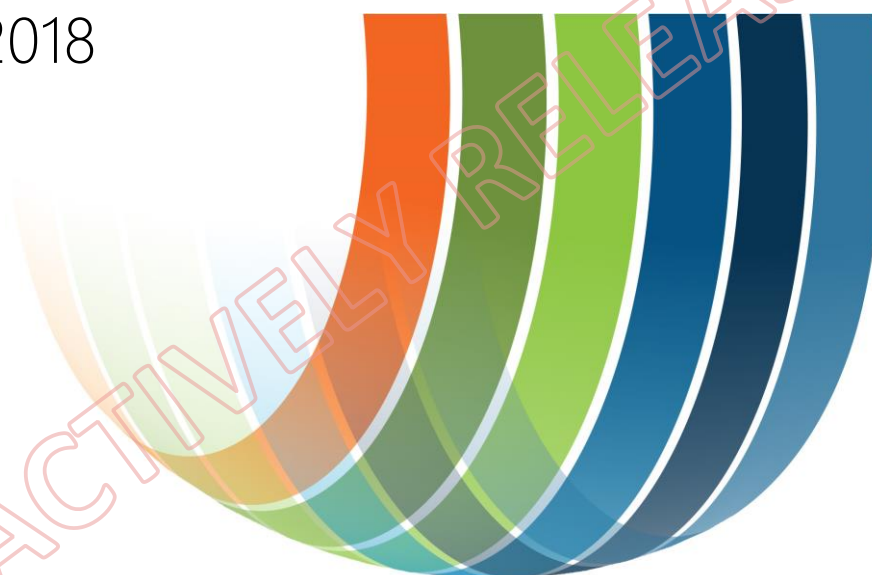


Regional Differentiation Framework

May 2018



Infometrics

Economics put simply

Authorship

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Summary

The Ministry of Business, Innovation and Employment (MBIE) asked Infometrics to develop a framework for characterising New Zealand's regions as having high or low labour demand and high or low labour supply.

Based on data up to the end of the 2018 calendar year, the Regional Differentiation Framework (RDF) yielded the results shown in Figure 1. Northland, Gisborne/Hawke's Bay and Manawatu-Wanganui are characterised as having high demand and high supply. The remaining regions are characterised as having high demand and low supply.

Figure 1

Regional Differentiation Framework results, 2018

	High Demand	Low Demand
High Supply	Northland Gisborne/Hawke's Bay Manawatu-Wanganui	
Low Supply	Auckland Waikato Bay of Plenty Taranaki Wellington	T/N/M/W* Canterbury Otago Southland

*Tasman/Nelson/Marlborough/West Coast

For Northland and Manawatū-Wanganui we recommend that immigration settings be tightened. The rationale for this recommendation is as follows.

- Northland's labour supply has been high for several years
- Manawatū-Wanganui has the highest labour supply score of any region and has shown no sign of falling in recent years; the region's demand score not as high as most other North Island regions.

For Auckland, Waikato, Canterbury, Otago and Southland we recommend that immigration settings be loosened. The rationale for this recommendation is as follows.

- Auckland is firmly in the low labour supply quadrant (indicated by a large negative score), has been in low supply for several years, and is currently on a falling supply trajectory (indicated by most measures of change in supply being negative)

- Waikato is firmly in the low labour supply quadrant (indicated by a large negative score) and has been on a falling supply trajectory for the past two years (indicated by comparing 2016-18 results)
- Canterbury labour supply has been low for several years
- Otago labour supply has been low for several years and demand is currently the highest of any region.
- Southland currently the lowest labour supply of any region resulting from a strong trajectory for falling supply in recent years

For Bay of Plenty, Gisborne/Hawke's Bay, Taranaki, Wellington and Tasman/Nelson/Marlborough/West Coast, the RDF results are less clear-cut because either they have fluctuated between quadrants in recent years or are at high risk of fluctuating between quadrants in the near future. In these cases, our recommendation is that govt agencies consider and advise Ministers on what the appropriate policy responses should be on a case-by-case basis. The rationale for this recommendation is as follows.

- Bay of Plenty has been on a falling labour supply trajectory but is currently in low supply by only a small margin (indicated by a small negative result) because current supply indicators are a mix of high and low scores
- Gisborne/Hawke's Bay is currently in high labour supply by a small margin (indicated by a small positive result) and is currently on a falling supply trajectory
- Taranaki is currently in low labour supply and high demand by a small margin (indicated by a small negative supply result and a small positive demand result), supply and demand indicators currently show mixed score and their trajectory is unclear
- Wellington has been on a falling labour supply trajectory in recent years and is currently in low supply and high demand by a small margin (indicated by a small negative supply result and a small positive demand result)
- Tasman/Nelson/Marlborough/West Coast is currently in low supply by only a small margin (indicated by a small negative score) and has been on an increasing supply trajectory recently

Consideration was also given to whether the RDF results suggest policy responses for the main centres of Auckland, Hamilton City, the Wellington urban area¹ and Christchurch City should be different to the wider regions in which they sit. Analysis was performed on a limited set of indicators for which TA and Auckland Community Ward data exists, namely: the working age population, and job openings. Unemployment rate data is also available for TAs but not Auckland Community Wards. The analysis looked at whether the results from the main centres differed to the wider regions to the extent that they would be placed in different quadrants.

¹ Includes Wellington City, Porirua, Lower Hutt City, and Upper Hutt City

The analysis found that the main centres would not be placed in different quadrants to their broader regions because, based on the limited data available, their labour supply and labour demand results were broadly similar.

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Introduction

On behalf of the Government, the MBIE is undertaking a public consultation on proposed changes to the employer-assisted temporary work visa system and regional workforce planning. The consultation document can be found at www.MBIE.govt.nz/TempWorkVisaConsultation and will hitherto be referred to as *the consultation document*.

Included in the consultation document is a proposal for a set of labour market indicators that would inform a regionally differentiated approach to the labour market test for employer-assisted temporary work visas, responses from the education/skills and welfare systems, and employer responses.

- Proposal four of the consultation document (see p.18 of the consultation document) states that: “The labour market test will be reviewed to make it easier or harder to recruit temporary migrants working in a region. How it will be applied will depend on how the regions are differentiated.”
- Proposal five of the consultation document (see p.19 of the consultation document) states that: “The regions will be differentiated based on a set of indicators which reflect the labour market dynamics and growth pressures of New Zealand’s 16 regions.”
- Figure 7 in the consultation document (see p.22 of the consultation document) lists a proposed set of regional indicators that could be used to classify and differentiate regions.
- Figure 6 in the consultation document (p.20 of the consultation document) shows how regions could be differentiated into one of four possible quadrants relating to high or low labour demand and high or low labour supply. The quadrant diagram is reproduced in Figure 2 below.

Figure 2: Four quadrant differentiation of regional labour market dynamics and growth pressures

		Labour Demand	
		High	Low
Labour Supply	High		
	Low		

In February 2019, MBIE asked Infometrics to provide the following:

1. Advice on whether the proposed indicators in the consultation document (see figure 7, p.22 of the consultation document) represent the best way to characterise and distinguish between different regional labour markets.
2. Advice on whether the proposed classification of the regions into the 16 regions in the consultation document (see proposal five, p.19 of the consultation document) works for the purposes of the proposals (including an assessment of how such classifications would work with other regional classifications for the labour market).
3. A framework for applying the indicators to the regions in order to characterise them into one of four quadrants relating to high and low labour demand and labour supply (see Figure 6, p.20 in the consultation document and Figure 2 above).
4. Advice on the sensitivity of the framework to changes in the underlying indicators/data and, with this in mind, how frequently the model should be run.
5. Analysis of how the set of indicators currently apply to the 16 regions and how the regions are allocated into one of the four quadrants relating to high and low labour demand and labour supply (see Figure 6, p.20 in the consultation document and Figure 2 above).
6. Advice on the policy responses deriving from the allocation of regions into one of the four quadrants relating to high and low labour demand and labour supply (see Figure 6, p.20 in the consultation document and Figure 2 above).

This report accompanies the Excel-based RDF. The Excel-based RDF meets the requirements of point 3 above. This report contains the analysis and advice specified in points 1, 2, 4, 5 and 6, and describes the framework in detail – thus providing supporting information to point 3 above.

The report is set out as follows:

Conceptual framework – defines and explains the concepts of labour demand, labour supply that underpin the RDF and explains how labour demand and supply can be measured.

Regions – outlines and explains our advice regarding the regional boundaries that should be used in the RDF.

Indicators – outlines and explains our advice regarding the indicators that should be included (and excluded) in the RDF.

Framework – outlines and explains our advice regarding the calculations that should be performed on the various indicators of labour demand and supply, and how these measurements should be aggregated to determine whether a region is characterised as high or low labour demand and labour supply.

Results – outlines the RDF results in terms of the characterisation of regions as high or low labour demand and labour supply, and the policy recommendations derived from the results.

Sensitivity analysis – shows how the RDF results change when different aspects of the framework are changed.

Operating the framework – outlines and explains our advice on how often the RDF should be updated and the steps required to update it.

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Conceptual underpinnings

This section defines the concepts of labour demand and labour supply that underpin the four-quadrant diagram shown in Figure 2 and explains how they are measured. These concepts are then taken forward into subsequent sections to frame our advice on which indicators should be included in the RDF and how they should be measured.

At its core, the RDF measures labour demand and the extent to which existing labour supply is being utilized. New jobs, replacement jobs and job vacancies encompass labour demand. The under-utilisation rate best represents the utilisation of labour supply. Several other measures capture other aspects of labour supply.

Defining labour demand and labour supply

The four-quadrant diagram in Figure 2 refers to regions being characterised in terms of their labour demand and labour supply. Labour demand is the amount of labour (usually measured as job numbers or hours worked) that employers are willing to employ. Labour supply is the amount of labour (usually measured either as numbers of people or numbers of hours) that people in the labour force are willing to work.

Labour demand and labour supply interact in the job market through a process of 'matching' people to jobs. People offer their labour for a price (i.e. wages) and employers 'purchase' labour by awarding people with employment (see Figure 3).

Figure 3: job market supply, demand and matching



Measuring labour demand

Labour demand is often measured as changes in the level of employment, but this is only part of the picture. Employment growth happens when additional jobs are created in the labour market. But job vacancies also occur when people exit their jobs to either transition to another job or leave the workforce. People leave the workforce for a range of reasons including retirement, taking time off to raise children or chronic illness. When

people exit their job to transition to another job there is no net change in labour demand², but when people leave the workforce there is an increase in labour demand.

Furthermore, measured employment is capturing only those job vacancies that have been filled. Therefore, a fuller measure of labour demand also includes the number of job vacancies.

Measurement of labour demand should therefore include the following:

- new jobs,
- replacement jobs, and
- job vacancies.

Measuring labour supply

Traditionally, labour supply has been measured as the number of people employed, plus the number of people both available for work **and** seeking work. The latter is the definition of 'unemployed' in statistical series such as New Zealand's Household Labour Force Survey (HLFS), the purpose of which is to produce estimates of the population's status in the job market.³ The employed and the unemployed are collectively referred to as the 'labour force'.

Recently the definition of labour supply has been broadened to include those people who are either available for work **or** seeking work. People in these circumstances have a lower attachment to the labour market than the unemployed and the employed and are therefore referred to as the 'potential' labour force.⁴ The employed, unemployed and potential labour force are collectively referred to as the 'extended labour force'.⁵

Labour supply measurement also seeks to determine the extent to which the labour force is being utilised. The unemployed, potential labour force and the 'under-employed' (people who are employed part-time but want to work more hours) are collectively referred to as the 'under-utilised'.

Labour supply is influenced by the size of the working-age population. In New Zealand, the working-age population is defined as all usually resident, non-institutionalised people aged 15 years or older.⁶ As the working age population grows or shrinks, so does the pool of people who could potentially make themselves available for work. The proportion of the working-age population that is either employed or unemployed is referred to as the 'labour force participation rate'.

There are therefore multiple dimensions to measuring labour supply depending on the extent of people's attachment to the labour market. To reflect these different dimensions, measurement of labour supply should include the following:

- the working age population,

² When people change occupations or industry there is a net change in labour demand in the occupations or industry they exit, but not a net change in labour demand across the workforce as a whole.

³ http://archive.stats.govt.nz/browse_for_stats/income-and-work/employment_and_unemployment/improving-labour-market-statistics/hlfs-summary-of-changes-2016/purpose.aspx

⁴ http://archive.stats.govt.nz/browse_for_stats/income-and-work/employment_and_unemployment/improving-labour-market-statistics/introducing-underutilisation/the-underutilised.aspx

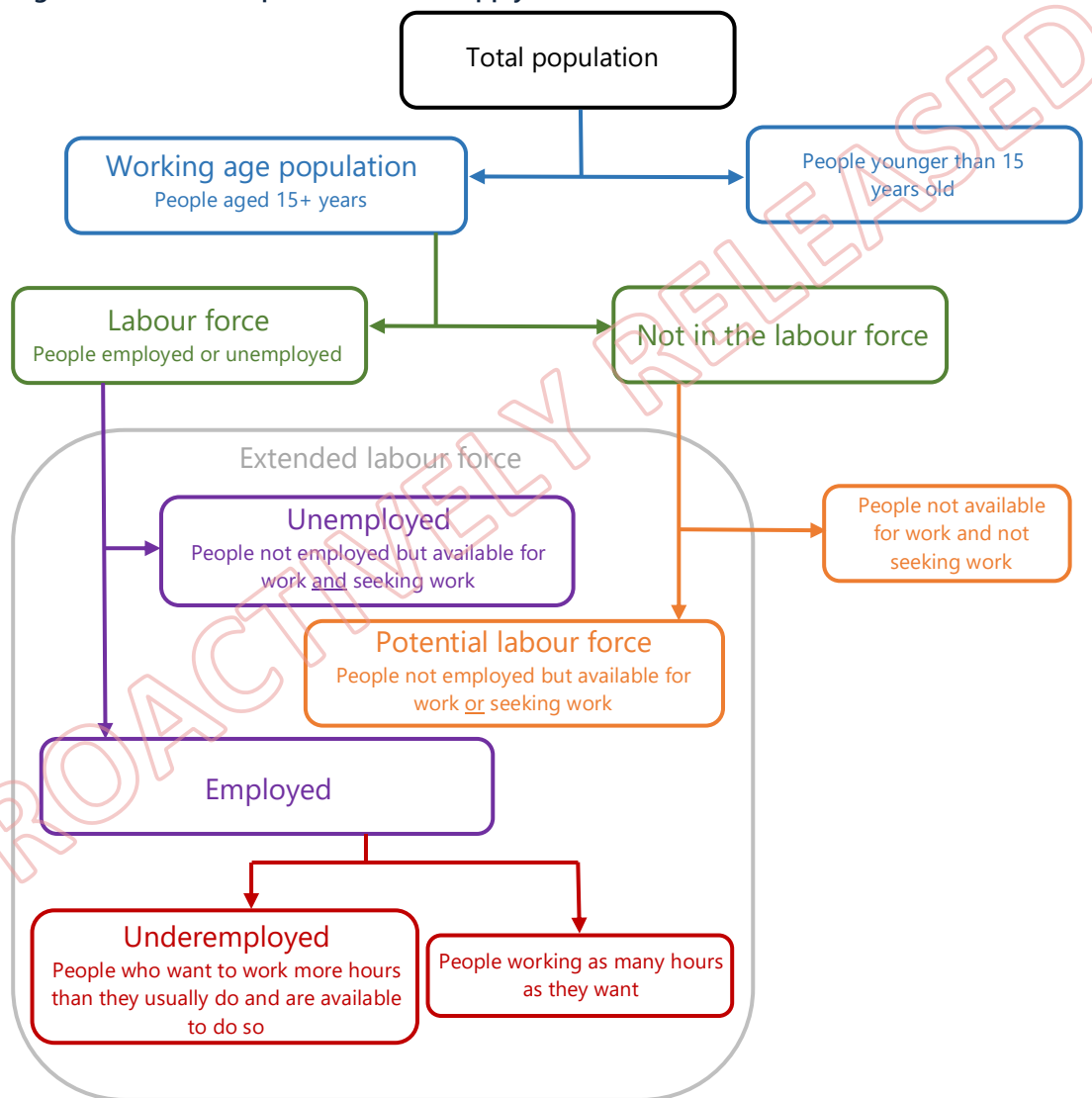
⁵ IBID

⁶ http://archive.stats.govt.nz/browse_for_stats/income-and-work/employment_and_unemployment/hlfs-estimated-working-age-population-info-releases.aspx

- the under-utilised (including the potential labour force, the unemployed and the under-employed), and
- the employed.

The various aspects of labour supply can be summarised in a diagram (see Figure 4) which shows how the population is segmented into different groups according to their attachment to the job market.

Figure 4: different aspects of labour supply



Labour supply is not static. People enter and leave the labour supply pool all the time. The net impact of these flows is captured in changes in the size of the labour pool, but it can also be also useful to measure inflows into the labour supply from key sources such as school and tertiary education.

High and low labour demand and labour supply

The purpose of the RDF is to characterise regions according to whether they have high or low labour demand and high or low labour supply. The four-quadrant diagram shown in Figure 2 makes this explicit.

What does high and low labour demand and high and low labour supply look like in terms of the measurements we have introduced in the previous sub-section?

High labour demand indicates new job openings and/or replacement job openings are plentiful in the labour market. At any given time, some of these jobs will be vacant. The higher the labour demand, the greater chance there is that there will be more vacancies, and jobs will remain vacant longer as more employers are competing for available workers.

High labour supply indicates that there are plentiful workers either working or available for work and/or seeking work. The higher the labour supply, the greater the chance that workers will be under-utilised. What does an under-utilised labour supply look like?

- The number of people who want to work but are unable to find a job is high.⁷
- Many people in work are not working as many hours as they want.

The measure that most closely captures utilisation is the 'under-utilisation rate'. The under-utilisation rate is defined as the number of people under-utilised as a percentage of the extended labour force. People under-utilised are the unemployed, the potential labour force and people under-employed.

$$\text{Underutilisation rate} = \frac{\text{underemployed} + \text{unemployed} + \text{potential labour force}}{\text{extended labour force}}$$

$$\text{Extended labour force} = \text{employed} + \text{unemployed} + \text{potential labour force}$$

In addition to the under-utilisation rate, several other indicators capture some aspect of labour supply utilisation.

The unemployment rate is the number of people who are unemployed expressed as a percentage of the number of people in the labour force.

$$\text{Unemployment rate} = \frac{\text{unemployed}}{\text{labour force}}$$

$$\text{Labour force} = \text{employed} + \text{unemployed}$$

The employment rate is the number of people employed expressed as a percentage of the number of people in the working-age population.

$$\text{Employment rate} = \frac{\text{employed}}{\text{working age population}}$$

$$\text{Working age population} = \text{people aged 15 years and above}$$

As already noted, the labour force participation rate is the number of people in the labour force expressed as a percentage of the number of people in the working-age population.

$$\text{Labour force participation rate} = \frac{\text{labour force}}{\text{working age population}}$$

⁷ At any given time, there will always be some people unemployed or in the potential labour force simply because there is a consistent churn of people moving in and out of jobs and the process of finding a job can take time.

The unemployment rate, the employment rate and the labour force participation rate are narrower measures of labour supply utilisation than the under-utilisation rate because they do not include people in the potential labour force.

A broader measure of labour supply considers the size of the working-age population relative to the total population.

$$\text{Working age population rate} = \frac{\text{working age population}}{\text{total population}}$$

Measures of labour supply can also focus on specific groups such as young people and ethnic minorities. The Youth NEET rate focuses on young people and is defined as follows:

$$\text{NEET rate} = \frac{\text{15 to 24 year olds unemployed/NILF and not in education/training}}{\text{All 15 to 24 year olds}}$$

NILF = not in the labour force

The measures of supply outlined such as the labour force participation rate, employment rate, under-utilisation rate and unemployment rate above can be applied to ethnic minorities.

Measuring flows of people into the labour supply from school and tertiary education can be achieved by counting the number of school leavers and the number of people completing tertiary education qualifications and not progressing to further study. Counting the number of people enrolling in tertiary education courses can also be a lead indicator of future completions. A proportion of people who enrol in a course do not go on to complete it. However, rises in enrolments over time generally lead to rises in completions.

Returning to the four-quadrant diagram in Figure 2, the following job market conditions characterise each quadrant:

- High labour demand and low labour supply: this is typical of a fast-growing economy. Jobs openings are plentiful, and the under-utilisation rate is low.
- Low labour demand and high labour supply: this is typical of an economy growing slowly or even declining. Job openings are hard to come by, consequently the under-utilisation rate is high.
- High labour demand and high labour supply: jobs are plentiful, but under-utilisation rates are high. This typically happens when the skills employers need cannot be found in the available labour supply.
- Low labour demand and low labour supply: this is relatively uncommon and tends to happen when labour force participation is low because job openings are hard to come by.

Skill levels

It is proposed that the regional labour market test be applied predominantly to low-to-mid skilled jobs. Under the Australia and New Zealand Standard Classification of Occupations (ANZSC) this equates to occupations classified at skill levels 4 and 5. These skill levels are defined as follows:

- Skill level 4: occupations requiring NZ Register Level 2 or 3 qualification. At least one year of relevant experience may substitute for the required formal qualifications. In some instances, relevant experience may be required in addition to the formal qualification.
- Skill level 5: occupations requiring NZ Register Level 1 or compulsory secondary education; for some occupations a short period of on-the-job training may be required in addition to, or instead of, the formal qualification.

Occupations that are predominantly classified at these skill levels include lower skilled community workers, personal service workers, clerical and administrative workers, and sales workers as well as most machinery operators, drivers and labourers.

Labour demand for mid-to low-skilled jobs can be defined in terms of the skill level of the jobs that employers need filling. Measures of labour supply, such as the under-utilisation rate and the unemployment rate, are reasonably appropriate for an analysis of the lower-skilled because people with lower skills are more likely than people with higher skilled to be under-utilised in the job market.

Measures of supply inflows can also be tailored to the lower skilled. Based on advice from Ministry of Education (MoE) and Tertiary Education Commission (TEC), school leavers who have not achieved University Entrance (UE) and who are not engaged in tertiary education at level 3 or above on the National Qualifications Framework (NQF), and people who complete tertiary education qualifications at NQF levels 1 to 4 are considered inflows into the lower skilled labour pool.

Regions

This section outlines our advice on whether the classification of regions into the 16 Regional Councils as proposed in the consultation document works for the purposes of the RDF and how such classifications would work with other regional classifications for the labour market. Our advice has been developed in close consultation with staff at MBIE.

The 12 HLFS regions, which are based on Regional Council areas are the most appropriate regional classification for the RDF because they enable the greatest range of regional labour market data to be utilised.

Regional classification types

A number of regional classifications were considered. In addition to the Regional Council regions proposed in the consultation document, the following five had the most merit and were therefore given the closest attention.

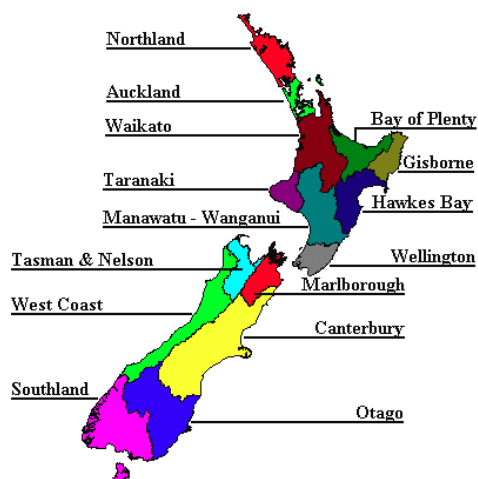
- Regional Council Areas,
- Territorial Authorities,
- Work and Income Regions,
- Ministry of Education Areas, and
- Functional labour market areas.

Regional Councils Areas

New Zealand is divided into sixteen regions for local government purposes. Eleven are administered by regional councils and five are administered by unitary authorities, which are territorial authorities (TAs) that also perform the functions of regional councils.

Regional Council names and regional boundaries are shown in Figure 5.

Figure 5: Regional Councils



Source: <http://sites.rootsweb.com/~nzlauckl/nzmap.html>

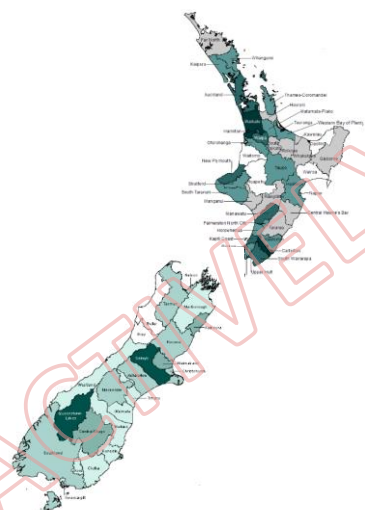
HLFS Regions

As already noted in the *Conceptual underpinnings* section, the purpose of the HLFS is to produce estimates of the population's status in the job market. The HLFS is the source of several Tier 1⁸ labour market statistics such as unemployment and employment. HLFS regions are made up of 12 areas, which are based on the 16 Regional Council boundaries (see Figure 5) with some smaller regions combined namely: Gisborne and Hawke's Bay, and Tasman, Nelson, Marlborough and West Coast.

Territorial Authorities

Defined under the Local Government Act 2002 as a city council or district council, there are 67 TAs consisting of 12 city councils, 53 districts, Auckland Council, and Chatham Islands Council (see Figure 6).

Figure 6: Territorial Authorities



Source: StatsNZ

http://archive.stats.govt.nz/browse_for_stats/population/estimates_and_projections/SubnationalPopulationEstimates_HOTPAJun16/Commentary.aspx

Work and Income Regions

Work and Income (WINZ) is divided into a network of 11 regions. They are broadly similar in size to the HLFS regions but in almost all cases, the actual boundaries are different (see Figure 7).

⁸ Tier 1 statistics are New Zealand's most important statistics, and are essential to help the Government, business, and members of the public to make informed decisions and monitor the state and progress of New Zealand. <https://www.data.govt.nz/use-data/showcase/official-statistics/>

Figure 7: Work and Income Regions

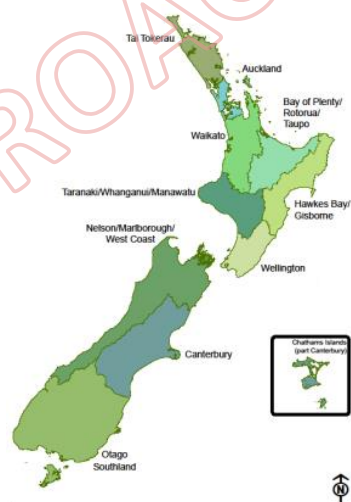


Source: McGuinness Institute <http://www.mcguinnessinstitute.org/wp-content/uploads/2017/01/20170130-Lines-within-New-Zealand-map-A4.pdf>

Ministry of Education Areas

MoE maintains a regional network of 10 offices that provide services to communities. They are broadly similar in size to the HLFS regions and the Work and Income Regions but in almost all cases, the actual boundaries are different.

Figure 8: Ministry of Education Areas



Source: MoE <https://www.education.govt.nz/assets/Documents/Ministry/Mapof10MinistryofEducationAreas.pdf>

Functional labour market areas

Functional labour market areas (FLMAs) are labour market areas that are self-contained in terms of labour demand and labour supply. This is best explained with an example. Let's say we defined Wellington City as a region and analysed a set of indicators that showed it to be a region of high labour demand and low labour supply. This is obviously

not a fair assessment because much of the labour supply comes from people living outside the city and commuting in – in other words, the catchment area for Wellington city’s employers is broader than Wellington city. To properly assess the extent of labour demand relative to labour supply, we would want to include in the regional boundaries the places where the people offering their labour supply live.

We might also consider a labour market’s ability to adjust to changes in labour supply and demand, at least over the short-term. We would do this by looking at inter-regional migration flows. If demand for skills is high in Wellington city for a sustained period, people living elsewhere in New Zealand might come to live there to take advantage of the job opportunities. If so, the places where these people come from could be considered within definition of the Wellington region’s labour market.

Several research projects have been carried out to define New Zealand’s FLMAs, although not recently. See, for example, Papps, K & Newell, J (2002) *Identifying Functional Labour Market Areas in New Zealand: A Reconnaissance Study Using Travel-to-Work Data* which used commuting data to define functional labour market areas.

Figure 9 shows the boundaries of the areas that Papps and Newell (2002) arrived at. The areas are relatively small – smaller than TAs, for example. If the research were reproduced today, the intervening population growth and development of roading and public transport infrastructure may result in functional labour market areas being larger than those defined by Papps and Newell (2002).

Figure 9: functional labour market areas,



Source: Papps, K & Newell, J (2002)

Criteria for considering regional boundaries

The purpose of the RDF is to differentiate regions based on a set of quantitative indicators. Therefore, the main criterion under which the different regional boundaries have been considered is availability of data.

Functionality of labour market dynamics is considered a secondary criterion because of its importance in accurately comparing a region’s labour supply and labour demand. The ability of the RDF to inform an integrated regional response from the welfare and education/training systems is also taken into account.

Availability of data

The *Indicators* section outlines the various indicators used in the RDF and the data sources they are drawn from. The sources are:

- StatsNZ population estimates
- StatsNZ HLFS
- MoE school leaver data
- TEC tertiary education enrolment and completions data
- Ministry of Business Innovation and Employment (MBIE) Jobs Online series, and
- Infometrics' Job Openings series.

The following table summarises which regional labour market datasets are available for each of the regional boundary types. The greatest range of regional labour market data is available for HLFS regions.

Table 1:

Regional labour market data availability by region type

Data source	Series	Boundary types					
		Regional Councils	HLFS regions	TAs	WINZ regions	MoE Areas	FLMAs
StatsNZ	Population	Yes	Yes	Yes	No	No	No
StatsNZ	HLFS	No	Yes	No	No	No	No
MoE	School leavers	Yes	Yes	No	No	Yes	No
TEC	Tertiary education	Yes	Yes	No	No	No	No
MBIE	Jobs online	Yes	Yes*	No	No	No	No
Infometrics	Job openings	Yes	Yes	Yes	Yes	Yes	No

**Some regions are aggregated: Taranaki and Manawatu-Wanganui; Otago and Southland*

Functionality of labour market areas

This criterion refers to the need to specify regions that are relatively self-contained in terms of their labour demand and supply. Functional labour market areas would, by definition, be the most appropriate regional boundaries to use in this respect. However, no recent research exists into what these functional labour market boundaries look like in New Zealand today and how they compare in size and location with the other boundary types. It is therefore difficult to judge the suitability of the other boundary types under this criterion.

Intuitively, it can be argued that many of the regions within the HLFS, WINZ and MoE boundary types exhibit characteristics of functional labour market areas. In most cases each region is dominated by a main population centre from which most of the region's labour demand originates. This centre is also surrounded by a catchment area, within the same regional boundary, from which most labour supply originates. Good examples are Taranaki (New Plymouth), Manawatu-Wanganui (Palmerston North), Wellington (Wellington City), Canterbury (Christchurch), Otago (Dunedin) and Southland (Invercargill).

There are exceptions. The Auckland catchment may extend beyond Auckland region. Rotorua and Taupo in the central North Island may have labour supply catchments that extend across regional boundaries, and regions such as Otago have centres of high

labour demand outside the main centre (Queenstown). To account for this in policy determination, TA-level data could be analysed outside of the RDF.

Ability to inform an integrated regional response from the welfare and education/training systems

The RDF results will influence decisions about whether, and how, the welfare systems and the education/training systems respond when there is an excess of labour demand over supply. Any responses would be optimised if the regions used in the RDF align with the service networks of agencies tasked with making a response.

As noted in the *Regional classification types sub-section*, WINZ is divided into a network of 11 regions for the purposes of administering service delivery (see Figure 7) and MoE maintains a regional network of 10 offices that provide services to communities (see Figure 8). No single regional boundary classification aligns perfectly with the administrative boundaries used by WINZ and MoE, therefore no boundary classification is more appropriate than any other. Regional delivery in the tertiary education sector is influenced in part by the location of New Zealand's institutes of technology and polytechnics (ITPs). Figure 10 shows their location⁹ which could arguably align with HLFS regions, WINZ Regions or MoE Areas.

Figure 10: location of New Zealand's institutes of technology and polytechnics



Source: TEC <https://www.tec.govt.nz/assets/Publications-and-others/e69feb473a/ITP-Roadmap-Regional-Delivery-infosheet.pdf>

⁹ At the time of writing this report, the Government is carrying out a public consultation of its proposals reform to Vocational Education which may have implications for the regional provision of tertiary education.

Indicators

This section outlines our advice on whether the indicators proposed in the consultation document represent the best way to characterise and distinguish between different regional labour markets.

There follows a list of the indicators proposed in the consultation document that we think should be included in the RDF, those that we think should be excluded, and indicators not proposed in the consultation document that we think should be included. The list includes the rationale underpinning the decision to include or exclude. Our advice has been developed in close consultation with staff at MBIE.

Included indicators

Indicator: the working age population (15 years+) as a percentage of the total population (WAP%)

Source: StatsNZ subnational population estimates

Rationale: measures the size of the working age population from which its labour pool is drawn.

Indicator: the employment rate (ER%)

Source: StatsNZ HLFS

Rationale: measures the extent to which the working-age population is being utilised in the job market.

Indicator: the under-utilisation rate (UUR%)

Source: StatsNZ HLFS

Rationale: broadly measures the extent to which the extended labour force is under-utilised in the job market.

Indicator: the unemployment rate (UR%)

Source: StatsNZ HLFS

Rationale: measures the extent to which the labour force is under-utilised in the job market.

Indicator: Māori labour force participation rate (MLFPR%)

Source: StatsNZ HLFS

Rationale: measures the size of the Māori labour pool that is either working, or available for work and seeking work.

Indicator: Māori employment rate (MER%)

Source: StatsNZ HLFS

Rationale: measures the extent to which the Māori working-age population is being utilised in the job market.

Indicator: the number of school leavers with NCEA attainment below university entrance who, at the end of the year they leave school are either not participating in tertiary education or are participating in tertiary education at NQF levels 1 and 3, expressed as a percentage of all people in the labour force (SL%)

Source: Ministry of Education

Rationale: is a lead indicator of the flow of school leavers into lower skilled work.

Indicator: tertiary education enrolments at NZQA levels 1 to 4 as a percentage of the labour force (EN%)

Source: Tertiary Education Commission

Rationale: is a lead indicator of the flow of tertiary education graduates into lower skilled work. Industry training enrolments are not included in this indicator because, as industry trainees, these people are already in employment.

Indicator: tertiary education completions at NZQA levels 1 to 4 as a percentage of the labour force (EN%)

Source: Tertiary Education Commission

Rationale: is an indicator of the flow of tertiary education graduates into lower skilled work. Industry training completions are not included in this indicator because, as industry trainees, these people are already in employment.

Indicator: vacancies (V)

Source: MBIE Jobs Online

Rationale: measures the extent of labour demand that has not been matched with labour supply.

Included indicators not in the consultation document

Indicator: the labour force participation rate (LFPR%)

Source: StatsNZ HLFS

Rationale: measures the size of the labour pool that is either working, or available for work and seeking work.

Indicator: job openings at Australia and New Zealand Standard Classification of Occupations (ANZSCO) skill levels 4 and 5 as a percentage of total employment (JO%)

Source: Infometrics

Rationale: is the most comprehensive indicator of labour demand.

Indicator: young people not in employment education or training rate (NEET%)

Source: StatsNZ HLFS

Rationale: measures the extent to which young people are not being utilised in the job market or are not gaining new knowledge and skills.

Excluded indicators

Indicator: employment

Source: StatsNZ HLFS

Rationale: is only a partial measure of labour demand because it excludes demand originating from existing workers leaving the workforce.

Indicator: Work and Income benefit recipients with work obligations as a percentage of the working-age population

Source: Ministry of Social Development (MSD)

Rationale: data is currently unavailable for the regions used in the RDF (may be available for later iterations of the framework).

Indicators: employment rate, labour force participation rate, unemployment rate, under-utilisation rate of Pacific People

Source: StatsNZ HLFS

Rationale: standard errors associated with small populations such as those for Pacific Peoples and other ethnicities are relatively large. This makes them unsuitable for use in the RDF because the credibility of the framework is dependent on regional characteristics being measured to a high degree of precision.

Indicators: unemployment rate of Māori

Source: StatsNZ HLFS

Rationale: standard errors associated with small populations such as those for unemployed Māori are relatively large. This makes them unsuitable for use in the RDF because the credibility of the framework is dependent on regional characteristics being measured to a high degree of precision.

Indicators: under-utilisation rate of Māori

Source: StatsNZ HLFS

Rationale: this data is currently not released.

Indicators: employment rate, labour force participation rate, unemployment rate, under-utilisation rate of youth

Rationale: subnational HLFS estimates by age group are currently not released by StatsNZ for regions other than Auckland, Wellington and Canterbury. Estimates for regions with smaller populations by age group are subject to large sample errors. This makes them unsuitable for use in the RDF because the credibility of the framework is dependent on regional characteristics being measured to a high degree of precision. In addition, the utilisation of young people is accounted for in the framework through the inclusion of NEET rates.

Indicators: employment rate, labour force participation rate, unemployment rate, under-utilisation by gender

Rationale: analysis of the extent of any gender bias in the indicators included in the RDF was out of scope.

Indicators: working age population, employment rate, labour force participation rate, unemployment rate, under-utilisation rate by disability status

Rationale: data is only available from the New Zealand Census of Population and Dwellings, which does not occur frequently enough to be of use in the RDF.

Indicators: wage levels and labour costs

Rationale: The Labour Cost Index (LCI) is the best measure of wage inflation in New Zealand because it adjusts for changes in the types of jobs included in the sample, however the LCI is not available on a regional basis.

The Quarterly Employment Survey (QEM) and measures of earnings from the Linked Employee Employer Dataset (LEED) are available on a regional basis, but do not adjust for changes in the types of jobs included in the measure. As a result, observed growth in earnings could be the result of wage inflation or an increase in the number of higher paid jobs relative to lower paid jobs. The QEM and LEED are therefore inappropriate for use in the RDF because the credibility of the framework is dependent on regional characteristics being measured to a high degree of precision.

Indicator: Net migration and number of people granted Essential Skills work visas as a percentage of employment

Rationale: while relevant to an understanding of a region's dependence on migrant labour, immigration indicators do not reflect the extent to which the existing workforce is being utilised in the job market and is therefore out of the scope of the RDF.

Indicator: age distribution within key occupations

Rationale: the age structure of people in employment is a proxy for the rate at which the workforce will retire. Retirements are accounted for in the framework by the inclusion of replacement job openings, which estimate the number of job openings resulting from, amongst other things, retirements.

Indicator: economic growth

Rationale: economic growth could be a proxy for demand pressures, but these are better captured in the framework by job openings.

Indicators: infrastructure constraints and investment in infrastructure

Rationale: Consultation with MBIE clarified that the intent of these indicators was to measure a region's capacity to accommodate further economic, employment and population growth. Determining this would be a complex analytical exercise not suited to accommodation in the RDF. Also, the RDF is a labour market framework. Inclusion of non-labour market variables relating to infrastructure capacity would render the overall results difficult to interpret.

Indicators: industry training enrolments and completions

Rationale: Industry training enrolments and completions are not appropriate indicators of the supply of people into lower-skilled jobs because, as industry trainees, these people are already in employment.

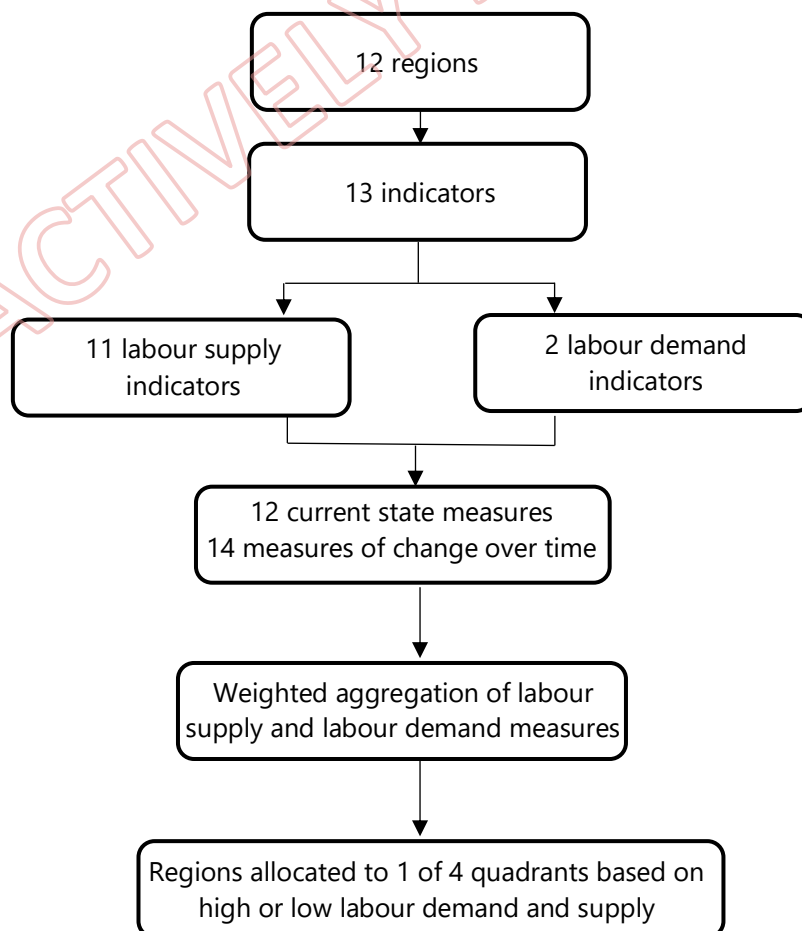
Framework

This section outlines our advice on how the indicators detailed in the *Indicators* section should be applied to the 12 HLFS regions described in the *Regions* section in order to characterise each region as having either high or low labour demand and high or low labour supply.

Overview

The RDF structure is summarised in Figure 11. Earlier sections have explained how we arrived at the 12 regions and 13 indicators. This section looks at how we measure the current state of regional labour markets and how regional labour markets change over time, as well as how we aggregate the results.

Figure 11: Regional Differentiation Framework structure



Measuring rates rather than volumes

For indicators such as the working-age population, labour force, employment, unemployment, under-utilisation, NEET, tertiary education enrolments and completions, school leavers, and job openings it is more appropriate to calculate them as a proportion of a broader population rather than as volumes.

Our reasoning is as follows:

- A comparison of absolute volumes across regions does not account for differences in the size of regional populations and economies.
- Calculating year-to-year percentage changes in volumes in smaller groups such as the unemployed and under-utilised can produce results which are large and volatile over time, this could introduce volatility in the overall RDF results which could undermine its credibility.
- Volatility is less of an issue for larger groups such as the employed and the labour force. However, consistency in the way indicators are treated will make the framework clearer and easier to explain.
- Calculating long-term average volumes does not account for changes in the size of the overall population over time. For example, the number of people unemployed will, other things remaining equal, rise over time because the overall population grows over time.

Measuring the current state of regional labour markets

Immigration, welfare and education/training policies need to adapt to current regional job market conditions. Therefore, the RDF incorporates measures of the current state of regional labour demand and labour supply. This section explains the choices made to determine how the calculations are made.

Across all indicators, the current state of regional labour markets is measured relative to the long-term national average. The metric is as follows:

Current regional rate – long term national average rate

Interpreting the current state measure

For supply indicators such as the working age population, the labour force participation rate, school leavers and tertiary education enrolments/completion, if the regional rate is above the national average this results in a positive score and suggests that the size of the existing regional labour pool, or inflows into the labour pool are relatively large. IN other words, labour supply is high. A positive score therefore indicates high supply.

For supply indicators such as the unemployment rate, the under-utilisation rate and the NEET rate, if the current regional rate is higher than the long-term national average this results in a positive score and suggests that the existing regional workforce could be utilised more – labour supply is high. A positive score therefore indicates high supply.

If a region's employment rate is higher than the long-term national average, this results in a positive score and suggests the that the existing regional workforce is being highly

utilised – labour supply is low. This is dealt with in the RDF by changing the sign (positive or negative) of the employment rate results. For example, if a region's employment rate is higher than the long-term national average, the positive score is converted to a negative score.

For the job openings demand indicator, if the regional rate is above the national average this results in a positive score and suggests that labour demand is high. A positive score therefore indicates high demand.

Current state data time frames

To measure the current state of regional labour markets the latest available data was used for each indicator. For data that is produced quarterly, annual averages were used to avoid seasonality in the results. Table 2 shows the timeframe used for each indicator to measure the current labour demand and supply in regional job markets in the initial version of the RDF produced in May 2019.

Table 2

Time frames used to measure current state in the May 2019 RDF

Indicator	Time frame
Working age population	At 30 June 2018
Labour force participation rate	12 months to December 2018
Employment rate	12 months to December 2018
Unemployment rate	12 months to December 2018
Under-utilisation rate	12 months to December 2018
NEET rate	12 months to December 2018
School leavers	12 months to March 2018
Enrolments	12 months to December 2018
Completions	12 months to December 2018
Job openings	12 months to March 2018

The Jobs Online data series is expressed as an index. Consequently, it is not possible to measure the current stock of vacancies in regions.

Benchmarking current state regional labour market performance

Regional indicators are benchmarked against that indicator's long-term national average. Long-term is defined as 15 years because this time period includes a range of economic conditions and most indicators have time series data stretching back this far.

The four-quadrant diagram shown in Figure 2 is explicit about the RDF needing to measure regions' labour demand and supply as either high or low. Each indicator, therefore, needs a benchmark against which each region is compared to determine whether that region is currently experiencing high or low demand and high or low supply. Several options were considered:

- The long-term national or regional median
- the current national rate,
- the long-term regional average, and

- the long-term national average.

Why the long-term average was chosen

The long-term average was chosen because it incorporates values across a range of economic conditions making it a reasonable point at which to differentiate 'high' and 'low' values for any given indicator. The long-term median could also have been used. However, there is a stronger precedent for using the long-term average because the long-term average annual economic growth rate generally considered to be the best measure of an economy's underlying growth trend.

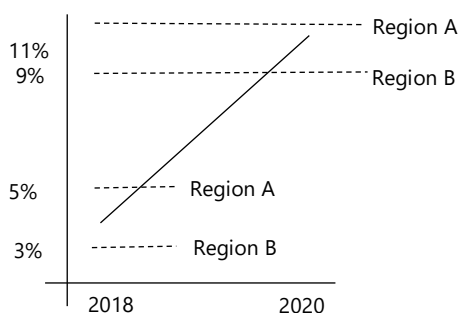
Why the current national rate was not chosen

Benchmarking a region against the current national rate could create problems in the future because the current national rate changes over time. The conceptual example shown in Figure 12 demonstrates this.

Let's assume, for simplicity, that the supply side of the RDF only included one indicator: the unemployment rate. Furthermore, let's say that in 2018, the national unemployment rate was 4%, region A's unemployment rate was 5%, and region B's was 3%. The labour market test for employers in region A might be tightened because its unemployment rate is above the national average, which suggests that employers in region A are not utilising their existing workforce as much as employers in other regions. The labour market test for employers in region B might be loosened because its unemployment rate suggests that employers in region B are utilising their existing workforce to a greater extent than employers in other regions.

In the future, say 2020, the national unemployment rate might have risen. Let's say it rises to 10% and region A's unemployment rate is 11% (above the national rate) and region B's is at 9% (below the national rate). Should region B's labour market test remain looser than region A's? Employers in region B could argue that they are still utilising their existing workforce to a greater extent than employers in other regions. Employers in region A could argue that region B's unemployment rate is now higher than region A's was in 2018, and that back then, region A's labour market test was tightened. Having a benchmark that changes very little over time avoids any such controversy.

Figure 12: example of benchmarking regions against the current national average

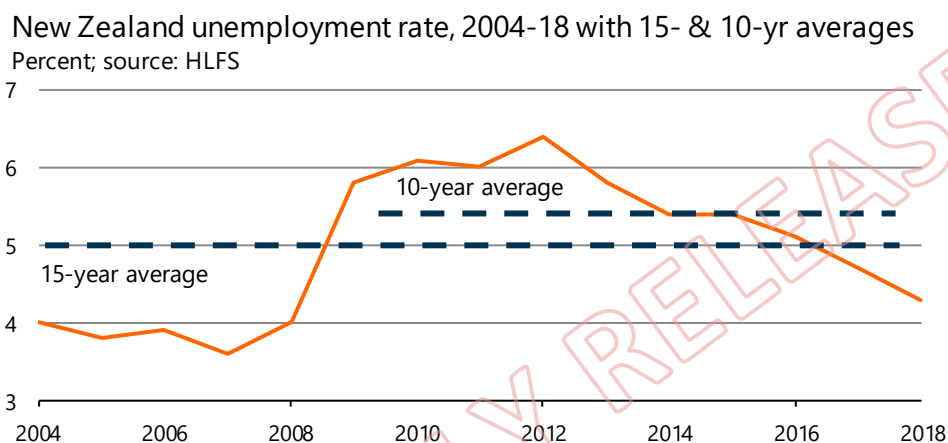


Why the long-term was defined as 15 years

Figure 13 demonstrates the importance of measuring growth rates over a long period of time. In the past 15 years, the national unemployment rate has been as low as 3.6% and

as high as 6.4%, averaging out at 5.0%. This is because the 15-year average includes the low unemployment rates experienced during the strong economic growth that preceded the Global Financial Crisis (GFC). The 10-year average is higher at 5.5% because it is influenced more by the higher unemployment rates that prevailed for much of the post-GFC period. The longer the time frame that the long-term average incorporates, the less influence any given year, or event, has on that average.

Figure 13



The choice of 15 years was also made for pragmatic reasons because this was the timeframe for which most indicators, particularly the core indicators of under-utilisation and job openings, had time series data available.

Table 3

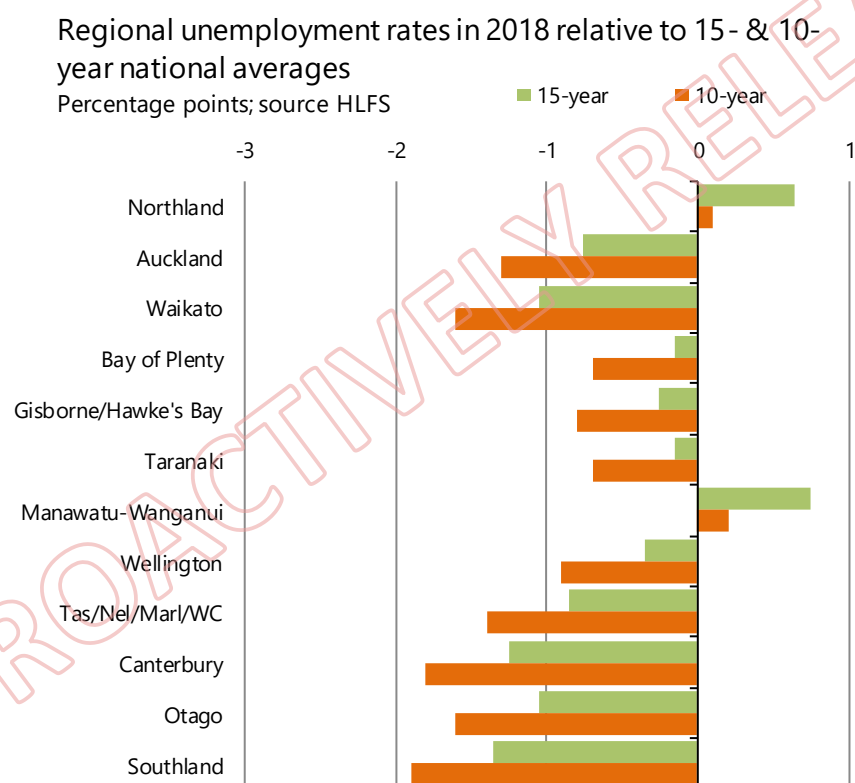
Time series data availability

Indicator	Timeframe
Working age population	2006-18 (13 years)
Labour force participation rate	1986-2018 (33 years)
Employment rate	1986-2018 (33 years)
Unemployment rate	1986-2018 (33 years)
Under-utilisation rate	2004-18 (15 years)
NEET rate	2004-18 (15 years)
School leavers	2009-17 (9 years)
Enrolments	2008-17 (10 years)
Completions	2008-17 (10 years)
Job openings	2001-17 (17 years)
Vacancies	2011-18 (8 years)

The choice of timeframe for the long-term national average matters because it influences the RDF results. Figure 14 demonstrates this by taking each region's unemployment rate in 2018 and subtracting the 15-year national average and the 10-year national average.

Regions that are above the 15-year national average (Northland and Manawatu-Whanganui) are also above the 10-year average, and regions that are below the 15-year national average are also below the 10-year average. However, the 10-year average is higher than the 15-year average which means the magnitude of the differences differ depending on which long-term average is used. So, for unemployment rates, the choice of timeframe for the long-term average changes the magnitude but not the direction (positive or negative) of the 2018 results. For indicators whose 10- and 15-year averages are more disparate, it is possible that the choice of timeframe would also impact on the direction (positive or negative) of results. In either case, it could ultimately lead to differences in a region's characterisation as having high or low demand and supply, depending on the time frame for the long-term average.

Figure 14



Why the national average was preferred over the regional average

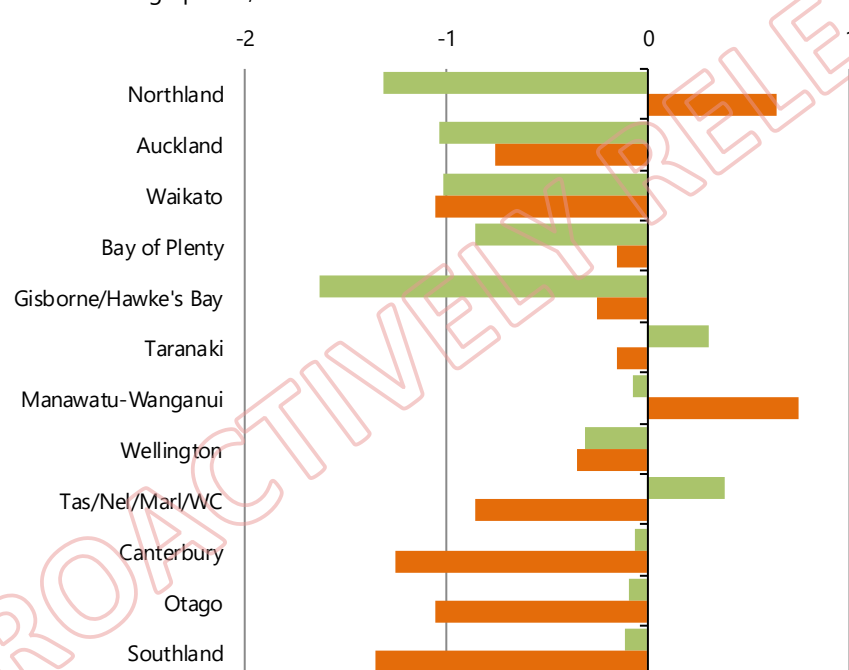
Benchmarking against the long-term national average rather than the long-term regional average means each region's performance is compared to other regions rather than to its own past performance. This provides a sharper delineation of regions.

One could argue that comparing a region with its own past performance takes into account regions' unique structural characteristics that relate to their population, geography, economy and labour market which result in different regional labour market performance over time. However, the purpose of the RDF is to inform an integrated response from the immigration, welfare and education/training systems that will (amongst other things) address region's structural issues. Therefore, a benchmark that emphasises these differences rather than accounting for them, is more appropriate.

This choice of regional or national average is important because, as Figure 15 shows for the unemployment rate, it can affect the magnitude and sometimes the direction of the results. For example, Northland’s current unemployment rate is low compared with Northland’s own long-term regional average unemployment rate: (current rate – long term regional average = -1.3) but high compared with the long-term national average: (current rate – long term national average = 0.6). The choice of national over regional averages could therefore lead to differences in a region’s characterisation as having high or low demand and supply.

Figure 15:

Regional unemployment rates in 2018 relative to 15-year national and regional averages
 Percentage points; source HLFS



Measuring change in regional labour markets over time

The consultation document (Figure 7 on p.32 of the consultation document) proposes that measures should include the direction of change over the last three years. A region might currently have a labour supply that is currently under-utilised, which would

Across all indicators, change is measured as the average annual percentage point change over the past 3 years. The metric is as follows:

$$\frac{\text{Current rate} - \text{rate 3 years ago}}{3}$$

For the job openings indicator, projected change is also measured over the next 3 years. The metric is as follows:

$$\frac{\text{Current rate} - \text{rate 3 years from current year}}{3}$$

suggest the labour market test should be tightened. But if the extent of that under-utilisation has fallen in recent years, this should also be taken into account.

Interpreting the change over time measure

For supply indicators, such as the working age population, the labour force participation rate, school leavers and tertiary education enrolments/completions, if the regional rate has been increasing over time, this suggests that the size of the existing regional labour pool, or inflows into that pool, have been getting bigger. A positive score is therefore associated with high labour supply.

For supply indicators such as the unemployment rate, the under-utilisation rate and the NEET rate, if the regional rate has been rising over time, this suggests that the existing regional workforce is being utilised less. A positive score is therefore associated with high labour supply.

If a region's employment rate has been rising, this suggests that the existing regional workforce is being utilised more – labour supply is low. This is dealt with in the RDF by changing the sign (positive to negative or vice versa) of employment rate results.

For the job openings and vacancies demand indicators, if the regional rate has been rising this suggests that labour demand is increasing. A positive score is therefore associated with high labour demand.

The rationale for how change is measured

We agree with the proposal in the consultation document that change should be measured between two points in time, three years apart. The time period is sufficient to capture recent, but meaningful, trends. Measuring all indicators in the same way over the same time period is clear and easy to understand. Benchmarking recent change against long-term average rates of change would add unnecessary complexity to the framework.

The consultation document proposed that change should be measured over three years. Although there are no hard and fast rules to guide this decision, three years balances the importance of measuring recent trends with the need to measure change over a time period long enough to register a meaningful trend, rather than year-to-year volatility in job market dynamics.

Measuring change between two points in time, three years apart was preferred to measuring the annual average over a three-year period relative to the current year.

(Average of: rate 2 years ago, rate 1 year ago, current rate) – current rate

The advantage of comparing two points in time over annual averages is that it is a more sensitive measure of change.

Different measures could have been dealt with differently. Broader measures of labour supply, such as the working-age population and labour force tend to change more slowly than narrower measures such as the under-utilisation rate and the unemployment rate. One option, therefore, was to measure change in these broader measures over a

longer time period. However, this option was rejected in favour of consistency. Measuring change consistently across indicators has the advantage of producing a framework that is clearer and easier to explain.

Recent change could have been benchmarked against long-term average change. This would have captured how fast or slow recent change has been relative to the long-term underlying trend. Benchmarking change would have been consistent with the way current state measures were benchmarked against the long-term average. The current state metrics need to be benchmarked in order to determine whether they were 'high' or 'low'. Measures of change, on the other hand, only need to capture whether an indicator has increased or decreased in the recent past, not how fast or slow this change was. Therefore, benchmarking change would add unnecessary complexity to the framework.

Vacancies

Change in the number of vacancies was dealt with differently in the framework. The Jobs Online data series is expressed as an index. Consequently, it is not possible to measure the vacancy rate (vacancies expressed as a percentage of employment). Instead, changes in the number of vacancies was measured as the annual average percentage change. The metric is as follows:

$$\left(\frac{\text{Current vacancy index}}{\text{vacancy index 3 years ago}} - 1 \right) \div 3$$

Aggregating results

A weighted aggregation was the preferred method of aggregating each region's results because it is relatively easy to understand, reflects the fact that some supply indicators are closer measures of workforce utilisation than others, and allows for the greater delineation of regions than other methods.

A number of considerations went into choosing the aggregation method. Most importantly, any aggregation method needs to retain regional variations across each indicator. For example, if one region's unemployment rate is double that of another region's then this differentiation should be maintained in the aggregation.

The aggregation method should also reflect the fact that some indicators measure more closely than others what the RDF is trying to capture and should therefore receive a greater weighting. See the *Conceptual underpinnings* section for further explanation.

Another consideration is that, for both labour demand and labour supply indicators, there should be a natural delineation between 'high' and 'low' scores. This has been taken care of in how the indicators are calculated.

- For current-state labour demand and labour supply indicators, regions that are above the long-term average will receive a 'high' (positive) score and those that are below the long-term national average will receive a 'low' (negative) score.

- For change in labour supply and labour demand indicators, regions that have experienced an increase will receive a 'high' (positive) score and those that have experienced a decline will receive a 'low' (negative) score.

It is important that these delineations are not changed when the results are aggregated.

Rationale for using a weighted aggregation

A weighted aggregation method was preferred because it maintains the greatest sensitivity to regional variation across each indicator and includes a clear weighting of indicators that are based on the framework's conceptual underpinnings.

A disadvantage of this option is that weight have been chosen manually. While the weights are based on conceptual underpinnings, an element of subjectivity is unavoidable, leaving this method open to criticism.

Another drawback of the weighted aggregation approach is that even with indicators being weighted, some have a greater impact on the final results than others. For example, a region that is producing a large number of tertiary education completions relative to the national average would gain a high score for this indicator which might dwarf scores for other indicators, despite tertiary education completions having a lower weight.

How the weighted aggregation method works

The weighted aggregation is a three-step process:

1. Prioritise each indicator in the framework.
2. Weight each indicator based on its priority.
3. Aggregate the weighted indicators for each region.

Table 4 shows how the different indicators have been prioritised. A high number denotes a higher prioritisation.

Table 4

Measure prioritisation

Indicator	Current	Past change	Projected change
Working age population	3	2	
Labour force participation rate	3	2	
Māori labour force participation rate	3	2	
Employment rate	3	2	
Māori employment rate	3	2	
Unemployment rate	3	2	
Under-utilisation rate	4	3	
NEET rate	3	2	
School leavers	2	1	
Enrolments	2	1	
Completions	2	1	
Job openings	4	3	1
Vacancies		3	

The rationale for the prioritisations is based partly on the conceptual underpinnings of the framework and partly on consideration of the policies the framework informs. The prioritisation rationale can be summarised as follows:

- The under-utilisation rate, job openings and vacancies are at the core of the model's purpose and therefore get the highest priority.
- The working-age population, labour force participation rate, employment rate, unemployment rate and NEET rate are secondary supply indicators and therefore get a lower prioritisation than the under-utilisation rate.
- Tertiary education enrolments/completions and school leavers are part of the supply pipeline and therefore get a lower prioritisation than actual measures of supply.
- Māori labour force participation rate and employment rate indicators as given the same weight as that given to the labour force participation rate and employment rate of the whole population.
- Current measures all get a higher priority than past changes over time because current labour market status is of greater importance to policy than the recent past.
- Measures of projected change get a lower prioritisation than past change because projections of change are unlikely to be totally accurate.

The prioritisation scores sum to 62. The weightings for each measure are calculated by taking each measure's score as a percentage of the total. Table 5 shows the results.

Table 5

Measure weights			
Indicator	Current	Past change	Projected change
Working age population	4.8%	3.2%	
Labour force participation rate	4.8%	3.2%	
Māori labour force participation rate	4.8%	3.2%	
Employment rate	4.8%	3.2%	
Māori employment rate	4.8%	3.2%	
Unemployment rate	4.8%	3.2%	
Under-utilisation rate	6.5%	4.8%	
NEET rate	4.8%	3.2%	
School leavers	3.2%	1.6%	
Enrolments	3.2%	1.6%	
Completions	3.2%	1.6%	
Job openings	6.5%	4.8%	1.6%
Vacancies		4.8%	

The final step is to multiply these weights by the score for each region. Here's an example:

- In 2018, Northland's unemployment rate was 5.6% and the long-term (15 year) national average unemployment rate was 5.0%.
- Northland's 2018 rate was 0.6 percentage points above the long-term national average.
- Multiply 0.6 by the current unemployment rate weight of 4.8% (see Table 5) and you get 0.03.
- Repeat this process for Northland across all the measures and sum the results.
- Repeat across all regions and compare the results.

Results using the weighted aggregation method can be found in the *Results* section.

Alternatives considered

Simple addition

This method is similar to the *weighted aggregation* method except that the indicators are not weighted prior to being aggregated. The *Sensitivity analysis* section outlines the results using the simple addition method.

The simple addition method has the advantage of being simple to execute and avoids any controversy relating to how indicators are weighted. However, the simple aggregation approach is not the preferred method because it does not take into account the conceptual underpinnings of the framework, which establishes that some indicators measure labour supply more closely than others and should therefore have a greater influence on the overall results.

The results shown in the *Sensitivity analysis* section show that for the past four calendar years, there has been no difference in the regional allocations produced by the weighted aggregation approach and the simple addition method. However, running the RDF quarterly from 2015 to 2018 showed that differences can emerge when a region's overall supply or demand score is close to zero. In these instances, a small change in the overall score can change a region's characterisation from 'high' and 'low' (and vice versa). The *Sensitivity analysis* section shows these quarterly results. The *Operating the framework* section explains how the RDF was run quarterly.

Bands

This method involves creating bands for each indicator and scoring each region according to where they place within the bands. For the current state measures this can be done by comparing the current regional rate for each indicator with the standard deviation¹⁰ around the long-term national average rate.

This is best explained with an example. Northland's unemployment rate in 2018 was 5.6%. The long-term national average unemployment rate was 5.0% and the standard deviation of the long-term national average unemployment rate was 1 percentage point. Each region is banded according to how many standard deviations they are away from the national average (see Table 6).

Table 6

Banding example: national unemployment rate

Band	Band score
Greater than 6.5%	2
Between 5.5% and 6.5%	1
Between 4.5% and 5.5%	0
Between 4.5% and 3.5%	-1
Less than 3.5%	-2

For measures of change over time there is no long-term average to benchmark the results for each region. Instead, for each measure, the bands were based on the highest positive and lowest negative values. This is best explained with an example.

For changes in the unemployment rate the highest maximum value was 0.33 percentage points and the lowest negative value was -0.67. The bands for were set as the midpoint between zero and 0.33, and the midpoint between zero and -0.67.

¹⁰ For a definition of standard deviation and how it is calculated go to: <https://www.investopedia.com/terms/s/standarddeviation.asp>

Table 7

Banding example: change in the unemployment rate

Band	Band score
Between 0.17 and 0.33	-2
Between 0 and 0.17	1
Zero	0
Between 0 and -0.33	-1
Between -0.33 and -0.67	-2

The fact that the midpoint between the two negative bands (-0.33) is the same value as the top of the highest positive (0.33) band is a coincidence but it does serve to demonstrate that the bands are of different widths. This is necessary because, zero must be the key point of delineation. For measures of change, increases must receive a positive score and decreases must receive a negative score. If the point of delineation had instead been the midpoint between 0.33 and -0.67 (-0.17) then some regions whose unemployment rate had fallen in recent years would receive a positive score.

The banding method was not the preferred method of aggregation for the following reasons:

- It blunts the RDF's sensitivity to regional differentiation because it takes a group of regional scores, places them into a band, and gives them all the same score.
- The delineation of bands for measures of change over time is essentially subjective and therefore open to criticism.
- For measures of change over time it is essentially taking regional scores and adding another layer of scoring on top.

Table 8 in the *Sensitivity analysis* section compares the 2018 results of the banding method described above with the weighted aggregation method. Table 16 in the appendix compares results of the banding method and the weighted aggregation method for the years 2015 to 2018.

- The results demonstrate that using bands increased the likelihood that regions' overall scores sum to zero. An overall score of zero for either labour demand or labour supply means the region cannot be allocated to a quadrant. The bands and scores can be refined to lessen the chance of this happening, but the more refined the method, the closer it gets to using the actual scores generated by the framework.

Analysing results

The purpose of the framework is to utilise several measures of labour supply and labour demand in a way that determines whether a region's labour demand and labour supply are high or low.

Three options were considered:

- Panel approach – regions are allocated to a quadrant based on an analysis of each individual measure.

- Aggregation approach – regions are allocated to a quadrant based on two scores produced by aggregating demand indicators and supply indicators.
- Hybrid approach – regions are allocated to a quadrant based on two scores produced by aggregating demand indicators and supply indicators, but the allocation may be amended based on an analysis of individual indicators.

A hybrid approach is preferred because it allows the best of both worlds. It uses the aggregated scores to give regions a default allocation, but the analyst is then able to exercise judgement and advise on any allocations that should be amended based on observation of final scores, how these scores have changed over time and how each indicator has contributed to the final score.

With the RDF comprising some 24 different measures across 12 indicators, it would be difficult to reach any firm conclusion using the panel approach. One might consider developing a set of rules to govern a panel approach, such as: if a majority of supply indicators are shown to be high, then a region is designated as having high supply. However, a rule-based analysis is what the aggregation approach is designed to do.

The aggregation approach removes any judgement from the analysis. It is simpler and more objective but may also be perceived as mechanistic and dogmatic.

Results

This section outlines the results of how the RDF currently applies to the 12 regions and how the regions are characterised as having high or low labour demand and high or low labour supply.

Results

Following the weighted aggregation method outlined in the *Framework* section and using data up to December 2018, yields the results shown in Figure 16. Northland, Gisborne/Hawke's Bay and Manawatu-Wanganui are characterised as having high demand and high supply. This indicates that, while jobs are plentiful, the existing workforce is not being utilised as much as it could be. The remaining regions are characterised as having high demand and low supply.

Figure 16

Regional Differentiation Framework results, 2018

	High Demand	Low Demand
High Supply	Northland Gisborne/Hawke's Bay Manawatu-Wanganui	
Low Supply	Auckland T/N/M/W* Waikato Canterbury Bay of Plenty Otago Taranaki Southland Wellington	

*Tasman/Nelson/Marlborough/West Coast

Policy recommendations

The policy recommendations take into account the 2018 results shown in Figure 16 as well as the results across previous years from 2015 to 2018 shown in the appendix in Table 12.

For Northland and Manawātū-Wanganui we recommend that immigration settings be tightened. The rationale for this recommendation is as follows.

- Northland's labour supply has been high for several years

- Manawatū-Wanganui has the highest labour supply score of any region and has shown no sign of falling in recent years; the region's demand score not as high as most other North Island regions.

For Auckland, Waikato, Canterbury, Otago and Southland we recommend that immigration settings be loosened. The rationale for this recommendation is as follows.

- Auckland is firmly in the low labour supply quadrant (indicated by a large negative score), has been in low supply for several years, and is currently on a falling supply trajectory (indicated by most measures of change in supply being negative)
- Waikato is firmly in the low labour supply quadrant (indicated by a large negative score) and has been on a falling supply trajectory for the past two years (indicated by comparing 2016-18 results)
- Canterbury labour supply has been low for several years
- Otago labour supply has been low for several years and demand is currently the highest of any region.
- Southland currently the lowest labour supply of any region resulting from a strong trajectory for falling supply in recent years

For Bay of Plenty, Gisborne/Hawke's Bay, Taranaki, Wellington and Tasman/Nelson/Marlborough/West Coast, the RDF results are less clear-cut because either they have fluctuated between quadrants in recent years or are at high risk of fluctuating between quadrants in the near future. In these cases, our recommendation is that govt agencies consider and advise Ministers on what the appropriate policy responses should be on a case-by-case basis. The rationale for this recommendation is as follows.

- Bay of Plenty has been on a falling labour supply trajectory but is currently in low supply by only a small margin (indicated by a small negative result) because current supply indicators are a mix of high and low scores
- Gisborne/Hawke's Bay is currently in high labour supply by a small margin (indicated by a small positive result) and is currently on a falling supply trajectory
- Taranaki is currently in low labour supply and high demand by a small margin (indicated by a small negative supply result and a small positive demand result), supply and demand indicators currently show mixed score and their trajectory is unclear
- Wellington has been on a falling labour supply trajectory in recent years and is currently in low supply and high demand by a small margin (indicated by a small negative supply result and a small positive demand result)
- Tasman/Nelson/Marlborough/West Coast is currently in low supply by only a small margin (indicated by a small negative score) and has been on an increasing supply trajectory recently

Main centres

Consideration was also given to whether the RDF results suggest policy responses for the main centres of Auckland, Hamilton City, the Wellington urban area¹¹ and Christchurch City should be different to the wider regions in which they sit.

Analysis was performed on a limited set of indicators for which TA and Auckland Community Ward data exists, namely: the working age population, and job openings. Unemployment rate data is also available for TAs but not Auckland Community Wards. The analysis looked at whether the results from the main centres differed to the wider regions to the extent that they would be placed in different quadrants.

The analysis found that the main centres would not be placed in different quadrants to their broader regions because, based on the limited data available, their labour supply and labour demand results were broadly similar.

Explaining the overall results

On the demand side, the overall results are explained by the fact that, for several years now, New Zealand has been enjoying strong economic growth that is translating into plentiful job openings across every region. Consequently, the measure of current regional demand relative to the national long-term average is making a greater contribution to the overall demand score, than the measures of recent change in demand.

Labour supply is a little more complex because there are many more indicators of supply than demand in the RDF and, for the most part, no clear patterns emerge in terms of which supply measures contribute most to overall supply scores. Table 12 in the Appendix shows the scores for each individual measure that contributed to the final results. Measures that score above 0.05 and below 0.05 have been highlighted in green and red respectively.

- More measures of current supply are highlighted than measures of recent change in supply, which suggests that measures of current supply are having a greater impact on the overall result.
- Across most regions, the current Māori employment rate has bigger negative scores than other indicators. Two conclusions can be drawn from this. Firstly, in most regions the Māori employment rate is currently higher than the long-term national average. Secondly, for several regions, the Māori employment rate measure is contributing more to the overall supply score than other supply measures.
- Across most regions, the current Māori labour force participation rate has bigger positive scores than most other indicators. This means that in most regions the Māori labour force participation rate is currently higher than the long-term national average. Secondly, for several regions, the Māori labour force participation rate is contributing more to the overall supply score than other measures.

¹¹ Includes Wellington City, Porirua, Lower Hutt City, and Upper Hutt City

- In most regions, the big negative current Māori employment rate score is offset by the big positive current Māori labour force participation rate score.

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Sensitivity analysis

This section outlines how the characterisation of regions as having high or low labour demand and high or low labour supply changes when changes are made to the RDF methodology.

Overview

The sensitivity analysis examines the impacts of each of the following changes to the RDF methodology:

- the simple addition method is used to aggregate results,
- the weights used in the weighted aggregation method are changed,
- the banding methods are used to aggregate results, and
- the included indicators are narrowed down to just three or four core indicators.

The simple addition aggregation method

As already noted in the *Framework* section the weighted aggregation and simple addition methods produced the same regional allocations when the RDF was run on calendar year data from 2015 to 2018. However, differences in both supply and demand allocations did emerge when the RDF was run quarterly, particularly for Taranaki, Manawatū-Wanganui and Wellington and particularly from the March 2016 quarter to the September 2017 quarter (see Table 15 in the appendix).

In all the cases where the two methods produced different allocations, the actual scores were small (either positive or negative). For example, when the RDF was run for the March, June and September 2016 quarters, Taranaki's demand allocation was low under the weighted aggregation method and high under the simple addition method.

For each of those quarters, the actual demand score was -3 under the weighted aggregation method and 0.3 under the simple addition method. (The two numbers are not comparable because of the different methodology used to produce them.) The reason why the simple addition is positive in each quarter is mainly because a projected increase in low skilled labour demand (a positive score) offsets the fact that current labour demand was lower than the long-term average and had fallen in recent years (both negative scores). Under the weighted aggregation method, the projected increase in labour demand gets a lower weight than the measures of current demand and recent change in demand, so the projection measure does not offset the other two as much. This leaves the overall demand score negative.

This example serves to underline the conclusion drawn in the *Framework* section: that, while the preference for using weighted aggregation is grounded in the RDF's conceptual framework, and despite the weighting of scores having a relatively small impact on regional allocations, they can and do affect the allocations when the overall demand and supply results are close to zero.

Changing weights in the weighted aggregation method

The *How the weighted aggregation method works* sub-section of the *Framework* section explains the rationale behind the weights used in the weighted aggregation method. These weights have been adjusted to analyse the impact on the final regional allocations.

Changing the weights seems to have very little impact on the final demand and supply score, and therefore very little impact on regional allocations to high or low supply and demand. There are instances where regions that have very small (positive or negative) scores under the existing weights, have their regional allocations changed because the weights have been adjusted. But for the most part, the underlying measures, rather than the weights, drive results.

Increasing the weight on the core measures of supply and demand – the under-utilisation rate, job openings and vacancies – had relatively little impact. The priority score attached to current measures of these three indicators was raised from 4 to 6. This raised their weight from 6.5% to 8.3% while the weights given to most other measures of supply fell from 4.8% to 4.2%. As a result, only Taranaki's allocation for the 2018 calendar year changed from low supply to high supply.

Increasing the weight on the other measures of supply – working-age population rate, labour force participation rate, Māori labour force participation rate, employment rate, Māori employment rate, unemployment rate and NEET rate – to parity with the weight given to the under-utilisation rate, had no impact on the 2018 calendar year allocations.

Increasing the weight on measures of change in supply and demand in recent years to parity with the weights given to measures of current state also had very little impact on the 2018 calendar year allocations. Only the Gisborne/Hawke's Bay allocation changed from high supply to low.

Banding method

Table 8 below compares the RDF 2018 results under the weighted aggregation methodology and the banding methodology outlined in the *Framework* section. Table 16 in the appendix compares the results for the two aggregation methodologies for the years 2015 to 2018.

Cells shaded in grey in Table 8 indicate instances where the banding methodology produces regional allocations that differ to the weighted aggregation methodology. A 'zero' allocation indicates that the methodology produced a score of zero and therefore the region could not be characterised as either high or low. Table 8 demonstrates a number of things:

- Under the banding method, four regions could not be allocated to a quadrant because they receive a zero score for either labour demand or labour supply. The chance of this happening could be lessened by having more bands. But the chance of getting zero scores is always going to be greater under the banding method than a method that aggregates raw scores.
- Gisborne/Hawke's Bay is allocated to high supply in the weighted aggregation method and low supply in the banding method. Generally speaking, regions that have relatively small scores (either negative or positive) under the weighted aggregation method, are most likely to see their allocations change when the banding method is used. This is the case for Gisborne/Hawke's bay.

Gisborne/Hawke's Bay has seen a number of supply measures fall in recent years. Under the weighted aggregation method, these scores were negative but quite small and therefore not enough to outweigh measures of current supply such as the region's NEET rate and Māori labour force participation rate, which are quite high compared with the long-term national average. However, the banding method gave the supply change indicators greater scores which caused them to have a greater impact on the final result.

Table 8

Reginal differentiation framework sensitivity results, 2018

	Weighted aggregation		Banding method	
	Demand	Supply	Demand	Supply
Northland	High	High	High	Low
Auckland	High	Low	High	Low
Waikato	High	Low	High	Low
Bay of Plenty	High	Low	High	Zero
Gisborne/Hawke's Bay	High	High	High	Low
Taranaki	High	Low	Zero	Low
Manawatu-Wanganui	High	High	High	High
Wellington	High	Low	High	Low
Tasman/Nelson/Marlborough/West Coast	High	Low	High	Low
Canterbury	High	Low	Zero	Low
Otago	High	Low	High	Low
Southland	High	Low	Zero	Low

Fewer indicators

With the full RDF comprising 11 supply indicators it was decided to run results for a core set of supply indicators. The supply results, shown in Table 9, demonstrate that excluding indicators can significantly change the final results but regional variation is not necessarily increased. Cells shaded in grey in indicate instances where including the fewer indicators changed the results.

The 'Lite 1' version included the labour force participation rate, the under-utilisation rate, school leavers not achieving UE who are not enrolled in tertiary education at levels 3 or above, and tertiary education completions at levels 1 to 4. Both current state and recent change measures were included, and the weights have been kept the same as the 'Full' version. The demand indicators were the same as in the 'Full' version.

Table 9 shows that almost every region switched its supply allocation when the full version was compared with the 'Lite 1' version. This is because the current labour force participation rate and the current under-utilisation rate measures tended to dominate the scoring, and work against each other. Regions that had higher than average labour force participation rates tended to have lower than average under-utilisation rates (and vice versa), and the labour force participation rate score would tend to be the higher of the two. Therefore, the final allocations under 'Lite 1' correspond closely to whether a region currently has a higher than average labour force participation rate.

Table 9

Regional differentiation framework sensitivity supply results, 2018

	Full	Lite 1	Lite 2
Northland	High	Low	High
Auckland	Low	High	Low
Waikato	Low	High	Low
Bay of Plenty	Low	High	High
Gisborne/Hawke's Bay	High	Low	Low
Taranaki	Low	High	High
Manawatu-Wanganui	High	High	High
Wellington	Low	High	Low
Tasman/Nelson/Marlborough/West Coast	Low	High	High
Canterbury	Low	High	Low
Otago	Low	High	Low
Southland	Low	High	Low

The 'Lite 2' version uses the same indicators as 'Lite 1' except that the labour force participation rate is excluded. Here, the current under-utilisation rate measure tends to dominate the other measures in determining the final allocation.

Operating the framework

This section outlines our advice on how frequently the RDF should be updated with new data and explains the mechanics of how the RDF should be updated when new data becomes available.

How frequently the RDF should be updated

This section mainly considers data availability, data alignment and framework sensitivity in determining how often the RDF should be updated. It is our understanding that a detailed analysis of how often the relevant welfare, immigration, and education/training policy responses should be reviewed is out of scope of this project. However, some consideration is given to broad policy timeframes, nonetheless.

Our view is that the RDF should be updated annually in February each year using data up to the end of December of the previous year.

It is possible to update the RDF quarterly using data for the 12 months up to the end of the March, June and September quarters. However, the results would be of less value than the December update because several of the indicators cannot be updated quarterly, and those indicators that can be updated would then cover different timeframes to those that cannot. An annual update also arguably aligns better with the timeframes that regional welfare, education/training and employer policies generally take to have an impact, which tend to be measured in years rather than quarters.

Data availability

From a data availability standpoint, the indicators that are sourced from the HLFS and the Jobs Online series can be updated quarterly. The remaining indicators can be updated annually (see Table 10). On this basis, the RDF could be partially updated every quarter, with a full update happening annually.

Table 10

Frequency with which indicators can be updated

Indicator	Timeframe
Working age population	Annually
Labour force participation rate	Quarterly
Employment rate	Quarterly
Unemployment rate	Quarterly
Under-utilisation rate	Quarterly
NEET rate	Quarterly
School leavers	Annually
Enrolments	Annually
Completions	Annually
Job openings	Annually
Vacancies	Quarterly

Data alignment

From a data alignment standpoint, the RDF should be run annually using calendar year data across as many indicators as possible. This means that timeframes for the data sourced from the HLFS and Jobs Online series would be in alignment with the calendar year data on school leavers, tertiary education enrolments and tertiary education completions.

Job openings data is for the year to March. Data on school leavers, tertiary education enrolments and tertiary education completions is published after a longer delay than data from the HLFS and the Jobs Online series. Therefore, even when the RDF is updated annually using calendar year data for all but the job openings series, the RDF data is not fully aligned. However, alignment must be maximised for the results to characterise regions meaningfully as possible.

Framework sensitivity

A quarterly update of the RDF would maximise its ability to reflect current labour market conditions. However, an analysis of quarterly RDF results from 2015 to 2018 suggests that those regions that experience quarter-to-quarter variations in results are those same regions that showed variation when the RDF was run annually. This suggests that quarterly updates do not add much more information to annual updates.

Table 14 in the appendix shows the supply side results of the RDF being run every quarter from the March 2015 quarter to the December 2018 quarter. The demand side results are not shown because there is hardly any quarter-to-quarter variation in results. On the supply side, six of the 12 regions experience a number of quarter-to-quarter switches between high and low supply. These regions are the same ones that showed variations in their supply results when the RDF was run annually (see Table 13).

A number of regions, namely Wellington, Tasman/Nelson/Marlborough/West Coast and Southland do experience quarter-to-quarter switches that are not picked up in the annual results but, as the following *Policy timeframes* section argues, quarter-to-quarter changes in results probably shouldn't translate to quarter-to-quarter changes in policies.

Policy timeframes

From a policy standpoint, our view is that the RDF should be updated annually. This balances the need for the RDF to respond to current labour market conditions with the timeframes over which responses from the education/skills system, the welfare system, and employers, to local labour market conditions generally take place.

- The welfare system has processes in place to respond to local labour shortages in timeframes that are measured in weeks (for example, MSD's response to a regional labour shortage declaration). However, responses such as active labour market policies and relocation of beneficiaries from other regions can take years to have an impact.
- Changes to temporary work immigration policies can have an immediate impact but policies that can substantively impact on the supply of labour in local labour markets generally take years.
- Employers can, in principal, change their recruiting practises relatively quickly, but more fundamental changes to business models can take much longer.
- Policies to increase in the number of people completing qualifications through the local education/training system can take years to come to fruition.

Decoupling the RDF update from policy reviews

The RDF could be updated more frequently than the regional policy responses are reviewed. The frequency of policy reviews could also be tailored to different types of policies. This could involve a stipulated timeframe for RDF updates and policy reviews or a set of criteria which need to be met in order for regional policies to be reviewed.

An example of how this could work is as follows.

- The RDF could be updated quarterly,
- welfare and immigration policies could be reviewed annually, and
- education/training policies could be reviewed every two or three years.

Such an approach would mean policy makers are kept abreast of short-term changes in local labour market conditions. However, three out of every four RDF updates would not have an impact on policy which might be seen as a drawback because it places greater emphasis on the results of the one quarterly update that does inform a policy review.

To avoid this drawback, criteria could be employed to ensure every RDF update has an impact on policy considerations. For example, the following criterion could be used: when a quarterly update of the RDF results in a region changing quadrants, the region needs to remain in this quadrant for four quarters (1 year) before a policy review is triggered.

How to update the RDF

This section outlines the steps required to update the RDF. It explains how to add updated data for the indicators currently used in the RDF. It does not explain how to add data for new indicators.

The RDF has been developed in an Excel spreadsheet. The spreadsheet has three worksheets named as follows:

- Raw data,

- Metadata, and
- Final results.

In the 'Final results' worksheet, the regional allocations are shown in cells D21 to E32 (shaded green). The demand and supply scores for each region are shown in cells G21 to H32 (shaded blue). The scores for each measure for each region are shown in cells P21 to BB32 (shaded red).

The key steps for updating the RDF are as follows:

1. Add new data to the 'Raw data' worksheet.

The ordering of the data doesn't matter in terms its row placement, but the column placement and format are important.

- Column A must have the age categories used for population data. The categories are '0-14 years', '15-39 years', '40-64 years' and '65 years and over'.
- Column B must have the name of the indicator. The name must match the name given in the 'Final results' worksheet.
- Column C must have the year that the data relates to.
- Column D must have the quarter the data relates to. All data must be annual. So, September quarter data must be for the 12 months to the end of September. For data that is released annually, leave column D blank.
- Column E must have the name of the region the data relates to. Each region's name must match the names in the 'Final results' worksheet.
- Column F must have the actual data.
- The format of columns A to E must be 'General'. The format of column F must be 'Number'.

The data sources are as follows:

- **Working age population as % of the total population:** StatsNZ sub-national population estimates by age (available on the NZStat online tool <http://nzdotstat.stats.govt.nz/wbos/Index.aspx>)
- **Labour force participation rate:** StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **Māori labour force participation rate:** StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **Employment rate:** StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **Māori employment rate:** StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **Under-utilisation rate:** StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **Unemployment rate:** StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **NEET rate:** StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)

- **Tertiary education enrolments at NQF levels 1 to 4 as % of labour force:** tertiary education enrolments from TEC (Fraser Sloane fraser.Sloane@tec.govt.nz) labour force estimates from StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **Tertiary education completions at NQF levels 1 to 4 as % of labour force:** tertiary education completions from TEC (Fraser Sloane fraser.Sloane@tec.govt.nz) labour force estimates from StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **School leavers who didn't achieve UE who are not enrolled in tertiary education at level 3 or above as % of labour force:** school leaver numbers from TEC (Fraser Sloane fraser.Sloane@tec.govt.nz) labour force estimates from StatsNZ HLFS (available on the Infoshare online tool <http://archive.stats.govt.nz/infoshare/>)
- **Job openings at skill levels 4 & 5 as % of employment:** job openings and employment from Infometrics (Robert Heyes robert.hey@infometrics.co.nz)
- **Unskilled job vacancy index:** MBIE Jobs Online series (<https://www.mbie.govt.nz/business-and-employment/employment-and-skills/labour-market-reports-data-and-analysis/jobs-online/jobs-online-quarterly-report/>)

Table 11 summarises how frequently each indicator can be updated and the timing of data releases.

Table 11

Regional differentiation framework updates

Indicator	Frequency	Timing of data release
Sub-national population estimates	Annually	October
HLFS	Quarterly	About 1 month after the end of the quarter
School leavers	Annually	July
Tertiary education enrolments and completions	Annually	July
Job openings	Annually	February
Vacancies	Quarterly	About 1 month after the end of the quarter

2. Update the 'Series timeframe' column (column E) in the 'Metadata' tab so that it reflects the time frame over which the raw data extends.
3. Update the 'Final results' worksheet.

The 'Final results' worksheet has been designed to read directly from the 'Raw data' worksheet and to only read the data that it needs to for each measure. Therefore, only a limited number of cells need to be changed to update the RDF.

- Cell C14 can be changed to any year covered by the data. This determines both the year used in the current state measures and the year to which the measures of change extend to.
- Cell C13 can be changed to any quarter of the year: March, June, September, December.

- Cell C15 can be changed if the user wants a different time period for the long-term national average (the default is 15 years). Measures for which data does not extend over the time frame specified are automatically truncated.
- Cell AH15 can be changed if the user wants a different time period for the measures of change over time (the default is 3 years). This determines the base year for measures of change.
- Weights can be adjusted by changing the values in either row 18 (priority scores) or row 19 (weights). Currently, the priority scores are all calculated relative to the score given to the current state under-utilisation rate measure and reflect the scores given in Table 4 of this report.

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Appendix

Table 12

Regional Differentiation Framework detailed results, 2018

	Northland	Auckland	Waikato	BoP	Gis/HB	Taranaki	Manawatu-Wanganui	Wellington	T/N/M/WC	Canterbury	Otago	Southland
Supply indicators, current state relative to long-term national average												
Working age population as % of total population	-0.03	0.06	-0.03	-0.03	-0.07	-0.02	0.02	0.10	0.12	0.12	0.20	0.02
Labour force participation rate	-0.24	0.12	0.21	0.05	-0.01	0.17	-0.13	0.24	0.09	0.11	0.19	0.20
Employment rate	0.24	-0.14	-0.23	-0.05	0.00	-0.17	0.15	-0.24	-0.11	-0.15	-0.22	-0.24
Under-utilisation rate	0.17	-0.08	-0.03	-0.06	0.01	0.08	0.33	0.00	0.04	-0.06	-0.02	-0.04
Unemployment rate	0.03	-0.04	-0.05	-0.01	-0.01	-0.01	0.04	-0.02	-0.04	-0.06	-0.05	-0.07
NEET rate	0.00	-0.01	0.00	0.00	0.29	0.05	0.23	-0.02	-0.04	-0.04	-0.19	-0.20
Māori labour force participation rate	-0.11	0.07	0.26	0.21	0.12	0.04	-0.04	0.31	0.38	0.31	0.14	0.32
Māori employment rate	0.10	-0.17	-0.34	-0.22	-0.21	-0.04	-0.02	-0.38	-0.45	-0.47	-0.22	-0.35
Tertiary education enrolments at NQF levels 1 to 4 as % of labour force	0.12	-0.09	-0.05	0.04	0.03	-0.05	-0.04	-0.07	-0.06	-0.12	-0.13	-0.02
Tertiary education completions at NQF levels 1 to 4 as % of labour force	0.05	0.00	0.00	0.04	0.03	0.00	0.01	0.00	0.00	-0.01	-0.02	0.00
School leavers who didn't achieve UE who are not enrolled in tertiary education at level 3 or above as % of labour force	0.02	-0.01	0.00	0.01	0.01	0.00	0.00	-0.01	0.00	-0.01	-0.01	0.00
Demand indicators, current state relative to long-term national average												
Job openings at skill levels 4 & 5 as % of employment	0.18	0.18	0.17	0.19	0.14	0.02	0.08	0.12	0.06	0.11	0.19	0.03
Supply indicators, recent change												
Working age population as % of total population	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00
Labour force participation rate	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.04	-0.01	0.03	-0.02
Employment rate	-0.04	-0.04	-0.06	-0.03	-0.03	-0.05	-0.01	-0.03	-0.04	0.01	-0.03	0.01
Under-utilisation rate	-0.06	-0.04	-0.04	-0.03	-0.07	0.00	0.00	-0.02	0.02	0.03	0.01	0.01
Unemployment rate	-0.02	-0.02	-0.02	-0.02	-0.03	-0.01	-0.01	-0.01	0.00	0.01	0.00	-0.01
NEET Rate	-0.06	0.02	-0.02	-0.05	0.00	-0.01	0.04	0.00	0.00	0.03	0.01	-0.07
Māori Labour Force Participation Rate	0.09	0.05	0.09	0.05	0.05	0.00	0.01	0.05	0.05	0.02	0.01	-0.03
Māori employment rate	-0.12	-0.05	-0.11	-0.06	-0.08	-0.04	-0.02	-0.06	-0.05	-0.03	0.01	0.02
Tertiary education enrolments at NQF levels 1 to 4 as % of labour force	0.00	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	0.00	-0.01
Tertiary education completions at NQF levels 1 to 4 as % of labour force	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
School leavers who didn't achieve UE who are not enrolled in tertiary education at level 3 or above as % of labour force	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demand indicators, recent change												
Job openings at skill levels 4 & 5 as % of employment	0.01	0.01	0.02	0.01	0.04	-0.01	0.01	0.02	0.02	-0.01	0.02	-0.01
Job openings at skill levels 4 & 5 as % of employment	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unskilled job vacancy index	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01
Supply total	0.16	-0.35	-0.36	-0.03	0.05	0.00	0.54	-0.13	-0.06	-0.32	-0.28	-0.46
Demand total	0.19	0.19	0.20	0.20	0.19	0.02	0.10	0.14	0.10	0.10	0.22	0.04

Table 13

Regional Differentiation Framework results, 2015-18

	Demand				Supply			
	2018	2017	2016	2015	2018	2017	2016	2015
Northland	High	High	High	High	High	High	High	High
Auckland	High	High	High	High	Low	Low	Low	Low
Waikato	High	High	High	High	Low	Low	High	High
Bay of Plenty	High	High	High	High	Low	High	High	High
Gisborne/Hawke's Bay	High	High	High	High	High	High	High	High
Taranaki	High	High	Low	High	Low	High	High	High
Manawatu-Wanganui	High	High	High	High	High	High	High	High
Wellington	High	High	High	High	Low	Low	High	High
Tasman/Nelson/Marlborough/West Coast	High	High	High	High	Low	Low	High	Low
Canterbury	High	High	High	High	Low	Low	Low	Low
Otago	High	High	High	High	Low	Low	Low	Low
Southland	High	High	High	High	Low	Low	High	High

Table 14

Regional Differentiation Framework quarterly supply results, March 2015- December 2018

	Dec-18	Sep-18	Jun-18	Mar-18	Dec-17	Sep-17	Jun-17	Mar-17	Dec-16	Sep-16	Jun-16	Mar-16	Dec-15	Sep-15	Jun-15	Mar-15
Northland	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Auckland	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Waikato	Low	Low	Low	Low	Low	Low	Low	High	High	Low	High	High	High	High	High	High
Bay of Plenty	Low	Low	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Gisborne/Hawke's Bay	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Taranaki	Low	High	High	Low	High	High	High	High	High	High	High	High	High	High	High	High
Manawatu-Wanganui	High	High	High	High	High	High	High	Low	High	High	High	High	High	High	High	High
Wellington	Low	Low	Low	Low	Low	High	High	Low	High	Low	High	High	High	High	Low	Low
Tasman/Nelson/Marlborough/West Coast	Low	Low	Low	Low	Low	Low	Low	Low	High	Low	High	Low	Low	High	Low	Low
Canterbury	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Otago	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Southland	Low	Low	Low	Low	Low	Low	High	High	High	Low	Low	Low	High	High	Low	Low

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Table 15

Reginal differentiation framework sensitivity results, March 2016 to September 2017

	Sep-17		Jun-17		Mar-17		Dec-16		Sep-16		Jun-16		Mar-16	
	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply
	Weighted aggegation													
Northland	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Auckland	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Waikato	High	Low	High	Low	High	High	High	High	High	Low	High	High	High	High
Bay of Plenty	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Gisborne/Hawke's Bay	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Taranaki	High	High	High	High	High	High	Low	High	Low	High	Low	High	Low	High
Manawatu-Wanganui	High	High	High	High	High	Low	High	High	High	High	High	High	High	High
Wellington	High	High	High	High	High	Low	High	High	High	Low	High	High	High	High
Tasman/Nelson/Marlborough/West Coast	High	Low	High	Low	High	Low	High	High	High	Low	High	High	High	Low
Canterbury	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Otago	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Southland	High	Low	High	High	High	High	High	High	High	Low	High	Low	High	Low
	Simple addition													
Northland	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Auckland	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Waikato	High	Low	High	Low	High	Low	High	High	High	Low	High	High	High	High
Bay of Plenty	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Gisborne/Hawke's Bay	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Taranaki	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Manawatu-Wanganui	High	High	High	Low	High	Low	High	High	High	Low	High	High	High	High
Wellington	High	Low	High	Low	High	Low	High	High	High	Low	High	High	High	High
Tasman/Nelson/Marlborough/West Coast	High	Low	High	Low	High	Low	High	High	High	Low	High	High	High	Low
Canterbury	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Otago	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Southland	High	Low	High	High	High	High	High	High	High	Low	High	Low	High	Low

Table 16

Regional differentiation framework sensitivity results, 2015-18

	Weighted aggregation								Banding method							
	2018		2017		2016		2015		2018		2017		2016		2015	
	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply	Demand	Supply
Northland	High	High	High	High	High	High	High	High	High	Low	High	High	High	High	High	High
Auckland	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Waikato	High	Low	High	Low	High	High	High	High	High	Low	High	Low	High	Low	High	Low
Bay of Plenty	High	Low	High	High	High	High	High	High	High	Zero	High	High	High	Low	High	High
Gisborne/Hawke's Bay	High	High	High	High	High	High	High	High	High	Low	High	High	High	Zero	High	High
Taranaki	High	Low	High	High	Low	High	High	High	Zero	Low	Zero	High	Zero	High	Zero	High
Manawatu-Wanganui	High	High	High	High	High	High	High	High	High	High	High	Low	High	Low	High	High
Wellington	High	Low	High	Low	High	High	High	High	High	Low	High	Low	High	Low	High	Low
Tasman/Nelson/Marlborough/West Coast	High	Low	High	Low	High	High	High	Low	High	Low	High	Low	High	High	High	Low
Canterbury	High	Low	High	Low	High	Low	High	Low	Zero	Low	Low	Low	High	Low	High	Low
Otago	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Southland	High	Low	High	Low	High	High	High	High	Zero	Low	High	Low	High	Low	Zero	High