

Analytical Notes

The household cash flow effects of low interest rates in New Zealand.

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Key findings

- The reduction in term deposit and mortgage rates between 2016 and 2020, other things constant, implies a net positive income gain of 0.1% across all New Zealand households.
- On average, mortgage holders experience a 1% increase in income, while non-mortgage holders see a 0.4% reduction in income.
- Across the population, the reduction in income due to a lower term deposit rate exceeded any increase in income from lower mortgage rates for the bottom three income deciles. Almost half of these households are in the 65+ age group.
- The decline in interest rates also had varying effects across age groups. Those in their prime earning years (25-54) gained on average 0.3% while the gross income of older workers (55-64) and retirees (65+) declined by 0.1% and by 0.5% respectively.

Introduction

The distributional implications of a variety of policies have received increasing attention over the past decade, since an unequal recovery from the Global Financial Crisis has led to rising wealth concentration. Low interest rates during this period, and active monetary policy easing through unconventional monetary policy tools, have not escaped scrutiny (Domanski et al. (2016), O'Farrell et al. (2016)).

Lower interest rates, as part of monetary policy easing by the central bank, influence the distribution of income in a variety of ways. As noted by Leong (2021), Lenza and Slačálek (2018) and Bunn et al. (2018), such policies support the employment of those most at risk of displacement and help to maintain income growth. However, by contributing to lower market interest rates, stimulatory monetary policy also boosts asset prices, reduces the servicing cost of debt, and reduces the income of deposit holders.

In order to consider the distributional implications of lower interest rates, we can use microdata to evaluate how a decline in interest rates changes the income or wealth available to households. In this Note, we focus on two specific margins of interest - mortgage rates and term deposit rates. These channels are considered in isolation, as others, e.g. lower unemployment due to an easing in monetary policy, may work in opposite directions. A reduction in both of these interest rates would be beneficial to mortgage holders with small bank deposits as they are net borrowers. The interest rate reduction reduces the interest expense they have to pay on their debt, with lower mortgage interest payments leaving more cash in hand for the mortgage holder to spend on other things. However, such a decline would directly reduce the income of households who are net savers in terms of deposit holdings - by reducing the income they receive from their stock of bank deposits.

In this Note, we take the population in 2016 and consider what the distributional implications would have been if mortgage and bank deposit rates immediately declined to their 2020 level.

Table 1: Mortgage and term deposit rates

Year	Mortgage yield	Term deposit yield
2016	5.18	3.24
2017	4.74	3.36
2018	4.66	3.31
2019	4.39	3.10
2020	3.73	2.21

In particular, we compare measures of household income in the 2016 year to a hypothetical 2020 year in which the population had not changed, but deposit interest rates and mortgage rates had declined (Table 1). We assume that there was no change in the behaviour of households, no influence on other channels (e.g. if the decline was due to active monetary policy which reduced the counterfactual unemployment rate), and no general equilibrium effects. We can then compare these two populations for an initial indication of the distributional implications of declining interest rates over this period.

What is the cash flow channel?

As described in La Cava et al. (2016), the cash flow channel focuses on one particular channel of monetary policy transmission – the direct effect of a change in retail interest rates on the interest income and expense of households holding all behaviour and general equilibrium effects (i.e. additional changes in behaviour such as changes in the capital stock) constant.

Such a transmission path links monetary policy to real economic outcomes in the following way:

1. monetary policy easing lowers retail interest rates,
2. lower retail interest rates change the interest income and expense from a stock of bank deposits and mortgage debt,
3. the change in available income due to this reduction in interest rates then influences the consumption choices of liquidity-constrained households.

This *Note* concentrates on the second stage of this transmission path – asking if, for the observed decline in interest rates between 2016 and 2020, there was an associated increase in household cash flow. As lower-income individuals tend to be more heavily liquidity-constrained, we also investigate the distributional implications of this change.

However, it should be noted that this method does not evaluate whether it was monetary policy that lowered interest rates in this period as opposed to a decline in the neutral interest rate or a fall in risk premia. We also emphasise that this method also does not account for changes in household behaviour, other channels of monetary policy, or general equilibrium effects.

Data

We obtain the household-level data from the Household Economic Survey (HES) from Stats NZ. We use 2016/2017 as a base year. The HES provides a rich dataset on incomes, mortgage interest payments, mortgage balances, and deposit income required to examine the distributional consequences of a sudden change in interest rates.

When considering the change in cash-in-hand for different households, we will consider the effect on two different groups of households: mortgage holders and non-mortgage holders.

'Mortgage holders' refers to households who have a mortgage on either their primary residence or any of their investment properties. Non-mortgage holders are made up of both renters and those who own property assets free-hold. These two categories are mutually exclusive.

The sample includes 8,046 mortgaged households (weighted as 567,000 households) and 7,935 non-mortgaged households (weighted as 1.2 million households). The households that reported negative gross income in the year are dropped from the sample.

Our analysis is similar that undertaken in Connolly et al. (2012) and La Cava et al. (2016). Both of these papers had a larger underlying sample based on longitudinal data for Australia which allowed them to investigate a broader range of claims than we discuss in this Note.

Methodology

Change in income for mortgage holders

For mortgage holders, the overall change in cash-in-hand income is the product of two changes - the reduction in gross income due to a decline in deposit interest rates, and an increase in after-housing cost income due to a reduction in mortgage interest payments.

Counterfactual deposit income is adjusted by reducing deposit income by the proportional decline in deposit rates between 2016/17 and 2020. During this time the average term deposit rate declined from 3.3% to 2.2% - a 33% decline.

The reason average rates were used was that there was no indication in the dataset, of the bank deposit that was generating the deposit income - and as a result, we could not make use of household-level interest rates.

For counterfactual mortgage interest payments, we are able to use household-level interest rates on the basis of mortgage interest paid, and the opening and closing balance of the mortgage liability in the 2016/17 year.

These household-level mortgage rates, and thereby payments, are then scaled down by the proportional reduction in average mortgage rates in this period - a 25% reduction.

The calculations for mortgage holders are expressed as follows:

$$I_t = G_t - M_t$$

$$I_{t+4} = G_t - D_t + D_{t+4} - M_{t+4}$$

$$C_m = (I_{t+4}/I_t) - 1$$

where

I_t is income after mortgage in 2016 and I_{t+4} in 2020;

G_t is gross income in 2016;

D_t is deposit income in 2016 and D_{t+4} in 2020;

M_t is mortgage interest payment in 2016 and M_{t+4} in 2020;

C_m is change in income for mortgage holders.

Change in income for non-mortgage holders

We use a similar method to calculate the income change for the owner-occupiers and renters. Deposit income is calculated in the same way as mortgage holders. However, instead of subtracting mortgage interest payments, we deduct housing costs such as rents and rates from the gross income of households.

As we are considering the immediate effect associated with the change in interest rates, these housing costs are assumed to be unaffected by the change in mortgage rates.

The calculations for non-mortgage holders are expressed as follows:

$$I_t = G_t - H_t$$

$$I_{t+4} = G_t - D_t + D_{t+4} - H_t$$

$$C_{nm} = (I_{t+4}/I_t) - 1$$

where

I_t is income after housing cost in 2016 and I_{t+4} in 2020;

G_t is gross income in 2016;

D_t is deposit income in 2016 and D_{t+4} in 2020;

H_t is housing cost in 2016;

C_{nm} is change in income for non-mortgage holders.

Results

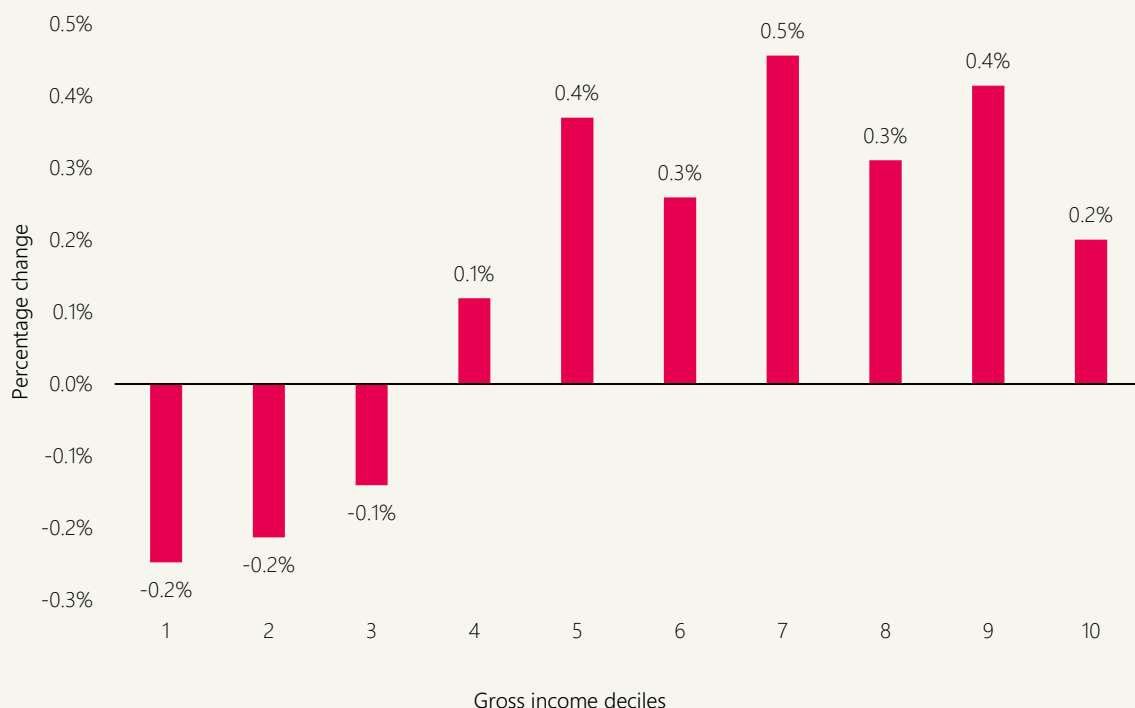
The results from these calculations are presented in the figures below.

Analysis by income deciles

Aggregate

When considering the reduction in mortgage rates and term deposit rates, there is a net 0.1% gain in aggregate income over the population as a whole.

Figure 1: Changes in household income from 2016 to a hypothetical 2020 for the representative population



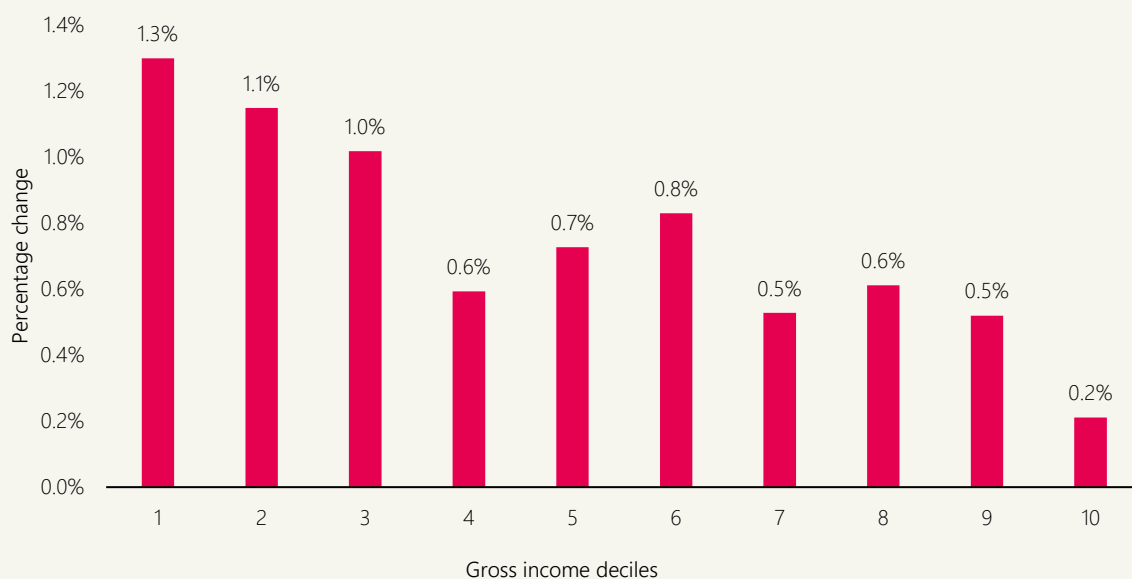
The reduction in income due to lower bank deposit rates exceeded any increase in income from lower mortgage rates for the bottom 3 deciles (Figure 1). These deciles are largely made up of retired individuals, beneficiaries, and part-time workers - who either tend to own their properties mortgage free or are renters. Other deciles show a net increase in income due to lower mortgage rates, with the 7th decile seeing the sharpest increase. The increase in income in the top decile was relatively more muted, due to this group's wider range of asset holdings.

Mortgage holders

For mortgage holders, the effect through mortgage interest rates dominates the change in deposit rates, leading to an average 1.0% increase in cash-in-hand for these households.

Figure 2 looks at only mortgage holders and orders them by gross income. Changing both deposit income and mortgage payments leads to a significantly progressive change in income - as low-income mortgage-holding households benefit more from the reduction in mortgage rates.

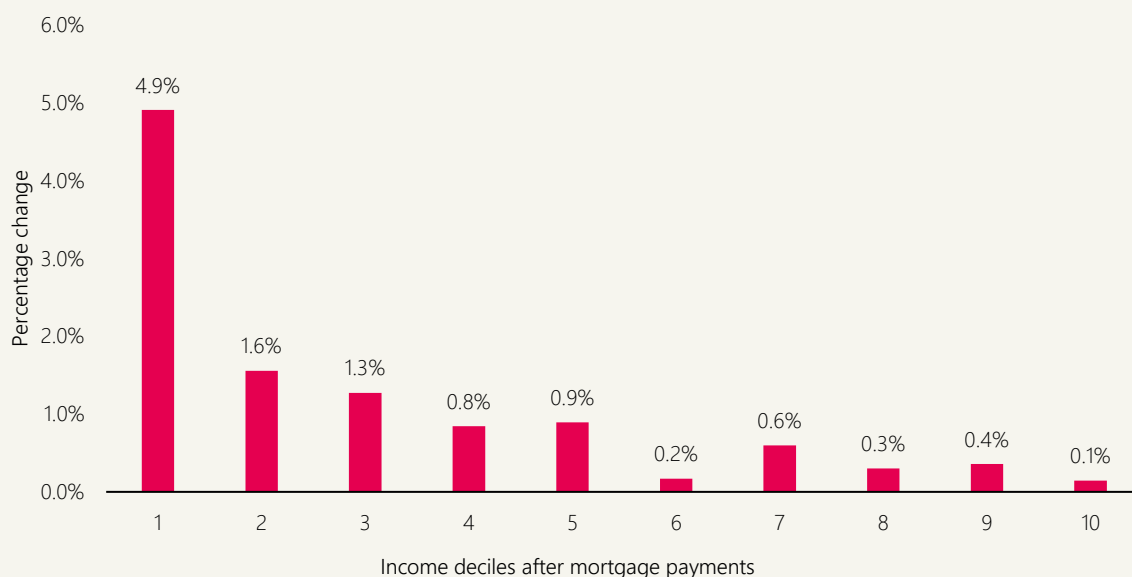
Figure 2: Changes in household income from 2016 to a hypothetical 2020 for the mortgage holders ordered by gross income deciles



Subtracting mortgage payments from income above and then re-ranking the mortgage holder group into new deciles gives the following graph (Figure 3). Both indicate that a cut in mortgage rates lead to a significant lift in net income (gross income minus mortgage payments) for the first decile.

However, this result should not be too surprising. The new income measure is defined with respect to the mortgage payment and so, those with larger mortgages have been re-ranked to be lower in the income distribution. This assumption makes lower interest rates appear more progressive than they were initially.

Figure 3: Changes in household income from 2016 to a hypothetical 2020 for the mortgage holders ordered by income deciles after mortgage payments



Non-mortgage holders

For non-mortgage holders (mortgage-free owners and renters), cash-in-hand will only be changed due to changes in deposit income in this scenario. This leads to an average 0.4% decrease in cash-in-hand for these households.

Figure 4-Figure 5 include rents in the equation for non-mortgage holders – Figure 4 looks at mortgage-free owner-occupiers and renters ordered by income deciles after housing costs, while Figure 5 is ordered by gross income deciles. For each, they are organised into their own deciles, and so the income levels are not comparable.

The results when housing costs are included (Figure 4) are similar to the case where we look at gross income (Figure 5), as the only income component that changes is deposit income. However, the declines are proportionally larger as the income base for calculating the proportions has shrunk for renters (due to the subtraction for rents).

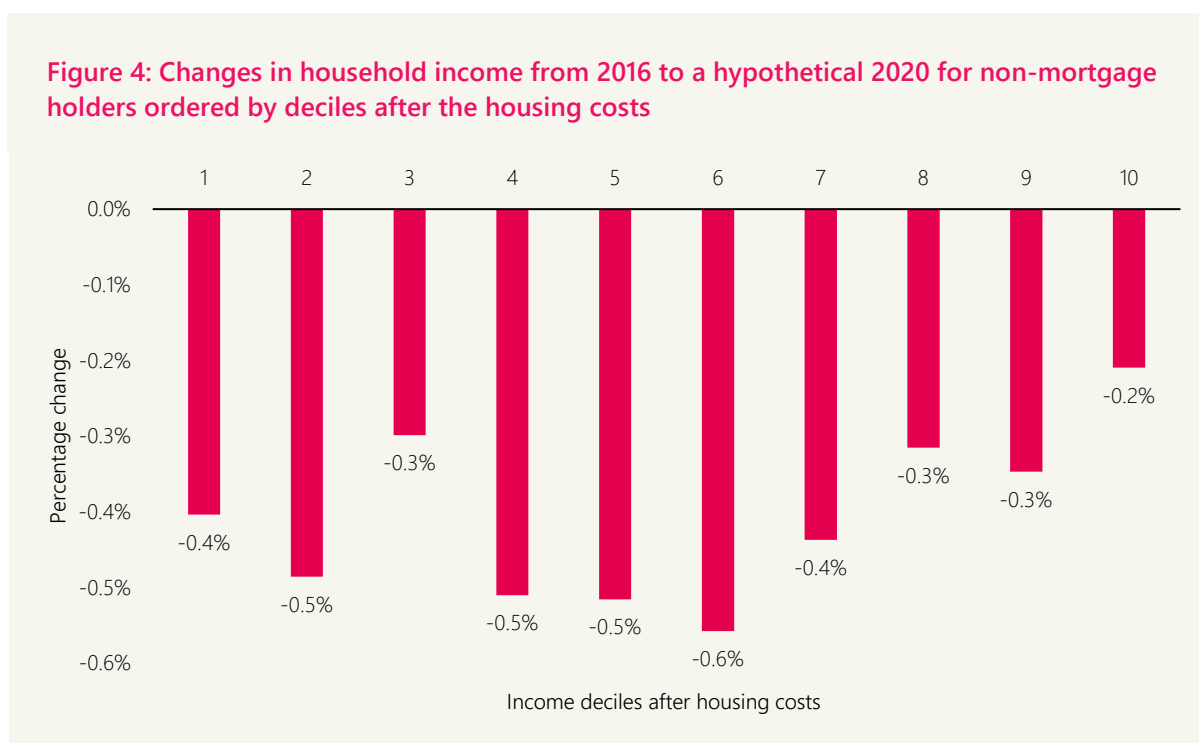
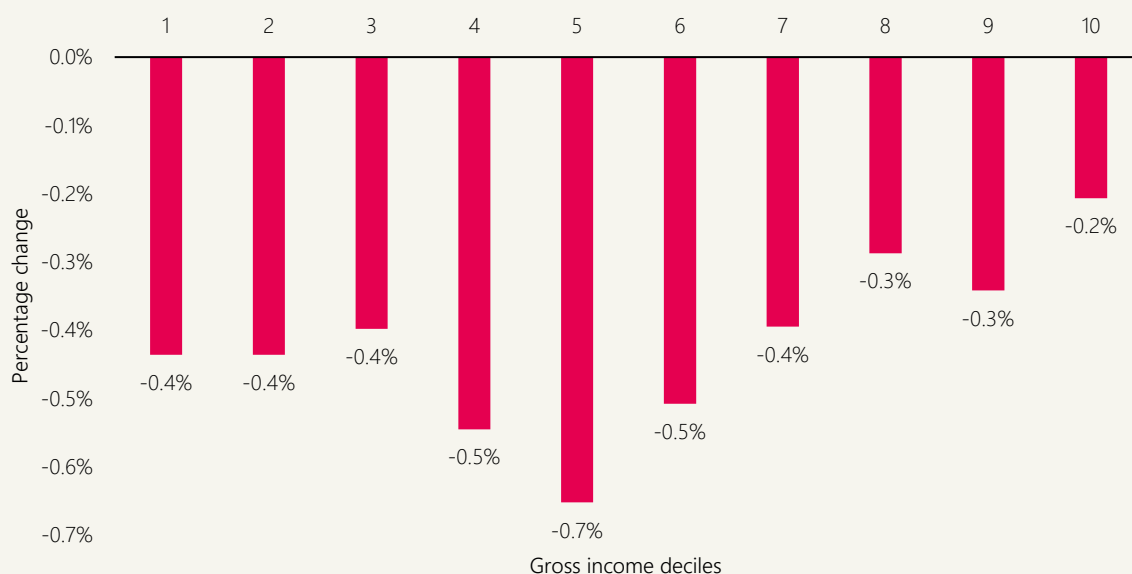


Figure 5: Changes in household income from 2016 to a hypothetical 2020 for non-mortgage holders ordered by gross income deciles



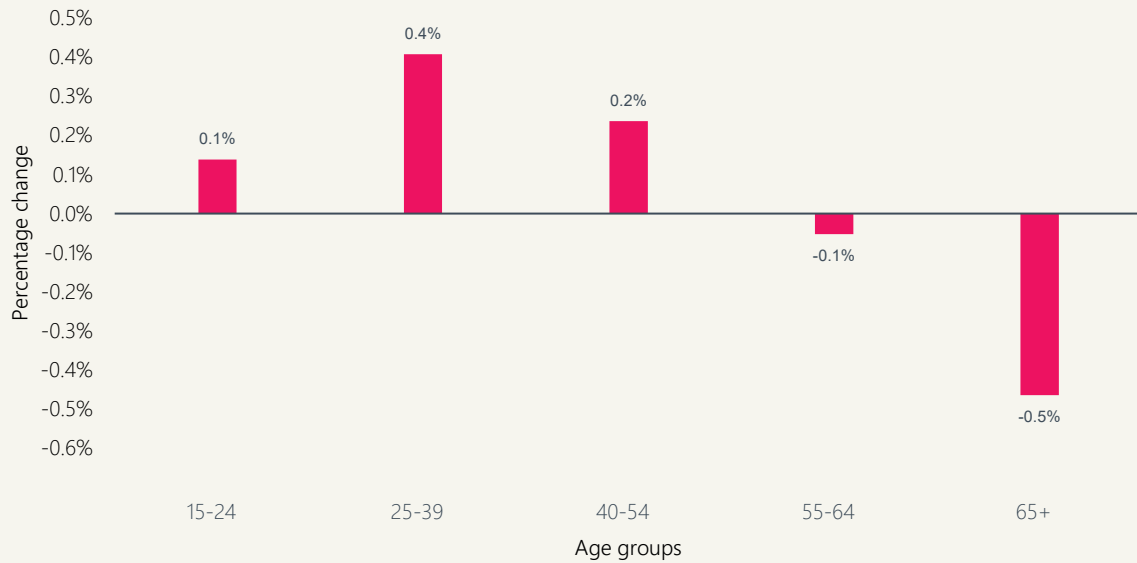
Analysis by age groups

Across the population as a whole, the counterfactual deposit and mortgage interest rates lead to a 0.1% increase in gross income. However, as noted above, the bottom three deciles experienced a net decline in their available income.

In order to understand this distributional change it is useful to consider the distribution of income changes by age - given that individuals who have retired will tend to have low current income but significant savings, while young individuals may have relatively large savings to income as they are building up a deposit for a house.

This intuition is supported by the data. The winners and losers of interest rate changes vary by age group - with those in their prime earning years (25-54) gaining 0.3%. The gross income of older workers (55-64) and retirees (65+) drop by 0.1% and by 0.5% respectively (Figure 6).

Figure 6: Changes in household income from 2016 to a hypothetical 2020 for the representative population by age groups



Total deposit income rises with age, while total mortgage obligations peak for the 25-39 group and are generally much higher for prime-aged workers than deposit income (Figure 7).

Overall, this indicates that the cash flow effect of the change in interest rates leads to an intergenerational transfer, and this transfer is a large part of the reason why the income of the lowest deciles declines (Figure 8).

Figure 7: Distribution of debt and liquid assets by age groups from HES 2016/17

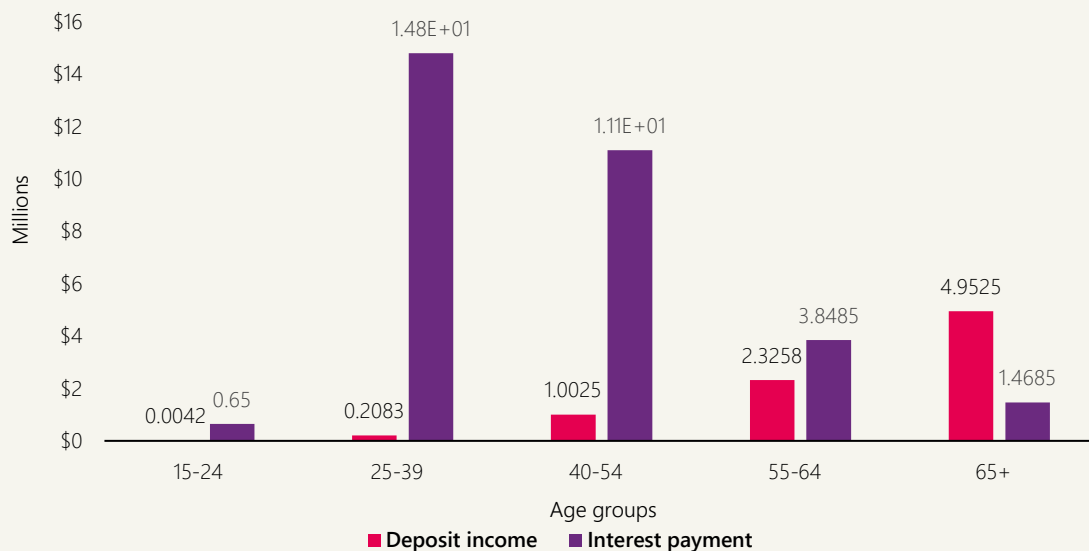


Figure 8: Debt and liquid assets as a percentage of gross income from HES 2016/17

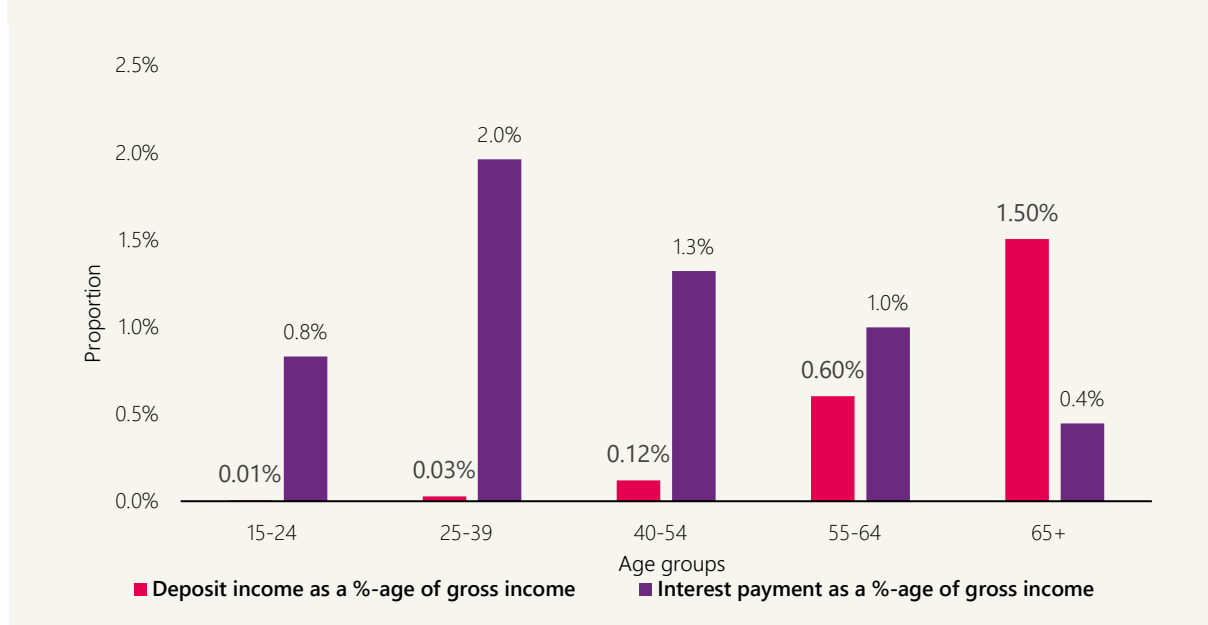
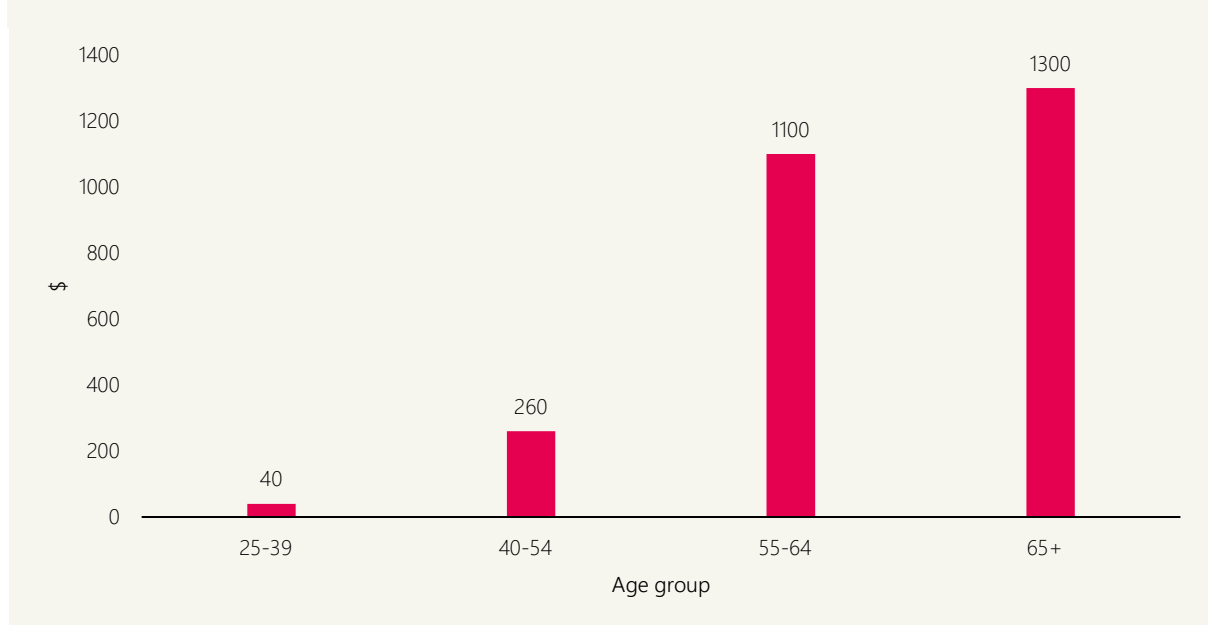


Figure 9 indicates that, in 2016/17, the average deposit income for those over 65 is the highest among all groups, while the average deposit income for those between 15 and 24 is very small. Note that deposit income is suppressed for the 15-24 age group due to its low value.

Figure 9: Mean deposit income by age group for the 2016/17 population



In Table 2, more information is provided about the bottom three gross income deciles. 44% of the population in the bottom three deciles is made up of households where the average age of household is over 65. This compares to 23% of households in the total population which have the average age of household over 65. As a result, this decile is disproportionately made up of retired individuals.

Table 2: Decomposition of the first three income deciles by age groups

Age grp for deciles 1,2,3	Change in household income	Weighted population proportion
15-24	0.04%	2%
25-39	0.16%	7%
40-54	0.09%	5%
55-64	-0.18%	4%
65+	-0.55%	15%
Total sub-sample	-0.2%	34%

People in the age group 55-64 and those over 65 experience a decline in gross income due to the decline in term deposit rates.

Conclusion

In this paper, we have simulated how the 2016 income distribution would have looked if deposit and mortgage rates had declined to their 2020 levels.

Mortgage holders were the key beneficiaries of the decline in interest rates, with their income rising 1% due to lower mortgage rates. Younger households, especially those aged between 25 and 39 years, benefit disproportionately from this.

The increase in cash-in-hand for mortgage borrowers is sufficient to increase aggregate income by 0.1%, even as the deposit income of savers declines.

The bottom three deciles of the gross income distribution experience a decline in income following this interest rate shock. This is largely due to a 0.55% drop in household income for households with retired individuals – who tend to have smaller mortgages, more sizable bank deposits, and higher related deposit income.

The exercise undertaken in this paper only provides an indication of the cash flow effect of a change in interest rates, leaving aside other important channels of monetary policy such as labour market effects, asset price changes, and other general equilibrium effects. A future extension to this work would aim to consider the effect of lower interest rates on other margins, and describe how this would change the incomes available to different groups of New Zealanders.

Disclaimer

These results are not official statistics. They have been created for research purposes from the [Integrated Data Infrastructure (IDI) and/or Longitudinal Business Database (LBD)] which [is/are] carefully managed by Stats NZ. For more information about the [IDI and/or LBD] please visit <https://www.stats.govt.nz/integrated-data/>

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