with the literature, we generally avoid reporting values and instead focus on the relativity of regional resilience⁴. The resistance measure captures how sensitive regional employment is to a shock and the ensuing economic slowdown, while the recoverability measure captures how quickly and comprehensively the region bounces back from the impacts of a national recession.

It's important to note that while we focus on regional employment growth in this paper, the approach could be applied to a range of indicators, e.g., NEET rates, subjective wellbeing (data permitting), or any high-frequency outcome of interest. These indicators would provide alternative perspectives of regional resilience. Further, the use of overall employment in a region may neglect known inequities across age, ethnicity, and sex groups, e.g., analysis has shown that Māori are adversely affected to a greater extent during recessions (Te Puni Kōkiri, 2009). Investigating group specific resilience during recessions is important for understanding distributional challenges that may be hindering regional resilience. However, due to data limitations, group specific analysis is out of scope for this initial foray into regional economic resilience.

2.3.2. Decomposing resistance and recoverability

The resistance and recoverability metrics provide useful and simple measures of resilience. However, it provides no insight into the potential source of regional variations. We therefore also decompose regional employment growth using dynamic shift-share analysis following (Martin, Sunley, Gardiner, & Tyler, 2016). Specifically, we decompose quarterly regional employment growth over the resistance and recovery periods – $\Delta E_r^{resis} / \Delta E_r^{recov}$ – into three components: a national component, an industrial mix effect, and a regional 'competitiveness' effect. We then sum these effects across the relevant quarters to determine the share of overall growth attributable to each component.

The industry mix effect captures the share of a region's relative resistance (and recoverability) that is attributable to its specialisation in nationally resilient (or non-resilient) industries. The regional 'competitiveness' effect reflects the residual growth that is not explained by national growth, or the industry mix effect, i.e., it explains differences in outcomes between industries in a region and those same industries nationally.

For example, ΔE_r^{resis} , the change in employment growth over the resistance period can be written as:

$$\Delta E_r^{t+k} = \underbrace{\sum_i (g_N^{t+k} E_{ir}^t)}_{National\ effect} + \underbrace{\sum_i (g_{iN}^{t+k} - g_N^{t+k}) E_{ir}^t}_{Industry\ effect} + \underbrace{\sum_i (g_{ir}^{t+k} - g_{iN}^{t+k}) E_{ir}^t}_{Regional\ effect}$$

Where g_N^{t+k} is the rate of change of national employment over the resistance period; g_{iN}^{t+k} is the rate of change in sector i nationally; g_{ir}^{t+k} is the rate of change of employment in that sector in region, r . See Martin, Sunley, Gardiner, & Tyler (2016) for a more detailed description of these components.

⁴ This partly addresses the issue of large cities biasing the analysis (due to their resistance and recoverability values being closer to 0 the larger their share of national employment).

2.3.3. Measuring adaptation

To measure adaptation (with a focus on labour market reallocation during crises) we apply the concept of gross worker flows from Davis & Haltiwanger (1998), Burgess, Lane & Stevens (2000) and Davis, Faberman & Haltiwanger (2012). Gross worker flows measure the gross number of labour market transitions at any given time. It generally serves as a useful indicator of the worker reallocation process where workers move across employers (and potentially regions) as well as between employment and joblessness. In market economies, workers frequently change jobs and employment status in response to broader economic, social, and institutional conditions. When a local labour market weathers economic shocks well and shows strong economic growth, a large volume of worker flows is expected, i.e., more local workers moving between jobs, but also an increase in workers from neighbouring and other regions coming in search of better job opportunities.

Gross worker flows are analysed on an annual basis across all 16 regional councils in this study. Specifically, we compare person-level job information between two adjacent years (e.g., 2003 June quarter and 2004 June quarter) and identify employment movements utilising linked employer-employee data⁵. Importantly, this monthly employer-employee information enables us to track individual job changes over time, as well as changes in regions and/or industries.

To quantify gross worker flows, we use the equation:

$$WFR_t^r = \frac{(A_t^r + S_t^r)}{(E_t^r + E_{t-1}^r)/2} = \frac{(N_t^r + X_t^r + J_sisr_t^r + J_disr_t^r + J_sidr_t^r + J_didr_t^r)}{(E_t^r + E_{t-1}^r)/2}$$

where subscript r and t are region and period respectively. The denominator, $(E_t^r + E_{t-1}^r)/2$, in the equation is average regional employment at current t and previous $t-1$ periods.

The numerator is made up of accessions (A_t^r) and separations (S_t^r). Both are the number of accessions and separations that occurred the interval from $t-1$ to t in region r . Accessions measure inflows of people to new employment, including those previously not employed or employed by a different employer. Separations capture outflows of workers from current employers. These include workers who become unemployed or leave New Zealand.

For example, let's assume a region has 1,000 workers in period one and period two. Among the 1,000 workers, 200 people (S_t^r) move out of the 'old' jobs and 200 people (A_t^r) find new jobs in the region. The corresponding worker flow rate is:

$$\frac{200+200}{1000} \times 100\% = 40\%.$$

These accessions and separations can be further divided into six terms. N_t^r and X_t^r are entry and exits, respectively. They primarily show transitions in and out of paid employment. The remaining four terms measure worker flows via job-to-job transitions, i.e., workers move from one employer to another. Using industry and location information associated with workers' employment spells we can further break this down into four types of job-to-job transitions.

- $J_sisr_t^r$ is a job-to-job transition within the same industry and region;
- $J_disr_t^r$ is a job-to-job transition within the same region, but to or from a different industry;
- $J_sidr_t^r$ is a job-to-job transition within the same industry, but to or from different region;
and
- $J_didr_t^r$ is a job-to-job transition between different industries and different regions.

⁵ See Chapter 3.

For instance, a worker who moves from a café in Wellington to a supermarket in Palmerston North will contribute two counts. One $J_didr_t^r$ is counted in Wellington for the previous job location, and one $J_didr_t^r$ is counted in Palmerston North for the current job location.

These detailed worker flows shed crucial information on the labour market dynamics of sectoral and spatial labour reallocations.

Summary

- We adopt Martin & Sunley's definition of regional economic resilience: *The capacity of a regional or local economy to withstand or recover from market, competitive and environmental shocks to its developmental growth path, if necessary, by undergoing adaptive changes to its economic structures and its social and institutional arrangements, so as to maintain or restore its previous developmental path, or transit to a new sustainable path characterized by a more productive and equitable use of its physical, human and environmental resources.*
- To develop a picture of the resilience of New Zealand's regions we create measures of **relative economic resilience** popularised by Martin, Sunley, Gardiner, & Tyler (2016). These measures compare regional employment growth with that of the broader economy for both the recessionary (resistance) periods, as well as the subsequent recovery periods.
- While overall employment growth in the region is an informative economic indicator, it does ignore distributional challenges in the regions (and nationally), e.g., sub-regional and group specific employment impacts from recessions. Understanding these trends are important but are out of scope for this initial foray into regional economic resilience.
- We investigate the role of adaptation in the regions using analysis of job-to-job transitions – based on the approaches of Davis & Haltiwanger (1998) and Davis, Faberman & Haltiwanger (2012) – over the resistance and recovery periods. It's important to note that this is but one form of adaptation (labour market reallocation) that regions and industries are likely to undertake.

3. Data

There are two key sources used to produce official employment statistics in New Zealand. They are the Household Labour Force Survey (HLFS) and the Linked Employer-Employee Data (LEED). The LEED series is created using Statistics New Zealand's Integrated Data Infrastructure (IDI) which houses administrative data on individuals and businesses, most relevant of which is tax and income data provided by the Inland Revenue Department (Stats NZ, 2022). Due to the limitations of both the HLFS and LEED employment series, we opt to use Stats NZ's employment data within the IDI for much of our analysis. This chapter explains the rationale for that decision as well as how we created the employment series for our analysis.

Key differences and limitations of the LEED and HLFS

While both the LEED and HLFS employment series provide an insight into national and regional employment growth, they often tell different stories due to the types of employment they capture, as well as their design. For example, while the HLFS specifically excludes temporary workers and long-term (6 or more weeks) residents of homes for older people, hospitals and psychiatric institutions, and prisons – the LEED series does not (Stats NZ, 2023a). Secondly, the HLFS also counts unpaid work for relatives as employment, while the LEED series only captures paid for employment that is reported to the IRD (Stats NZ, 2009).

Further, the HLFS series aggregates regions to twelve groups, combining both Gisborne and the Hawke's Bay, as well as Tasman, Nelson, Marlborough, and the West Coast, into aggregated regions. The LEED series aggregates regions in a comparable way, with Tasman, Nelson, Marlborough, and the West Coast combined for all measures, but reports Gisborne and the Hawke's Bay separately for some measures. And while the LEED series does include industry breakdowns at a regional level, Stats NZ aggregates the regions to twelve when reporting these industry breakdowns. See Fabling & Maré (2012) for a detailed comparison of the two series.

Capturing employment for the sixteen regional councils

To create our measures of resilience, undertake shift-share analysis, as well as investigate regional worker flows within, and between, for all sixteen regions, we have created a LEED-inspired series in the IDI. Where practical, we have adopted the same rules used to create the LEED series, for example:

- we count all employee-employer matches where wages or salary were paid for the middle month of a quarter, i.e., February, May, August, and November;
- we exclude observations where job start and end dates were available and where these dates indicate that the employment spell spanned less than half the month;
- we excluded observations where workers were not 15 years or older at the time of the observation; and
- job location information is based on firm plant data.

While the LEED does include a small number of working proprietors (Stats NZ, 2009), we have excluded working proprietors where they are observed. Overall, our employment series reports 4.8% more filled jobs at the national level, on average (over time), compared to Stats NZ's LEED, with a range of 2% and 7.1% (and standard deviation of 1%).

At a regional level, this increases marginally with a mean of 5.2%, and a standard deviation of 1.5%, with the largest reported differences occurring in the early 2000s and among the aggregated regions, e.g., Gisborne/Hawke's Bay, and Tasman, Nelson, Marlborough, and the West Coast. The discrepancies between the two series were smallest in the larger cities, Auckland, Canterbury, and Wellington (where most employment takes place), and across the more recent observations (2019

and later in particular). Differences in exclusions, interpolation of missing data, and treatment of contiguous employment spells are likely drivers of our counts being marginally higher compared to the official LEED series.

Seasonal adjustments

To create the resistance and recoverability measures of employment we use seasonally adjusted quarterly data. This is a slight deviation from the approach popularised by Martin, Sunley, Gardiner, & Tyler (2016) where an annual employment series was utilised. An annual employment based measure may hide the extent to which a region was impacted, particularly if the impact – or recession itself – was relatively short-lived, e.g., the recession which followed the Canterbury earthquakes. Further, the Martin et al. is intractable when two recessionary periods occur in quick succession. For example, the recovery period of the GFC overlaps the resistance period of the Canterbury earthquakes if annual employment data is used.

To mitigate these limitations, we seasonally adjust our quarterly employment series at both the region and industry level. We adopt Stats NZ's seasonal adjustment approach for economic variables (Stats NZ, 2001). Specifically, we utilise the United States' Census Bureau's X-13ARIMA-SEATS seasonal adjustment program in R (U.S. Census Bureau, 2017) to make these seasonal adjustments.

Worker flow data

To measure worker movements among firms we utilise our LEED-like series described above. Three additional data restrictions are applied to remove noise within worker flow data. The first restriction is the exclusion of workers aged 65 years and over. These 'retired' workers are expected to have different motivations and generally exhibit unusual job movements compared with the much larger, working age (15-64) population.

The second restriction is the exclusion of secondary and lower income jobs. In other words, only the highest-paid job for a worker at a point in time is counted. If a Wellington worker earned \$1,000 from a local café and \$500 from a motel, then his/her primary income job as a café worker will be selected for analysis. The exclusion of secondary and other jobs is about 7% of the total job counts and does not meaningfully affect the main results of our worker flow analysis. The third restriction is that only jobs in the June quarters are considered to avoid seasonal job transitions biasing our results. We therefore take snapshots of workers' jobs from the 2003 June quarter to the 2022 June quarter.

Summary

- Due to both the LEED and HLFS employment series aggregating smaller regional councils, we create our own quarterly employment series within Stats NZ's Integrated Data Infrastructure and based upon the design of the LEED series. We seasonally adjust this series using Stats NZ's seasonal adjustment approach for economic variables.
- We use this data to analyse gross worker movement as well but apply three additional data restrictions.

4. Regional economic resilience in New Zealand

The New Zealand economy experienced five technical recession inducing shocks between 1990 – when the first consistent employment series, the Household Labour Force Survey, began – and 2022. Table 4.1 provides a list of these shocks and their respective resistance and recovery periods as described in Chapter 2. For example, the GFC resistance period spans the December quarter of 2007 – when quarterly national GDP peaked – and the June 2009 quarter, when GDP saw its lowest level – before recovering up until the June quarter of 2010.

Table 4.1. Resistance & recovery periods over the past 30 years

Recessionary shocks	Resistance period	Recovery period
COVID-19	2019Q3 – 2020Q2*	2020Q2 – 2022Q2**
Canterbury earthquakes	2010Q2 – 2010Q4	2010Q4 – 2019Q3
Global Financial Crisis	2007Q4 – 2009Q2	2009Q2 – 2010Q2 (SR) 2009Q2 – 2019Q3 (LR)
Asian Banking Crisis & local droughts	1997Q2 – 1998Q1	1998Q1 – 2007Q4
Post-policy reforms	1990Q4 – 1991Q2	1991Q2 – 1997Q2

*While GDP peaked in Q4 of 2019, we've selected Q3 due to per capita GDP peaking Q3 following unusually high immigration.

**Although the recovery period technically ended in Q3 2022 – when GDP peaked – we were limited by the quality of the data available at the time of our analysis.

SR and LR denotes short-run and long-run recovery periods, respectively.

Source: Adapted from Hall & McDermott (2016).

Due to the availability of employment data within Stats NZ's IDI, we focus our analysis on the GFC and COVID-19 pandemic. Further, given the proximity of the Canterbury earthquakes to the lingering impacts of the GFC, we present analysis of two GFC recovery periods. The first is the short-term recovery, up until the downturn that followed the Canterbury earthquakes (Q4 of 2010). The second represents the longer-term recovery from the GFC – which had a relatively large impact on the economy compared to the Canterbury earthquakes – up until the end of 2019. The second approach effectively ignores the temporary, albeit significant impact that the Canterbury earthquakes had on several regions and instead focuses on the long-run growth of the regions.

As noted in Chapter 3, our analysis is based on an employment series created within Stats NZ's IDI using employment data provided by the Inland Revenue Department. To demonstrate how this series compares to the official HLFS and LEED series, the Annex includes several charts comparing the resistance and recoverability measures across the three series.

Global Financial Crisis and COVID-19 pandemic recessions

The GFC and pandemic induced recessions were significant for New Zealand's regions, both in terms of the magnitude and variability of the impacts across regions and industries. The analysis that follows uses our employment series to explore how resilience across the regions compared during these two shocks, and how the regions' resilience has changed over time. We complement this analysis with shift-share analysis to decompose the employment growth over these periods into national, regional, industry effects. We then investigate the role of regional labour market adaptation in the resilience of regions through analysis of worker flows.

4.1. Regional resilience during the Global Financial Crisis

The GFC's impact on New Zealand's economy was relatively mixed compared to the rest of the OECD. While annual GDP per capita increased 4.5% between 2007 and 2009, the unemployment rate increased from 3.6% to 5.9% over the same period (OECD, 2023). Australia saw a relatively small increase in the unemployment rate (1.2 percentage points) from 4.4% to 5.6%, while across the OECD the unemployment rate increased on average from 5.9% to 8.3%. In terms of GDP per capita, Australia saw a 5% increase over the 2007-2009 period, while across the wider OECD it decreased by 0.2%.

Initial impacts felt more acutely across the North Island

Over the relatively prolonged recessionary period (Q4 2007 to Q2 2009), the impacts were felt more acutely across the North Island with seasonally adjusted employment decreasing by 2.3% on average across the regions, and only Taranaki seeing modest employment growth (0.7%) – see Table 4.2, Figure 6.1 and Figure 6.2. Auckland, Northland, and the Hawke's Bay were particularly hard hit, with employment decreasing by 3.9%, 3.7%, and 2.9%, respectively. National employment fell 2.6% over this period, driven by relatively large declines in Auckland and Canterbury.

Across the Cook Strait, employment fell by an average of 0.5%, while the West Coast, Marlborough, and Southland regions saw growth of 4.6%, 1.4%, and 1.1%, respectively. On the other hand, the Nelson, Canterbury, and Tasman regions' employment decreased by 3.5%, 2.9%, and 2.6% over this period. The figures highlight that regional employment growth over time has diverged significantly following the GFC, particularly across the North Island where regions' employment growth previously tended to be more closely aligned.

Southern regions recover relatively well in the short-term

Recovery from the impacts of the GFC were similarly mixed, both over the short-term – up until the next downturn caused by the Canterbury earthquakes – and longer-term (the 2019/2020 pandemic recession). Between Q2 2009 and Q2 2010, employment levels fell a further 0.1% nationally, with growth near zero across the North Island, while the South saw significant variability. While employment grew 4.2% and 2.3% in the Tasman and West Coast regions, it fell 4.7% in Marlborough over this twelve month period.

Over the longer-run, national employment grew 20.6% between Q2 2009 and Q3 2019. Employment growth in Auckland, Tasman, Bay of Plenty and Waikato outpaced national growth at 30.8%, 26%, 25.8%, and 22.6%, respectively, while it was negative in the West Coast, decreasing by 3.2%.

Table 4.2. Employment shares and growth during recession and recovery periods

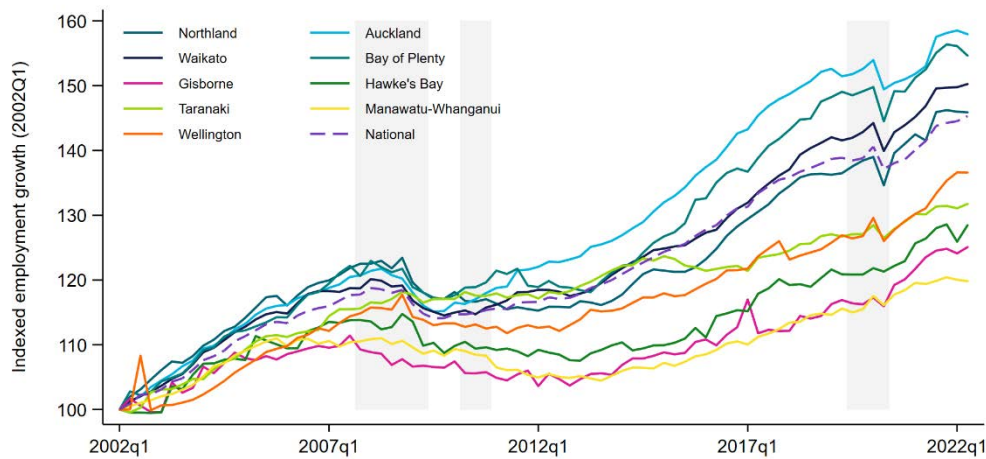
Regions	Global Financial Crisis			COVID-19 Pandemic			
	Employment shares pre-shock	Resistance	Short-run Recovery	Long-run Recovery*	Employment shares pre-shock	Resistance	Recovery
Northland	2.9%	-3.7%	-1.1%	16.2%	2.7%	-1.1%	8.7%
Auckland	33.2%	-3.9%	0.2%	30.8%	35.7%	-1.1%	5.8%
Waikato	8.6%	-2.6%	-0.3%	22.5%	8.7%	-1.1%	7.4%
Bay of Plenty	5.7%	-2.6%	0.5%	25.8%	6.0%	-1.9%	6.6%
Gisborne	1.0%	-2.7%	-1.0%	9.0%	0.9%	0.0%	7.6%
Hawke's Bay	3.7%	-2.9%	0.4%	9.5%	3.2%	0.3%	6.1%
Taranaki	2.5%	0.7%	1.5%	9.1%	2.3%	-0.7%	4.3%
Manawatu-Wanganui	5.2%	-2.1%	0.5%	5.9%	4.6%	1.0%	3.1%
Wellington	12.4%	-0.8%	-0.9%	10.9%	11.7%	-0.4%	8.3%
Tasman	0.9%	-2.6%	4.2%	26.0%	0.9%	1.2%	4.1%
Nelson	1.3%	-3.3%	1.4%	13.7%	1.2%	1.6%	5.4%
Marlborough	1.1%	1.4%	-4.8%	5.3%	1.0%	2.2%	-1.0%
Canterbury	13.5%	-2.9%	-0.2%	20.1%	13.4%	-1.5%	5.6%
West Coast	0.7%	4.6%	2.3%	-3.3%	0.6%	-0.6%	-2.2%
Otago	5.0%	-1.9%	-1.6%	20.1%	5.1%	-2.7%	3.8%
Southland	2.3%	1.1%	-1.6%	6.8%	2.1%	-0.4%	2.6%
Total		-2.6%	-0.1%	20.7%		-0.9%	5.9%

Note: Green shading indicates relatively high employment growth over the given resistance or recovery period, while grey shading indicates relatively low employment growth.

*Between Q2 2009 and Q3 2019. See Table 4.1 for a list of the resistance and recovery periods.

Source: Authors' calculations using data from Stats NZ's IDI.

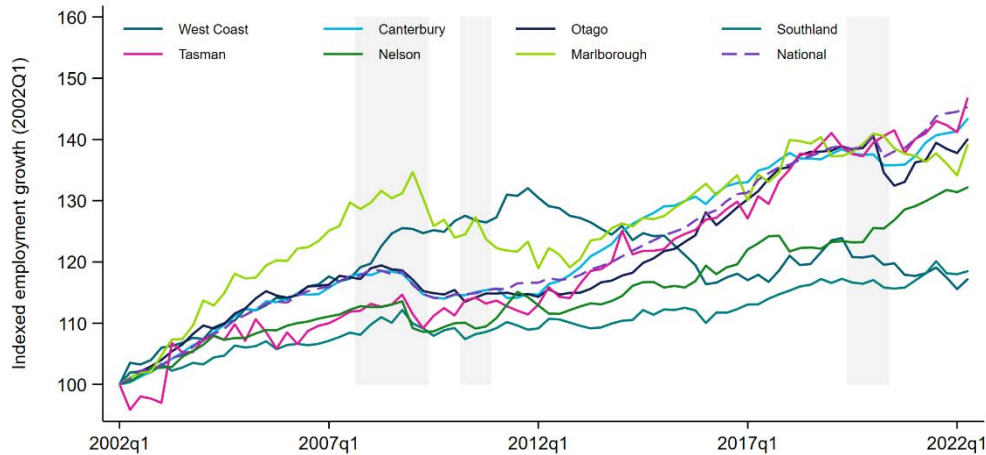
Figure 4.1 North Island regions' employment growth over time



Note: Grey shading indicates recessionary periods.

Source: Authors' calculations using data from Stats NZ's IDI.

Figure 4.2. South Island regions' employment growth over time



Note: Grey shading indicates recessionary periods.

Source: Authors' calculations using data from Stats NZ's IDI.

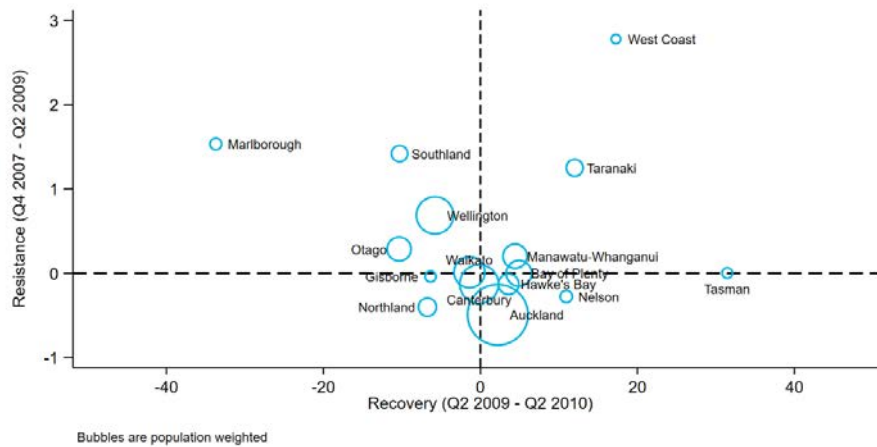
4.1.1. Relative regional resistance and recoverability

Figure 4.3 and Figure 4.4 summarise the regions' relative resistance and recoverability over the GFC by comparing their employment growth to national employment growth. Figure 4.3 presents regional growth over the relatively short recovery period to Q2 of 2010. Figure 4.4, on the other hand, presents regional growth over the longer-run recovery to Q3 of 2019. We focus our analysis on the latter recovery period.

The figures highlight that few regions saw relatively strong employment growth – or decline – across both the resistance and recovery periods (top right or bottom left quadrants). On the other hand, most regions, and particularly the more populous regions (Auckland, Christchurch, and Wellington), tended to do relatively well during either the resistance or recovery period, but generally not both.

Over the short-run recovery period, regions that did well across both the resistance and recovery periods included the West Coast, Taranaki, and Manawatu-Whanganui. However, over the longer-run recovery period, these more rural regions tended to fail to keep pace with employment growth in the faster growing, and more urban regions (e.g., Auckland, Canterbury, and Waikato) that tend to drive national employment and population growth over time. We also observe employment growth across the regions converging over the longer-run recovery.

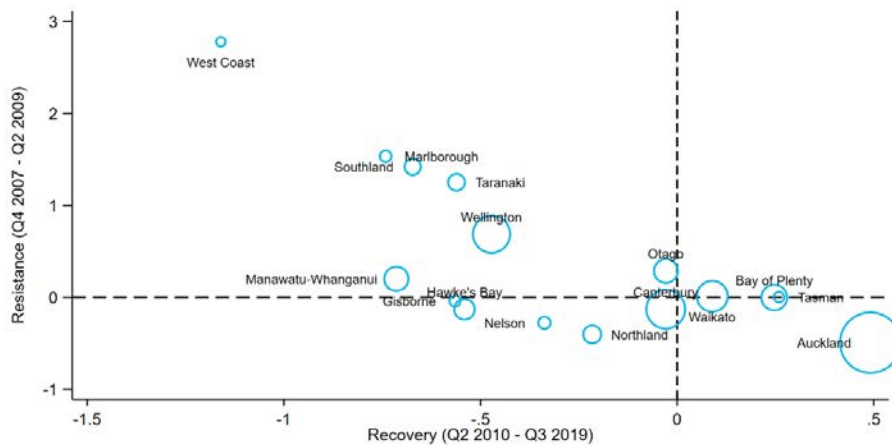
Figure 4.3. Global Financial Crisis – resistance & recoverability



Note: Bubbles are population weighted.

Source: Authors' calculations using data from Stats NZ's IDI.

Figure 4.4. Global Financial Crisis – resistance & long-run recoverability



Note: Bubbles are population weighted.

Source: Authors' calculations using data from Stats NZ's IDI.

Decomposing employment growth over the resistance and recovery periods

In the analysis that follows we decompose growth into national growth, industry mix, and regional effects using the traditional model discussed in Chapter 2. Specifically, we follow the approach of Martin et al (2016), with Figure 4.5, Figure 4.6, and Figure 4.7 presenting the regions' differential employment growth (regional growth less national growth). However, while Martin et al (2016) only presented decompositions of regional and industry effects for the entire cycle (combining the resistance and recovery periods), we decompose employment growth for each period, as well as the entire cycle.

Rewriting the equation in Chapter 2 we get:

$$\Delta E_r^{t+k} - \sum_i (g_N^{t+k} E_{ir}^t) = \sum_i (g_{iN}^{t+k} - g_N^{t+k}) E_{ir}^t + \sum_i (g_{ir}^{t+k} - g_{iN}^{t+k}) E_{ir}^t$$

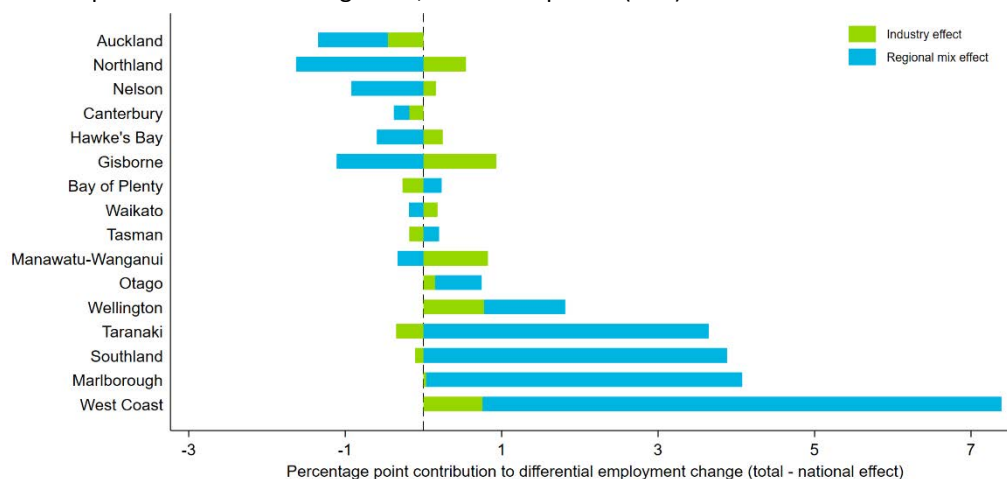
Total change
National effect
Industry effect
Regional effect

Primary sector growth buoyed some regions during the downturn

Figure 4.5 suggests that the North Island regions' relatively poor employment growth over the resistance period was driven by regional characteristics, with industry mix effects offsetting it to some degree for most regions. This was particularly true for the relatively rural regional economies, e.g., Northland, Gisborne, and Manawatu-Whanganui regions. On the other hand, Taranaki saw relatively strong growth over this period, with regional characteristics driving the differential employment growth. We explore Taranaki's resilience and unique economic structure in the chapter that follows.

Further south, strong primary sector growth was an important factor for the West Coast and Marlborough's relatively strong resilience, with the West Coast's GDP from forestry, fishing, mining, and utilities increasing 87.9% between 2007 and 2009, while agricultural and manufacturing (mostly wine) activity in Marlborough increased by 16.6% and 26.1%, respectively, over the same period (Stats NZ, 2023e). Commodity price growth in key export industries is a likely driver of regional resilience among rural regions during this period. For example, the export price of New Zealand wine peaked in 2006 and remained elevated for several years – at a time when yields were also increasing (Lee-Jones, 2014). Similarly, the price of New Zealand's dairy exports was also increasing from 2006 – albeit with a significant dip in 2009 – and remained elevated until 2011 (ANZ, 2024).

Figure 4.5. Decomposition of differential growth, resistance period (GFC)



Source: Authors' calculations using data from Stats NZ's IDI.

Recoveries driven by regional characteristics

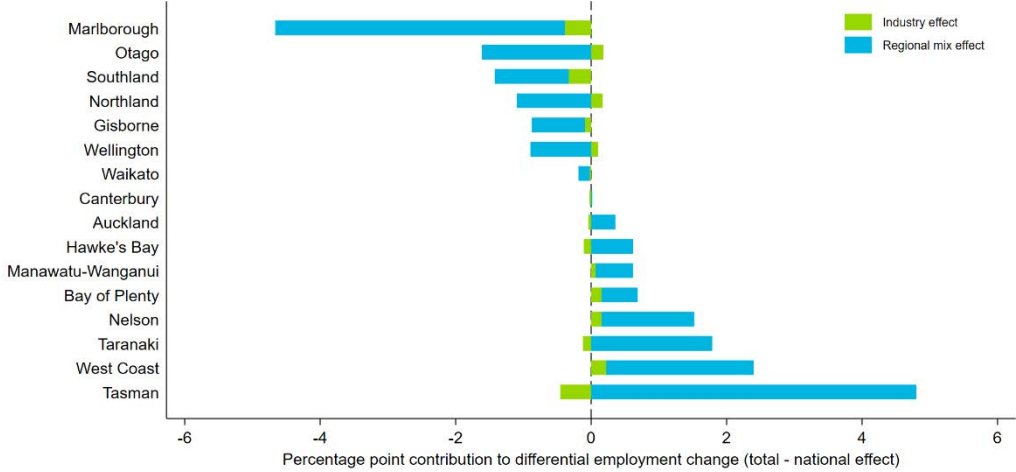
While the national growth effect appears to explain much of the employment decline seen across the regions during the recessionary period, there is virtually no national growth effect across the short-run recovery period, i.e., industry and regional effects are roughly equal to total regional employment growth. Instead, much of the regional variation is explained by regional effects. For example, Marlborough's recoverability was relatively poor in the short-term, driven partly by a return to more sustainable levels of employment following rapid growth the prior year. This presents itself as a regional effect due to growth in the primary and goods-producing sectors over that period, with Marlborough's viticulture and related manufacturing activities bucking that trend.

For the Bay of Plenty – which has seen relatively strong population growth since the early 2000s – regional effects are likely to capture the consumption and productive amenities that make the Bay of Plenty a desirable place to live and work in, e.g., a relatively dry, warm climate, with proximity and access to major urban centres (Hamilton and Auckland). We discuss the region's unique characteristics and its relative resilience in greater detail in Chapter 5.

The Tasman and Nelson regions saw relatively high growth over this brief period (albeit modest in absolute terms at under 1%), once again attributed to regional characteristics. Again, this may reflect the fact that these regions – much like the Bay of Plenty – are attractive places to live. Between 2006 and 2013 these two regions saw above average population growth (9.9% and 6.6% compared to the national growth of 6.2%). Intuitively, positive net migration (the primary driver of population growth in New Zealand) will generally support regional economic resilience (Giannakis & Bruggeman, 2020).

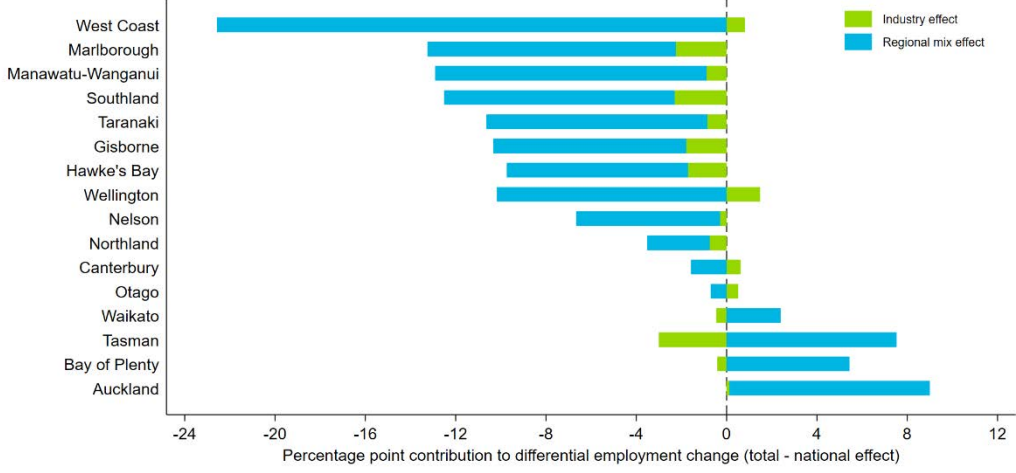
Longer-term recoveries also appear to be driven by regional characteristics. Figure 4.7 shows Auckland, Bay of Plenty, Waikato, and Tasman regions outpacing national growth, with regional effects contributing most to the differential growth rate. For the Auckland and Waikato regions, being a gateway region, or neighbour of one, respectively, are likely to be key factors, particularly with sustained, high levels of net migration over this period. Giannakis and Bruggeman (2020), in the context of European region, found that the accessibility of a region can be a source of resilience, and that simply being the neighbour of a resilient region (conditional on also being an urban region) could support resilience as well.

Figure 4.6. Decomposition of differential growth, short-run recovery period (GFC)



Source: Authors' calculations using data from Stats NZ's IDI.

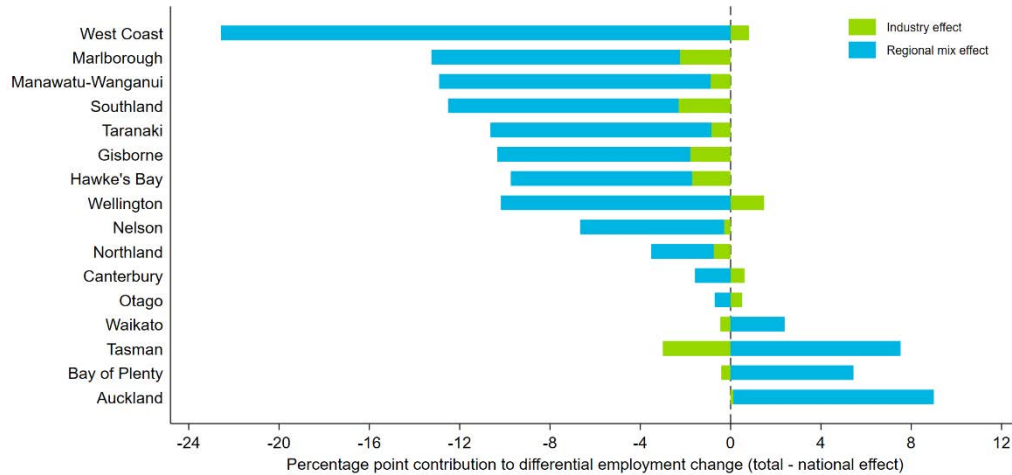
Figure 4.7. Decomposition of differential growth, long-run recovery (GFC)



Source: Authors' calculations using data from Stats NZ's IDI.

Combining the resistance and recovery periods to take a broader perspective of the importance of industry and regional effects, we see virtually no differences when compared to the long-run recovery decomposition of effects (see Figure 4.8). This is due to the particularly long recovery period following the GFC, which captures most of the change in employment in the regions between 2007 and 2019.

Figure 4.8. Decomposition of differential growth, resistance and long-run recovery (GFC)



Source: Authors' calculations using data from Stats NZ's IDI.

Regional labour market reallocation during the GFC

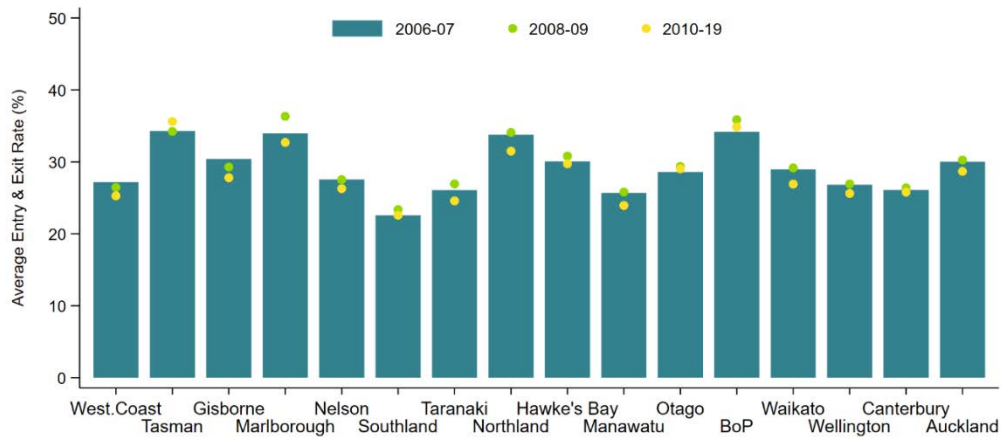
Businesses adapt to economic shocks in a number of ways, e.g., changing prices or the mix of inputs (e.g., more labour or capital), or by changing the quantity produced, among other things. Labour market reallocation during the GFC – the flow of workers within or across industries and regions – provides an insight into aspects of this adaptation. To analyse reallocation during the GFC we compare regional job-to-job transition rates as well as entry and exit rates before, during, and after the GFC – see Figure 4.9 and Figure 4.10.

In terms of entry and exit rates, we observe moderate regional variation, with rates of entries and exits between 25 and 35 percent across all three periods. Southland had the lowest entry and exit rates (23 percent), while Tasman, Bay of Plenty, Marlborough and Northland saw relatively large shares of their workers coming in and out of employment spells.

Job-to-job transition rates are generally higher than entry and exit rates, with the majority of job movements occurring between employers. Job-to-job transition rates ranged between 50 and 60 percent during 'normal' times, (averages over the 2006-07 period). When the crisis reached New Zealand, all regions saw a drop in their transition rates, with Gisborne and Taranaki experiencing marginally larger declines (11 and 10 percentage points, respectively) compared to the other regions.

Over the long-run recovery period (2010-2019), we observe that job-to-job transition rates across regions remained at relatively low levels compared to the 2006-2007 period. While this overall decline in worker flows may suggest that labour market reallocation had little to do with regional employment growth, it can mask the impacts of particular types of flows.

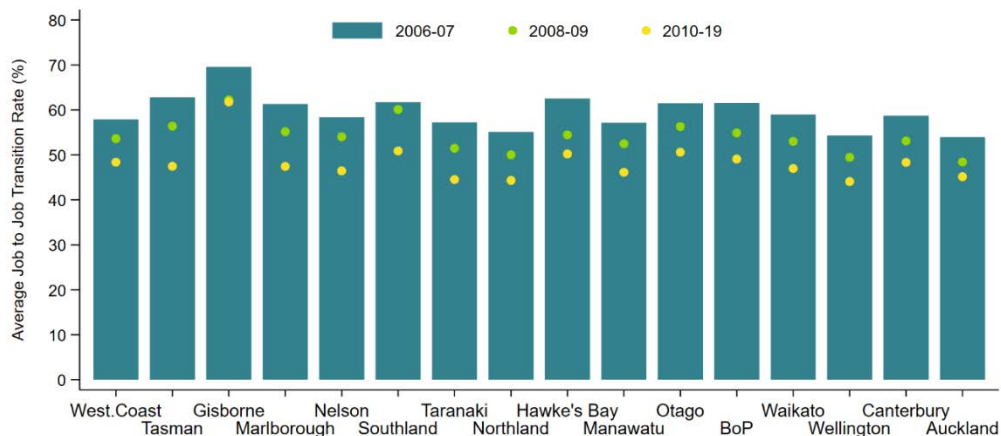
Figure 4.9. Regional entry and exit rates (GFC)



Note: Regions are ordered from smallest (left) to largest (right).

Source: Authors' calculations using data from Stats NZ's IDI.

Figure 4.10. Regional job-to-job transition rates (GFC)



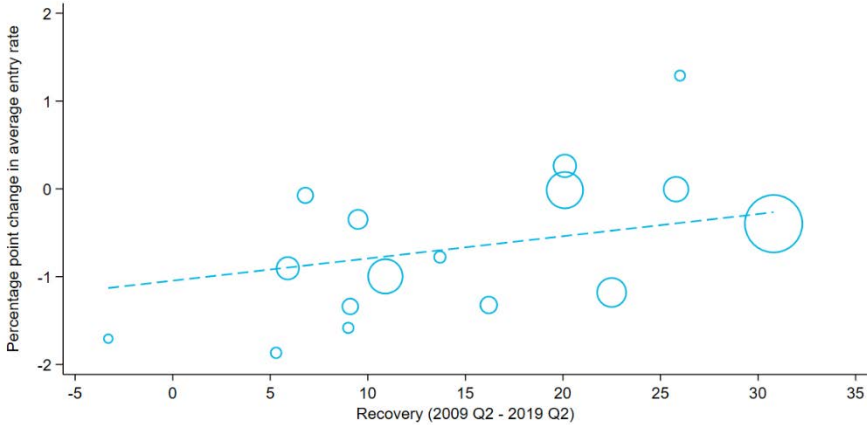
Note: Regions are ordered from smallest (left) to largest (right).

Source: Authors' calculations using data from Stats NZ's IDI.

Digging deeper into the types of flows we observe three patterns⁶. First, regions with relatively strong employment growth between 2009 and 2019 also saw both a relatively small change in entry rates (which tend to decrease in downturns) and relatively large declines in exit rates (see Figure 4.11 and Figure 4.12). This suggests that fast-recovering regions offered more job opportunities compared to other regions. This would naturally result in some job seekers – who were previously unemployed (due to study, illness or having recently migrated to New Zealand) – moving to these relatively opportunity abundant regions in search of jobs. At the same time, workers residing in these fast-recovering regions may benefit from the strong labour market performance, with options to explore other jobs. In this case, workers would be less likely to be observed leaving a job (unemployed or migrating overseas) and may instead be observed moving to another job within the same region, but within or outside of their current industry.

⁶ These patterns are only correlations and are not causal relationships. Further analysis using econometric models is required to substantiate the robustness of these relationships.

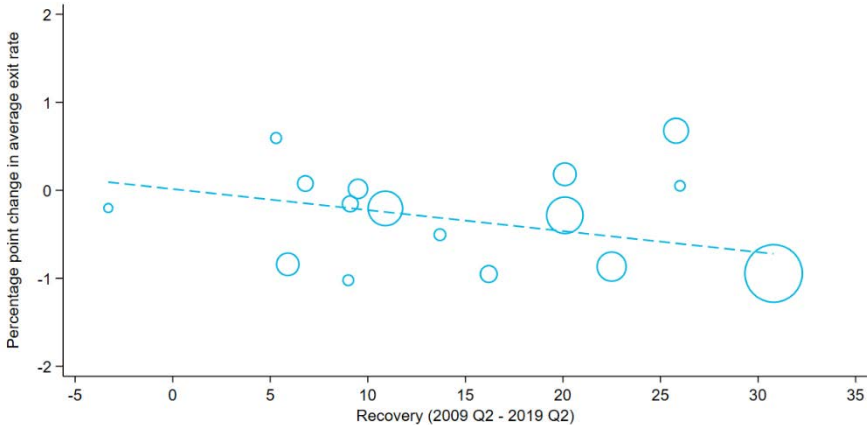
Figure 4.11. Changes in entry rates and employment growth, 2009-2019



Note: Bubbles and line of best fit (dashed) are population weighted.

Source: Authors’ calculations using data from Stats NZ’s IDI.

Figure 4.12. Changes in exit rates and employment growth, 2009-2019

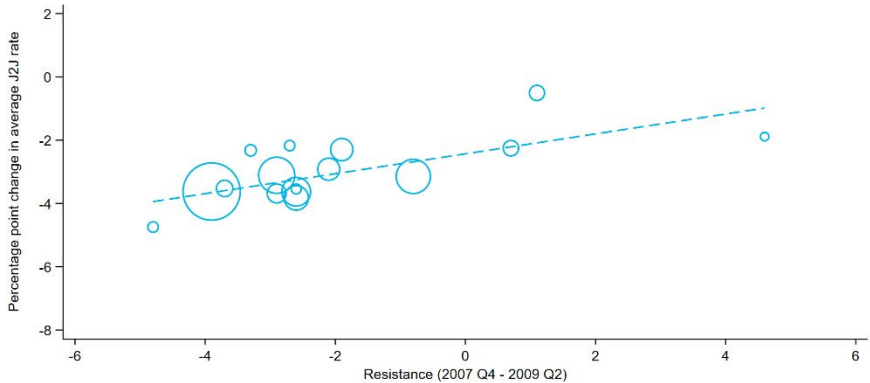


Note: Bubbles and line of best fit (dashed) are population weighted.

Source: Authors’ calculations using data from Stats NZ’s IDI.

Secondly, we observe that relatively resistant regions also exhibited relatively large changes in between-industry job-to-job transition rates – see Figure 4.13. Job transitions between industries includes job movements to different industries within the same region, as well as different regions. This positive correlation may suggest that workers in some regions found it easier to switch to a different industry compared to others, pointing to relatively high flexibility and absorptive capacity in those regional labour markets. Maré, Fabling & Hyslop (2024), in the context of New Zealand, found that re-employed workers who were previously laid off were more likely to stay in the same region and work in a different industry if the regions had more job opportunities (or thicker labour markets). However, less populated regions generally had fewer job opportunities, and their workers tended to relocate to other regions, especially to urbanised ones like Auckland (Coleman & Zheng, 2020).

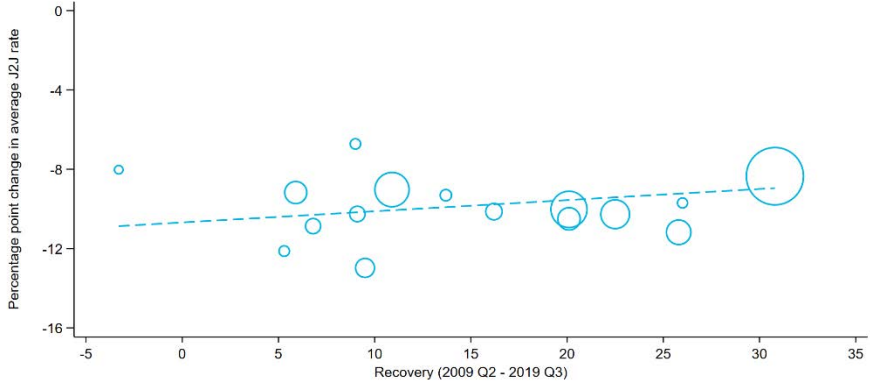
Figure 4.13. Changes in job-to-job transition rates (between industries) and employment growth, 2007-2009



Note: Bubbles and line of best fit (dashed) are population weighted. The y-axis shows percentage point changes in the average job-to-job transition rates (between industry flows) between the resistance period (2008 and 2009) and a pre-shock baseline period (2006 & 2007).
 Source: Authors’ calculations using data from Stats NZ’s IDI.

The third pattern was a positive correlation between job-to-job transitions within the same region (within and between industries), and employment growth over the long-run recovery period – see Figure 4.14. An increase in the within region job-to-job transition rate suggests greater ‘stickiness’ of workers in the region. This stickiness reflects some workers’ preferences to stay in a region they anticipate having a stronger (or earlier) recovery following a shock, however, it may also reflect other regional or individual characteristics. For example, it may also reflect the different types of workers, e.g., those with regional attachments (family, or cultural significance) and those that are more mobile.

Figure 4.14. Changes in job-to-job transition rates (within region) and employment growth, 2009-2019



Note: Bubbles and line of best fit (dashed) are population weighted. The y-axis shows percentage point changes in the average job-to-job transition rates (with region flows) between the resistance period (2008 and 2009) and a pre-shock baseline period (2006 & 2007).
 Source: Authors’ calculations using data from Stats NZ’s IDI.

4.2. Regional resilience during the COVID-19 pandemic

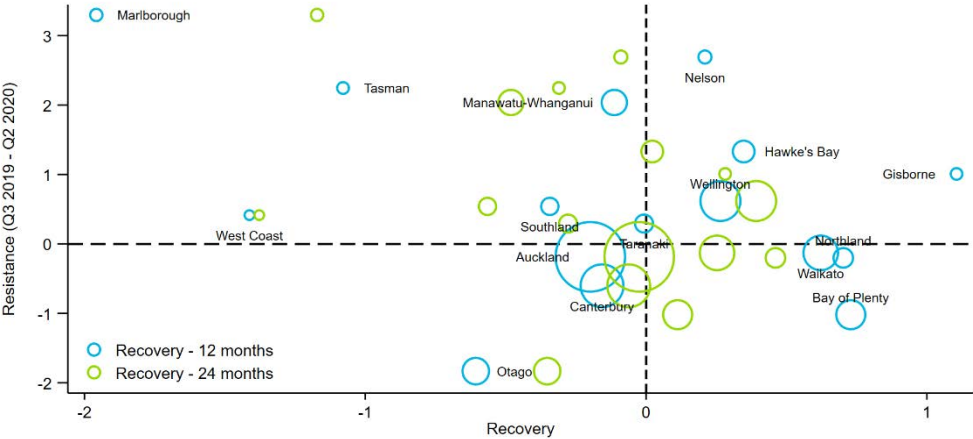
While both the GFC and COVID-19 pandemic were global shocks, their nature and impacts were very different both internationally, and within New Zealand. The most salient impact of the pandemic was the significant, albeit short-term reduction in economic activity during the national lockdowns of early 2020 (Kiernan, 2020). While 53% of New Zealanders were able to work during the lockdowns, many were not. To support firms through these periods of inactivity, the Government provided unprecedented financial support to businesses through the Wage Subsidy Scheme and related schemes (Inland Revenue, 2023).

Tourism sector and industries reliant on migrant labour were hardest hit

With closed borders and limited domestic travel, regions that traditionally relied on tourism to support their wider economies were suddenly faced with a significant reduction in economic activity, and consequently, labour demand. For example, the Bay of Plenty, Northland, and Otago regions – the 6th, 3rd, and most international tourism reliant regions⁷, respectively – saw relatively large declines in employment (2.8%, 2.8%, and 2.1%, respectively) over the resistance phase of the shock – see Table 4.2. Palomino, Rodríguez and Sebastian (2023) found similar impacts in the context of Spanish regions specialised in tourism.

Regions that relied on migrant labour, e.g., regions with large horticultural or tourism industries, making use of the Recognised Seasonal Employer (RSE) scheme or temporary migrants, faced the challenge of a sudden loss of labour supply. Otago – a region that has traditionally relied on temporary migrants to support its seasonal tourism sector – not only saw employment falling up to mid-2020, but also a relatively slow recovery over 12 and 24 months that followed – see Figure 4.15.

Figure 4.15. Resistance & Recovery – COVID-19



Source: Authors' calculations using data from Stats NZ's IDI.

Large cities were not immune to the effects of COVID-19

As early as April 2020, the OECD had noted that tourism destinations and large cities would likely suffer most in the short-term (OECD, 2020). The analysis highlighted manufacturing of transport equipment; construction; wholesale and retail trade; air transport, accommodation, and food services; real estate services; professional service activities; and arts, entertainment and recreation, as the most at risk sectors.

Applying the same resilience methodology at an industry level – see Figure A.7 in the Annex – we observe arts and recreation; accommodation and food services; transport, postal, warehousing, information media, and telecommunications; and administrative and support services; as the least resilient industries over this period.

With Auckland's disproportionate shares of employment in a number of these industries, e.g., 51.4% of the country's wholesale trade jobs in the March 2020 quarter, 45.3% of administrative and support services jobs, and 43.9% of jobs in the transport, postal, warehousing, information media, and telecommunications industries, it is unsurprising that it fared relatively poorly across both the resistance and recovery periods.

⁷ Based on tourism expenditure as a proportion of regional GDP (MBIE, 2023e)

The shift-share analysis of the resistance phase of the recession highlights this industry mix effect for Auckland – see Figure 4.16. Despite being New Zealand’s most diverse regional economy, Canterbury also had a disproportionate share of jobs in at-risk industries, albeit to a lesser extent than Auckland. Notably, transport, postal, warehousing, information media, and telecommunications (13.71%); and wholesale trade (13.65%).

Overall, we see the industry mix of the regions contributing more to differential employment growth during the pandemic when compared to the GFC. This is particularly true for the resistance period, e.g., Auckland and Taranaki, where most of the differential growth was explained by industry mix effects. Looking across both the resistance and recovery periods (see) we continue to see regional effects explaining most of the variation in differential employment growth rates. For example, we observe all but two South Island regions saw growth below that of the national average, with the West Coast, Otago, and Marlborough regions seeing particularly modest growth over these three years.

Figure 4.16. Decomposition of differential growth, resistance (COVID-19)

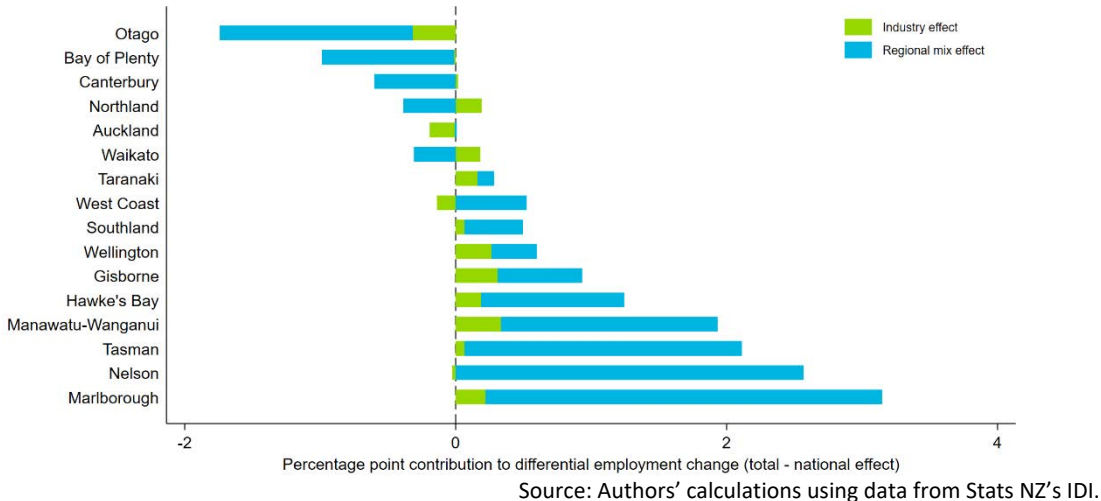


Figure 4.17. Decomposition of differential growth, recovery (COVID-19)

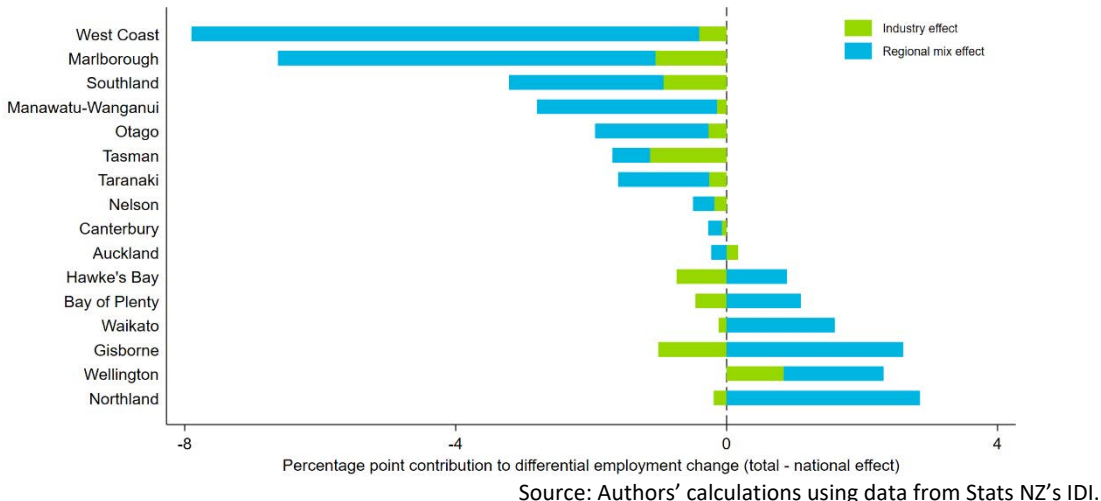
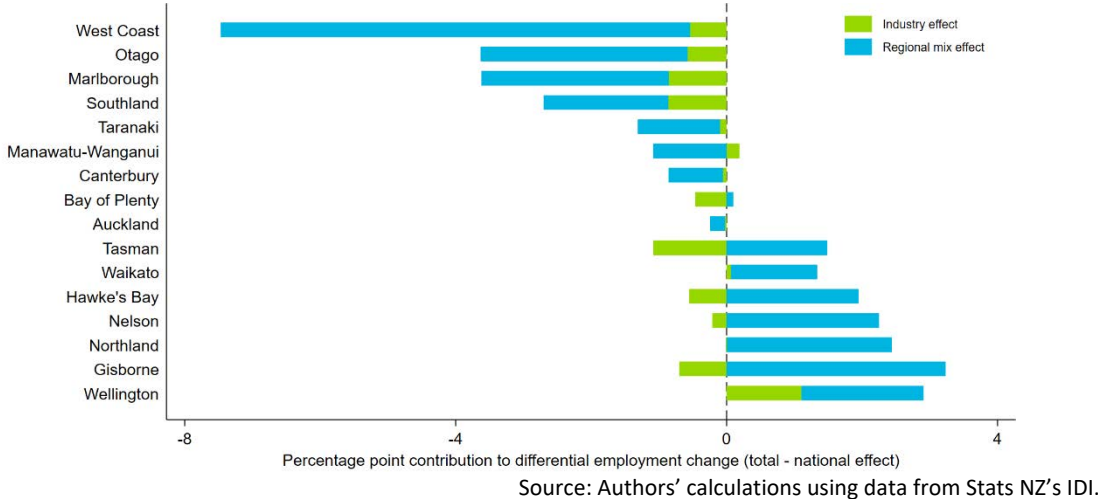


Figure 4.18. Decomposition of differential growth, resistance and long-run recovery (COVID-19)



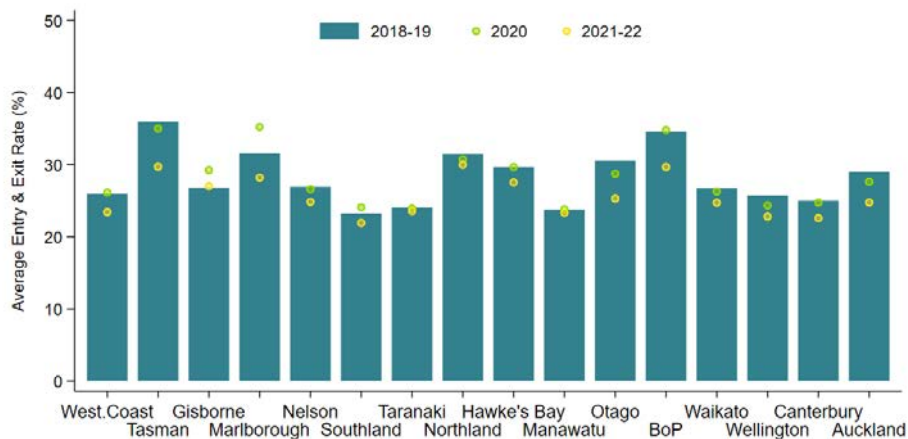
Wellington buoyed by public sector growth

Wellington’s experience of COVID-19 has been unique as far as large urban areas go. With a negligible decline in employment (-0.4%) over the recessionary period, and relatively strong growth over the recovery period (8.3%), Wellington proved relatively resilient, in part because of its large public sector base. These findings are consistent with research by Cochrane et al (2022) and Webber, Healy, & Bristow (2018) who found that a greater share of the work force coming from the public service could support resilience by dampening the effect of exogenous shocks.

Regional worker flows during the COVID-19 shock

The observed impact of COVID-19 on reallocation within the labour market is markedly different from that of the GFC. In response to the initial COVID-19 outbreak, the New Zealand government implemented public health measures that limited trading activities and population movements and provided direct financial support to affected businesses through Wage Subsidy Scheme (WSS) (Inland Revenue, 2023). Facing significant uncertainty, and incentives to stay with their current employers, workers hunkered down, leading to a temporary dip in job-to-job transition rates. On the other hand, entry and exit rates remained high or even increased in some regions, reflecting higher than usual exit rates as many temporary migrants left for their home countries, while entry rates were down across most regions (the exception being Marlborough). Once these restrictions were lifted and workers and business were able to return to ‘normal’, average job-to-job transitions in many regions recovered to or exceeded their pre-pandemic levels – see Figure 4.20. Similar patterns are observed in the UK, while job mobility in Australia broadly stayed in line with long-term averages (Carrillo-Tudela, et al., 2023; Black & Chow, 2022).

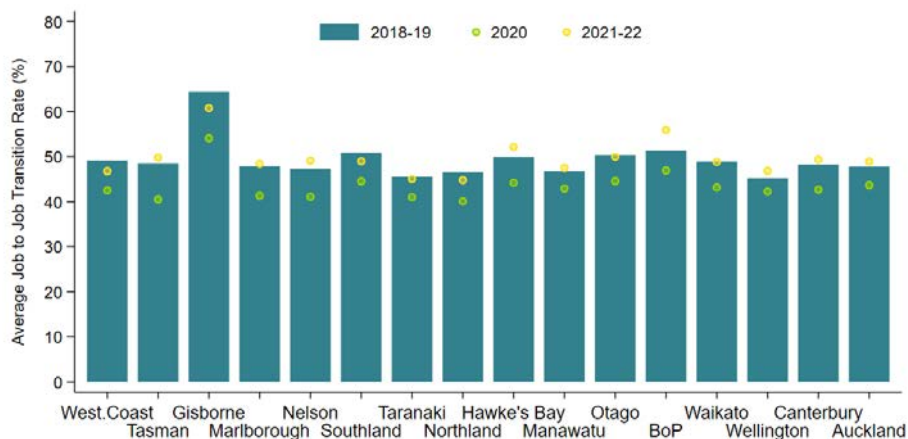
Figure 4.19. Regional entry and exit rates, COVID-19 resistance & recovery periods



Note: Regions are ordered from smallest (left) to largest (right).

Source: Authors' calculations using data from Stats NZ's IDI.

Figure 4.20. Regional job-to-job transition rates, COVID-19 resistance & recovery periods



Note: Regions are ordered from smallest (left) to largest (right).

Source: Authors' calculations using data from Stats NZ's IDI.

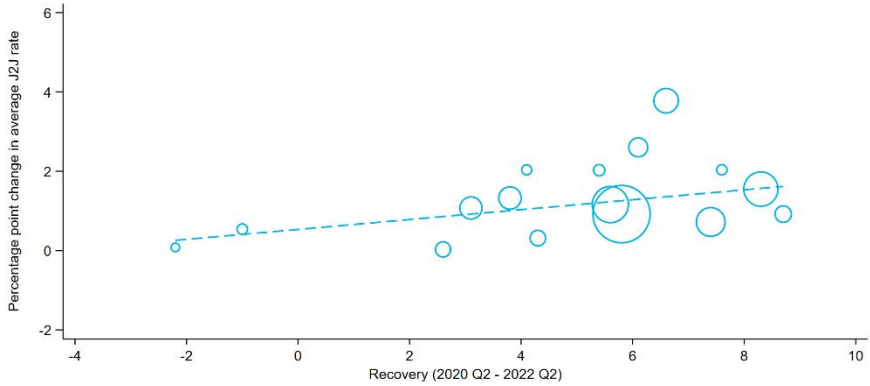
Breaking down different types of worker flows we see a positive relationship between the recovery of regions and changes in their inter-industry transition rates – see Figure 4.21 – i.e., regions with stronger recoveries also experienced higher than usual volumes of workers switching to different industries, within the same region and from other regions. Zheng & Sing (2023) studied aggregated job-to-job transitions in New Zealand from 1999 onwards and found similar job movements between industries during the COVID-19 pandemic relative to the GFC. With the introduction of border restrictions, many high-contact, tourism-related businesses⁸ struggled to operate and lost employees to other, at the time, more sustainable industries. These workers generally flowed to the construction and health care industries following a surge in residential investment and the government's public health response.

With relatively high shares of the South Island's regional economic activity associated with high-contact and tourism-related industries, many of the Island's workers faced the decision to relocate, and/or change industries. Comparing inter-regional flows before and following the pandemic recession, we observe a pattern of reallocation from South Island regions to North Island regions –

⁸ The definition of high-contact and tourism-related industries can be found on page 16 in the analytical note.

see Table A.1 in the Annex. This partially explains why, over the recovery period (June 2020 quarter – June 2022 quarter), the seven fastest growing regions were in the North Island (Northland, Wellington, Gisborne, Waikato, Bay of Plenty, Hawke’s Bay, and Auckland).

Figure 4.21. Changes in job-to-job transition rates (between industry) and employment growth, 2020-2022



Note: Bubbles and line of best fit (dashed) are population weighted. The y-axis shows percentage point changes in the average job-to-job transition rates (between industry flows) between the recovery period (2021 and 2022) and a pre-shock baseline period (2018 & 2019).

Source: Authors’ calculations using data from Stats NZ’s IDI.

Summary

- We observe stark differences in employment growth across the regions during the GFC and COVID-19 recessions, with agricultural regions generally weathering the initial impacts of the economic slowdowns well. Some of this relative resilience is explained by increases in the price of commodities that these regions export. However, the long-term growth of employment in these regions tends to be slower compared to other, more urbanised regions.
- The regional impacts of the COVID-19 recession are notably different when compared to the GFC. Labour reallocation was suppressed due to economic support measures and the uncertainty the pandemic presented workers and businesses. However, we do observe a gradual movement of workers from the South Island to the North Island following the recessionary period. This flow of workers likely reflects changing demand for workers as tourism, and adjacent industries, were disrupted by public health measures, including border restrictions.
- Analysis of differential growth in the regions points to the importance of regional differences beyond industry mix, although this was important for some regions (particularly during the pandemic recession), e.g., distance to large urban cities, infrastructure, and natural amenities. Our analysis of worker flows suggests that the flexibility of a region’s labour market is important for resilience and, unsurprisingly, so is its ability to attract workers from other regions.

5. Case studies

5.1. Bay of Plenty

The Bay of Plenty is something of a unicorn among New Zealand's regions. With a mix of cultural and natural tourism activities, a robust forestry industry, 80% of New Zealand's \$2.7 billion kiwifruit export sector⁹, and consumption amenities that make it a desirable place to live, the region has a lot going for it. Add to that the fact that it is proximal to New Zealand's largest city, Auckland, the Bay of Plenty attracts both local workers and those who commute to Auckland¹⁰.

Tauranga, which accounts for nearly half of the region's population, is particularly attractive to domestic and international migrants. Analysis by the Ministry of Business, Innovation, and Enterprise (Regional Skills Leadership Group, 2021) shows that much of the region's population growth for the year ended June 2020 was driven by net international migration and net domestic migration.

Grimes et al found, in the context of New Zealand, that domestic migrants were more likely to move to urban areas that offered consumption amenities associated with a higher quality of life, while international migrants were more attracted to productive amenities, i.e., places with a high quality of business. Tauranga offers relatively high quality of life as well as quality of business (Grimes, Preston, Maré, Badenhorst, & Donovan, 2021). Rotorua – the second most populous district in the region – on the other hand has high quality of business but fares relatively poorly when it comes to quality of life, according to the authors' analysis.

Demographics and economic structure

With a population of 347,700 as of 2022, the Bay of Plenty is New Zealand's 5th largest region. Over 67% of this population is concentrated in Tauranga and Rotorua, with the remainder spread across Kawerau, Ōpōtiki, Western Bay of Plenty, and Whakatāne. The region's population are marginally older than New Zealand as a whole, with a median age of 39.9 compared to the national median age of 38 as of June 2022, with the population of people 65 and older increasing relatively quickly (Stats NZ, 2022). However, the region is also increasingly attracting the 15-39 year old cohort.

The marginally older population is reflected in the region's workforce, with the second largest share (12.2%) of employees working within the health care and social assistance industry in the June 2022 quarter. While the region has historically relied on its primary sector, its economy has been relatively diverse for much of the last 20 years – see Figure A.8 in the Annex. The region's diverse economy is supported by Tauranga Port, New Zealand's largest port. Tauranga Port not only lowers the cost of importing and exporting for local firms but provides broader economic benefits as well (Merk, 2013). For example, while the port largely services the import and export of goods, it also provides access to hundreds of thousands of tourists each year (Stats NZ, 2020).

While seasonal by nature, the region's tourism activity supports economic development through several mechanisms. Firstly, it strengthens the case for infrastructure investments, e.g., roads and bus networks, due to their complementarity to investment in tourism (Holzner, 2011). It can also support innovation in industries related to tourism, and enable these industries to scale, which would otherwise be challenging given New Zealand's relatively small, isolated regions (Motsa, Rybakova, Shelemetieva, Zhuvahina, & Honchar, 2021). This is particularly important for the more isolated districts, e.g., Rotorua, that provide significant value to visitors as a centre for Māori culture and history.

⁹ As of 2020/2021 (Tupu, n.d.).

¹⁰ According to the 2018 Census, most domestic migrants were living in Auckland five years prior (Stats NZ, 2023d).

The Māori economy plays a crucial role in the local economy of Bay of Plenty. According to Te Matapaeroa 2021 (Te Puni Kōkiri, 2023), there were 2,154 Māori-owned businesses in the Bay of Plenty region, accounting for 15.8% of the total business population. Over half of these Māori-owned businesses were concentrated in three key sectors, namely Agriculture; Forestry and Fishing; Construction; and Professional, Scientific, and Technical Services. At the national level, the share of Māori businesses in the total business population was only 11%. The higher presence of Māori businesses in the Bay of Plenty region reflects the greater share of Māori in the area (29% as of 2018) and is expected to grow to 34% in 2043 (Stats NZ, 2022).

However, while Māori play an important role in the economic success of the wider region, inequities persist, e.g., the unemployment rate for Māori (9.3%) was much higher than Europeans (3.7%) in 2023, and considerably higher than the national average for Māori (7.9%) (Stats NZ, 2023c). To support Māori economic development and success in the region, Toi Kai Rawa (a regional Māori Economic Development Agency) was established in 2020, with an added goal that ‘Māori meet or exceed national averages in income, employment, health and education by 2030’ (Bay of Connections, n.d.). Achieving this goal will be important for the future of the region, with OECD research highlighting that addressing high and growing inequality in the regions is necessary to achieve strong and sustainable growth (Cingano, 2014; Brian, 2015). The government’s He Kai Kei Aku Ringa: Māori-Crown Economic Growth Partnership 2023 framework further supports this important work through targeted investments and initiatives (MBIE, 2023).

The Bay of Plenty’s relative resistance and recovery

Given the Bay of Plenty’s strong economic growth over the last twenty years, it’s unsurprising that the region’s labour market was relatively resilient during the GFC and COVID-19 pandemic. And while it performed less well in terms of resistance, the region has tended to bounce back quickly, and strongly.

The region’s performance over the GFC resistance period is likely attributable to its relatively large workforces in the manufacturing and construction industries, which were relatively vulnerable – see Figure A.6 in the Annex. This was largely offset by growth in the health care and social assistance industry, and primary sector during that period of economic decline.

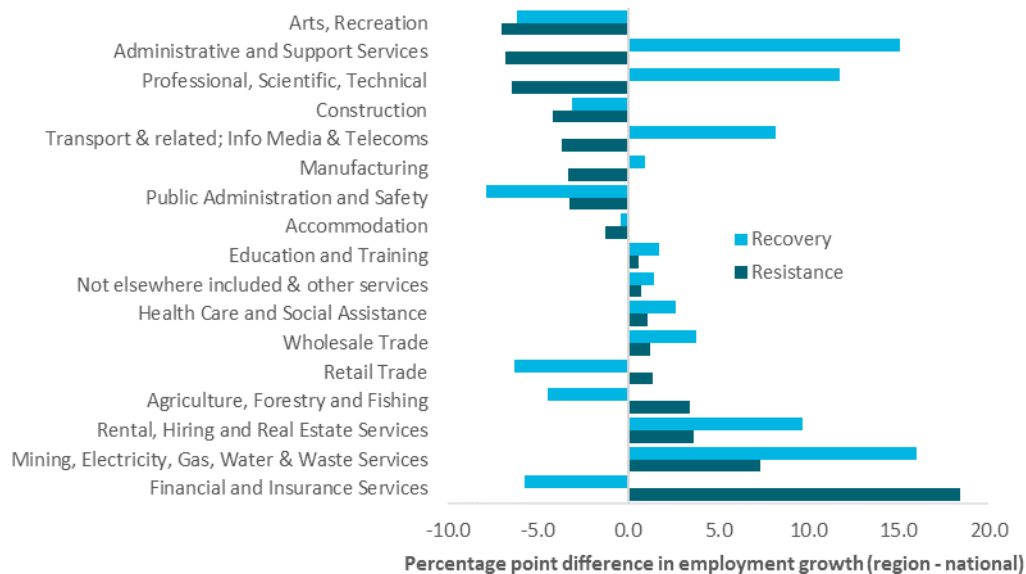
Between Q2 2009 and Q3 2019, however, the region bucked the national trend, with employment growth in the region’s agriculture, forestry, and fishing; construction; and manufacturing industries outpacing national growth, 22.9% vs 11.4%, 69.5% vs 55%, and 13.8% vs 5.2%, respectively. Relatively strong growth in the construction and manufacturing industries is expected however, having sustained relatively large losses over the resistance period. On the other hand, the 172.6% growth in the value of kiwifruit exports between the year ended November 2011 and November 2021 has likely contributed to the recovery of the region over this period (Stats NZ, 2021).

Despite the growing, robust kiwifruit export industry, the Bay of Plenty saw relatively large employment losses (-1.9%) during the pandemic downturn of 2019/2020 – behind only Otago (-2.7%). Again, much of this can be attributed to the economic structure of the region and the impact of the pandemic – and government’s public health response – on certain industries. For example, while not the most tourism reliant region in New Zealand, tourism expenditure did represent around 11% of regional GDP in 2019. With borders closed, and limited domestic travel permitted, tourism related industries (e.g., accommodation; arts & recreation; and rental, hiring, and real estate services) were particularly hard hit across the country over both the COVID-19’s resistance and recovery periods – see Figure 5.1.

Other, hard hit industries within the Bay of Plenty include construction; manufacturing; professional, scientific, and technical services; and the transport, postal, warehousing, information media and telecommunications. These industries saw relatively large declines in employment over the

pandemic resistance period, when compared to national growth, while their subsequent recoveries were a bit more mixed.

Figure 5.1. Relative employment growth in Bay of Plenty by industry - 2019-2022



Source: Authors' calculations using data from Stats NZ's IDI.

Over the two years that followed, and while international borders remained closed, over half of the region's employment growth (9,400 additional jobs) came from the services sector, specifically, health care and social assistance (1,900 jobs); administrative and support services (1,500 jobs); and professional, scientific, and technical services (1,500 jobs). Many of these jobs, including the additional 1,100 construction jobs, will be explained by the government's significant investment into public health and infrastructure in 2020, including the Bay of Plenty receiving over \$103 million of government support via the COVID-19: Infrastructure Investment fund since the start of 2020 (MBIE, 2023).

Overall, while the Bay of Plenty region faces several long-term challenges, the region is relatively well placed to continue to grow and be relatively resilient to short-term shocks. Ensuring that infrastructure development keeps pace with the region's growth is likely to be a key challenge. Additionally, addressing persistent inequality in the region will also be important for the long-term, and sustainable growth of the region, as well as the resilience and wellbeing of the population, and the businesses that operate in the region.

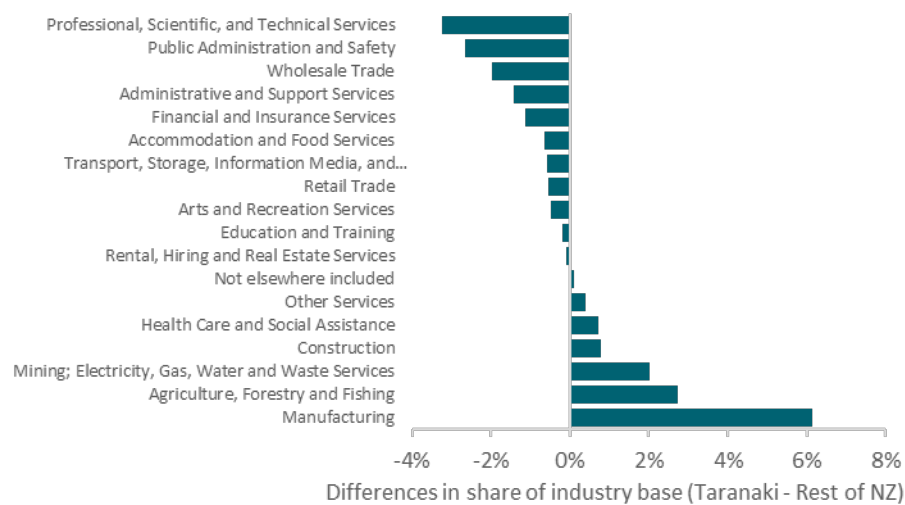
5.2. Taranaki

Specialised in a few key industries for much of the past 200 years, Taranaki has boasted the highest regional GDP per capita for much of the last fifteen (Stats NZ, 2023e). However, economic growth in the region has also been relatively poor, and volatile in recent years – e.g., growth of 4.7% between 2009 and 2019 compared to a national average of 61.7%. Much of this can be attributed to its specialisation in a few, low-growth, and commodity price exposed industries (Stats NZ, 2023e). The region's exposure to commodity prices has seen its annual GDP increase by up to 44.3% but also decrease by up to 13.3%. Further, while GDP per capita is relatively high in the region, this hasn't necessarily translated into higher incomes for the communities across the region (Eaqub & Stephenson, Regional economies-shape, performance and drivers, 2014). Despite this, the region's labour market has been relatively resilient to recessionary shocks.

Specialisation driven by commodity prices

As noted above, the Taranaki economy has tended to be relatively specialised due to traditional industries dominating for much of the 21st century – see Figure 5.2 and Figure A.8. At its peak in 2008, the region’s primary sector contributed 46.7% of the region’s GDP, with much of that driven by forestry, fishing, and mining industry, which accounted for 37.4% of Taranaki’s GDP (Stats NZ, 2023e). A further 9.8% of the region’s GDP came from the adjacent manufacturing industry. Due to record high oil prices in 2008, Taranaki’s forestry, fishing and mining industry accounted for 53.4% of the industry’s collective GDP across the country in 2008. As of 2021, this share is a much more modest 18.5%, with the region’s economy significantly more diversified in recent years. This sharp diversification has primarily been driven by the region’s dependence on oil and gas exploration decreasing as crude oil and natural gas prices fell from the record highs of 2008-2012, and more recently, as the government restricted further exploration for oil and gas (World Bank, 2023).

Figure 5.2. Taranaki’s industry mix compared to the national economy



Source: Created using official statistics on regional gross domestic product (Stats NZ, 2023e).

Taranaki’s population is older and ageing, while youth outcomes are poor

Much like the Bay of Plenty, Taranaki has an ageing population. With over 50% of the population aged 40 and older as of 2022, the region’s workforce is likely to need an injection of younger workers from other regions to support its transitioning economy (Stats NZ, 2022). While the region could look to attract young domestic migrants, it has struggled to do so in recent years, with international migrants driving much of the growth in the region¹¹. Further, natural growth in the population (from births) has been trending down relatively quickly – compared to the national decline (Stats NZ, 2023d). Collectively, the region’s 65 and older population has grown fastest between 2018 and 2022 (13.9%), while growth in the 0-14, 15-39, and 40-64 cohorts were modest at 3.1%, 3.9%, and 2.5%, respectively.

An inability to attract (or retain) young domestic migrants may reflect the fact that youth outcomes have deteriorated in the region over time. The region has consistently reported higher than national average NEET rates (not in employment, education, or training) – a key indicator of youth outcomes – since 2012 (MBIE, 2023c). And since 2014 the NEET rate has steadily increased, with Taranaki reporting 16.5% of 15-24 year olds not in education, employment, or training in 2020, and 18.8% in the year to June 2023.

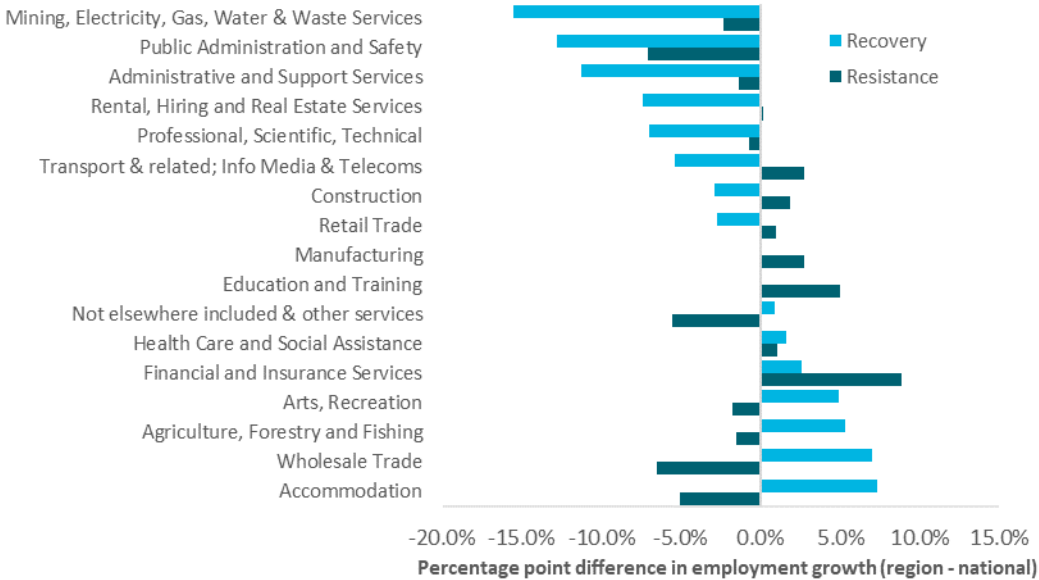
¹¹Data is only available from 2019 to 2022. Given the influx of New Zealanders in 2020 and 2021, it is possible that some of these international migrants are in fact just Kiwis returning home.

Taranaki’s resilience to recessionary shocks

Taranaki proved relatively resilient during both the GFC and pandemic induced recessions – see Chapter 4. As Figure 4.3 and Figure 4.4 highlights, Taranaki’s outperformed all other North Island regions in terms of resistance during the GFC. And while some of this resistance is due to the region’s strong agricultural industry, high commodity prices during both these shocks are likely to have played a key role in buoying the regional economy during the initial economic downturns.

In terms of recoverability, the region did well in the year that followed – again in large part because of historically high commodity prices, but Taranaki’s subsequent, longer-run growth was poor. A similar pattern is observed following the pandemic recession, with slow GDP growth seen in the region since 2019 – see Figure 4.15. However, this more recent recovery has also been driven by structural changes in the economy in response to the oil and gas exploration ban. For example, we see that significant employment losses – compared to those nationally – occurred in industries directly and indirectly impacted by the ban – see Figure 5.3.

Figure 5.3. Relative resilience of Taranaki’s industries during the COVID-19 shock



Source: Authors’ calculations using data from Stats NZ’s IDI.

Supporting structural change

In 2018, to support the region in transitioning away from a reliance on its emissions intensive industries in a just and fair way (and minimises economic harm), the Government of the day embarked on a Just Transition Partnership with Taranaki (MBIE, 2023a). The Taranaki 2050 Roadmap listed 12 transition pathways to support the region in achieving its long-term vision for 2050 (Venture Taranaki, 2023). These included growing specific sectors, e.g., tourism, energy, and food & fibre, but also a focus on enablers of growth, e.g., people and talent, and regulation.

Several of these transition pathways sought to leverage the region’s natural endowments which include scenic coastlines, generally moderate climatic conditions that provide relatively high growing degree days, and wind energy potential (Stats NZ, 2023b). Offshore wind is regarded as a particularly viable new industry for the region, with several large investments planned for over the next decade. Venture Taranaki – the region’s economic development agency – anticipates offshore wind generation will create high-value jobs, while leveraging existing skills in offshore operations, and playing an important role in the transition of the region and country to a low-emissions economy (Venture Taranaki, n.d.). However, the regulatory environment has acted as a speed bump to date,

which is why the government has worked at pace to develop – and consult – on a new regulatory framework for these infrastructure developments (MBIE, 2022; MBIE, 2023b).

Uncertainty can hinder economic growth

The future of Taranaki’s economy is somewhat uncertain, however, due in large part to divergent views on the need for an oil and gas exploration ban. While a reversal of the ban by a new Government could lead to some additional requests for exploration permits, firms may be wary of yet another reversal in the future. Further, a return of oil and gas exploration may risk delaying offshore wind projects which will be competing for the same workers and resources required to scope and build offshore operations (GEP, 2023).

While both oil and gas exploration and offshore wind developments are likely to support employment growth in the short-to medium-term, this growth is unlikely to be sustained over the longer-term. For example, in the context of onshore wind farms, Leung-Wai & Generosa (2012) show that full-time equivalents (the number of full-time workers) generally drop from 1.79 FTEs per megawatt generated during the construction and installation phase, to 0.15 FTEs per MW during the operation and maintenance phase. The Manawatu-Whanganui region’s development of the Te Āpiti and Tararua wind farms serve as a recent example of this with employment growth in the construction, retail trade, and wholesale trade industries relatively (compared to national growth) strong during 2003-2007, while the wind farms were under construction, but relatively poor in the years that followed. Offshore wind projects are likely to follow the same patterns.

Businesses and workers require a degree of certainty to make long-term investments that can be beneficial to the region. Without this certainty, there is a risk that workers and capital will flow to other regions. Further, fundamental changes in the economic structure of a region can be slow, and fraught in the short-to medium-term, as was observed in New Zealand in the wake of the 1980s reforms, and in the UK in the 1980s/80s following a shift away from coal mining (Singleton, 2008; Vermeulen, 2022). Providing a clear long-term direction and enduring, and tailored policies will be increasingly important for regions like Taranaki that face significant structural change (Green, 2023; Productivity Commission, 2017).

Summary

- New Zealand is facing an ageing labour force and population challenge. Regional exposure to the risk of population ageing varies. The Productivity Commission highlights increased demand for migrant workers to fill low skill but physically demanding roles (e.g., in horticulture or construction), as well as health and age-care related roles as the population continues to age.
- While there are common challenges across the motu, e.g., cost of infrastructure, impacts of climate change, and an ageing population, regions also face unique and dynamic challenges. Ensuring that policies are flexible enough to respond to these region-specific challenges will be key for central government.
- Balancing the short-and longer-term needs of regions facing significant disruption from climate change – and governments’ responses to it – will require careful consideration of the trade-offs. For example, supporting traditional industries at the cost of slower growth in new, but potentially more sustainable industries.

6. Discussion

Small, distant national and regional economies

New Zealand is a relatively small, distant, and dispersed¹² economy – including at the regional level – facing perennial as well as new challenges. These include slow productivity growth, underinvestment in infrastructure, reconcentration of trade¹³, and a changing geopolitical world (New Zealand Productivity Commission, 2023). Further, while the overall economy has seen growth in the services industries and the adoption of new technologies – a trend among developed economies – not all regions have kept up. Relatedly, inequality across age, ethnicity, and sex groups persists, further constraining economic growth. These challenges can make it costly for government to support economic development, and for regional economies to be resilient in the face of shocks, and more gradual structural change, e.g., in response to climate change. For example, dispersed regional economies means that the cost of infrastructure investments is likely to be higher compared to similarly sized economies in Europe.

Compounding these challenges are increasingly frequent economic and environmental shocks. While most of these economic shocks originated overseas, New Zealand has had to deal with natural disasters (e.g., droughts, earthquakes, and floods) as well as sweeping policy reforms in the 1980s that ‘proved somewhat tortuous and quite painful for many segments of New Zealand society’ in the short-term (Kelsey, 1997). Since 2001, there has been a steady rise in the number of natural disasters resulting in insurance claims – see Figure 6.1.

Figure 6.1. Number of natural disasters resulting in insurance claims



Source: Insurance Council of New Zealand (2023)

Regional impacts from these shocks have tended to vary, particularly where specific industries or geographic areas were disproportionately impacted. For example, the effects of the 1980s reforms were more acute for some industries, with manufacturing (particularly of cars and home appliances) no longer sustainable as subsidies were removed, resulting in many inefficient firms closing (Singleton, 2008). On the other hand, the Canterbury earthquakes’ impacts were relatively localised, despite leading to a national recession.

While our analysis of regional economic resilience has focused on the GFC and COVID-19 pandemic, and in particular, the resilience of their labour markets, it has highlighted several important themes in New Zealand’s regional economic development and resilience. We explore these further in this chapter.

¹² While New Zealand is small, its regions are relatively spread out when compared to other similarly sized, advanced economies.

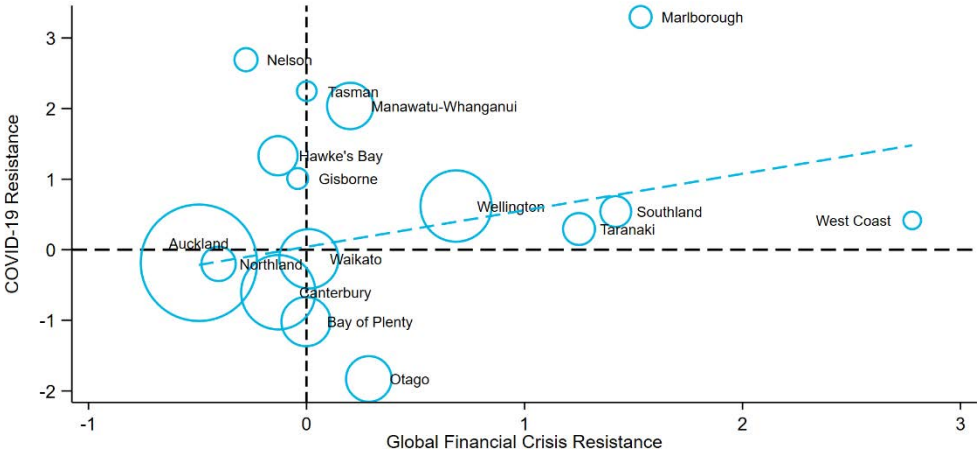
¹³ Where an economy gradually imports and exports to fewer trading partners over time.

Structural factors can be important, even when shocks are fundamentally different

Comparing regional resistance and recoverability across both the GFC and COVID-19 pandemic recessions, we see evidence of the importance of structural factors during short-term shocks. Figure 6.2 shows that regional resistance during the GFC and COVID-19 recessions are positively associated, suggesting that while the shocks were fundamentally different, regional impacts generally followed a similar pattern. This suggests that structural factors (e.g., accessibility, industry mix, natural endowments, and size, to name a few) may play a role in the short-term following a shock.

The shift-share analysis in Chapter 4 supports this, with regional characteristics found to explain most of the regions’ differential employment growth rates. This is also consistent with previous studies, e.g., Gong, Hassink, Tan, & Huang (2020); Kim, Lim & Coletta (2023); Partridge, Chung & Wertz (Partridge, Chung, & Wertz, 2022); and Gajewski (2022), that noted the role of regional economic structure in supporting economic resilience during shocks, particularly the COVID-19 pandemic.

Figure 6.2. Regional resistance during the Global Financial Crisis and pandemic recessions



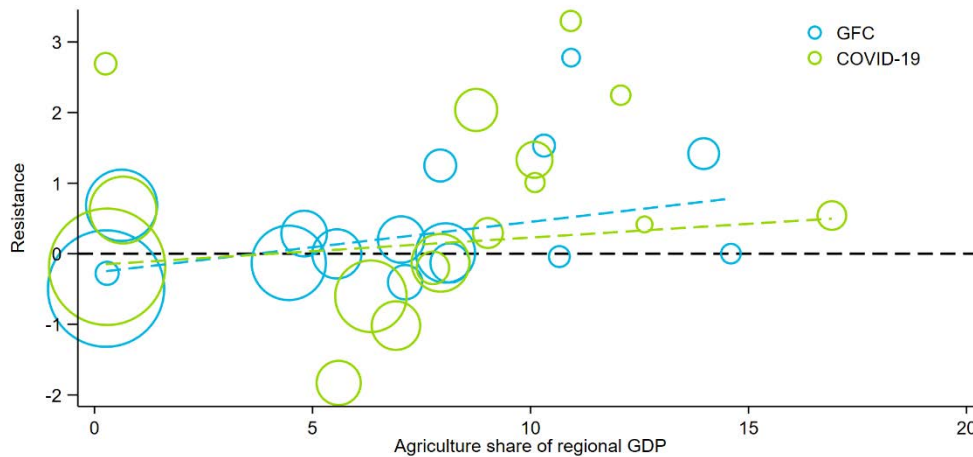
Note: Bubbles and line of best fit (dashed) are population weighted.

Source: Authors’ calculations using data from Stats NZ’s IDI.

For example, in the context of Poland, Gajewski (2022) noted the importance of structural factors for the resistance period in particular, observing that regions resistant to the impacts of the GFC were likely to be relatively resistant during the COVID-19 economic downturn as well. Relatedly, several studies point to relatively high resistance in regions with a larger share of agricultural employment (Faggian, Gemmiti, Jaquet, & Santini, 2018; Gajewski, 2022; Giannakis & Bruggeman, Determinants of regional resilience to economic crisis: A European perspective, 2017). We see some evidence of this in New Zealand, with agriculturally based regional economies generally more resistant to the two recessionary shocks we analysed – see Figure 6.3.

Conversely, Palomino, Rodríguez and Sebastian (2023) have shown that regional economic structures can also hinder resilience, particularly where a shock disproportionately impacts the industry in which a region is specialised, e.g., the international tourism sector during the pandemic. As noted in Chapter 4, we see similar outcomes in our analysis of New Zealand’s regions during the COVID-19 pandemic. Intuitively, the impact of a recessionary shock is primarily going to depend on whether the economic slowdown is concentrated in a specific industry, or distributed across industries, but also the ability of regional economies to reallocate workers between industries as necessary.

Figure 6.3. Regional resistance and share of agriculture’s contribution to GDP



Note: Bubbles and line of best fit (dashed) are population weighted.

Source: Authors’ calculations using data from Stats NZ’s IDI.

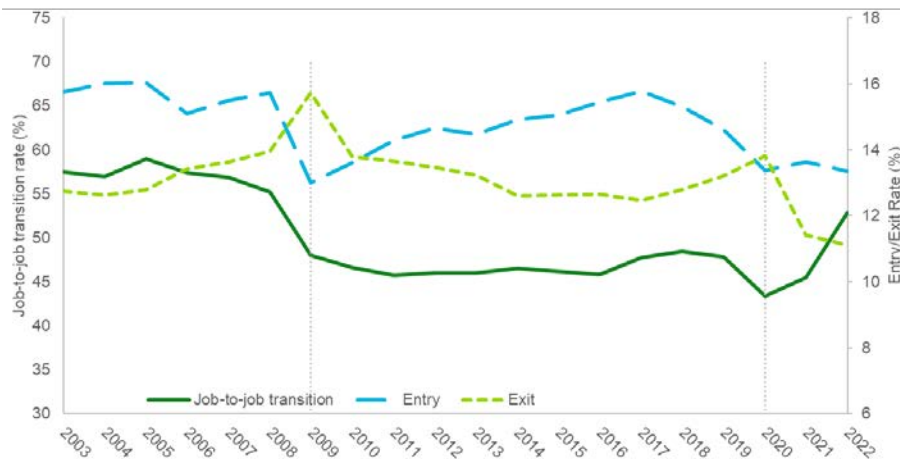
Reallocation can support regional economic resilience

Martin & Sunley (2020) argue that adaptation – which in a labour market context includes reallocation or mobility – is one of five dimensions of regional economic resilience. Adaptation is about a region’s ability to adapt to changing circumstances to improve resilience both in the short- and long-term. Reallocation of workers across firms, industries and regions is an indispensable and crucial element of regional adaptation. The reallocation of workers can improve broader economic efficiency and worker wellbeing when it improves skill matching and supports the movement of workers to the industries and locations where they are most valued¹⁴. Burgess & Mawson (2003) used labour market data on 15 OECD economies and found reallocation had a significant positive impact on economic growth.

Reallocation tends to follow predictable patterns. For example, business cycles often trigger cyclical reallocations. In line with many international studies (Deutscher, 2019; Nakamura, Nakamura, Phong, & Steinsson, 2018; Shimer, 2005), New Zealand’s job-to-job transitions as well as movements in and out of employment closely follow economic expansions and contractions. Specifically, job-to-job transition and entry rates are pro-cyclical while exit rates tend to be counter-cyclical (Shimer, 2005). Economic mega trends, including technology and demographics, can also drive the reallocation of workers, but tend to be more gradual processes. Coleman & Zheng (2019) studied 40 years of changes in New Zealand urban areas and found a broad-base shift from manufacturing jobs to information-intensive jobs.

¹⁴ However, a lot of reallocations may not be always desirable. High and volatile worker movements can lead to high costs, e.g., staff hires and retention, and may entail economic and social costs to individuals and their families.

Figure 6.4. Annual job-to-job, entry, and exit rates, 2003 to 2022



Note: Vertical lines indicate the troughs of GDP.

Source: Authors' calculations using data from Stats NZ's IDI.

At the regional level, the GFC and pandemic shocks had materially different impacts on reallocations. While the GFC shock was devastating to many regional economies and suppressed worker movements for some time, the pandemic shock was short-lived (but significant) and saw an unusually rapid bounce-back in reallocations. Drilling down into specific types of worker flows (e.g., within/between industry/region) across regions and industries, our analysis suggests that regions with higher than usual levels of reallocation tended to weather negative shocks well and saw stronger employment growth over the recovery periods. The results suggest a return to labour market flexibility that can support not only short-term resilience, but also longer-term economic resilience.

In the absence of an unlimited supply of migrant workers, the ability of a region to attract workers from neighbouring or further afield regions can also be a source of resilience. Grimes et al (2021) studied the geographic mobility of international and domestic migrants using Census data among 31 urban areas and found that business amenities (e.g., better business community or infrastructure) tended to attract international migrants, while consumption amenities (e.g., favourable climate or better schools) were more important to domestic migrants. Similarly, Coleman & Zheng (2020) found over 50 percent of workers who changed work locations went to highly urbanised regions (Auckland, Wellington, and Christchurch) where wages were higher, and jobs were relatively abundant. On face of it, people value both the quality of business and life of a potential destination, and regions with these qualities are more likely to attract skilled workers as well as business and infrastructure investments. In the case of the Bay of Plenty, we observe how these amenities can promote more robust economic growth and build the capacity of the local economy to withstand shocks.

Of course, the reallocation of workers (particularly across regions) inevitably benefits some regions more than others. However, given its importance to the national economy, the OECD (2023) recommends that economies continue to remove obstacles to the efficient allocation of workers and capital to improve economic efficiency, wellbeing, and long-term growth. Modelling by Maré, Fabling & Hyslop (2024) suggests that wage subsidies can further support resilience-enhancing reallocation by resulting in more net employment in the growing sectors that are likely to underpin recovery.

Longer-term risks for the regions

Regional economic resilience in the context of short-term shocks is important. However, it's also important to consider the longer-term and more gradual drivers of change in regional economies (Pells, 2024). Particularly when, as our analysis suggests, these longer-term trends contribute to regional economic resilience to short-term shocks. For instance, it is necessary to proactively consider – and plan for – the impact of an ageing workforce and population, technological changes, the decline of a region's dominant industry, as well as the effects of climate change (e.g., structural, but also from extreme weather events) on our regional economies. A proactive and considered approach is particularly important to minimise the impact for Māori who tend to be disproportionately affected by economic downturns, as well as economic transitions, e.g., the 1980s reforms (Te Puni Kōkiri, 2009; MBIE, n.d.)

Climate change – which presents both physical risks and transition risks¹⁵ – is predicted to lead to more frequent, and extreme weather events in New Zealand according to NIWA's climate modelling (Ministry for the Environment, 2018). Regional impacts will vary significantly, with northern and eastern North Island regions expected to see an increase in dry days, while western regions, and the South Island, may see an increase in extreme daily rainfalls (NIWA, 2023). These extreme weather events pose a significant risk to the future resilience of our regions, particularly those with land-and emissions-intensive industries such as agriculture, forestry, and tourism.

Spatial analysis of business level exposure to coastal flooding events by Prieto (forthcoming) highlights that, in the event of a one-in-a-hundred-year flood event, some businesses could face significant costs within the next 25 years – see Figure 6.5. The Northern and Eastern coasts of the North Island are particularly exposed, with an estimated 10% or more of value added output likely to be disrupted (and up to 10% of businesses). Importantly, these costs serve as a lower bound (in the absence of adaptation), as it does not consider the impact of flooding events on public infrastructure or housing. However, recent extreme weather events demonstrate the potentially significant fiscal costs to both local and central government. The Treasury estimates that the damage to property and infrastructure from the significant flooding events in the upper and eastern North Island in 2023 could be between \$9 billion and \$14.5 billion (The Treasury, 2023). Further, to compensate the owners of properties within designated high-risk areas (where future extreme weather event risk cannot be sufficiently mitigated), central and local government are sharing the cost of voluntary buyouts of these properties (New Zealand Government, 2023). For Auckland Council, these costs are expected to be around \$800 million (Auckland Council, 2023).

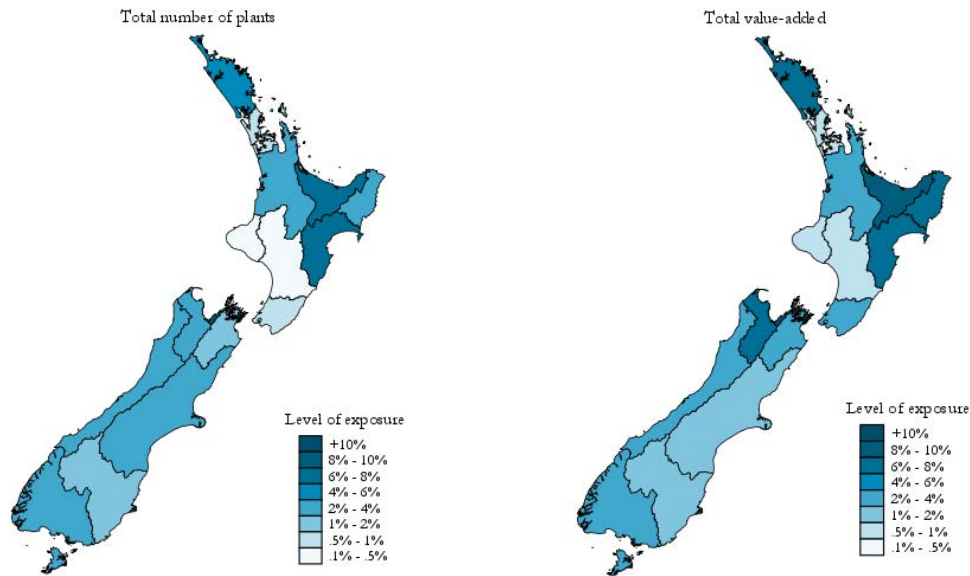
Adaptation by individuals and firms in response to these risks, e.g., moving from high-risk to low-risk areas, will present further challenges for local and central governments. Not only will it change the distribution of workers and the broader population, which can place pressure on under developed infrastructure, and local housing and labour markets, but it can also contribute to a persistent, gradual decline in some regions, and sub-regions. We've already seen some evidence of this type of adaptation, with the population of the West Coast 0.3% smaller in 2023 than in 2013 – following several significant flooding events since 2012 (Stats NZ, 2023b), while other regions grew between 8% and 27% over the same period.

To manage such risks, Pells (2024) suggests an integrated whole-of-society approach, highlighting the Asian Disaster Preparedness Center (ADPC) and United Nations Office for Disaster Risk Reduction (UNDRR) recommendations, including that New Zealand progresses to a proactive risk reduction approach, in contrast to its current, inherently reactive emergency management and civil defence (ADPC and UNDRR, 2020). However, as Pells notes, communication of such risks need to take

¹⁵ Physical risks include sea level rise and extreme weather events, while transition risks include lowering emissions and adapting to the effects of climate change (Pells, 2024).

account of cognitive biases, and be culturally aware and tailored, to minimise the mistrust of information coming from government agencies.

Figure 6.5. Regional exposure of businesses to significant flood events* (number of plants and value-added).



Note: Coastal flooding hazard from a one-in-a-hundred year event with sea level rise of 20cm.

Source: Prieto (forthcoming).

A potentially significant barrier to structural change in New Zealand – necessary to manage mitigate these long-term risks – is the strong path dependence across the economy (Pells, 2022). While there are economic strengths which have persisted over time, e.g., New Zealand has performed well in areas such as fundamental institutions, social capital/trust, health, education and employment rate, there are also weaknesses that persist. These include weak investment in infrastructure and research & development, skill mismatches, and low trade intensity and product complexity. Pells notes that it's proven particularly challenging to diversify the economy (or even our export markets) with many regions and industries still reliant on agricultural and tourism activity. The author further states that to achieve any desired shift in direction would likely require strong, focused, and coordinated effort across the public and private sectors (including business, local and central government, Iwi, and community groups).

Role of government

The government will continue to play a key role in the economic development and resilience of the regions as New Zealand navigates these short-and longer-term challenges. Regional economies have typically been shaped or reinforced by local and national policies, even in New Zealand where regions tend to have strong path dependency (Christopherson, Michie, & Tyler, 2010; Nel, Connelly, & Bergen, 2019).

In response to short-term shocks – e.g., extreme weather events or recessions – government will continue to be instrumental as an economic stabiliser. However, as noted by Bernstein, Gaukrodger, & Parkyn (2021), the role of fiscal policy has, and will continue to need to adapt to achieve the government's short-term goals during crises. For example, while governments have tended to rely on automatic stabilisers (e.g., Jobseeker Support) during economic downturns, we've seen increased use of discretionary fiscal spending across many developed economies, e.g., the job retention schemes utilised by many developed economies during the COVID-19 pandemic.

However, as Pells (2024) notes, balancing these short-term goals with longer-term goals – which includes reducing the country’s growing infrastructure deficit, as well as supporting the economy to adapt to the long-term challenges that climate change presents – will be a key challenge for government. Striking a balance is particularly important given the potential trade-offs between building longer-term resilience and supporting the economy to ‘bounce back’ from a short-term shock. Government should look for opportunities to support both short-and long-term goals and could include targeted infrastructure investments that support long-term resilience in the regions, but also creates enduring jobs. As noted in our case study of Taranaki, offshore wind farms can support the long-term resilience of the region and wider economy but are less likely to provide long-term employment opportunities.

The Productivity Commission (New Zealand Productivity Commission, 2024) notes that long-term, economic resilience hinges on physical and social infrastructure. The Commission highlight ports, roads, rails, airports, pipes, cables, and satellites that facilitate the movement of goods and services within New Zealand, and globally, as important physical infrastructure. As noted in our Bay of Plenty case study, the Port of Tauranga plays a key role in supporting local economic activity within the Bay of Plenty region. Not only does the port lower costs for local businesses importing and exporting goods, but it also provides the wider region with greater access to the international tourism sector. This access is particularly important for the more isolated parts of the region, e.g., Rotorua, which provides significant value to visitors as a centre for Māori culture and history. However, as Grimes & Young (2009) note, careful consideration should be given to the real long-term benefit of significant infrastructure investments, particularly in rural communities where large projects run the risk of turning into white elephants. On the other hand, the Productivity Commission notes that trade agreements with foreign economies that eliminate trade barriers, education, health, and social policies that cultivate the skills and capabilities of workers, are important social infrastructure to invest in.

Our analysis suggests that regional outcomes following the GFC and COVID-19 pandemics may have been moderated by regional characteristics. This suggests that while the more traditional, broad-based economic development policies¹⁶ are likely to remain effective, consideration should also be given to the increased use of place-based policy making, i.e., devolution of power to the regions, and taking into account regional characteristics, comparative advantages, and economic development to date when developing policies (Jackson, Hewings, Rey, & Lozano-Gracia, 2020; Goldenberg, 2008; McCann, 2023; OECD, 2023). A proactive and targeted approach will be particularly important for regions that are likely to undergo significant structural change, e.g., Taranaki.

City and regional deals are place-based policy tools gaining traction due to their potential to support cities and regions address longer-term challenges. First introduced in the United Kingdom, the deals tend to be long-term (10-20 years), place-based, partnership arrangements between central and local government (MinterEllisonRuddWatts, 2023; Infrastructure New Zealand, 2023). While there is evidence to suggest these deals can be effective in promoting regional growth, there is also a risk that they can exacerbate existing regional inequalities due to information and resource asymmetries that ultimately determine which cities and regions are successful at negotiating new deals (Alonso & Andrews, 2023; O’Brien & Pike, 2015). An additional challenge for central

¹⁶ For example, promoting local knowledge generation, accumulation, and spill overs (innovation and agglomeration); connecting regions to key markets, including through the development of digital and physical infrastructure (e.g., trade policies and infrastructure investment); upskilling and retraining to meet the current and future needs of the region; supporting stable labour markets; and making sure that places are ‘sticky’ (McCann & Van Oort, 2019; House of Representatives Select Committee on Regional Development and Decentralisation, 2018; OECD, 2012; Christopherson, Michie, & Tyler, 2010; OECD, 2023; Davies & Maré, 2021).

government will be the tension between regional priorities and national priorities, particularly when fiscal constraints require prioritisation between regions.

Both the Australian and New Zealand Productivity Commissions agree that building resilience and taking a long-term approach are essential for regional and national economic development (Productivity Commission, 2017; New Zealand Productivity Commission, 2024). The Australian Commission recommends removing impediments to progress, avoiding ad hoc financial assistance, and maintaining primary responsibility for regional development with local and regional governments. Meanwhile, the New Zealand Productivity Commission recommends building cross-government capability for analysis, developing public-private networks to support proactive investments, and giving business and other stakeholders a strong voice in long-term, proactive decision making and investments. Taken together, it suggests that policymakers need to prioritise investments and resources that support a long-term economic development strategy and to withstand future shocks and challenges.

Summary

- New Zealand is a small, distant, and dispersed economy facing short- and longer-term challenges. These challenges affect the regions differently due to the characteristics of the regions, e.g., industry mix, historical development, natural amenities, and exposure to risks (climate change).
- Labour market flexibility can support regional economies to resist and recover from a recessionary shock. For example, regions that saw an increase in the share of workers flowing to different industries, or into the region, tended to experience relatively strong employment growth.
- It's important for governments to balance supporting short-term goals with longer-term, more gradual demands, e.g., climate change mitigation and adaptation. This is due to the trade-offs involved, particularly where local and regional economies must contend for limited fiscal support.
- Analysis of differential growth in the regions during crises points to the importance of regional differences beyond industry mix, e.g., distance to large urban cities, infrastructure, and other amenities that make it a great place to work or live.
- Overseas evidence suggests a role for central government as a facilitator of regional development, including removing policies and regulations impeding the transition and development of regions, providing discretionary funding to local and regional economies based on strategic plans developed at the local and regional level and justified by rigorous analysis, and focusing on improving the planning and delivery of infrastructure and government services.

7. Conclusion

New Zealand is a relatively small, distant, and dispersed economy – including at the regional level – facing perennial as well as new challenges. These challenges threaten the sustainable and inclusive growth of many developed economies. The New Zealand Productivity Commission highlighted slow productivity growth, underinvestment in infrastructure, reconcentration of trade, and a changing geopolitical world as key challenges (New Zealand Productivity Commission, 2023). Compounding these challenges are increasingly frequent economic and environmental shocks.

To address these challenges, businesses, communities, and local and central governments are increasingly focusing on developing the resilience of their economies. However, while there is an intention to develop regional economic resilience, the collective understanding of the concept, and how best to measure and develop it is in its infancy within the economics literature. An important theme in the literature is the fact that resilience is about more than simply bouncing back to some pre-shock baseline (an ‘equilibrium’ perspective). Instead, regions may need to adapt and evolve in response to short-and long-term disruptions to ensure sustainable, long-term growth (an ‘evolutionary’ perspective).

This report investigates the resilience of regional labour markets to two of New Zealand’s most disruptive recessionary shocks, the GFC, and COVID-19 pandemic. Using an approach popularised by Martin, Sunley, Gardiner, & Tyler (2016) we investigated the relative resilience of New Zealand’s regions and found that: the economic structure of a region can support, or hinder resilience; agricultural regions tended to weather the initial impacts of a recession well; regional labour markets that are flexible tended to be more resilient; and that while the nature of the recessionary shock is important, relative resilience among the regions persists over time in part because of regional characteristics.

Our analysis and review of the broader literature provides several key insights for government. Firstly, while short-term shocks such as recessions pose significant risk to the regions, longer-term, more gradual forces for change are an increasingly important, but historically neglected source of risk. Governments need to strike a balance between meeting short-term and longer-term objectives in response to these risks. Proactively coordinating and managing investments to build resilience across New Zealand’s regions will be particularly important but will require longer-term thinking across the government system. Additionally, it may require making trade-offs across the regions, or between regional and national interests, but should be carefully considered to avoid undermining the government’s longer-term objectives.

While traditional economic development tools are likely to remain important, developing regional resilience may require an increased use of more tailored solutions, i.e., place-based policy making as recommended by the OECD. This includes leveraging existing comparative advantages and the unique characteristics of the regions. City and region deals are a tool that central government could use to support regional economies striving to build resilience, but care should be taken to ensure to ensure equal access across the regions.

8. References

- ADPC and UNDRR. (2020). *Disaster Risk Reduction in New Zealand: Status report 2020*. Bangkok: Asian Disaster Preparedness Center and United Nations Office for Disaster Risk Reduction.
- Alonso, J. M., & Andrews, R. (2023). Can City Deals Improve Economic Performance? Evidence from England. *Urban Affairs Review*.
- Ansari, R. M. (2013). *KSI: Stata module to compute Krugman specialization index*. Retrieved from <https://ideas.repec.org/c/boc/bocode/s457630.html>
- ANZ. (2024). *ANZ New Zealand Commodity Price Index*. ANZ.
- Auckland Council. (2023). *Category 3 property buy-out information between Auckland Council and the government*. Retrieved from Auckland Council: <https://www.aucklandcouncil.govt.nz/recovery-extreme-weather-disasters/property-categorisation-resolution/Pages/category-3-property-buyout-information-auckland-council-government.aspx>
- Augustine, N., Wolman, H., Wial, H., & McMillen, M. (2013). Regional Economic Capacity, Economic Shocks and Economic Resilience. *MacArthur Foundation Network on Building Resilient Regions, Working Paper*.
- Bay of Connections. (n.d.). *Māori Economy*. Retrieved March 7, 2024, from <https://www.bayofconnections.com/business-and-investment/maori-economy/>
- Bernstein, J., Gaukrodger, B., & Parkyn, O. (2021). *Enhancing the role of fiscal policy in New Zealand's macroeconomic stabilisation*. Wellington: The Treasury.
- Black, S., & Chow, E. (2022). *Job Mobility in Australia during the COVID-19 Pandemic*. Reserve Bank of Australia.
- Blanchard, O. J., & Katz, L. F. (1992). Regional Evolutions. *Brookings Papers on Economic Activity*, 23, 1, 1-76.
- Brian, K. (2015). *OECD insights income inequality the gap between rich and poor: The gap between rich and poor*. OECD Publishing.
- Bristow, G., & Healy, A. (2020). *Handbook on Regional Economic Resilience*. Edward Elgar Publishing.
- Burgess, S. M., & Mawson, D. (2003). Aggregate growth and the efficiency of labour reallocation. *Available at SSRN 412002*.
- Burgess, S., Lane, J., & Stevens, D. (2000). Job flows, worker flows and churning. *Journal of labor economics*.
- Carrillo-Tudela, C., Clymo, A., Comunello, C., Jäckle, A., Visschers, L., & Zentler-Munro, D. (2023). Search and Reallocation in the COVID-19 Pandemic: Evidence from the UK. *Labour Economics*.
- Christopherson, S., Michie, J., & Tyler, P. (2010). Regional resilience: theoretical and empirical perspectives. *Cambridge Journal of Regions, Economy and Society*, 3-10.
- Cingano, F. (2014). *Trends in income inequality and its impact on economic growth*. Paris: OECD.
- Cochrane, W., Poot, J., & Roskrug, M. J. (2022). Urban resilience and social security uptake: New Zealand evidence from the global financial crisis and the COVID-19 pandemic.

- Cornwall, J., & Davey, J. (2004). *Impact of Population Ageing in New Zealand on the Demand for Health and Disability Support services, and Workforce Implications*. Wellington: Victoria University of Wellington.
- Cowell, M. M. (2013). Bounce back or move on: Regional resilience and economic development planning. *Cities*, 212-222.
- Davies, B., & Maré, D. C. (2021). Relatedness, complexity and local growth. *Regional Studies*, 479-494.
- Davis, S. J., Faberman, R. J., & Haltiwanger, J. (2012). Labor market flows in the cross section and over time. *Journal of monetary economics*, 59(1), 1-18.
- Davis, S., & Haltiwanger, J. (1998). *Measuring Gross Worker and Job Flows*. Labor Statistics Measurement Issues. University of Chicago Press.
- Davoudi, S. (2012). Resilience: A Bridging Concept or a Dead End? *Planning Theory & Practice*, Vol. 13, No. 2,, 299–333.
- Deutscher, N. (2019). *Job-to-job transitions and the wages of Australian workers*. Treasury Working Paper.
- Dinh, H., & Pearson, L. (2015). Specifying community economic resilience-a framework for measurement. *Australasian Journal of Regional Studies*, 278-302.
- Doran, J., & Fingleton, B. (2013). US Metropolitan Area Resilience: Insights from Dynamic Spatial Panel Estimation. *Paper presented at the Annual Conference of the Regional Science Association International (British and Irish Section), University of Cambridge, 22 August 2013*.
- Eaqub, S. (2014). *Growing apart: Regional prosperity in New Zealand*. Auckland: Bridget Williams Books.
- Eaqub, S., & Stephenson, J. (2014). *Regional economies-shape, performance and drivers*. Wellington: New Zealand Institute of Economic Research.
- Easton, B. (2023). *Learnings from The New Zealand Economic History of Shocks, Working paper*.
- Eberl, A., Collischon, M., & Wolbring, T. (2022). Subjective Well-Being Scarring Through Unemployment: New Evidence from a Long-Running Panel. *Social Forces*.
- Evans, R., & Karecha, J. (2014). Staying on top: Why is Munich so resilient and successful? *European Planning Studies*.
- Fabling, R., & Maré, D. C. (2012). Cyclical labour market adjustment in New Zealand: The response of firms to the Global Financial Crisis and its implications for workers.
- Faggian, A., Gemmiti, R., Jaquet, T., & Santini, I. (2018). Regional economic resilience: The experience of the Italian local labor systems. *The Annals of Regional Science*, 393-410.
- Fingleton, B., Garretsen, H., & and Martin, R. (2014). Shocking Aspects of Monetary Union: The Vulnerability of Regions in Euroland. *Journal of Economic Geography* 15, 5, 907-934.
- Fingleton, B., Garretsen, H., & Martin, R. (2012). Recessionary Shocks and Regional Employment. *Journal of Regional Science*, 109-133.
- Gajewski, P. (2022). Regional resilience to the Covid-19 shock in Polish regions: how is it different from resilience to the 2008 Global Financial Crisis? *Regional Studies, Regional Science*, 672-684.

- GEP. (2023). *Offshore Oil & Gas Vs. Offshore Wind Power Projects: The Intensifying Fight Over Resources*. Retrieved from GEP: <https://www.gep.com/blog/mind/offshore-oil-gas-vs-offshore-wind-projects-the-intensifying-fight-over-resources>
- Giannakis, E., & Bruggeman, A. (2017). Determinants of regional resilience to economic crisis: A European perspective. *European Planning Studies*, 1394-1415.
- Giannakis, E., & Bruggeman, A. (2020). Regional disparities in economic resilience in the European Union across the urban–rural divide. *Regional Studies*, 1200-1213.
- Goldenberg, M. (2008). *A review of rural and regional development policies and programs*. Ottawa: ON: Canadian Policy Research Networks.
- Gong, H., Hassink, R., Tan, J., & Huang, D. (2020). Regional resilience in times of a pandemic crisis: The case of COVID-19 in China. *Tijdschrift voor economische en sociale geografie*, 497-512.
- Green, A. (2023). *When should place-based policies be used and at what scale?* OECD.
- Grimes, A., & Young, C. (2009). Spatial effects of 'mill' closures: Does distance matter? *The Australasian Journal of Regional Studies*, 264-299.
- Grimes, A., Preston, K., Maré, D., Badenhorst, S., & Donovan, S. (2021). The contrasting importance of quality of life and quality of business for domestic and international migrants. *Labor Markets, Migration, and Mobility: Essays in Honor of Jacques Poot*, 97-121.
- Hall, V. B., & McDermott, C. J. (2016). *Recessions and recoveries in New Zealand's post-Second World War business cycles*. New Zealand Economic Papers.
- Han, Y., & Goetz, S. (2015). The Economic Resilience of US Counties During the Great Recession. *he Review of Regional Studies*, 131-149.
- Holzner, M. (2011). Tourism and economic development: The beach disease? *Tourism Management*, 922-933.
- House of Representatives Select Committee on Regional Development and Decentralisation. (2018). *Regions at the Ready: Investing in Australia's Future*. Canberra: Parliament of Australia.
- Hu, X., Li, L., & Dong, K. (2022). What matters for regional economic resilience amid COVID-19? Evidence from cities in Northeast China. *Cities*.
- Infrastructure New Zealand. (2023). *Infrastructure New Zealand Position Paper: City and Regional Deals - Laying the Foundations for Partnership*. Wellington: Infrastructure New Zealand.
- Inland Revenue. (2023). *COVID-19 subsidies and payments*. Retrieved from Inland Revenue: <https://www.ird.govt.nz/covid-19/business-and-organisations/employing-staff/leave-subsidies>
- Insurance Council of New Zealand. (2023). *Cost Of Natural Disasters*. Retrieved from Insurance Council of New Zealand: <https://www.icnz.org.nz/industry/cost-of-natural-disasters/>
- Jackson, R. W., Hewings, G. J., Rey, S., & Lozano-Gracia, N. (2020). Regional development: Challenges, methods, and models.
- Kelsey, J. (1997). *The New Zealand experiment: A world model for structural adjustment?* Bridget Williams Books.
- Kiernan, G. (2020). *The effects of COVID-19 on the regional economies of New Zealand*. Infometrics.
- Kim, A., Lim, J., & Colletta, A. (2023). How regional economic structure matters in the era of COVID-19: resilience capacity of U.S. states. *The Annals of Regional Science*, 159-185.

- Lee-Jones, D. (2014). *New Zealand Wine Sector Annual Report 2014*. USDA.
- Leung-Wai, J., & Generosa, A. (2012). *Economic Benefits of Wind Farms in New Zealand*. Wellington: BERL Economics.
- Lyon, C. (2014). Place systems and social resilience: a framework for understanding place in social adaptation, resilience, and transformation. *Society & Natural Resources*, 1009-1023.
- Maré, D. C., Fabling, R., & Hyslop, D. R. (2024). Job displacement and local employment density (Discussion Paper 16685). *IZA Institute of Labour Economics*.
- Martin, R. (2012). Regional economic resilience, hysteresis and recessionary shocks. *Journal of economic geography*, 1-32.
- Martin, R., & Sunley, P. (2020). Regional economic resilience: Evolution and evaluation. In G. Bristow, & A. Healy, *Handbook on regional economic resilience* (pp. 10-35). Edward Elgar Publishing.
- Martin, R., Sunley, P., Gardiner, B., & Tyler, P. (2016). How regions react to recessions: Resilience and the role of economic structure. *Regional studies*, 561-585.
- MBIE. (2022). *Enabling Investment in Offshore Renewable Energy*. Wellington: Ministry of Business, Innovation & Employment.
- MBIE. (2023a). *Just Transitions for Taranaki*. Retrieved from Ministry of Business, Innovation, and Employment: <https://www.mbie.govt.nz/business-and-employment/economic-development/just-transition/just-transitions-for-taranaki/>
- MBIE. (2023b). *Consultation on advancing New Zealand's energy transition*. Retrieved from MBIE: <https://www.mbie.govt.nz/have-your-say/consultation-on-advancing-new-zealands-energy-transition/>
- MBIE. (2023c). *Regional Economic Activity Web Tool*. Retrieved from Ministry of Business, Innovation & Employment: <https://webrear.mbie.govt.nz/theme/neet-rate/>
- MBIE. (2023d). *Kānoa - What we have funded*. Retrieved from Grow Regions: <https://www.growregions.govt.nz/established-funds/what-we-have-funded/>
- MBIE. (2023e). *Reliance on tourism*. Retrieved from MBIE: <https://teic.mbie.govt.nz/ste/regions/relianceOnTourism/>
- MBIE. (2023f). *He Kai Kei Aku Ringa: Strategy and action plan*. Retrieved from <https://www.mbie.govt.nz/business-and-employment/economic-development/maori-economic-development/he-kai-kei-aku-ringa-strategy-and-action-plan/>
- MBIE. (n.d.). *Impacts of Economic Transitions on Firms, Workers, Regions and Households*. Retrieved from MBIE: <https://www.mbie.govt.nz/dmsdocument/25537-impacts-of-economic-transitions-on-firms-workers-regions-and-households>
- McCann, P. (2023). *How have place-based policies evolved to date and what are they for now?* Background paper for the OECD-EC High-Level Expert Workshop Series on “Place-Based Policies for the Future”, Workshop 1, 14 April 2023. Retrieved from <https://www.oecd.org/regional/place-based-policies-for-the-future.htm>
- McCann, P., & Van Oort, F. (2019). Theories of agglomeration and regional economic growth: a historical review. In R. Capello, & P. Nijkamp, *Handbook of regional growth and development theories* (pp. 6-23). Edward Elgar Publishing.
- Merk, O. (2013). *The competitiveness of global port-cities: synthesis report*. OECD.

- Ministry for the Environment. (2018). *Climate change projections for New Zealand: Atmosphere projections based on simulations from the IPCC fifth assessment, 2nd edition*. Ministry for the Environment.
- MinterEllisonRuddWatts. (2023). *Enabling cities and regions: Insights on City Deals and place-based approaches*. Retrieved from MinterEllisonRuddWatts: <https://www.minterellison.co.nz/insights/enabling-cities-and-regions-insights-on-city-deals-and-place-based-approaches>
- Motsa, A., Rybakova, S., Shelemetieva, T., Zhuvahina, I., & Honchar, L. (2021). The effect of regional tourism on economic development: Case study: The EU countries. *International Review*, 67-75.
- Nakamura, A., Nakamura, E., Phong, K., & Steinsson, J. (2018). Worker reallocation over the business cycle: Evidence from Canada. *Unpublished manuscript, UC Berkeley*.
- Nel, E., Connelly, S., & Bergen, S. (2019). Evolution of new regional development interventions in New Zealand: An analysis of the first year of the Provincial Growth Fund. *New Zealand Geographer*, 177-193.
- New Zealand Government . (2023). *Economic Plan*. Retrieved from Ministry of Business, Innovation & Employment: <https://www.mbie.govt.nz/business-and-employment/economic-development/economic-plan/>
- New Zealand Government. (2023). *Govt and councils working together on buying out properties*. Retrieved from Beehive: <https://www.beehive.govt.nz/release/govt-and-councils-working-together-buying-out-properties>
- New Zealand Productivity Commission. (2023). *Improving economic resilience: Draft report*. Wellington: New Zealand Productivity Commission.
- New Zealand Productivity Commission. (2024). *Improving Economic Resilience: Report on a Productivity Commission inquiry*. Wellington.
- New Zealand Treasury. (2022). *Te Tai Waiora: Wellbeing in Aotearoa*. Wellington: The Treasury.
- NIWA. (2023). *Climate change scenarios for New Zealand*. Retrieved from NIWA: <https://niwa.co.nz/our-science/climate/information-and-resources/clivar/scenarios>
- O'Brien, P., & Pike, A. (2015). City Deals, Decentralisation and the Governance of Local Infrastructure Funding and Financing in the UK. *National Institute Economic Review*.
- OECD. (2012). *Promoting Growth in All Regions*. OECD Publishing.
- OECD. (2020). *From pandemic to recovery: Local employment and economic development*. Paris: OECD Publishing.
- OECD. (2023). *Economic Policy Reforms 2023: Going for Growth*. OECD.
- OECD. (2023). *OECD Data - Economy*. Retrieved from OECD: <https://data.oecd.org/economy.htm>
- OECD. (2023). *Regions in Industrial Transition 2023: New Approaches to Persistent Problems*. Paris: OECD Regional Development Studies, OECD Publishing.
- Palomino, J. C., Rodríguez, J. G., & Sebastian, R. (2023). The COVID-19 shock on the labour market: poverty and inequality effects across Spanish regions. *Regional Studies*, 814-828.
- Partridge, M., Chung, S. H., & Wertz, S. S. (2022). Lessons from the 2020 Covid recession for understanding regional resilience. *Journal of Regional Science*, 1006-1031.

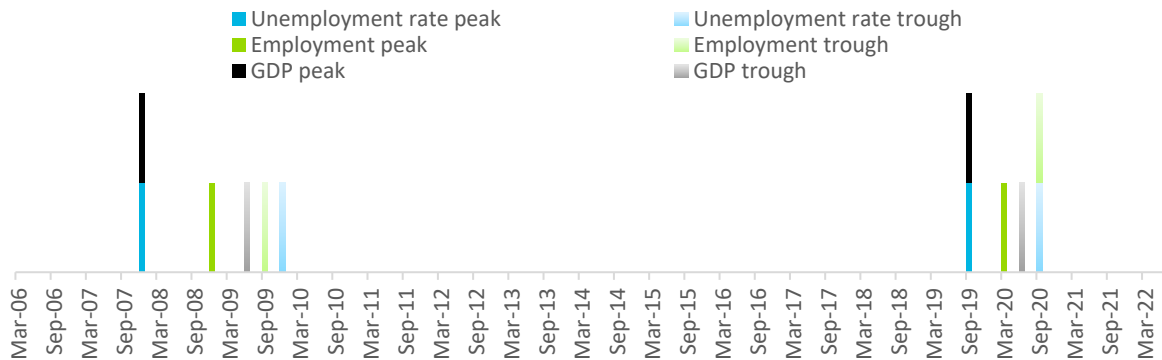
- Pells, S. (2022). *New Zealand's areas of (economic) strength: A literature review*. Retrieved from Ministry of Business, Innovation & Employment: <https://www.mbie.govt.nz/data-and-analysis/>
- Pells, S. (2023). *Resilience – definitions, concepts and measurement*. Retrieved from Ministry of Business, Innovation & Employment: <https://www.mbie.govt.nz/data-and-analysis/>
- Pells, S. (2023). *Which analytical tools are suited to transformative change?* Retrieved from Ministry of Business, Innovation & Employment: <https://www.mbie.govt.nz/data-and-analysis/>
- Pells, S. (2024). *How effective are resilience-focused policies? A literature review*. Retrieved from Ministry of Business, Innovation & Employment: <https://www.mbie.govt.nz/data-and-analysis/>
- Productivity Commission. (2017). *Transitioning Regional Economies, Study Report*. Canberra.
- Queenstown Lakes District Council. (2023). *Shrinking rental housing supply adds pressure to Queenstown Lakes workforce*. Retrieved from Queenstown Lakes District Council: <https://www.qldc.govt.nz/2023/february/23-02-14-shrinking-rental-housing-supply-adds-pressure-to-queenstown-lakes-workforce>
- Regional Skills Leadership Group. (2021). *Bay of Plenty: Regional Labour Market and Socio Economic Profile*. Wellington: Ministry of Business, Innovation & Employment.
- Rockefeller Foundation/Arup. (2015). *City Resilience Framework*. London: Arup.
- Saad, M. H., Hagelaar, G., van der Velde, G., & Omta, S. W. (2021). *Conceptualization of SMEs' business resilience: A systematic literature review*. Cogent Business & Management.
- Sense Partners. (2021). *Addressing labour market scarring in a recession*. Sense Partners.
- Sensier, M., Bristow, G., & Healy, A. (2016). Measuring Regional Economic Resilience across Europe: Operationalizing a Complex Concept. *Spatial Economic Analysis* 11, 2, 128-151.
- Shimer, R. (2005). The cyclicalities of hires, separations, and job-to-job transitions. *Review-Federal Reserve Bank OF Saint Louis*.
- Shimer, R. (2005). The cyclicalities of hires, separations, and job-to-job transitions. *Review-Federal Reserve Bank OF Saint Louis*.
- Simmie, J., & Martin, R. (2010). The economic resilience of regions: towards an evolutionary approach. *Cambridge journal of regions, economy and society*, 27-43.
- Singleton, J. (2008). *New Zealand in the Nineteenth and Twentieth Centuries*. Retrieved from EH.Net Encyclopedia, edited by Robert Whaples: <http://eh.net/encyclopedia/an-economic-history-of-new-zealand-in-the-nineteenth-and-twentieth-centuries/>
- Stats NZ. (2001). *Seasonal adjustment in Stats NZ*. Retrieved from Stats NZ: <https://www.stats.govt.nz/methods/seasonal-adjustment-in-stats-nz/>
- Stats NZ. (2009). *Guide to interpreting the LEED Data*. Retrieved from Stats NZ: <https://www.stats.govt.nz/methods/guide-to-interpreting-the-leed-data/>
- Stats NZ. (2020). *Cruise ship traveller and expenditure statistics: Year ended June 2020*. Retrieved from Stats NZ: <https://www.stats.govt.nz/information-releases/cruise-ship-traveller-and-expenditure-statistics-year-ended-june-2020/>
- Stats NZ. (2021). *Fruit exports dominated by gold kiwifruit*. Retrieved from Stats NZ: <https://www.stats.govt.nz/news/fruit-exports-dominated-by-gold-kiwifruit/>

- Stats NZ. (2022, August 23). *Data in the IDI*. Retrieved from Stats NZ: <https://www.stats.govt.nz/integrated-data/integrated-data-infrastructure/data-in-the-idi/>
- Stats NZ. (2022). <https://www.stats.govt.nz/news/maori-population-share-projected-to-grow-in-all-regions/>. Retrieved from <https://www.stats.govt.nz/news/maori-population-share-projected-to-grow-in-all-regions/>
- Stats NZ. (2022). *Subnational population estimates: At 30 June 2022 (provisional)*. Retrieved from Stats NZ: <https://www.stats.govt.nz/information-releases/subnational-population-estimates-at-30-june-2022-provisional/>
- Stats NZ. (2023a, September 21). *About the Household Labour Force Survey*. Retrieved from Stats NZ: <https://www.stats.govt.nz/help-with-surveys/list-of-stats-nz-surveys/about-the-household-labour-force-survey/>
- Stats NZ. (2023b). *Indicators*. Retrieved from Stats NZ: <https://www.stats.govt.nz/indicators/>
- Stats NZ. (2023c). *Infoshare*. Retrieved from <https://infoshare.stats.govt.nz/>
- Stats NZ. (2023d). *NZ.Stat*. Retrieved from Stats NZ: <https://nzdotstat.stats.govt.nz/>
- Stats NZ. (2023e). *Regional gross domestic product: Year ended March 2022*. Retrieved from Stats NZ: <https://www.stats.govt.nz/information-releases/regional-gross-domestic-product-year-ended-march-2022/>
- Tan, J., Hu, X., Hassink, R., & Ni, J. (2020). Industrial structure or agency: What affects regional economic resilience? Evidence from resource-based cities in China. *Cities*.
- Te Puni Kōkiri. (2009). *The Implications of a Recession for the Māori Economy*. Wellington: Te Puni Kōkiri.
- Te Puni Kōkiri. (2009). *The Implications of a Recession for the Māori Economy*. Wellington.
- Te Puni Kōkiri. (2023). *Te Matapaeroa 2021*. Wellington.
- The Treasury. (2023). *Impacts from the North Island weather events*. The Treasury.
- Tupu. (n.d.). *Land use fact sheet - Kiwifruit*. Retrieved from Tupu: <https://www.tupu.nz/en/fact-sheets/kiwifruit>
- U.S. Census Bureau. (2017). *X-13ARIMA-SEATS Reference Manual*. Washington: Center for Statistical Research and Methodology, U.S. Census Bureau.
- Venture Taranaki. (2023). *Taranaki 2050 and Tapuae Roa*. Retrieved from Venture Taranaki: <https://www.venture.org.nz/projects/tapuae-roa-and-taranaki-2050>
- Venture Taranaki. (n.d.). *Offshore Wind: A New Energy Opportunity for Taranaki*. New Plymouth: Venture Taranaki.
- Vermeulen, W. (2022). *Policies for Resilient Local Economies*. Paris: OECD.
- Webber, D. J., Healy, A., & Bristow, G. (2018). Regional growth paths and resilience: A European analysis. *Economic Geography*, 355-375.
- World Bank. (2023). *Commodity Markets*. Retrieved from World Bank: <https://www.worldbank.org/en/research/commodity-markets>
- Ženka, J., Slach, O., & Pavlík, A. (2019). Economic resilience of metropolitan, old industrial, and rural regions in two subsequent recessionary shocks. *European Planning Studies*, 2288-2311.

Zheng, G., & Sing, M. (2023). Sectoral reallocation and income growth in the labour market during the COVID-19 pandemic. A review of the New Zealand labour market during COVID-19. *Reserve Bank of New Zealand Analytical Notes series.*

Annex

Figure A.1. Comparison of peaks and troughs using employment, GDP, and the unemployment rate



Note: The bars indicate the incidence of a peak or trough using the corresponding indicator.

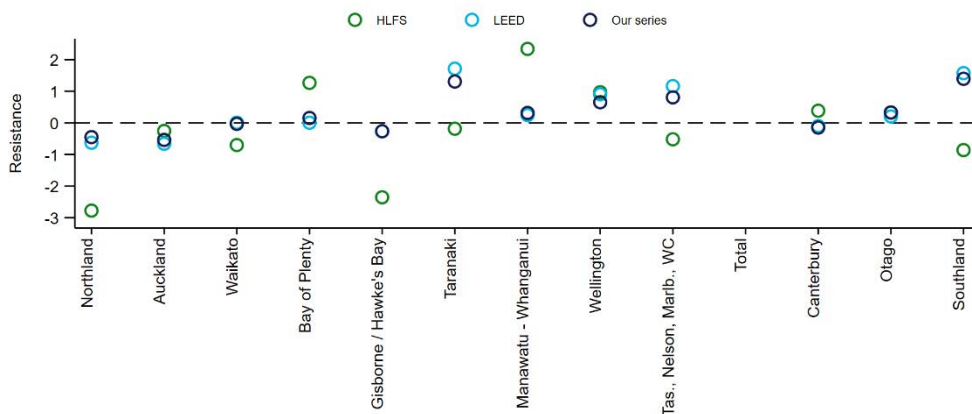
Source: Authors’ calculations using data from Stats NZ.

Comparing resilience measures using different employment series

Given the differences in what these three employment series captures one would expect the choice of employment series to affect a region’s relative resilience score. However, comparing resistance and recoverability measures over the GFC and pandemic recessions we see reasonably consistent ranks, with only a handful of instances where a region is relatively resilient – compared to the national average – using one series, but relatively less resilient using another – see below.

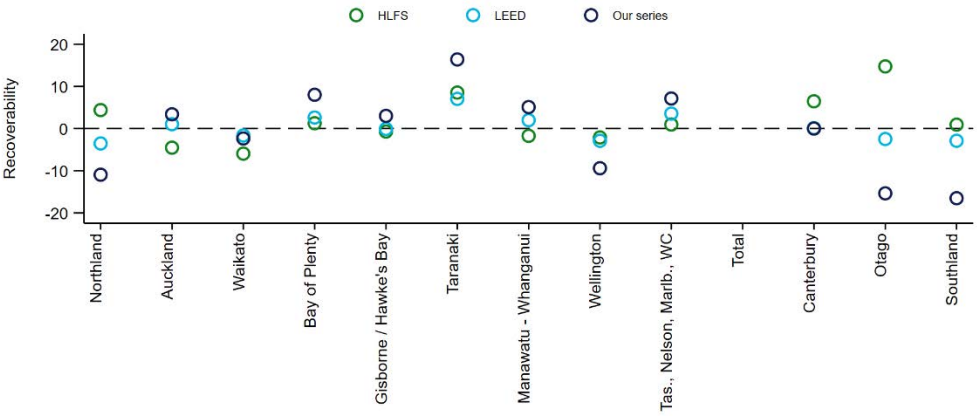
The measures based on our employment series generally follows the same pattern as the official LEED series, as expected. While Figure A.4 appears to suggest significant differences between the two series, this is due to a very small change in national employment (the denominator in our measures) in the LEED series over that period. This has the effect of drastically blowing out the scale of the measure for the LEED series. However, the relatively rankings of the regions are again very similar.

Figure A.2. Comparison of resistance measures using three employment series (GFC)



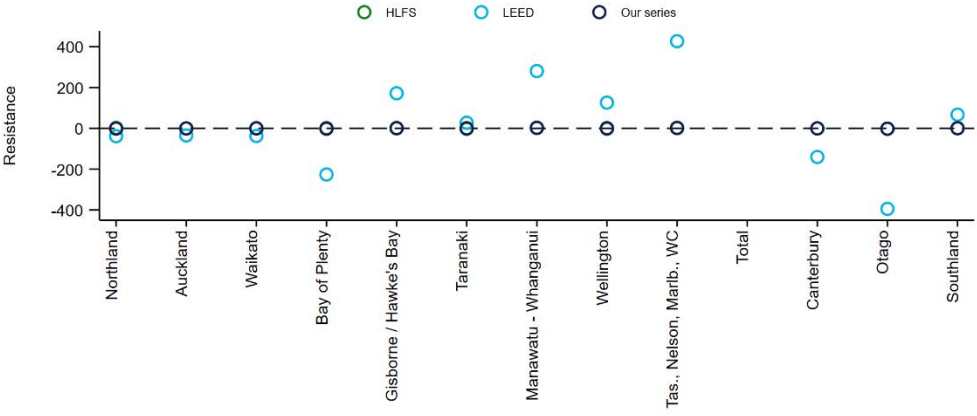
Source: Authors’ calculations using data from Stats NZ’s IDI.

Figure A.3. Comparison of recoverability measures using three employment series (GFC)



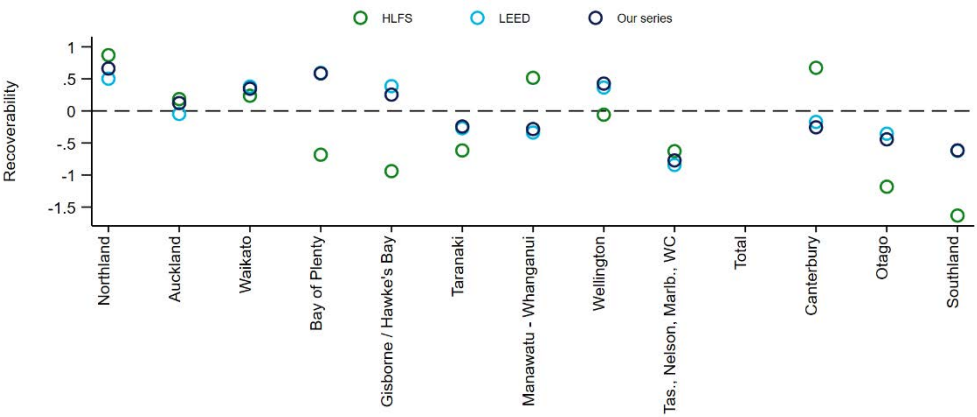
Source: Authors' calculations using data from Stats NZ's IDI.

Figure A.4. Comparison of resistance measures using three employment series (COVID-19)



Source: Authors' calculations using data from Stats NZ's IDI.

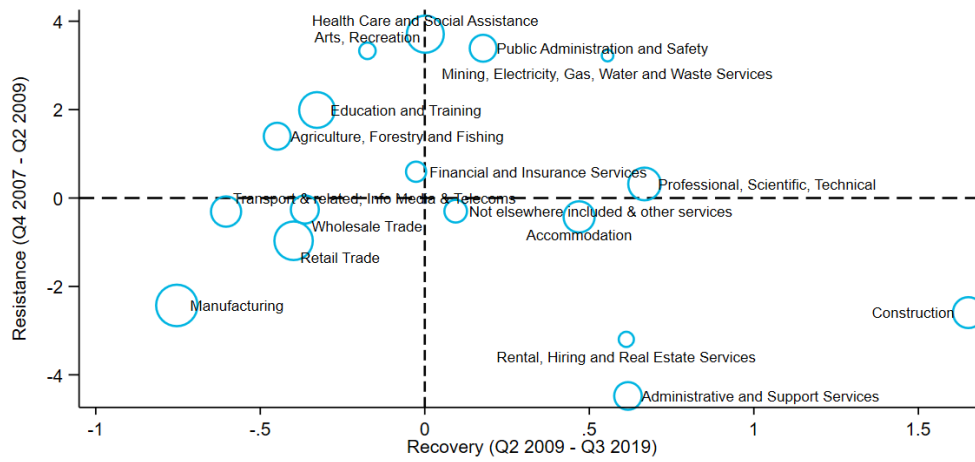
Figure A.5. Comparison of recoverability measures using three employment series (COVID-19)



Source: Authors' calculations using data from Stats NZ's IDI.

Additional charts and tables

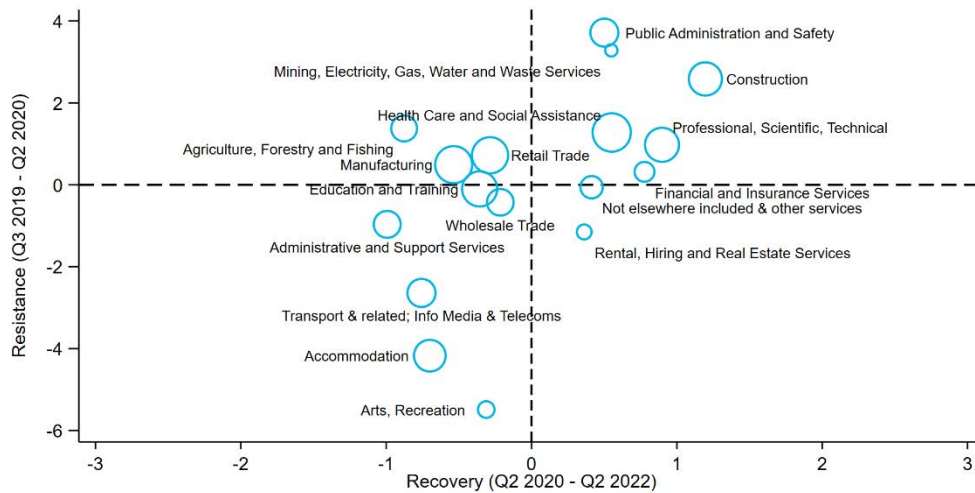
Figure A.6. Resistance & recoverability of industries during the Global Financial Crisis



Note: Bubbles are population weighted.

Source: Authors' calculations using data from Stats NZ's IDI.

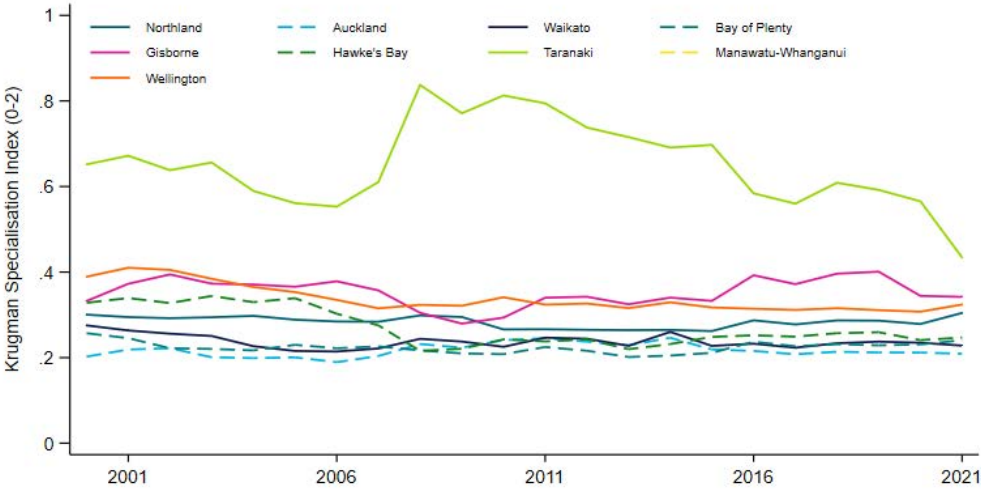
Figure A.7. Resistance & recoverability of industries during the COVID-19 pandemic



Note: Bubbles are population weighted.

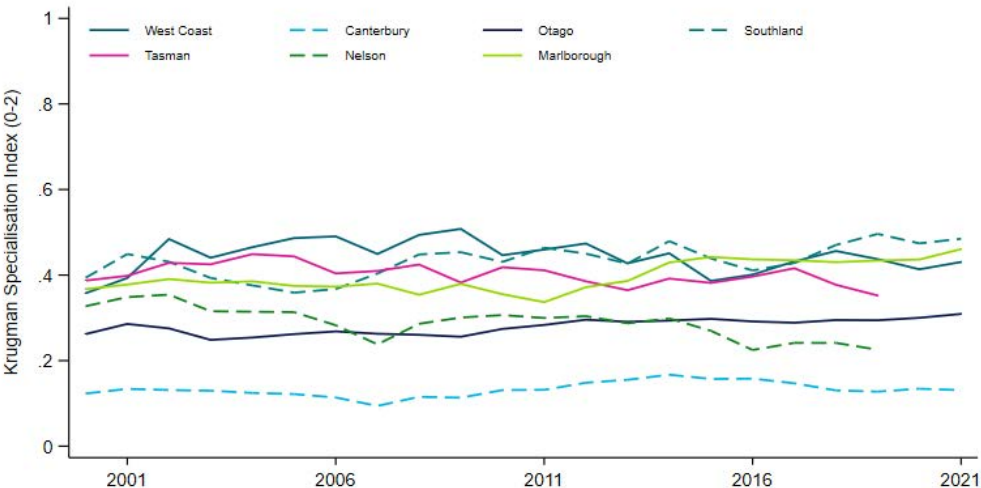
Source: Authors' calculations using data from Stats NZ's IDI.

Figure A.8. Economic diversity¹⁷ - North Island



Source: Authors' calculations using GDP data.

Figure A.9. Economic diversity – South Island



Source: Authors' calculations using GDP data.

¹⁷ We create the Krugman Specialisation Index using Gross Domestic Product data sourced from MBIE's regional economic activity dashboard (MBIE, 2023c), and a user created Stata module that computes the index (Ansari, 2013).

Table A.1. Change in inter-regional flows of workers around the COVID-19 pandemic

Origin region	Destination region															
	Northland	Auckland	Waikato	Bay of Plenty	Gisborne	Hawke's Bay	Taranaki	Manawatu-Wanganui	Wellington	Tasman	Nelson	Marlborough	Canterbury	West Coast	Otago	Southland
Northland	-4.25	2.27	0.36	0.37	0.00	0.02	0.11	0.23	0.18	0.05	0.01	-0.06	0.62	0.05	0.18	-0.13
Auckland	-0.03	0.65	-0.15	0.24	0.03	0.14	-0.16	-0.18	0.06	0.02	0.00	-0.02	-0.21	-0.05	-0.23	-0.11
Bay of Plenty	-0.02	-0.29	0.66	-2.84	0.04	0.04	0.47	0.19	0.52	0.10	0.10	0.14	0.56	-0.08	0.33	0.08
Waikato	0.13	0.52	-2.17	0.38	0.16	0.31	0.06	0.03	0.57	0.01	-0.10	0.03	0.29	-0.14	0.03	-0.10
Gisborne	0.24	-1.08	0.51	0.62	-6.86	1.59	0.74	0.88	0.76	0.74	0.37	0.36	0.59	0.40	0.09	0.04
Hawke's Bay	0.23	-0.40	-0.07	0.16	-0.05	-1.15	-0.11	0.94	0.28	0.09	0.37	-0.40	0.39	0.12	-0.41	0.02
Taranaki	0.07	-0.75	0.64	1.08	-0.01	-0.06	-2.04	0.26	1.05	-0.12	-0.11	-0.21	0.22	0.02	-0.13	0.08
Manawatu-Wanganui	0.25	1.17	-0.67	-0.13	0.35	0.08	0.19	-3.43	1.31	0.06	0.30	0.00	0.46	0.10	0.01	-0.05
Wellington	0.07	0.07	-0.39	-0.01	0.00	0.06	-0.23	-0.55	0.36	0.01	0.09	0.05	0.37	-0.02	0.09	0.03
Tasman	0.00	1.45	0.06	0.85	0.69	0.60	0.13	1.06	1.49	-5.57	0.59	0.19	-1.00	-0.62	0.33	-0.26
Nelson	-0.01	2.93	0.12	0.14	-0.21	0.08	-0.17	0.54	1.80	-0.19	-2.46	-0.53	-1.72	-0.32	-0.12	0.14
Marlborough	0.14	0.43	0.58	0.58	0.11	1.29	-0.45	-0.16	0.00	-0.45	-0.18	-3.15	0.22	-0.09	1.07	0.06
Canterbury	0.02	0.37	-0.09	0.31	0.05	-0.07	-0.05	-0.07	0.76	-0.05	-0.04	-0.23	-0.93	-0.16	-0.01	0.18
West Coast	0.09	1.14	0.14	0.70	-0.12	-0.13	-0.69	0.22	0.63	0.40	-0.60	0.13	2.38	-3.61	0.34	-1.05
Otago	0.06	0.88	0.34	0.76	0.14	0.03	0.08	0.12	-0.04	0.09	0.08	0.11	0.46	-0.05	-3.34	0.29
Southland	-0.03	1.01	0.83	0.59	0.16	0.35	0.05	0.40	0.13	0.15	0.06	0.08	1.43	-0.01	-0.60	-4.59

Note: Changes are calculated as percentage point differences between share of local (origin) workers who moved to a destination region in 2020-2022 and share of local (origin) workers who moved to a destination region in 2017-2019. The choice of 2017-2019 is set as the normal/pre-shock baseline period.

Shades of green reflect higher than normal rates of regional flows (relative to the baseline period), while shades of grey reflect lower than normal rates.

Source: Authors' calculations using data from Stats NZ's IDI



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