Taylor Fry

Ministry of Social Development

Baseline valuation of the social housing system

As at 30 June 2015

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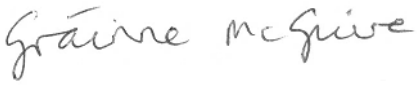

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1.1 Background

This report is the first ever **life-course valuation of New Zealand's social housing system**. The purpose of this valuation is to provide information about New Zealanders' projected lifetime housing pathways and costs to assist the Ministry of Social Development (MSD) to manage the social housing system. This approach builds on similar valuations conducted of the working-age benefit system over the last five years. These valuations are the principal evidence base underlying the Government's '**investment approach**' to reducing long-term benefit receipt. The investment approach is an evidence-based policy and delivery framework, which is intended to be expanded across the social sector.

'Valuations' – a tool from insurance and social insurance – are best-practice in modelling long-term risk and costs. In the social sector context, such valuations introduce **a long-term, whole-of-system view** that is relevant because of the long-term dynamics of social disadvantage and service usage. They provide visibility of expected future trends, and create a feedback cycle that shows the long-term implications of policy and operational decisions. They also provide insight into concentrations of risk and cost, which management can use to guide its decisions on how to improve social outcomes and financial sustainability.

This first valuation sets a baseline that will become the point of reference for understanding how the social housing portfolio is evolving over time.

1.2 Scope

The valuation is an estimate of the future housing-related costs for households currently in or 'close to' the social housing system. Households 'close to' the social housing system are defined as those in a social housing property, or on the social housing register, at any time during the year ending 30 June 2015. The valuation reports **household** lifetime housing cost (which is the sum of individual lifetime costs for adults in a given household), as movements in housing state typically occur at a household level.

In this valuation, we have defined 'housing-related costs' as:

- Income-related rent subsidy (IRRS)
- Accommodation Supplement (AS) (but only those AS payments attributable to people in or close to the social housing system)
- Temporary Additional Support (TAS)
- MSD's expenses in relation to administering the social housing system.

Where this report refers to 'cost' it is in the context of this definition (unless otherwise specified). However, there are broader 'costs' associated with social housing that we have not included, such as:

- Any charge, where applicable, for the cost of capital.

- Housing New Zealand administrative expenses, rates, or costs of repair. However, some of this is implicit in the market rent calculation (see Section 2.3.1).
- Future costs for renewal and reconfiguration of the current social housing stock.
- Any measurement of 'unknown' demand (for example, the potential housing costs of people who would qualify for a social housing placement but currently don't apply).

As such, care should be taken in using the results of this valuation in making decisions where the above items are important considerations. If the further costs, outlined above, were included, the cost to the Crown of providing social housing is likely to be higher than the costs currently measured in the valuation. Future valuations may include some of these costs.

Finally, the scope of this report is broader than the valuation of future housing-relating costs. It also includes other related analysis intended to assist MSD in making investment decisions about the sector, including long-term projections that help to estimate the demand for social housing places, and estimations of how well matched households are to the current social housing stock.

1.3 Context and rationale

The Government's Social Housing Reform Programme has introduced a suite of changes to increase the diversity and supply of social housing in New Zealand and provide better housing services to tenants. The key objectives of the reform programme are that:

- **People who need housing support can access it** and receive social services that meet their needs
- Social housing is of the **right size and configuration**, and in the right areas, for households that need it
- Social housing tenants are **helped to independence**, as appropriate
- There is **more diverse ownership** or provision of social housing
- There is **more innovation and more responsiveness** to social housing tenants and communities
- The **supply of affordable housing is increased**, especially in Auckland.

As part of the reform programme, MSD has three key functions in relation to the social housing system:

1. Managing the register
2. Purchasing social housing places from Housing New Zealand (HNZ) and Community Housing Providers (CHPs)
3. Assisting tenants toward improved housing stability and eventual transition to independence.

The social housing valuation is designed to assist MSD carry out each of these functions.

The aim of social housing reform can be summarised in simple terms as:

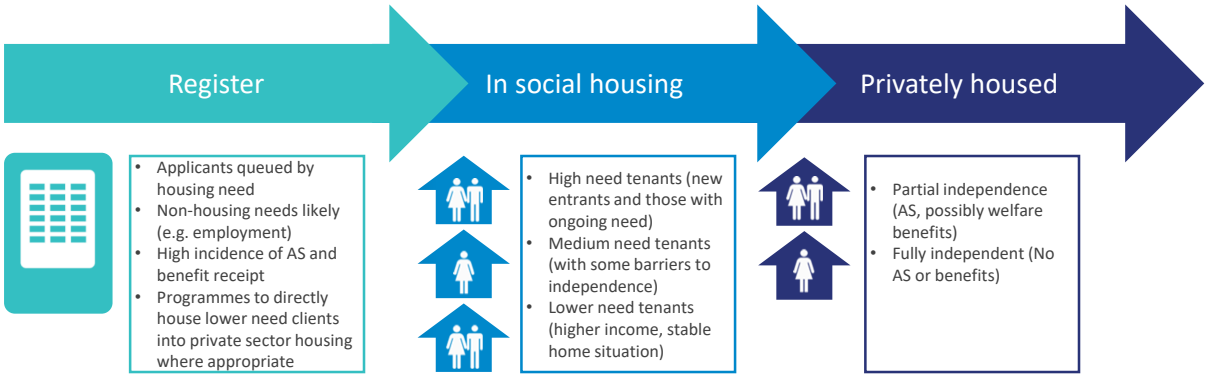
- Right person
- Right place
- Right duration.

That is, to **provide appropriate housing** (right place) **for the highest needs households** (right person) **in New Zealand for the duration of their need** (right duration). 'Right duration' is a break from the tradition of 'a house for life', and therefore makes it perhaps the most fundamental reform underpinning an investment approach for social housing. It signals a movement from the idea that the limited social housing supply (and its associated stream of payments) should be allocated for the full duration of a client's life regardless of their situation, to housing people only for the period of their need.

In some cases, such as seniors and severely disabled people, there may well be a life-long need for social housing. In other cases, social housing is a platform to help stabilise a need while building towards greater independence in the future – for example, a means of improving health or family stability. Moreover, the investment approach introduces active support to assist tenants in improving their likelihood of future independence from benefits and social housing – for example, by addressing

underlying drivers of housing need such as low income or barriers to employment (where employment is an appropriate outcome). The idea of encouraging independence **for those who are able to transition to independence** represents a move towards more active management of the social housing sector and is illustrated in Figure 1.1**.**

Figure 1.1 Schematic of potential pathways towards housing independence



1.4 Valuation metrics

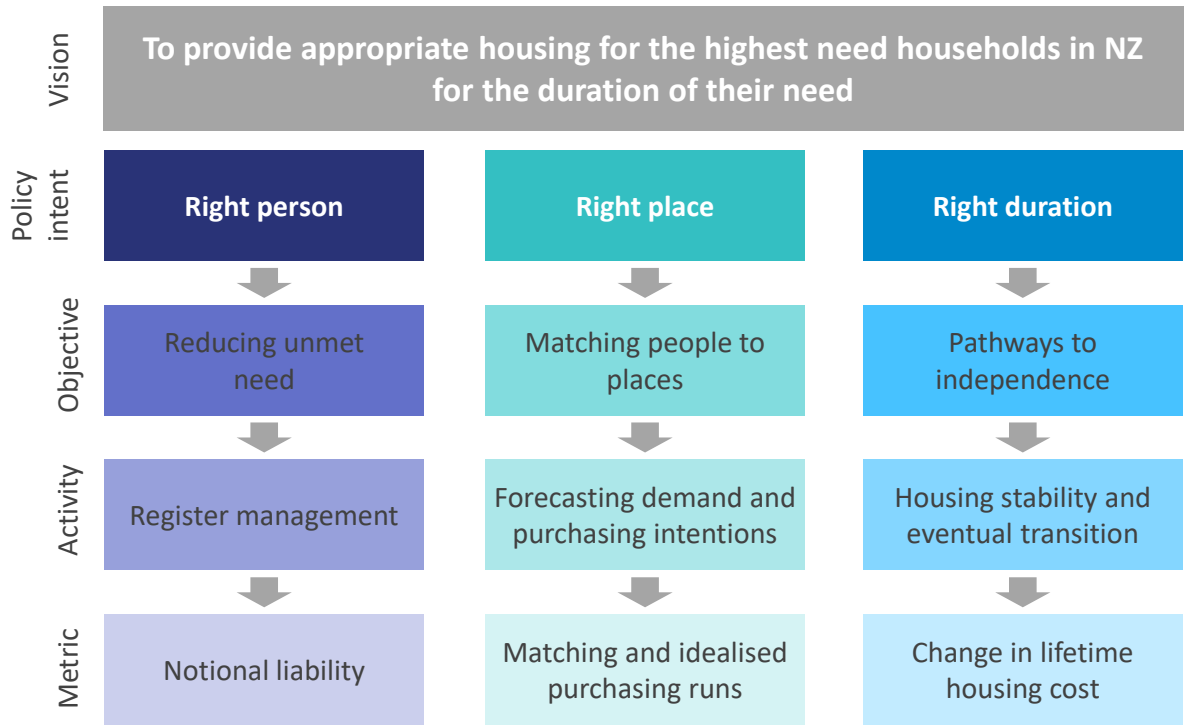
1.4.1 Introducing the metrics

The social housing valuation introduces three core metrics:

» Notional liability
» 'Matching' and idealised purchase runs
» Change in lifetime housing cost.

Each metric corresponds to one of MSD's key management functions in relation to the social housing system. The figure below illustrates how each of the metrics relates to MSD's activities and objectives.

Figure 1.2 Valuation metrics for social housing and MSD objectives



The valuation metrics and the purposes they serve are discussed in further detail in Table 1.1.

Table 1.1 Valuation metrics for social housing – explained

	Right duration: ***Lifetime housing cost***	**Right person:** ***Notional liability***	**Right place:** ***Matching***
What is it?	The lifetime housing cost is the sum of future Income-Related Rent Subsidy (IRRS), Accommodation Supplement (AS) and Temporary Additional Support (TAS) payments expected to be paid to the valuation population, that is, adults who have been in social housing or on the register in 2014/15.	Notional liability quantifies the additional cost it would take (hypothetically) to address unmet need for those on the social housing register (addressing their housing needs immediately) or in social housing (moving to the right-sized place for their needs).	Matching measures how well households fit in their current properties. A mismatch occurs if a household is too big or small for its current property, or if a property is empty.[1]
What does it tell you?	This metric provides insight into lifetime housing pathways, risk factors and concentrations of risk. It also allows the change in long-term cost to be measured over time.	This metric provides insight into unmet need (as represented by the register) for new applicants to the register and people already on the register.	Matching analysis, including demand projections, gives MSD the tools to take a more active approach to managing the social housing system over time.
How can MSD use this information?	To target services that stabilise need, provide active support to tenants where appropriate, and inform the measurement of return on investment. To track overall system performance (this years' valuation provides only the initial baseline – in future years this functionality will be available).	Once there are additional years of data to compare, this metric will allow quantification of changes in unmet need (for example, due to increasing the housing supply). Notional liability is also an important safeguard in understanding and interpreting overall system performance (see Section 1.4.2 below).	Combined, matching and idealised purchasing (a related set of statistics discussed in Sections 5.2 and 5.3) can be used to inform investment decisions such as medium and long-term purchasing intentions for social housing places.

1.4.2 Some caveats when interpreting these metrics

From next year's valuation onwards, we will begin to be able to see change in the social housing system over time (as we will be able to compare metrics between years). There will be **some important differences from the benefit system valuation in interpreting the cost and performance signals associated with these changes**. Benefits are demand-driven and decreased overall costs are a relatively good (though imperfect) indicator of employment outcomes. The social housing system is more complex, and the valuation design reflects this; it incorporates the behavioural dynamics of social housing, such as supply constraints and the register. Additionally, funding for IRRS places is capped, and the policy intent is to increase social housing places and shift towards higher-needs composition through tenancy reviews. **Planned increases to the liability** that are expected in next and subsequent years' valuations are **not accounted for in this year's valuation**. This year's valuation is a baseline which can be used to measure the impact of policy and operational changes going forward.

[1] We also introduce **idealised purchasing**, which simulates the net selling and purchasing of properties over many future years to best match properties to future need as indicated by the register.

Section 3.10 discusses how future change can be interpreted to ensure that cost and performance signalling **does** align with policy intent, and serve as a useful proxy for movements on a continuum towards housing independence (as illustrated in Figure 1.1). For example:

- We will compare *the same group of households' pathways towards independence at two different time points,* rather than mixing together different households with potentially different housing needs.
- Through further client segmentation we will identify groups that should be quantified separately when assessing change in lifetime housing cost. This is to ensure, for example, that reduced liability is not viewed as improved performance for groups at risk of churning in and out of social housing due to increased vulnerability, rather than leaving due to housing independence. For such groups an increase in housing stability and thus an increase in their lifetime housing cost should be viewed as a good outcome, with potential benefits to other social sectors.
- Measuring the change in the notional liability of the register also allows us to recognise the potential cost that has been realised by placements into housing. Tracking this also helps to understand overall system performance, safeguarding against lower intakes to social housing from the register.

As noted in Section 1.2, the report's life-time cost figures do not include a cost of capital component. This component should also be considered by management in its deliberations regarding the strategic and operational implications of this report's findings.

1.5 Right duration

1.5.1 Understanding the valuation population

The **current valuation population** included in this valuation consists of those households who at some time in the year to 30 June 2015 were in a social housing place or were on the social housing register. In all, this equates to about 150,000 adults and 67,500 households in scope for this 2015 valuation. Due to the heavy overlap with the benefit system population, the underlying projection model used to conduct this valuation is a combined welfare-housing model. The 'main estimate' for the lifetime cost of the housing system includes only current households (as defined above). We also project social housing entry and tenancy for **future** households; this is needed to understand future demand.

We split the valuation population into **15 segments**[2] to better understand the behaviour patterns of sub-groups. The segments are based on the combination of housing status (in a social housing place, on the register or a recent exit) and benefit receipt. The segments are as follows:

- **IRRS recipients**: in a social housing place with an IRRS payment[3], further split by type of welfare benefit receipt – Jobseeker (JS), Sole Parent Support (SPS), Supported Living Payment (SLP), Youth Payment(YP)/Young Parent Payment (YPP), not on main benefits (NOMB) or receiving NZ Super
- **Market renters**: in a social housing place with no IRRS payment[4], further split into those receiving welfare benefits (BEN), NOMB or receiving NZ Super
- **On register**: on the register, further split into BEN, NOMB, or receiving NZ Super

[2] Section 2.3.2 depicts two layers to the segments, a top tier segment based on housing tenancy status and a further subdivision based on benefit receipt. The rationale behind the segmentation of the benefit system – that is, our statistical analysis of possible subgroups, combined with MSD input into operational considerations – is described more fully in the 30 June 2012 benefit system valuation.

[3] Tenants' rent is determined based on market rents in comparable housing. However the amount of rent tenants actually pay – called 'Income-Related Rent' (IRR) – is based on their household's income to ensure affordability for low-income families, and is typically 25% of income. The difference between market rent and IRR is subsidised by the Government is called the 'Income-Related Rent Subsidy' (IRRS).

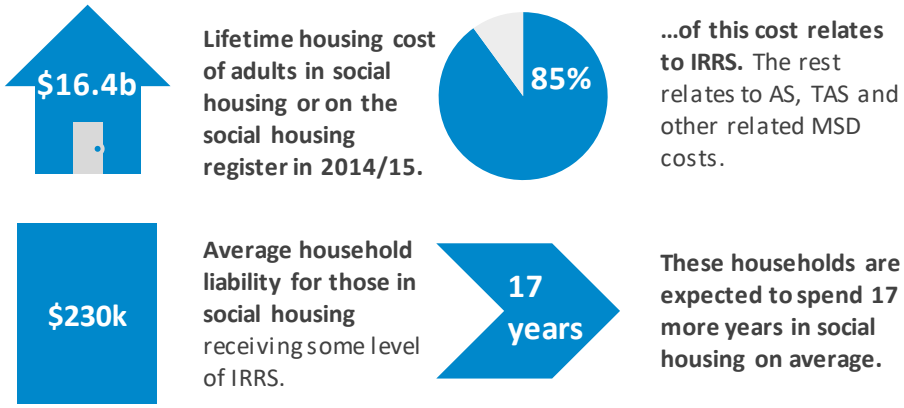
[4] 'Market renters' are those who cover the market rent themselves; because their income is high enough, for non-compliance reasons, or by choice. For these households IRRS is zero, but they are still housed in an HNZ place.

» **Recent housing or register exit**: no longer in in a social housing place or on the register but were at some time in the year to 30 June 2015, further split into BEN, NOMB, or receiving NZ Super.

The segmentation will be subject to review before the next housing valuation, to ensure segments are as operationally relevant as possible.

1.5.2 Key findings

Figure 1.3 Social housing valuation at a glance



The lifetime housing cost of adults in social housing or on the register in 2014/15 is $16.4 billion. **Around 85% of this cost relates to future IRRS payments**, with the remainder made up of AS, TAS and other expenses.

The discounted mean term of these payments (the dollar-weighted average length of time till payment, after allowing for the time value of money) is almost 17 years. This reflects a very long-term payment stream, with typically very long tenures and relatively strong increases in the subsidy paid over time.

For those currently in social housing receiving some level of IRRS payment, **the average household liability is $230k, with an expected 17 more years in social housing**.

Results have been summarised by segment in Table 1.2 below.

Table 1.2 Current cohort lifetime housing cost results[5]

Segment		Number of households	# Adults	IRRS payments ($b)	AS + TAS payments ($b)	Total liability ($b)	Average HH liability ($k)	Number of future years in Social housing (for primary tenant)	Number of future years on AS (for primary tenant)
IRRS recipients	JS	10,827	21,668	2.65	0.26	2.90	268	18.7	4.4
	SPS	10,389	15,066	2.47	0.26	2.73	262	21.0	6.5
	SLP	12,037	21,278	2.69	0.21	2.90	241	18.6	3.2
	YP/YPP	30	37	0.00	0.00	0.00	164	15.1	10.8
	NOMB	14,611	35,514	3.54	0.29	3.84	263	18.5	3.2
	NZ Super	12,789	21,198	1.51	0.09	1.61	126	9.3	0.5
Sub total		**60,683**	**114,761**	**12.86**	**1.12**	**13.98**	**230**	**17.0**	**3.4**
Market Renter	BEN	72	157	0.01	0.00	0.01	166	15.6	5.4
	NOMB	2,587	7,267	0.38	0.05	0.43	166	15.1	2.6
	NZ Super	357	784	0.03	0.00	0.03	84	9.1	0.7
Sub total		**3,016**	**8,208**	**0.42**	**0.05**	**0.47**	**156**	**14.4**	**2.5**
On register	BEN	2,967	3,712	0.30	0.12	0.41	140	10.9	10.5
(incl those on in	NOMB	643	1,019	0.06	0.01	0.07	108	8.3	5.4
April / May)	NZ Super	337	487	0.01	0.01	0.02	49	2.2	5.1
Sub total		**3,947**	**5,218**	**0.36**	**0.14**	**0.50**	**127**	**9.7**	**9.2**
Recent housing	BEN		7,635	0.41	0.29	0.70	92^	7.5	12.3
or register exit	NOMB		12,720	0.24	0.14	0.38	30^	3.0	5.2
	NZ Super		1,634	0.00	0.01	0.02	11^	0.3	3.0
Sub total			**21,989**	**0.65**	**0.45**	**1.10**	**50^**	**4.3**	**7.5**
Total		**67,646**	**150,176**	**14.28**	**1.76**	**16.05**	**203**	**14.7**	**4.2**
CHP Loading						0.06			
Expenses						0.32			
Grand total						**16.42**			

^Estimated. Average liabilities for recent exits are per individual, rather than per household.

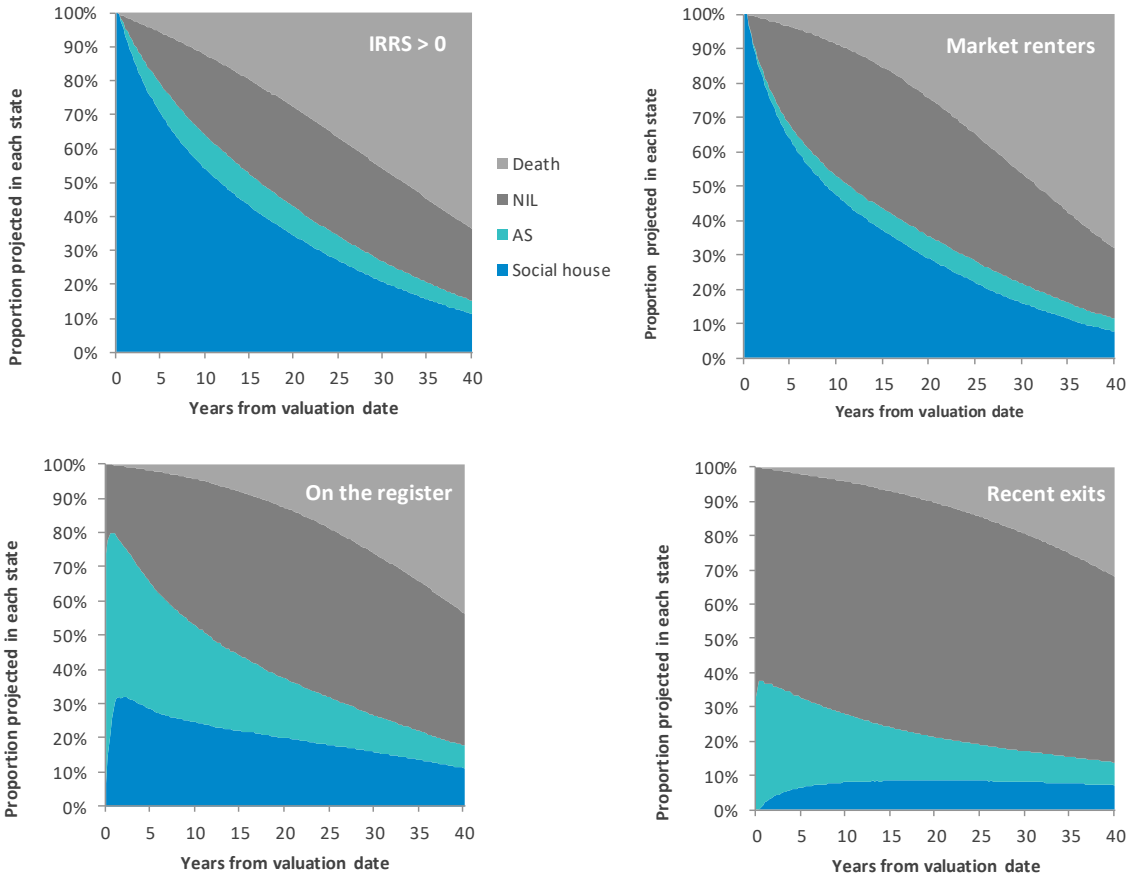
Section 3 of the report drills down into these results. Key findings are:

- **There is a large spread between households with high and low predicted costs.** The top decile (typically those in housing with high market rent and IRRS) has an average around $480k whereas the lowest decile (including older clients on the register) has an average of about $50k.
- The **top five predictors** of lifetime housing cost for people in social housing are market rent, household size, age, IRRS level and welfare benefit history. Some of these factors are interrelated. This analysis is based on available data – further data may be collected and added in future to give further insight into housing-specific drivers of need.
- **Market renters** who are otherwise financially independent (in that they are receiving neither a main benefit nor NZ Super) have average future costs of $166k.
- For those who exit social housing but continue to receive a main benefit, future expected housing costs are on average close to $95k per person, with an average of 7.5 years of future social housing support – indicating a **high likelihood of re-entry** to social housing and/or long-term take-up of AS/TAS payments.
- **Auckland, despite comprising only 35% of the population of New Zealand, represents 61% of the total liability.** The average household liability is 80% higher due to higher IRRS levels, which in turn also leads to longer durations in social housing (because the likelihood of exiting social housing falls with higher IRRS as it becomes more difficult to achieve independence).
- **Māori and Pacific peoples are heavily overrepresented in the social housing system.** Māori are five times more likely to be in social housing, and Pacific peoples seven times, compared to the average rate for those with European or Other background. Their households are typically larger (although this is partly because the primary householders are less likely to be older – pensioners typically have smaller households).

[5] Totals throughout report may not add due to rounding.

» We project that **1 in 5 households** currently in social housing will still be in a social housing place in 30 years' time. Lifetime plots are shown in Figure 1.4.

Figure 1.4 Lifetime plots for various housing segments



Notes: NIL refers to neither in a social housing place nor receiving AS. Mortality is separately modelled for clients aged over 65 and the lifetime plots show the impact of mortality. We assume all clients exit social housing by age 100.

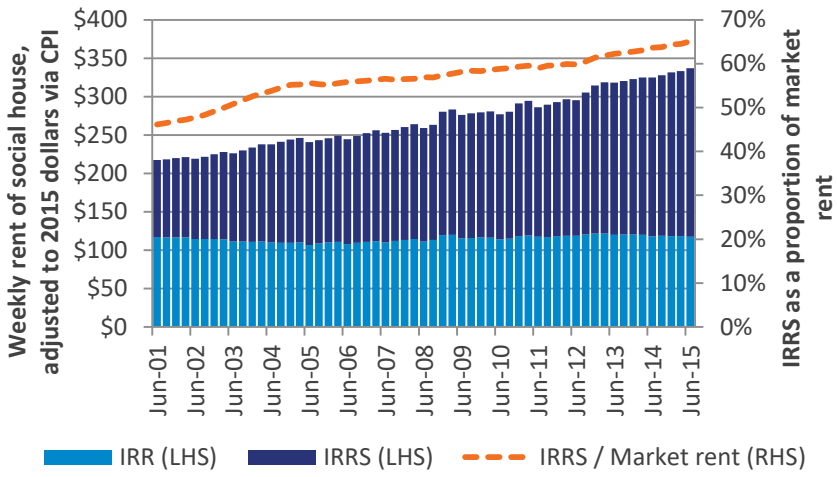
» Growth in IRRS payment size over time is driven by the growth in market rents. While growth in the incomes of people in social housing has typically averaged close to CPI, **rents have grown significantly faster than CPI**. In 2002 nearly nine in ten households in social housing had IRRS less than $200 per week (in today's dollars – we inflate by CPI). This figure has halved, with less than five in ten households below that threshold in 2015.The increase in IRRS as a proportion of market rents is shown in Figure 1.5.

» **Housing exit rates** – that is, the rates at which people leave social housing places – **have decreased over time** due to compositional changes in the social housing population. **Compared to 15 years ago tenants are older, they have been in social housing longer and they receive more IRRS.** These factors mean that a household is 30% less likely to exit in any given quarter, which in turn means a household seeking a social house is 30% less likely to be placed each quarter.

» Certain characteristics predict higher exit rates. **Households with a Māori primary householder tend to have higher exit rates**. However, Māori are also more likely to exit with poor social outcomes (which could potentially include termination by tenancy tribunal, safety concerns, abandonment, prison, overcrowding, neighbourhood issues, etc.). If exit rates due to poor social outcomes are excluded from the analysis, Māori exit at a similar rate to other tenants.

» Having served a corrections spell as a result of a criminal conviction is also a strong predictor of an exit which is a socially poor outcome.

Figure 1.5 Average Income-related Rent (IRR) and IRRS for those in social housing. Dollars have been inflated to 2015 levels using the CPI index.

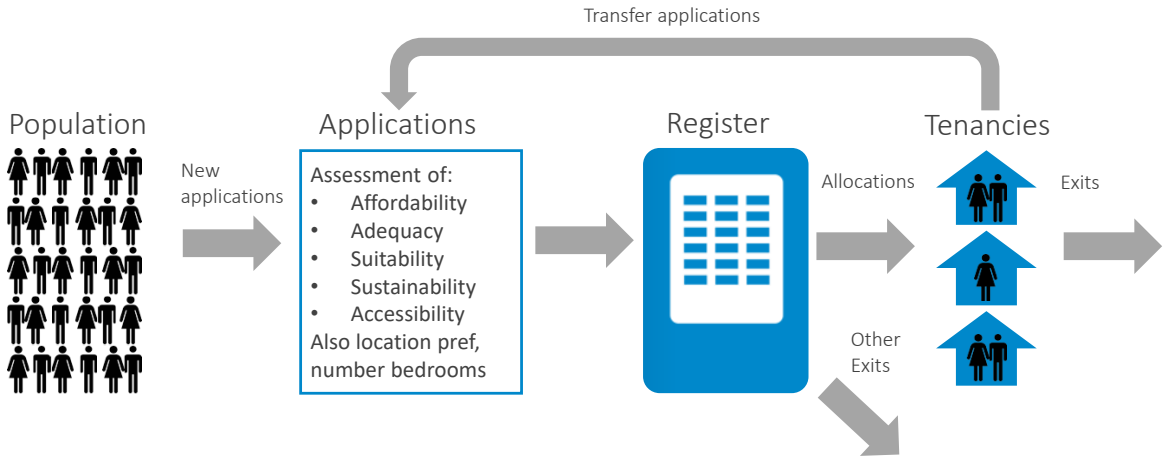


1.6 Right person

1.6.1 About the notional liability

The social housing register represents those people who have applied and been assessed as eligible for social housing. A simplified schematic of the flow from the general population through the register and into housing is shown in Figure 1.6. Note that in reality the system is more complex than the illustration below; for example, there are pre-assessment stages such as screening and advice before an application is made.

Figure 1.6 Schematic of social housing register



The notional liability metric in this valuation report attempts to measure the unmet need of those on the register. It also captures some of the notional costs related to overcrowding and potential notional 'releases' associated with underuse, for those in social housing places.

Notional metrics are *hypothetical* – interpreting them can be counter-intuitive. Notional 'costs' associated with overcrowding can be understood as the additional costs that would be incurred on allocating these households to places that suit their requirements. Notional 'release' associated with underuse can be understood as the opportunity cost of inefficiencies currently within the system. That is, the hypothetical cost savings that would be released if households were allocated places that met their need instead of exceeded their requirements. This matters because more dynamic management of the

portfolio over the long-term would enable these savings to be invested elsewhere in the housing portfolio.

1.6.2 Key findings

Table 1.3 Lifetime housing costs for current clients[6]

	Main ($b)	Additional notional ($b)	Total notional ($b)
Register	0.47	0.24	0.71
Transfer	0.51	0.02	0.53
Over-crowding	2.46	0.54	2.99
Underuse	4.53	-1.38	3.15
Well matched	8.07	0.00	8.07
Total	**16.05**	**-0.59**	**15.46**

Table 1.3 summarises our notional liability findings. They show that:

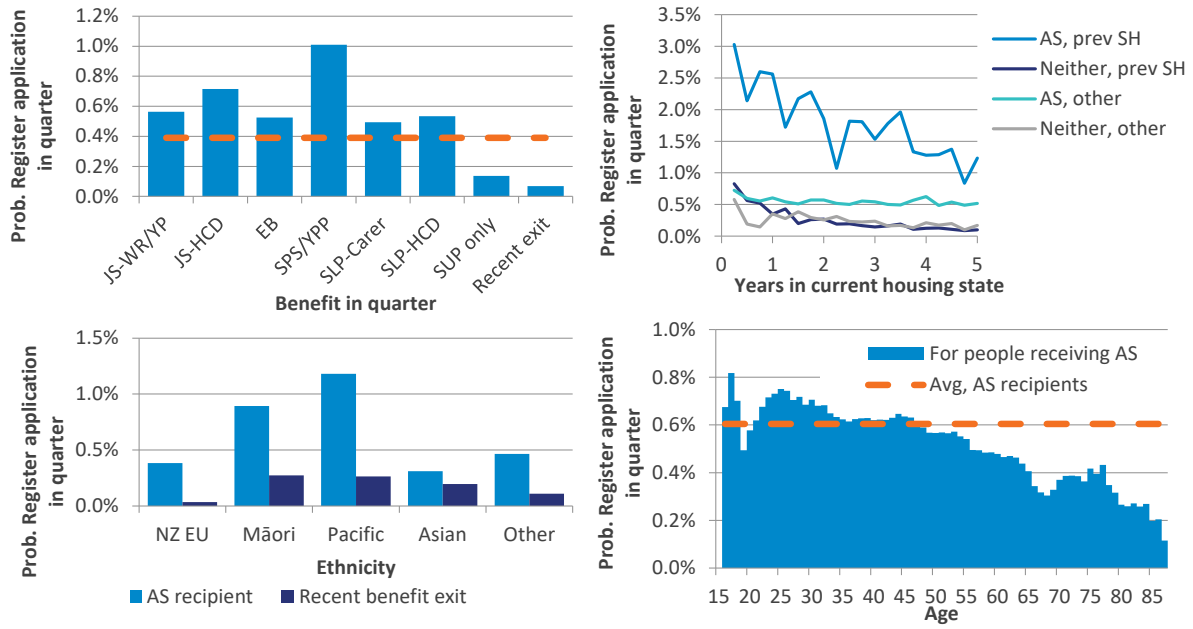
- The housing liability would be **$0.2 billion higher if additional social housing places were found for those on the register** at the valuation date. This is the fiscal measure of register unmet need.
- The housing liability would be **$0.5 billion higher** if those known to be in overcrowded dwellings were moved to larger social housing places, and **$1.4 billion lower** if those known to be in underused dwellings were moved to smaller social housing places at the valuation date.

The number of new register applications has been volatile over time, in part due to significant policy changes. This makes it difficult to establish a direct link between the level of register applications and the broader macro-economy. However, there is an indirect link via the benefit system. Beneficiaries have higher application rates, and beneficiary numbers are strongly influenced by the unemployment rate – therefore the unemployment rate also indirectly influences the number of register applications.

Register application rates vary markedly among people with different housing history, ethnicity and age, as shown in Figure 1.7. Māori and Pacific peoples receiving AS are two to three times more likely to apply compared to NZ European people. **The most significant predictor of register applications is welfare benefit status.** About two thirds of new working-age applicants (primary or non-primary) also received JS or SPS benefits in their application quarter. The rate of application for these clients is about 10 times that of someone who has recently left welfare benefits, and about 70 times that of someone who has not received benefits in the last five years.

[6] Excluding costs related to CHPs and expenses.

Figure 1.7 Significant predictors of register applications



There is significant variation in the need profiles of applicants. MSD assesses the need for social housing based on housing accessibility, adequacy, affordability, suitability, and sustainability.

To give an indication of how many applicants ultimately end up in social housing, we examine the outcomes for applications in 2012/13. We see that **68% have subsequently entered social housing,** a very small number were still on the register at 30 June 2015, and the remaining 31% exited the register without moving into social housing (about two-thirds due to non-response, and the remaining third because they either withdrew their applications, found private housing, or became ineligible).

Table 1.4 Register differences by region

Region	Population (Census 2013)	# social houses (occupied)	Houses per 1,000	New applications in 14/15			Active at valn date			Avg dur of applns active at 30-Jun-15, yrs	Ratio Active ÷ New
				Number	Per 1,000 popln	Percent Priority A	Number	Per 1,000 popln	Percent Priority A		
Northland	168,300	2,080	12.4	375	2.2	67%	139	0.8	45%	0.9	37%
Waikato	439,100	3,920	8.9	624	1.4	64%	256	0.6	41%	0.6	41%
East Coast	287,100	2,850	9.9	469	1.6	66%	190	0.7	59%	0.5	41%
Bay of Plenty	207,400	3,920	18.9	792	3.8	69%	190	0.9	54%	0.3	24%
Taranaki	115,700	1,900	16.4	286	2.5	77%	54	0.5	56%	0.1	19%
Central	234,500	1,970	8.4	311	1.3	73%	42	0.2	64%	0.2	14%
Wellington	496,900	7,920	15.9	994	2.0	72%	235	0.5	57%	0.4	24%
Nelson	132,100	1,420	10.7	240	1.8	68%	61	0.5	52%	0.4	25%
Canterbury	586,400	5,600	9.5	1114	1.9	75%	522	0.9	62%	0.6	47%
Southern	312,300	2,390	7.7	376	1.2	62%	77	0.2	48%	0.4	20%
Auckland	1,569,900	29,670	18.9	3298	2.1	63%	1,704	1.1	44%	1.0	52%
Total	4,549,700	63,640	14.0	8879	2.0	68%	3,470	0.8	49%	0.7	39%

There are notable differences in the register by region, as shown in the table above. Auckland and Northland have the longest average wait time for those currently on the register; the Auckland result arises despite having a high number of social housing places per capita. Canterbury has had high register application levels in 2014/15, relative to historical levels.

1.7 Right place

1.7.1 About 'matching'

Ideally, a social housing system should have social housing places in the right locations and of the right size to meet future demand. The reality is often different: investing in housing stock is a long-term prospect, and assets are not easily shifted from place to place as needs change. The available places are driven by where current tenants are exiting and it is difficult to effectively buy and sell places. The composition of households evolves over time, so an appropriately sized place today may not be appropriately sized in ten years' time. Projecting future demand can be difficult, as it is driven by a number of factors that are hard to forecast.

By separating the supply management role from the demand management role, housing reform seeks to diversify the provision of supply and increase responsiveness to demand. 'Matching' statistics are designed to support MSD in introducing a more active approach to managing the housing portfolio.

1.7.2 Key findings

While short term matching is not enough to quantify long-run future housing need, our main findings are that:

- **About 45% of social housing places are well matched.** This means that 45% of social housing places are occupied by households whose bedroom need equals the number of bedrooms in the property. Converting this analysis to a dollar-weighted basis, we find that **84% of total market rent on social housing places is well matched.** Future valuations will monitor match rates over time.
- As shown in Table 1.5, **there are too few 1- and 4-bedroom places, and too many 2- and 3-bedroom places.** While 80% of the housing portfolio has 2 or 3 bedrooms, less than 50% of current households actually need 2 or 3 bedrooms.
- **Underuse is forecast to be stable over time.** In the next valuation we will be able to assess the change in the matching rate, both relative to current levels and against our projection.

It is important to note that while the results suggest a significant level of underutilisation this is based on the recorded data as disclosed by tenants. It's possible that a number of the "empty" bedrooms are occupied. It is similarly possible that houses that appear well matched based on the data are actually over-crowded.

Table 1.5 Occupied houses at the valuation date, split by current number of bedrooms and need

Bedrooms current	Bedrooms needed 1	2	3	4+	Number
1	97%	3%	0%	0%	5,676
2	55%	35%	8%	2%	23,917
3	13%	27%	38%	22%	26,664
4+	3%	7%	18%	72%	7,442
Total need	22,191	16,037	13,518	11,953	63,699

Matched
Overcrowded
Underused

Regionally, Auckland is better than average for matching. This is partly due to a higher percentage of 4 bedroom (or more) properties – 16% of the social housing portfolio is comprised of 4 bedroom (or more) social housing places compared to 8% for the rest of New Zealand.

Results are more variable for client segments. NZ Super households tend to have high underuse rates, often because children who previously required rooms have left. Match rates are good for Sole Parent

Support recipients, while underuse is fairly high for Supported Living Payment recipients[7]. Overcrowding appears worst for working age tenants not on a main welfare benefit.

'Idealised purchasing' is another way to understand the future housing need by size and location. This is a thought exercise that assumes perfect flexibility in buying and selling properties between tenancies. Its purpose is to establish what the ideal housing supply requirements would be to perfectly match demand. This assumed flexibility to reconfigure housing stock is not feasible in reality—but is nevertheless instructive in understanding the gap between current supply and future demand, in order to inform planning and develop purchasing intentions. This functionality has been provided to MSD.

1.8 Method

At its most basic level, the valuation approach involves the following steps:

1. **Identifying the number of New Zealanders** who have interacted with the social housing or benefit systems over the previous year.
2. **Predicting the number of new applicants** to the housing register, for every year through to the end of the projection, who aren't already included in the projection.
3. **Predicting the housing and benefit system 'state'** (as defined in Figure 1.8) in each projection quarter for these clients.
4. **Estimating payments** to these clients, for each projection quarter. These are initially estimated in 30 June 2015 dollar values, but subsequently adjusted to allow for inflation from that date to the date of payment. Housing payments modelled include all IRRS, AS and TAS payments.[8]
5. **Discounting the inflated payments** to allow for the time value of money.
6. **Adding an amount** to cover IRRS paid to community housing providers (CHPs), and MSD expenses.
7. **Running additional analyses** for items such as notional liability and scenarios.

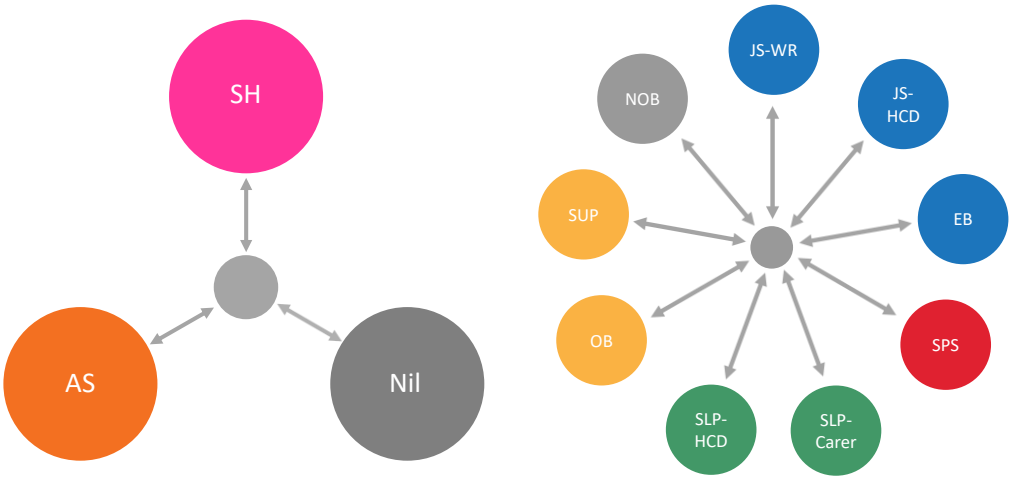
We have built a combined welfare-housing projection model since housing pathways will influence welfare pathways and vice versa. This is justified by the heavy overlap in population plus the strong predictive effects (both welfare predicting housing movements, and housing predicting welfare outcomes).

Thus each quarter we model the evolution of housing state (three possibilities – in a social housing place, receiving AS, or neither) and welfare benefit state (nine possibilities). These are shown in Figure 1.8. We use this to simulate pathways and costs for individuals and households.

[7] Potential reasons for some of the underutilisation for this group could include having an additional room for carers or storing medical equipment.

[8] Note that the scope of payments included in the *models* is broader than the scope included in *liability estimates* for both a) the benefit valuation (models now include AS/TAS payments to beneficiaries above retirement age as these are required for the social housing valuation); and b) the housing valuation (models include AS/TAS payments to beneficiaries even if they are not in or close to the social housing system).

Figure 1.8 Housing states (left) and welfare benefit states (right) in the valuation quarterly transition model



The probability models that drive these pathways depend on a large number of predictors that include demographics, benefit and housing history and macroeconomic factors.

1.9 Reliances and limitations

The housing data is less reliable than the data on benefit receipt. This is largely a result of how the housing database was created – via the combination of data from several different legacy systems, followed by matching to the benefit database by name and date of birth.

Potential methodology improvements – particularly household dynamics – may be possible in future valuations. These methodology adjustments may alter results, although we should be able to isolate and quantify the impact of any changes.

More generally, actuarial estimation of liability is subject to influences whose effects cannot be determined with complete accuracy. Consequently, **it is a virtual certainty that the ultimate liabilities will depart from any estimate –** but the extent of this departure is subject to uncertainty. Note that if potential outcomes and their relative likelihoods were expressed as a probability distribution, we would consider our liability estimates to be the mean of that distribution. That is, the estimates provided in this report contain no deliberate bias towards over- or under-estimation. Moreover, valuations become increasingly accurate over time, and perhaps more importantly, in any event provide useful insight into the relative impact of various changing drivers of behaviour and cost compared to forecast.

2 INTRODUCING THE SOCIAL HOUSING VALUATION

INSIDE THIS SECTION

2.1 Introduction

2.1.1 About this report

This report is the first ever **life-course valuation of New Zealand's social housing system**. The valuation is an estimate of the total future housing-related costs for households currently in or close to the social housing system (on the social housing register or in a social housing place during 2014/15). **Income-related rent subsidy** (IRRS) and **Accommodation Supplement** (AS) are the largest components of these housing costs.

This valuation is broader in scope, but similar in nature to valuations of the working-age benefit system which Taylor Fry has conducted over the past five years for the Ministry of Social Development (MSD)[9]. These valuations are the principal evidence base on life-course transitions, costs, and patterns of vulnerability underlying the '**investment approach**' to reducing long-term benefit receipt. The investment approach is the evidence-based policy and delivery framework underpinning New Zealand's Welfare Reform, introduced in response to a 2011 recommendation from the independent from Government Welfare Working Group.[10]

Since then, this type of thinking has expanded across New Zealand's social sector. The Treasury notes *"[s]ocial Investment is about improving the lives of New Zealanders by applying rigorous and evidence-based investment practices to social services."*[11] Actuarial valuations – a tool from insurance and social insurance – have been adapted to provide intelligence to assist management in making policy and operational decisions, such as investment decisions. Originally used to understand the long-term financial obligations of social insurance and private insurance schemes ('**future liability**') to ensure their financial sustainability, **valuations** are best practice in modelling long-term risk and costs.

In the social sector context, such valuations introduce a long-term, whole-of-system view that is relevant because of the long-term dynamics of social disadvantage and service usage. They provide visibility of expected future trends, and create a feedback cycle that shows the long-term implications of policy and operational decisions. They also provide insight into concentrations of risk and cost, which management can use to guide its decisions on how to improve social outcomes and financial sustainability.

[9] The most recent valuation at http://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2016/2015-valuation-of-the-benefit-system-for-working-age-adults.html
[10] Welfare Working Group, *Reducing Long-Term Benefit Dependency*: http://igps.victoria.ac.nz/WelfareWorkingGroup/Downloads/Final%20Report/WWG-Final-Recommendations-Report-22-February-2011.pdf
[11] The Treasury, *Social Investment:* http://www.treasury.govt.nz/statesector/socialinvestment

"An actuarial approach can be thought of as a disciplined framework for estimation, monitoring and re-estimation of uncertain long-term costs. The investment approach applies this actuarial discipline to the social sector. It is based on the premise that making long-term financial signals transparent can encourage better investment decisions based on a long-term view of outcomes. The policy and operational implication is that investing upfront to improve outcomes for vulnerable populations can offset long-term social consequences as well as costs."[12]

The social housing sector is the second sector in New Zealand to introduce such a valuation. The **purpose** of this valuation is to provide information about projected lifetime housing pathways and costs. Its broader scope includes other related information, such as long-term projections of the demand for social housing places that assist MSD management in making investment decisions about the sector. This first valuation sets a baseline that, in future, will become the basis for understanding how the social housing portfolio is evolving over time.

The **purpose of this report is to:**

- Estimate the lifetime housing cost of those in or close to the social housing system in 2014/15 (as defined in Section1.2)
- Estimate various types of unmet need in the social housing system, where known
- Assess how well the existing housing supply is matched to current and future demand
- Forecast demand to help inform MSD's purchasing intentions for housing places, and inform providers' asset investment decisions
- Highlight the key drivers of long term cost and trends observable over time
- Provide a baseline for measuring the long term impact of future policy and operational changes.

The valuation reports lifetime housing cost at a household level – that is, the sum of the individual lifetime costs for those in a given household. The valuation does not project all future AS – only those AS payments attributable to people currently in or close to the social housing system.

2.1.2 Overview of report

This report contains the following sections

1. **Executive summary –** The social housing valuation and this year's findings in brief
2. **Introducing the social housing valuation –** A high level overview of the valuation method and an introduction to the rationale, key concepts and valuation metrics and an explanation of how they are useful in managing the social housing system
3. **Right duration –** Analysis of the total future cost and trends influencing the evolution of the portfolio, and insights into social housing pathways
4. **Right person –** The social housing register, drivers of need, and analysis of known unmet need.
5. **Right place –** Analysis of how well the current portfolio of Housing New Zealand (HNZ) and housing places purchased from Community Housing Providers (CHPs) matches current and future demand for housing places.
6. **Sensitivity and scenarios –** Analysis of variability in our estimates; that is, how they would change based on changes to key underlying assumptions such as rental assumptions
7. **Other costs –** Investments in products and services to actively manage the social housing system to improve outcomes, and discussion of other operating expenses
8. **Interactions between housing and welfare –** Understanding how housing status influences welfare trajectories

[12] Taylor Fry, *Actuarial advice on feasibility: A long-term investment approach to reducing the harm associated with crime*, Treasury and Ministry of Justice, New Zealand, 15 April 2015: http://www.justice.govt.nz/justice-sector/investment-approach-to-justice/documents/taylor-fry-feasibility-report

9. **Method –** An explanation of the valuation approach, important design parameters and underlying assumptions
10. **Reliances and limitations –** Understanding the limitations to the data and method for producing forecasts
11. **Glossary –** An explanation of key terms and acronyms.

Separate to this document, there are also a number of appendices which cover in more detail the modelling approach, projection assumptions, detailed results, background, and valuation scope.

2.1.3 About Section 2

To our knowledge, this is not only the first life-course valuation of New Zealand's social housing system, but the first ever actuarial valuation of any social housing portfolio on a client lifetime basis. Consequently, the introductory section is quite detailed this year; the concepts and design of the valuation are relatively complex. Principally, this section explains the rationale for introducing a valuation in the social housing sector, how it works, and how MSD can use it to manage the social housing portfolio.

Section 2 outlines:

2.2 **Context and rationale –** The rationale for introducing an investment approach and a valuation in the social housing sector
2.3 **Background concepts** – An explanation of the conceptual building blocks of the valuation, such as the current and future valuation population, social housing payment types, client segments and regions
2.4 **Key metrics and management applications –** An explanation of the metrics this valuation introduces and how they relate to each of MSD's three housing functions:
- » Actively managing tenant **pathways** to independence
- » Managing the **register** to address housing need
- » Matching people to housing **places**

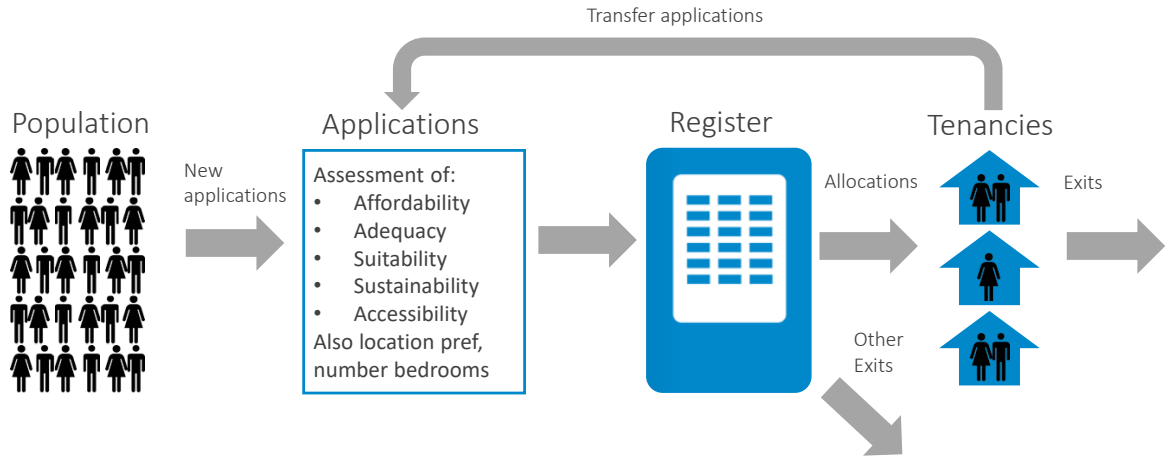
2.5 **Valuation design –** An overview of the method and a discussion of its strengths and limitations
2.6 **Future developments** – An explanation of how the valuation findings can be used by MSD to manage the housing sector, and plans for future development of this and other social sector valuations.

2.2 Context and rationale

2.2.1 Social housing pathways

This valuation models New Zealanders' life-course pathways through the social housing system, and the costs associated with these transitions. Figure 2.1 describes the flow of people through the social housing system via the application process, on and off the register and into and out of social housing. Note that the schematic is simplified; in reality the system is more complex than the illustration suggests; for example, there are pre-assessment stages such as screening, emergency housing and advice before an application is made.

Figure 2.1 Schematic of social housing register and tenancies



Social housing is provided by **Housing New Zealand** (HNZ), and more recently also by **Community Housing Providers** (CHPs). Tenants' rent is determined based on market rents in comparable housing. However the amount of rent tenants actually pay – called '**Income-Related Rent**' (IRR) – is based on their household's income to ensure affordability for low-income families. The difference between market rent and IRR is subsidised by the Government – this subsidy is called the '**Income-Related Rent Subsidy**' (IRRS). Most tenants contribute 25% of their income in rent, with the difference between this and the market rent being the IRRS. '**Market renters**' are those who cover the market rent themselves; because their income is high enough, for non-compliance reasons, or by choice. These households' IRRS is zero, but they are still housed in an HNZ place.

'**Housing places**' – access to social housing is not an entitlement[13], that is, the number of households that can receive the IRRS at any given time and the specific housing places attached to the subsidy are managed within a financial envelope. There is an application process based on need to determine which households are eligible for social housing. Households who are eligible, but do not yet have a place in social housing, are placed on the '**housing register**'. The 'social housing register' also includes tenants who are already in social housing and are waiting to move to a different housing place. Aggregate liability/notional liability estimates do not double count households who are currently in social housing but also on the transfer register.

For low- and modest-income households that are *not* housed in social housing, there are other housing-related payments to assist with housing affordability:

- **Accommodation Supplement** (AS): A supplementary benefit paid to assist with the cost of housing. It can go towards rent, board or mortgage payments. It is often (but not always) paid in conjunction with a main benefit e.g. Jobseeker Support. The payment varies with income, household type and region.
- **Temporary additional support** (TAS): A type of hardship benefit paid to beneficiaries, primarily to assist with housing-related costs.

[13] This is an important difference from demand-driven working age benefits — which are available to all who qualify – in interpreting long-term financial trends in the sector.

2.2.2 An investment approach to social housing

Social Housing Reform Programme

The Social Housing Reform Programme[14] introduced a suite of changes to increase the diversity and supply of social housing in New Zealand and provide better housing services to tenants. The key objectives of the reform programme are:

- **People who need housing support can access it** and receive social services that meet their needs
- Social housing is of the **right size and configuration**, and in the right areas, for households that need it
- Social housing tenants are **helped to independence**, as appropriate
- There is **more diverse ownership** or provision of social housing
- There is **more innovation and more responsiveness** to social housing tenants and communities
- The **supply of affordable housing is increased**, especially in Auckland.

The aim of social housing reform can be summarised simply as: right person, right place, right duration. That is, to provide appropriate housing for the highest need households in New Zealand for the duration of their need.

A new role for MSD in managing the social housing system

Through the reform, some responsibilities for the management of social housing have moved from HNZ to MSD. While HNZ continues to manage the social housing portfolio, MSD is now the **purchaser of housing places** – taking over this role from HNZ. By separating the supply management role from the demand management role, this reform seeks to diversify the provision of supply and increase responsiveness to demand. It also allows a greater role for CHPs as a seller of housing places along with HNZ.

Developing the social housing portfolio is a long-term project. In order to ensure the requisite supply is available for MSD to purchase, MSD has a new role in forecasting demand and setting purchasing intentions that signal its long-term requirements in advance to the market.

This new arrangement provides an opportunity to diversify the provision of social housing to include specialised providers who can potentially address specific underlying drivers of social housing need over and above low-income – such as addiction, family violence, prisoner re-integration, mental health, and accessibility. The integration of the social housing system with the benefit system will also enable new options for working with clients who have both welfare and housing needs by opening up new, more integrated, avenues for addressing low income. For example, in July 2016 Government introduced new funding to "*ensure that community organisations - working alongside central and local government - will be able to tackle the causes of homelessness, from employment, through to health factors like addiction and mental health issues.*"[15] Future valuations will be influenced by the effects of such changes.

[14] See http://www.socialhousing.govt.nz/

[15] https://www.beehive.govt.nz/release/supporting-better-housing-outcomes

MSD has three key functions in relation to managing the social housing system:

- **Managing the social housing register** – determining which applicants to social housing are eligible and have the highest need, with the aim to reduce unmet need for social housing ('the **right person'**).
- **Purchasing social housing places** – allocating eligible applicants on the register to social housing places in HNZ or CHPs and matching applicants to their properties, with the aim to ensure people who need housing are matched to suitable places ('the **right place'**); forecasting demand and setting purchasing intentions to ensure an appropriate supply of suitable places to purchase going forward.
- **Helping tenants –** working with tenants to move toward improved housing stability and eventual transition to independence, including reviewing tenancies as required ('the **right duration'**).

The social housing valuation is designed to assist MSD to carry out each of these three functions.

The Government recently announced an increase to the number of social housing places it would purchase[16], but there still remain annual limits to expenditure. Even with increased expenditure in the social housing sector, there is a question of fairness in allocating a limited resource: should housing places be prioritised for long-standing tenants who might be ready to be housed independently, or for new applicants on the register who are in crisis housing situations? These are the types of trade-offs that MSD management faces in making investment decisions about the sector.

Moving from a passive to an active social housing system

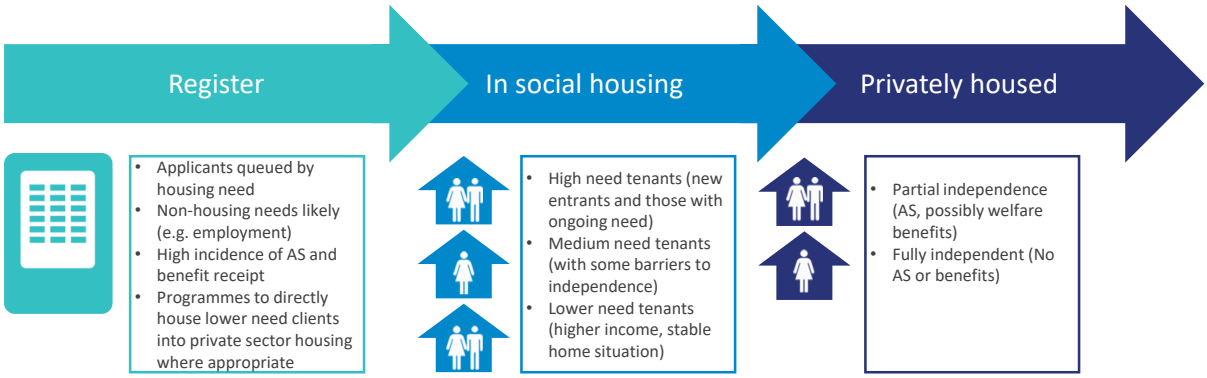
Perhaps the most fundamental reform in terms of underlying policy rationale is the concept of '**right duration'**, which refers to housing people only for the period of their need. This is a break from tradition in New Zealand, where social housing tenants could once expect to remain in 'housing for life.' In part this is because state-subsidised housing is costly – total social housing rental subsidies were about $710m in 2014/15. Additionally there is significant government capital locked up in property for social housing. Also there is a financial constraint on the total social housing places available; which has increasingly come under pressure particularly in high-cost housing centres such as Auckland.

In income support systems across the OECD, there is a broad consensus that 'active' support for unemployed people that encourages those who are able to find work to do so is preferable over 'passive' income support only, which can contribute to long-term benefit receipt and correlated poor social and health outcomes. In some ways, New Zealand's social housing reform mirrors this trend towards active management of benefit systems through labour market programming. That is, it considers the role of providing supports that address the underlying low-income driver of housing need rather than simply providing 'passive' long-term income support in the form of housing subsidies.

Households' pathways through the social housing system are illustrated in Figure 2.2. This new, active model is based on understanding these pathways from a lifetime perspective, and encouraging progress towards independence, where appropriate, by addressing the drivers of housing need – the conceptual basis for an investment approach in the social housing sector. That is, taking a long-term view of pathways and underlying drivers of risk enables MSD to invest up front to reduce long-term social disadvantage and related service costs.

[16] https://www.beehive.govt.nz/speech/next-steps-social-housing

Figure 2.2 Schematic of pathways towards housing independence



Entry into social housing establishes a potentially long-term stream of payments. We refer to the liability as the sum of these projected long-term payments. Understanding the liability, the drivers of change to the liability, and the concentrations of risk and cost, can help MSD to better manage the financial sustainability of the system. At the same time, the underlying business intelligence – projections of household level pathways and costs over a lifetime – provides valuable insights into what drives the need for social housing, long-term pathways, and which measures are most effective in improving tenants' pathways towards independence.

Households enter the register, and in due course social housing, because they have a pressing housing need – which could be related to income and/or other factors such as safety and accessibility. A new household entering social housing receives the relevant level of IRRS for their rental costs and household size. Given that it is allocated based on need we would expect that, typically, this would be at the higher end of possible IRRS support levels for the house size and local rents. Additionally, housing itself can be an investment in a household, giving them a stable platform to address other types of need (for example, improving health, accessing training and education) which in turn helps the household move closer to housing independence). Moving closer to independence while in social housing may take the form of paying a greater share of market rent (thus reducing IRRS), or becoming a market renter (reducing IRRS to zero). In time a household may have become sufficiently stabilised to be housed independently outside of the social housing system – freeing up a place for another household with more immediate needs. In these instances, a decrease in lifetime housing cost compared to expected would reflect an improved pathway towards independence.

In other cases, internal MSD analysis shows that vulnerable households in crisis may cycle in and out of social housing. In these cases, an exit is not correlated with meaningful independence, in that re-entry is probable. In still other cases, social housing may be required long-term. It is worth noting that a decrease in lifetime housing cost in either instance would not necessarily be correlated with a positive social outcome. Effective management of the portfolio requires differentiating between households' needs in each of these cases and customising approaches based on clients' needs. Client segmentation offers the opportunity to 'carve out' vulnerable groups from liability estimates to ensure that analysis of change in the liability is consistent with the objective of increasing independence – where it is an appropriate outcome for that household.

Active management of social housing seeks to address client needs at each stage, while also encouraging households who are able to progress towards independence. To encourage such progress, the Government has: introduced new products to facilitate connecting people on the register to alternatives to social housing; improved the potential to provide 'active' support to tenants; and instigated tenancy reviews to support those no longer eligible for social housing to seek independent housing in the private market.

An 'active' approach to managing the social housing system encourages transitions towards housing independence by:

- Offering alternative services to social housing for potential applicants, where appropriate
- Addressing risk factors underlying the need for social housing, where possible, to stabilise tenancies
- Progressively increasing tenants' earnings, for example, by prioritising social housing tenants for employment supports
- Encouraging tenants to exit social housing when they no longer need it, for example, by reviewing existing tenants' ongoing eligibility for social housing.

2.2.3 Investment decisions

The overarching purpose of the housing valuation is to provide a robust evidence base on long-term housing dynamics and costs to inform investment decisions in managing the housing sector. Such investment decisions include:

- **Which applicants to place in housing** – what determines 'need' for social housing? Where is housing most valuable as a social investment that improves households' quality of life and reduces the risk of poor outcomes such as family vulnerability, crime, victimisation and long-term unemployment? Where are there alternative supports (such as employment supports) that may address the underlying drivers of need for social housing?
- **How to work with tenants in housing places** – what are the best types of housing support in different situations? Are specialised housing supports or interventions required to improve lifetime outcomes for vulnerable families and improve their likelihoods of employment and housing independence?
- **Which housing places to purchase in the near and long term** – how many, where, for which types of household configurations, from which providers, and which types of special considerations come into play (for example, tenants with special needs)?

The benefit system valuations have shown that projecting patterns of service usage over a lifetime provides valuable insight into what drives long-term patterns of reliance on social supports. In some cases, such as people with severe disabilities, such long-term reliance is consistent with a social contract to support those in need to have the best possible quality of life. In other cases, such as long-term unemployment of employable people, a concentration of service usage may be a reflection of poor social integration that may be preventable, and prevention could significantly improve quality of life.

Social housing has both similarities and differences to the benefit system. As noted earlier, most of the households in the social housing system are also receiving benefit payments, or have done so in the past. There are similar drivers of risk. Patterns of social housing and benefit receipt can both be very long-term in nature – thus similar statistical modelling tools can provide insights into long-term pathways in both systems. There is also the opportunity to reduce the duration of exposure and long-term costs in some cases through investments in employment programmes, training, education; or other supports that address underlying drivers of risk such as family violence, health, addictions, and mental health issues.

From a systems perspective, the social housing system is very different to the working-age benefits system. While benefits (including AS) are 'demand-driven' (everyone who meets the eligibility conditions can receive a benefit), there is a constrained supply of social housing places, and the allocation of IRRS needs to be managed within a financial envelope. This heightens the need to ensure that housing support is well targeted and that policy changes are supported by evidence of improvements.

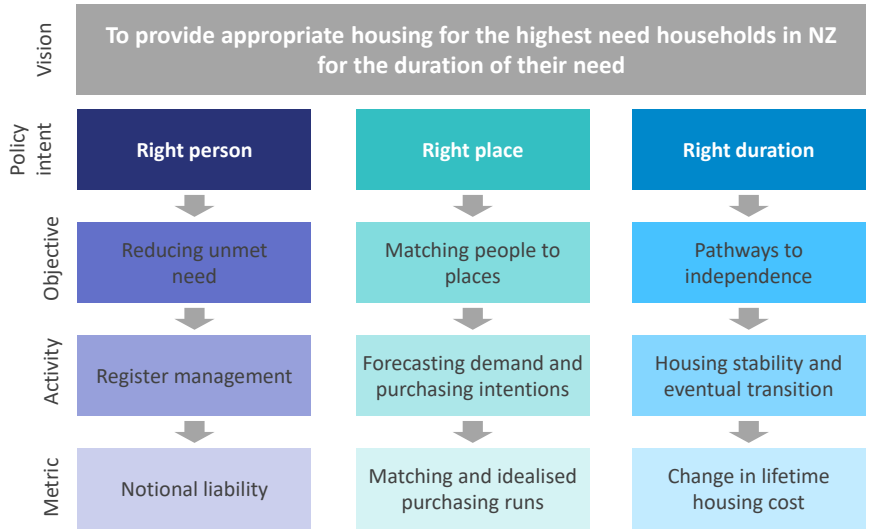
The design process for this valuation is the culmination of an extensive consultation with MSD and stakeholders, including HNZ, the Treasury and the Ministry of Business, Innovation and Employment. Long-term 'signals' are an important part of the architecture of the investment approach – whether used for information or to set performance targets. The focus at this early stage has been to design metrics that provide insight that is useful in managing MSD's functions, and informing investment decisions in

the sectors in such a way as to align with the policy intent of the reforms discussed thus far in this section.

2.2.4 Valuation metrics

The social housing valuation introduces three core metrics. Each metric corresponds to one of MSD's key management functions in relation to the social housing system. Figure 2.3 illustrates how each of the metrics relates to MSD's activities and objectives.

Figure 2.3 Valuation metrics for social housing objectives



Sections 2.4.1 through 2.4.3 explain each of these metrics in turn at a high level. We note that some are quite complex. Section references are provided to refer readers to more complete explanations in each of the relevant sections of the report. For ease of presentation, we will discuss the metrics in the following order in this section and throughout the report: 'right duration', 'right person' and 'right place.' First, however, we introduce readers to important background concepts in the social housing valuation.

2.3 Background concepts

2.3.1 Valuation scope

Current valuation population

The **current valuation population** consists of those households who at some time in 2014/15 were in a social house or were on the social housing register.

- There were 63,700 households in social housing (excluding CHPs) at the valuation date (30 June 2015).
- Another 3,900 households were on the register at the valuation date (including 300 temporarily off the register, but returning in the subsequent two months).
- Additionally, there were another 22,000 adults who have been in a social house or on the register sometime in 2014/15[17], but weren't at the valuation date.
- In all, this is about 150,000 adults[18], 81,000 children and 67,500 households in the 2015 valuation.

[17] These numbers differ from MSD statistics due to differences in how client status is determined for the purpose of our modelling. Please see Section 9.5.7 for further detail.
[18] We generally include signatory youths (aged 16 or 17) as 'adults' in our commentary.

The valuation projection is done at individual level, but with households linked – this report is primarily at the **household level**. This introduces a new lens compared to the benefit system valuations to date – and an added layer of complexity. Changing household composition is highly significant in understanding changing housing needs.

There is a large overlap with the benefit system valuation population – 63% of the primary householders in this valuation are also included in the benefit system valuation. A further 19% of the primary householders are receiving NZ Super. As such, we estimate full lifetime cost for social housing, as many tenants stay in social housing till advanced age. This is in contrast to the working-age benefits valuation, as these benefits are only available up to age 65.

Future valuation population

While the 'main estimate' for the lifetime cost of the housing system includes only current households (as defined above), we also project social housing entry and tenancy for **future** households. That means households expected to enter the register or establish a social housing tenancy each year for the next 100 years. This is necessary to understand future demand and where future housing places might be needed, but is not included in estimates of the aggregate liability or aggregate notional liability.

Housing places

At the valuation date there were 64,684 social housing properties (excluding those not available, such as those for sale), with 734 of them unoccupied and 63,950 of them occupied[19]. Of these social housing properties, 99.6% are managed by HNZ and 291 are managed by CHPs. It is the Government's intention that an increasing share of social housing be provided by CHPs over time (in addition to approximately 2800 HNZ properties formally transferred to the Tāmaki Regeneration Company in March 2016[20]). MSD purchasing intentions will help determine the level, location and size of the future housing portfolio.

Social housing register

Households' eligibility for social housing is assessed through the social housing needs assessment – the Social Allocation System (SAS). Need for social housing is assessed across five dimensions (adequacy, suitability, affordability, sustainability and accessibility). Applicants are given a need score out of 20 (with 20 indicating highest need), plus a priority category (A for high priority, B for lower priority). Of the 3,900 households on the register at the valuation date[21], about half had priority A.

Applicants remain on the register until a suitable available place is found (currently about 1,800 placements a quarter), or they are no longer eligible or in need of a place.

Once in a tenancy, transfer applications are sometimes made if the current place is no longer suitable. These are either business-initiated (HNZ or the CHP initiate the transfer) or at the request of the household.

When a household exits from a tenancy (typically after a number of years) that place becomes available for another household on the register.

[19] These are numbers provided to us by MSD. The equivalent numbers used in our projection are slightly different due to data differences at a unit record level.
[20] https://www.beehive.govt.nz/release/auckland%E2%80%99s-t%C4%81maki-housing-transfer-confirmed
[21] This number differs from MSD's official figure, because of differences in how client status is determined for the purpose of our modelling and projections compared to MSD's standard definition. Please see Section 9.5.7 for further details.

Scope of housing-related payments and other costs

There are three key housing-related payment types in scope for this valuation that we attribute down to an individual level:

- Income-related rent subsidy (IRRS)
- Accommodation Supplement (AS) (but only those AS payments attributable to people in or close to the social housing system)
- Temporary Additional Support (TAS).

In addition to the above, we include MSD's **housing-related investments and expenses** in relation to administering the social housing system. These include products and services that assist with housing independence, and expenses associated with MSD's management of the housing sector. These are discussed in Section 7 of this report.

Where this report refers to 'cost' it is in the context of this definition (unless otherwise specified). However, there are broader 'costs' associated with social housing that we have not included, such as:

- Any charge, where applicable, for the cost of capital.
- Housing New Zealand administrative expenses, rates, or costs of repair. This is mainly to avoid double counting; the market rent of a property in the private market typically includes the cost of property management and maintenance by the landlord. However, these costs are potentially important and may warrant future analysis. In particular, understanding how management costs vary across households is useful in developing the role of CHPs in social housing.
- Future costs for renewal and reconfiguration of the current social housing stock.
- Any measurement of 'unknown' demand (for example, the potential housing costs of people who would qualify for a social housing placement but currently don't apply).

As such, care should be taken in using the results of this valuation in making decisions where the above items are important considerations. If the further costs, outlined above, were included, the cost to the Crown of providing social housing is likely to be higher than the costs currently measured in the valuation. Future valuations may include some of these costs.

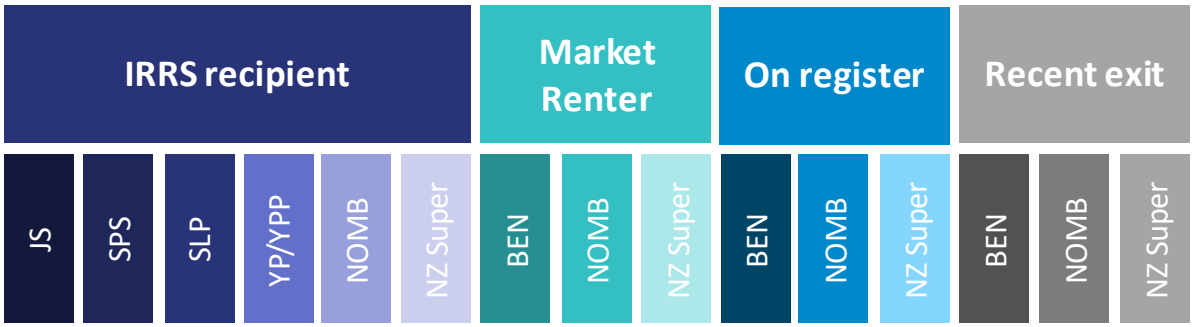
2.3.2 Common breakdowns

For insight into various aspects of the housing system, we often break down the results by 'segment' and region.

Segments

We have split the valuation population into 15 segments to better understand the behaviour patterns of sub-groups – as shown in Figure 2.4. Households are assigned to a segment based on the status of the primary tenant. There are two layers to the segments, a top tier segment based on housing tenancy status and a further subdivision based on benefit receipt (working-age benefits as per the benefit system valuation, as well as NZ Super). Households in social housing places are included in the 'IRRS recipients' segment if they have a non-zero IRRS, or in the 'Market Renter' segment if their IRRS is zero. Households not currently in a social housing place but on the register are included in the 'On register' segment. Households or individuals who are not currently in a social housing place or on the register but were at some stage during 2014/15 included in the 'Recent exit' segment. The glossary (Section 11) gives the meaning of acronyms used here and throughout the report.

Figure 2.4 Tenancy segments



A good segmentation aims to combine both statistical insight (that is, differentiating meaningfully by risk) and operational relevance (that is, utility in customising service delivery responses). This segment structure has been selected to:

» Identify households with low and high future lifetime housing cost (for statistical insight), and
» Incorporate key differences in how MSD approaches service delivery; such as whether the household is in social housing or not, and the level of subsidy (for operational relevance).

This structure also has some overlap with how segments are set up in the benefit valuation. Benefit type is reflective of key reasons for benefit receipt – such as unemployment, health conditions/disabilities, and caregiving responsibilities – as well as differences in work expectations. These factors influence how MSD targets service delivery, and are thus relevant to segment definition in the benefit system. Some of these services overlap – for example, support in finding employment can lift people out of both benefits and IRRS receipt simultaneously to become 'market renters not on benefit', and eventually support their transitions to housing independence in the 'recent exit' segment. Thus benefit type is also a relevant indicator in managing investment decisions in the social housing sector.

The segmentation will be subject to review before the next housing valuation, to ensure segments are as operationally relevant as possible.

Regions

Housing markets vary markedly between regions, and people tend to prefer housing in areas they are familiar with. MSD has responsibility for purchasing intentions, where housing needs are detailed by location and size. For this reason we have modelled down to territorial authority. Further, in the Auckland territorial authority we have subdivided to a local board level. In all there are 85 territorial authorities and boards that we produce forecasts for. In this report 'territorial authority' almost always means 'territorial authority and Auckland local board'.

To summarise our analysis in this report, we often break down the valuation population into 11 regions, based on MSD's Service Delivery regions already built into the benefit system valuation.

2.4 Key metrics and management applications

2.4.1 Right duration

As explained in Section 2.2.4, there are three key metrics discussed in this valuation, reflecting the three key functions of MSD in relation to managing the social housing system. This section focuses on the first of the three: **lifetime housing cost**, which – when aggregated – is the **sum of future cash flows** associated with housing costs for the current valuation population.

The 'right duration' component of the social housing framework (illustrated to the right side of Figure 2.3) looks at lifetime housing pathways. The objective is to manage tenancies actively so as to:

- Make the best use of New Zealanders' investment in social housing as an opportunity to stabilise the risk factors that drive each household's need for social housing, and
- *Where appropriate*, build pathways towards independence from social housing, thereby freeing up spaces from those capable of independence to be available for new entrants with high need.

What is 'lifetime housing cost'?
Lifetime housing cost is the sum of future IRRS, AS and TAS payments for those adults who have been in social housing, or on the register in 2014/15 – at the individual household level. Individual and household-level estimates can also be aggregated into estimates for certain segments of the social housing population.

What is 'current liability'?
Household-level estimates of lifetime housing costs can also be summed into estimates for the full valuation population. Current liability is the total combined cost of future IRRS, AS and TAS payments, plus additional related costs, for all adults who have been in social housing, or on the register in 2014/15.

The valuation uses 'future lifetime housing cost' as a metric to provide insight into household pathways – such as how they are changing over time, and the associated costs with these changes. Forecasting lifetime pathways and costs through the valuation also generates insights into trends in the social housing portfolio and lifetime housing pathways. Analysis of lifetime housing dynamics and costs is the focus of Section 3 of this report.

How can MSD use lifetime cost and liability estimates?
- **To understand lifetime housing pathways**, risk factors and concentrations of risk
- **To target services that stabilise need** – for example specialist support to address underlying drivers of housing need
- **To provide active support to tenants** where appropriate, such as case management or tenancy reviews, and to inform measurement of return on investment
- **To measure change**, understand the relative influence of drivers of change, and track overall performance (this years' valuation provides the initial baseline – in future years this functionality will be available).

These applications – particularly the last two – align with the policy rationale of housing reform. If MSD is effective in reducing the need of households over time (that is, ensuring 'right duration' via moving households towards housing independence, where appropriate), this will be reflected in reductions in lifetime housing costs for those households.

2.4.2 Right person

The 'right person' component of the social housing framework illustrated in Figure 2.3 looks at drivers of need for social housing and seeks to understand and quantify '**unmet need**' (as represented by the social housing register). The objective is to manage the housing register to ensure that housing places are purchased for the households who need them most, but also that services are available – *where appropriate* – to resolve the issues driving housing need so that social housing may no longer be required (such as offering financial assistance for rent in advance or bond payments).

The 'notional' lifetime housing costs are a way of understanding the unmet need for people who are not yet housed in social housing – that is, people on the register and incoming applicants to the register. This answers the question: ***'If this household currently on the register were placed in housing today, what would be the expected lifetime cost?'***

While we can estimate a household's lifetime housing cost (based on when we expect them to enter social housing), there is a notional cost that could be paid if the housing portfolio was increased to house

them today. As with lifetime housing estimates, notional estimates can be expressed at the level of an individual household, or expressed as an aggregate measure.

Monitoring this notional liability also avoids a perverse incentive (that is, an incentive with an unintended and undesirable result) that could potentially arise from using lifetime housing cost alone as a metric. That is, reducing housing placements would reduce lifetime housing cost (as having people on the register is cheaper than having them in housing) – which could create incentives to *reduce* the supply of social housing, counter to the objective of addressing unmet need. However, an increase in the register size would lead to higher *notional* liability, thus countering this risk by offsetting the reduction in lifetime housing cost for tenants.

What does 'notional lifetime housing cost' mean?
The notional lifetime housing cost is the hypothetical lifetime cost of housing all people on the register today. We use the term 'notional liability' to refer to the sum of these notional costs across all households.

An aggregate measure of notional housing liability is intended to bring a long-term perspective to managing the register, and insight into how much it would cost over the long-term to address all known unmet need. In particular, such an aggregate measure introduces the possibility of analysing change over time in the nature, cost, and drivers of unmet need to assist management in developing a more responsive social housing portfolio.

There are other types of notional liability that can be calculated. There are three other cases we estimate in this report:

- **Transfer register applications:** If people are applying for a larger social housing place or have a need to move to a social housing place in a more expensive area, this may indicate an unmet need amongst existing tenants. There are also notional releases (that is, negative notional costs) associated with people applying for cheaper or smaller housing.
- **Overcrowded social housing places:** Some tenancies are overcrowded, even in the absence of a transfer application. There is a notional long-term cost associated with addressing this unmet need.
- **Underused social housing places:** Some social housing properties are underused, even in the absence of a transfer application. There is a notional release (a negative notional liability) associated with moving a household to a right-sized social housing place.

Notional metrics are hypothetical and interpreting them can be counter-intuitive. Notional 'costs' associated with overcrowding can be understood as the additional costs that would be needed to allocate these households to places that suit their requirements. Notional 'release' associated with underuse can be understood as the opportunity cost of inefficiencies currently within the system. That is, the hypothetical financial savings that would arise if households were allocated to places that met instead of exceeded their requirements. This matters because more dynamic management of the portfolio over the long-term would enable these savings to be invested elsewhere in the housing portfolio.

Analysis of the register and unmet need is the focus of Section 4 of this report.

How can MSD use notional estimates and liability?

- To understand the evolution of aggregate need and unmet need
- To quantify reductions in unmet need (once there are additional years of data to compare)
- To understand overall system performance and safeguard against lower intakes to social housing from the register.

2.4.3 Right place

'Matching' measures how well social housing supply is aligned to demand by household size and location. This comprises the 'right place' component of the social housing framework illustrated in Figure 2.3. The objective of matching is twofold:

- To assess on an ongoing basis how optimally the current configuration of housing places suits the needs of current and future tenants
- To forecast demand relative to supply of appropriate housing places to assist MSD in setting purchasing intentions that indicate to the market which housing places will be required in future.

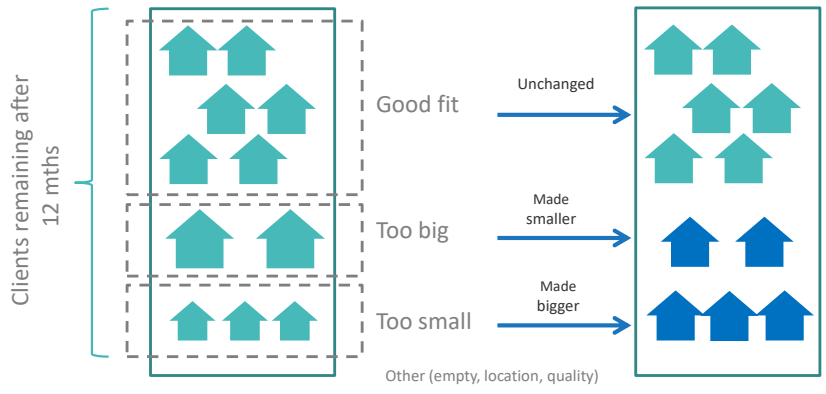
The first step in understanding 'matching' is to measure present levels of overcrowding and underutilisation at the valuation date. This helps answer the question ***'What proportion of households are in social housing places that are appropriate to their requirements?'*** This analysis focuses primarily on the size and location of housing stock relative to household composition. Finer-grained analysis would be required to assess more specific household needs, such as wheelchair accessibility.

We define a **'mismatch'** as occurring if:

- A usable social housing place is empty
- A household is on the transfer register
- A social housing place is overcrowded
- A social housing place is underutilised.

The **net difference** between people's current housing and their appropriate housing gives insight into what optimal purchasing intentions would be for 'today', based on the current configuration of households (as depicted in Figure 2.5).

Figure 2.5 Illustration of the concept of 'matching' – actual vs. optimal configuration today



'Matching' can be projected into the future – this will become a useful tool in understanding how the appropriateness of housing allocation is changing over time. It will also provide insight into the factors driving these differences.

Idealised purchasing runs

'Matching' tells us about how well the current social housing stock compares to current tenants' and applicants' needs. A complementary statistic is the **flow measure**. This answers the question ***'How well will the housing places that become available reflect the future needs of the register?'*** In order to answer this question, we have run our models using a hypothetical scenario that removes the constraints associated with the realities of a tangible housing portfolio that is fixed in place and time. We have performed '**idealised purchasing runs**' where we assume perfect flexibility in buying and selling of properties while they are unoccupied. These help MSD understand where there are expected to be gaps and oversupply in their current housing places.

This is a theoretical exercise that assumes perfect flexibility in buying and selling properties between tenancies. Its purpose is to establish what the ideal housing supply requirements would be to perfectly match demand. This assumed flexibility to reconfigure the housing stock is not feasible in reality—but is nevertheless instructive in understanding the gap between current supply and future demand, in order to inform planning and develop purchasing intentions. Specifically, these can help MSD understand where there are expected to be gaps and oversupply in their current housing places. This functionality has been provided to MSD.

What does 'matching' mean?
The proportion of households that are well-matched (by size of household and location) to social housing places.

What does 'idealised purchasing run' mean?
Illustrative analysis showing the hypothetical net selling and purchasing of social housing properties that would best match social housing places to future need as indicated by the register.

This detailed analysis of current supply versus projected demand is an important source of business intelligence to inform MSD's decisions about which types of housing places to purchase, where, and for how long they are likely to be required.

Analysis of matching and idealised purchasing runs is the focus of Section 5 of this report. While results for idealised purchasing are not reported, this functionality has been provided to MSD for their own internal scenario testing.

How can MSD use 'matching' statistics and idealised purchasing runs?

- To understand how well the current supply of housing stock fits the demand for current housing places.
- To anticipate housing supply and demand trends in the future to help optimise use of existing housing stock for more dynamic management of the housing portfolio.
- To understand – on a medium and long-term basis – where there are expected to be gaps and oversupply in the current housing stock based on projected trends in demand. This is an important new source of business intelligence to assist MSD in setting its purchasing intentions.

2.5 Valuation design

2.5.1 Overview of method

At its most basic level, the valuation approach involves the following steps:

1. Identifying the number of current clients, in the valuation year, who have interacted with the social housing or benefit systems over the previous year.
2. Predicting the number of new applicants to the register, for every year through to the end of the projection, who aren't already included in the projection.
3. Predicting the housing and benefit state in each projection quarter for these clients.

4. Estimating payments to these clients, for each projection quarter. These are initially estimated in 30 June 2015 dollar values, but subsequently adjusted to allow for inflation from that date to the date of payment.
5. Discounting the inflated payments to allow for the time value of money.
6. Adding an amount to cover IRRS paid to CHP providers and MSD expenses.
7. Running additional analyses for items such as notional liability and idealised purchasing.

This section describes how the social housing valuation method builds on the benefit system valuation, key assumptions, and limitations. The valuation method is discussed in detail in Section 8. Reliances and limitations of this method are discussed in detail in Section 10.

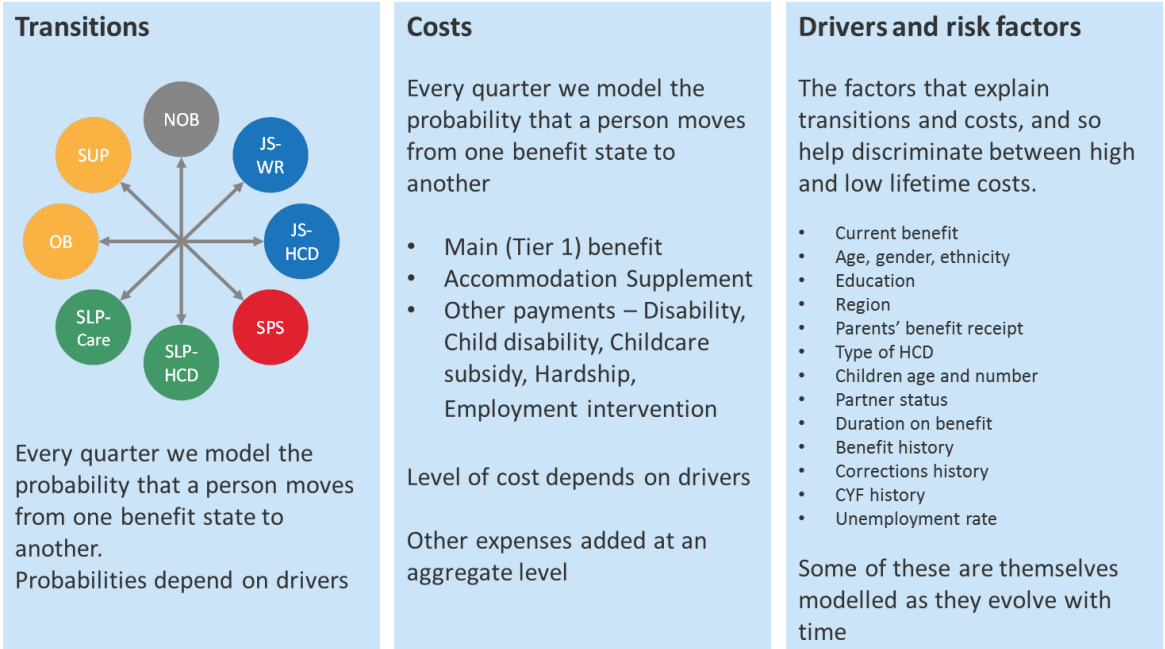
2.5.2 Overview of benefit system valuation modelling structure and components

The approach to valuation social housing payments very much builds on our now-established approach for MSD's benefit system valuations. The current benefit projection is made up of transitions, costs, and drivers/risk characteristics:

» **Transitions** – a beneficiary's primary 'state' in any given quarter; for example 'receiving Sole Parent Support' or 'not receiving a main benefit'
» **Costs** – the estimated cost associated with each 'state' (including supplementary benefits and other costs) in any given quarter
» **Drivers and risk factors** – factors that affect whether or not a claimant is likely to be in any given state each quarter, such as the unemployment rate, their family composition, and the presence of barriers to employment. There are currently about 40 factors in the benefit system valuation; some are static (such as ethnicity), while others are dynamic (such as region).

Figure 2.6 provides a very high level overview of how the benefit system valuation is structured based on beneficiary transitions, costs and drivers/risk factors.

Figure 2.6 Overview of the structure of the benefit system valuation



2.5.3 Overview of the housing valuation model structure and components

The housing valuation includes all of the components described in Figure 2.6 above for the benefit system. Each component has been extended to reflect the additional realities of the social housing sector. The following additional states, costs and drivers/risk factors have been introduced:

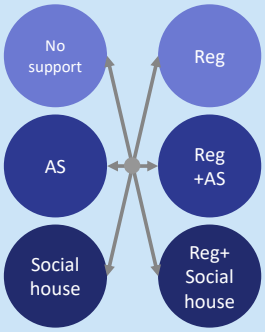
- New **housing-specific transition states** are introduced, such as whether households are on the register, in social housing, and/or receiving AS. Importantly, benefit and housing states are not necessarily mutually exclusive. This is discussed further below.
- There are also new **housing-related costs** to incorporate – predominately IRRS. We distinguish between HNZ and CHP costs. AS and TAS were included in the benefit system valuation previously, but a more sophisticated level of insight into these payment types is required in the housing valuation so these are modelled in further detail.
- Last but not least, there are **additional drivers and risk factors** to consider in understanding housing transitions. A dynamic view of household composition is critical. It is also important to understand characteristics of the property itself, and macroeconomic variables that affect the housing market.

Figure 2.7 provides a high level overview of the new components added to the housing valuation models over and above those already included in the welfare models.

Figure 2.7 Overview of the structure of the housing valuation

Transitions

In addition to probabilities for changing welfare state, we have probabilities for changing housing state



Temporary/emergency housing added when possible

Costs

In addition to existing costs, we model:

- IRRS – HNZ
- IRRS - CHPs
- AS (in better detail)
- TAS
- IRRS debts
- Other MSD housing programmes (case mgmt, incentives)
- Other MSD housing payments (motels, relocation, whiteware)

Other expenses added at an aggregate level

Drivers

Additional housing drivers added:

- Primary householder indicator
- Household (number, children)
- Required # bedrooms
- Actual # bedrooms
- SAS need scores, and other need information
- IRRS
- Current TLA / Board
- Desired TLA / Board
- Housing history (duration, previous spells)
- Housing economic variables (rents, vacancies, deprivation, …)

These have been added to the existing transition and cost models (housing impact on welfare)

2.5.4 Core projection – joint welfare-housing models

The core projection is used to develop a '**central estimate**' of the aggregate lifetime costs of social housing payments, with IRRS and AS being the largest two components. This core projection also generates the related insights about housing pathways at the individual, segment and population level. This approach can be used to calculate future lifetime housing costs.

A key design decision was to combine the benefit system and housing projection models. The substantial overlap between these systems means that considerable insight is gained by a combined approach.

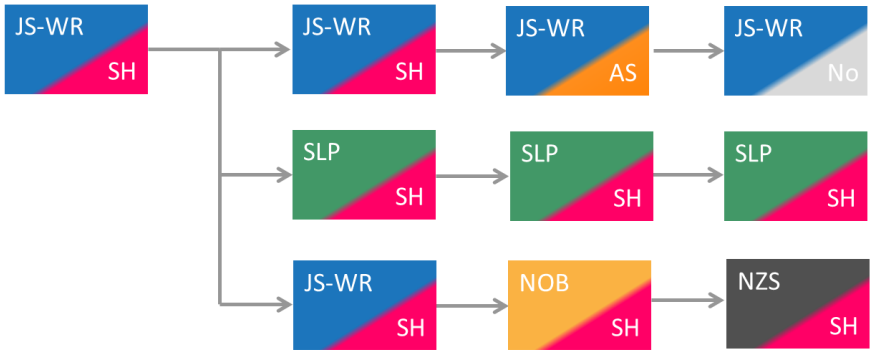
Households may be receiving both a main benefit and a housing-related payment in any given quarter. Both are important in terms of understanding household pathways. As a result, the core projection model projects dual welfare-housing status each quarter. For example, Figure 2.8 shows a pathway in which a primary tenant is receiving both Jobseeker Support – Work Ready benefit (JS-WR) and residing in social housing (SH) in the first quarter of 2014/15. In the second quarter, the primary tenant becomes employed and ceases to receive a main benefit (Not on Benefits - NOB) while still residing in social housing. In the third quarter, the household leaves social housing and receives Accommodation Supplement (AS). In the fourth quarter the household becomes fully independent, receiving neither a main benefit nor a social housing payment (No). This is an idealised pathway demonstrating progressively

greater independence in each state – transitions between these particular states in succession are unlikely to happen so quickly in reality.

Figure 2.8 Illustration of joint welfare benefit and housing quarterly transition states

Since housing trajectories are not actually known, models estimate the *probability* of each possible quarterly transition between benefit-housing states, as illustrated in Figure 2.9. Each of the three tracks reflects a different potential pathway over the year, which we first assign a probability and then a cost estimate.

Figure 2.9 Illustration of joint welfare and housing transition state probabilities for the core projection



Register status is also modelled – both the entry into the register and the waiting time until a household is allocated a house (or exits the register for other reasons).

Finally, payment models for both housing and welfare related benefits are estimated. These are sensitive to both benefit-housing state and the other drivers.

Assumptions for transitions and costs are based on historical rates. They are projected on the basis that clients in the future will behave the same as similar clients today. Transition rates and other factors will change in future years – the annual valuation will then be able to measure the long term impact of these changes.

2.5.5 Projection variations

The central estimate developed based on the main projection uses baseline assumptions for property availability and demand. Other projections help support other elements of the housing report. Two are particularly notable:

- **The notional housing run** is based on a hypothetical scenario that assumes that current unmet need is entirely addressed (that is, everyone on the new and transfer register – plus those in housing in an overcrowded or underused social housing place – are re-allocated to housing that fits their requirements). This gives a notional liability that can be compared to the main projection to provide insight into the differences between actual and ideal states – the difference between 'met' and 'unmet' demand for social housing. It should be noted that there may be additional 'unmet' demand that is 'unknown' because some households in need are not on the register.
- **Idealised purchasing runs** are also based on a hypothetical scenario – in this case an assumption of perfect flexibility in the selling and buying of unoccupied properties, as discussed in Section 2.4.3. By monitoring the state of the register, we can make recommendations of housing swaps (in both size and potentially location) to better meet future need. The result is highly sensitive to the economic assumptions used in the models.

2.5.6 Economic assumptions

For this valuation we require long-range forecasts for:

- Unemployment rates (at the regional level)
- CPI inflation
- Risk-free discount rates (the rates of return on Government bonds)
- Rental growth (for first quartile rent levels, at the territorial authority level)
- Average weekly earnings (AWE).

The first three assumptions are already built into the benefit system valuation and our assumptions are the same as the 30 June 2015 valuation of the benefit system. Unemployment rates are relevant for the social housing valuation because unemployment is an indicator of the overall strength of the economy and a primary determinant of households' need for income and related support. CPI and discount rates are necessary for any analysis of long-term cash flows.

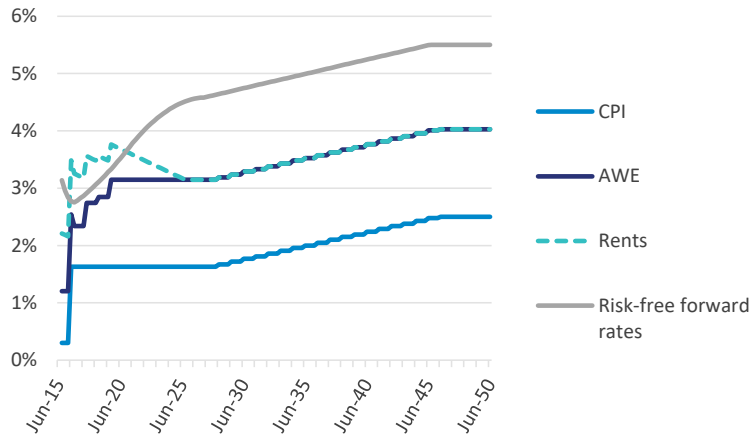
Rental growth is used to project the increase in IRRS and market rents over time for social housing. Movements in local rents at the 25th percentile are relevant to more broadly understanding trends in the housing market that influence housing costs and affordability, as well as availability. AWE is needed to project the income of NZ Super clients, since this index is used to increase NZ Super benefits over time. We have taken AWE from Treasury Budget Economic and Fiscal Update (BEFU) 2015[22]. More precisely, we take the difference between AWE and CPI in BEFU and apply it to our existing CPI forecasts.

The rental growth assumption is:

- The national rate starts at 1.0% above AWE and decreases on a linear basis to AWE at June 2025
- Regional differences (at a MSD Service Delivery region level) are applied for the first two years (decreasing to the national rate), based on the regional differences observed in the two years to June 2015.

Four of these assumptions are shown in Figure 2.10 below.

Figure 2.10 Assumptions for CPI, AWE, Rents and Risk-free forward rates



2.5.7 Reliances and limitations

There are a number of limitations to this valuation approach. Importantly, any long-term projection is inherently uncertain, and highly reliant on the underlying assumptions. Changes to these underlying inputs to the models – such as changes to economic assumptions – will have a material impact on the

[22] See http://www.treasury.govt.nz/government/fiscalstrategy/model/archive

estimates and forecasts. Each successive valuation will analyse the change over the course of the year to these underlying assumptions, and update estimates and forecasts in light of this more recent information.

It is important to stress that *these limitations are more material than the usual limitations* to our benefit system valuation. This is due to a lesser quality of data, additional modelling complexity, and a longer time horizon under observation. Further detail on reliances and limitations – which are the basis of understanding the level of precision and uncertainty associated with various components of these estimates – is provided in Section 10**.**

Data

The individual and household level data have been sourced from HNZ and required extraction from three different databases (the most recent system plus two legacy databases). There are many 'matching' issues (internally and with the benefit system data), as well as missing fields on various tranches. We have attempted to address these issues to the extent possible in our data cleaning – see Section 9.3.

Method

All models are a simplification of reality. While sophisticated, our approach does simplify some important household dynamics. In particular, there are material simplifications in the treatment of:

- Households who will enter social housing in the future
- The evolution of households once in social housing
- Households in social housing managed by CHPs.

These simplifications might materially affect the results – any future improvements to address this would be accompanied by an analysis of change.

2.6 Future developments

2.6.1 Operationalising the valuation

The applications of each of the three key metrics in relation to MSD's key housing functions – that is, 'right duration', 'right person' and 'right place' – were discussed in Sections 2.4.1, 2.4.2, and 2.4.3.

In summary, the goal of shifting to more active management of the social housing system is to:

- Ensure that those most in need have the opportunity to access social housing places – **the right person**.
- Enable more dynamic management of the housing portfolio and better matching – **the right place**.
- Provide a stable platform for those in social housing and encourage transitions to independence for those households who are capable of becoming independent, and by doing so reduce the lifetime cost associated with those households as well as free up places for those in greater need – **the right duration**.

The social housing valuation supports these objectives by providing insight into lifetime housing dynamics and costs, risk and concentrations of risk, and drivers of cost; and how these are evolving.

In parallel with the completion of this report, MSD is considering management implications and related strategy. For example, MSD will use the projection model to assess idealised purchasing (which assumes flexible buying and selling of property) and release its report into feasible and affordable purchasing intentions. With respect to pathways, MSD will need to determine how to configure its portfolio of investments throughout applicants' and tenants' pathways to continue the shift to active management of the social housing system. We anticipate that future iterations of this valuation will adjust as MSD refines its specifications for business intelligence and metrics over time.

2.6.2 Understanding change and key drivers of system-level change

The valuation provides a long-term, whole-of-system view to assist in decision-making at every level of the social housing system. More broadly, coordinated efforts across sectors will enable future work to enhance these insights from a holistic person-centred – and now also household-centred – perspective.

This first valuation sets a baseline – it does not incorporate analysis of change. Future valuations will show changes to key drivers in 2015/16 that influence the valuation result. These include:

- Policy and operational changes – changes to policy and operational settings
- Behavioural changes – changes to social housing pathways and household composition
- Demographic changes – population dynamics such as ageing and migration
- Economic changes – changes to cost/availability of rentals and unemployment rate
- Financial changes – inflation/discount rate assumptions.

2.6.3 Improving and integrating the social housing valuation

Five valuations of the benefit system for working age adults have been completed. Since then, similar thinking has been applied to a number of other government sectors:

- This is the first valuation of the social housing sector.
- The justice sector has commissioned statistical modelling of long-term patterns of crime and victimisation.
- In March 2016, the Government announced an overhaul to the child welfare sector, and its intention to look at vulnerable children's pathways across agencies and sectors from a life-course perspective.

Future valuations will be cognisant of the need for balance between sector-specific insights that relate to the specific mandates and outcomes of agencies, and the client- or household-centred view of interactions across multiple agencies.

In that context, it is expected that the social housing valuation will evolve to respond to feedback about its utility, methodology, and emerging policy and delivery priorities, as well as the opportunities presented by the Government's broader focus on integration and cross-sectoral alignment.

3 RIGHT DURATION

INSIDE THIS SECTION

3.1 Introduction and key results

Section 3 focuses on tenants' lifetime housing progression and their costs. Figure 3.1 shows the headline figures of this years' valuation.

Figure 3.1 The social housing valuation at a glance

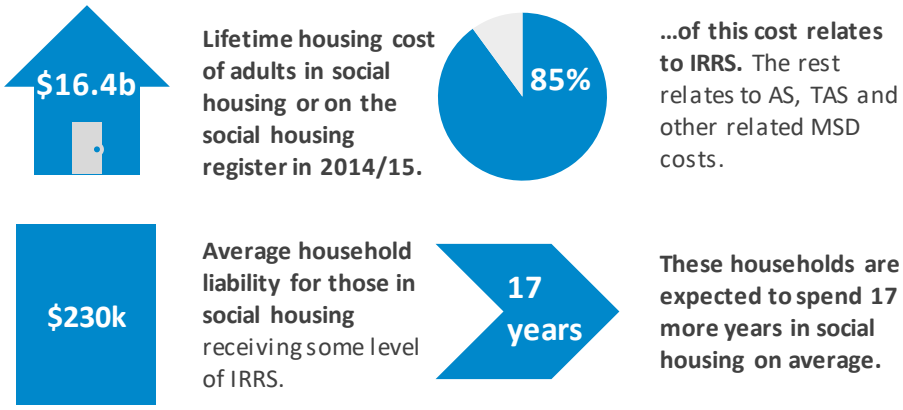
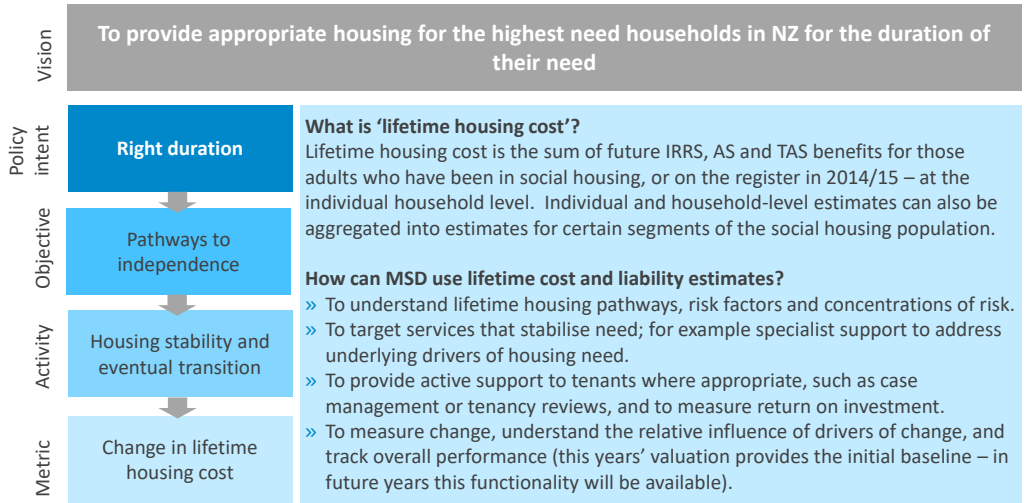


Figure 3.2 recaps the 'right duration' component of the framework discussed in Section 2.4.1.

Figure 3.2 'Right duration'



KEY RESULTS

- The lifetime housing cost of adults in social housing or on the register in 2014/15 is **$16.4 billion**. Around **85%** of this cost relates to **future IRRS payments**.
- For those in social housing receiving some level of IRRS, the **average household liability is $230k**, with an expected 17 more years in social housing.
- The **top five predictors of lifetime housing cost** for people in social housing are market rent, household size, age, IRRS level and welfare benefit history. Some of these factors are interrelated. This analysis is based on available data – further data may be collected and added in future to give further insight into housing-specific drivers of need.
- **There is a large spread between households with high and low predicted costs**. The **top decile** (typically those in housing with high market rent and IRRS) has an average **over $480k** whereas the lowest decile (including older clients on the register) has an average of about $50k.
- Market renters who are otherwise financially independent (in that they are receiving neither a main benefit nor NZ Super) have average future costs of $166k.
- **For those who exit social housing but continue to receive a main benefit**, future expected housing costs are on average **$92k per person,** with an average of **7.5 future years** in social housing– and 12.3 years of AS receipt indicating a high likelihood of re-entry to social housing and/or long-term take-up of AS/TAS payments.
- **Auckland, despite comprising only 35% of the population of New Zealand, represents 60% of the total liability**. The average household liability is 80% higher due to higher IRRS levels, which in turn also lead to longer durations in social housing.
- **Māori and Pacific peoples are heavily overrepresented in the social housing system.** Māori are five times more likely to be in social housing, and Pacific peoples seven times, compared to the average rate for those with European or Other background. Māori and Pacific peoples' households are typically larger (although this is partly because the primary householders are less likely to be older – pensioners typically have smaller households).
- **Housing exit rates have decreased over time.** This is not a behavioural change – it is due to the changing characteristics of people in houses; compared to 15 years ago tenants are older, they have been in social housing longer and they receive more IRRS. These factors mean that a household is 30% less likely to exit in any given quarter, which in turn means a household seeking a social house is 30% less likely to be placed each quarter.
- **Growth in IRRS payment size over time is driven by the growth in market rents.** While growth in the incomes of people in social housing has typically averaged close to CPI, rents have grown significantly faster. In 2002 nearly 9 in 10 households in social housing had IRRS less than $200 per week (in today's dollars – we inflate by CPI). This figure has halved, with less than 5 in 10 households below that threshold in 2015.
- **Households with a Māori primary householder tend to have higher exit rates**. However, Māori are also more likely to exit with poor social outcomes (which could potentially include termination by tenancy tribunal, safety concerns, abandonment, prison, overcrowding, neighbourhood issues, etc.). If exit rates due to poor social outcomes are excluded from the analysis, Māori exit at a similar rate to other tenants.
- Having served **a corrections spell as a result of a criminal conviction is also a strong predictor of an exit which is a socially poor outcome**. 'Prison' is given as a reason for exit in 6% of exits which are socially poor outcomes.
- **Around 1 in 5 households currently in social housing will still be in a social housing place in 30 years' time.**

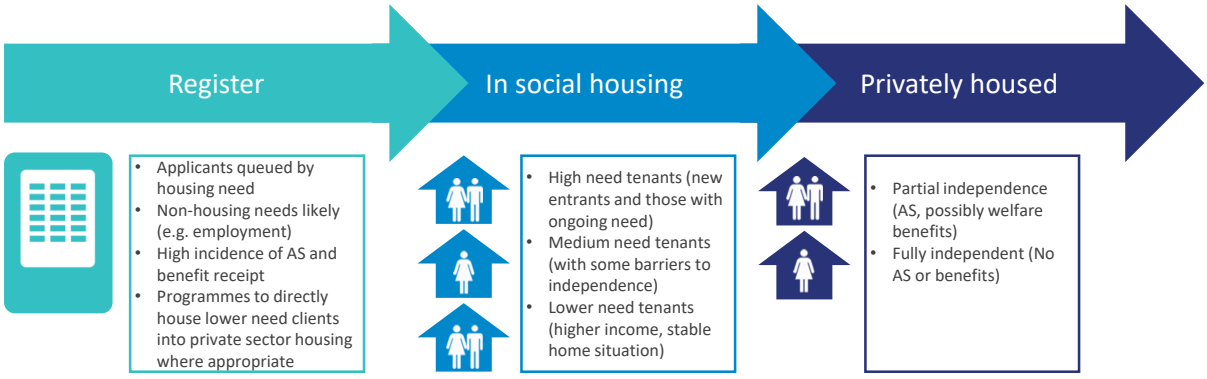
3.2 Building pathways towards independence

As explained in Section 2, there are three key metrics discussed in this valuation, reflecting the three key functions of MSD in relation to managing the social housing system. This section focuses on the first of the three: **lifetime housing cost.**

The 'right duration' component of the social housing framework looks at lifetime housing pathways. The objective is to manage tenancies actively so as to:

» Make the best use of New Zealanders' investment in social housing as an opportunity to stabilise the risk factors that drive each household's need for social housing, and
» Where appropriate, build pathways towards independence from social housing, as depicted in the figure below.

Figure 3.3 Schematic of pathways to housing independence



The valuation uses 'future lifetime housing cost' as a metric to provide insight into pathways, how they are changing over time, and the associated costs.

What is 'lifetime housing cost'?
Lifetime housing cost is the sum of future IRRS, AS and TAS benefits, plus additional related costs, for those adults who have been in social housing, or on the register in 2014/15.

As with the benefit system, at an individual household level, a projection of lifetime housing costs becomes a proxy for the duration of housing-related payments. Household-level estimates can also be aggregated into estimates for certain segments of the social housing population, or the full population.

It is possible to view future lifetime housing cost as a liability figure of future government expenditure. As such, we sometimes use the term 'liability' as shorthand. However, the cost is not a formal part of the Government's balance sheet – for example, given the interactions between social sectors and the overlap in vulnerable populations, a reduction in housing liability could lead to an increased or decreased liability in another sector.

Forecasting lifetime pathways and costs through the valuation generates insights into trends in the social housing portfolio and lifetime housing pathways.

3.3 Valuation population

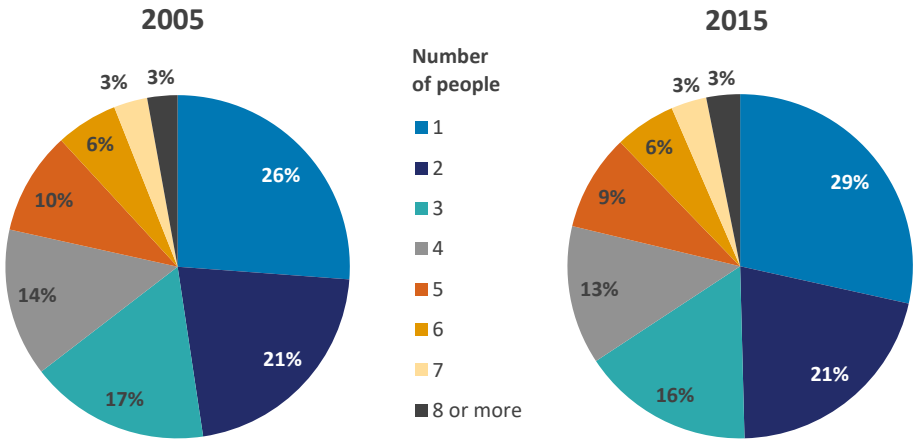
There are slightly over 63,600 households in social housing as at the valuation date (30 June 2015) and another 3,900 households on the register (including 300 temporarily off the register, but returning in the

subsequent two months)[23]. The average household size is three people, with two thirds of these being adults. Additionally, there are another 21,300 adults who have been in a social housing place or on the register sometime in 2014/15. In all, this gives about 150,000 adults[24] in scope for the current cohort valuation.

We have split the tenants into 15 segments, as introduced in Section 2.3.2.

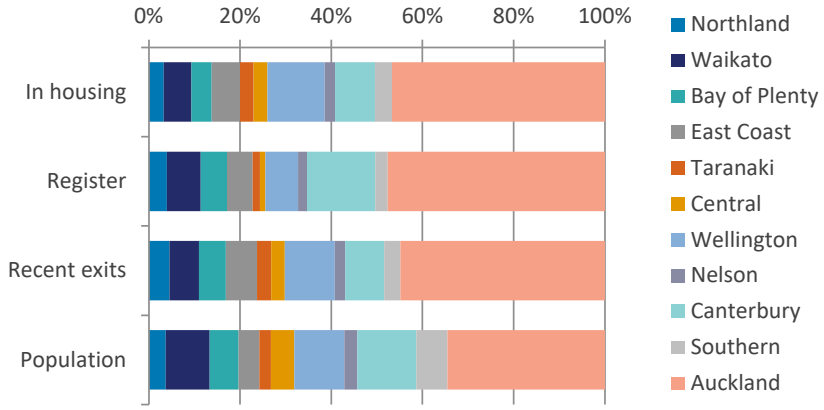
There is a reasonably wide spread of household sizes in social housing. Half of all households in social housing have just one or two people. This figure is up slightly compared to a decade ago. About one in eight households have more than five people in them, which is fairly similar to 2005.

Figure 3.4 Household size, for households in social housing at 30 June



The Auckland region represents just under half of the social housing system in terms of number of people in housing – an overrepresentation compared to its population. East Coast, Taranaki and Wellington have similarly high rates of social housing tenants to population. At the valuation date Canterbury had an unusually high level of register applicants (relative to history and amount of available social housing places), whereas the level is low for Taranaki, Central and Wellington regions. Regional differences are discussed further in Section 4.7.

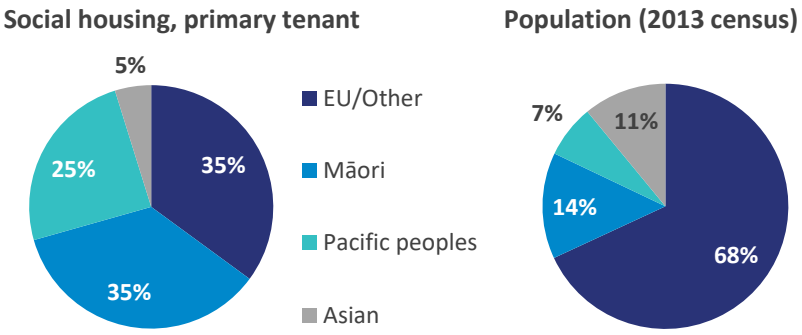
Figure 3.5 Regional distribution of social housing, register and recent exits from the social housing system



[23] These numbers differ from official statistics due to differences in how client status is determined for the purpose of our modelling. Please see Section 9.5.7 for further detail.
[24] We generally include signatory youth (aged 16 or 17) as 'adults' in our commentary.

Figure 3.6 summarises the ethnic composition of social housing tenancies. **Māori and Pacific peoples are heavily overrepresented in the social housing system.** About 35% of primary tenants are Māori and about a quarter are Pacific peoples. Māori are five times more likely to be in social housing, and Pacific peoples seven times, compared to the average rate for those with European or Other background. Their households are typically larger (although this is partly because the primary householders are less likely to be older – pensioners typically have smaller households).

Figure 3.6 Ethnic composition of social housing tenancies



3.4 Lifetime housing cost

3.4.1 Main result

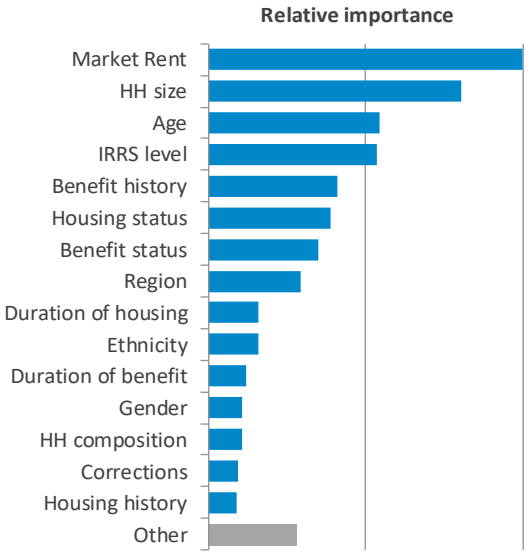
The lifetime housing cost of adults in social housing or on the register in 2014/15 is $16.4 billion. Around 85% of this cost relates to future IRRS payments, with the remainder made up of AS, TAS and expenses.

The discounted mean term of these payments (the dollar-weighted average length of time till payment, after allowing for the time value of money) is about 17 years. This reflects a very long-term payment stream, with typically very long tenures and relatively strong increases in the subsidy paid over time.

3.4.2 Key predictors of lifetime housing costs

There are dozens of risk factors that contribute to the future lifetime housing cost (See Section 9.2.2). We have attributed relative importance of these, shown to Figure 3.7. As with most analyses of this type, the link is statistical rather than causal. We do not attempt to attribute causality to any identified risk factor.

Figure 3.7 Relative risk factor importance for lifetime housing cost, for those in housing at the valuation date.



Three of the top five factors are market rent, household size and IRRS level. Note that these are related, but distinct, variables. Larger households will tend to be in larger houses with higher market rent which in turn suggests higher IRRS levels. But larger household sizes increase lifetime cost, even if other factors are held constant; they exit more slowly and there are potentially more adults to re-enter the housing system in the future.

Age (here meaning of the primary householder) is very important and is third on the list. The partial dependence effect[25] of age is an unusual shape. It is effectively flat at younger ages, with a slight peak at age 39, then decreasing rapidly with age thereafter (see the bottom left panel of Figure 3.9). This shape is the result of many effects; young primary householders have higher exit rates (see section 3.7.1) which lowers the household liability, but many years remaining in their lifetime. Older primary householders have fewer years remaining in their lifetimes and hence a lower lifetime cost.

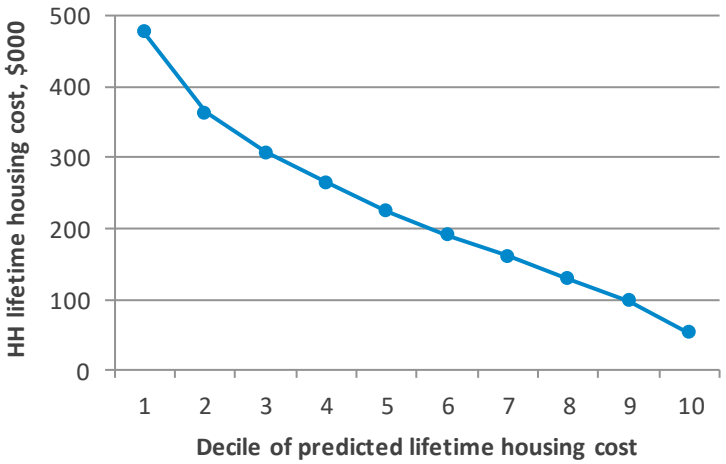
Benefit history and (current) benefit status are also prominent on the list. This information affects the duration in housing, as well as the amount of AS likely to be received after exit. Generally speaking, benefit system variables feature strongly as predictors of lifetime housing cost.

The 'Other' category includes income, education, register related variables, CYF history, intergenerational plus some other variables. These are still significant; for example, some have a large effect on a small subset of the population.

In Figure 3.8 below we have taken all households (in social housing or on the register), and grouped them into deciles based their future lifetime housing cost. The chart shows that **there is a large spread between households with high and low predicted cost**. The differences are driven by the factors described above. There are about 6,700 households in each decile. **The top decile (typically those in housing with high market rent and IRRS) has an average over $480k whereas the lowest decile (including older clients on the register) has an average of about $50k.**

[25] The average effect of a variable while holding all others constant.

Figure 3.8 Lifetime household cost split by decile – households in social housing or on the register

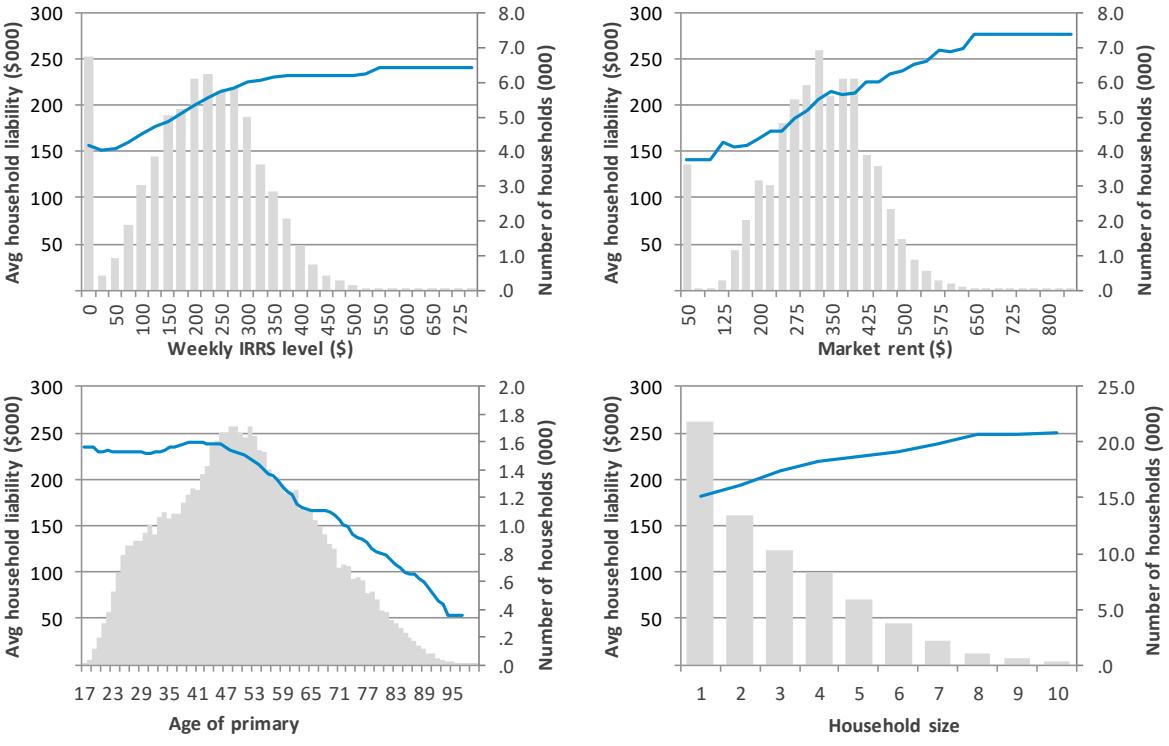


Partial dependence plots are shown below for the four most important predictors. These plots hold all other factors constant. For example, **the $40k decrease from age 50 to 60 means that two households that are identical except for this (primary householder) age difference would have a $40k difference in their lifetime housing cost**.

What is a partial dependence plot?
A partial dependence plot calculates the impact of a variable while holding all other variables constant, thus removing the impact of correlations.

Note that the IRRS level and market rent effects typically compound; households with higher lifetime cost have both a higher IRRS and higher market rent. All the effects shown are strong, and drive much of the variation in lifetime cost that is shown in Figure 3.9.

Figure 3.9 Partial dependence effects – household lifetime cost, holding all other factors constant. The blue line is the effect size (left axis), and the grey bars the number of households (right axis).



3.5 Segment level results

Results have been summarised by segment in Table 3.1 below.

Table 3.1 Current cohort lifetime housing cost results

Segment		Number of households	# Adults	IRRS payments ($b)	AS + TAS payments ($b)	Total liability ($b)	Average HH liability ($k)	Number of future years in Social housing (for primary tenant)	Number of future years on AS (for primary tenant)
IRRS recipients	JS	10,827	21,668	2.65	0.26	2.90	268	18.7	4.4
	SPS	10,389	15,066	2.47	0.26	2.73	262	21.0	6.5
	SLP	12,037	21,278	2.69	0.21	2.90	241	18.6	3.2
	YP/YPP	30	37	0.00	0.00	0.00	164	15.1	10.8
	NOMB	14,611	35,514	3.54	0.29	3.84	263	18.5	3.2
	NZ Super	12,789	21,198	1.51	0.09	1.61	126	9.3	0.5
Sub total		**60,683**	**114,761**	**12.86**	**1.12**	**13.98**	**230**	**17.0**	**3.4**
Market Renter	BEN	72	157	0.01	0.00	0.01	166	15.6	5.4
	NOMB	2,587	7,267	0.38	0.05	0.43	166	15.1	2.6
	NZ Super	357	784	0.03	0.00	0.03	84	9.1	0.7
Sub total		**3,016**	**8,208**	**0.42**	**0.05**	**0.47**	**156**	**14.4**	**2.5**
On register	BEN	2,967	3,712	0.30	0.12	0.41	140	10.9	10.5
(incl those on in	NOMB	643	1,019	0.06	0.01	0.07	108	8.3	5.4
April / May)	NZ Super	337	487	0.01	0.01	0.02	49	2.2	5.1
Sub total		**3,947**	**5,218**	**0.36**	**0.14**	**0.50**	**127**	**9.7**	**9.2**
Recent housing	BEN		7,635	0.41	0.29	0.70	92^	7.5	12.3
or register exit	NOMB		12,720	0.24	0.14	0.38	30^	3.0	5.2
	NZ Super		1,634	0.00	0.01	0.02	11^	0.3	3.0
Sub total			**21,989**	**0.65**	**0.45**	**1.10**	**50^**	**4.3**	**7.5**
Total		**67,646**	**150,176**	**14.28**	**1.76**	**16.05**	**203**	**14.7**	**4.2**
CHP Loading						0.06			
Expenses						0.32			
Grand total						**16.42**			

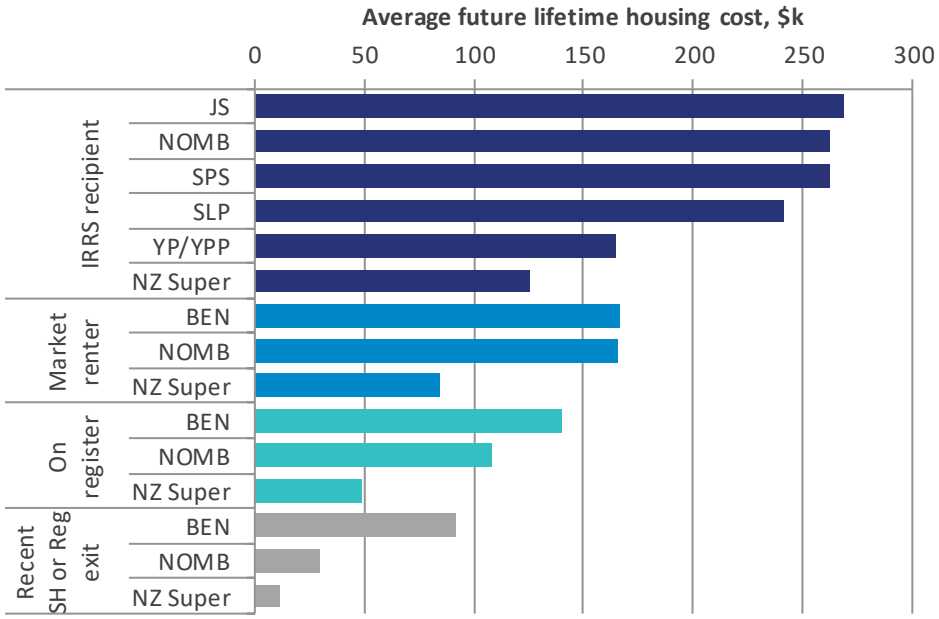
^Estimated. Average liabilities for recent exits are per individual, rather than per household.

The main segment-level results are that:

- **About 90% of the total liability is attributable to households currently in social housing** (IRRS recipients and market renters). These households are expected to be in social housing for an average of 17.0 more years over their lifetimes, with a further three-and-a-half years of AS. The average lifetime housing liability for these clients is $227k per household.
- **The liability attributable to those on the register is $0.50 billion, or $127k per household.** The lower average household liability reflects the possibility of leaving the register before entering housing, as well as the higher exit rates for younger applicants in the first few years of being placed in housing (register applicants are typically younger than those in housing). Those who are on the register and are also receiving a welfare benefit have a large number of expected years of AS receipt.
- **A further $1.1 billion of the liability relates to people who have been in social housing or on the register during the year but are not as at the valuation date**. This is about $50k per individual (per household it would be about double), almost two thirds of which is IRRS related to future re-entries into the social housing system.
- **Lifetime liabilities are smaller for NZ Super segments.** This is primarily an age effect; these clients have fewer future years to receive housing support.

Figure 3.10 compares average household future lifetime housing cost by segment.

Figure 3.10 Average household future lifetime housing cost by segment

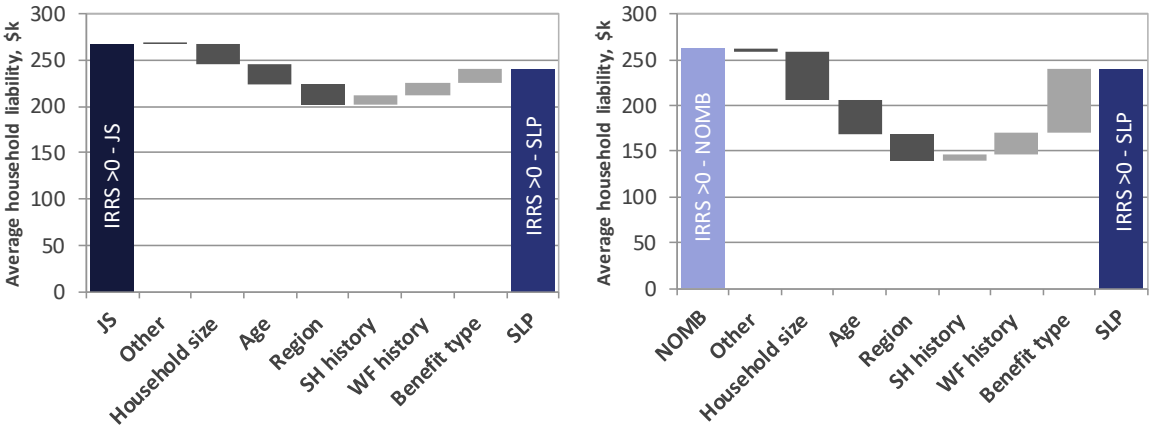


Recent exits have significantly lower future expected costs. It is worth noting, however, that **for those who exit but continue to receive a main benefit**, their future expected housing costs are on average **$92k per person,** with an average of **7.5 future years** in social housing and 12.3 of AS receipt– indicating a high likelihood of re-entry to social housing and/or long-term take-up of AS/TAS payments.

Market renters who are otherwise financially independent (in that they are receiving neither a main benefit nor NZ Super) have average future costs of $166k. Most of this future cost is still IRRS. There are a couple of reasons for this relatively high estimate. First, there are a portion of households who are only temporarily market renters; sometimes IRRS is set to zero to help clients meet their social housing obligations when MSD is unable to contact clients over an extended period of time. We have allowed for this effect. Second, with projected rents growing faster than incomes some market renters will naturally become IRRS recipients in the future. Third, market renter households tend to be larger and younger; we estimate these effects add about $51k to the average household future costs (compared to if they had a similar demographic profile to IRRS recipients).

It is perhaps surprising that the highest average lifetime costs of any household type is associated with households receiving both IRRS and Jobseekers' benefit (on average $268k); higher than the average for households receiving IRRS alongside either Supported Living Payment ($241k) or Sole Parent Support ($262k). Part of the explanation is the **compositional differences** between these groups. Figure 3.11 (left panel) compares IRRS recipients receiving Jobseekers' (JS) to those receiving Supported Living Payment (SLP), breaking the difference in average lifetime costs into components based on six key compositional differences between the segments.

Figure 3.11 Breakdown in differences in average liability for IRRS recipient households, JS to SLP (left) and NOMB to SLP (right)



The left panel shows that the 'benefit type' effect is positive; that is, **if all other factors were equal the lifetime housing cost of an SLP household would be higher than that of a JS household**. However, those receiving SLP live in smaller households, which reduces their cost.

To explain in further detail, the opening bar in the left panel shows the average liability for IRRS + JS recipients, and the closing bar shows the average liability for IRRS + SLP recipients. Each of the bars between shows the contribution of one of the components in explaining the difference between these two groups. When the two groups are compared, those receiving SLP:

- Live in smaller households and are older, reducing their cost relative to the JS cohort
- Live in less expensive regions (with a lower proportion in Auckland)
- Have a more extensive history in social housing, increasing their likelihood of remaining long term.

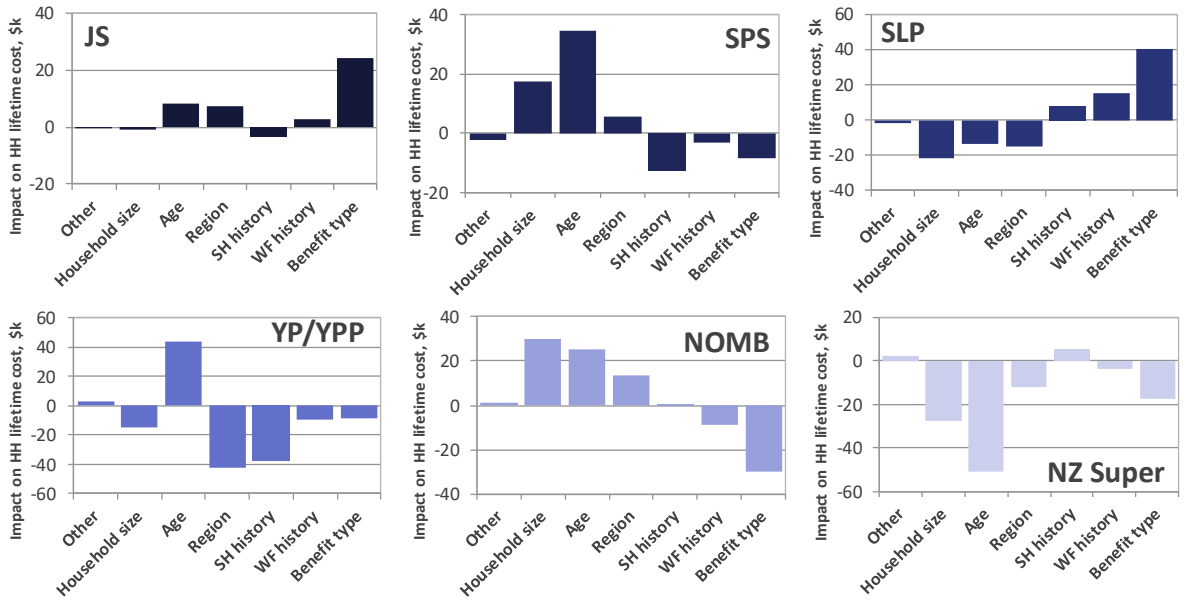
The right panel repeats the exercise, comparing IRRS recipients who are Not on Main Benefit (NOMB) in the opening bar to IRRS + SLP recipients in the closing bar. In a similar fashion, the benefit type effect for IRRS recipients on SLP gives a higher liability than those not on main benefits (NOMB), all other factors being equal. However, their average cost is similar after allowing for other factors. When the two groups are compared, those receiving SLP:

- Live in smaller households, are older, and live in less expensive regions, reducing their cost relative to the NOMB cohort
- Have a more extensive history of welfare benefit receipt, increasing their likelihood of remaining long term.

The remaining drivers of lifetime cost are generally small, which means that either their influence on future lifetime cost is small (such as partner status), or the distributions are similar across the two groups (for example, educational attainment).

While it is useful to compare two sub segments in this way in order to answer specific questions, considering each sub-segment relative to the IRRS segment average gives a more complete view of each segment. Figure 3.12 shows how each of the six key drivers identified above affects the average lifetime cost compared to the IRRS segment average.

Figure 3.12 Breakdown of impact on average household lifetime cost by key components



Notably:

- The average household liability is **$38k higher for JS clients** (compared to the overall average for IRRS households). JS clients tend to have slightly smaller households (-$1k) and have spent less time in social housing (-$3k) but live in more expensive regions (+$7k; 48% live in Auckland) and have a more extensive history of benefit receipt (+$3k).
- The average household liability is **$32k higher for SPS clients.** SPS clients tend to have spent less time in social housing (-$13k) but be younger (+$35k) and have larger households (+$18k).
- The average household liability is **$11k higher for SLP clients**. SLP clients tend to have smaller households (-$22k) live in less expensive regions (-$15k; only 35% live in Auckland) but have an extensive history of benefit receipt (+$15k).
- **After NZ Super, YP/YPP beneficiaries have the lowest future social housing cost of any segment receiving IRRS – $66k lower than the average**. This is potentially surprising, given their high average lifetime costs on working age benefits. Less than 20% live in Auckland, reducing the average cost substantially (-$42k), and their larger number of future potential years in housing is offset by the faster exit rates amongst younger adults.
- The average household liability is **$32k higher for clients not on main benefits**. For these clients there is a higher proportion of clients being aged 45-55 (+$25k) and living in more expensive areas (+$13k). In this age bracket the cost is high, as the competing effects of decreasing exit rates and decreasing life expectancy with age create a peak in lifetime cost.
- **For NZ Super clients the average is $105k lower**. These clients are older (-$51k) and typically have smaller households (-$28k) in less expensive areas (-$12k) – all lowering the future lifetime housing costs.

3.6 Regional results

Results vary markedly by region.[26] Table 3.2 below gives a summary. **The average household liability for Auckland is 80% higher than for the rest of the country, and is over two-and-a-half times the cost compared to some regions**. There are also high liabilities for Canterbury and Wellington, reflecting the higher rents in major cities. There is a threefold effect from high rents:

[26] As discussed in Section 2.3.2 we actually model and forecast at a TLA level (and boards for Auckland). However, this report generally gives results at a regional level for interpretability and brevity.

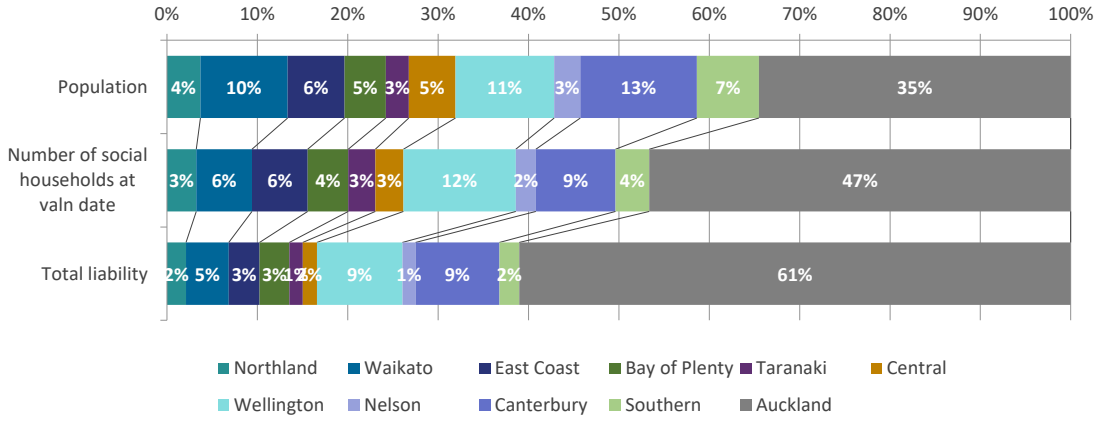
» The level of IRRS is significantly higher, as the gap between market rents and incomes is larger
» The expected duration in housing is longer, as higher IRRS is associated with lower exit rates
» The level of AS is larger in these areas, increasing housing costs after housing exit too.

Table 3.2 Lifetime housing costs for current clients – households in social housing only

Region	# HHs	Avg # adults	Total future payments (IRRS+AS+TAS, $b)	Number of future years in Social housing	Average household liability ($k)
Northland	2,076	1.7	0.3	13.3	145
Waikato	3,870	1.8	0.7	15.7	177
East Coast	3,934	1.6	0.5	14.0	126
Bay of Plenty	2,841	1.8	0.5	14.9	164
Taranaki	1,905	1.5	0.2	13.1	111
Central	1,956	1.6	0.2	13.6	113
Wellington	7,981	1.8	1.4	15.7	172
Nelson	1,432	1.6	0.2	14.4	147
Canterbury	5,589	1.7	1.3	18.2	239
Southern	2,386	1.5	0.3	14.6	131
Auckland	29,729	2.2	8.8	18.7	297
Total	**63,699**	**1.9**	**14.4**	**16.9**	**227**

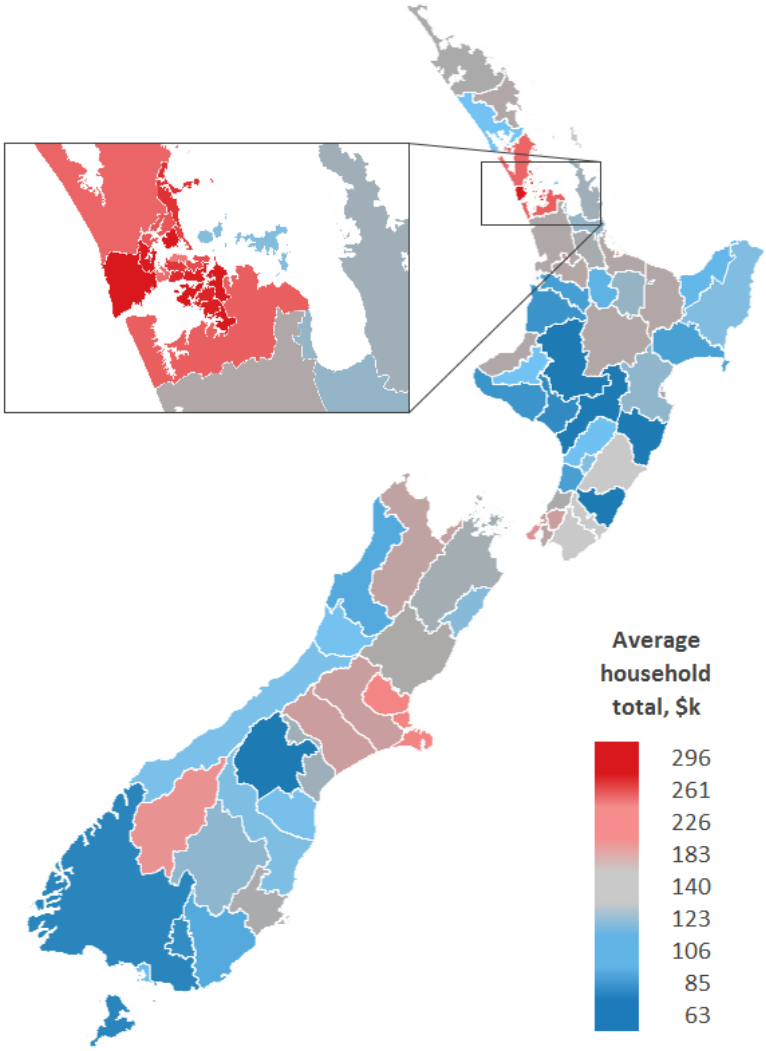
The markedly higher average household liability for Auckland leads to a significant overweighting of Auckland in the overall liability. Although the region represents a third of the population, it represents nearly half of households in social housing and two-thirds of lifetime housing cost.

Figure 3.13 Regional composition of lifetime housing cost – households in social housing only



Average future lifetime housing cost for households is shown by territorial authority and Auckland local board in Figure 3.14 . The map shows that there is considerable variation between territorial authorities in the same region. This is to be expected – rents vary significantly between territorial authorities and boards, and there are also demographic differences which will affect the averages.

Figure 3.14 Regional composition of lifetime housing cost – households in social housing only



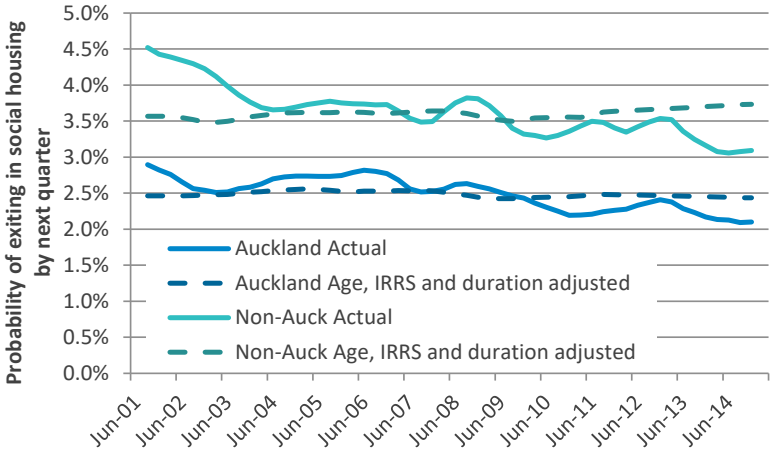
3.7 Understanding tenancy exit rates

The **rate of exit from social housing** is a fundamental driver of long term trends. A faster rate of exit:

- Allows a greater number of needy households to move from the register into social housing
- Will lower future IRRS payments and lead to lower lifetime housing costs
- Allows housing places to be managed more actively, in terms of focusing housing where it is needed most.

We have therefore examined trends in housing exit rates carefully. There are some complexities associated with defining an exit; sometimes a subset of the household will leave, representing a partial exit. We have defined an 'exit' as when the primary householder leaves, since the rest of the household usually exits at the same time. Trends are similar if we had used an 'entire household' definition.

Figure 3.15 Probability that a primary householder exits next quarter (seasonal effects have been smoothed)



As per Figure 3.15**, Overall exit rates have decreased significantly over the last decade or so.** Quarterly exit rates were 3.8% in 2001/02, and were 2.7% in 2014/15. The decrease means that 30% fewer households can be placed in housing each quarter. This trend is present for both Auckland and the rest of New Zealand, as shown in Figure 3.15 above. **It is important to note that this is not a behavioural change – it is due to the changing characteristics of people in houses**:

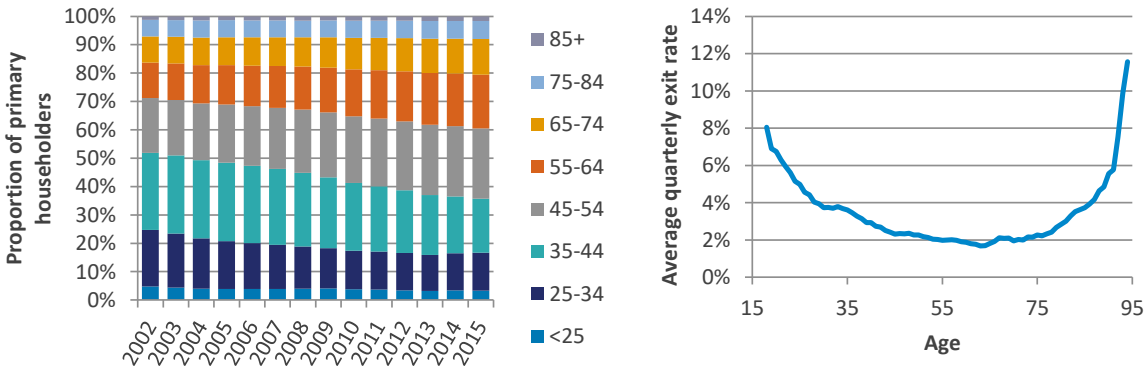
- The age of householders has increased substantially
- The average level of IRRS support has grown markedly, even after allowing for inflation
- The average length of time households have been in houses has increased.

If we adjust exit rates for these three features (so we remove their effect from historical rates), then we observe that exit rates have been close to constant over time. We discuss these features in more detail below – they are important as they explain why movements through the social housing system have slowed over time.

3.7.1 Age

Households with a primary householder under 45 have significantly higher exit rates, and lower lifetime housing costs as a result. **In 2002 about 52% of primary householders were aged under 45, and this figure is now 36%.** The change is mainly due to natural aging – existing householders have become older, and the rate of new entries (who are typically younger) has not been fast enough to offset.

Figure 3.16 Age of primary householder over time and average exit rates by age in 2014/15



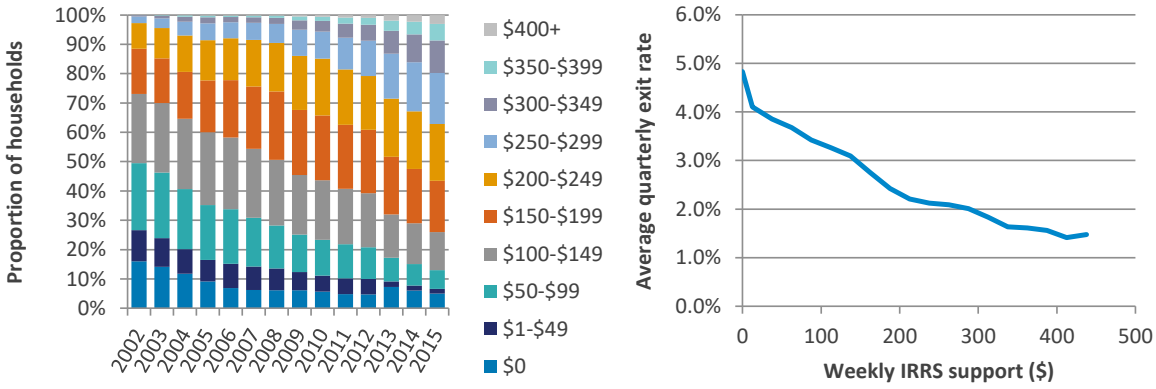
As discussed in the previous section, the highest average lifetime housing costs are represented in the 45-54 age-band in the chart. This group is now the largest age-band, a marked change since 2002.

3.7.2 IRRS levels

The level of IRRS support can be thought of as the scale of the difference between a household's current circumstances and the private market. **A large IRRS indicates significant affordability issues in finding a similarly priced social housing place privately.** A household with weekly IRRS of $300 is 40% less likely to exit housing compared to one with IRRS of $100.

The growth in IRRS is driven by the growth in market rents. While growth in the incomes of people in social housing has typically averaged close to CPI, rents have grown significantly faster. As per Figure 3.17, in 2002 nearly nine in ten households in social housing had IRRS less than $200 per week (in today's dollars – we inflate by CPI). This figure has halved, with less than five in ten households below that threshold in 2015.

Figure 3.17 IRRS distribution for social housing places over time and average exit rates by IRRS level in 2014/15 (historical IRRS support has been inflated to 2015 using the CPI index)



This trend reflects the growing gap between the private rental market and many in social housing. Figure 3.18 below shows average IRR paid by tenants and the IRRS levels over time. In 2002 IRRS represented less than half of the total market rent, but this figure has increased to 65%. While the amount of rent contributed by tenants has remained flat over this period, IRRS growth has been very rapid.

Figure 3.18 Average IRR and IRRS for those in social housing (dollars have been inflated to 2015 dollars using the CPI index)

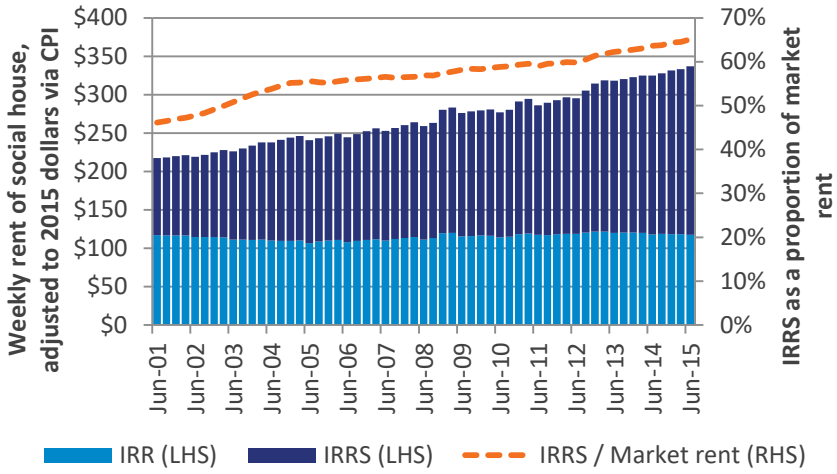


Figure 3.18 shows that when rents are growing faster than incomes, the growth in IRRS can be rapid. For example, in the year to June 2015 benefits were increased by 0.5%, in line with CPI. The average IRR paid by social housing tenants – the lower light blue part of the column – thus increased only slightly (the

actual increase was less than CPI – a 0.2% increase from $117.4 to $117.6 per week). In contrast, the average market rent of a social housing place – the combined height of the light and dark blue columns – rose 4.4% from $323 to $337 per week. Differencing market rent and IRR reveals that the average IRRS has increased by $14 to $219.50 a week, a 6.7% increase.

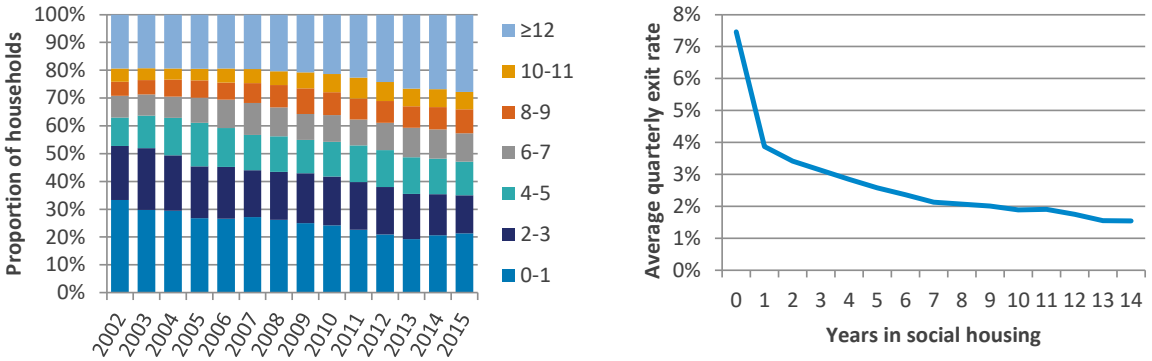
This pattern of high IRRS growth due to incomes (which have typically grown at CPI rates for tenants) growing slower than rents is strongly visible in the history. While rental growth has averaged 3.2% p.a. above CPI in the 14 years shown in the figure, IRRS growth has been over 5.5% p.a. above CPI.

3.7.3 Duration and housing history

Exit rates tend to be faster for lower-duration households (those households who have spent less time in social housing). This is to be expected – those with short-term needs exit quickly, while others with ongoing needs remain. Also, as noted earlier, some vulnerable populations churn in and out of housing. In a 'steady state' system you expect average duration to remain constant over time; the increase in duration of those who remain is balanced by new people entering. However, **we have actually seen duration increase[27] over the past decade**, rather than remain at a steady state, as shown in Figure 3.19.

This has further depressed average exit rates in the housing system.

Figure 3.19 Years household has been in social housing place over time and average exit rates in 2014/15 by years in social housing



3.7.4 Other important factors affecting exit rates

There are many other factors affecting household exit rates. We have allowed for these in our projections and we discuss the most important ones:

- **Welfare benefit status:** Clients who are also receiving Supported Living Payment or Jobseeker (Health condition or disability) have very low average exit rates. Clients who are not receiving main benefits (whether no benefits at all, or just Tier 2 or 3 benefits) have much higher exit rates – twice as high in some cases.
- **Household size:** Larger households are less likely to exit, although this effect interacts heavily with others such as the age of householders.
- **Ethnicity:** Households with a Māori primary householder tend to have higher exit rates. However, Māori are more likely to exit with poor social outcomes – see Section 3.7.6.

[27] We show our best estimates in the figures – it is difficult to precisely determine duration for households who enter before 2002 due to data limitations.

» **District:** Even after allowing for the differing rents and IRRS levels amongst regions, significant regional differences remain. Exit rates tend to be lower for the bigger cities; Auckland, Wellington and Canterbury.

3.7.5 Receipt of AS after housing exit

About a quarter of clients will receive AS upon housing exit. The two largest influences on whether a person will receive AS are:

» **Welfare benefit status:** We jointly model welfare benefit and housing status. Clients receiving a main benefit are much more likely to 'pick up' AS as they exit, compared to someone not on main benefits. About 80% of working age leavers will receive AS if they are on main benefits, compared to less than 10% of non-main beneficiaries. A relatively low proportion of pensioners will receive AS on exit.

» **Age:** The probability of receiving AS generally decreases with age. A 25-year-old primary householder who exits and is on benefit is, on average, nearly twice as likely to receive AS after exit as someone aged 50.

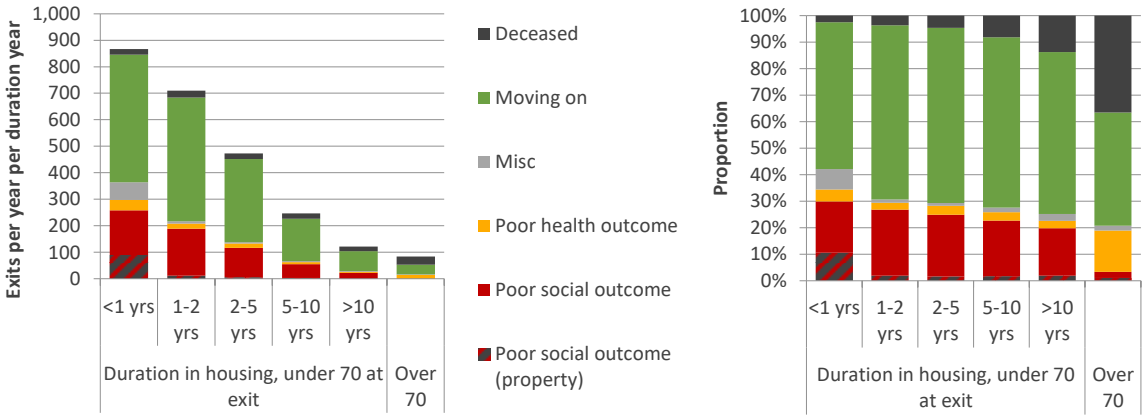
3.7.6 Types of tenancy exits

Around 1,200 households leave their place each quarter for a variety of reasons. While exit reasons are not modelled in lifetime liability estimates, they are useful for understanding some of the underlying factors driving change. We have grouped the reason for exit provided into five categories:

» **Moving on**: Tenant choice, change of circumstance, change of scene, employment opportunity, etc.
» **Poor social outcomes**: Tribunal termination, safety, house abandonment, prison, neighbourhood issues, etc. These relate to tenant circumstances that could potentially be improved with more active tenant management.
» **Poor social outcomes (property)**: Property condition, fire damage, etc. These are not tenant specific.
» **Poor health outcomes**: Health issues, longer term care, etc.
» **Miscellaneous**: Property upgraded/sold and unknown reasons.

Exit reason coding typically has poorer data quality as it is not a core field needed for day-to-day management. However, the degree to which exit reasons vary between groups can still be useful for understanding outcomes. Figure 3.20 shows reason for household exit (excluding transferred) over the five years to 2015.

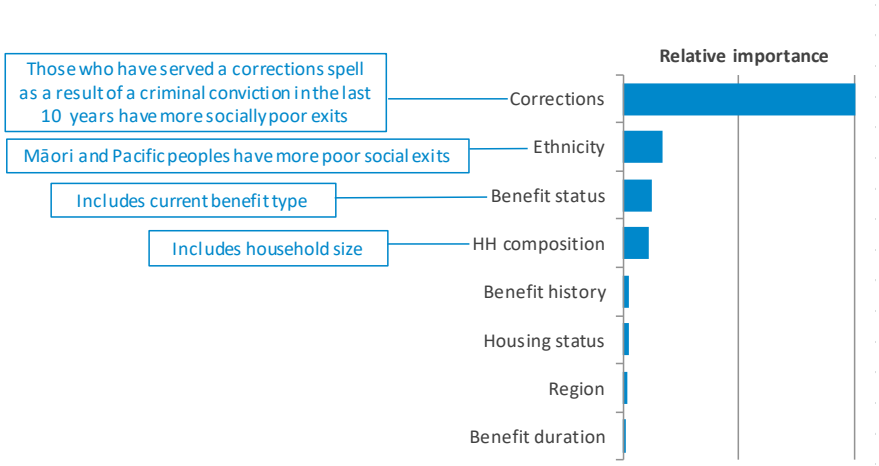
Figure 3.20 Reason for household exit (excl. transfers), average over five years to 2015



Of particular interest are the exits which are deemed poor social outcomes. Figure 3.21 shows the variable importance in predicting a poor social outcome exit given a household exit. This analysis was done on primary householder exits between 30 March 2013 and 30 March 2015. Those aged above 70 at 30 June 2013 have been excluded. Having served a corrections spell as a result of a criminal conviction is

a strong predictor of an exit which is a socially poor outcome. “Prison” is given as a reason for exit in 6% of exits which are socially poor outcomes.

Figure 3.21 Relative variable importance for predicting a socially poor outcome exit amongst exits



To illustrate the differences in risk levels of a socially poor outcome we have conducted an illustrative segmentation of housing exits. **On average 21% of exits are deemed socially poor outcomes**, but this varies across the segments. For example, amongst Māori or Pacific peoples:

- Primary householders who had served a corrections sentence as a result of a criminal conviction in the last 10 years were nearly twice as likely to exit due to socially poor outcomes as those who had not.
- The same is true for those with a benefit duration of less than one year, and youngest children over three years in age.
- Conversely, those who have not served a corrections sentence as a result of a criminal conviction and who are receiving SLP or NZ Super are 60% less likely than average to have exits explained by a poor social outcome.

Table 3.3 Segmentation of housing exits that are poor social outcomes

Cohorts						Exits in 2yrs to June 2015	Poor social outcome %
Corrections history (last 10 yrs)	Not Māori or Pacific Islander					570	28%
	Māori or Pacific Islander					1,655	37%
No Corrections history (last 10 yrs)	Not Māori or Pacific Islander					2,534	10%
	Māori or Pacific Islander	NZ Super or Supported living				803	8%
		Not NZ Super or Supported living	Current benefit duration <=1 yr	Youngest child >=3		138	37%
				Youngest child < 3		1,393	24%
			Current benefit duration >1 yr	Not Auckland, Wellington or Canterbury		800	15%
				Auckland, Wellington or Canterbury	Weekly Income <$500	772	26%
					Weekly Income >=$500	821	20%
All						**9,486**	**21%**

3.8 Projected pathways

The pathway plots below show the average housing state for the top level segments (introduced in Figure 2.4). The first two show the long tenure of households. We project that in 30 years:

- Around 3 in 10 households[28] currently in social housing will still be in a social housing place
- Just under 2 in 10 households currently on the register will be in a social housing place

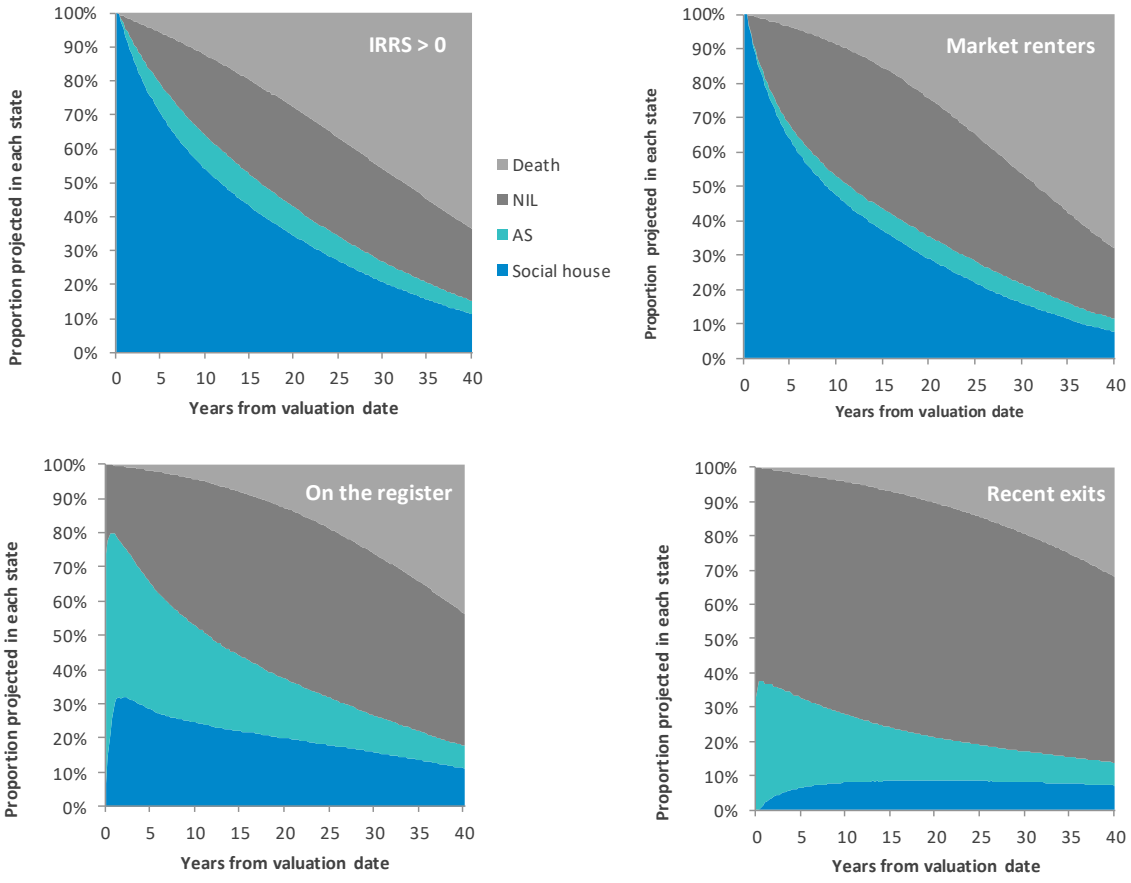
[28] Household status is based on the housing situation of the primary householder.

» Around 1 in 10 households who have recently exited a social housing place or the register will be in a social housing place.

Compared to market renters, those receiving some level of IRRS ('non-zero') are more likely to receive AS in the future. This reflects the higher needs of this group and hence higher incidence of current welfare benefit receipt.

Of those that are currently on the register, a high proportion of those that do not enter housing will receive AS in the short term. The rate of AS receipt decreases faster than the rate of social housing tenancies.

Figure 3.22 Lifetime plots for various housing segments[29]



Notes: NIL refers to neither in a social housing place nor receiving AS. Mortality is separately modelled for clients aged over 65 and the lifetime plots show the impact of mortality. We assume all clients exit social housing by age 100.

3.9 Future cohorts and total IRRS

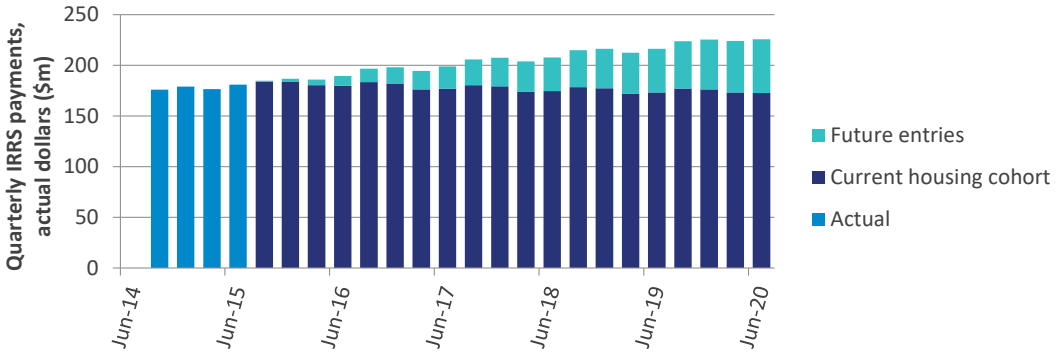
The overall future cost of the social housing system is relatively easy to forecast – assuming a near full housing portfolio (which our forecast does), total cost is the average IRRS level (inflated for rent increases) for this housing portfolio. Total IRRS paid is then a combination of households (and individuals) who:

[29] Note 100 years has been chosen as the age at which to cap the projection, because observed exit rates suggest almost everyone is not in a social housing placement, or on benefits by the time they reach age 100. This does not imply those aged over 100 are not entitled to social housing support.

» Are in the current housing cohort, as described in Section 3.3
» Are not in the current housing cohort, but are in the current benefit system cohort
» Have not interacted with the housing or benefit systems in 2014/15.

IRRS payments for the next five years are shown in Figure 3.23 and are attributed to the current housing cohort and future entries.

Figure 3.23 Forecast total IRRS payments (HNZ current and planned places)



Total IRRS is forecast to grow at 4.8% p.a. in absolute terms for the next five years – quarterly IRRS is forecast to grow from $180m to $225m over this period. This is slower than the historical average rate of growth (about 5.5% p.a.). This slower rate partly reflects the lower CPI inflation compared to historical levels, which in turn lowers our forecast growth rate for market rent. Growth in IRRS payments slows over the course of the projection, reflecting a slower rate of rental cost growth; the average growth over 25 years is 3.5% p.a. Payments to adults currently in social housing places are projected to remain roughly flat. This reflects a combination of increased rates of housing exits offset by higher IRRS payments for those remaining in social housing. Payments to current tenants are about 80% of the total over the next ten years. Of the remaining 20%, three quarters will be paid to people in the benefit system cohort (current and recent beneficiaries entering social housing places), and the last quarter to applicants from outside this group.

3.10 Future analysis of change

This is the first social housing valuation, and is a baseline. Future valuations will measure change over time and attribute the change to various drivers. The valuation does not account for planned changes – in order to set a baseline based on the policy and operational parameters at the time of the valuation that can be used to measure the impact of policy and operational changes going forward.

One important point in understanding future change is that effective policy action may ***increase*** the current cohort liability. This could happen for a number of reasons, discussed in Table 3.4 below.

The table also describes the solutions we have developed in consultation with MSD to overcome the potential mixed signals of an increasing liability for positive improvements by management.

Table 3.4 Potential situations where good outcomes lead to an increase in lifetime housing cost

Issue leading to an increase in current cohort liability	Solution
If either: » The overall funding envelope for IRRS increases to create more social housing places, and/or » A low need (and low liability) household successfully moves to the private rental market, creating an empty social housing place. If this empty social housing place is filled by a higher need household with longer expected duration, then this can increase the total liability of households in social housing. ***Both changes are part of the policy intent for the Social Housing Reform Programme.***	We will split the attribution down to a household level, and treat households in housing at the previous valuation as a separate group to new entrants over the year. This gives us the ability to measure 'throughput' of households which will recognise the transition to independence of those already in social housing. In other words, we will be comparing *the same group of households' pathways towards independence at two different intervals*. Notional liability of the register also allows us to recognise potential cost that has been realised by the placement into housing.
An increase in exits by vulnerable groups due to poor social outcomes could be masked as a positive change. Conversely, if there is a reduction in exits for poor social outcomes, then this could lengthen housing duration.	A future client segmentation exercise will identify cohorts that should be carved out from a liability metric, where it is used to understand system performance. We will also monitor the exit reason field, noting that it has some data quality issues.
If more empty social housing places are filled, then this increases total IRRS payments (even if it reduces underuse of housing assets).	The matching statistic will recognise the improved use of existing housing portfolio. The change will lead to reduced notional liability associated with the register, which can be compared to the increase in realised cost.
More register applications than expected.	We will separate out increases related to register application rates. Management has less control over this factor.

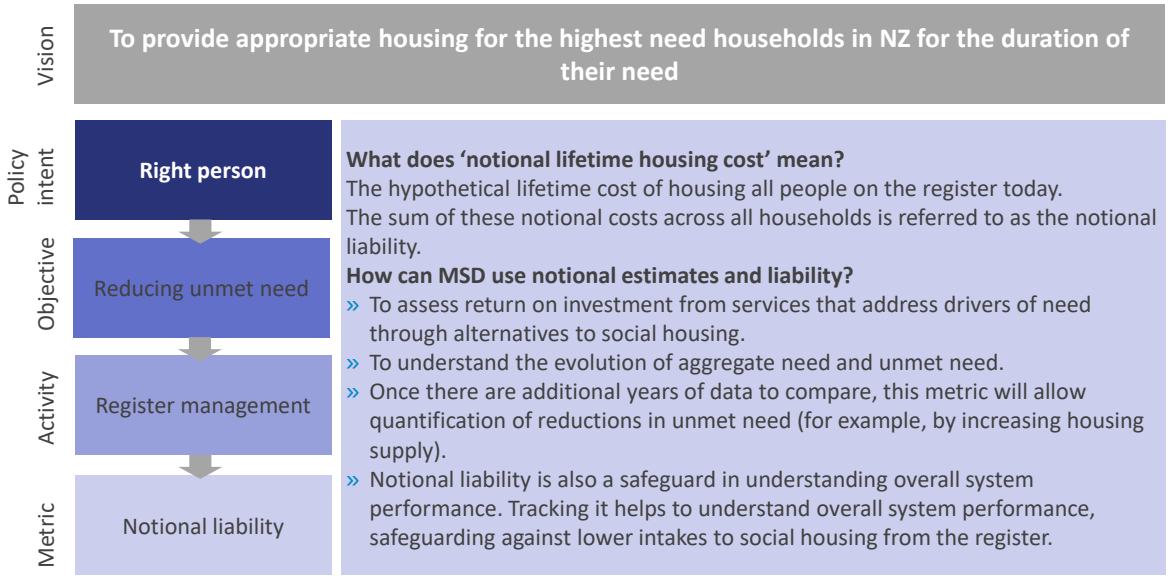
4 RIGHT PERSON

INSIDE THIS SECTION

4.1 Introduction and key results

Section 4 focuses on understanding how effectively social housing is targeted to those who need it. Figure 4.1 summarises the 'right person' component discussed in Section 2.4.1

Figure 4.1 'Right person'



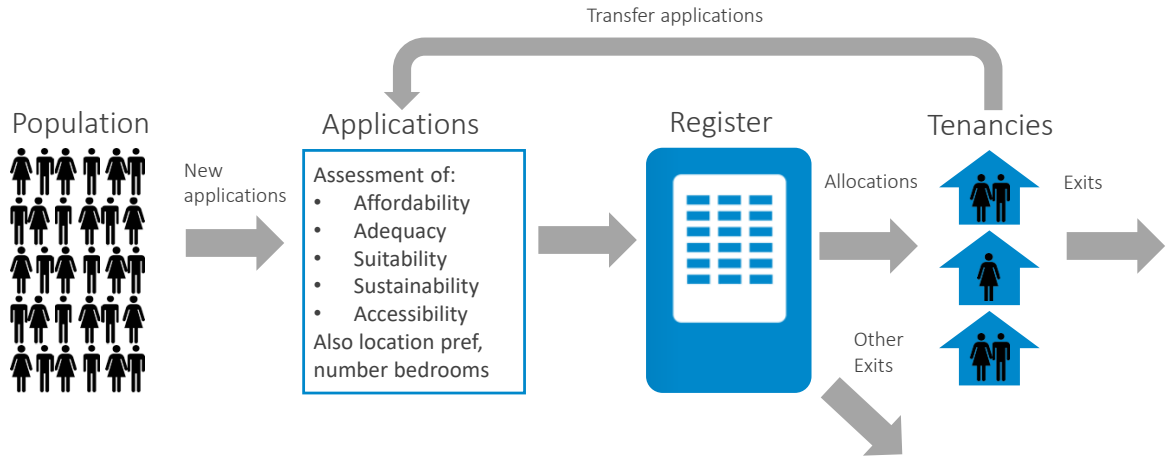
KEY RESULTS

- **The housing liability would be $0.2 billion higher** if additional social housing places were found for those on the register at the valuation date. This is the fiscal measure of register unmet need.
- **The housing liability would be $0.5 billion higher** if those in known-to-be overcrowded dwellings were moved to larger social housing places, and **$1.4 billion lower** if those in known-to-be underused dwellings were moved to smaller social housing places as at the valuation date.
- The number of register applications has been volatile over time, making it **difficult to establish a direct link between the level of register applications and the broader macro-economy**. However, there is an indirect link via the benefit system. Beneficiaries have higher application rates, and beneficiary numbers are strongly influenced by the unemployment rate – therefore **the unemployment rate indirectly influences the number of register applications**.
- **The most significant predictor of register applications is welfare benefit status.** About two thirds of new working-age applicants (primary or non-primary) also received JS or SPS benefits in their application quarter. The rate of application for these clients is about 10 times that of someone who has recently left welfare benefits, and about 70 times that of someone who has not received benefits in the last five years.
- **Register application rates vary markedly among people with different housing history, ethnicity and age.** Māori and Pacific peoples receiving AS are two to three times more likely to apply compared to NZ European people.
- **There is significant variation in the types of need for applicants.** Those with the most acute housing need (as measured by the Social Allocation System (SAS) scores) are a small group of applicants with inadequate housing. Those that are homeless or living in over-crowded environments also have high need levels.
- For applications in 2012/13, we see that **68% have subsequently entered social housing**. A very small number were still on the register at 30 June 2015. The remaining 31% exited the register without moving into social housing (about two-thirds due to non-response, and the remaining third because they either withdrew their applications, found private housing, or became ineligible).
- There are striking differences in the register by region. **Auckland and Northland have the longest average wait time for those currently on the register**; the Auckland result is despite having a high number of social housing places per capita. Canterbury has had high register application levels in 2014/15, relative to historical levels.
- Welfare benefit status and history are easily the strongest predictors (in the model) of whether a leaving tenant will re-apply to the register over the next two years. The re-application rate over this period is 12%, but the rate is triple for some subgroups.

4.2 About the social housing register

A simplified schematic of the flow from the general population through the register and into housing is shown in Figure 4.2. The register is comprised of those people who have applied and been assessed as eligible for social housing following pre-assessment processes. Households apply to the register, giving detail about their level of need and their preferred locations for housing. Need is assessed on five dimensions with each being given a Social Allocation System (SAS) score between 1 and 4 inclusive. These are added together to give a total SAS score.

Figure 4.2 Schematic of social housing register



Two measures relate to a household's need to move:

» **Adequacy:** The physical condition/structure of the household's current residence and availability of basic facilities. This dimension only takes values 1 or 4.
» **Suitability:** Crowding, lack of security of tenure of current accommodation and medical and personal needs.

Three measures relate to the ability to be housed in the private market:

» **Affordability:** The ability to afford alternative, suitable housing in the private market.
» **Sustainability:** Financial management difficulties and difficulties in social functioning and lack of social skills.
» **Accessibility:** The ability to access and afford suitable and adequate housing as a result of discrimination, lack of financial means to move and availability of alternative, affordable, suitable housing in the private market.

These are summed to give a total score out of 20. Additionally, an overall priority level is assigned. The combination of priority level and score is used to prioritise the placements of housing. Rules are applied to establish how many bedrooms are required (see Section 5.2.1). Ideally an exact match of location and size can be found. Sometimes this is not possible, so there is a balance between not achieving an exact match on placement – with one too many bedrooms or in a neighbouring area, say – versus waiting for a matched social housing place to become available.

Households remain on the register, periodically updating their details. They exit the register when they are placed in a social housing property, or for other reasons.

The register also contains transfer register applications; these are applications from current social housing tenants who have successfully applied to move to more suitable social housing. Some transfers are 'business initiated,' rather than by tenant choice, which can occur if there are some particular tenancy issues at the current location or if the social housing property is scheduled for sale or renovation.

4.3 Right person – notional lifetime housing cost

The 'right person' component of the social housing framework looks at drivers of need for social housing and seeks to understand and quantify known unmet need. The objective is to manage the housing register to ensure that housing places are available to households who need them most, but also that services are available – where appropriate – to resolve the issues driving housing need.

There are many ways to understand unmet need. A complete view of unmet need using data is not possible since we can only measure the need MSD is aware of. Some unmet need, as a result, is 'unknown.' One useful metric to understand unmet need where known is notional lifetime housing cost

(or 'notional liability', for short), which was introduced in Section 2.4.2. For a household on the register, this is the lifetime housing cost if they were placed in a (right-sized) social housing place today – thus to move from the lifetime estimate to the notional estimate, an 'additional' notional amount is added. Notional liability is a useful concept as placing households in a social housing place (either by finding a vacated social housing property or purchasing a new one) will realise this notional amount.

Notional lifetime housing cost is highly relevant to households on the register and not in social housing, as it represents the long term cost of housing everyone on the register immediately. However, the concept can be extended to three other groups in the valuation cohort:

- **Transfer register applications:** If people are applying for a larger social housing place or are applying for a social housing place in a more expensive area, this may indicate an unmet need amongst existing tenants. There are also notional releases (that is, negative notional costs) associated with tenants applying for cheaper or smaller housing.
- **Overcrowded social housing places:** Some tenancies are overcrowded, even in the absence of a transfer application. There is a notional long term cost associated with addressing this unmet need.
- **Underused social housing places:** Some social housing places are underused, even in the absence of a transfer application. There is a notional release (a negative notional liability) associated with moving such a household to a right-sized social housing place.

Notional metrics are hypothetical – interpreting them can be counter-intuitive. Additional notional 'costs' associated with overcrowding can be understood as the extra costs that would be incurred on allocating these households to places that suit their requirements. Notional 'release' associated with underuse can be understood as the opportunity cost of inefficiencies currently within the system. That is, the hypothetical financial savings that would arise if households were not allocated to places that exceed their requirements. This matters because more dynamic management of the portfolio over the long-term would enable these savings to be invested elsewhere in the housing portfolio.

We give notional liability for each of the four categories above. All of them reflect current imperfections in the social housing allocation process. Overcrowding and underuse are revisited in more detail in Section 5.

4.4 Notional liability estimates

The difference between the main lifetime housing cost (as introduced in Section 3.4) and total notional cost for each of the four subgroups is shown in the table below.

Table 4.1 Lifetime housing costs for current clients[30]

	Main ($b)	Additional notional ($b)	Total notional ($b)
Register	0.47	0.24	0.71
Transfer	0.51	0.02	0.53
Over-crowding	2.46	0.54	2.99
Underuse	4.53	-1.38	3.15
Well matched	8.07	0.00	8.07
Total	**16.05**	**-0.59**	**15.46**

The result for the register is important – it reflects the cost of placing these households more quickly, and/or at a greater rate (some households on the register do not end up in social housing – this is discussed in Section 4.7.2). **The additional notional liability associated with the register is $0.24b, which is a 50% increase on lifetime cost for those on the register.** This takes the average household liability for

[30] Excluding costs related to CHPs and expenses.

these households **from $127k to $191k.** This is still below the average lifetime cost of those already in social housing – this is because exit rates are higher at the beginning of a tenancy, and for younger households (as register applicants typically are).

The results for the other groups are also interesting:

- **The additional notional liability attributable to the transfer register is virtually zero**; the households with a notional release almost exactly balance those with an increase.
- **The notional release associated with underuse of the social housing portfolio is very large; around seven times the additional notional liability of the register.** This reflects a large number of small households in 2 or 3 bedroom social housing places.

When combining all categories there is a notional release associated with these groups of $0.6b.

The segment level results, including additional notional liability, are shown in Table 4.2 below. Those on the register have substantial increases. The largest decreases are associated with NZ Super segments – these are most likely to have too many bedrooms relative to their calculated need.

Table 4.2 Lifetime housing costs for current clients

Segment		Number of households	# Adults	Real dollar liability ($b)	Total incl. notional liability ($b)	Diff
IRRS recipients	JS	10,827	21,668	2.90	2.74	-6%
	SPS	10,389	15,066	2.73	2.74	1%
	SLP	12,037	21,278	2.90	2.57	-11%
	YP/YPP	30	37	0.00	0.01	3%
	NOMB	14,611	35,514	3.84	3.80	-1%
	NZ Super	12,789	21,198	1.61	1.27	-21%
Sub total		**60,683**	**114,761**	**13.98**	**13.12**	**-6%**
Market Renter	BEN	72	157	0.01	0.01	3%
	NOMB	2,587	7,267	0.43	0.44	3%
	NZ Super	357	784	0.03	0.02	-19%
Sub total		**3,016**	**8,208**	**0.47**	**0.48**	**2%**
On register	BEN	2,967	3,712	0.41	0.60	44%
(incl those on in	NOMB	643	1,019	0.07	0.12	79%
April / May)	NZ Super	337	487	0.02	0.03	80%
Sub total		**3,947**	**5,218**	**0.50**	**0.75**	**50%**
Recent housing	BEN		7,635	0.70	0.70	0%
or register exit	NOMB		12,720	0.38	0.38	1%
	NZ Super		1,634	0.02	0.02	0%
Sub total			**21,989**	**1.10**	**1.10**	**0%**
Total		**67,646**	**150,176**	**16.05**	**15.46**	**-4%**
CHP Loading				0.06	0.06	
Expenses				0.32	0.32	
Grand total				**16.42**	**15.84**	

4.5 New and transfer register application numbers

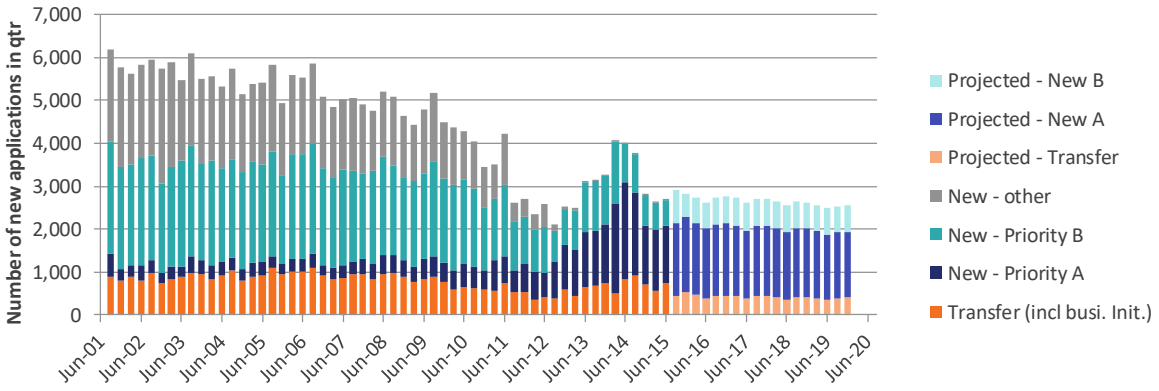
4.5.1 Overall trends

The number of new applications per quarter has been volatile over the past few years. There have been important changes to policy and delivery over time that influence these trends:

- The needs assessment process was revised heavily in mid-2011. Entry onto the register was restricted to those assessed as Priority A or B (those C or D on the register at the time were grand parented) and there were some adjustments to the criteria and hence the characteristics of Priority A and B applications. The process for client contact, pre-assessment and assessment saw further refinement in 2012.
- The service delivery model changed substantially in 2012, including over-the-phone pre-assessments.
- The responsibility for assessment was transferred to MSD in April 2014. The first couple of quarters saw some unusual patterns as the changeover was bedded down. This included significantly higher levels of applications.
- The Canterbury region has been particularly volatile and application rates are currently very high by historical standards. Some of this change is likely earthquake (and rebuild) related, although the effect is unclear; the increase occurred recently, rather than immediately after the quakes. Canterbury applications have a slightly different SAS scoring mechanism, although this is more likely to cause more applications to move from priority B to A, rather than increase the number of new applications.

Historical and projected patterns of successful applications to the social housing register are shown in Figure 4.3. In making our projections, we have adopted a level of applications a little higher than the last few quarters, which gives partial recognition to the higher numbers seen prior to December 2014. While this particular assumption has limited impact on the lifetime cost of those in housing, it is material for recent exits and for idealised purchasing. The level of applications will be assessed and the assumed rate considered carefully from year to year.

Figure 4.3 Past and projected numbers of register applications per quarter



Another consequence of the irregular patterns over time is that it has been hard to establish a direct link between the level of register applications and the broader macro-economy. We have allowed for a moderate signal associated with market rents – regions with very low average rents tend to have lower applications. However, we do have a strong indirect macroeconomic effect – the application rate is much higher for welfare benefit recipients (see below), and the number of recipients is projected to fall in line with lower projected unemployment rates. This contributes to the visible decrease in projected register applications in Figure 4.3.

4.5.2 Predictors of register applications

There are many factors that affect the likelihood of a register application from a statistical point of view. The most important ones are summarised in Figure 4.4 and the accompanying comments below. This analysis is based on the housing state, benefit state and other characteristics of the **primary** applicant.

The most significant predictor of register applications is benefit status. About two thirds of new working-age applicants (primary or non-primary) also received JS or SPS benefits in their application quarter. The rate of application for these clients is about 10 times that of someone who has recently left

benefits (not receiving main or supplementary benefits), and is about 70 times that of someone who has not received benefits in the last five years.

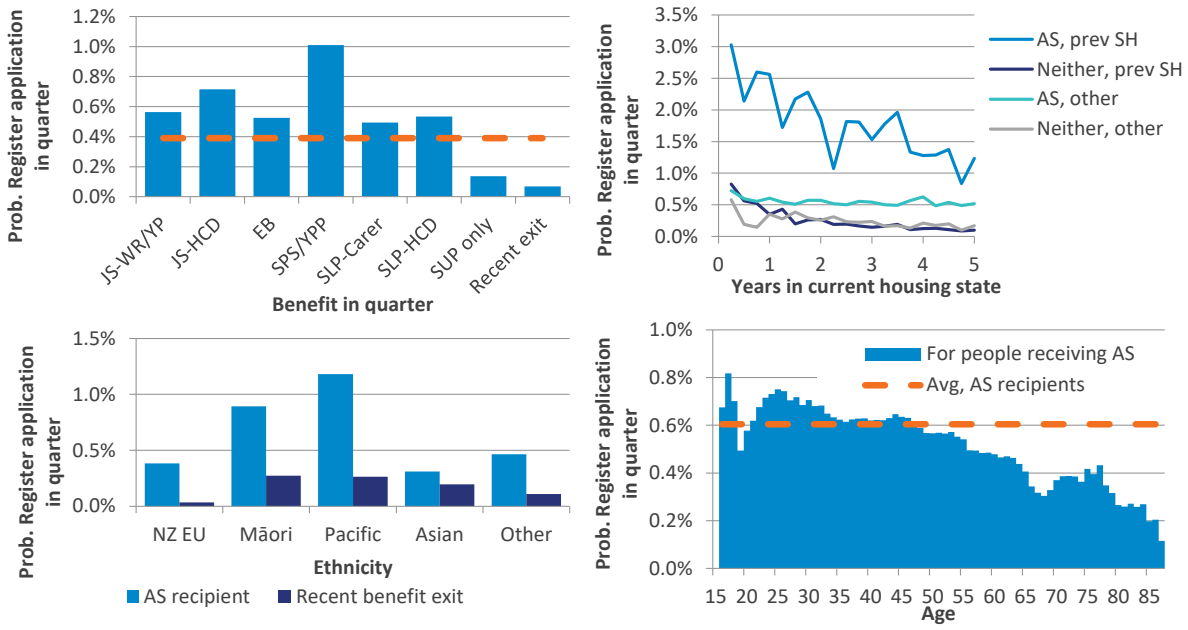
Previous social housing history is predictive – the rate of reapplication is roughly double in the first two years after exit from a social housing place, and also roughly double that of people who have not been in housing for three to five years. The rate of reapplication continues to decrease with time since last in housing.

Housing state (whether someone is receiving AS or not) is also highly predictive. For someone exiting social housing and receiving AS the reapplication rate is about eight times that of someone not receiving AS. Although this effect is entangled with the main benefit effect, even those receiving AS without a main benefit are significantly more likely to apply compared to those not receiving AS.

Ethnicity is also significant. Māori and Pacific peoples receiving AS are two to three times more likely to apply compared to NZ European people. For recent welfare exits (not receiving main or supplementary benefits) the figure is seven times higher (off a much lower base).

Age is important, with the majority of primary applicants aged under 35. Other factors such as partner status, gender and region are also significant and have been incorporated into our projections. **Figure** 4.4 shows that the application rate for 25-year-olds is nearly double that for those aged 60.

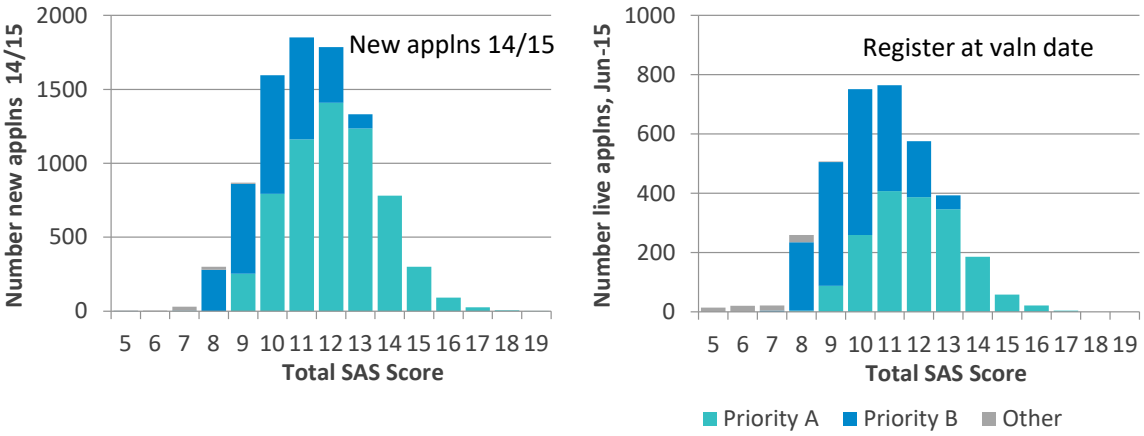
Figure 4.4 Significant predictors of register applications



4.5.3 Need scores

In 2014/15 there were about 9,000 new (that is, non-transfer) applications to the register. About two-thirds of these were priority A. Higher priority applicants tend to be housed first (a priority B application would be allocated an available social housing place if there is no priority A application close to that location and bedroom need, for example)—only half of live applications at the valuation date were priority A. The need scores for new applications and those on the register at the valuation date are summarised in Figure 4.5.

Figure 4.5 Need scores for new applications in 2014/15 (left), and live applications at the valuation date (right)

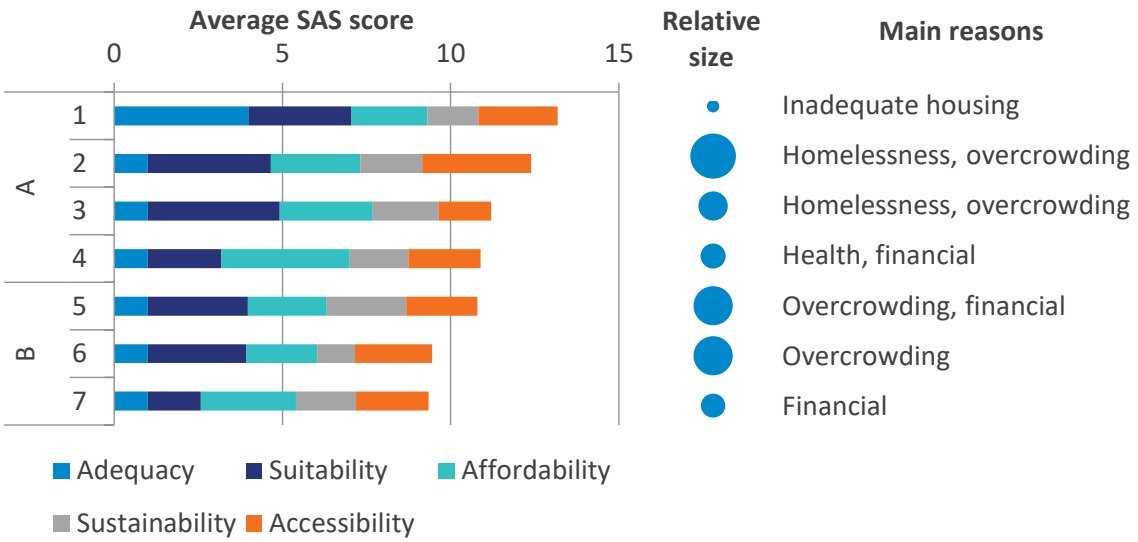


The need scores for each of the five subcategories are relatively independent measures. There is a weak positive correlation between accessibility and suitability scores (those who score higher on one will tend to score a little higher on the other). These two measures have a weak negative correlation with affordability (those who apply for affordability reasons are slightly less likely to have accessibility and suitability needs).

We have performed a small clustering exercise to illustrate the different types of applications that have been made in 2014/15. There are seven groups, four corresponding to priority A and three to priority B. They are summarised in Figure 4.6 and sorted by descending average need. Cluster 1 contains those with a high adequacy score; there is a relatively small number of them, but they have high need. The next two groups (clusters 2 and 3) are high priority clients with high suitability scores; cluster 2 also has high accessibility needs. These two groups are relatively large and the most common 'main reason' is either homelessness or overcrowding. Cluster 4 has high affordability needs, with financial or health being the main reasons.

The three priority B groups (clusters 5, 6 and 7) have fewer differences between them, with overcrowding and financial reasons being the most common.

Figure 4.6 Statistical grouping of need sub-scores into seven clusters



Differences in needs sub-scores can also be seen across the regions as shown in Table 4.3. On average priority A applications for housing in Canterbury, Wellington and Auckland have higher need scores in terms of affordability, whereas applications for Bay of Plenty, Northland and East Coast have higher needs in terms of adequacy of current housing. Note that adequacy scores can only take two values (1 or 4), and there is discretion when assessing affordability and accessibility in Canterbury.

Table 4.3 Mean SAS sub-scores for Priority A (left) and Priority B (right) applications

Region	Priority A applications					Priority B applications				
	Affordability	Suitability	Accessibility	Adequacy	Sustainability	Affordability	Suitability	Accessibility	Adequacy	Sustainability
Northland	2.21	3.72	2.61	1.39	1.97	1.98	2.91	2.02	1.00	1.99
Waikato	2.39	3.50	2.99	1.24	1.91	2.30	2.77	2.16	1.01	1.62
Bay of Plenty	2.20	3.53	3.04	1.43	1.74	2.02	2.89	2.44	1.00	1.69
East Coast	2.40	3.65	2.83	1.30	1.87	2.15	2.85	2.21	1.00	1.53
Taranaki	2.28	3.53	3.37	1.14	1.86	2.11	2.92	2.37	1.00	1.81
Central	2.20	3.71	2.82	1.13	1.92	2.16	2.86	2.45	1.00	1.87
Wellington	2.94	3.59	2.49	1.08	1.91	2.35	2.83	2.04	1.00	1.72
Nelson	2.33	3.51	2.77	1.22	1.81	2.03	2.82	2.31	1.00	1.64
Canterbury	3.10	3.64	3.09	1.12	2.01	2.28	2.80	2.93	1.00	1.69
Southern	2.50	3.64	2.79	1.09	2.30	2.15	2.90	2.31	1.00	2.20
Auckland	2.67	3.66	2.68	1.16	1.79	2.32	2.84	2.40	1.00	1.69
National	2.62	3.63	2.79	1.18	1.87	2.25	2.84	2.35	1.00	1.72

4.6 Regional differences in the register

Table 4.4 below summarises some key register metrics and how they differ by region. Note that the average duration of applications (second last column) is different to the "time to house" statistic reported by MSD. The average duration of applications is the average duration of people on the register at the valuation snapshot date (30 June 2015). There are a number of reasons why this average duration might differ from MSD's statistic, including the fact that the people who remain longer on the register are less likely to be the high priority cases that are housed quickly.

Table 4.4 Register differences by region

Region	Population (Census 2013)	# social houses (occupied)	Houses per 1,000	New applications in 14/15			Active at valn date			Avg dur of applns active at 30-Jun-15, yrs	Ratio Active ÷ New
				Number	Per 1,000 popln	Percent Priority A	Number	Per 1,000 popln	Percent Priority A		
Northland	168,300	2,080	12.4	375	2.2	67%	139	0.8	45%	0.9	37%
Waikato	439,100	3,920	8.9	624	1.4	64%	256	0.6	41%	0.6	41%
East Coast	287,100	2,850	9.9	469	1.6	66%	190	0.7	59%	0.5	41%
Bay of Plenty	207,400	3,920	18.9	792	3.8	69%	190	0.9	54%	0.3	24%
Taranaki	115,700	1,900	16.4	286	2.5	77%	54	0.5	56%	0.1	19%
Central	234,500	1,970	8.4	311	1.3	73%	42	0.2	64%	0.2	14%
Wellington	496,900	7,920	15.9	994	2.0	72%	235	0.5	57%	0.4	24%
Nelson	132,100	1,420	10.7	240	1.8	68%	61	0.5	52%	0.4	25%
Canterbury	586,400	5,600	9.5	1114	1.9	75%	522	0.9	62%	0.6	47%
Southern	312,300	2,390	7.7	376	1.2	62%	77	0.2	48%	0.4	20%
Auckland	1,569,900	29,670	18.9	3298	2.1	63%	1,704	1.1	44%	1.0	52%
Total	4,549,700	63,640	14.0	8879	2.0	68%	3,470	0.8	49%	0.7	39%

There are striking differences in regions:

- Auckland, Bay of Plenty, Taranaki and Wellington have the **highest level of social housing places per capita**. For Bay of Plenty and Taranaki this is consistent with high register application rates per capita. For Auckland, it is consistent with the slower rate of housing exits.
- Southern and Central regions have very small registers at the valuation date, relative to their population. This reflects a low number of new applications.
- Canterbury has fewer social housing places per capita, but has seen an application rate in 2014/15 comparable to the national average. Historically the application rate has been below the national

average. Further, the percentage of these applications having priority A is very high. This has contributed to a larger than usual register at the valuation date.

» Northland has the second-longest average wait time for those currently on the register, after Auckland. In 2014/15 it has seen above average applications and has below average housing places levels (compared to the national average).

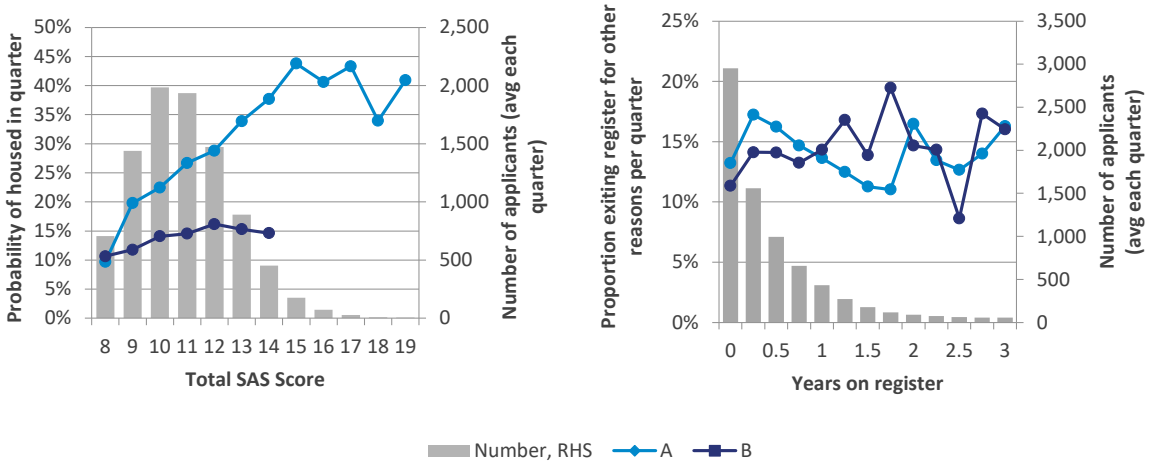
Some of these effects could be temporary, such as the high Canterbury application rates compared to historical levels. Assumptions regarding whether effects are temporary or not will heavily impact the results of any idealised purchasing intentions analysis (as discussed in Section 5.3).

4.7 Entries to social housing, register exits and churn

4.7.1 Entries to social housing (leaving the register) and other register exits

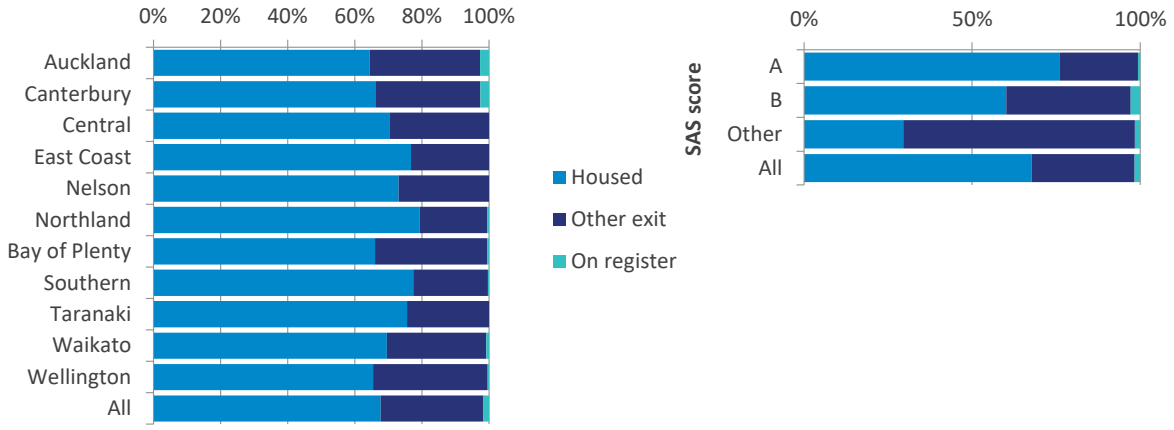
In the two years to June 2015, about 20% of applicants on the register were housed per quarter. The most important predictor in being housed was the SAS need priority and total score. This is illustrated in the left panel of Figure 4.7. A further 14% exited the register for reasons other than entering social housing, as shown in the right panel. The trends for these exits are less strong, although Auckland applicants appear less likely to exit. Priority A applicant exit rates tend to fall with duration.

Figure 4.7 Rate (over eight quarters to June 2015) of housing placements (left) and non-housed exits from the register (right)



A related question is what proportion of applicants end up in housing. This result is sensitive to the supply side (how many social housing places are available in an area), as well as the demand side. Figure 4.8 shows the eventual outcome at 30 June 2015 for all applications made in the 2012/13 year. We see **68% of households on the register are housed in social housing**, with highest rates in Northland and Southern and lowest in Bay of Plenty. A very small number were still on the register at 30 June 2015; the remaining 31% exited the register without moving into social housing.

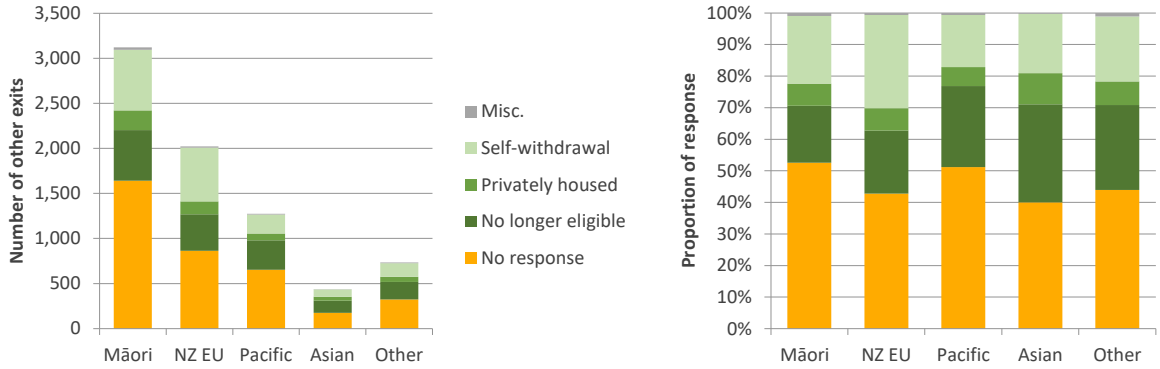
Figure 4.8 Outcome of register application, for households applying in 2012/13



4.7.2 Register exit reason codes

There is a reason code supplied when an applicant exits the register without being housed. As with reasons for housing exits (see Section 3.7.6), the quality of this data field is typically lower, but some trends carry some insight. We have grouped these reason codes as shown in Figure 4.9. They vary by age, ethnicity and region. Māori and Pacific peoples tend to have higher rates of exit coded as non-response[31]. Nearly half of those who exited the register without entering social housing either withdrew their applications, found private housing, or became ineligible.

Figure 4.9 Exit reasons for those not housed over the two years to June 2015, by ethnicity of primary applicant. The left panel is absolute numbers, the right percentages.



4.7.3 Housing churn

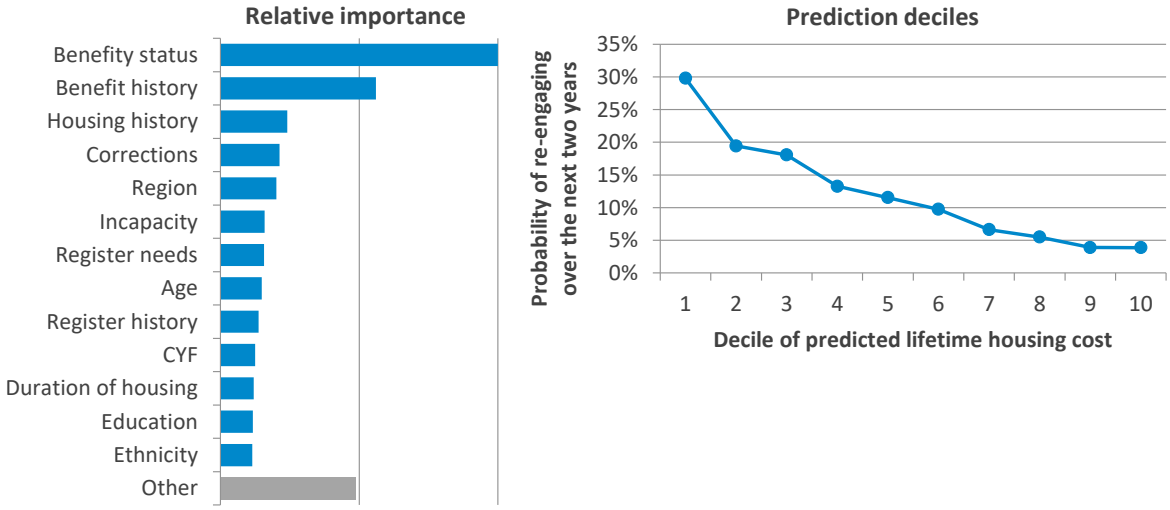
Those who have recently exited social housing are more likely to re-engage via a register application. We have performed a snapshot analysis to understand how the likelihood of re-engaging varies by risk factors. We've taken all people who have exited housing or the register in the year to 30 June 2013, and then predicted which of them re-engage in the subsequent two years. This is shown in Figure 4.10.

On average about 12% of clients (aged under 70) re-engaged, but the rate for the decile of people most likely to re-engage was triple this. Benefit status (and history) proved to be very significant; this is

[31] In instances where MSD is unable to contact a client on the register, or is unable to verify their current circumstances over an extended period of time, MSD eventually places their application on hold. If the client has not made any contact after two months their application is closed (i.e. exit for 'no response'). This process applies to the time period for which the data for this valuation was collected.

consistent with the heightened likelihood of register applications for benefit clients seen in **Section 4.5.2.** There were also strong regional effects, and also those with corrections spells as a result of a criminal conviction tended to have higher rates of re-engagement.

Figure 4.10 Relative importance and prediction deciles for re-engaging with the housing system over the next two years.



There is also some evidence of register churn in the data; individuals exiting the register without being housed sometimes re-apply to the register within the next year.

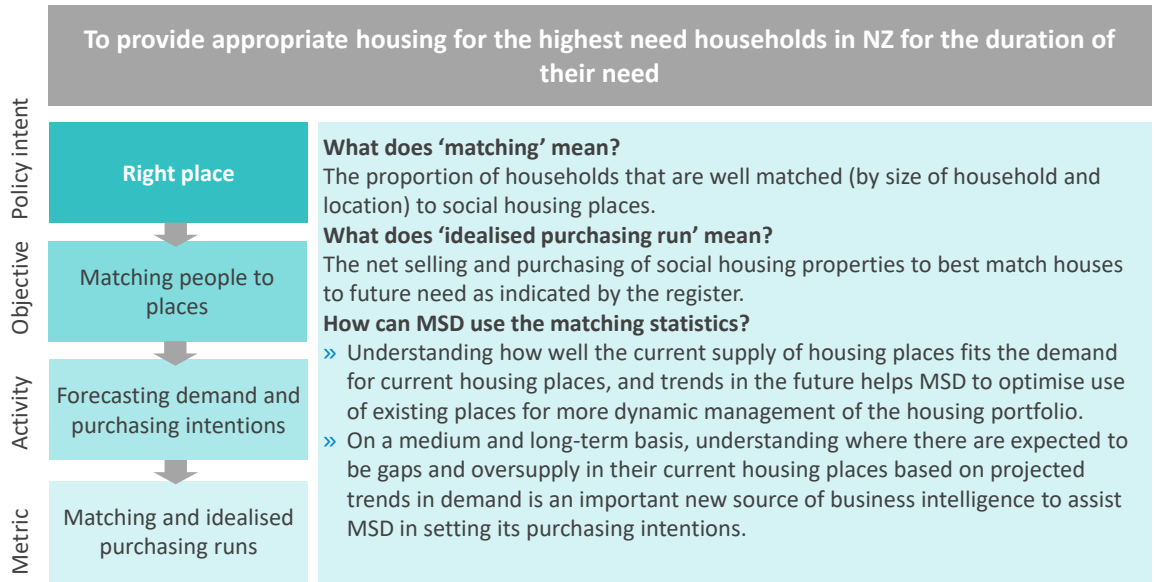
5 RIGHT PLACE

INSIDE THIS SECTION

5.1 Introduction and key results

Section 5 aims to address the question of 'right place.' Figure 5.1 recaps the 'right place' component of the social housing framework discussed in Section 2.4.3**.**

Figure 5.1'Right place' component of the social housing framework



An effective social housing system should have social housing places in the right locations and of the right size to meet future demand. The reality is often different: the available places are driven more by where current tenants are exiting and it is difficult to quickly buy and sell properties to adjust to where current demand is. The composition of a household evolves over time, so an appropriately sized property today may not be appropriately sized in ten years' time. Projecting future demand can be difficult, as it is driven by a number of factors that are hard to forecast.

This valuation introduces two tools to help understand the appropriateness of the housing portfolio:

1. **Matching** measures how well the current portfolio is matched to current households
2. **Idealised purchasing** shows how the housing portfolio should be bought and sold over time, given a set of assumptions on place levels and register demand.

KEY RESULTS

- We find that **45% of social housing places are well matched.** This means that 45% of social housing places are occupied, and the household bedroom need equals the number of bedrooms in the social housing place. **On a dollar-weighted basis, we find that 84% of total market rent on social housing places is well matched**. We plan to monitor match rates over time.
- **There are too few 1- and 4-bedroom social housing places.** While 80% of the housing portfolio has 2- or 3- bedrooms, less than 50% of current households actually need 2- or 3- bedrooms.
- **Regionally, Auckland is better than average for matching.** This is partly due to a higher percentage of 4-bedroom (or more) social housing places – 16% compared to 8% for the rest of New Zealand.
- **NZ Super households tend to have high underuse rates**, often because children who previously required rooms have left. **Match rates are good for SPS recipients**, while underuse is fairly high for SLP recipients. **Overcrowding appears worst for working age tenants not on a main welfare benefit.**
- **Underuse is forecast to be stable over time**. We also forecast a slight increase in the number of empty social housing places. In the next valuation we will be able to assess the change in the matching rate, both relative to current levels and against our projection.
- **Idealised purchasing is another way to understand the future housing need by size and location.** It assumes perfect flexibility in buying and selling properties between tenancies. This functionality has been provided to MSD.

5.2 Matching statistics

5.2.1 Defining the matching rate

We define the matching rate to be the proportion of households that are appropriately housed. A mismatch occurs if:

- A usable social housing place is **empty**
- A household is (voluntarily) **on the transfer register**
- A social housing place is **over-crowded** (too few bedrooms)
- A social housing place is **underused** (too many bedrooms).

Then we can calculate the matching rate:

$$Matching = 1 - \frac{Weighted\ number\ of\ inappropriate\ social\ housing\ places}{Weighted\ number\ of\ social\ housing\ places\ in\ system}$$

There are various ways to define the weights used in the matching rate; we present two here. A 'raw' or unweighted rate would give every house equal weight. A 'dollar-weighted' rate would use dollars to measure the degree of mismatch:

$$Dollar\ weighted\ Matching = 1 - \frac{Market\ rent\ of\ empty\ social\ housing\ places + (Market\ rent\ changes\ to\ fix\ transfers, overcrowding\ and\ underuse)}{Market\ rent\ of\ all\ of\ the\ social\ housing\ portfolio}$$

So a social housing place with two few bedrooms would carry more weight than one too few, since the dollar cost of resolving this would be greater. Thus the dollar weighting attempts to measure what percentage of social housing market rent is well allocated.

The number of bedrooms required is only available for register applications, for people in social housing we have attempted to calculate this based on MSD's rules:

- A primary householder and their partner are allocated a bedroom.
- Children are allocated bedrooms with maximum occupancy of two per room.
- A child aged under 10 years is able to share a bedroom with another child of either gender, while a child of 10 years and over is able to share a bedroom with another child of the same gender.

Other adults can be allocated a bedroom under some circumstances, but our data does not allow easy discrimination between those who qualify and those who don't. We have generally added other adults a bedroom, unless they are recorded as a boarder. We also don't allow for manual overrides, such as when an extra bedroom is allocated for medical reasons.

We note this approach has significant data-based limitations. We are not able to quantify how much higher or lower the matching rate would be if we better understood household characteristics.

We have also simplified bedroom numbers in the calculation. We have treated 0-bedroom social housing places – i.e. studios – as 1 bedroom social housing places, and we have defined no mismatch if a household needs more than 4 bedrooms but are in a 4 bedroom social housing place; as there are very few social housing places with 5 or more bedrooms.

It is important to note that while the results suggest a significant level of underutilisation this is based on the recorded data as disclosed by tenants. It's possible that a number of the "empty" bedrooms are occupied. It is similarly possible that houses that appear well matched based on the data are actually over-crowded.

5.2.2 Matching at the valuation date

Table 5.1 shows **the dollar-weighted matching rate is 78%. The largest contributor is housing underuse, with about 15% of total market rent being spent on bedrooms that are not strictly required (representing about $3.4m per week).** Overcrowding represents about 4% of total rent on a dollar-weighted basis; that is, the amount of rent saved by those households in houses considered too small is about 4% p.a. of the total market rent paid by **all** households. This amount is about $940k per week.

On an unweighted basis, we observe a matching rate of 45%. About 40% of social housing places have underuse and 13% have overcrowding. Much of this mismatch is having one too many or too few bedrooms. If we instead define a mismatch as needed and actual differing by two or more bedrooms (for example, allowing a 2 bedroom household in a 3 bedroom social housing place), then the matching rate is 90%.

Table 5.1 Matching rates at 30 June 2015. Left shows dollar weighted rates, the right is unweighted

	$m per week
Unoccupied	0.3
Transfer	0.1
Overcrowded	0.7
Underused	2.4
Total mismatch	3.5
Total weekly rent	21.7
Matching rate	84%

	Exact match	Match within ± bedroom
	Number	Number
Unoccupied	822	822
Transfer	1,349	1,349
Overcrowded	8,246	519
Underused	25,316	4,062
Total mismatch	35,733	6,752
Total	64,521	64,521
Matching rate	45%	90%

Table 5.2 examines matching rates by bedrooms, region and segment, enabling a better understanding of the results.

Table 5.2 Occupied social housing places at the valuation date, split by current number of bedrooms and need

Bedrooms current	Bedrooms needed 1	2	3	4+	Number
1	97%	3%	0%	0%	5,676
2	55%	35%	8%	2%	23,917
3	13%	27%	38%	22%	26,664
4+	3%	7%	18%	72%	7,442
Total need	22,191	16,037	13,518	11,953	63,699

Matched
Overcrowded
Underused

We observe in Table 5.2 that while 80% of the housing portfolio has 2 or 3 bedrooms, less than 50% of current households actually need 2 bedrooms. Most 1- and 4- bedroom social housing places that are available are well used. Nationally the imbalance implies a shortage of about 4,500 4- bedroom (or more) social housing places, and about 16,500 1- bedroom social housing places.

Figure 5.2 Unweighted matching rates by region and by segment

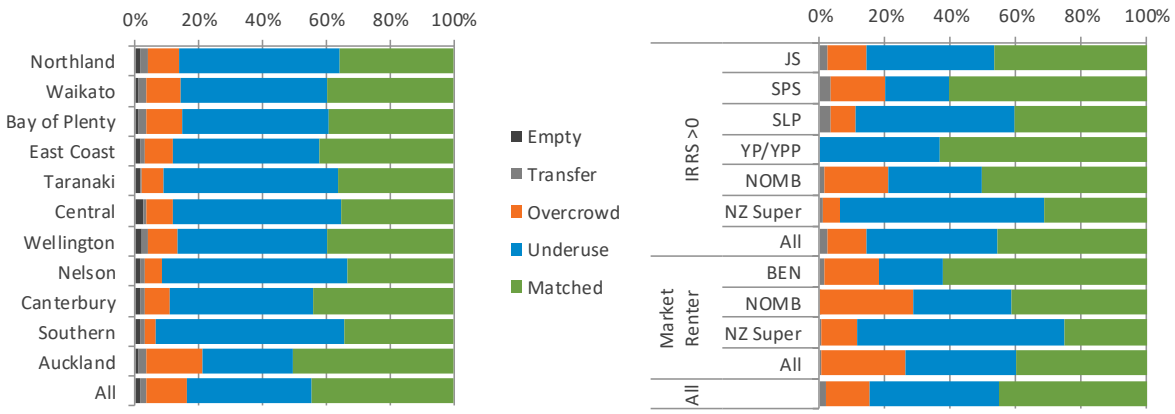


Figure 5.2 shows matching rates by region and segment. **Regionally, Auckland is better than average for matching. This is partly due to a higher percentage of 4 bedroom (or more) social housing places– 16% compared to 8% for the rest of New Zealand.** Notwithstanding, the allocation of social housing places is a bit better. For instance, the rate of 3-bedroom households only needing 2 bedrooms is substantially lower.

Results are more variable for client segments. NZ Super households tend to have high underuse rates, often because children who previously required rooms have left. Match rates are good for SPS recipients, while underuse is fairly high for SLP recipients. Overcrowding appears worst for working age tenants not receiving a main benefit.

5.2.3 Projected matching rate

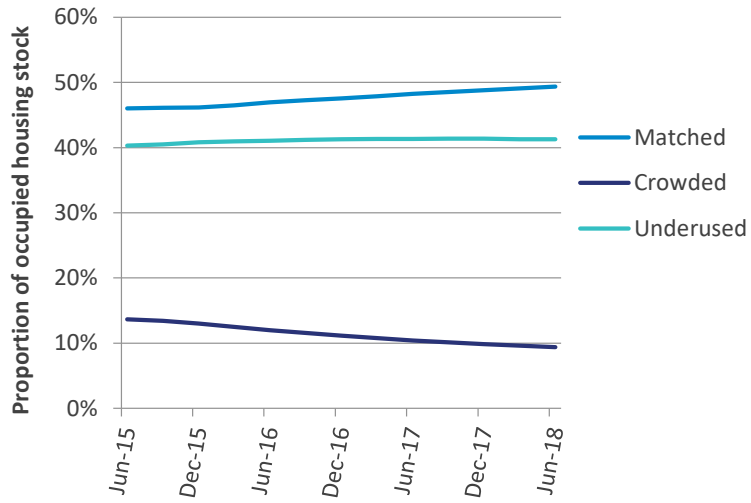
Figure 5.3 shows forecast matching rates for the next three years. This projection has heavy caveats:

- The approach to housing allocation in the projection is algorithmic, and substantially different to the approach used in reality. While we have attempted to reflect current practice, the rate of mismatch at time of placement is likely to be different in reality.
- We have not attempted to estimate growing mismatch from existing household composition changes in this projection.

Our projection forecasts an improvement in matching, driven by reduced crowding. This largely assumes a low rate of overcrowding at the time of housing allocation. This would be enough to increase the (dollar-weighted) matching score by a percentage point to 85%. **Underuse is forecast to be stable over**

time. We also forecast a slight increase in the number of empty social housing places, although this is sensitive to the way HNZ allocates tenancies where a perfect match is unavailable.

Figure 5.3 Projected overcrowding and underuse rates for the next three years.



5.2.4 Attribution over time

In the next valuation we will be able to assess the change in the matching rate, both relative to current levels and against our projection. Changes can be subdivided by the type of mismatch (for example, how much of the change is due to fewer empty properties), which will give insight into the performance over the year.

5.3 Idealised purchasing projections

5.3.1 Introduction to idealised purchasing

The main 'supply' of social housing places for new applicants arises from social housing places made available when an existing household exits. Current supply is not always well-matched to demand. There may be too many social housing places vacated in some areas and too few in others. The size of the social housing place might be too large or small. The vacated properties might be suitable for clients with lower need, rather than those with higher need. Several of the Social Housing Reform Programme policy changes aim to increase flexibility in purchasing housing places that better suit demand.

While MSD and HNZ attempt to adjust housing placements over time to better meet demand, our main projection has assumed that social housing properties remain fixed (in size and location) over the projection. This section relaxes this assumption to gain insight into where social housing places are needed; it explores idealised situations where the housing portfolio can be modified between tenancies.

5.3.2 What is idealised purchasing?

Our base model projection (as used for the metrics in Sections 3 and 4) performs a housing allocation step each quarter:

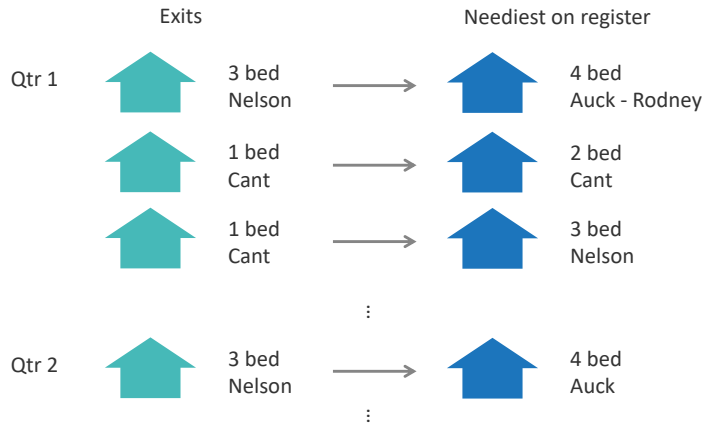
- We calculate the number of available social housing places (those empty at the start and a fraction of those made available during the quarter) by territorial authority and size.
- We produce an ordered list of applicants, including those on the register at the end of the previous quarter and those applying during their quarter. Their order on the list is based on their calculated level of need (needier are more likely to be towards the top), and we note their requirements (location and size). Variants of this are possible, including an ordering independent of need.

» Working down the list, we attempt to allocate each household to an available social housing place. If an exact match is unavailable, we allow some mismatch in terms of neighbouring territorial authorities and bedroom size.
» If there are no available social housing places, the household remains on the register (or exits without being housed).

Section 9.8.2 gives more detail on our methodology.

It is possible to create variations of the base model where we allow the housing portfolio to vary at the time properties are vacated. In particular, we can see what would happen if we sold the vacated property and then bought another to match the requirements of the neediest households on the register. So if there were 2,000 available properties, we would sell these and buy 2,000 properties according to the needs to the 2,000 households at the top of the register waitlist. This buying and selling process gives a net change in housing places that reacts to the current demand. It can be thought of as a series of housing swaps in location and size, as shown in Figure 5.4 below. We refer to this process as 'idealised purchasing'.

Figure 5.4 Illustration of housing swaps for idealised purchasing



We have provided MSD with the functionality to make idealised purchasing projections for 25 years. It gives a net purchasing position for any quarter, for any territorial authority and, for any social housing property size. This functionality will form part of MSD's analysis for purchasing intentions.

Idealised purchasing is highly sensitive to assumptions, in a few ways:

» Numbers on the register are very sensitive to the register application rate, which we have identified as very uncertain (see Section 4.5). A small change to the rate can cause the cumulative number waiting to either grow strongly or reduce rapidly; comments on future register size should be treated with appropriate caution.
» The level of need across regions is likely to evolve with time; for instance, Canterbury currently has higher need scores than Auckland, but this may not always be the case.
» The other characteristics of applicants (such as age and household composition), particularly those not currently known to MSD, is likely to evolve with time.
» The algorithmic allocation of register applicants to social housing places is unable to replicate the true allocation process; allocation has particular subtleties in timing and balancing competing demands that we have not attempted to replicate.

The best way to approach idealised purchasing outputs is to consider a range of plausible scenarios and see how results vary. No single scenario should be thought of as our expectation of the future; rather, in combination they provide insight into how demand for housing places might evolve with time.

6 SENSITIVITY AND SCENARIOS

INSIDE THIS SECTION

6.1 Introduction and key results

Section 6 looks at level of simulation variability and the sensitivity of the social housing valuation to changes in assumptions.

KEY RESULTS

- Although the projection is simulation based, the large number of repetitions plus the large number of individuals mean that the **aggregate level liability figures are virtually free of simulation error**.
- **The valuation is most sensitive to changes in the growth rate of rents.** If the rents grew faster by one percentage point per year then the liability would be 22% higher through higher rents, a higher proportion of rent paid by the IRRS and lower social housing exit rates.
- **The size of the register is very sensitive to total applications rates**. If applications lodged per quarter were 5% higher, the register would end up 15% larger over time.

6.2 Simulation variability

Our projections involve simulating the quarterly pathway through housing and welfare benefit receipt for each individual, using characteristics known at the valuation date. These pathways carry enormous variability at an individual level. For a group of similar individuals, we would expect some of them to make heavy use of housing and welfare benefit support, and others relatively little.

The simulation process adds variability to our results. When calculating the overall liability, we obtain stability by:

- Projecting multiple times (here 10 times) and taking the average.
- Taking the sum of many individuals. In any individual simulation some will be higher than their true average, some lower, but these will tend to balance across the projection.

We calculate the simulation error attributable to our overall estimate ($16.5 billion) to be ±$0.021 billion, to a 95% level of confidence. This means that the simulation error at an aggregate level is very small (just under 0.1%).

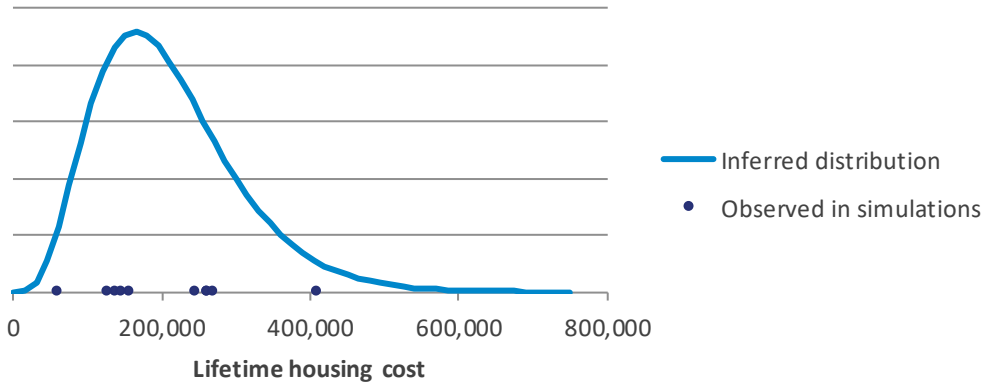
The simulation variability at a segment level is summarised in Table 6.1. The coefficient of variation is the standard deviation of the estimate divided by the estimate itself; it shows that the relative variability is somewhat larger for the segments with fewer people in them. In absolute terms, all the confidence interval widths are very small.

Table 6.1 Simulation variability by segment

Segment		Total liability ($ billion)	Simulation Confidence interval ($ billion)	Coefficient of variation
IRRS recipients	JS	2.904	(2.896, 2.911)	0.1%
	SPS	2.726	(2.716, 2.736)	0.2%
	SLP	2.899	(2.892, 2.907)	0.1%
	YP/YPP	0.005	(0.005, 0.005)	3.9%
	NOMB	3.837	(3.821, 3.853)	0.2%
	NZ Super	1.607	(1.601, 1.613)	0.2%
Market Renter	BEN	0.012	(0.011, 0.013)	3.7%
	NOMB	0.429	(0.421, 0.438)	1.0%
	NZ Super	0.030	(0.029, 0.031)	1.7%
On register *(incl. those on in April / May)*	BEN	0.415	(0.408, 0.421)	0.8%
	NOMB	0.069	(0.069, 0.070)	0.6%
	NZ Super	0.017	(0.016, 0.017)	1.6%
Recent housing or register exit	BEN	0.703	(0.700, 0.706)	0.2%
	NOMB	0.377	(0.374, 0.381)	0.5%
	NZ Super	0.018	(0.018, 0.019)	0.7%
Total (incl. CHP + Expenses)		16.424	(16.403, 16.445)	0.1%

The variability between individual simulations for a single person, however, is substantial. The coefficient of variation is about 1, which means that the ratio between actual future cost and the average cost could easily be double, or half. Figure 6.1 shows the lifetime housing cost for a single person (here a 45-year-old male in Auckland). The 10 lifetime cost estimates arising from each simulation are shown as dark blue dots, and we have inferred a distribution around this. While the average future cost is about $205k, we can see significant variation. For similar individuals we would expect to see realised cost under $138k about a quarter of the time, and 10% of the time lifetime cost would be higher than $335k. This illustrates that while the average liability makes sense at an aggregate level, it hides significant variability at an individual level.

Figure 6.1 Simulated lifetime cost for a single individual (45-year-old male in Auckland) and implied distribution



6.3 Sensitivity to assumptions

Our projections are sensitive to many underlying assumptions. We illustrate this sensitivity in Table 6.2, where we summarise the results of various scenarios.

Table 6.2 Sensitivity of liability to changes in assumptions

Scenario	Liability excl. CHPs and Expenses, $ billion	Change, $ billion	Change %
Base	16.05		
Increasing housing exit rates by 5%[32]	15.8	-0.2	-1.3%
Decreasing exit rates by 5%	16.3	+0.2	+1.3%
Adding 1% to rental growth pa	19.5	+3.5	+21.6%
Subtracting 1% from rental growth pa	13.1	-3.0	-18.6%
Subtracting 1% from CPI and AWE inflation pa	17.8	+1.7	+10.9%
Adding 1% to CPI and AWE inflation pa	15.4	-0.6	-3.9%
Unemployment flat (rather than falling)	16.5	+0.4	+2.5%
Register applications 5% higher	15.9	-0.1	-0.8%
Register applications 5% lower	16.0	-0.1	-0.3%

The main findings are:

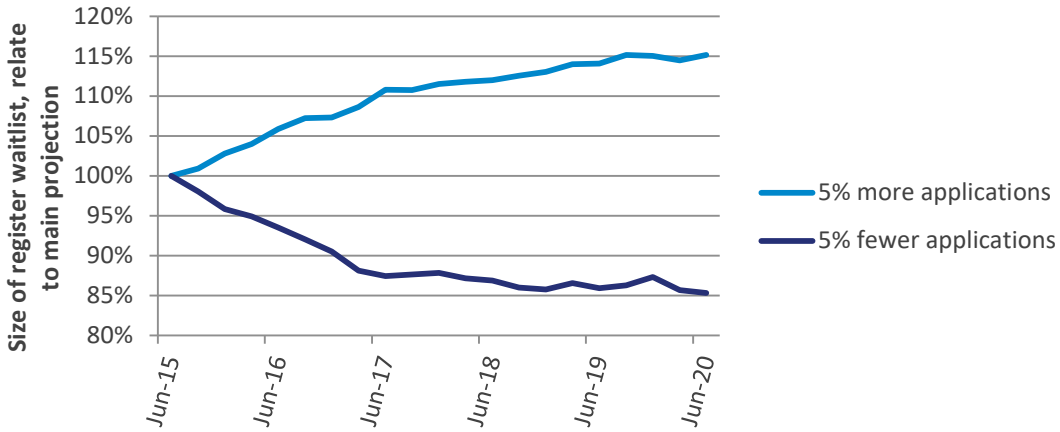
- The results are extremely sensitive to the assumed rental growth rates (relative to inflation). If rent increases were 1% higher (so 4% becomes 5%, say), then this causes a 22% increase in the liability. There is a three-pronged effect:
  - The direct increase in market rents, increasing IRRS
  - The growth rate above CPI (and AWE) means that IRRS growth is higher than just rental growth; the proportion of rent paid by householders falls.
  - The higher level of IRRS decreases exit rates, increasing durations.

  The effect is also true in the opposite direction. If long term rental growth rates were 1% lower, then there would be a very large reduction in the lifetime housing cost.
- Housing exit rates have been relatively stable over time, particularly for primary householders; see Section 3.7. This would suggest that the ±5% change to rates tested here are a plausible variation.
- Decreasing inflation (but keeping the rental growth rate assumptions constant) actually increases the liability. Future AS and TAS payments decrease (as we have tied these payment rates to inflation, as with other welfare benefits) by 7%, but this is more than offset by the increased gap between rental and inflation growth; if a household's income grows slower relative to rent then their IRRS increases and their exit rates fall.
- Unemployment rates have a small impact on the valuation cohort; these people are mainly those already on the register or in housing, where the influence of unemployment is less direct. The impact on those in the benefit system cohort (receiving benefits in the 12 months to 30 June 2015) but not housing is larger; their lifetime housing cost increases by 2.5% under this scenario.
- Changes to the number of register applications has a minimal impact on the valuation cohort. Again, the effect is more significant for people outside the cohort.

The scenarios regarding register applications also show the sensitivity in the size of the register over time. This is shown in Figure 6.2. If register applications were 5% higher than forecast, the register would grow in size over time, stabilising at about 15% higher than the base projection after five years. Conversely, if register applications were 5% lower, the numbers on the register over time would stabilise at a figure 15% below the base projection. Thus the projected size of the register is very sensitive to application rates.

[32] Here this means that if a household has a 3% chance of exiting next quarter in the base scenario, they have a 3% x 1.05 = 3.15% chance of exiting in the scenario

Figure 6.2 Relative size of the register over time, sensitivity tests



7 OTHER COSTS

INSIDE THIS SECTION

7.1 Introduction and key results

The lifetime housing cost estimate of $16.5 billion shown in Section 3.4 included allowances for CHPs and other MSD expenses. Section 7 explores these estimates in this section.

KEY RESULTS

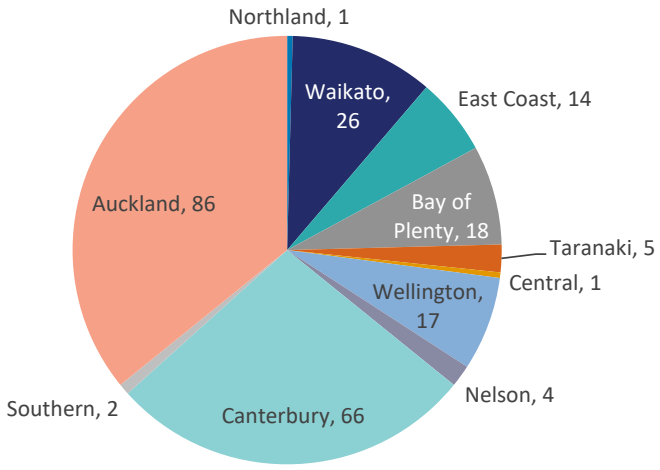
- **We estimate the lifetime housing liability for households managed by CHPs at $60m.** This estimate is based on CHPs' 0.41% share of weekly IRRS payments, a relatively crude method intended to improve in future years as CHPs take on an increasing role in the social housing sector.
- In addition to housing-related benefit payments, MSD incurs administrative expenses in delivering benefits, and invests in housing-related services and programs – some of which aim to improve housing independence. The estimated liability for the current cohort includes a **$316m allowance for such expenses and investments**.

7.2 Allowance for CHPs

We estimate the lifetime housing liability for households managed by CHPs at $60m. At the valuation date there were 240 such households – shown by region in Figure 7.1 – with a combined weekly IRRS subsidy of $56,100. This compares to an average of $13.6m per week in 2014/15 for HNZ properties, so CHPs represent 0.41% of total IRRS payments. We have used this percentage to estimate the $60m, which implies an average household liability of $250,000. This estimate is relatively crude in that it does not attempt to adjust for household or location characteristics.

CHPs will play an increasingly important part of the social housing system in the future, and subsequent valuations will include more detailed modelling of households managed by CHPs.

Figure 7.1 Number of CHP IRRS places by region



7.3 Allowance for other MSD expenses

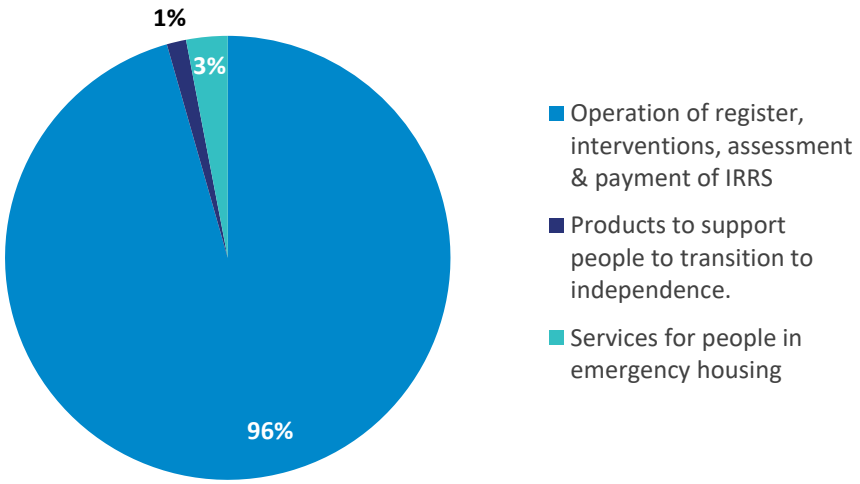
MSD incurs expenses in delivering benefits, services and programs in addition to the cost of the benefit payments. The estimated liability for the current cohort includes a $316m allowance for such expenses. Specifically, the allowance covers expense items related to:

- Operating the social housing register and associated interventions
- Assessing eligibility and payment of IRRS
- Provision of assistance for alternative housing solutions
- Services for people in emergency housing

Some expenses in the social housing system are already captured in the 2015 benefit system valuation. These will be more accurately split for the 2016 valuations.

The expense allowance has been determined based on appropriations provided for the financial year ending 30 June 2015. The total budget for the expense items listed above was $21m, with a breakdown shown in Figure 7.2 below.

Figure 7.2 Breakdown of 2014/15 appropriations by value



8 INTERACTIONS BETWEEN HOUSING AND WELFARE

INSIDE THIS SECTION

8.1 Introduction and key results

As identified in Section 3.3 there is a large overlap between the benefit system and housing valuation populations. Around 12% of the benefit system valuation population is also part of the current housing valuation population. Earlier sections show that welfare benefit status has a significant effect on future lifetime housing cost, the likelihood of a register application and the likelihood of re-entry to social housing (churn). In Section 8, we explore the inverse question: how does housing status influence welfare outcomes? While strictly speaking somewhat outside the scope of a valuation of the housing valuation, the joint welfare-housing models provide an opportunity to look at these dynamics for the first time – and so we have included them in this report. Further commentary will also be provided in the next benefit system valuation.

KEY RESULTS

The influence of housing state on the rate of exiting working age benefits:

- Is **moderate for work-ready Jobseekers** – On average someone in social housing is nearly 4 percentage points more likely to remain on JS-WR benefit next quarter compared to someone who is not in social housing and not receiving AS.
- Is also **moderate for Sole Parents** – On average someone in social housing is 2.5 percentage points more likely to remain on SPS benefit next quarter compared to someone who is not in social housing and not receiving AS.
- Is **minimal for beneficiaries receiving Supported Living Payment** whose exit rates are largely determined by duration of SLP receipt, incapacity type and age.
- Is **significant for recent exits** (<12 months off benefits) – The impact of housing state on the likelihood of *re-entering* benefits is large – tenants have a 40% chance of re-entry by the fifth quarter, compared to 29% for those who are not in social housing, and applicants on the register have a 45% chance of re-entry within that time period.

8.2 The influence of housing status on benefit dynamics

The most important models in the benefit system valuation are the transition models that estimate the probability that a person exits their current benefit state.

These are important because exits rates determine the duration and by extension the long-term cost of benefit receipt. We discuss our findings regarding exit rates for each of the following segments:

- Work-ready jobseekers
- Sole parents
- Recent exits (in this case, re-entry rates to benefits rather than exit rates, since they have already exited benefits)
- Beneficiaries with health conditions and disabilities – both JS-HCD and SLP.

8.2.1 Work-ready jobseekers

Housing state has a moderate influence on the transition rates for people receiving the jobseeker work-ready (JS-WR) benefit. The influence is far smaller than other variables such as ethnicity and education, but this is partly distributional; while all clients have an ethnicity, only around 11% of JD-WR

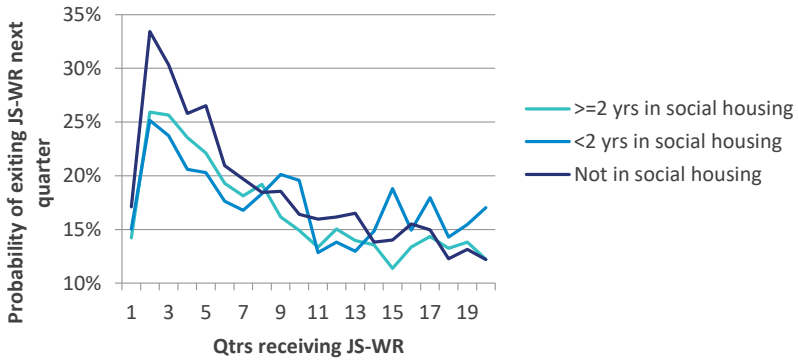
clients are in a social housing during the quarter and the majority (74%) receive AS. As shown in Table 8.1 the social housing status variables have a strong influence on the probability of remaining on JS-WR in the next quarter.

Table 8.1 Average probability of remaining on JS-WR next quarter, two years to June 2015

Clients	Average probability of exiting JS-WR next quarter	Diff. from average
In social housing	20.6%	-1.9%
Not in social housing but receiving AS	22.5%	0.0%
Not in social housing and not receiving AS	25.6%	3.1%
Maori receiving AS	19.1%	-3.3%
All	**22.5%**	

On average, someone in social housing is nearly 4 percentage points more likely to remain on JS-WR benefit next quarter compared to someone who is not in social housing and not receiving AS. The social housing status of clients may indicate an increased need relative to other JS-WR clients. This effect is particularly pronounced for those who have recently moved into social housing, as shown in Figure 8.1. The social housing entry might indicate a short term need that forms a barrier for welfare exit. A new interaction between ethnicity and those receiving AS has been added to the transition model. Māori clients receiving AS are over 3 percentage points more likely to remain on benefit.

Figure 8.1 Average probability of exiting JS-WR next quarter, past two years split by social housing tenancy status



8.2.2 Sole parents

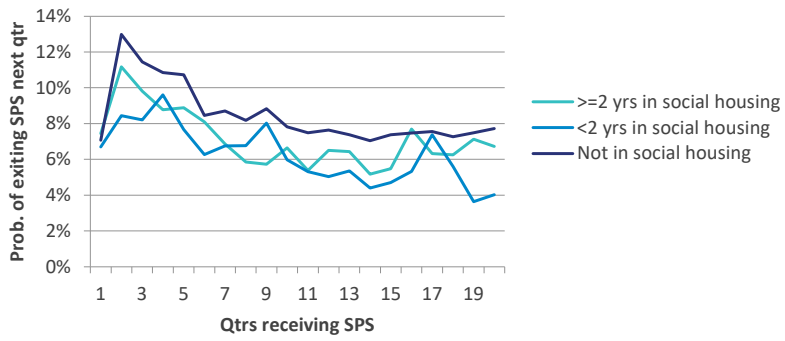
Similarly to JS-WR, housing state has a moderate influence on transition rates for clients receiving Sole Parent Support (SPS). The relative influence is comparable to ethnicity or region. About 16% of SPS clients are in a social housing during the quarter and a further 74% are receiving AS. As shown in Table 8.2 the social housing status variables have a strong influence on the probability of remaining on SPS in the next quarter.

Table 8.2 Average probability of exiting on SPS next quarter, two years to June 2015

Clients	Average probability of exiting SPS next quarter	Change on base
In social housing	6.9%	-1.0%
In social housing and "other" ethnicity	4.9%	-3.1%
Males not in social housing and not receiving AS	9.5%	1.6%
Not in social housing but receiving AS	8.0%	0.0%
Not in social housing and not receiving AS	9.5%	1.6%
On the register at the end of the quarter	6.1%	-1.8%
All	**8.0%**	

On average, someone in social housing is 2.5 percentage points more likely to remain on SPS benefit next quarter compared to someone who is not in social housing and not receiving AS. This effect is particularly pronounced for those who have recently moved into social housing, this is can be seen in in Figure 8.2; as for JS-WR clients the social housing status of clients may indicate an increased need relative to other SPS clients. As shown in Table 8.2 there is an interaction between ethnicity and those in social housing. Clients of ethnicity "Other" who are in housing are 2 percentage points more likely to remain on benefit. There is also a new interaction between gender and housing status; males generally exit SPS faster on average, but this is less true for those not receiving AS nor in social housing.

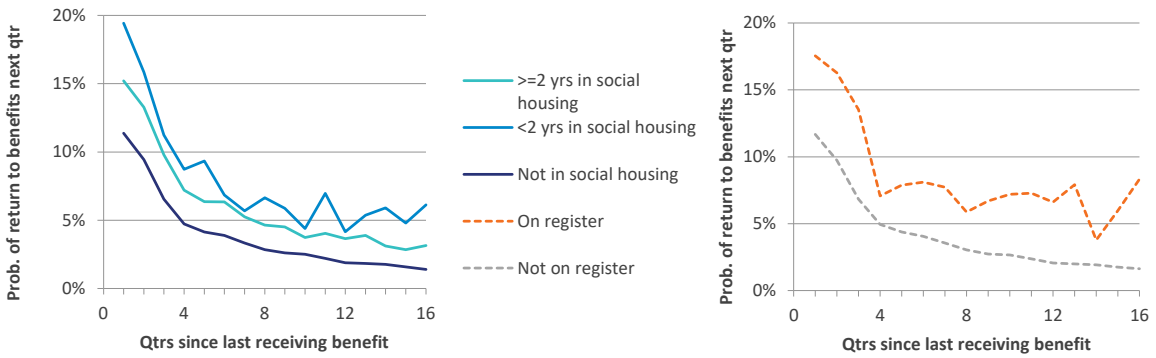
Figure 8.2 Average probability of exiting SPS next quarter, past two years split by social housing tenancy status



8.2.3 Recent exit beneficiary segment re-entry rates

Housing state has a large impact on benefit re-entry, comparable to gender in importance. This is despite its lower exposure (social housing tenants represent less than 5% of recent exits). A recent exit from the welfare system (<12 months off benefits) has on average, a 29% chance of re-entering benefits by the fifth quarter. For a social housing tenant this figure is 40%. This difference in re-entry rate persists with time out of welfare as shown in Figure 8.3; someone in social housing who hasn't been in welfare for five years has a 3.2% chance of re-entering the next quarter, compared to half that for those not in social housing. Clients on the register also show a much higher probability of re-entry to the welfare system. On average a client on the register has a 45% chance of returning to benefits by the fifth quarter.

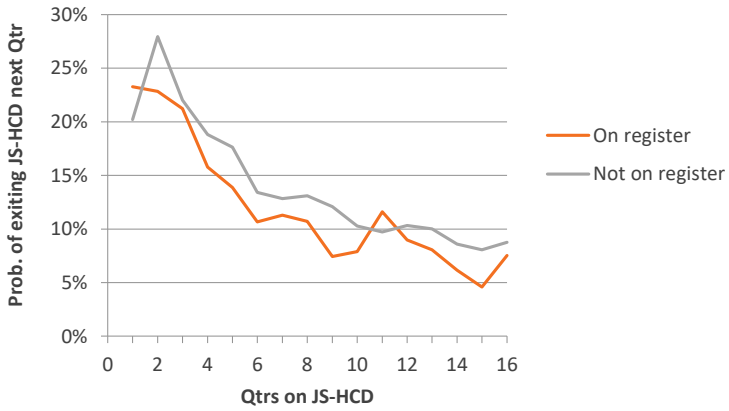
Figure 8.3 Average probability of a recent exit client returning to benefits next quarter, past four years split by social housing tenancy status (left) and register status (right)



8.2.4 Beneficiaries with health conditions and disabilities

Housing state has a minimal impact on SLP transition rates, these are largely determined by duration of SLP receipt, incapacity type and age. Housing state has more influence on the JS-HCD transition rates. For JS-HCD clients in a social housing or receiving AS the exit rate per quarter is very similar at around 14.5%. Around one in five clients on JS-HCD are not in social housing and are not receiving AS, these clients have a higher exit rate at around 16% per quarter. As with JS-WR clients there is an interaction between ethnicity and AS receipt; Māori clients receiving AS are around 1.5 percentage points more likely to remain on benefit. Figure 8.4 shows how a JS-HCD client is more likely to remain on JS-HCD when on the housing register.

Figure 8.4 Average probability of a JS-HCD client exiting JS-HCD next quarter, past two years split by register status



9 METHOD

INSIDE THIS SECTION

9.1 Introduction

Section 9 of this report explains how Taylor Fry carries out the valuation of the New Zealand social housing system. The approach was jointly developed with MSD (policy and actuarial) over an extensive consultation process. As this is the first time this valuation has been undertaken we go into some detail. It should benefit readers keen to understand how we move from data to models and then through to projections. Other technical details are also available in the appendices to this current report.

At its most basic level, the valuation approach involves the following steps:

1. Identifying the number of New Zealanders who have interacted with the social housing or welfare systems over the previous year.
2. Predicting the number of new applicants to the housing register, for every year through to the end of the projection, who aren't already included in the projection.
3. Predicting the housing and welfare state in each projection quarter for these clients.
4. Estimating payments to these clients, for each projection quarter. These are initially estimated in 30 June 2015 dollar values, but subsequently adjusted to allow for inflation from that date to the date of payment. Housing payments modelled include all IRRS, AS and TAS payments.
5. Discounting the inflated payments to allow for investment return.
6. Adding an amount to cover IRRS paid to community housing providers (CHPs), and MSD expenses.
7. Running additional analyses for items such as notional liability and scenarios.

9.2 Data and data quality

9.2.1 Data supplied

Household and individual level housing data

A number of individual level datasets have been provided to build the forecast model for housing. To protect the privacy of individuals, original social welfare numbers (SWNs) were not supplied in the datasets described below. The client identification numbers used for matching datasets were separately created by MSD. Other personal information such as names and addresses were not supplied. A full list of files provided is in Appendix D.

We have built a combined welfare-housing model. In addition to the usual files used for the benefit system valuation, social housing information was supplied by HNZ and MSD. Data was generally from June 2001 through to August 2015, with a 30 September extraction date:

- **New register applications:** One row per household register application. Includes application date, reasons for application, household size, type and current location of the applicant household and housing requirements such as number of bedrooms and preferred locations.
- **New household register applications:** One row per person for each household register application. Gives demographic information (age, gender and ethnicity) for household members as well as their relationship to the primary applicant.
- **Transfer applications:** As for new register applications, but for those in social housing. Includes client applications and business initiated transfers.
- **Household transfer applications:** As for new household register applications, but for those in social housing. Includes client applications and business initiated transfers.
- **Monthly register snapshots:** One row per application active at the end of each month. It gives visibility on how register applications evolve over time. It also contains the analysis scores for adequacy, suitability, sustainability and accessibility that determine the overall level of need for social housing.
- **Monthly register household snapshots:** One row per person on an active application at the end of each month. Gives demographic information (age, gender and ethnicity) as well as their relationship to the primary applicant.
- **Register exits:** One row per application being closed off the register. Includes date, reason for exit, and the house ID in cases where the application successfully obtained a social house.
- **Tenancy snapshot:** One row per tenancy per end-of-month snapshot date for households in social housing. Includes the size, type and weekly income of the tenant household, the dates of entry into social housing, the current social house and details of income-related rent and subsidies that make up the market rent of the house.
- **Tenancy household snapshots:** One row per person in a social house each month. Includes age, gender and ethnicity of each household member as well as information regarding their relationship to the primary householder and whether they are a signatory on the application/tenancy.
- **Tenancy exits:** One row per household exit event. Includes the date of exit and the status and reason for each exit.
- **Social housing property snapshot:** One row per social housing property per end-of-month snapshot date and gives information regarding location, characteristics, rent and occupancy status. Only supplied for HNZ properties.
- **Child protection and youth justice service usage:** Similar to that provided for the 2015 benefit system valuation, but expanded to include housing clients.
- **Criminal conviction history:** Similar to that provided for the 2015 benefit system valuation, but expanded to include housing clients.

Other housing information

We have also been provided with:

- A supply forecast spreadsheet, indicating planned social housing purchases and developments.
- A CHP summary as at 30 June 2015. It contains the number of occupied CHP households.
- Monthly summaries from MSD and HNZ, to validate aggregate statistics at various time points between 2001 and 2015.
- A summary of MSD administration and programme expenses relating to the social housing reform programme.
- Rules for determining the appropriate number of bedrooms for a household applying to the register.
- Other background documents for reconciliation and description of the social housing system.

Historical rent information was taken from MBIE's website[33]. We used territorial authority level synthetic lower quartile rates in our analysis. Economic forecasts were generally taken from the Treasury where available. They were discussed in Section 2.5.6.

Welfare data

The 2015 valuation of the benefit system[34] included detailed information about the benefit data supplied by MSD. This includes:

- Data files containing payments up to 30 June 2015 but extracted as at 31 July 2015.
- Data files containing demographic information such as education level and ethnicity. We have used MSD's priority ordering of ethnicity in cases of multiple stated ethnicities.
- Data files containing child protection and youth justice service usage.
- Data files containing criminal conviction history.
- Benefit rates (all but the most recent benefit rate information was carried across from the previous valuation).
- Historical and forecast economic variables: Treasury forecasts for population, unemployment, and future discount and inflation rates.
- Other miscellaneous files, including eligibility reason codes, explanations of datasets and district codes.

The criminal conviction, child protection and youth justice datasets required MSD to perform matching of clients based on their name and date of birth.

One additional welfare dataset was supplied for the housing dataset – AS payments made to people aged over 65. This was needed to calculate lifetime AS payments and was similar in format to other welfare payment files.

Matching welfare and housing data

The data provided by HNZ to MSD was not fully matched – although many HNZ tenants had recorded SWNs, a large subset did not and there were errors for the portion that did. To address this:

- MSD undertook a matching exercise using name and date of birth to link common clients. This successfully merged the bulk of cases, although a number of matching issues remained.
- In September 2015 social housing data was migrated from HNZ to MSD IT systems. We have also been provided with client matches identified as part of the migration. This supplements the matching in the previous bullet.

We discuss our approach to data cleaning further in Section 9.3.2.

9.2.2 Modelling variables

Housing related variables

The following variables were added to the existing welfare variables to help model housing transitions and payments:

- **Variables while in social housing:** Relationship to primary householder, number of signatories, household size, weekly IRRS subsidy, weekly market rent, number of bedrooms, territorial authority.

[33] http://www.mbie.govt.nz/info-services/housing-property/sector-information-and-statistics/rental-bond-data

[34] https://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2016/2015-valuation-of-the-benefit-system-for-working-age-adults.html

- **Variables while on register:** Relationship to primary applicant, SAS priority and need scores, household size, preferred locations.
- **Variables for everyone, regardless of housing state:** Territorial authority, private market rents, social housing and AS history variables.

Variables from the benefit system valuation

The following variable sets were used in the 2015 benefit system valuation:

- **Time-related variables:** Benefit quarter and the corresponding unemployment rate (at a national and regional level).
- **Client-related variables:** Age, gender, ethnicity, education level and region.
- **Client history:** Whether the client's parents were beneficiaries while the client was aged 13-18 and the intensity of benefit receipt.
- **Benefit history:** Number of quarters: on current benefit, previous benefit, since first benefit and spent in each state.
- **Family-related variables:** Youngest child age and number of registered children (for SPS clients), and Partner flag (for JS and SLP clients).
- **Health and disability-related variables:** Incapacity type for JS-HCD and SLP-HCD clients, and whether the incapacity belongs to the primary client or to their partner.
- **Criminal convictions history:** Four variables that related to time serving criminal sentences resulting from an offence. The most important two are the percentage of time spent in prison in the past year and the percentage of time over the past ten years serving any type of criminal sentence.
- **Child protection and youth justice variables:** For clients up to age 25 we include whether the client as a child was involved in a child protection or youth justice event, the number of events that occurred, the age of the client when the first event occurred and the number of days in placement.

All these variables are also used in the housing valuation in two ways. First the welfare models are part of the projection of welfare state. To the extent that welfare state then influences housing movements, there is an indirect dependence. Second, these variables were considered as candidates for housing state transition and payment models. Many were found to be significant and were explicitly factored into the housing models.

Variables not used in modelling the liability

The omission of certain variables does not mean they are unimportant. Rather, it indicates that our results can be viewed as an average over that variable.

Use of macroeconomic variables

We use the unemployment rate extensively in the existing welfare models – it is predictive of transitions both in and out of benefits. We tested this (and other economic variables) in the housing transition models and found there was not sufficient statistical signal to justify inclusion. This means that the unemployment rate is an important but indirect variable in our housing projection. Benefit status is very important for housing (both entries and exits), so to the extent that the unemployment rate influences welfare state it will then influence housing forecasts. In our model higher unemployment rates increase entries into welfare which in turn increases register applications.

One macroeconomic variable that is used in some models is the private sector level of rents (25th percentile, based on data from MBIE). This does have a moderate influence on the rate of register applications.

Assumptions regarding the **growth** in rents have a very large influence on the valuation. For example, Section 6.3 showed that the total liability was extremely sensitive to a small change in the growth of rent. There are two key reasons for this sensitivity and impact:

» Higher rental growth directly leads to higher IRRS levels, increasing the liability.
» Higher IRRS levels in turn reduces the rate of exit from social housing.

Our derivation of these assumptions is described in Section 9.4.3

9.2.3 Reliability of data

We performed a number of checks to ascertain the reliability of data. In summary, these include:

» Checks on internal consistency of rate files
» Consistency across provided files
» Consistency with files used in the previous valuation.

Overall, consistency with the welfare data is good. As with previous years, we found small differences in the historical data, affecting less than 0.5% of records. There is also a small decrease in historical payments, which occurs each year; our data is supplied net of overpayments, so some historical reversals are applied over the course of the year. Fuller discussion of welfare data quality can be found in our welfare report.

The housing data is less reliable. This was largely a result of how it was created, via the combination of data from several different legacy systems, and then matching to the welfare database by name and date of birth. For instance:

» The majority of household relationships were missing between 2009 and 2012.
» A check against a secondary SWN field (only available for a subset of individuals) suggest about 10% of households have (at some stage) a householder who has not been in the welfare system, when in fact they have. This suggests a material failure in welfare-housing ID matching, particularly for the pre-2009 data.
» The register entry and exit files do not completely reconcile with active register snapshots.
» There are a number of duplicate observations for individuals and social housing properties.
» A large proportion of non-primary households appear to exit after the September 2012 quarter, coinciding with a system change (triple the usual rate).
» Many other fields have missing values, including age, ethnicity, property location and IRRS level.
» There are material differences in age and ethnicity variables across welfare and housing datasets where ID matches have been made. We have generally favoured welfare variables.

Such issues are not wholly surprising – this is the first time detailed longitudinal modelling of the social housing data has been attempted.

The main consequence of the data issues is that the longitudinal view of the datasets is incomplete; some people have too little housing history because they have not consistently been identified over time. This has led to increased weight being placed on trends seen in the last few years. Another consequence is that dynamics for non-primary householders are less reliable than that of primary householders.

Overall we believe that the dataset, after cleaning, is fit-for-purpose; it is possible to estimate overall dynamics and long term trend. Aggregate summaries are consistent with other statistics produced by the government.

Future improvements in data quality are possible, with more careful cleaning of the longitudinal series. This may materially alter results – we would have to restate old results on the new basis to properly attribute change.

Note that while we make significant efforts to check and improve the quality of data used in our analysis, we do not take ultimate responsibility for the accuracy and completeness of the data. Our reliance on the data provided is further discussed in Section 10.

9.2.4 Missing values

The housing data has a number of important fields with a material percentage of missing data:

- Current territorial authority of register applicant (~12% missing)
- Meshblock location of social housing property
- Relationship to primary householder (particularly between 2009 and 2012)
- Signatory flag
- Other variables to a lesser extent: gender, age, ethnicity.

A number of welfare variables had a significant percentage of missing values:

- Ethnicity
- District (welfare data)
- Incapacity (type and number)
- Education and qualifications.

Whether a variable is missing is often predictive of dynamics; those on benefits for a short amount of time are more likely to have missing fields. Our approach, also used in our benefit system valuation, is to impute missing variables using the distribution of non-missing cases across various strata.

The education and qualifications field are of particularly poor quality. The high rate of imputation tends to dilute the effect of different education levels; differences in results by education reported are likely to be larger than estimated.

9.2.5 Missing eligibility fields

The welfare payment data files contain an eligibility field to distinguish between benefit subtypes, as follows:

- Youth service: YP and YPP
- Jobseekers: JS-WR and JS-HCD
- Supported Living: Carer and HCD.

About 30,000 payment spells since the reform dates (0.35% of the total) had a missing eligibility field. This has been inferred using surrounding payments.

9.3 Data preparation and cleaning

9.3.1 Overview of data preparation

In broad terms the data preparation has three stages.

1. **Welfare:** A large dataset is produced with one row per person for every quarter from their first welfare receipt until the valuation date is created. This quarterly file contains demographic variables, history of welfare receipt variables and welfare state.
2. **Housing:** A large dataset is produced with one row per person for every quarter since they first enter a social housing place or the register. This contains demographic variables, history of social housing variables, register variables and current social housing information.
3. **Merge:** The above two datasets are merged to create a quarterly file giving the welfare benefit status, social housing status and other variables for each person in receipt of welfare payments, IRRS payments or on the housing register.

From the merge dataset we are able to identify subsets for building specific models, as well as produce the valuation cohorts to use in projection.

9.3.2 Cleaning

The main data quality issues are discussed in Section 9.2.3 above. To address these, the main cleaning steps include (but are not limited to):

- Reconciliation of entry/snapshot/exit files, filling in snapshot data where needed
- Identifying locations of housing with missing fields and inferring from postcode, suburb or interpolation
- Filling in missing fields for social housing property, household and individual level data by copying information backwards and forwards in the time series, where possible
- Removing duplicate observations and filling in observations where they appear to be temporarily missing
- Ensuring a single primary householder at any time, including cases of no primary and more than one
- Ensuring only one partner at any one time
- Identifying pairs of individual IDs which (based on household ID, age and the time series) appear to be the same person, and consolidating as a single individual
- Tidying up relationship field and assigning signatory status to partners
- Cleaning ethnicity, gender and age based on matched welfare information
- Checking resulting household size (number of individuals linked to a particular social housing property) against the "household size" field.

Responsibility for data was transferred to MSD in July 2015, creating another potential disconnect in the longitudinal series for future valuations. Data cleaning stages will be carefully reviewed in the next valuation.

9.4 Economic assumptions

Economic assumptions were discussed in Section 2.5.6. Some additional background is provided here.

9.4.1 CPI Inflation and discounting

Our projections are performed on a 'June 2015 dollar' basis. Historical dollar values are inflated to June 2015 using the historical Consumer Price Index (CPI) index (consistent with welfare benefit rate increases).

For inflation factors that are different to CPI (for example, rent) we express these as the inflation *relative* to CPI in the projection.

For final results we apply future CPI inflation assumptions to express amounts in actual dollars. We then apply discount factors to reflect the time value of money – effectively allowing for interest earned if money was put aside today. We use CPI assumptions and risk-free discount rates consistent with the Treasury's assumptions[35]. These are the same rates used in the 2015 benefit system valuation.

9.4.2 Wage inflation

Superannuation payments to those aged over 65 are pegged to changes in average weekly earnings (AWE). For this reason, IRRS payment levels to pensioners will tend to grow more slowly than welfare beneficiaries; the portion of the market rent that they pay will tend to offset the growth in rents.

[35] http://www.treasury.govt.nz/publications/guidance/reporting/accounting/discountrates

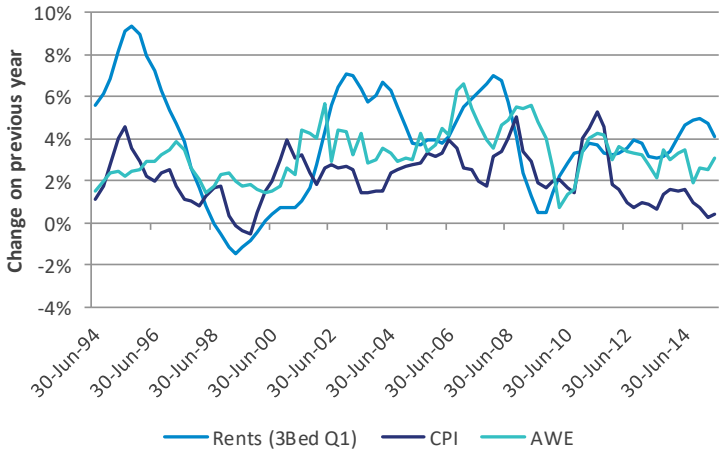
We have assumed that incomes for those in social housing grow at the rate of CPI, regardless of welfare benefit status. This appears reasonable based on historical data. However, there is no inherent reason why the income of non-beneficiaries should be limited to CPI in the future.

9.4.3 Rent inflation

We have used first quartile rent throughout our analysis – it is much closer to average social housing rents than the average or median.

We have assumed that growth in rents will be faster than AWE growth in the short to medium term. There are a number of reasons why rents can temporarily grow faster than average wages. First, average wages may mask higher wage growth in some regions such as major cities. Second, housing costs can grow as a proportion of total income. Third, housing supply constraints can squeeze both the owner-occupier and rental markets higher. These supply constraints can be further compounded by population growth, both from births and migration. Figure 9.1 below compares rental growth to that of wages; it has averaged higher, particularly in the periods 1994-98, 2003-08 and the year to June 2015.

Figure 9.1 Historical AWE, CPI and rental growth rates



One issue with rents growing faster than wages is that results can become implausible in the very long term; beyond ten years we assume they both grow at the same rate.

9.5 Valuation scope

9.5.1 Benefit population and valuation definition

It is useful to subdivide the projections into people close to the housing system, and those who will be in the future. We define:

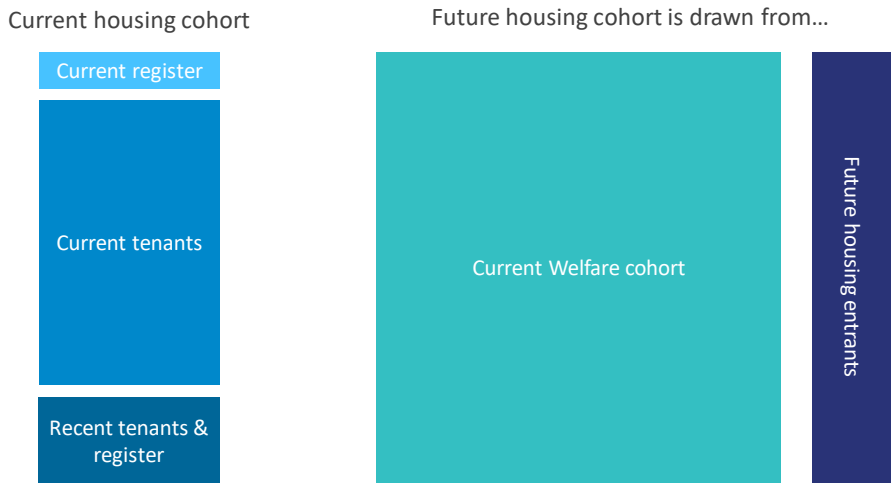
- **Current clients** as people who have interacted with the social housing system in the 12 months to 30 June 2015. This includes being a tenant in a social housing place, or being part of an accepted register application. We only project adults (and 16 and 17 year olds who are signatories).
- **Future clients** as people who are not current clients but who we project to interact with the housing system after 30 June 2015.

There were about 150,000 clients in the current client cohort, with four-fifths of them currently in housing. Future clients typically enter the system a rate of a few thousand a quarter.

9.5.2 Projection cohort

Our approach to projection is to take a cohort with their characteristics at the valuation date and simulate forward using our transition and payment models. This is a simulation, which we repeat multiple times to get an 'average' value for each individual.

Figure 9.2 Schematic of projection population



The projection is integrated in the sense that estimates for current and future clients emerge from the same simulation. The projection itself – shown in Figure 9.2 above – has three distinct subgroups:

- **The housing current client population:** The 150,000 adults who have interacted with social housing in the 12 months to 30 June 2015.
- **The welfare current client population (who aren't also in housing):** The projection is an integrated welfare-housing status projection, so we carry the 500,000 clients who have interacted with the (working age) benefit system but are not already in the housing cohort. In the short term this group represents about two thirds of future housing clients.
- **Future social housing entrants**: We 'inject' additional register applicants into the projection each quarter to simulate the entry of people not in the two cohorts above. These people are notional, in the sense that they do not have known IDs and their characteristics are based on the distribution of similar entrants in the past. The projection adds roughly 1,000 people per quarter, which slowly increases over the course of the simulation.

9.5.3 Future payments in scope

We attempt to estimate lifetime housing costs. The main components of this are:

- **Income-related rent subsidy (IRRS):** For those in social housing, the amount that the Government paid towards the market rent of a property.
- **Accommodation Supplement (AS):** For those **not** in social housing, the amount of AS paid by Work & Income.
- **Temporary additional support (TAS):** Another benefit paid by Work & Income. Although not all TAS is directly related to housing, more than 90% is, so it has been treated as housing support payment, similar to AS.

The valuation is focused on the social housing sector, so including payments outside social housing (AS and TAS) may seem unnecessary. However, there is an important substitute effect between social housing and welfare housing support; many people who enter housing were previously receiving AS, and many who exit subsequently receive AS. Including these costs allows a better estimate of change over

time. For example, if a household is successfully helped from a social housing place into private accommodation, then their future receipt of IRRS would go down while their future receipt of AS may rise – not allowing for AS would overstate the fiscal saving.

Other costs in scope are:

» Administrative expenses incurred by MSD
» Payment integrity services.

Some programme expenses are difficult to isolate and have not been included in this year's valuation. Subject to availability, they will be added to future valuations. This includes social housing rent debt write-downs and some types of recoverable assistance.

One other set of payments **not** included in scope are maintenance and administrative costs incurred by HNZ. In the private sector, these costs are generally borne by the landlord and are implicitly included in the market rent of a property. By analogy the IRRS includes these costs, and including them would be double-counting. In reality, management costs for social housing clients may be higher than the private rental market; we have not attempted to measure this difference.

Further details on scope are given in Appendix E.

9.5.4 Length of projection

The lifetime housing cost extends until death, in contrast to the benefit system valuation which stops at age 65. This difference is natural – the limited social housing supply means than people can only enter a social housing place after it is vacated by an existing tenancy. For this reason, we need to project exits of older householders to properly understand new entrants.

For clients aged over 65 we have used cessation of pension benefits as a proxy for death and used this to build a mortality model. We cap the projection at age 100 (plus an adjustment for longevity); we assume that people aged 100 exit social housing and do not re-enter. In all, the main projection runs for about 100 years.

9.5.5 Attribution of IRRS payments

The projection is individual level, but we sum the results by household to obtain a household level forward liability. This raises the question of how to attribute payments at an individual level. Should the IRRS be attributed to the primary householder, all signatories, or even more broadly? For current households the question is largely academic (as the household level payments will be the same regardless of how it is divided), but it does affect the results as people leave and re-enter social housing. For example, if a person leaves a household and become a signatory in a new social housing place, the attribution of that future status will affect their total.

We have allocated IRRS evenly across signatories in the household. This means it is shared between the primary and their partner. This is a reasonable basis for operational intervention, as the income for signatories is the main determinant of the level of IRRS support.

9.5.6 Other parameters

Valuations are conducted annually as at 30 June, with a one-month delay before data extraction to allow data to mature; for example, adjustments due to abatement against earned income. Valuations are gross of tax for consistency with Crown accounts, and to better reflect the liability from MSD's perspective.

9.5.7 Reconciling Taylor Fry and MSD definitions

There are a few points of difference in how client status is determined for the purpose of our modelling and projection compared to MSD's standard definitions:

- **Number of people in housing:** We track two numbers – the number who are in social housing at some point in the quarter, according to our definition, a client is on benefit in the projection if they receive any payment in the quarter. In comparison, MSD typically defines this to be whether a client is on a spell at the end of a quarter.
- **Number of register applications**: There are two ways in which our model simplifies register movements. First, we view a person as still on the register if they were on the register at some point in consecutive quarters. This understates the number of applications as some people withdraw and reapply. Second, we class an application by someone in housing for some part of the quarter as a transfer application; in reality some people exit housing during the quarter and apply while not in a social housing place. We have estimated factors to reconcile our numbers to the actual ones typically used by MSD.
- **Number of social housing places available:** There is some difficulty in reconciling the exact number of social housing places available at the valuation date as timing of exits, repairs, purchases and sales are dynamic in nature. We have adopted values based on the individual level data, which is relatively close to the HNZ management numbers reported at the same date.

9.6 Modelling the social housing system

9.6.1 Overview of the valuation model structure

In the broadest of terms, the valuation methodology is as follows:

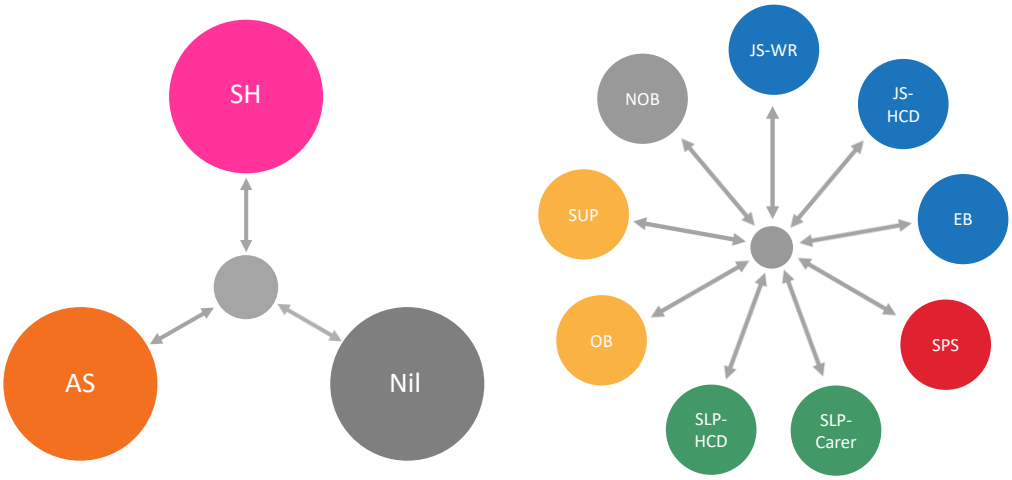
- Predicting the **number** of current beneficiaries, in the valuation year, who have interacted with the social housing or benefit systems over 2014/15.
- Predicting the **number** of new applicants to the register, for every year through to the end of the projection, who aren't already included in the projection.
- Predicting the **housing and benefit state** in each projection quarter for these clients.
- Estimating **payments** to these clients, for each projection quarter. These are initially estimated in 30 June 2015 dollar values, but subsequently adjusted to allow for **inflation** from that date to the date of payment.
- Estimating the **liability** by:
    - Discounting these inflated claim payments to allow for investment return
    - Adding an amount for MSD expenses
    - Adding an amount for CHP providers.

Each client is assumed to be in a single benefit 'state' and a single housing 'state' each quarter. There are nine possible benefit system states, corresponding to seven main benefit types, supplementary only beneficiaries and those not receiving benefits. We have defined three housing states:

- If the person is in a social housing place for any part of the quarter their state is "House"
- Otherwise, if they receive AS for some of the quarter, their state is "AS"
- Otherwise their state is "Neither".

A similar approach was taken in the benefit system valuation, which had nine benefit states. See Figure 9.3 below.

Figure 9.3 Housing states (left) and welfare states (right) in the valuation quarterly transition model



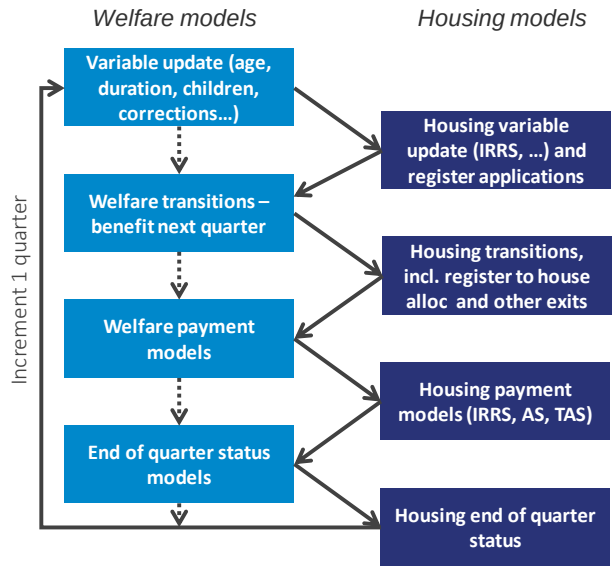
9.6.2 Integration of Welfare and housing projections

A key design decision was to integrate the welfare and housing models. This required developing a modelling structure consistent with the existing welfare models, which are based on individual level quarterly transitions. In the original welfare projection, we run through a series of steps:

- **The dynamic variables are updated**: Some variables (such as age) have easy updates. Other variables (such as region) have their own dynamics and a modelled via transition probabilities.
- **Benefit state in the next quarter is predicted**: The probabilities of transitioning to the various states are calculated using the static and dynamic variables carried in the projection.
- **Payment models calculated**: Average benefit payments based on a client's state and other characteristics are applied.
- **End of quarter status variables are set**: So reasonably point-in-time forecasts can be made.

At the end of these four steps the quarter is incremented and the process repeated. We have repeated these steps for housing, and interleaved these steps with equivalent welfare steps. This is illustrated in Figure 9.4 below.

Figure 9.4 Interleaving welfare and housing projection steps



9.6.3 Overview of housing state transition models

Treatment of households

A difficulty in projecting housing status is the evolution of households. Children leave home, singles become partnered and couples can split. The grouping of individuals into households in future years is difficult. Further, the data available is scant; while household evolution while in social housing is available, there is little data for what happens after exit. So we have simplified the treatment of households for tractability:

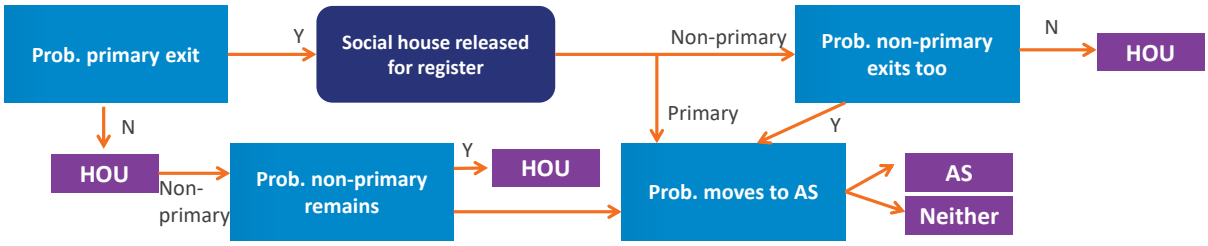
- Existing households in social housing are defined. There are modelled as a group, so that the movements of one householder will be closely related to the movements of the primary householder. We refer to these as 'real' householders.
- Future households are notional; we model people as individuals and assign to **notional households** ('Person A is the partner in a household of size four'), but we do not formally link individuals to others.
- Householders that start in housing but exit become notional too. So if a couple exit social housing, the future housing state of one is not affected by the other.

Probability of exiting social housing

For those in real households, we first model the probability of the primary householder exiting social housing. Generally, the remainder of the household will do the same; they will usually exit as a group, or remain in housing with the primary. However, we do have probability models to allow for cases were a non-primary householder exits without the primary, and when the non-primaries do not exit with the primary householder.

We also have a probability model for whether a person leaving a social housing place moves to the AS state or not. This probability depends on welfare state; by definition if a client is not receiving any benefits (main or supplementary) then they cannot be in the "AS" state. If they are receiving no welfare benefits in the next quarter then they cannot move to AS. All probabilities are binomial regression models and are illustrated in Figure 9.5.

Figure 9.5 Transition models for individuals in real households currently social housing



For individuals in notional households – as per Figure 9.6 – the transition models are simpler as there is no conditioning on the primary.

Figure 9.6 Transition models for individuals in notional households currently social housing

Transitions between AS and Neither

We have binomial regression models for probability of moving from AS to Neither and the reverse.

Allocation of register applications to housing and other register exits

The allocation of register applications to housing is complex. It depends on the level of need, the number of other households on the register and the availability of social housing places in the desired location (as well as neighbouring locations). It also depends on the tolerance for social housing place size mismatch – does a household needing a 2-bedroom property get placed in an available 3-bedroom property, or should they be made to wait? The quarterly definition we use also creates issues; a lower needs household could be housed over a higher need one if they applied at the start of the quarter, because there was a social housing place available at the time.

Because of this complexity, our approach to allocation is a simplification of reality. We first build a probability model of placement based on historical data. This gives a data-based estimate on the relative importance of SAS priority and score in allocation. Applications are then semi-randomly[36] sorted from high need to low. Working down the list, households are placed in social housing places, using the following ordering:

- If there is a matched social housing place in their preferred territorial authority
- If there is a social housing place with one too many bedrooms in their preferred territorial authority
- If there is a social housing place with one too few bedrooms in their preferred territorial authority
- If there is a matched social housing place in a neighbouring territorial authority
- If there is a social housing place with one too many bedrooms in a neighbouring territorial authority
- If there is a social housing place with one too few bedrooms in a neighbouring territorial authority
- In none of the above apply, then the application is not placed in a social housing place that quarter.

For applications that are not placed in a quarter, there is an additional model for the likelihood of exiting the register without being housed. If they do not exit, the application will remain active in the next quarter.

For applications that are placed in a social housing place, we initialise the market rent and IRRS level from distributional models. Other variables such as household size are taken from the equivalent variables on the register application.

Payment models

We have separate payment models for:

- IRRS in the quarter, for those in Housing state
- AS in the quarter for those in Housing state (this captures the small amount of AS payable in cases where an exit occurs before the end of a quarter)
- AS payments while in AS state
- TAS payments while in AS state
- TAS payments while in the Neither state.

The IRRS model uses the weekly market rents and weekly IRRS rate to scale up to the quarter. The remaining payment models are similar in nature to those used in the benefit system valuation.

9.6.4 Extension to the welfare transition models

Just as welfare state influences housing state, housing state influences welfare receipt. We have added housing related variables to all welfare transition models as part of the integration. The main variables incorporated are housing state, previous housing state, duration of housing state, household size (if in

[36] The semi-random sort keeps the relative probabilities; if application A is twice as likely to be allocated a house than application B, then it will be twice as likely to be higher than B in the sorted list.

social housing) and relationship to primary householder (if in social housing). These have proved to be significant in many of the welfare models.

The benefit system payment models have not been updated – we have used the same ones fit for the June 2015 benefit system valuation.

A new transition model has been added for 'entry into the welfare system'. This is for people in the housing cohort who have had no prior interaction with the welfare system.

9.6.5 Initialising the first quarter of the projection

Housing state does not recognise end of quarter status. This potentially creates a distortion at the valuation date where a household's state might be housing, but they may have already left at the valuation date. We apply special forcing rules for the first projection quarter to allow for status at the valuation date.

We retain the similar approach to allow for welfare benefit status at the valuation date.

9.6.6 Modelling the evolution of dynamic variables

Some of the modelling variables tend to remain fixed over the projection; for example, gender and ethnicity. However other variables such as IRRS level will evolve over the course of the projection. We refer to these variables as 'dynamic'. The pattern of this evolution needs to be modelled and allowed for. We describe our treatment for each of the dynamic variables below.

Register status

We have two sets of models for register applications, depending on housing state.

For people not in housing state (AS or Neither), a probability model predicts the likelihood of a new application. A second model then predicts to probability of being priority A or B. A probability table then simulates their location preferences based on their current location. Finally, we sample other factors such as household and need characteristics from historical distributions.

For people in housing state, we have a similar set of models. One difference is the SAS priority is a multinomial – either A, B or business-initiated. Other variables such as household size and household relationship are sensitive to existing housing variables.

Weekly market rent and IRRS

Weekly market rent is updated every quarter using our assumptions for rent growth (see Section 9.4.3).

If market rent increases, IRRS is non-zero and household income does not grow faster than CPI, then there is a default update to IRRS levels:

$$Default\ IRRS\ update = (Old\ rent \times rent\ inflation - old\ rent) + old\ IRRS$$

The default update is slightly modified when the individuals are on NZ Super. These benefits are indexed to AWE, which we assume grows faster than CPI.

We have a series of models for IRRS updating each quarter:

- Probability that IRRS level moves from zero to nonzero, or vice versa
- If it toggles to nonzero, we have a probability table for expected IRRS level (as a fraction of market rent)
- If IRRS remains nonzero, we have a probability model for whether the new IRRS equals the default update. If not, we have a probability table for the new IRRS level.

Region and territorial authority

We have two levels of regional variables – MSD regions and territorial authorities (plus local boards for Auckland). We have treated territorial authorities as a subdivision of MSD regions, although the alignment of borders is imperfect.

We have an existing set of models from welfare to simulate how people move between regions while they are on and off benefits. Various characteristics affect the probability of movement including age, duration, ethnicity, current region and benefit type. These models have been kept and we have added:

» Probability tables for territorial authority when a person does move region
» A probability model for a change of territorial authority when a person does not move region.

People in a social housing place will not move region or territorial authority, unless they transfer to another social housing place.

Welfare dynamic variables

Welfare dynamic variables include benefit history, incapacity type, partner, children, criminal convictions and Child, Youth and Family related variables. These are modelled in the same way as the benefit system valuation. We have tested housing state as a predictor and added it to some of these models.

9.6.7 Canterbury need scores

There is discretion when assessing affordability and accessibility in Canterbury as part of the earthquake and the subsequent rebuilding response. The impact of this is relatively immaterial.

9.6.8 Housing portfolio and availability

In our main projection (and Scenario A in idealised purchasing) we assume:

» The number of properties for every number of bedrooms in a territorial authority (or Auckland Board) is largely fixed. At the start of the projection this includes occupied housing and a number of unoccupied but available properties.
» Some additional supply is added, based on HNZ and CHP intentions, in the June quarter of 2016, 2017 and 2018. These numbers are shown in Table 9.1 below. The territorial authorities for these are known, and we assume a distribution of bedrooms consistent with the existing portfolio.
» We assume the number owned (but unavailable) remains constant.

Table 9.1 Housing places at the valuation date and net changes in progress over the next three years

	Occupied	Available	Unavailable	Change	Assumed supply (occupied + available)
June 2015 status	63,847	679	1,726		64,526
2015/16 net additions				660	65,186
2016/17 net additions				307	65,493
2017/18 net additions				71	65,564
Beyond 2017/18				0	65,564

Whenever a primary householder exits a property, this property is 'added' back to available portfolio. Most of the time this property will be reused within the quarter (about 73% of the time, based on historical data), but sometimes it will become available in the subsequent quarter. This allows for the time between exit and placing a new household; a property that becomes available late in a quarter has little chance of being filled before quarter end.

The approach ignores the dynamics of housing disrepair, and also largely ignores the role of CHPs. These were judged reasonable simplifications.

9.6.9 Applicants outside of the starting cohort

In 2015/16 we expect about 700 register applications per quarter to come from people who are not in the starting cohort. That is, they have not interacted with the welfare or social housing systems in the 2014/15 year. Similarly, there will be entrants in 2016/17 who were not in the starting cohort and not added in 2015/16. We refer to these as future housing entrants.

Additionally, we allow for future benefit system entrants as part of our projection for the next five years. Our approach is to build quarterly models of new client numbers entering the benefit or housing system that allows for:

- Benefit type and housing status at entry.
- Trends over time, including sensitivity to the unemployment rate.
- Time since valuation date. The number of new entries is conditional on those already in the projection, as we do not want to double count a person who exits and re-enters the benefit or housing system.

We have one model that projects entries over the first five years of the projection to both benefit and housing systems, plus a second model that estimates housing entries only beyond five years.

9.6.10 Mortality adjustments

We do not have actual deaths recorded comprehensively on our data, but have used cessation of NZ Superannuation for those over age 65 as a proxy for death. We use this to build a mortality model that is applied in the projection. We also attempt to adjust for improving mortality over time. Statistics New Zealand projects substantial mortality improvements over time[37]; life expectancy should grow by 12 years for females over the next 90 years and by 14 years for males. This means older clients will tend to leave homes slower in the future, as about half of social housing exits for those over 70 is due to death or poor health.

We have allowed for improving mortality by 'shifting the age curve to the right' for older clients (both in terms of mortality rates and non-mortality housing exits). For example, a 73-year-old male in 2022 is assumed to have the same dynamics as a 72-year-old male in 2015, and a 73-year-old male in 2029 is assumed to behave like a 71-year-old male in 2015. We apply this shift for all clients aged over 70, and do it at a rate of 1 year per 26 quarters for males and 1 year per 30 quarters for females.

9.7 CHPs and expenses

9.7.1 Lifetime housing cost for households in social housing managed by CHPs

We have little data on CHPs. We make a simple estimate for the lifetime housing cost of those in social housing managed by CHPs:

- We take the (weekly) IRRS paid to CHPs and divide by the weekly IRRS rate for HNZ households.
- We multiply this ratio by the lifetime household cost calculated for HNZ households.

The small fraction of CHP households at the valuation date (about 0.4% of total IRRS) means that the effect of adopting a more sophisticated approach is likely immaterial.

[37] http://www.stats.govt.nz/methods/research-papers/working-papers-original/forecasting-mortality-14-01.aspx

9.7.2 Administration and other programme costs

MSD incurs expenses in delivering benefits, services and programs in addition to the cost of the benefit payments. As discussed in Section 9.5.3, we have been provided with a number of expense items, with about 90% of this relating to Departmental Output Expenses. These are the costs associated with reviewing applications, register management and the accuracy and payment of IRRS.

While costs are relatively fixed over time, a share of these costs is associated with current clients and the rest attributable to future entrants.

Our methodology for determining the liability for administration and programs is to:

- Assume the total expense costs are **fixed in real terms** and are based on the 2014/15 appropriations
- Allocate expense costs to either current clients or future clients, weighted by IRRS payments
- Proportionally allocate these expenses into the various categories listed above, based on the expense budget information provided by MSD.

9.8 Notional liability and idealised purchasing

9.8.1 Notional liability

We have defined the notional liability as the main liability plus:

- The additional amount payable if those on the register at the valuation date were in a social housing place today
- The additional amount payable (or amount recoverable) if those on the transfer register at the valuation date were placed in their preferred social housing place today
- The additional amount payable if those in an overcrowded social housing place were moved to a bigger social housing place today
- The amount recoverable if those in an underused social housing place were moved to a smaller social housing place today.

To measure these costs, we create a modified notional cohort for projection, where we implement the four changes listed above. This gives the total liability including notional costs, and the change relative to the main projection for those households altered become the notional amounts.

9.8.2 Idealised purchasing

For idealised purchasing projections we do not retain a social housing place's location and size at exit; instead we add the social housing place to a pool of available housing, and note a 'sell' for the original social housing place. When a client is allocated to a social housing place we remove a social housing place from the pool and note a 'buy' for the size and location (based on their register preference).

9.9 Model checking and validation

There are many checks performed on the models to ensure their appropriateness. These relate to the:

- Individual models used, which are generalised linear model diagnostics statistics and plots
- Analysis of model changes from 2014 to 2015
- Detailed cohort-level analysis of differences in projection patterns
- Testing of models against historical data.

These allow us to ensure the reasonableness of projections and to better understand the limitations of the model.

9.10 Compliance with actuarial and accounting standards

There are currently no accounting or actuarial professional standards strictly applicable to the valuation of social benefit or social housing liabilities. However, in general we carried out the valuation in accordance with standards applicable to the valuation of accident compensation liabilities.

As such, we have generally complied with the New Zealand Society of Actuaries Professional Standard No. 4.1 entitled "Valuations of general insurance claims". We have also attempted to comply with International Financial Reporting Standards (IFRS). Specifically, estimates of liability incorporate an allowance for future inflation, investment return and administration expenses on a basis specified by the Standards.

However, we have not estimated nor incorporated a prudential margin as is sometimes required by such standards. In our opinion this seems unwarranted given the use to which the valuation will be put.

It is worth noting that in October 2013 the International Actuarial Association has published an International Standard of Actuarial Practice 2 (ISAP 2) "Financial Analysis of Social Security Programs". We do not believe that the standard's intention is to cover the type of social benefit system in New Zealand; the focus appears to be on schemes with narrower scopes and elements of funding. In any event, we consider that this valuation complies with those sections of ISAP 2 that may be considered relevant.

10 RELIANCES AND LIMITATIONS

INSIDE THIS SECTION

10.1 Introduction

Section 10 notes the reliances and limitations associated with this report. While there are standard reliances and limitations that usually accompany a valuation of this sort (see 10.4), this valuation has significant limitations that extend beyond these. These relate to limitations in data, simplifications in modelling and the uncertainty of undertaking a valuation for the first time. These are important – fully addressing them could materially affect absolute level of lifetime housing cost (although the conclusions regarding relative differences between households with different risk factors are less likely to be impacted).

10.2 Data limitations

The quality of the housing data was mixed, as discussed in Section 9. Some of the data issues may materially affect the results, and are flagged again below for completeness.

10.2.1 Step changes in the data and missing fields

The individual and household level data has been sourced from HNZ and required extraction from three different databases (the most recent system plus two legacy databases). There were inherent limitations to the data associated with this change points. For instance:

- At August 2012 (one of the system changes) a significant number of non-primary householders erroneously appear to exit.
- Relationship data is missing for much of 2009 through 2012.
- We do not have a clean field for non-primary signatories.

To the extent that these issues might be resolved in the future, the resulting analysis and projections could be affected.

10.2.2 Combining welfare and housing datasets

The matching between welfare and housing individuals is imperfect, and affects the longitudinal history of current clients. This history is important in predicting future transitions, so may have material impacts on the projections for some client groups.

10.3 Modelling simplifications

All models are a simplification of reality. While sophisticated, our approach does simplify some important household dynamics. These might materially affect the results, and future improvements to address them would be accompanied with an analysis of change.

10.3.1 Notional households for future entries

Current households are treated properly as a unit – the movements of one householder will affect the movement of another. However future households are not linked together (see Section 9.6.3). This potentially biases the projection results.

10.3.2 Household evolution

We have simplified the evolution of households within social housing. Typically we have not explicitly allowed for the aging of children (number of bedrooms needed falls once children are adults, for instance), nor the changing size and composition of notional households. We have not allowed for direct entry of adults in social housing; we always assume they enter via the register.

10.3.3 CHPs

We have little data for CHPs and have effectively excluded them from the projection. Their current small size (as a percentage of the overall housing portfolio) makes this reasonable, but the likely growth of their role over time makes this less feasible for future valuations.

10.3.4 Sensitivity to assumptions

Scenarios and sensitivity to assumptions was discussed in detail in Section 6. Suffice to say, these are very significant in driving overall results, and we cannot offer any certainty in how economic parameters will evolve over time.

10.3.5 Future social housing system changes

Our valuation is a baseline simulation that assumes the dynamics of the current policy arrangements continue indefinitely. Future policy and operational changes will influence these forecasts; our valuations are intended to measure these changes as they occur.

10.4 General limitations

The estimation of the liability is subject to influences whose effects cannot be determined with complete accuracy. Consequently, it is a virtual certainty that the ultimate liabilities will depart from any estimate, but the extent of this departure is subject to uncertainty. If potential outcomes and their relative likelihoods were expressed as a probability distribution, we would consider our liability estimates to be the mean of that distribution. In particular, the estimates provided in this report contain no deliberate bias towards over or under estimation.

11 GLOSSARY

The following tables give definitions for common acronyms and terms used in this report.

Table 11.1 Acronyms for social housing status, segments and their determination

Term	Definition
Basis of segment definitions	
AS	Accommodation Supplement (and related assistance) - a payment to help with accommodation costs. Not available to signatory householders in a social housing place.
BEN	Receiving a Main Benefit, this includes Jobseeker support, Sole Parent Support, Supported Living Payment, Young Parent Payment and Youth Payment.
IRR	Income-related rent – IRR is calculated based on a client's assessable income and their household type. Social housing providers (HNZC and CHPs) then charge this rate as rent to the client (market rent = IRR + IRRS). Note: if the calculated rate of IRR is higher than the market rent for the property, the housing provider will charge no more than the market rate as rent for the property.
IRRS	Income-related rent subsidy – a top up payment to housing providers to bridge the difference between the income-related rent a client pays and the market rent of the property. Market Rent = IRR + IRRS.
JSS	Jobseeker Support – new benefit type introduced July 2013 (replaced Unemployment Benefit and Sickness Benefit, and partially replaces Domestic Purposes benefit). We sometimes refer to people receiving JS as Jobseekers, or JS.
MR	Market Renter –clients who are paying market rent and residing in a property managed by Housing New Zealand or a Community Housing Provider.
NIL	Not in a social housing place and not receiving Accommodation Supplement. Sometimes referred to as Neither.
NOMB	Not on main benefits (in a given calendar quarter); a client might potentially be receiving supplementary benefits only though.
NZ Super	NZ Superannuation – A non means tested payment to New Zealanders aged over 65 who meet the residency requirements, also includes the Veterans Pension.
Recent H exit	Recent housing or register exit – a client who is currently not in a social housing place or on the register but has been in the last 12 months.
REG	Register – refers to the social housing register, used to manage applications for social housing.
SH	Social Housing – clients are considered in social housing if they reside in a property managed by Housing New Zealand or a Community Housing Provider, they may be paying income- related rent or market rent.
SLP	Supported Living Payment – new benefit type introduced July 2013 (replaced Invalid's Benefit and Domestic Purposes Benefit – Care of the Sick and Infirm).
SPS	Sole Parent Support – new benefit type introduced July 2013 (partially replaced Domestic Purposes benefit). We sometimes refer to people receiving SPS as Sole Parents, or SP.
YP/YPP	Youth Payment/Young Parent Payment.

Table 11.2 Further acronyms for welfare benefit types and welfare segments

Term	Definition
Tier 1 benefits (main benefits); and basis of segment definitions	
EB	Emergency benefit (included in Jobseeker Support benefit).
HCD	Health condition, disability (sub-set of both Jobseeker Support and Supported Living Payment beneficiaries with reduced work obligations).
JS	Jobseeker Support – new benefit type introduced July 2013 (replaced Unemployment Benefit and Sickness Benefit, and partially replaces Domestic Purposes benefit). We sometimes refer to people receiving JS as Jobseekers, or JS.
NOB	Not on benefits (in a given calendar quarter).
SUP	Clients receiving supplementary benefits (Tier 2 or 3), but no main benefit.
WR	Work-ready (sub-set of Jobseeker Support beneficiaries with work obligations).

Table 11.3 Other common terms and acronyms used in report

Term	Definition
Average household liability	The average across household by some variable of the inflated and discounted total future cost of each household.
ABP	Average benefit paid per quarter to clients in receipt of a benefit that quarter.
Average lifetime cost	Refers to the expected future welfare payments to a client up to age 65, including inflation and discounting.
Board	Community Board or Local Board – geographical sub-grouping of Territorial Local Authorities.
CHP	Community Housing Provider – a housing provider (other than Housing New Zealand) that provides social rental housing and/or affordable rental housing.
CYF	Child Youth and Family.
Future lifetime housing cost	The inflated and discounted total future cost projected for an individual or a household.
HH	Household – grouping of people who either share a tenancy or an application to the register.
HNZ	Housing New Zealand – the Crown agent that provides housing services for people in need.
Housing state	Current social housing status of a client, this is determined by whether a client is in social housing place, on the register for a social housing place and/or receiving Accommodation Supplement.
Market Rent	The average level of rent being paid for similar properties in the same area. Market Rent = IRR + IRRS.
Primary	A primary householder is nominated for a social housing place tenancy or register application.
Qtr	Quarter of the year – unit of measurement of time.
Region	A geographical grouping by MSD of New Zealand into 11 regions.
Register dynamics	Refers to the way a client moves through the register system, includes the application, needs assessment outcome, time spent on the register and register exit to housing or otherwise.
Relative exposure	This term is used on figures throughout the report. It is generally used to mean the number of clients in a given group compared to the total.
Signatory	A signatory in in a household is a person whose income is included in the household income calculation but is not a nominated primary householder.
System/benefit system	Refers to the NZ benefit system as administered by MSD. Implicitly applied only to those benefits within scope of the liability – i.e. the main benefits and supplementary/hardship assistance listed above.

Term	Definition
TAS	Temporary Additional Support – a payment to help clients meet essential living costs.
Tenant	Clients are sometimes referred to as tenants where they reside a property managed by Housing New Zealand or a Community Housing Provider, they may be paying income-related rent or market rent.
Territorial authority	Territorial authority, a geographical grouping of New Zealand into 68 territorial authorities each with a local government.
YJ	Youth justice.