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Undone Maintenance: What will it cost?

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Report for Affordable Housing for Generations – Component D

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Disclaimer

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

Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the author, not Stats NZ or individual data suppliers.

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Abstract

Analysis of two national surveys on the condition of New Zealand housing and reported expenditures on maintenance (the Pilot Housing Survey 2018/19 and the Household Economic Survey respectively) show a significant shortfall in New Zealand household maintenance expenditure. A low estimate of average expenditure required on maintenance of key dwelling components is $12,600 per dwelling or $13,500 per owner-occupied dwelling, for a total of $20.8 billion (NZD 2018/19), with over 90% of dwellings in need of some maintenance. This compares to less than around half of households reporting expenditure on maintenance. Furthermore, reported expenditure on 'Maintenance' or 'Alterations, Additions and Improvements', while stable from 2006/07 to 2012/13 (at around 45% to 50% households) declined to 2018/19 to about 35%, with total spend of $6 billion. The proportion of households reporting property maintenance expenditure increases with income. The majority is spent by the highest income households. In 2018/19, the top income quartile of owner-occupier households spent about 42% of the total expenditure, while the top 50% spent 70% of total expenditure. For comparison, the under-investment in maintenance is four and a half times the cost of large natural disasters 2018 to 2023.

Contents

1 Introduction 3

2 Estimating undone maintenance 3

2.1 About the data 4

2.2 Assessing housing condition and maintenance costs 4

2.3 Condition ratings of dwelling components – 2018/19 PHS 7

2.4 Cost of undone maintenance 11

2.5 Repair costs by other population groups 18

2.6 Section summary 20

3 Estimating Maintenance Expenditures 21

3.1 Expenditures over time 23

3.2 Spending on Maintenance and Improvements 27

3.3 The Role of Housing Tenure 29

3.4 Property Values and Recommended Annual Maintenance 37

3.5 Expenditures and Income 40

4 Discussion – Required and Actual Maintenance 47

4.1 Evidence of Insufficient Maintenance 47

4.2 Insufficient Actual Maintenance Expenditure 48

4.3 Comparison 50

5 Conclusion 51

6 References 53

7 Appendix 55

Tables

Table 1. BRANZ housing condition assessment scale 5

Table 2. Estimated cost of maintenance to bring up to 'as new' by component and condition applied to the PHS dataset (2018 prices, for 140m^2 dwelling) 6

Table 3. Dwelling size by PHS category and assumed floor area for deriving repair cost estimates 6

Table 4. Households needing some maintenance expenditure on exterior components 8

Table 5. Households needing some maintenance expenditure on interior components 10

Table 6. Total maintenance costs for interior, exterior and overall by tenure 17

Figures

Figure 1 Condition ratings of exterior dwelling components, 2018/19 PHS 8

Figure 2: Condition ratings of interior dwelling components, 2018/19 PHS 10

Figure 3 Total cost to repair exterior components to 'as new' condition, by tenure, based on PHS 2018/19 condition assessments 11
Figure 4. Average cost to repair exterior components to 'as new' condition, by tenure, based on PHS 2018/19 condition assessments (figures rounded to nearest thousand) 12
Figure 5. Histogram of exterior maintenance costs by tenure 13
Figure 6. Cumulative percent histogram of exterior maintenance costs 13
Figure 7: Cost of maintenance for interior components to 'as new' condition, by housing tenure 14
Figure 8. Average maintenance costs for interior components, by tenure, based on PHS 2018/19 condition assessments (rounded to nearest thousand 15
Figure 9: Histogram of interior maintenance costs by tenure 16
Figure 10. Cumulative percent histogram of interior maintenance costs 16
Figure 11: Histogram of total maintenance costs for all components assessed in the PHS, by tenure 17
Figure 12. Cumulative percent histogram of total maintenance costs 18
Figure 13. Average maintenance costs by household income 19
Figure 14. Average maintenance costs by household composition 19
Figure 15. Average maintenance costs by ethnicity 20
Figure 16. Property expenditure categories in the Household Economic Survey 22
Figure 17. Proportion of Households with Property Expenditures, by Expenditure Type 24
Figure 18. Proportion of Households with Property Expenditures, by Detailed Expenditure Type 25
Figure 19. Total Property Expenditures by Expenditure Type in Nominal and Real Terms 26
Figure 20. Average Annual Household Expenditure in Real Terms (2018 NZD), Weighted 27
Figure 21. Percentage of Households with One or Both Types of Expenditure 27
Figure 22. Households with One or Both Types of Property Expenditure 28
Figure 23. Percentage of Household Expenditure by Households with One or Both Types of Expenditure 29
Figure 24. Households with Property Expenditures by Housing Tenure 30
Figure 25. Housing Tenure of Households with Property Expenditures, by Expenditure Type 30
Figure 26. Percentage of Households with Property Expenditures, by Housing Tenure 31
Figure 27. MNT and AAI Property Expenditures by Housing Tenure 32
Figure 28. MNT and AAI Property Expenditures by Housing Tenure 33
Figure 29. MNT Property Expenditures by Housing Tenure and Expenditure Type 33
Figure 30. Total Aggregate Annual Expenditures (Nominal) by Housing Tenure 35
Figure 31. Total Aggregate Annual Expenditures (Real) by Housing Tenure 35
Figure 32. Average Household Property Expenditures by Housing Tenure 36
Figure 33. Median Property Expenditures by Housing Tenure, Weighted 36
Figure 34. Average Real Property Value (in 2018 NZD) by Housing Tenure 39
Figure 35. Total Aggregate Real Property Value (in 2018 NZD) by Housing Tenure 39
Figure 36. Average Property Value by Income Quartile 40
Figure 37 Percentage of Households with Property Expenditures by Income Quartile 41
Figure 38 Distribution of Households with Property Expenditures by Income Quartile 42
Figure 39 Distribution of Property Expenditures by Income Quartile 42
Figure 40 Total Nominal Property Expenditures (Weighted) by Income Quartile 44
Figure 41 Total Real Property Expenditures (Weighted) by Income Quartile 44
Figure 42 Total Real Expenditures by Expenditure Types 45
Figure 43 Average and Median Nominal Expenditures (Weighted) 46

Executive Summary

This report examines maintenance expenditure in New Zealand based on two surveys accessed through the Stats NZ Integrated Data Infrastructure (IDI). The cost liability of ‘undone’ maintenance uses the 2018/19 Pilot House Survey (PHS) data on the condition of dwellings. The second uses five years of the Household Economic Survey (HES) to explore actual maintenance expenditure. The analysis suggests a multi-year short fall of expenditure compared to the required investment.

The PHS sample of over 800 dwellings included both rented and owned dwellings. The survey involves a physical, onsite assessment of the condition of various dwelling components. Condition is assessed using a 5-point scale, from 'serious' to 'excellent' condition, taking account of functionality and need for maintenance of different interior and exterior dwelling components. The results show owner-occupied dwellings are in better condition compared to rented dwellings. Approximately 90% of owned dwellings (1,058,000) and 97% of rented dwellings (566,000), or 93% of all dwellings require some maintenance on key exterior components (roof, wall cladding and/or windows) to bring them back to 'excellent' or ‘as new’ condition.

Most interior spaces were assessed as being in good or average condition, although owner-occupied dwellings again tended to be in better condition than rented dwellings. Overall, 85% of owned dwellings and 96% of rented dwellings required at least some interior maintenance.

Applying estimates of the cost to maintain to the various components and condition rating, suggests exterior components (limited to roof, wall cladding and windows only) require about $15.5 billion (in 2018/19), or approximately $9,600 per house, for the 93% of houses requiring exterior maintenance. For the interior, the total is $5.3 billion or $3,300 per household. Overall, an average of around $12,600 per dwelling or $13,500 per owner-occupied dwelling is estimated to be required on maintenance. These results are a minimum, as not all dwelling features are included. There is a wide distribution of maintenance needs, with over a quarter of dwellings (26%) requiring over $15,000 to be spent on maintenance, and about 1 in 10 requiring over $21,000.

For data on actual household spending on maintenance, data from five HES years were available: 2006/07, 2009/10, 2012/13, 2015/16 and 2018/19, each with a sample of 3,000 to 4,000 households. The HES records property expenditures for 'Maintenance' and 'Alterations, Additions and Improvements' (abbreviated here to "Improvements") separately, which are further sub-divided into Materials (e.g. paint) or Services (e.g. painters). The proportion of households reporting either Maintenance or Improvements (or both) expenditures was relatively stable from 2006/07 to 2012/13 (45% to 50%) but then declined substantially to 2018/19 to about 35%. Future surveys will document if this worrying trend has continued.

The proportion of households with Improvement expenditure was fairly stable (from 15% to 20%), with most of the decline being driven by the reduction in households reporting Maintenance expenditures, which declined from 53% in 2006/07 to 40% in 2018/19. The opposite pattern was found for Improvements materials. Total household spending on both increased from about $3 billion (2018 NZD) in 2006/07 to almost $6 billion in 2018/19, peaking in 2015/16 at $6.3 billion.

The approximately three-quarters (73%-78%) of houses with reported spending on Improvements were likely to also spend on Maintenance, but the remaining quarter (21%-26%) spent only on Maintenance. So, despite being only about 25% of the population, households with both types of expenditures account for 60% of the total expenditure.

One unexpected finding was the proportion of renters who reported expenditure on either or both Maintenance and/or Improvements. The Residential Tenancies Act 1986 specifies that it is landlords' responsibility to ensure the property is in reasonable condition and to ensure that any necessary maintenance or repairs are undertaken. However, depending on survey year, 8-13% of renters reported Maintenance expenditure while 2-7% reported Improvement expenditure.

The analysis also identified a relationship between household income and maintenance under-spend, with the proportion of households reporting expenditure on property maintenance increasing with income. The majority of property expenditures are spent by the highest income households: in 2018/19 the top 25% by income of owner-occupier households spent about 42% of the total expenditure, while the top 50% spent 70% of total expenditure.

The reduction in expenditure with falling incomes is perhaps not surprising, but what was unexpected was that all income groups showed a reduction in the proportion of households spending on property maintenance, with the turning point being the 2012/13 HES. This does not seem to be a survey methodological issue, as the falling trend continues in 2015/16 and 2018/19.

BRANZ recommends that households spend annually 0.5-2% of their property value on maintenance. Applying this to the HES data showed that households without any type of property expenditure consistently have lower property values, and the proportion in this group is increasing with time. Even for the properties with reported spend on property Maintenance and/or Improvements, both the mean (average) and median (50%) percentages are below the bottom of the recommended spending range.

Applying the 0.5-2% of property value recommended spend on maintenance, gives a total owner-occupier expenditure in 2018/19 of $2.9 to $35.3 billion. The reported Maintenance spending was approximately $2 billion, which is below the bottom end of this range. Including both Maintenance and Improvements, the total spend is $5.5 billion, which is still at the lower end of the recommended range. For 2018/19, the maintenance underspend mid-range is $15.7 billion.

Inflation adjusted to 2023 dollars the mid-range underspend is $27.5 billion. This compares to the Insurance Council of New Zealand inflation adjusted large disasters payout from 2018 to 2023 of $5.4 billion. Thus, the under-maintenance assessed in NZ dwellings is four and a half times as much as the cost of large disasters over six years. The high costs of natural disasters have seen insurance premiums increase by 22% from 2019 to 2023. If the same increases held true for the impact of under-maintenance, it would be *expected* that the value of each house would decline: if maintenance is not carried out, the house condition will deteriorate, it will not perform as expected and its life will be reduced. Instead, the price of houses increased by 33% over the same period.

This study confirms previous research that New Zealand houses are under-maintained, but added to that knowledge by showing that this is likely due to under-expenditure. It has also shown that the investment in maintenance differs with incomes and only those in the top quartile of income earners are spending appropriately on maintenance.

1 Introduction

For most owner-occupiers, their dwelling is their biggest single investment, most valuable financial asset, and the most critical use-value. Routine maintenance is necessary to maintain a dwelling in good condition. Neglecting maintenance has a number of detrimental impacts including undermining the structural integrity and weathertightness of the building. Neglecting maintenance can also lead to further deterioration of building components, exacerbating the problem and increasing the cost to put it right. For example, deferring maintenance on wall cladding could eventually compromise the weathertightness of the building envelope, leading to damaged linings and/or a larger area becoming defective, resulting in a higher cost to repair than had the cladding been adequately and routinely maintained (Page et al., 1995). Hence, it is important for owners to maintain their dwellings and to ensure repairs are done in a timely manner. Yet, national surveys of our housing stock and of occupants suggest that 'undone maintenance' is a common occurrence in Aotearoa New Zealand (NZ). For example, the 2018 General Social Survey showed almost one-fifth (19 percent) of households considered their home needed moderate or major repairs.[1] Home maintenance is a financial responsibility for landlords and an affordability concern for homeowners. A study of motivations for moving, showed one of the top ten selection criteria was a dwelling that needed less repairs and maintenance (James, 2020).

This report provides a snapshot of the costs of undone maintenance and repair[2] as well as the actual amount households are spending on maintaining, repairing, and improving their homes. As maintenance and repair costs are intrinsically related, it is often difficult to fully distinguish them. For the remainder of this paper, we will refer to these costs as maintenance costs recognising that some aspect of maintenance includes repair.

Section 2 of this report covers the estimation of undone maintenance using the 2018/19 Pilot Housing Survey. Section 3 covers the estimation of household expenditure on maintenance and improvements to their homes using the Household Economic Survey from 2005/06 to 2018/19. Section 4 discusses the gap between required and actual expenditure.

2 Estimating undone maintenance

The BRANZ House Condition Survey (HCS), which has been undertaken since the mid-1990s, provides insight into the condition of our housing stock.[3] The HCS involves a physical assessment of hundreds of dwellings throughout New Zealand, undertaken by trained building surveyors. The HCS data provides an indication of trends in defects affecting New Zealand homes and the extent to which our houses are being adequately maintained.

[1] Stats NZ, 2019. Wellbeing statistics: 2018 (housing quality and tenure security). Table 1: Selected housing quality and tenure security measures for the total population. Available at: https://www.stats.govt.nz/information-releases/wellbeing-statistics-2018

[2] The costs of undone maintenance do not include the costs of deferred maintenance. Hence, these costs are likely to underestimate the true costs of required maintenance as some homeowners will defer the necessary maintenance to avoid these short-term extra costs.

[3] https://www.branz.co.nz/healthy-homes-research/hcs/

BRANZ's original HCS, undertaken in 1994, also developed a method for estimating the cost of maintenance required in a house, based on the information collected on the condition of different dwelling components. This method has been applied to all subsequent HCS (2000, 2005, 2010, 2015), with costs adjusted for inflation to align with the survey year in each instance.

2.1 About the data

The most recent national housing assessment survey in Aotearoa New Zealand – the Pilot Housing Survey (PHS) - was undertaken in 2018/19, through a partnership between BRANZ, Stats NZ and the Ministry of Business, Innovation and Employment (MBIE). This survey combined some of the typical data collection approaches of the HCS, while trialling some new approaches. The latter included the following:

- Recruiting households through the Stats NZ 2018 General Social Survey (GSS);
- Developing and using an app-based survey tool; and
- Reducing survey content to enable data to be collected in 1 hour.

Due to changes in both method and survey content, we differentiate the PHS conducted in 2018/19 from the earlier HCS in subsequent discussions.

While comprising a smaller survey (in terms of content), the PHS had a larger sample than the previous HCS, with 832 dwellings surveyed across all regions of New Zealand. Further details about the PHS methodology are reported in White (2020).

The collaborative approach adopted by BRANZ, Stats and MBIE in delivering the PHS, not only enabled a larger sample of houses to be surveyed, but also saw PHS participants recruited through the GSS, which supported a more robust sampling process. The direct link between the two surveys (through the Stats NZ Integrated Data Infrastructure (IDI)) offers further significant value-add, providing a richer source of information and opportunities for more in-depth analysis than is available for earlier HCS. For example, the linked PHS-GSS can be used to analyse the distribution of housing condition across different population groups and the relationship between housing condition and occupants' self-reported health and wellbeing (Jones & White, 2023).

The analysis reported in this paper utilises the linked PHS-GSS data. Firstly, using the condition assessment data from the PHS, the cost of maintenance to bring some key and critical components of the housing stock to 'as new' condition is quantified. The linked PHS-GSS dataset is then used to analyse these maintenance costs alongside a range of GSS sociodemographic variables, to explore how these costs distribute across different population groups.

2.2 Assessing housing condition and maintenance costs

The HCS and PHS use a 5-point scale to assess the condition of different components of the dwelling (Table 1). The condition assessment considers both functionality and need (i.e. urgency) for maintenance.

Table 1. BRANZ housing condition assessment scale

Condition	Description and assessment criteria
Excellent ★★★★★	"As new condition" **Visually:** no signs of any damage/wear and tear **Function:** item is performing its main function **Maintenance demand/timeline:** none/none
Good ★★★★	"Good, clean condition" **Visually:** minor signs of wear and tear **Function:** item is performing its main function **Maintenance demand/timeline:** none/none
Average ★★★	"Sound and clean" **Visually:** minor marks, chips and slight deterioration/signs of wear and tear **Function:** item is currently performing its main function **Maintenance demand/timeline:** normal work/minor repairs, e.g. repaint, clean/within a year
Poor ★★	"Needs work" **Visually:** badly marked, damaged or chipped **Function:** evident this is not working as required or it is nearing the end of its expected life **Maintenance demand/timeline:** significant repair or maintenance work within 3 months
Serious (★)	"Urgent attention" **Visually:** item is either broken and needs to be repaired/replaced or item is missing and needs to be installed; check for major and obvious faults, cracks, holes, serious damage, hazards **Function:** evident this item is not working, doesn't meet legislation/regulation requirements, is not installed, is a health and safety, security or fire risk, directly impacts on weathertightness, has major damage where replacing may be less expensive than repair, has reached end of expected life, is obsolete and cannot be repaired. **Maintenance demand/timeline:** major repair/urgently needed

The maintenance costs are estimated from the condition assessments, which are based on a visual inspection of each dwelling (i.e. defects and issues visible at the time of the survey), using the criteria above. Costs are applied for each condition rating and component individually (e.g. roof, walls, windows etc). Component costs are derived from the original base costs applied in previous HCS, adjusted to 2018 prices (to be consistent with the PHS survey year).[4] There are several key things to note about this method:

- The costs are for maintenance of the component only (labour and materials) and do not include wrap-around services (such as scaffolding) and do not differentiate between different construction types. Costs were derived for 140m^2 house then are scaled by floor area for each surveyed dwelling.
- For exterior components, it is assumed that only a percentage of the component requires maintenance, rather than full replacement (see Annex Table 1). This may not always be the case. For example, it may be more cost-effective to fully replace a roof in 'serious' condition, rather than just undertaking maintenance on the affected area. Costs should therefore be considered a low estimate.

[4] The original cost estimates were derived in 2010 using the *2010 Rawlinsons New Zealand Construction Handbook*, hence level of precision in these values. See Appendix C of Buckett et al (2012) for a full description of the method. 2010 costs were inflated to 2016 prices (for the last HCS) and subsequently to 2018 prices (for the PHS), using the CGPI for residential buildings (at 23.4% and 12.6% respectively)

- For interior spaces, the HCS differentiated the cost to maintain joinery, linings and (where relevant) fittings, whereas the PHS included only one overall assessment of the condition of a room, taking all features into account. The maintenance costs for interior spaces applied here are derived from the sum of costs for the joinery, lining, and fittings used in the HCS (i.e. maintenance costs for a room in PHS = joinery + lining + fitting maintenance costs from HCS).

Table 2. Estimated cost of maintenance to bring up to 'as new' by component and condition applied to the PHS dataset (2018 prices, for 140m^2 dwelling)

	Condition Rating				
Component:	**Serious**	**Poor**	**Average**	**Good**	**Excellent**
Roof	$4,202	$3,408	$2,590	$1,375	$0
Exterior Walls	$8,782	$5,990	$3,716	$2,124	$0
Windows	$7,718	$5,235	$3,789	$2,577	$0
Kitchen	$4,307	$2,154	$431	$0	$0
Laundry	$1,598	$799	$160	$0	$0
Bathrooms[5]	$4,710	$2,355	$471	$0	$0
Other rooms	$5,948	$3,263	$2,009	$753	$0

2.2.1 Adjusting for floor area

The costs shown in Table 2 are for a 140m^2 dwelling. These are then adjusted to reflect the floor area of each dwelling surveyed. In the PHS, floor area was estimated and recorded within 50m^2 bands.[6] To do this adjustment, an estimated (or 'assumed') floor area is derived from each band, taking into account housing tenure, as survey data (HCS, PHS and Census[7]) indicate rentals typically have a smaller footprint than owner-occupied dwellings (see Table 3 and

Annex Figure 1). The 'assumed floor area' for the PHS data is used to adjust the repair costs using the 'cost adjustment factor' shown in the last two columns of Table 3 (cost adjustment factor = assumed floor area/140).

Table 3. Dwelling size by PHS category and assumed floor area for deriving repair cost estimates

	Percent of PHS sample			Assumed floor area (m2)		Cost adjustment factor	
PHS dwelling size band:	**Owned**	**Rented**	**Total**	**Owned**	**Rented**	**Owned**	**Rented**
Small (<100m2)	12%	42%	22%	100	75	0.71	0.54
Medium (100-150m2)	35%	40%	37%	150	125	1.07	0.89
Large (150-200m2)	34%	15%	28%	200	175	1.43	1.25
Very large (200-250m2)	15%	3%	11%	250	225	1.79	1.61
Extra large (>250m2)	4%	0%	2%	300	275	2.14	1.96

[5] All bathrooms assessed individually and maintenance costs applied to each separately, then summed. The highest number of bathrooms recorded for any one dwelling in the survey was four.

[6] Previous HCS recorded floor area as a single metric.

[7] The 2018 Census showed rented houses have an average of 2.7 bedrooms, while owner-occupied houses have an average of 3.4 (Dixon, 2020. Are we building bigger and bigger homes? Analysis of building consents and census data. Available at: https://berl.co.nz/economic-insights/are-we-building-bigger-and-bigger-homes#:~:text=Reviewing%20the%202018%20Census%20data,have%20on%20average%203.4%20bedrooms.

2.2.2 Dwelling components assessed in the PHS

While the scale used to assess condition has been consistent across all HCS and the PHS, the number of different components assessed differs. The PHS, which was trialling a shorter survey to reduce data collection time, was limited to key components associated with weathertightness and thermal performance (roof, wall cladding and windows) as well as the condition of all rooms (individually assessed, taking account of linings, joinery and fittings). This has implications for this analysis and interpretation, in terms of both overall results and comparability with previous HCS. As the PHS includes data on only a subset of components, 'total' cost estimates cannot be considered a representation of total maintenance costs, as there will be other dwelling components potentially in need of maintenance that are not captured in the PHS assessment.

This is particularly true of the exterior, as the PHS only included a condition assessment of the roof cladding, wall cladding and windows. This excludes several other exterior features which need regular maintenance, such as guttering and downpipes and subfloor vents; and 'bigger ticket' items that may be prone to damage or deterioration such as foundations, piles, or roof framing. For this reason, totals presented here are an underestimate the sum total maintenance costs and not comparable with previous HCS analysis.

To put into context, previous HCS applied maintenance cost estimates to up to 14 different exterior components per dwelling, while the PHS only includes 3 (roof, wall cladding, windows). However, costs for individual components are broadly comparable and shown in Annex Figure 2.

2.3 Condition ratings of dwelling components – 2018/19 PHS

Figure 1 and Figure 2 below show the distribution of condition ratings of the different dwelling components assessed in the PHS, from which estimates of repair and maintenance costs have been derived.

Figure 1 shows the condition of PHS assessed exterior components, split by housing tenure (error bars show 95% confidence intervals). This shows that most houses have exterior components in good or average condition, but owned houses tend to be in better condition than rented houses. This pattern has consistently been observed through previous analysis of HCS and PHS data (for example see White et al. (2017) and White (2020)).

For the exterior components, our method assumes that dwelling components rated as excellent condition require no maintenance and, hence, will have no maintenance cost for that component (as shown in Table 2). For each of the three exterior components, significantly more owned dwellings are in excellent condition compared to rented dwellings. For example, only 6% of rented dwellings' windows were rated 'excellent', whereas 19% of owned dwellings' windows were rated excellent. This translates to some 548,000 rented dwellings and 951,000 owned dwellings that will require some maintenance expenditure on windows alone. Taking all three exterior components into account, approximately 90% of owned dwellings (1,058,000) and 97% of rented dwellings (566,000) require some maintenance cost to bring them back to 'as new' condition. This is a total of 1,625,000 dwellings (93%) across Aotearoa New Zealand require some maintenance expenditure on the roof, walls and/or windows, as shown in Table 4.

Figure 1 Condition ratings of exterior dwelling components, 2018/19 PHS

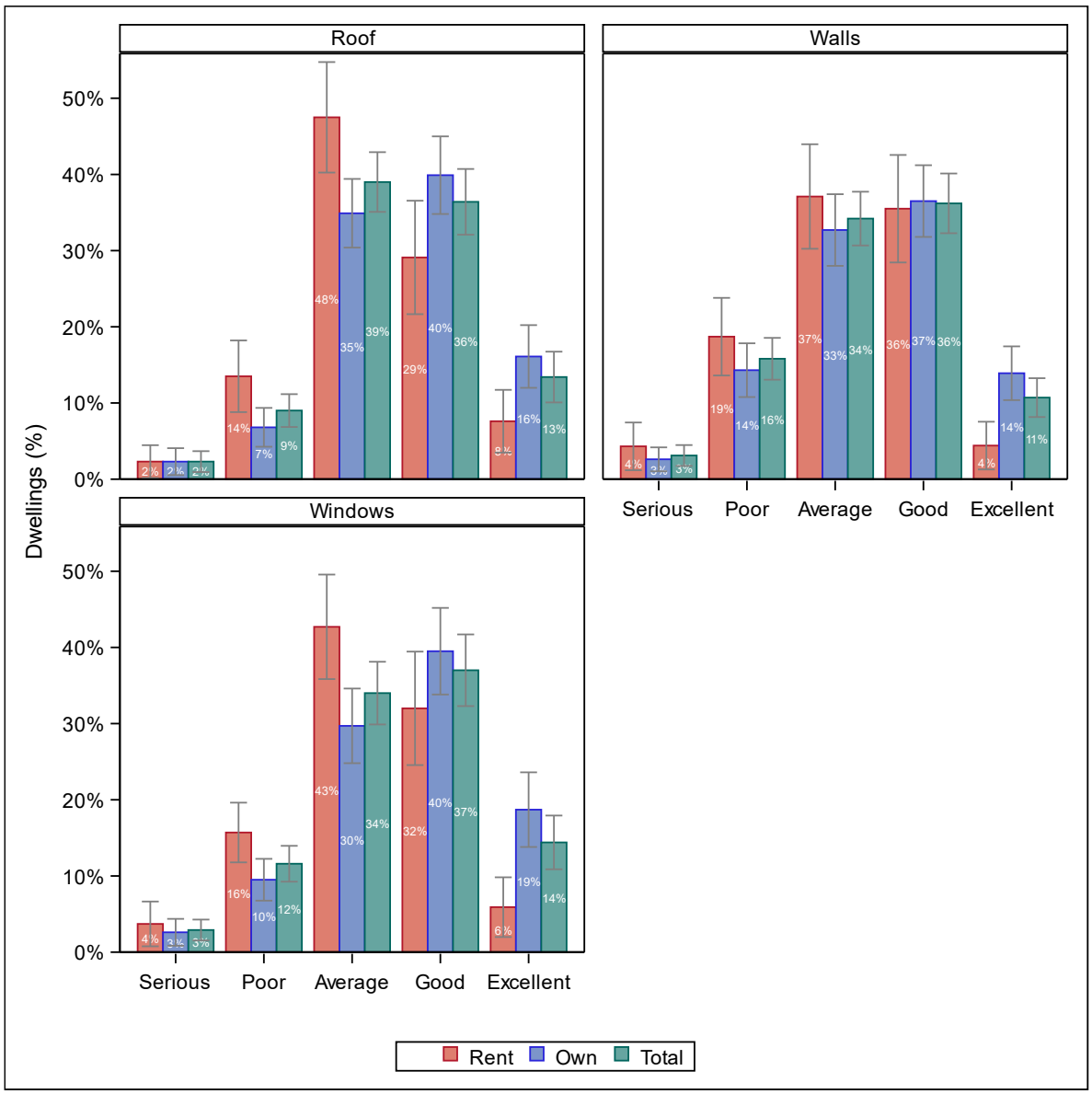


Table 4. Households needing some maintenance expenditure on exterior components

Component	Owned	Rented	Total
Roof	986,000 (84%)	495,000 (85%)	1,481,000 (85%)
Wall	1,007,000 (86%)	556,000 (96%)	1,564,000 (89%)
Windows	951,000 (81%)	548,000 (94%)	1,499,000 (86%)
All 3 exterior features	1,058,000 (90%)	566,000 (97%)	1,625,000 (93%)

Table notes: Percentage shows proportion of the total owned, rented and overall stock represented.

Figure 2 shows the distribution of the condition for the interior components assessed in the PHS, by tenure. Again, most interior spaces were assessed as being in good or average condition, and interiors in owner-occupied houses tended to be in better condition than rented houses. There were some differences between the components. Kitchens were more likely to be in excellent or good condition, whereas bathrooms were the most likely to be in poor or serious condition (especially for rented houses). Where a house had more than one bathroom, the condition of the worst bathroom was used for the purpose of the graph below.

As with exterior components, our method assumes that interior components in excellent condition require no maintenance and, hence, no maintenance cost as shown in Table 2. Components in the kitchen, laundry, and bathrooms rated as 'good' are also assumed to require no maintenance (and no maintenance cost). Other rooms, however, rated as 'good' are assumed to require some maintenance (and therefore some maintenance cost). For this reason, the number of dwellings requiring some maintenance for other rooms (1,526,000 in total) is much larger than the number of dwellings requiring some maintenance for kitchens (706,000 in total) (Table 5). Overall, 85% of owned dwellings and 96% of rented dwellings required at least some interior maintenance at the time of the survey.

Figure 2: Condition ratings of interior dwelling components, 2018/19 PHS

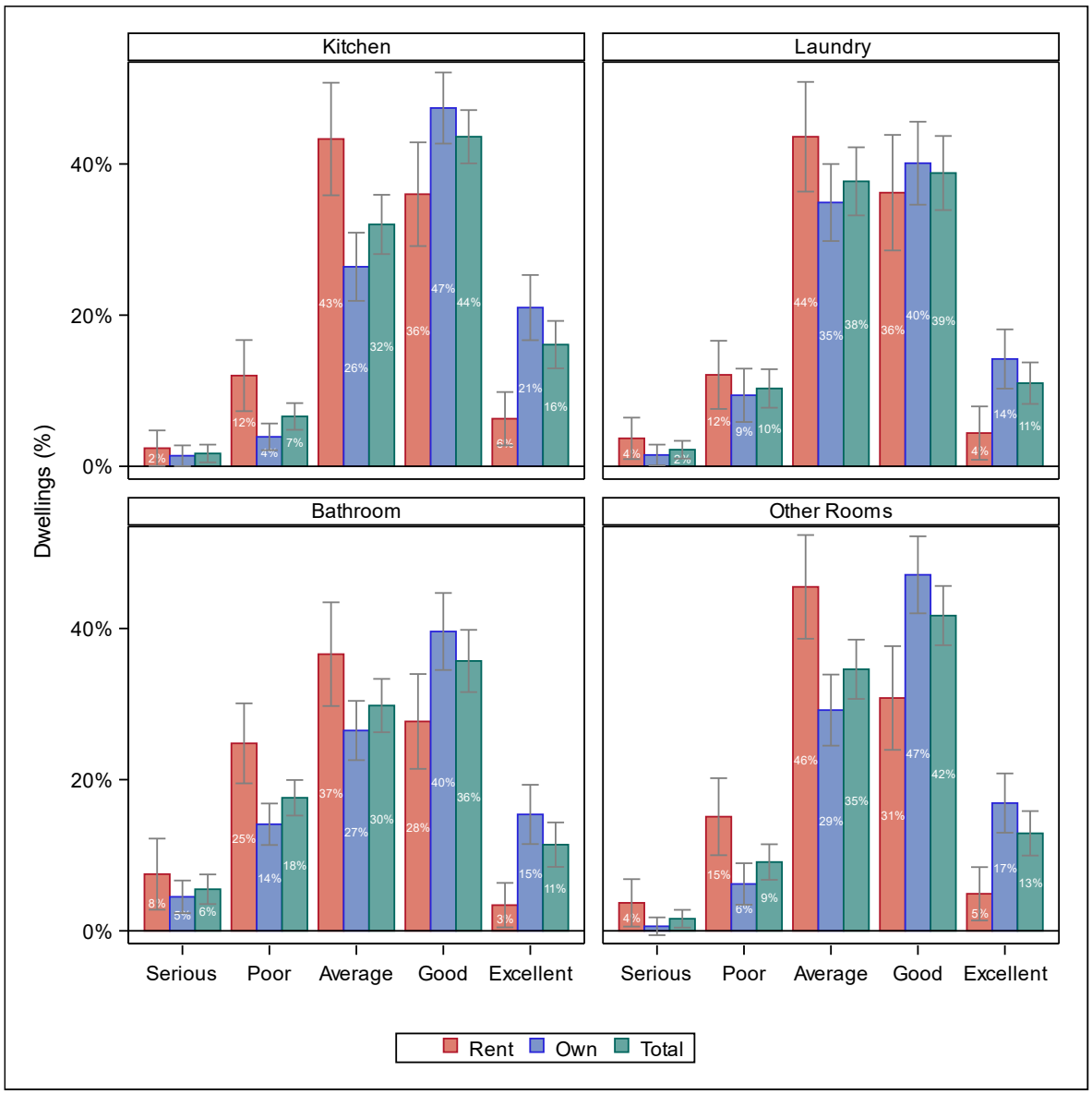


Table 5. Households needing some maintenance expenditure on interior components

	Owned	Rented	Total
Kitchen	370,000 (32%)	336,000 (58%)	706,000 (40%)
Laundry	504,000 (43%)	323,000 (55%)	827,000 (47%)
Bathrooms	526,000 (45%)	401,000 (69%)	927,000 (53%)
Other rooms	972,000 (83%)	554,000 (95%)	1,526,000 (87%)
All interior	993,000 (85%)	556,000 (96%)	1,549,000 (88%)

Table notes: Percentage shows proportion of the total owned, rented and overall stock represented.

2.4 Cost of undone maintenance

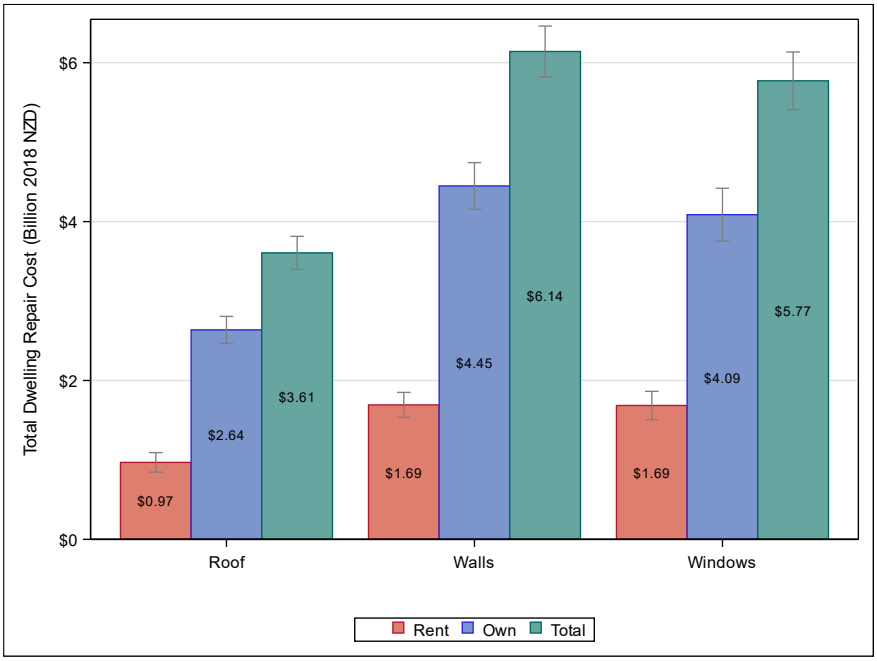
This section provides estimates of the cost to bring all house components assessed in the PHS to 'as-new' condition, by tenure (owned and rented). As described in the methodology section, costs are applied to each component and condition rating individually and then adjusted for the dwelling's floor area. The first section, 2.4.1.1, provides the results for the exterior components. The second section, 2.4.1.2, provides the results for the interior components. The third section, 2.4.1.3, combines the interior and exterior components to provide the results for the total dwelling cost.

When reporting the maintenance costs by different household types, the costs apply to the dwelling. The responsibility for undertaking maintenance (and therefore the cost burden) may not be that of the occupant – i.e. if the dwelling is rented, this will largely be the responsibility of the landlord. However, it is the occupant who is impacted in terms of living in a dwelling in suboptimal condition.

2.4.1.1 Exterior components

Using weighted PHS data linked to the GSS,[8] shows that for exterior components, the largest maintenance costs relate to walls, for both owned and rented houses, with an estimated $6.14 billion needed in maintenance in total (Figure 3). Maintenance costs for windows are slightly lower, with a total estimated $5.77 billion. In total, based on the PHS condition assessments (and noting this only includes three components: roof, walls and windows), the results indicate a cost around $15.5 billion to complete maintenance to bring these features to an 'as-new' condition. Note the total costs are *lower* for rented houses, compared to owner-occupied houses, despite the former being in poorer condition. This is due to (a) the fact these costs are based on a weighted count of dwellings, of which rentals represent around one-third of the total; (b) the costs are adjusted for floor area, and rented dwellings tend to be smaller on average than the owner-occupied stock (see Table 3).

Figure 3 Total cost to repair exterior components to 'as new' condition, by tenure, based on PHS 2018/19 condition assessments



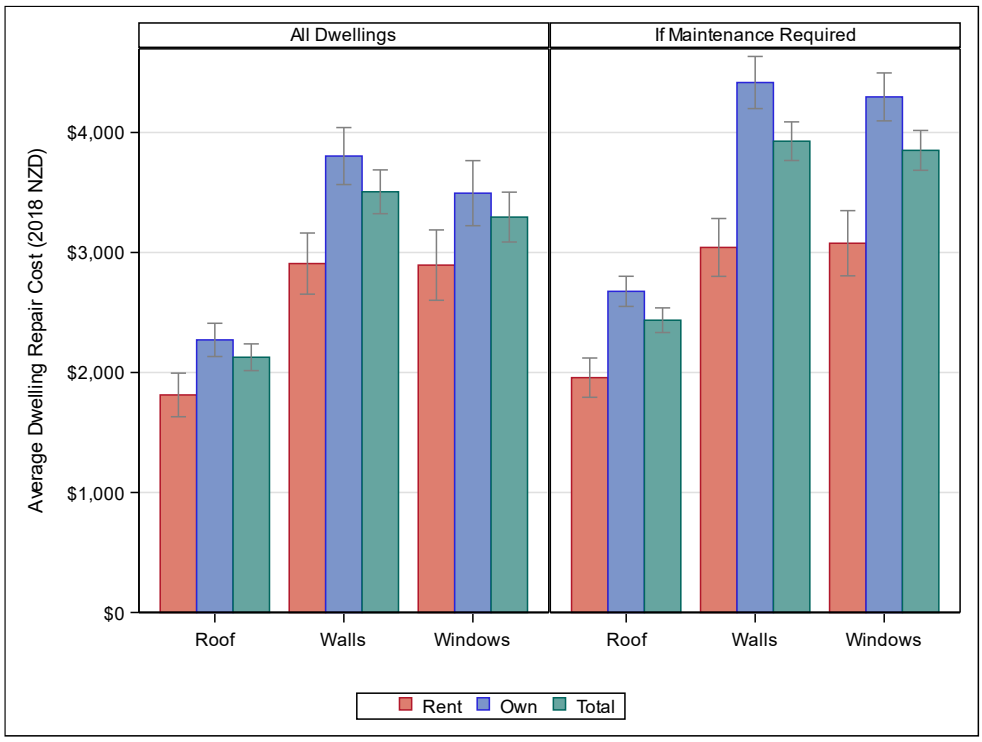
[8] The PHS was weighted to account for the total population of New Zealand houses (approx. 1.7 million), regional distribution and tenure. See White (2020) for a further information on the sampling and weighting.

Figure 4 shows the average cost of maintenance to bring each exterior component to 'as new' condition.[9] Two averages are shown in the figure: one (left hand panel) is the average across the whole sample, which includes a number of dwellings (or rather, components of dwellings) requiring no maintenance at the time of the survey; the other (right hand panel) is the average for dwellings needing some maintenance (i.e. excludes components that were in excellent condition at the time of the survey).

The average costs for all dwellings (left panel on Figure 4) show less of a difference between owned and rented houses compared to the average costs using only dwellings requiring maintenance on the component (right panel on Figure 4). Moreover, because of the higher percentage of rented dwellings requiring maintenance on the exterior components, the two averages for each rented dwelling component are not significantly different from each other. For owned dwellings, however, the two averages are significantly different. For example, 94% of rented dwellings require maintenance on windows (with an average repair cost of around $3,000 regardless of the sample used) but only 81% of owned dwellings require this (around $3,500 averaged over all dwellings and $4,300 averaged over dwellings requiring some window maintenance).

Overall, the results using all dwellings suggest that the 'average' rental needs around $7,500 in total spent on the roof, walls and windows and the 'average' owned dwelling needs around $9,600 spent on maintenance of these features, based on its condition at the time of the PHS. Conditional on needing some maintenance at the time of the survey, the average maintenance cost increases to $10,600 for owned dwellings and $7,700 for rentals, as shown in the right panel of Figure 4. As noted above, there are two conflicting factors at play here: while rentals are typically in worse condition, therefore requiring greater maintenance investment, they tend to have a smaller footprint, reducing the total cost compared to owned dwellings.

Figure 4. Average cost to repair exterior components to 'as new' condition, by tenure, based on PHS 2018/19 condition assessments (figures rounded to nearest thousand)



[9] The average cost in Figure 4 is averaged over all dwellings, including those needing no repair.

The averages shown above mask a wide distribution and do not show the combined total for all components given that the components needing maintenance will vary within any one house (for example, the roof may be fine, but the wall cladding and windows need attention). Figure 5 shows the whole sample distribution of households' total exterior maintenance costs, split by tenure. This shows a large number of owned dwellings at the zero mark, and the bulk of owned dwellings require between $1,000 and $20,000 of maintenance on the roof, walls and/or windows to bring them back to 'as new' condition. Overall, 1 in 10 houses have estimated outstanding maintenance costs for the roof, walls and windows of over $15,000 (see Figure 6).

Figure 5. Histogram of exterior maintenance costs by tenure

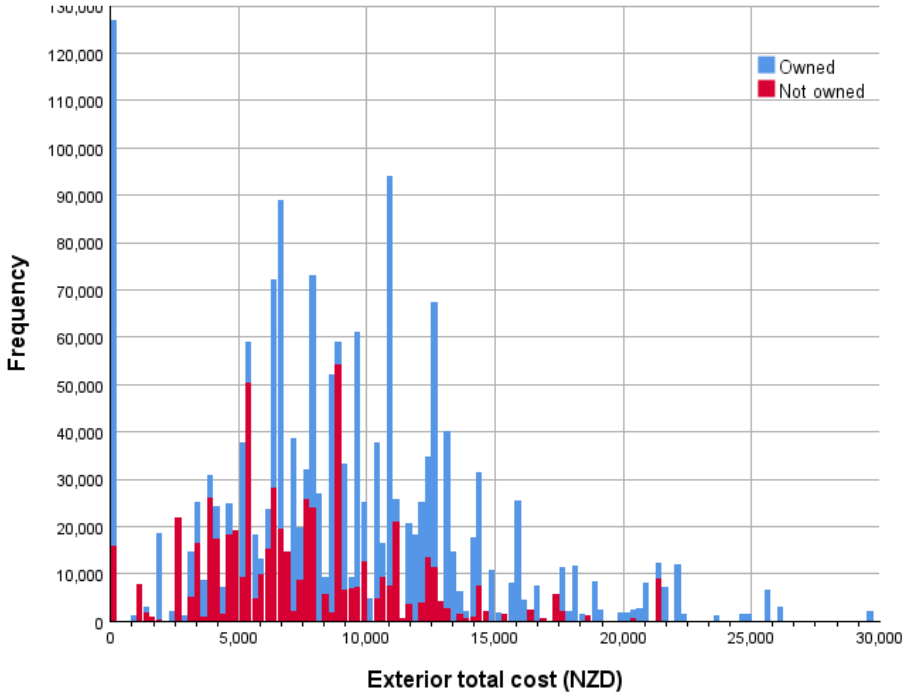
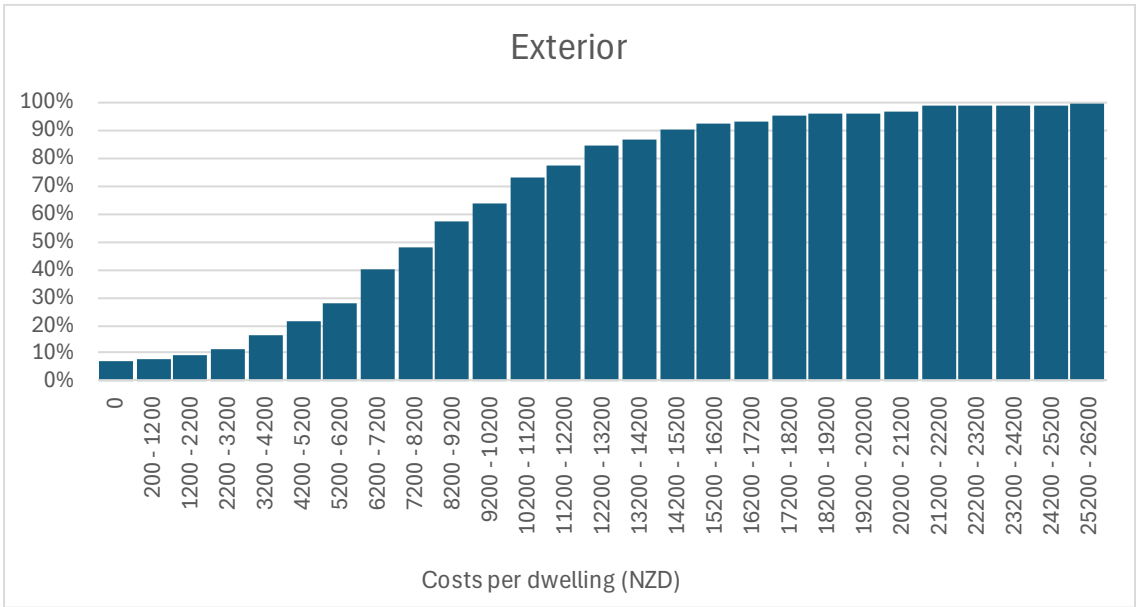


Figure 6. Cumulative percent histogram of exterior maintenance costs

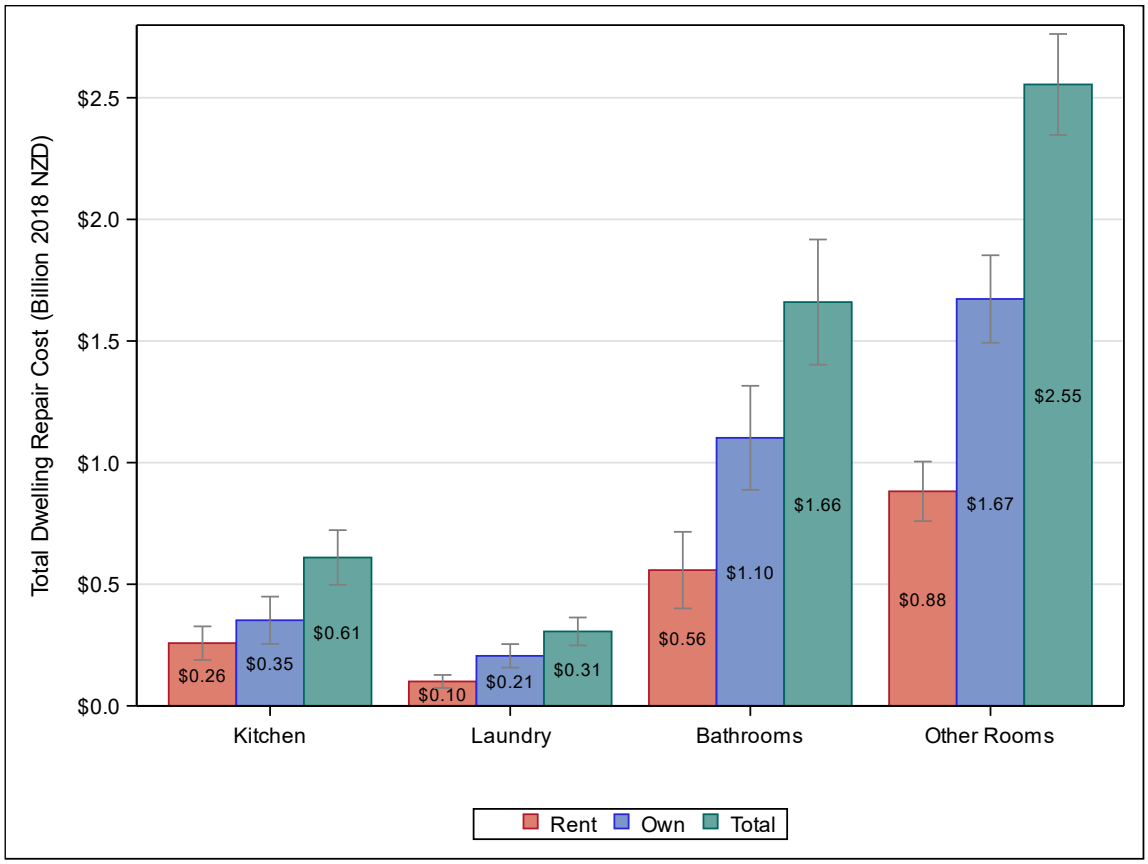


2.4.1.2 *Interior components*

Figure 7 shows the estimated total cost for all New Zealand dwellings to bring interior components up to 'as new' condition, based on the PHS assessments. Compared to kitchens and laundries, maintenance costs appear higher for bathrooms, which is due, in part, to houses often having more than one bathroom (and all are taken into account here). However, this also reflects the relative condition of the different room types, with bathrooms often being in the poorest condition of all the room types assessed, as discussed above. Being high moisture environments (and often under- or un-heated, which exacerbates moisture issues like condensation) linings are more at risk of damage or deterioration (e.g. from mould growth). The total cost for 'other rooms' is highest, as this covers multiple rooms (living areas and bedrooms).

Overall, the estimated total cost to bring interiors up to 'as new' condition, based on the PHS assessments, is $5.13 billion. It is important to bear in mind the method and assumptions around what is required to bring each condition to 'as new': that is, it assumes maintenance rather than total replacement.

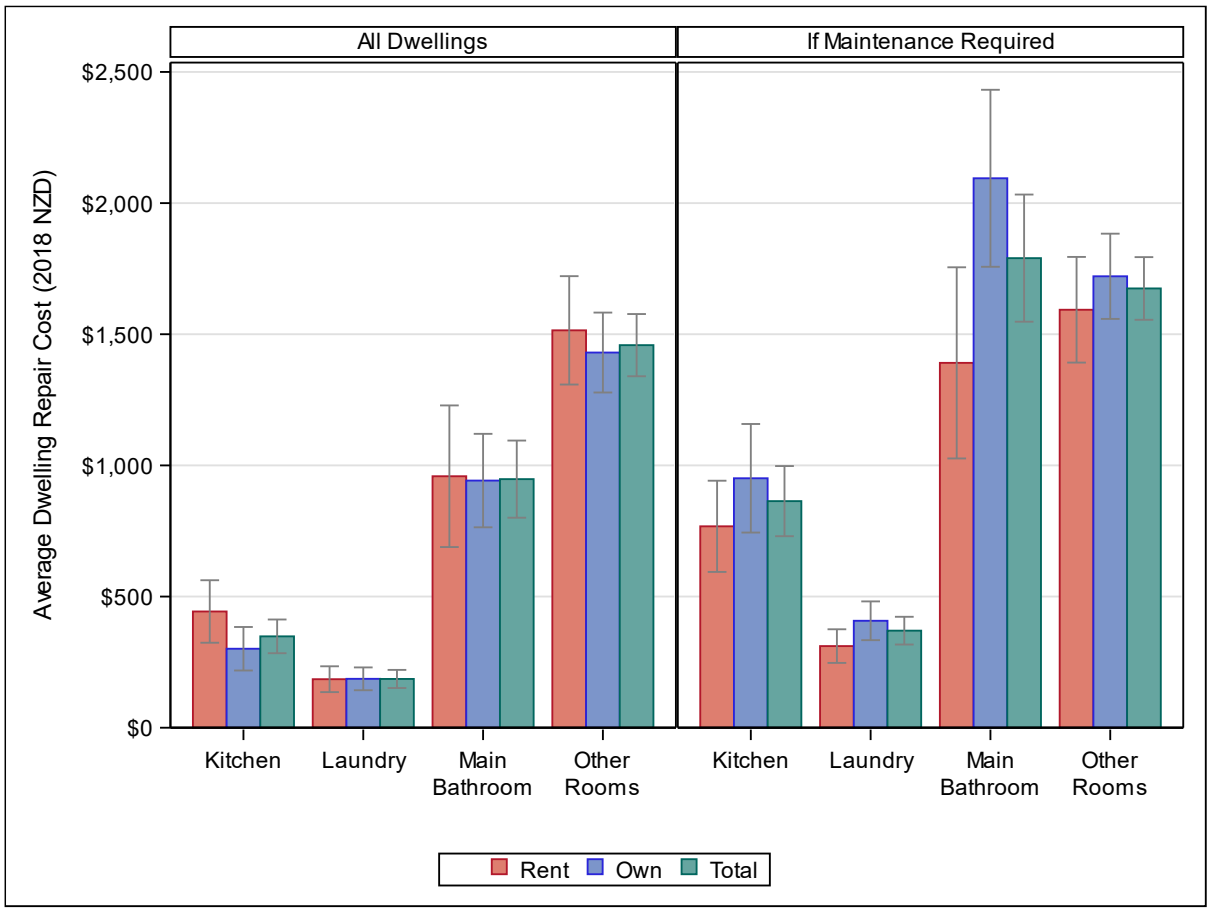
Figure 7: Cost of maintenance for interior components to 'as new' condition, by housing tenure



The average cost to repair each interior spaces for all dwellings assessed in the PHS is shown in the left panel in Figure 8. Excluding houses that needed no maintenance (shown in the right panel of Figure 8), the average costs increase. Based on the latter approach, the average cost of maintenance for interior components assessed in the PHS is around $3,300[10]. Despite having a smaller footprint on average, the interior maintenance costs for rentals ($3,200) vary little to owner-occupied dwellings ($3,400), reflecting the poorer state of repair of the former. As with the exterior costs, these averages mask a distribution, shown in Figure 9, which includes some houses needing no

interior maintenance expenditure based on condition at the time of the PHS assessment. Overall, the middle 80% of homes are estimated to require between $200 and $7,200, in total, to bring their interior back to an 'as-new' condition. Even so, around 1 in 10 dwellings have an estimated outstanding maintenance cost for the interior of over $7,000 (Figure 10).

Figure 8. Average maintenance costs for interior components, by tenure, based on PHS 2018/19 condition assessments (rounded to nearest thousand[10]



[10] 'All dwellings' is the average across the complete PHS weighted sample (where that component exists. Base N does vary for some, for example not all dwellings have 2+ bathrooms or a separate laundry). 'Conditional' excludes dwellings, on a component-by-component basis, where zero maintenance is required based on the condition at the time of the survey. This means base N is different for each component, as shown in Table 5. Varying base counts across the components means the averages cannot be summed to give the 'interior' overall average.

Figure 9: Histogram of interior maintenance costs by tenure

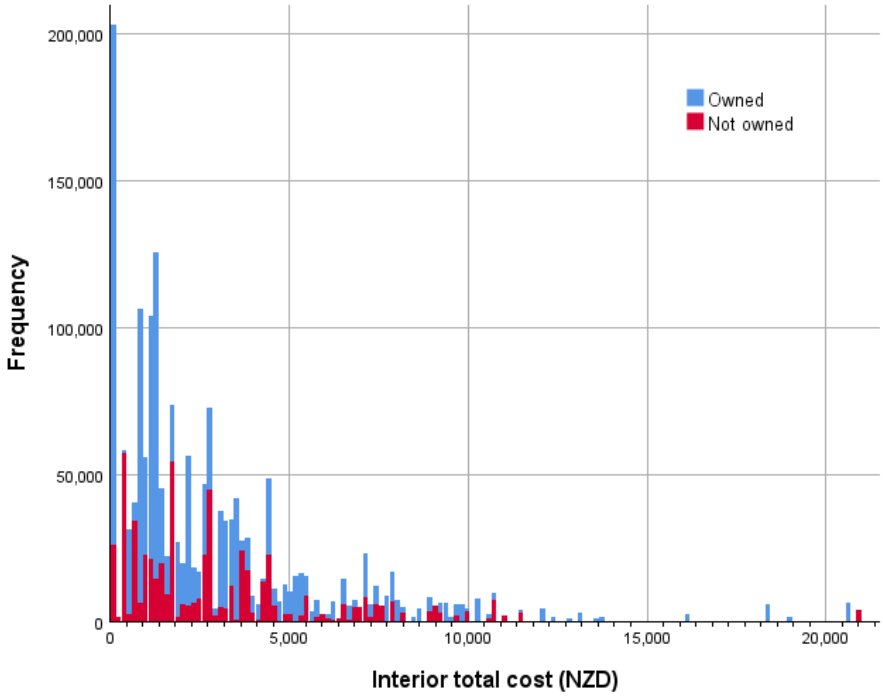
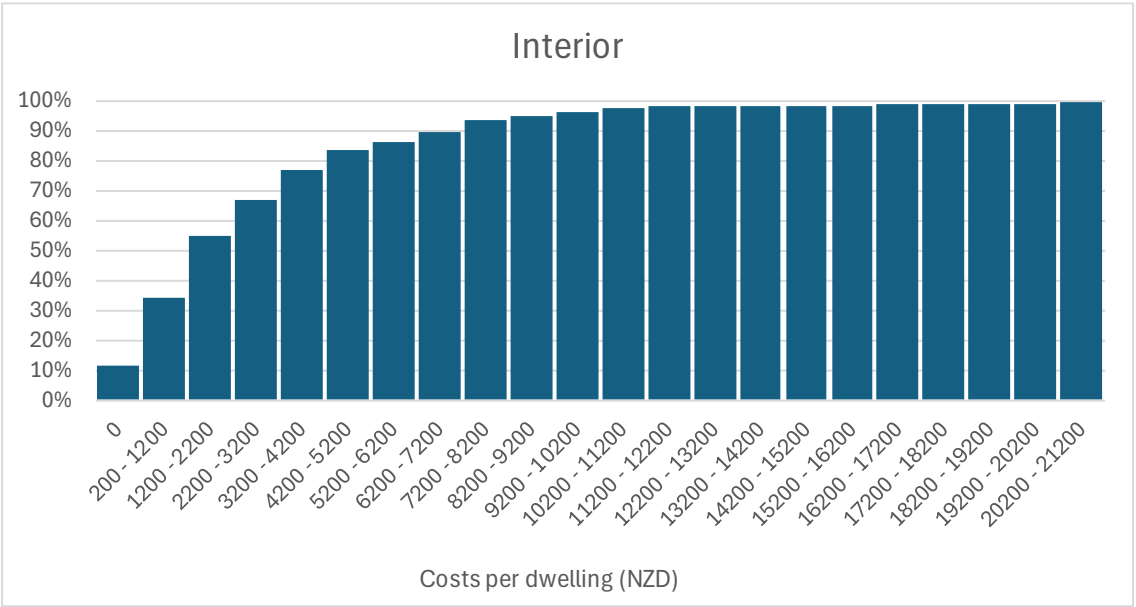


Figure 10. Cumulative percent histogram of interior maintenance costs



2.4.1.3 Overall maintenance costs for owned and rented dwellings

Bringing together the individual component maintenance costs for owned and rented dwellings, suggests an outstanding investment of $20.65 billion for all components considered in this analysis (roof, walls, windows, interior linings, joinery and fittings). As this is only a subset of dwelling components that require routine and regular maintenance, the total costs will be higher than this. The 'Valid N %' in Table 6 shows the proportion of the weighted sample to which the costs apply.

This shows only 3% of the rented sample was in need of no maintenance at the time of the survey, compared to 8% of the owned stock.

Overall, 1 in 10 dwellings have an outstanding maintenance cost of over $21,000 (Figure 12).

Table 6. Total maintenance costs for interior, exterior and overall by tenure

		Owned	Rented	Overall
Interior*	**Mean**	$3,400	$3,200	$3,300
	Sum total ($bn)	$3.33	$1.80	$5.13
	Valid N %	85%	96%	88%
Exterior*	**Mean**	$10,600	$7,700	$9,600
	Sum total ($bn)	$11.17	$4.35	$15.52
	Valid N %	90%	97%	93%
Total*	**Mean**	$13,500	$10,800	$12,600
	Sum total ($bn)	$14.51	$6.15	$20.65
	Valid N %	92%	97%	94%

* Maintenance costs apply to limited components, not the whole dwelling (Interior = linings, joinery, fittings by room; Exterior = roof, wall cladding, windows; Total is sum of Interior and Exterior components).

Figure 11: Histogram of total maintenance costs for all components assessed in the PHS, by tenure

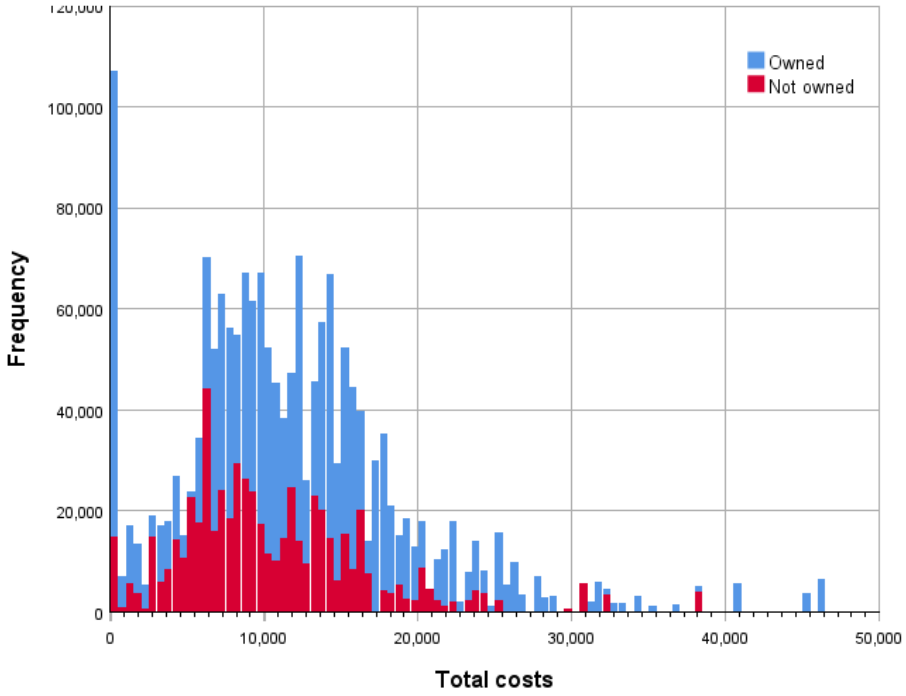
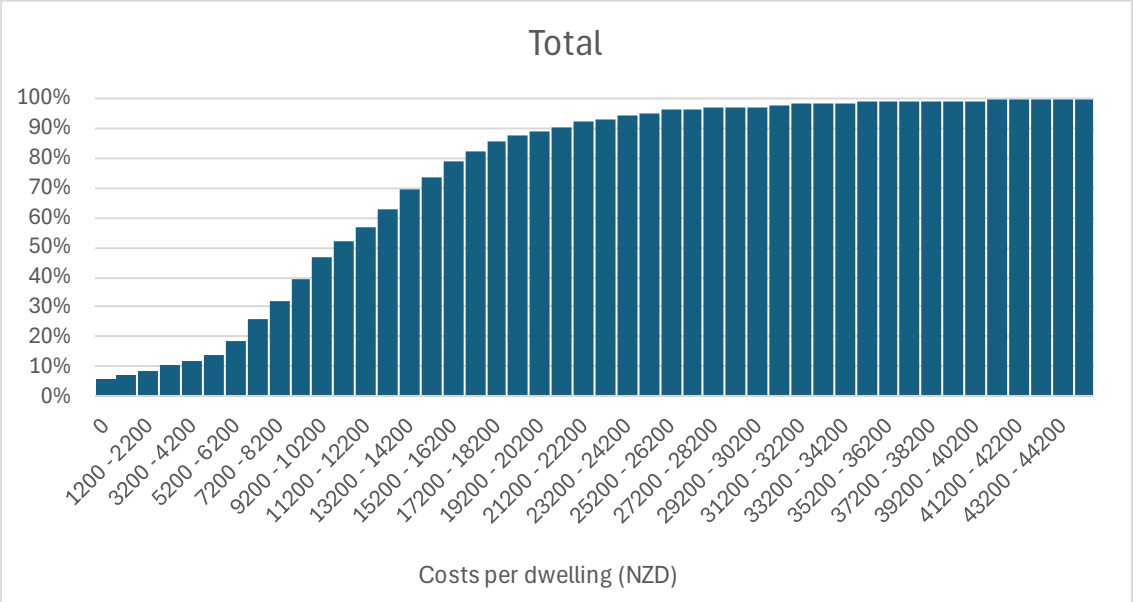


Figure 12. Cumulative percent histogram of total maintenance costs



2.5 Repair costs by other population groups

Using the linked PHS-GSS data, analysis was undertaken to explore how repair and maintenance costs distribute across other socio-demographic groupings. The results by household income, household composition and ethnicity are presented in each successive sub-section.

2.5.1 Household income

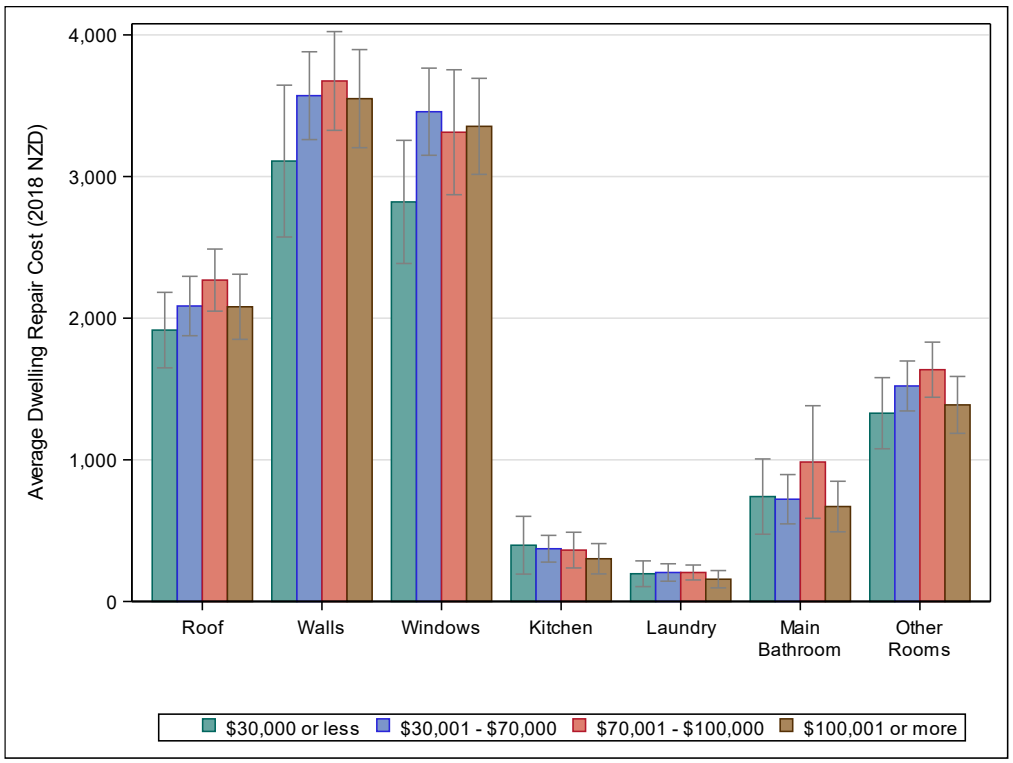
The results suggest there is little difference in the average maintenance costs for interior spaces across income groups. Average costs are higher for the roof and walls for higher income groups. There will be two key and conflicting factors at play here:

(1) The condition of the house, which is typically worse for lower income groups (Jones & White, 2023);
(2) The size of the house, which is typically smaller for lower income households (Riggs et al., 2023)[11] .

Despite having a smaller footprint on average, the maintenance costs for interior spaces for lower income households are on a par with those of higher income groups, reflecting the much poorer state of repair for the former. When considering costs relative to income (for owner-occupiers), the maintenance costs will be disproportionately higher for lower income households and will represent a higher proportion of their income. For instance, taking an assumed income of $20,000 for a household in the lowest income bracket shown here, the average maintenance costs represent 10%, compared to less than around 5% for all other groups. This is on top of other housing-related costs and financial stressed often experienced by low-income households (James et al., 2022).

[11] See Annex Figure 3.

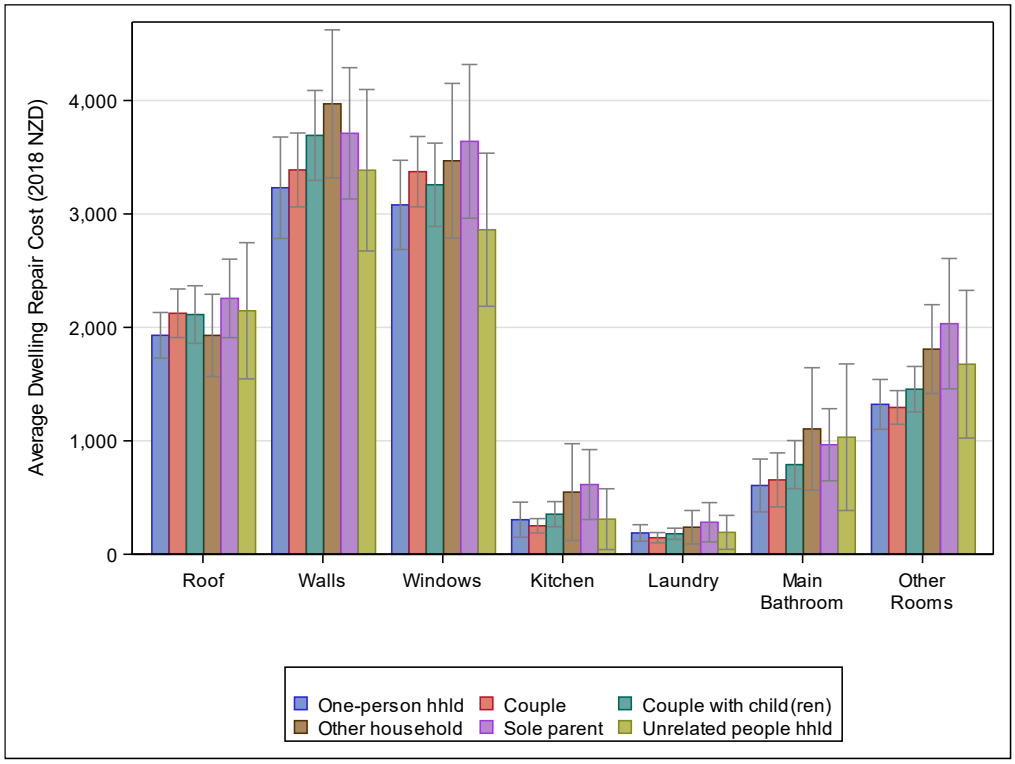
Figure 13. Average maintenance costs by household income



2.5.2 Household composition

The maintenance costs by household composition suggest little difference between different households. One-parent households somewhat stand out as having higher average costs for exterior components, but only marginally so. This same household type has higher average maintenance costs for the kitchen, laundry and others rooms.

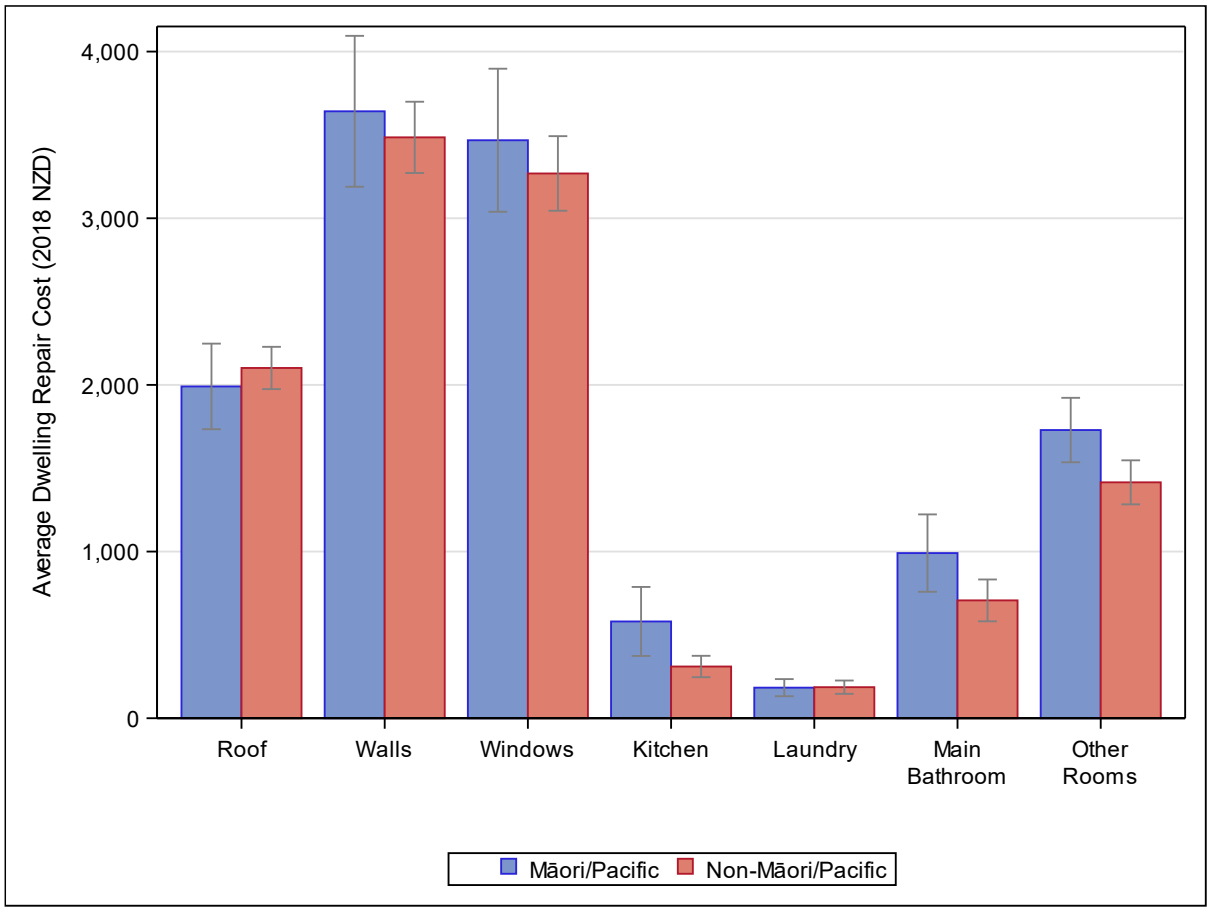
Figure 14. Average maintenance costs by household composition



2.5.3 Ethnicity

Figure 15 shows average cost of maintenance by ethnicity[12]. The results suggest Māori/Pacific peoples households have marginally higher maintenance costs on average for all components considered here (with the exception of the roof), most noticeably so for the kitchen, bathroom and other rooms. As noted in an earlier section, the maintenance costs apply to the dwelling, but may not be the responsibility of the occupant (i.e. in the case of rented dwellings). Other studies have found tenants will sometimes opt to undertake repair work themselves, for a variety of reasons, thereby picking up a financial liability that should not fall to them (Barrett et al., 2024).

Figure 15. Average maintenance costs by ethnicity



2.6 Section summary

This section of the report uses a national housing assessment survey to estimate the cost of 'undone' maintenance across the NZ housing stock. These costs are a low estimate for several reasons:

- They relate to a limited number of dwelling components rather than the whole dwelling
- The costs applied assume repair to the component, rather than full replacement

[12] Māori and Pacific peoples have been grouped due to small sample sizes. This analysis represents the ethnic group(s) of the person who completed the personal questionnaire (PQ) in the GSS on behalf of the household. This means the ethnicity applies to one person, not the whole household. For example, if the person completing the PQ identified as Māori or Pacific but other people in the household did not, this would be identified as a Māori/Pacific household in this analysis.

- Costs exclude wrap-around services (such as scaffolding)

Of the exterior components included in the analysis (roof, wall cladding and windows), the largest maintenance cost applies to walls, at $6.14 billion. In total, the estimated outstanding maintenance costs for these three components is some $15.5 billion. For houses that needed some maintenance on one or more of these three features, the average cost per dwelling is around $9,600. One in ten houses had an estimated outstanding maintenance cost for the roof, walls and windows of over $7,000.

For interior components (costs of which are based on a condition assessment of individual rooms), the total estimated maintenance cost is $5.13 billion. Bathrooms required the highest maintenance spend (on a per room basis), with an average cost of $1,800 per dwelling (excluding those where zero maintenance was required). One in ten houses had an estimated outstanding interior maintenance cost of over $7,000.

Combining the figures for the exterior and interior components and based on the condition assessment of these features in the PHS, suggests an outstanding maintenance cost of some $20.65 billion, or $12,600 per dwelling. There is a wide distribution, with over a quarter of dwellings (26%) needing over $15,000 spent on maintenance, and around 1 in 10 needing over $21,000 spent.

Looking at outstanding maintenance costs by subpopulation groups presents a complex picture, due to a multitude of, and often conflicting factors at play. For example, the condition of rented dwellings is generally poorer than owned, and therefore outstanding maintenance costs are higher; but rented dwellings also tend to have a smaller footprint, which reduces costs. Despite having a smaller footprint on average, the maintenance costs for interior spaces for lower income households are on a par with those of higher income groups, reflecting the much poorer state of repair for the former. When considering costs relative to income, the maintenance costs will be disproportionately higher for lower income households (i.e. reflect a higher proportion of their income), although some of these will be tenants, and the responsibility for maintenance is therefore on the landlord. Results also suggest one-parent households and Māori/Pacific peoples households are more likely to live in dwellings with greater outstanding maintenance.

3 Estimating Maintenance Expenditures

In addition to estimating the cost liabilities associated with undone repairs based on housing condition, we estimated the amount households spent on their dwellings on an annual basis. The main data source for these expenditures is the Household Economic Survey (HES), accessed through the Statistics NZ Integrated Data Infrastructure. The HES is designed to collect itemised household expenditures for calculating the expenditure weights of items in the Consumers Price Index (CPI).[13] Since 2006/07, the HES has been run annually; however, the expenditure component of the HES, which includes an expenditure diary and an expanded household expenditure questionnaire, is only run every three years.

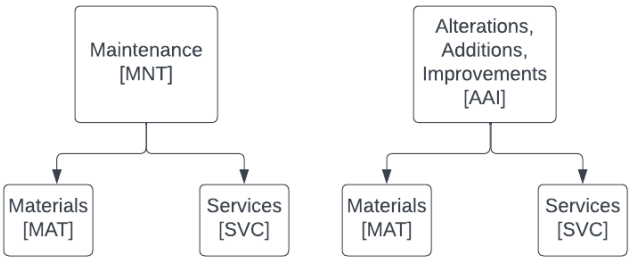
[13]Since its inception in 1973, the HES has undergone several redevelopments, most importantly in 2006/07 and 2018/19. In order to get better representation of households with low income or high material deprivation, the sample size for the core HES survey was boosted (to over 21,000, from 3,700 in 2016/17), but the sample size for the expenditure only changed slightly. The weighting scheme also changed. In HES Expenditure years, households now have two weights, one for the expenditure sample and the other for the income sample to reflect the different samples. The expenditure sample weight is used throughout this analysis.

This paper relies on the expenditure component of the HES and uses the five survey years (which generally run from July to June) available for this analysis: 2006/07, 2009/10, 2012/13, 2015/16 and 2018/19.[14] For the first four survey cycles, the sample size was 5,000 households, but in 2018/19, the sample size for the detailed expenditure component of the survey was increased to 5,500 households. Given that the response rate was less than 100% for each survey year, between 3,000 and 4,000 households are available for the analysis.

For those households selected for the expenditure component, all household members aged 15 years and older are asked to keep a diary record of all their expenditures for a specified period.[15] In addition to the diary and questions about general housing expenditures (e.g., rent, mortgage, rates), the expenditure component of HES asks respondents specifically about other types of expenditures relating to the property, and in particular about home maintenance or improvements, in the last 12 months.[16]

Property expenditures are primarily categorised as 1) maintenance (MNT) or as 2) alterations, additions, and improvements (AAI). Henceforth, we will also refer to the AAI category as improvements. Within those two expenditure categories, property expenditures can further be itemised as either materials (MAT) or services (SVC), as illustrated below.

Figure 16. Property expenditure categories in the Household Economic Survey



Statistics NZ releases information about household expenditure on property maintenance, which appears to only include property expenditures categorised as MNT. However, it is possible that some component of AAI expenditures is done in lieu of maintenance. For example, a household may not paint the exterior cladding if they are planning on replacing the cladding. For this reason, we analyse both MNT and AAI expenditures to determine 1) the extent to which households undertake these different types of projects and 2) differences in the expenditure patterns between the two categories.

Part of the examination of the differences between MNT and AAI involves looking at differences in spending on materials (MAT) versus spending on services (SVC). Generally speaking, spending on SVC

[14] There was a continuity break in the survey design that reduces the comparability of data in the years prior to 2006/07. Moreover, earlier years are not currently available for our use in this project. Nevertheless, the available years provide a sufficient sample for us to analyse.

[15] Respondents were asked to keep a 14-day diary of expenditures until the 2018/19 survey when the diary was changed to a 7-day diary to reduce respondent burden. More information can be found on the Statistics New Zealand website: https://www.stats.govt.nz/methods/changes-to-the-household-economic-survey-201819.

[16] Generally, the survey asks about expenditures for household maintenance, renovations, improvements or alterations for the household's main residence as well as other properties. Expenditures for other properties are denoted separately in the data. For the first three HES surveys, the questions generally limited expenditures to those of $200 or more. An example of the wording of one question in the 2009/10 survey is as follows: "in the last 12 months did you or anyone in this household buy, on the same day, one kind of home maintenance or improvement item for $200 or more? By one kind of item, I mean $200 or more for paint, or $200 or more for cement, or $200 or more for ceiling tiles etc." Expenditures less than $200 would be expected to be collected in the respondents' expenditure diary.

is likely to include the materials needed by the tradesperson to do the work. Hence, MAT expenditures are expected to be indicative of DIY work as opposed to hiring a tradesperson to do the work, though strictly speaking, this may not always be the case. For AAI then, we expect that a greater percentage of these expenditures will be SVC. For MNT, it seems likely that a larger proportion of households will have MAT expenditures as these could be smaller projects that do not necessarily require a tradesperson (e.g., buying materials to paint a small area in the dwelling).

For the analysis, we start with all households in the expenditure sample but focus primarily on the group that has positive expenditures in either the MNT or AAI category. This is our main sample. While most of this sample is comprised of those with only MNT or only AAI expenditures, a small percentage of households had spending on both MNT and AAI over the course of the year. Similarly, within those with MNT expenditures, some households only have MAT expenditures, some households only have SVC expenditures, but a small percentage report both MAT and SVC expenditures. The same is true for the group with AAI expenditures.

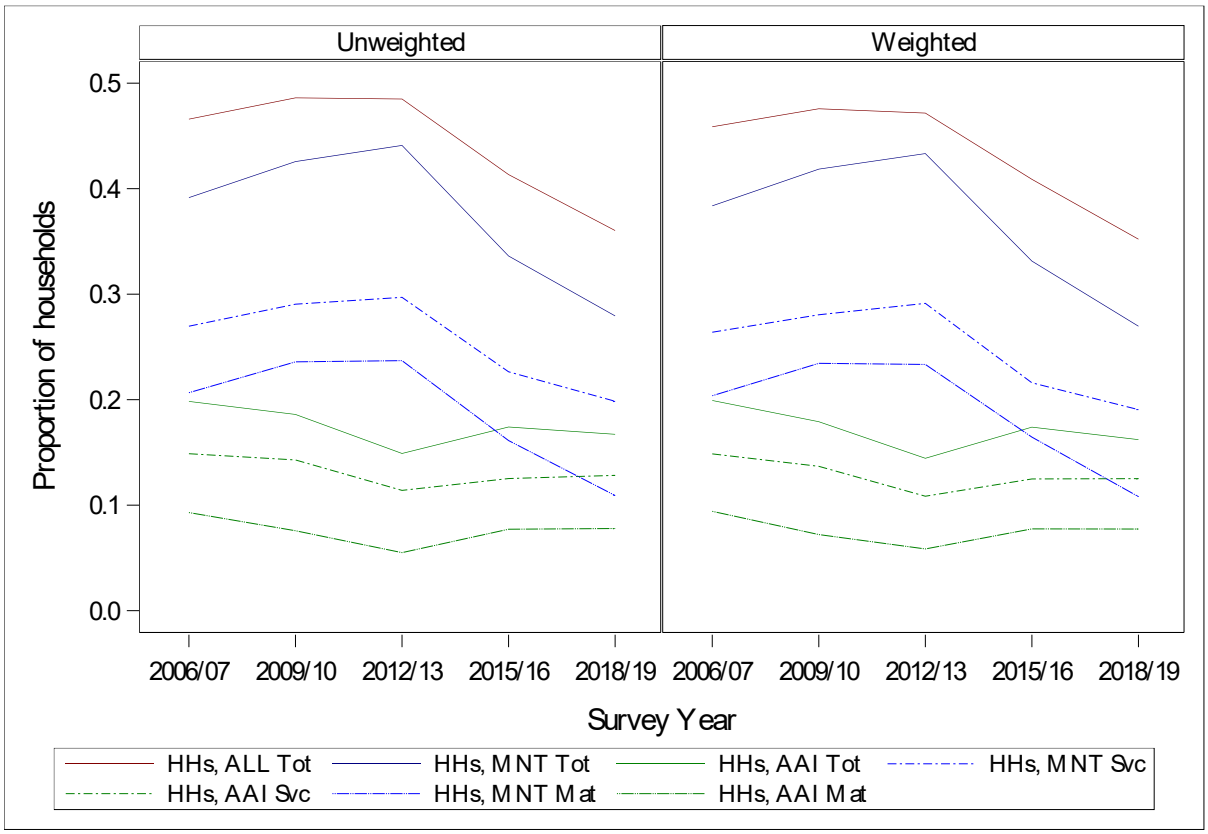
Most of the analysis presented here includes all households – both those who own their homes and those who rent – even though renters are likely to spend far less in these areas than owner-occupiers. We include renters in the analysis to better understand their expenditures in these areas. Moreover, while the HES collects information about other properties owned by a household, the number of households with these types of property expenditures for these other properties is small, and there were insufficient transactions categorised as either MNT or AAI available for analysis. Even if there were sufficient transactions, it would be difficult to determine if the other properties were used as rental properties. Hence, only expenditures from the household's main property are included, and expenditures for rental properties will be underestimated as only renters' expenditures are captured for rented dwellings.

3.1 Expenditures over time

Over the HES years analysed, between 35% and 50% of households reported either MNT or AAI (or both) expenditures regardless of whether the survey weights are applied, as shown by the red line (ALL Tot) in Figure 17. This proportion is relatively stable between 2006/07 and 2012/13 (between 45 and 50%) but declines substantially between 2012/13 and 2018/19 (to around 35%). Breaking households into those with MNT expenditures (solid blue line) or AAI expenditures (solid green line) indicates that the proportion of those with AAI expenditures is fairly stable over the time period (ranging between 15 and 20%). Most of the decline in the proportion of households with these expenditures is being driven by the decline in households reporting MNT expenditures between 2012/13 and 2018/19.

Given that Figure 17 includes owner-occupiers and renters, the decline in the proportion of households with these expenditures could be due to a decline in home ownership or due to the aging of owner-occupiers. We examine the role of tenure further in Section 3.3.

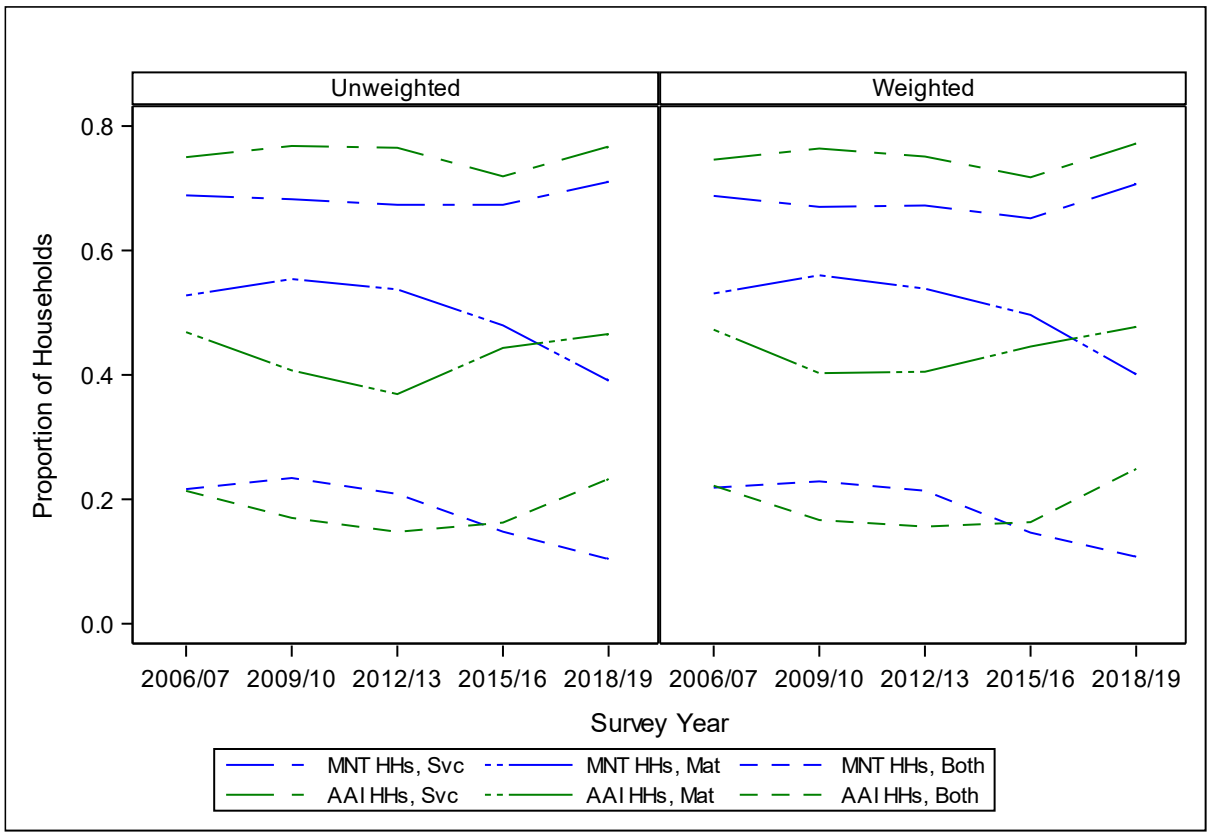
Figure 17. Proportion of Households with Property Expenditures, by Expenditure Type



In Figure 18, we further breakdown households within the maintenance (MNT) and improvement (AAI) expenditure categories to those with services (SVC) expenditures, materials (MAT) expenditures, or both services and materials (BOTH) expenditures. These results indicate that a greater proportion of households, within each expenditure category, purchased services, as shown in Figure 18, regardless of whether these are expenditures are for maintenance or for improvements.

Figure 18 also shows that the proportion of households spending on services stays fairly consistent over the time period for both expenditure categories – maintenance and improvements – as shown in Figure 18. Approximately 75% of households with AAI expenditures and 70% of households with MNT expenditures had service expenditures. The percentage of households with materials expenditures is more variable over the time period, ranging between 40 and 60% of households for either expenditure category. However, the proportion of households with expenditures on maintenance materials (MNT MAT) appears to be declining – from approximately 53% in 2006/07 to 40% in 2018/19 – while the proportion of households with expenditures on materials for improvements (AAI MAT) has almost the opposite pattern. The proportion of households with AAI MAT expenditures is around 47% in both 2006/07 and 2018/19, but the proportion dips down to around 40% in 2009/10 and 2012/13. The proportion of households with expenditures for both services and materials has a similar pattern to those with materials only; however, this proportion is less than half of those with materials.

Figure 18. Proportion of Households with Property Expenditures, by Detailed Expenditure Type



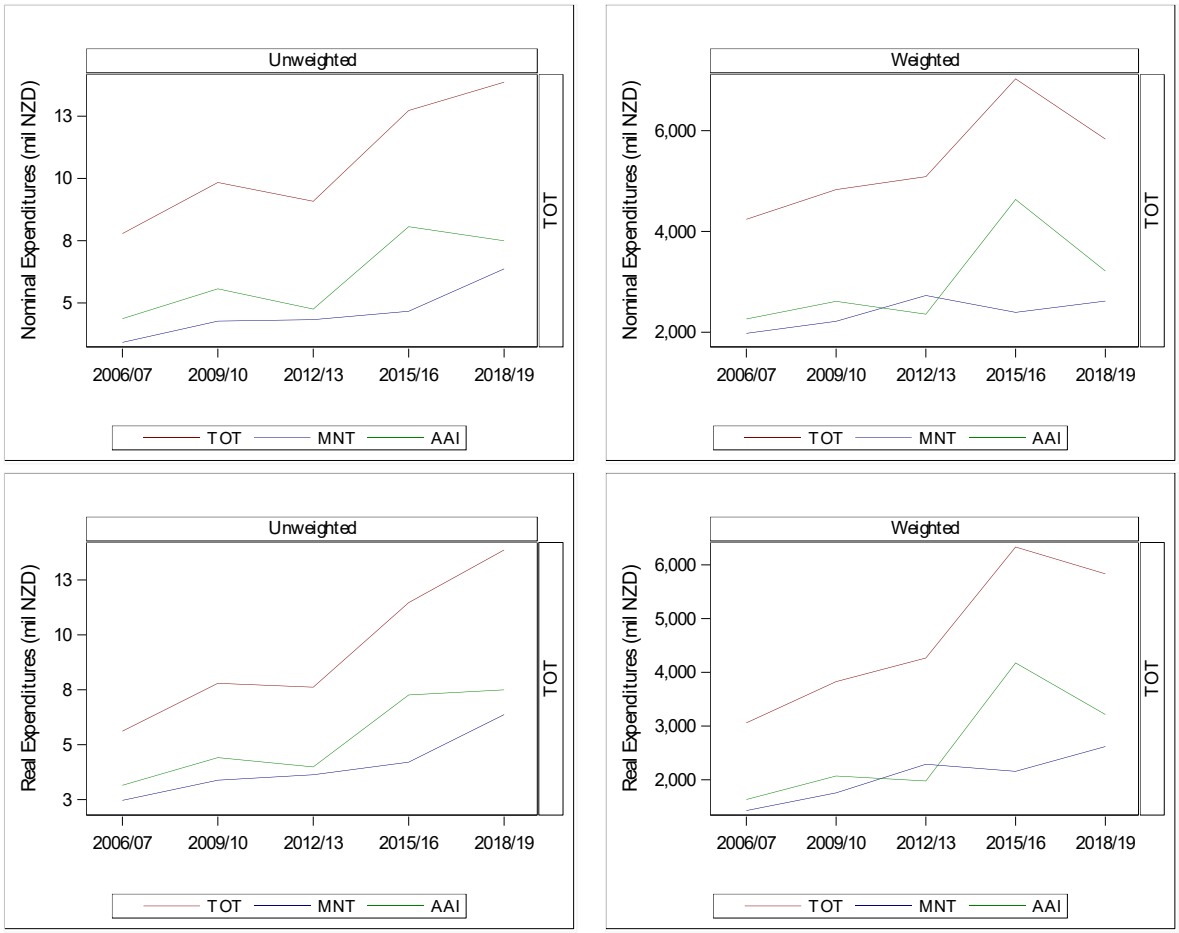
Despite the decline in the proportion of households spending on maintenance and improvements, the total amount being spent – even in real terms – increased over this time period as shown in Figure 19. Total household spending increased from approximately $3 billion (2018 NZD) in 2006/07 to almost $6 billion (shown in the right bottom panel of Figure 19) in 2018/19. Still, this is down from the peak in 2015/16 ($7 billion in nominal terms or $6.3 billion in real terms). This peak appears to be primarily driven by expenditures on improvements (AAI).[17] In fact, maintenance expenditures (MNT) actually drop slightly in 2015/16 (in both nominal and real terms).

In most HES years, total spending on maintenance is comparable to total spending on improvements (the exception is in 2015/16 when AAI spikes up), though spending on improvements generally exceeds spending on maintenance (the exception is 2012/13 when AAI expenditures are slightly lower than MNT expenditures).[18]

[17] Unweighted, expenditures grow almost linearly from 2006/07 to 2018/19 except for a dip in 2012/13, which occurs both in nominal and real terms. However, the weighted sums are expected to be representative of the total population.

[18] Looking at nominal expenditures using the unweighted sample shown in the left panel of Figure 19, total expenditures on AAI exceeds the total amount spent on MNT. However, the weighted sample indicates that total MNT expenditures for the population slightly exceeds AAI in 2012/13 but not in any other year. In 2015/16, however, AAI is almost twice the amount of MNT but then the two values are once again fairly close in 2018/19.

Figure 19. Total Property Expenditures by Expenditure Type in Nominal and Real Terms

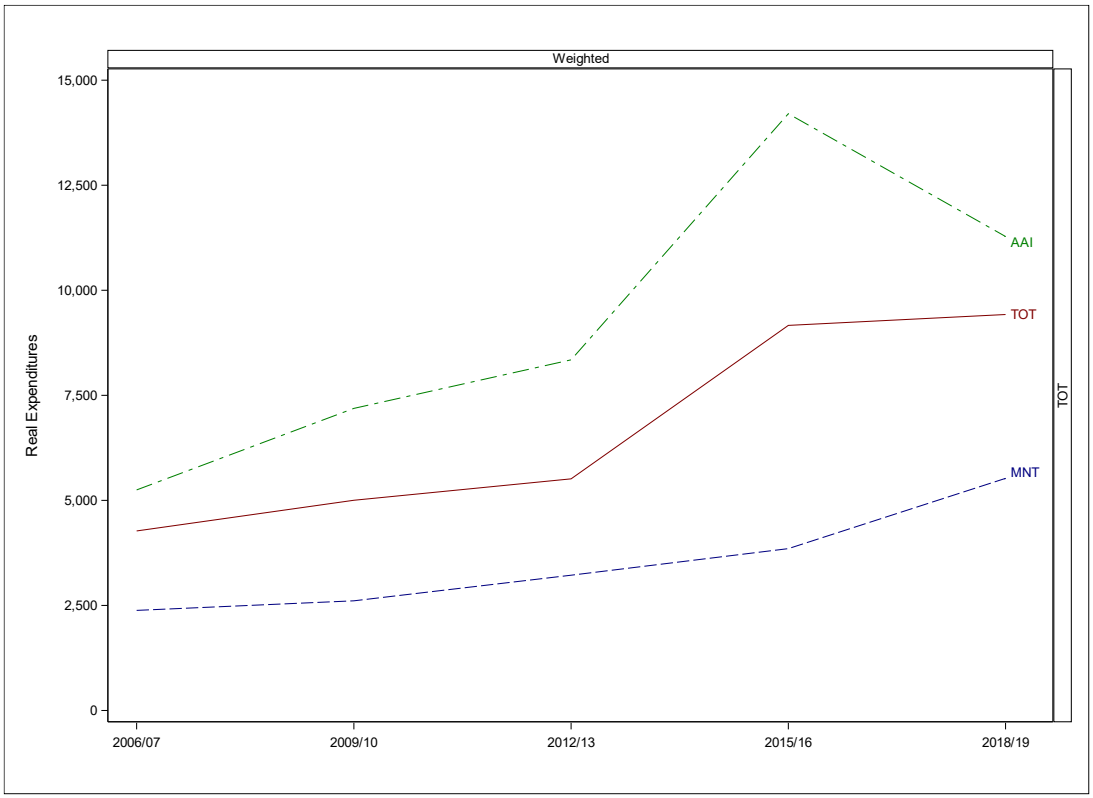


Notes: The top two figures show expenditures in nominal terms (in millions of NZD), whereas the bottom two are in real terms (in millions of 2018 NZD). The left two figures show total expenditures from the HES sample itself (unweighted), and the right two figures show the weighted totals for the NZ population overall.

As shown previously, the proportion of households spending on improvements is less than the proportion spending on maintenance. Yet, total expenditure for improvements is on par with total expenditure for maintenance. Hence, average annual household expenditure for improvements (for those households with AAI) should be greater than the average annual household expenditure for maintenance (conditional on having MNT) as shown in Figure 20. This also explains average annual household expenditure in total (AAI and MNT combined) being lower than the AAI average.

In real terms, average annual household expenditure has increased over time in both expenditure categories. For maintenance, average household expenditure (for those with MNT expenditure) increased from $2,400 in 2006/07 to $5,500 in 2018/19 as shown by the blue line in Figure 20. Similarly, average annual expenditure for improvements increased in real terms from $5,300 in 2006/07 to $11,300 in 2018/19, with a peak of $14,200 in 2015/16. In total, the average household spent $9,400 in 2018/19 on maintenance and improvements (conditional on having either AAI or MNT expenditures), which is up from $4,300 in 2006/07 (in 2018 NZD), as shown by the red line in Figure 20.

Figure 20. Average Annual Household Expenditure in Real Terms (2018 NZD), Weighted

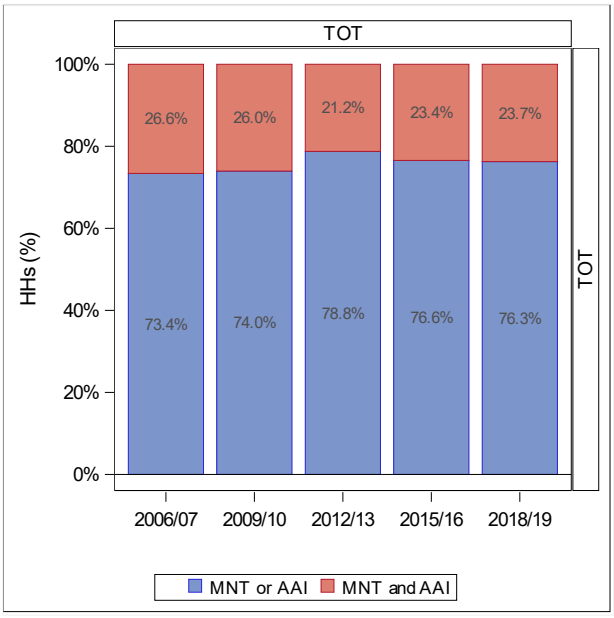


Notes: These averages are for households with MNT or AAI expenditures.

3.2 Spending on Maintenance and Improvements

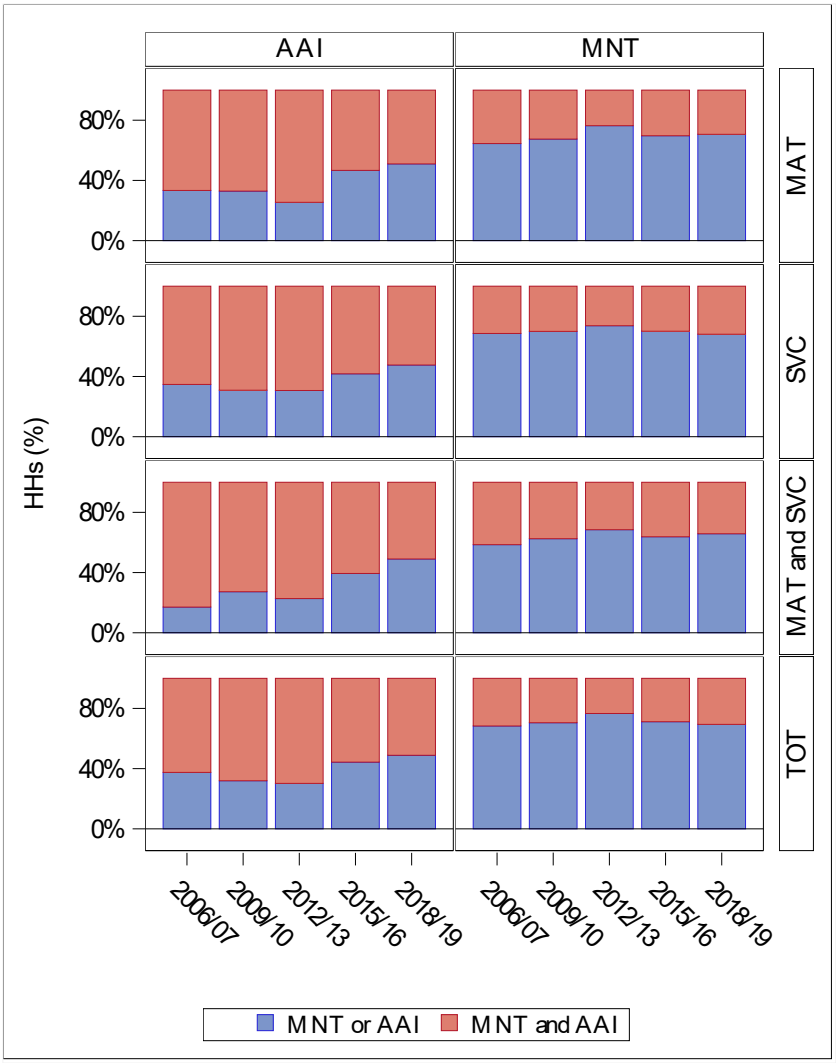
The previous section pertains to the separation of spending into either MNT or AAI. However, as shown in Figure 21, approximately 25% of households with either type of expenditure spent money on both maintenance and improvements (MNT and AAI). Hence, we further examine household spending patterns to see if spending is similar for households with both types compared to those with expenditures in only one category.

Figure 21. Percentage of Households with One or Both Types of Expenditure



As shown in Figure 22, households with improvement expenditures are much more likely to have both types of expenditures (AAI and MNT) compared to households with MNT expenditures. This is true regardless of the type of expenditure within the category (MAT, SVC, MAT and SVC, or total). Put another way, households spending on improvements were likely to also spend on maintenance, but the reverse was less often the case.

Figure 22. Households with One or Both Types of Property Expenditure

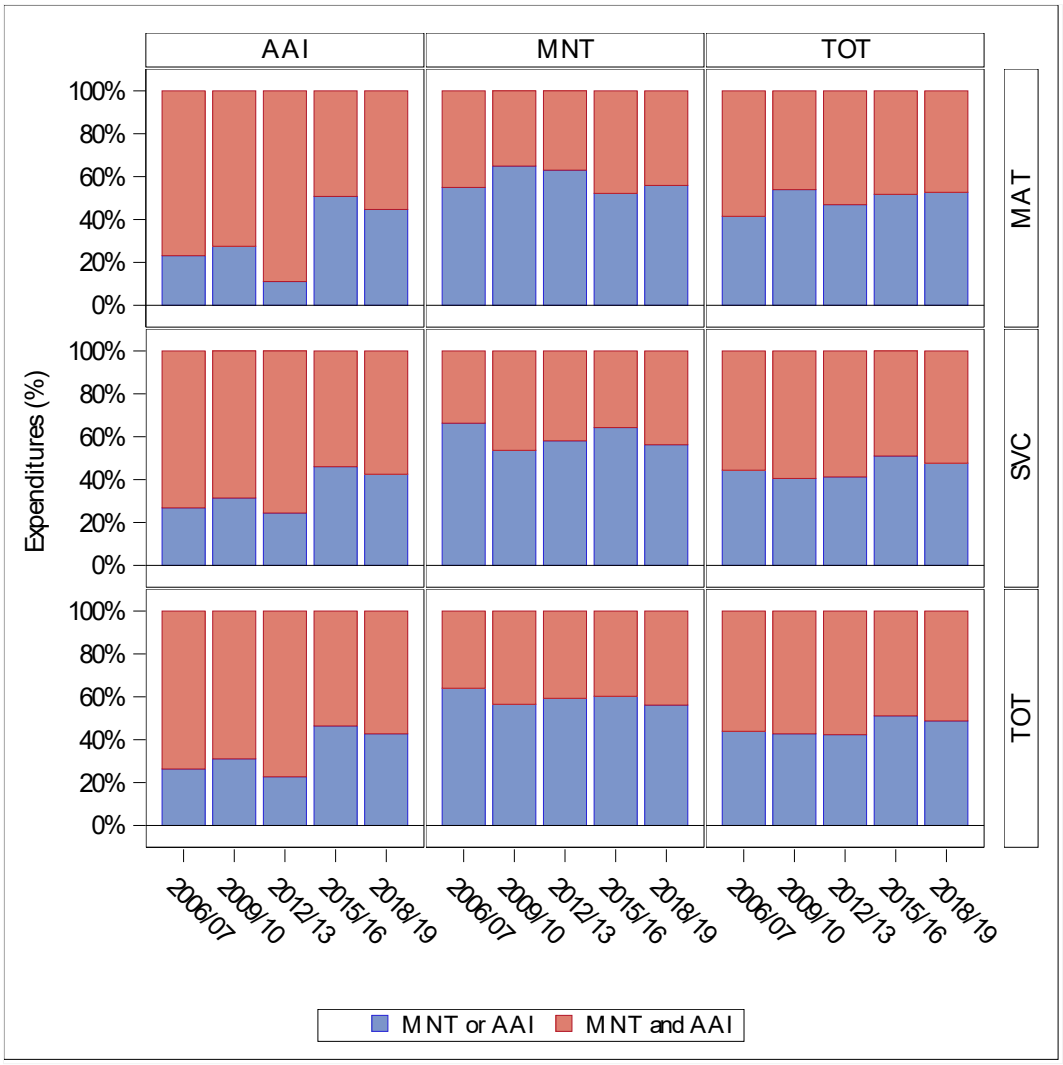


In terms of the percentage of expenditures (shown in Figure 23), the majority of improvement expenditures (AAI) is from households with both types of expenditures (MNT and AAI), particularly from 2006/07 to 2012/13 where this percentage ranges from 60 to 70%. In both 2015/16 and 2018/19, however, only about 50% of expenditure on improvements is spent by households who had both types of expenditures (AAI and MNT).

For maintenance expenditures, the converse is true. The vast majority spending (about 70% of MNT expenditures) is by households who only spent on maintenance. These percentages are fairly similar regardless of what was purchased (SVC or MAT).

In total, about 60% of expenditures are spent by households with both MNT and AAI expenditures. So, despite being only about 25% of the population, households with both types of expenditures had the majority of total expenditure (60%) on MNT and AAI (shown in bottom left panel of Figure 23).

Figure 23. Percentage of Household Expenditure by Households with One or Both Types of Expenditure



3.3 The Role of Housing Tenure

The vast majority of households who spend on property maintenance or improvements are expected to be owner-occupier households. However, a substantial portion – between 7% and 12% – of households reporting these types of expenditures are renters, as shown in Figure 24.[19]

Figure 25 breaks these percentages down further by type of expenditure: any property expenditure (MNT or AAI), MNT, or AAI. The percentage of renters with maintenance expenditures is very similar to the overall percentage – ranging from 8 to 13% depending on the survey year. On the other hand, the percentage of renters amongst households with expenditures for improvements is much lower – between 2 and 7% of AAI-expenditure households are renters, depending on the survey year. Hence, renters are less likely to invest in improvements – often thought of as capital expenditure – which is understandable. This is particularly true given the Residential Tenancies Act 1986 specifies that it is

[19] Note that weighting does not substantially change these percentages.

landlords' responsibility to ensure the property is in reasonable condition and to ensure that any necessary maintenance or repairs are undertaken. However, a recent study of senior tenants and their experience of homemaking showed it was not uncommon for them to do repairs and maintenance themselves (James et al., 2024).

Figure 24. Households with Property Expenditures by Housing Tenure

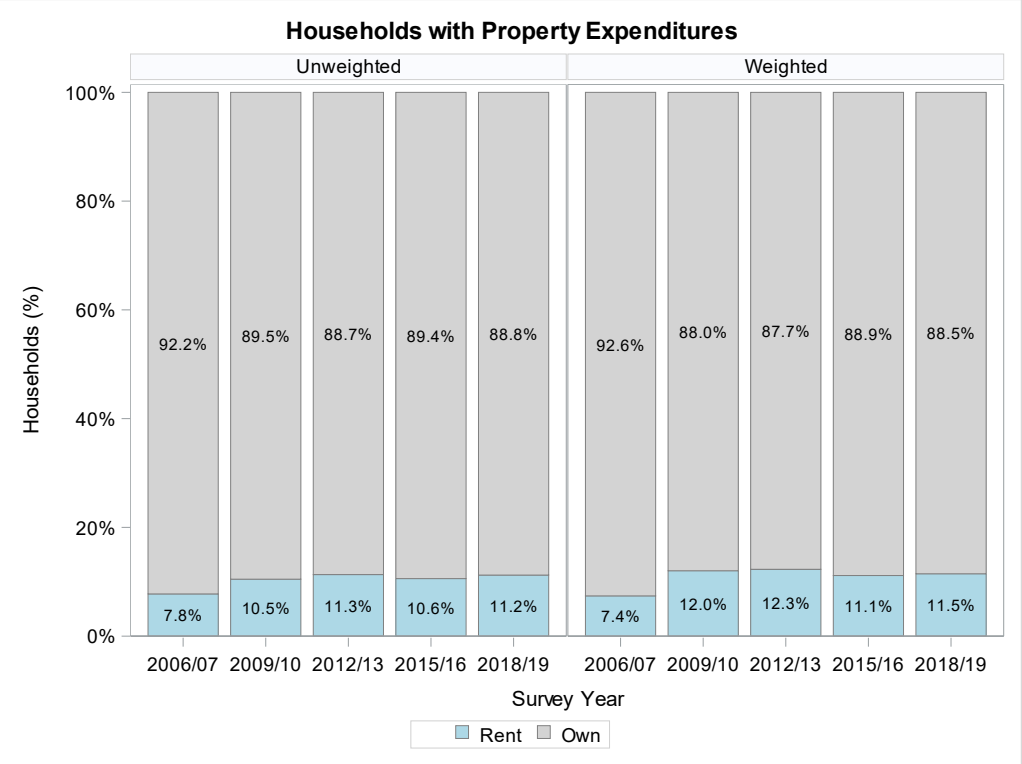
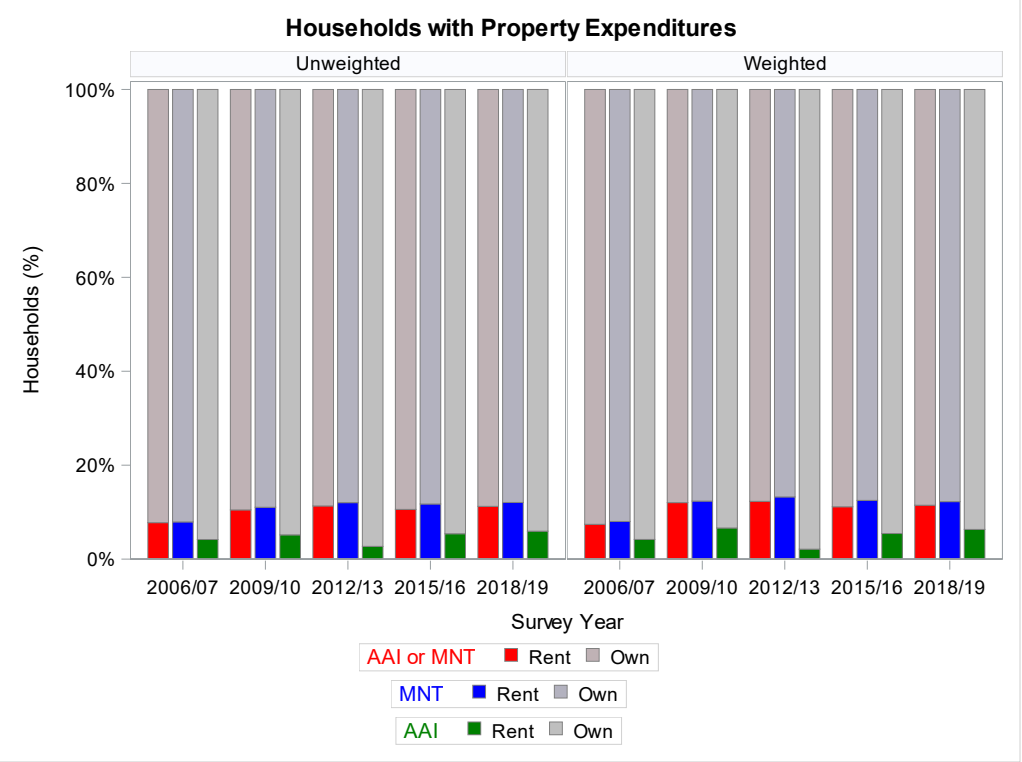


Figure 25. Housing Tenure of Households with Property Expenditures, by Expenditure Type



Turning the analysis on its ear, we next examine the percentage of households with either improvement or maintenance expenditures within each housing tenure category (shown in Figure 26). The left panels of Figure 26 show that between 10 and 20% of all renters reported expenditures on either improvements or maintenance (shown by the solid red line); hence, 80 to 90% of renters do not report either of these expenditure types. Figure 26 also shows that the percentage of renters with either type of expenditure is largely driven by households with maintenance expenditure (solid blue line). A very small percentage of renters (ranging from 1% to 4% of renters) report expenditures on improvements.[20]

In contrast, the percentage of owner-occupiers with any type of property expenditure, shown by the solid red line in the middle panels of Figure 26, ranges from approximately 50 to 60% with the lowest percentage around 50% in 2018/19, which means that approximately half of owner-occupiers in 2018/19 did **not** report either type of expenditure. As with renters, this percentage of owner-occupiers with either type of expenditure appears to be driven largely by those with maintenance expenditures. The percentage of owner-occupiers with expenditures for improvements remains relatively flat across the time period, with a similar pattern for both renters and owner-occupiers.

For both renters and owner-occupiers, weighting does not change the overall pattern of results.

Figure 26. Percentage of Households with Property Expenditures, by Housing Tenure

[20] Due to the small number of renting households with AAI expenditures, only results related to total AAI expenditures have been released.

Next, we examine expenditure shares by housing tenure. Figure 27 shows that 3 to 7% of total expenditures on maintenance and improvements are spent by renting households. Given that 7-12% of households reporting these types of expenditures are renters, the average rental household is spending less (though not that much less) than the average owner-occupier household, which is not a surprise.

Figure 27. MNT and AAI Property Expenditures by Housing Tenure

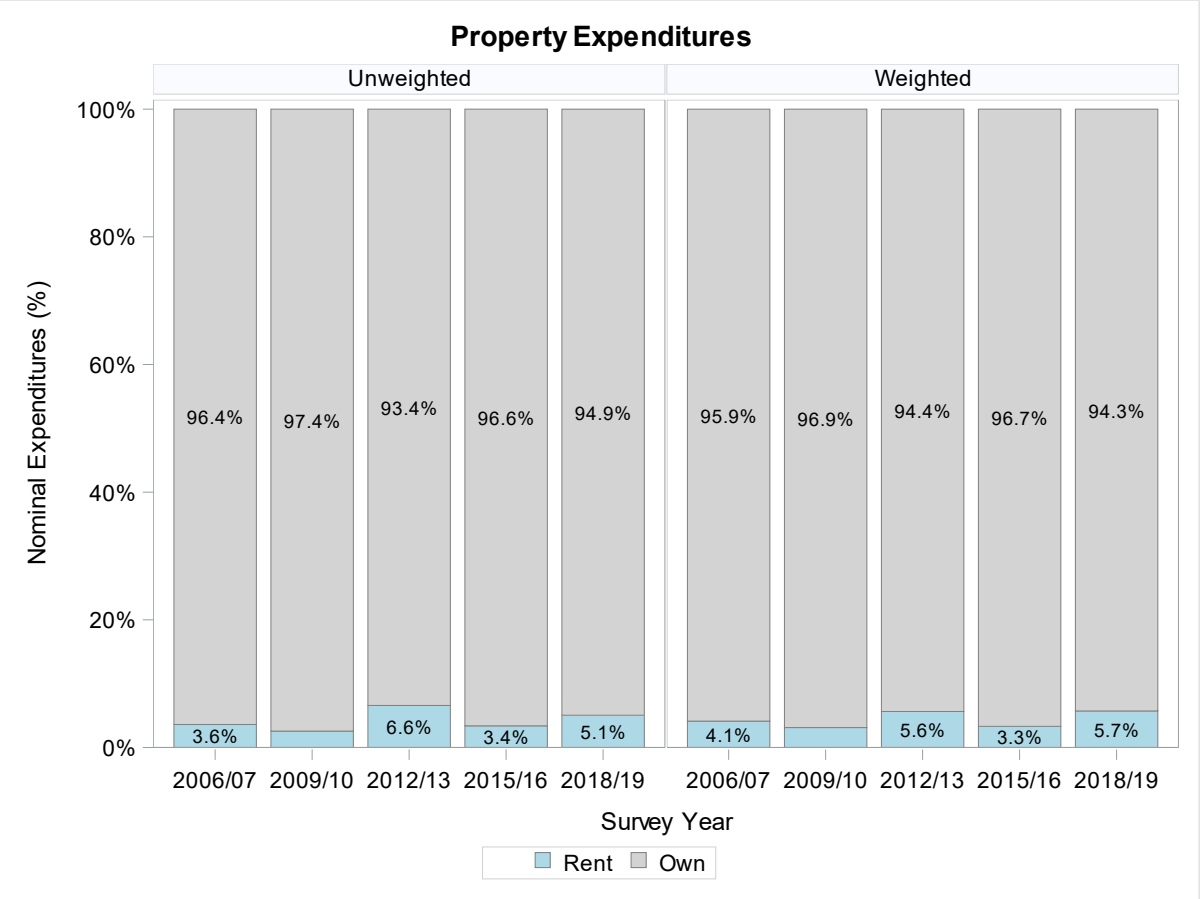


Figure 28 breaks these percentages down further by type of expenditure. For maintenance expenditures, spending by renters is between 4 and 9% of the MNT total, whereas renters' expenditures on improvement range from 1% to 3% of total AAI.[21]

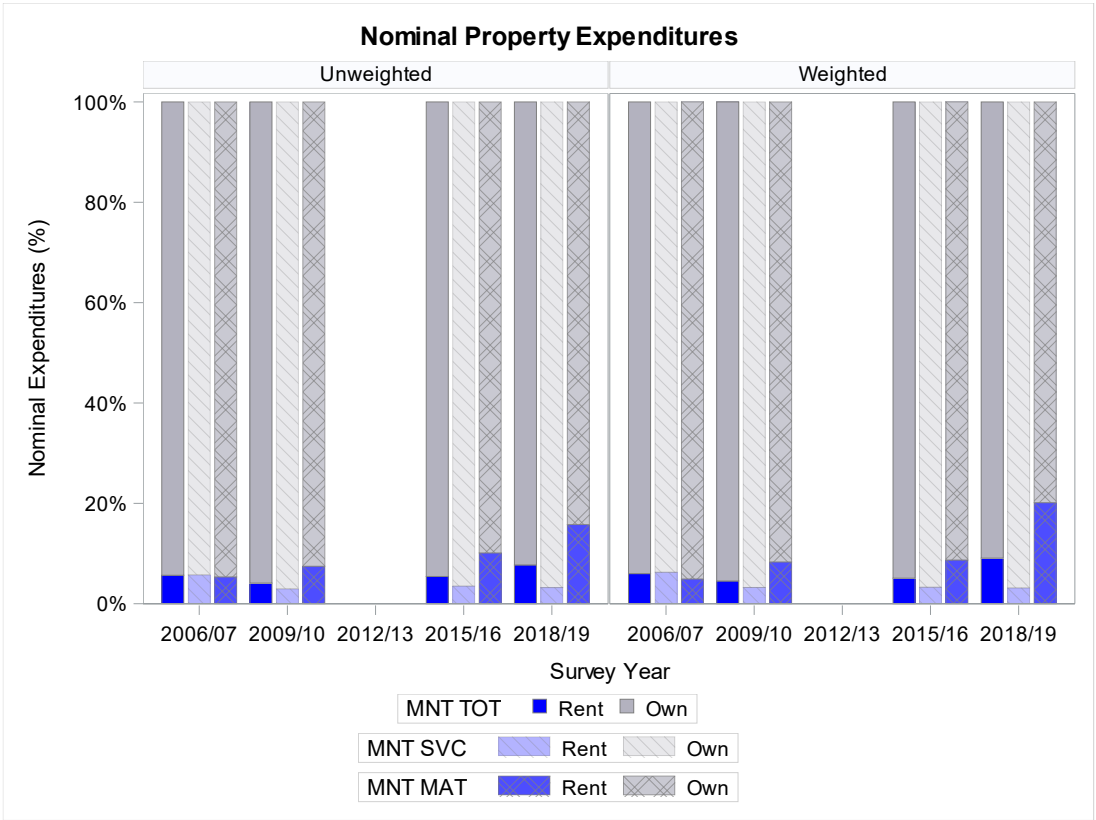
We further break down maintenance expenditures into services (SVC) and materials (MAT). The share of expenditures for maintenance services (MNT SVC) spent by renters appears to be fairly constant from 2009/10 to 2018/19 (around 3%).[22] However, their share of spending on materials increased more dramatically, from approximately 5% in 2006/07 to 20% in 2018/19. Hence, renters appear to make up a growing share of maintenance materials expenditures.

[21] Given the small number of renters with AAI expenditures in 2012/13, we have suppressed the AAI expenditure amount and the MNT expenditure amount in order to release the total AAI/MNT expenditure by renters.

[22] However, this is a decline from approximately 6% in 2006/07.

Figure 28. MNT and AAI Property Expenditures by Housing Tenure

Figure 29. MNT Property Expenditures by Housing Tenure and Expenditure Type



In aggregate, renters' total annual expenditures on maintenance and improvements are very small relative to owner-occupiers (as shown in Figure 30 and Figure 31) - in nominal terms, renters' aggregate expenditures ranged from $150 million to just over $330 million, with maintenance expenditures comprising the lion's share of these expenditures for renters. On average, renters with property expenditures spend less than owner-occupiers. Over the time period analysed, renters with these expenditures average between $2,500 to $5,000 for, and owner-occupiers average between $5,000 and $10,000 (in real terms) as shown in Figure 32. Median expenditure for renters (shown in Figure 33) is also lower than the median expenditure for owner-occupiers. Renters spending less on their dwelling than owner-occupiers is not surprising, but it is surprising that their spending is in the same neighbourhood to that of owner-occupiers, especially if this is in addition to their rent.

For owner-occupiers, total annual aggregate spending on maintenance and improvements (weighted) ranged from $4 to $7 billion in nominal terms as shown by the red line in the middle, bottom panel of Figure 30, with expenditures peaking in 2015/16. However, total annual aggregate spending by owner-occupiers in 2018/19 is more in line with the historical trend line (around $5.5 billion). In real terms, the pattern is similar to that of nominal expenditure, with total aggregate spending by owner-occupiers ranging from $3 billion to its 2015/16 peak of just over $6 billion (in 2018 NZD) as shown in the middle, bottom panel of Figure 31. Owner-occupiers' total annual aggregate expenditures on improvements exceeded their aggregate expenditures on maintenance in every year[23] – with aggregate annual maintenance expenditures ranging from $1.9 billion to $2.4 billion in nominal terms and aggregate annual expenditures on improvements ranging from $2.2 to $4.6 billion over the time period. As with total aggregate expenditures (AAI and MNT), expenditures for improvements (AAI) peak in 2015/16 (in both nominal and real terms).

[23] It should be noted that the amount of AAI expenditure and of MNT expenditure is not reported by housing tenure in 2012/13 to protect confidentiality – in the figures, this is denoted by a dotted line. However, AAI expenditures by both owner-occupiers and renters in 2012/13 does dip below their combined MNT expenditures. Hence, it is plausible that AAI expenditures by owner-occupiers was less than their MNT expenditures in 2012/13.

Figure 30. Total Aggregate Annual Expenditures (Nominal) by Housing Tenure

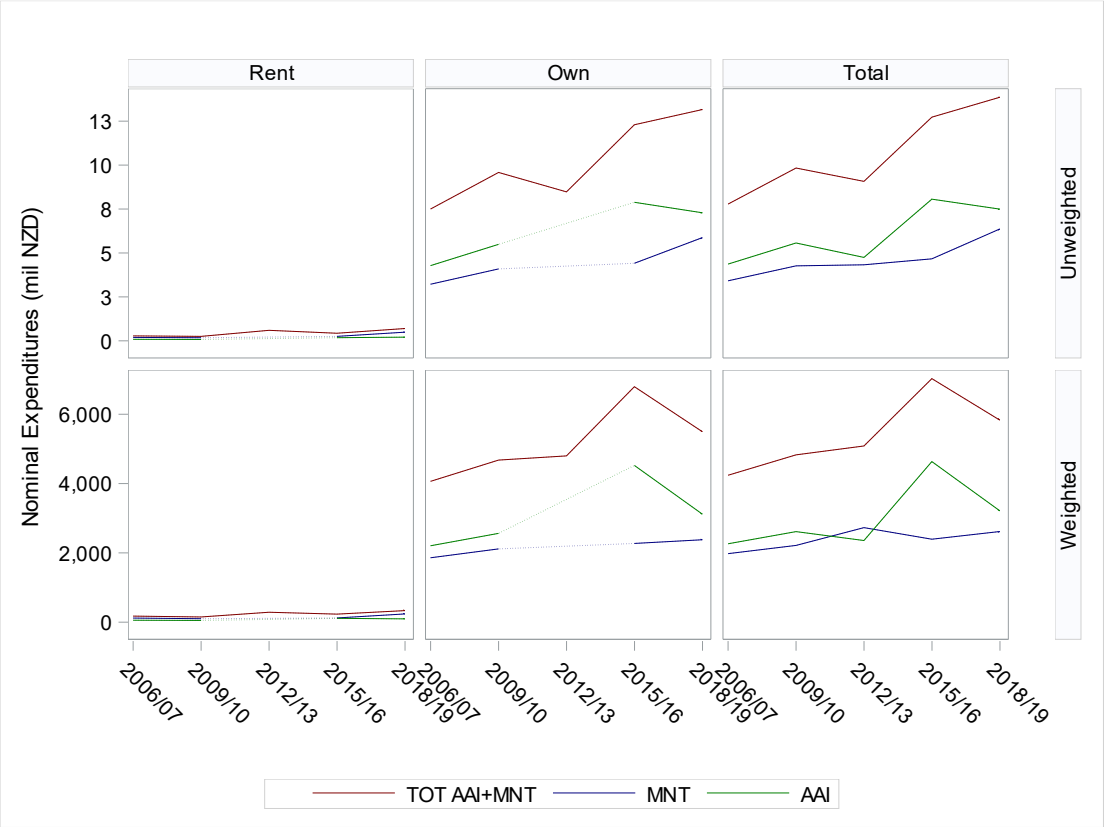
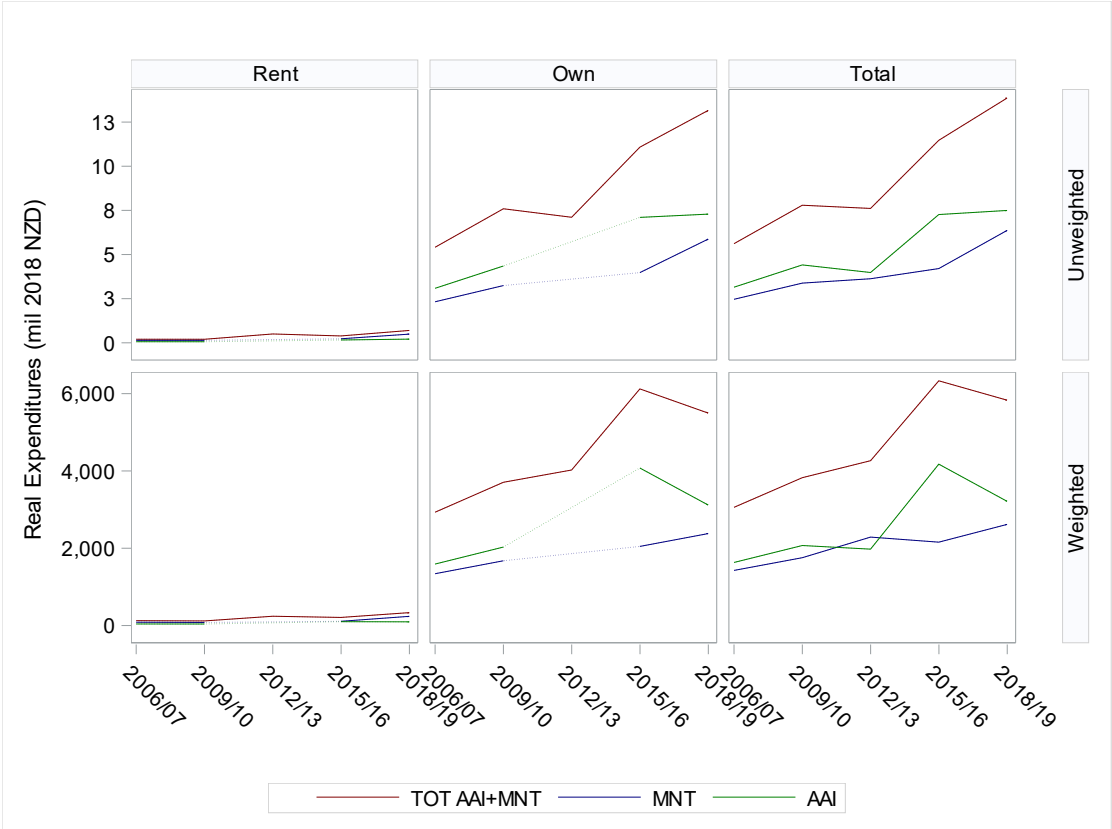


Figure 31. Total Aggregate Annual Expenditures (Real) by Housing Tenure



Notes: The dotted lines in the figures represent missing data for 2012/13. This is due to the small number of renters with AAI expenditures in this year.

Figure 32. Average Household Property Expenditures by Housing Tenure

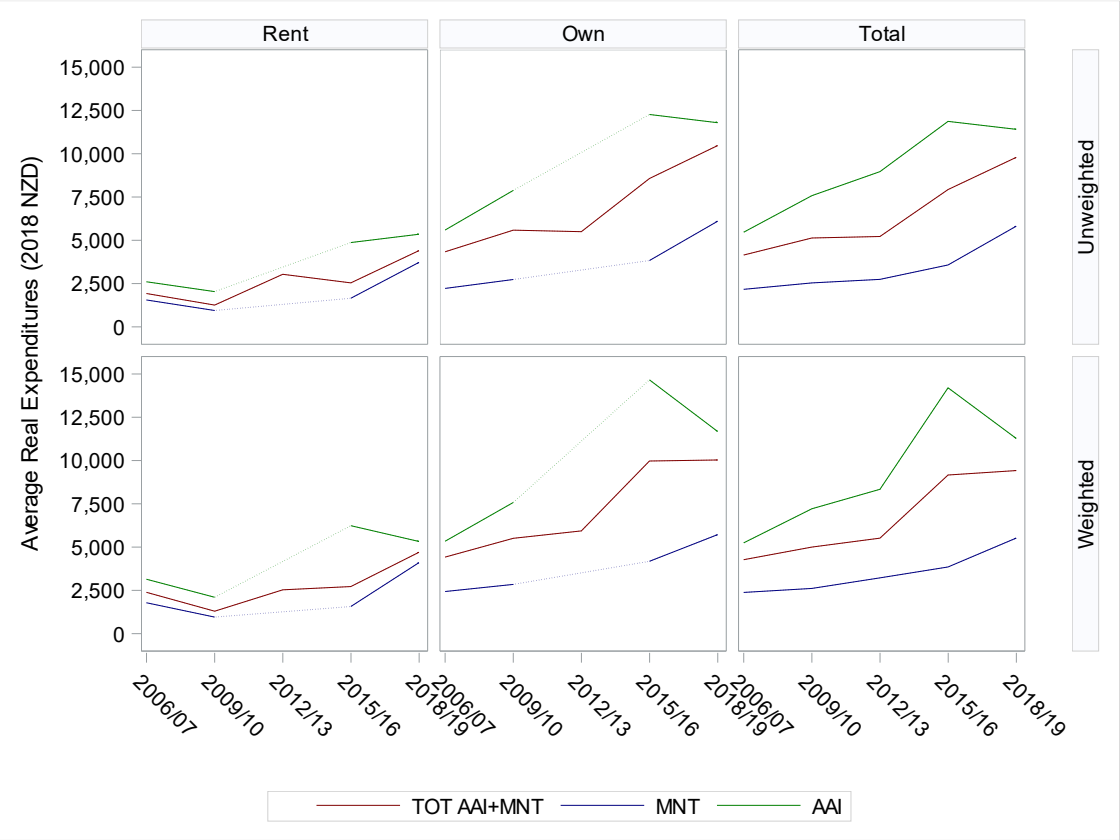
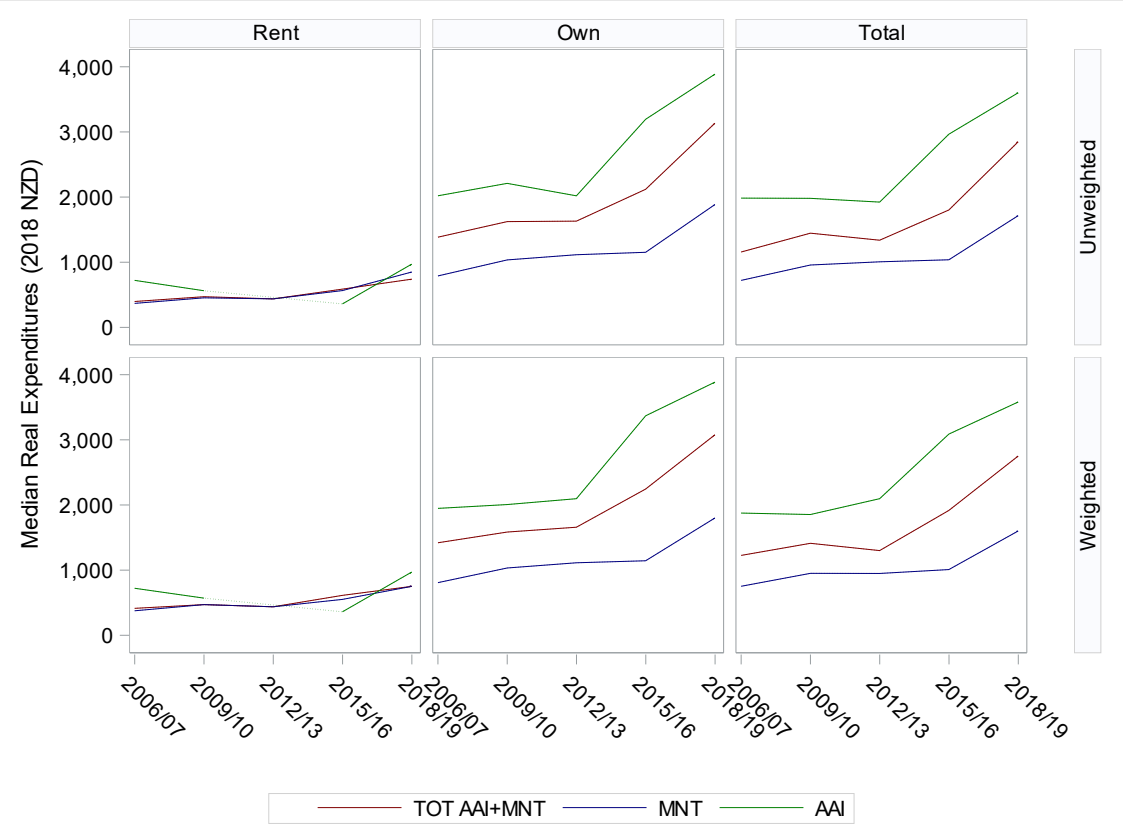


Figure 33. Median Property Expenditures by Housing Tenure, Weighted



It should be noted that aggregate expenditures on improvements by owner-occupiers generally exceeded their expenditures on maintenance in the same year even though fewer households reported AAI expenditures. Hence, it is not surprising that the average owner-occupier household expenditure for improvements (for those having AAI expenditure) exceeded the average owner-occupier household expenditure for maintenance as shown in Figure 32.[24] In real terms, the average household with expenditures on improvements spent between $5,300 and $14,700 on these improvements depending on the survey year (green line), with the peak in 2015/16. The average owner-occupier household with maintenance expenditures spent between $2,400 and $5,800 (in 2018 NZD) on maintenance depending on the survey year, with the average growing steadily over the time period. In total, the average owner-occupier household with either type of expenditure reported spending between $4,400 and $10,000 (in 2018 NZD) annually.

Given the skewed nature of the expenditure distribution, results for the median owner-occupier household are also presented. As expected, median household expenditure is below average household expenditure. The median owner-occupier household with positive expenditure on improvements spent between $2,000 and $4,000 (in 2018 NZD), depending on the survey year, shown by the green line in Figure 33. The median owner-occupier household with positive expenditures on maintenance spent between $800 and $1,800 (in 2018 NZD), shown by the blue line in Figure 33. In total, the median owner-occupier household with either type of expenditure spent between $1,400 and $3,100 (in 2018 NZD). The weighted median expenditure by owner-occupiers increased in real terms from survey year to survey year for each of the three types of expenditure.

3.4 Property Values and Recommended Annual Maintenance

The HES also asks owner-occupiers about the value of their property. The same information, however, is not available for renting households. Hence, for this section, we only include owner-occupiers.

We examine property expenditures using average property values (in real terms), which are shown in Figure 34 for households with either type of expenditure (EXP HH) compared to those without (NO EXP HH).[25] As Figure 34 shows, households without these expenditures consistently have lower average property values, and over this time period, the gap between the two groups is growing. In 2005/06, the difference in the average property value for these two groups is approximately $3,700 (1.6% of the NO EXP HH average property value), and in 2018/19, the difference is about $110,000 (about 11% of the NO EXP HH average property value). As a percentage of the average property value for those with neither expenditure type, the largest difference is in 2009/10 (25%).

Given the recommendation that households spend 0.5-2% of their property value on maintenance annually (Page, 2017), we also use these average property values to assess the recommended amount of annual maintenance expenditure (using the 0.5 to 2% of the property's value 'rule'). Based on the recommended amount, those with either improvement of maintenance expenditures (EXP HH) would be expected to spend between $2,800 and $34,000 in 2018/19. If we assume that only MNT expenditures count as home maintenance, then the average household with MNT expenditures spent about $6,100 in 2018/19 which is at the lower end of the expected annual maintenance amount for these households. If we assume that AAI expenditures are also part of

[24] While both the unweighted and weighted results are provided in the figures, the discussion refers to the weighted results.

[25] Figure 34 also highlights the growth in housing prices over this time period.

maintaining the home, then the average household with AAI/MNT expenditures spent approximately $10,500 in 2018/19.

Because the distributions of these expenditures are skewed, we also estimate median expenditure (shown in Figure 33) by these households. The median maintenance (MNT) expenditure (weighted) for owner-occupiers in 2018/19 is about $1,600 which is below the bottom of the recommended spending range. This indicates that, even among those owner-occupiers with some maintenance expenditure, at least half are likely to be underinvesting in home maintenance. Including expenditures for both maintenance and improvements increases the median household expenditure, to about $2,800 in 2018/19; however, while this is in the recommended range, it is at the very bottom and indicates that a large proportion of owner-occupiers are likely underspending on annual maintenance.

We do the same analysis but aggregated to the national level. Figure 35 shows the total aggregate property value for households with either type of expenditure (EXP HH) compared to those with neither type of expenditure (NO EXP HH). Overall, the total aggregate property value in each survey year is greater for those with some expenditure (EXP HH) compared to those with neither type (NO EXP HH). The total property value for those with maintenance or improvement expenditures (EXP HH) ranges from $154 billion in 2006/07 (in real terms) to $611 billion in 2018/19. Given the recommended household spend (0.5-2% of the property value) for maintenance annually (noted above), this group would be expected to spend in aggregate between $385 million and $4.6 billion in 2006/07. In 2018/19, this range increases to $1.5 - $18.3 billion.

For those with neither expenditure type (NO EXP HH), the total aggregate property value is lower than that for those with some maintenance or improvement expenditure (EXP HH) – ranging from $97 billion in 2006/07 (in real terms) to $574 billion in 2018/19. Hence, these households would have been expected to spend between $242 million to $2.9 billion in 2006/07 or between $1.4 to $17 billion in 2018/19.

The total recommended spend on annual maintenance in 2018/19 for all owner-occupiers ranges between $2.9 and $35.3 billion given property values in that year. Yet, by our estimates, total aggregate spending on maintenance by owner-occupiers in 2018/19 was approximately $2 billion, which is below the bottom end of the recommended range. Including expenditures for both maintenance and improvements increases this total amount to $5.5 billion in 2018/19, which is within the recommended range but at the lower end.

From these results, it appears that the majority of owner-occupiers who are spending on maintenance and improvements for their homes are either below or on the lower end of the recommended spending range. Moreover, there is also a large proportion of owner-occupiers who did not report any spending for maintaining or improving their homes in the 12 months prior to the survey. Hence, overall, annual spending on maintenance – even when spending on improvements is included in the estimation – is at the lower end of the recommended range.

It is possible that spending on maintenance is lumpy, and the survey timing could result in some spending being missed. For example, if a household undertook a large project 13 months prior to the survey or plans to undertake a large project in the month following the survey interview, their expenditures would not be included. Given our results, it does appear that the percentage of owners spending on either maintenance or improvements is declining while the average spend is increasing, even in real terms. One possible interpretation of these results is that owner-occupiers are doing maintenance less frequently and spending more when it is undertaken.

Figure 34. Average Real Property Value (in 2018 NZD) by Housing Tenure

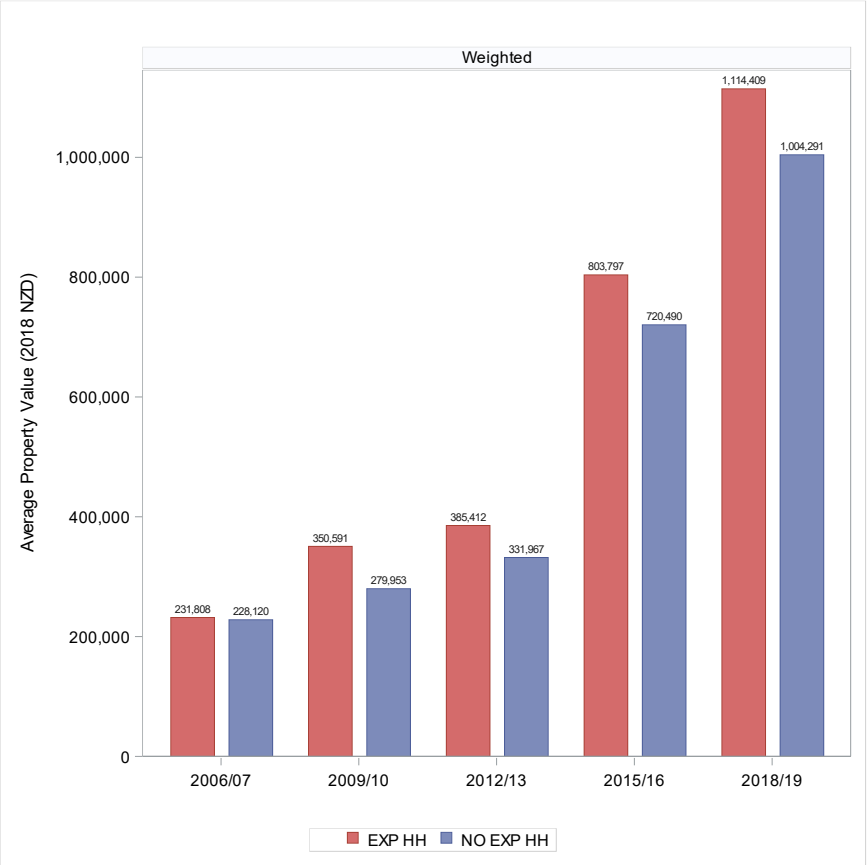
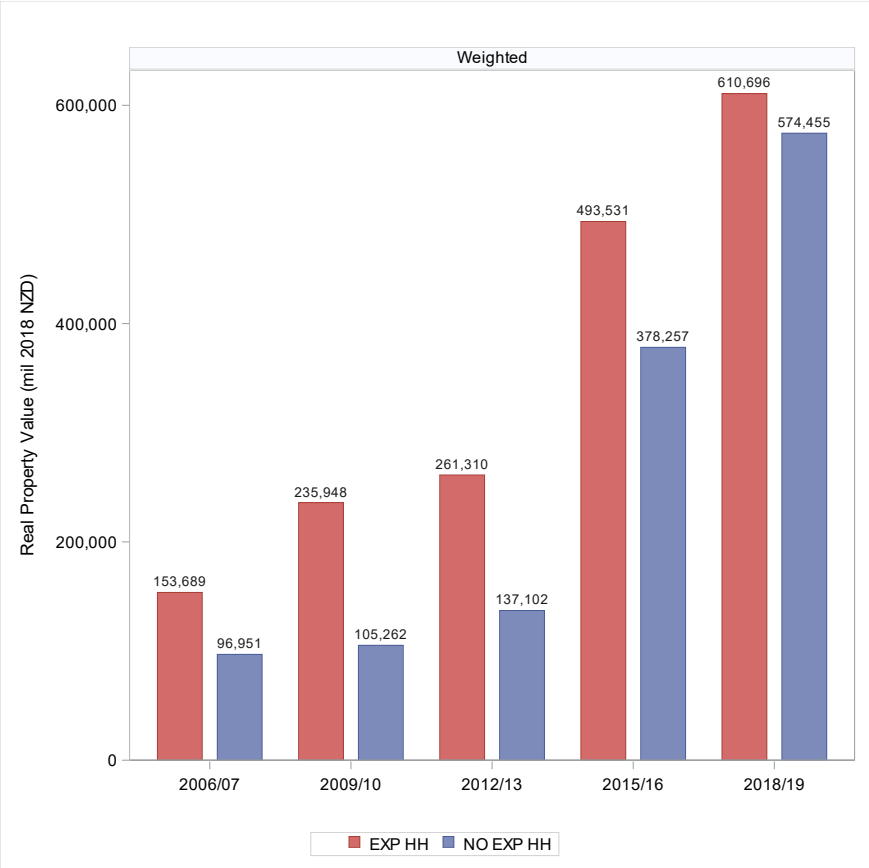


Figure 35. Total Aggregate Real Property Value (in 2018 NZD) by Housing Tenure

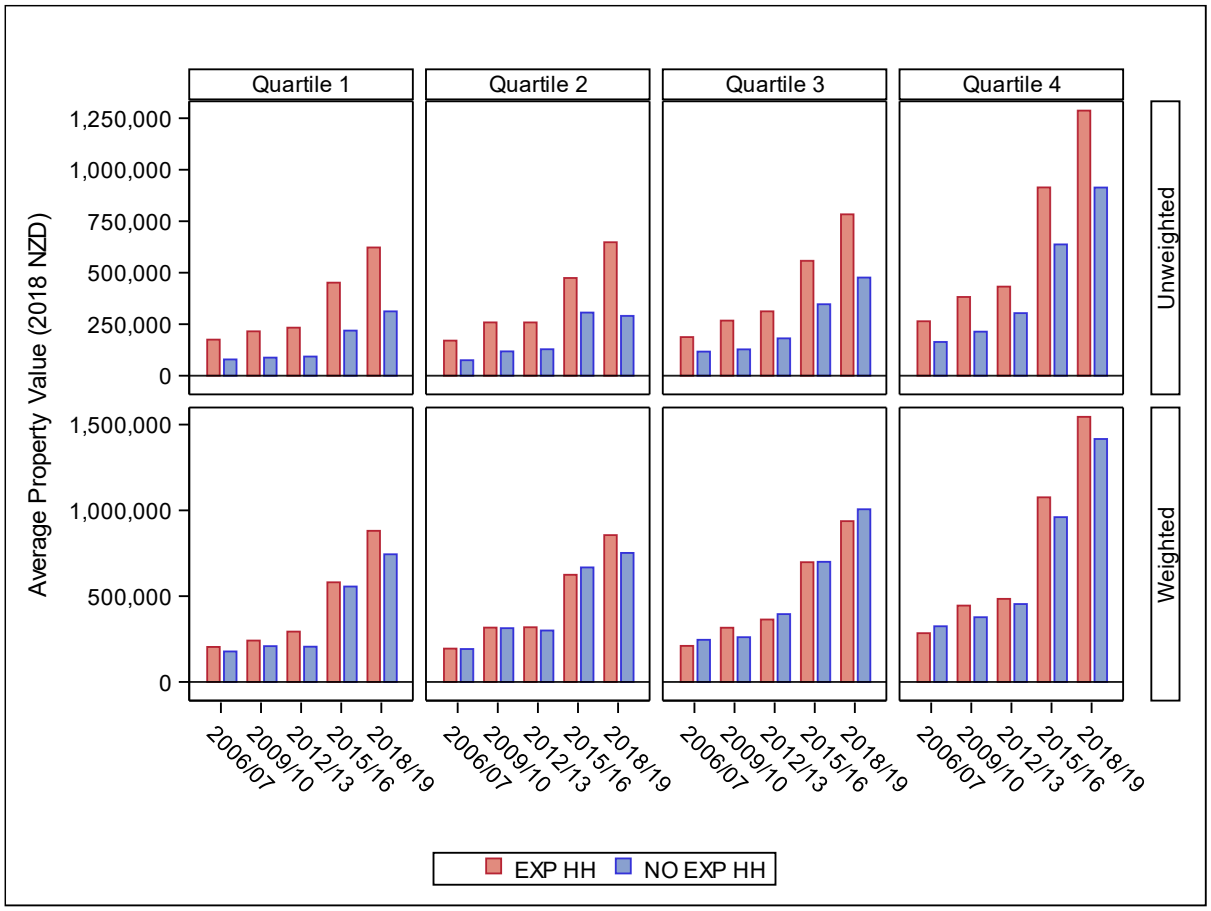


3.5 Expenditures and Income

To examine the relationship between income and household expenditures on maintenance or improvements, we group households into income quartiles.[26] Given the small number of renters with these types of expenditures, further dividing these households into quartiles results in a small number of respondents in each quartile. Hence, renters are excluded from the following analysis, and only owner-occupiers are included.

As expected, the average property value (in 2018 NZD) increases as the income quartile increases as shown in Figure 36. Using the weighted results, the difference in property values between households with and without these types of expenditures is very close in value. However, in the unweighted results, the difference between the two groups is much starker, with the average property value for households with no expenditures on maintenance or improvements (NO EXP HH) being about half that of households with property expenditures (EXP HH). The pattern holds across the 4 quartiles.

Figure 36. Average Property Value by Income Quartile



The percentage of households with expenditures on maintenance or improvements generally increases over each income quartile for most expenditure types (as shown in Figure 37). The one exception is the percentage of households with expenditures on maintenance services (MNT SVC) – this percentage is similar for the first three quartiles and is close to the overall average (shown by

[26] The entire expenditure sample was used to determine the income quartiles in each survey year. For the weighted results, the income quartiles were based on the weighted sample.

the dashed blue line in Figure 37. Only quartile 4 has a higher percentage of households with expenditures for maintenance services.

Figure 37 Percentage of Households with Property Expenditures by Income Quartile

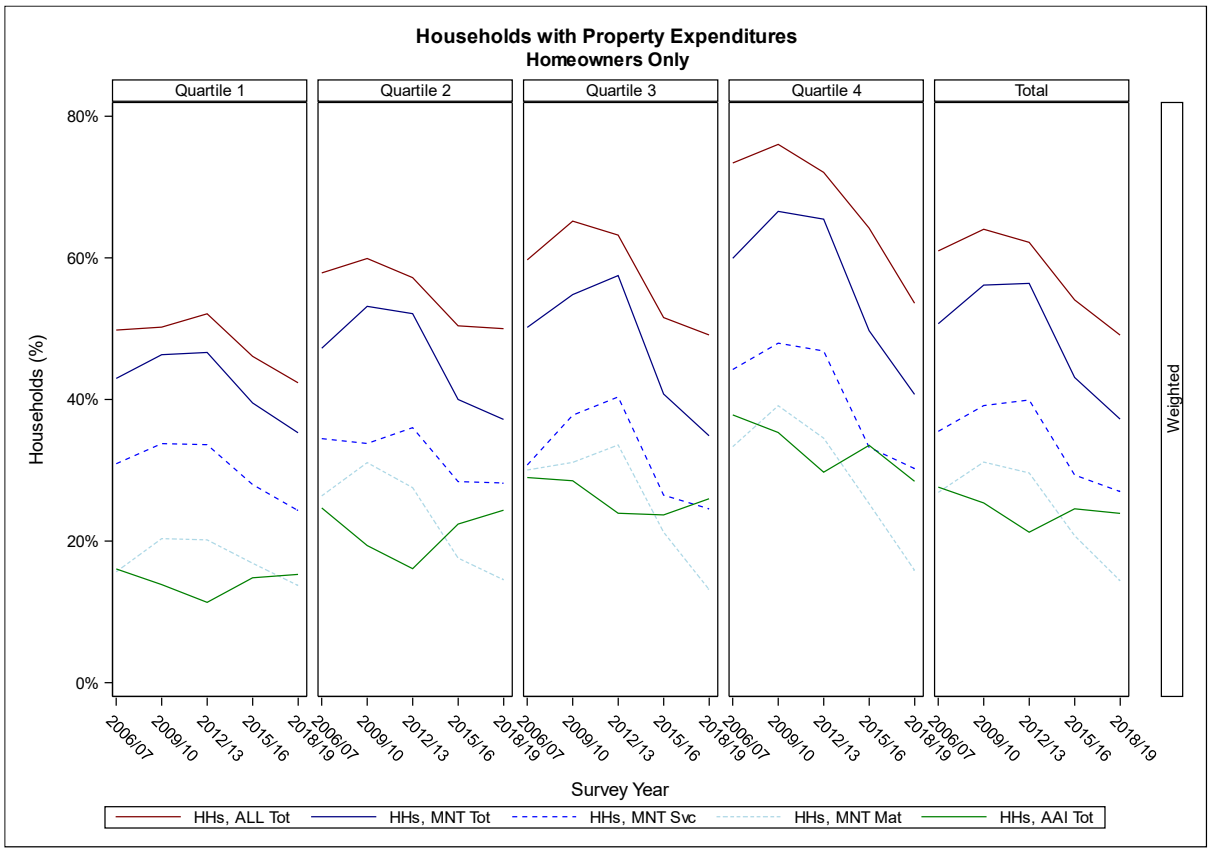


Figure 38 shows the distribution of households with maintenance or improvement expenditures by income quartile for each survey year. If households in each quartile are equally likely to have property expenditures, then the percentage for each group would be around 25%. However, the results indicate the lower two income quartiles are less likely to report these types of expenditures, whereas the upper two income quartiles are more likely. In fact, the top two quartiles generally comprise about 60% of those with property expenditures.

Similarly, if all groups spend equally on property expenditures, we would expect each quartile's share of the total to be about 25%. However, Figure 39 shows that the bottom two quartiles each have less than 25% of the total. In fact, when combined, they have 25% or less of the weighted total in the first four survey years (2006/07 to 2015/26). Hence, in most survey years, Quartile 3 and Quartile 4 have a combined share of 75%. In fact, in 2015/16, Quartile 4 alone is responsible for 66% of the weighted total expenditure, and close to 50% or more in four of the five survey years. Hence, the majority of spending on maintenance and improvements is by the wealthiest households.

Figure 38 Distribution of Households with Property Expenditures by Income Quartile

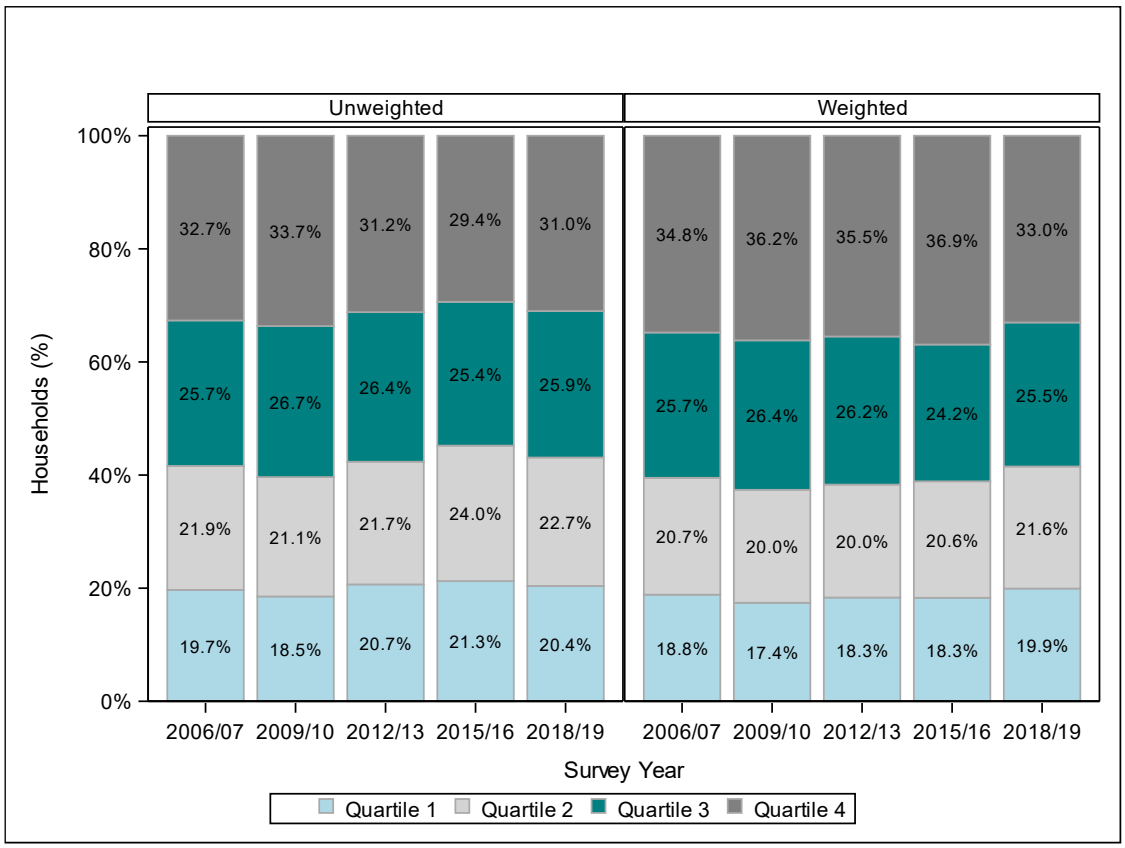
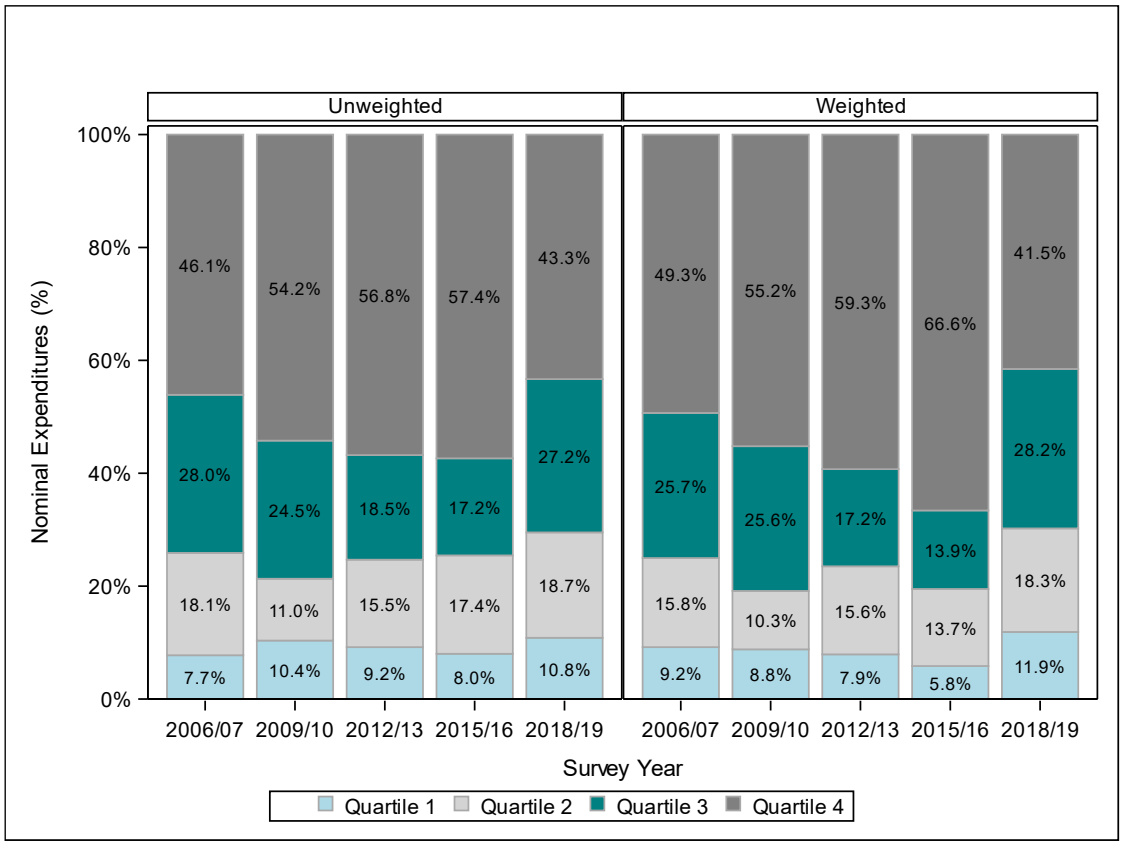


Figure 39 Distribution of Property Expenditures by Income Quartile



The disparity in expenditure by income quartile can further be seen in the aggregate totals, shown in Figure 40 and Figure 41. Spending on maintenance is fairly similar for the lower three quartiles but spending by Quartile 4 is substantially higher. Spending on improvements appears to increase more over the quartiles, but again Quartile 4 spending is substantially larger than that of the other quartiles, with a large spike in 2015/16. In general, expenditures for improvements have much more variation across the survey years then expenditures for maintenance, and expenditures for improvements appear to be driving the pattern in total spending. Only Quartile 1 consistently spends less on improvements than on maintenance. Figure 42 indicates that most of this difference is being driven by spending on services, with much of the spending on services for improvements.

Figure 40 Total Nominal Property Expenditures (Weighted) by Income Quartile

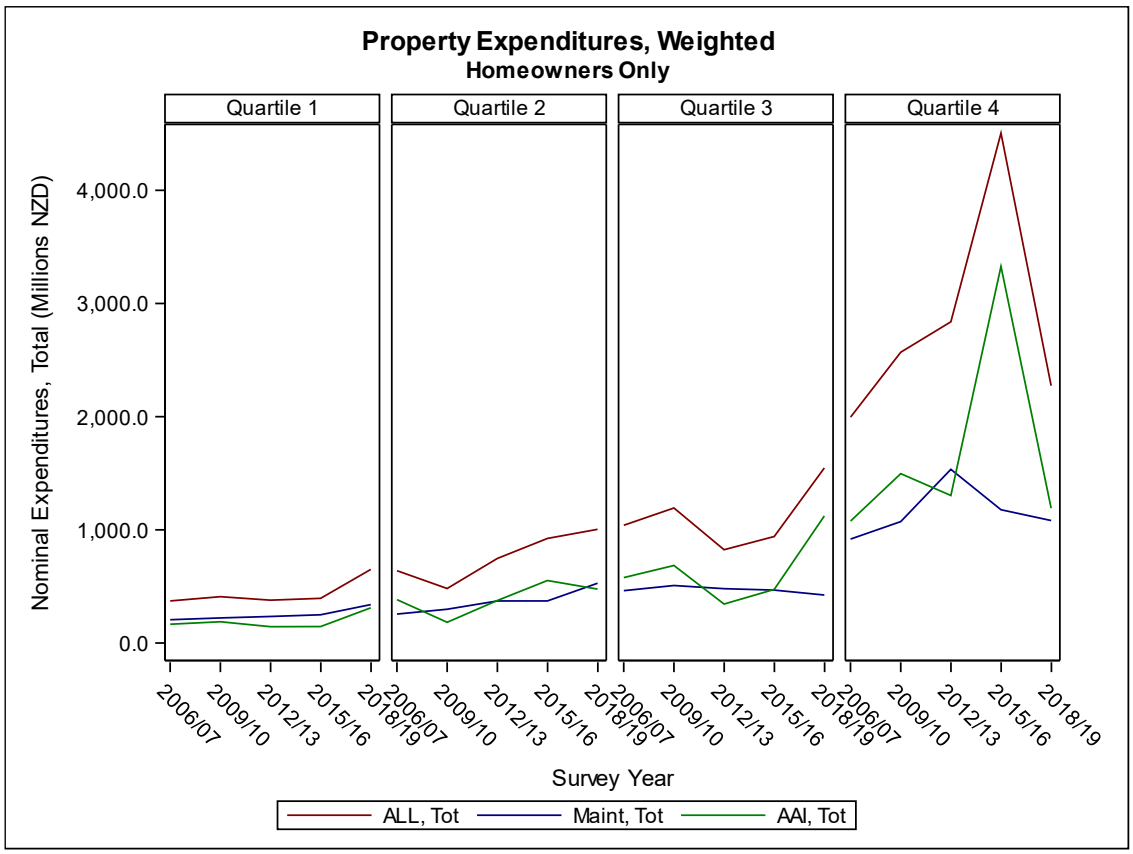


Figure 41 Total Real Property Expenditures (Weighted) by Income Quartile

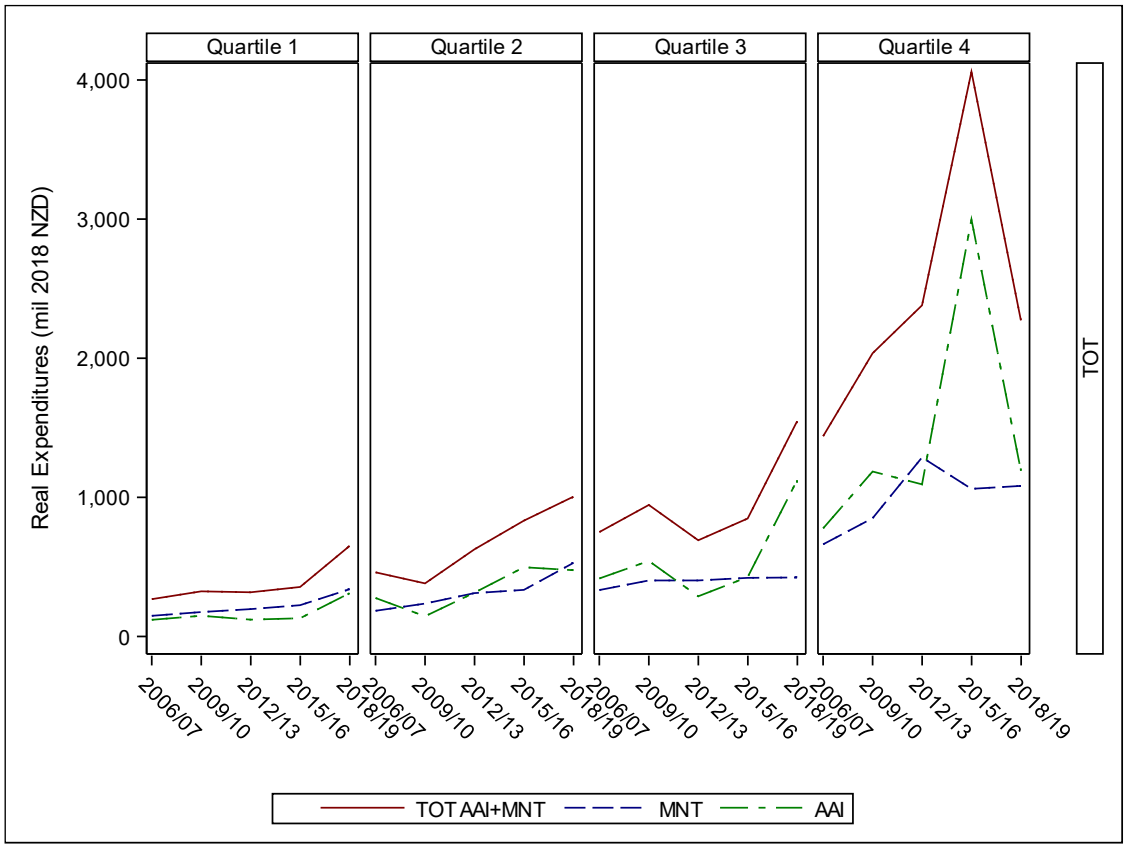


Figure 42 Total Real Expenditures by Expenditure Types

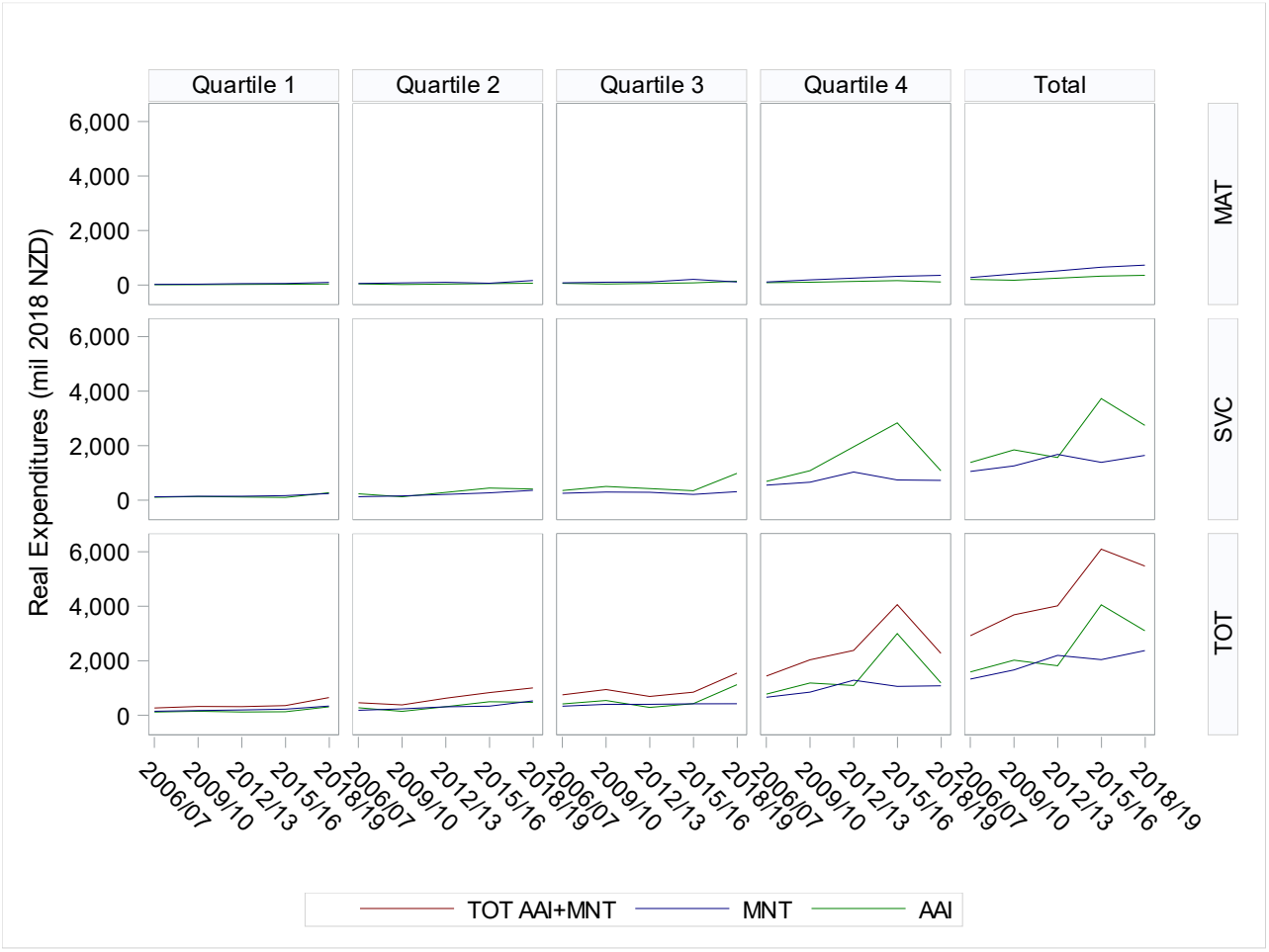
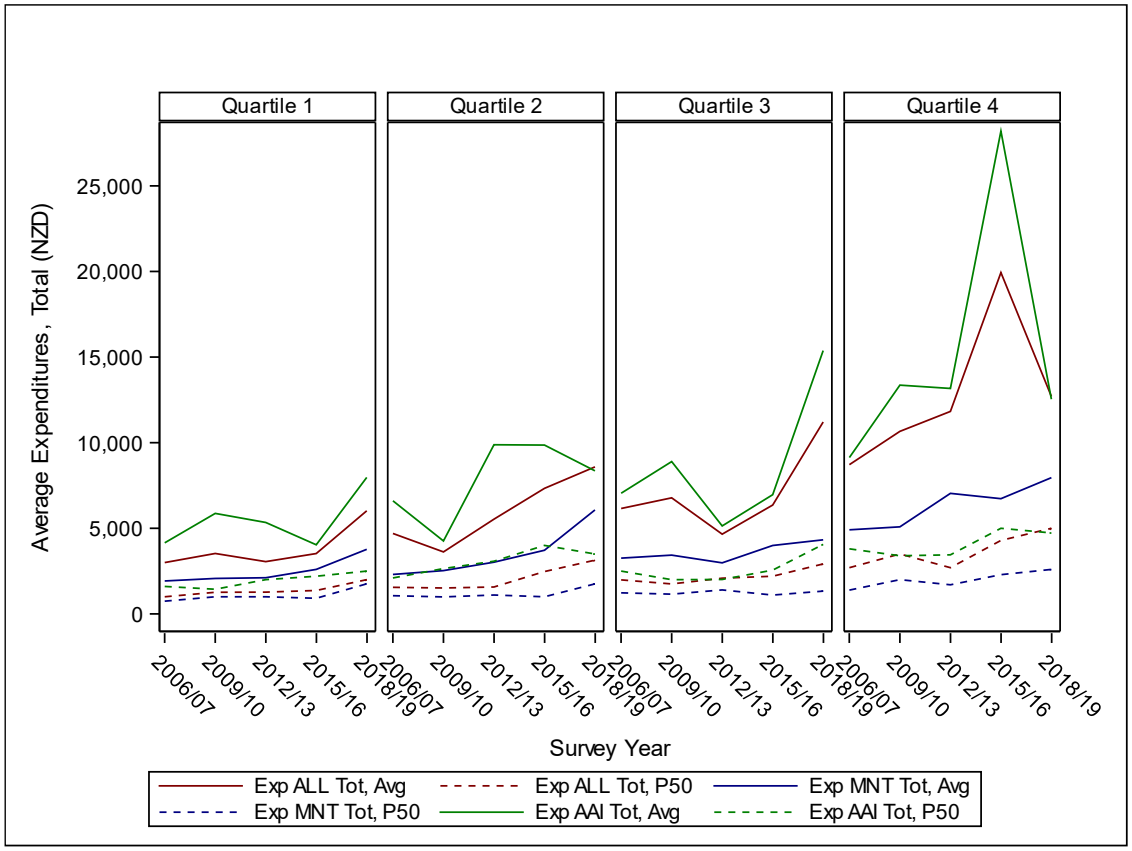


Figure 43 shows the average and median expenditure for the weighted sample by income quartile. These results further accentuate the differences between the quartiles.

Figure 43 Average and Median Nominal Expenditures (Weighted)



4 Discussion – Required and Actual Maintenance

Deterioration occurs to buildings in two broad ways – quickly due to a disaster such as flooding, earthquake or fire, or slowly as deterioration due to use or decay. In 2023, according to the Insurance Council of New Zealand, large disasters cost the country $3.9 billion ($3,898 million), while for the 6 years from 2018 to the end of 2023, the total cost was $5.4 billion (inflation adjusted to June 2023).[27] But how does this disaster cost compare to the cost of deterioration?

This report provides two windows on maintenance expenditure in New Zealand. One views the cost liability of 'undone' maintenance using a survey of the condition of dwellings. The other provides a view into actual expenditure on maintenance. Together these suggest a serious short fall on expenditure compared to the estimated required investment.

Two surveys conducted in 2018/19 are used. The BRANZ Pilot Housing Survey (PHS) (similar to the previous BRANZ House Condition Survey) examined how well houses are maintained, while the Stats NZ Household Economic Survey (HES) documented how much is spent on maintenance. Both surveys have been carried out on a regular basis, providing an invaluable time series to examine what, if any, changes have occurred over time. Both are available through Stats NZ Integrated Data Infrastructure (IDI) which allows for detailed investigations of the micro-level data under strict confidentiality requirements.

4.1 Evidence of Insufficient Maintenance

The 2018/19 PHS used the Stats NZ General Social Survey (GSS) sample to recruit participants, providing the opportunity to fit its results within the larger sociodemographic framework when compared to the earlier HCS. The PHS sample of over 800 dwellings included both rented and owned dwellings. The PHS and HCS both use a 5-point scale to assess functionality and maintenance of different dwelling components. In the case of the PHS, this included:

- **Exterior**: roof, exterior walls, windows
- **Interior**: kitchen, laundry, bathroom(s), and other rooms.

An estimated cost to bring each component up to 'as new' condition is then used to calculate the required maintenance expenditure for each dwelling based on floor area, which was then weighted to give a national estimate. These costs exclude supporting services e.g. scaffolding, so are an underestimation of the actual costs.

For each of the three exterior components, significantly more owned dwellings are in excellent condition compared to rented dwellings. For example, only 6% of rented dwellings' windows were rated 'excellent', compared to 19% of owned dwellings. This leaves about 548,000 rented dwellings and 951,000 owned dwellings requiring some window maintenance expenditure (i.e. 94% of rentals and 79% of owned). Taking all three exterior components into account, approximately 90% of owned dwellings (1,058,000) and 97% of rented dwellings (566,000) require some maintenance cost to bring them back to 'as new' condition, or a total of 1,625,000 dwellings (93% of all dwellings).

[27] https://www.icnz.org.nz/industry/cost-of-natural-disasters/

Most interior spaces were assessed as being in good or average condition, although owner-occupied house interiors tended to be in better condition than rented houses. Kitchens were more likely to be in excellent or good condition, whereas bathrooms were the most likely to be in poor or serious condition (especially for rented houses). Overall, 85% of owned dwellings and 96% of rented dwellings required at least some interior maintenance at the time of the survey.

Based on the PHS condition assessments and estimated outstanding costs to maintain, around 1 in 10 dwellings have outstanding interior maintenance of over $7,000, and a similar proportion have an exterior maintenance cost liability of over $15,000. Combined, the overall total is about 1 in 10 dwellings requiring over $21,000 in maintenance (as those requiring interior work are not necessarily the same as those requiring exterior work).

Using the weighted PHS data estimates of undone maintenance equate to some $6.1 billion for exterior walls, $5.8 billion for windows and $3.6 billion for roofs - a total of about $15.5 billion for these components (in 2018/19), or approximately $9,600 per house for the 93% of houses requiring exterior maintenance. For the interior, the total is $5.3 billion or $3,300 per household.

The maintenance costs have also been analysed by household income, ethnicity and composition. Observations suggest a proportionally larger maintenance cost liability for some population groups, but the results are confounded by the smaller house sizes for lower income groups and renters.

Based on the PHS condition assessments, an estimated investment of some $20.65 billion is required to bring key dwelling features up to ‘as-new’ condition, of which $14.5 billion is required for owner-occupied dwellings. This is an average of $12,600 per dwelling or $13,500 per owner-occupied dwelling. These results represent a minimum and underestimate the actual total required as not all dwelling features are included. Moreover, almost all dwellings surveyed (94%) required at least some maintenance, but by housing tenure 92% of owned dwellings and 97% of rented dwellings.

There is a wide distribution in the need for maintenance, with over a quarter of dwellings (26%) needing over $15,000 spent on maintenance, and around 1 in 10 needing over $21,000.

4.2 Insufficient Actual Maintenance Expenditure

Since 2006/07, while the HES has run annually, the expenditure component is only run every three years. There are therefore five survey years available for the analysis of expenditure on maintenance: 2006/07, 2009/10, 2012/13, 2015/16 and 2018/19. The HES generally runs from July to June and have data on between 3,000 and 4,000 households. Relevant property expenditures are either for (1) Maintenance or (2) Alterations, Additions and Improvements (abbreviated here to "Improvements"), but each of these can be further sub-divided into Materials (e.g. paint) or Services (e.g. painters).

Over the five surveys, between 35% and 50% of households[28] reported either Maintenance or Improvements (or both) expenditures. This proportion is relatively stable between 2006/07 and 2012/13 (45% to 50%) but then declines substantially for all households to 2018/19 to around 35%. It will be necessary to wait for future surveys to see if this trend has continued.

The proportion of households with Improvement expenditure is fairly stable (from 15% to 20%), with most of the decline being driven by the reduction in households reporting Maintenance

[28] This includes renters and owner-occupiers. However, the trend is the same for owner-occupiers.

expenditures. Further investigation revealed a reduction in the proportions of households with expenditure on Maintenance materials (from 53% in 2006/07 to 40% in 2018/19) but also the opposite pattern for expenditure on Improvements materials.

However, despite the changes in the proportion of households with these types of expenditure, the total household spending increased from about $3 billion (2018 NZD) in 2006/07 to almost $6 billion in 2018/19, although the peak in 2015/16 was $6.3 billion. This peak appears to be primarily driven by Improvements as Maintenance expenditures drop slightly in 2015/16.

The average annual household expenditure has increased over time in both expenditure categories. For households undertaking Maintenance, average expenditure, in 2018 NZD, increased from $2,400 in 2006/07 to $5,500 in 2018/19, while average annual expenditure for households undertaking Improvements increased from $5,300 in 2006/07 to $11,300 in 2018/19, with a peak of $14,200 in 2015/16. In total, the average household with either expenditure, spent $9,400 in 2018/19 on maintenance and improvements, up from $4,300 in 2006/07.

However, the approximately three-quarters (73%-78%) of houses with spending on Improvements were likely to also spend on Maintenance, but the remaining quarter (21%-26%) spent only on Maintenance. In total, about 60% of expenditures are spent by households with both Maintenance AND Improvements expenditures. So, despite being only about 25% of the population, households with both types of expenditures account for 60% of the total expenditure.

Perhaps the most revealing part of this analysis has been the identification of the relationship between household income and maintenance under-spend. The proportion of households reporting expenditure on property maintenance increases with income: the vast majority of property expenditures are being spent by the highest income households. In 2018/19 the top 25% of owner-occupier households by income spent about 42% of the total expenditure, while the top 50% spent 70% of total expenditure.

As there is likely to be a link between income and property value, it is unsurprising that these same patterns also show in the percent of house value spent on maintenance. It is recommended that households spend 0.5-2% of their property value on maintenance annually (Page, 2017). This percentage was calculated for each house individually, and then allocated to the income quartiles. It was found that households without any type of property expenditure consistently have lower property values, and the proportion of dwellings in this group are increasing with time. Even for the households that report expenditure on property Maintenance and/or Improvements, both the mean (average) and median (50%) percentages are below the bottom of the recommended spending range.

The total property value for those with Maintenance or Improvement expenditures ranges from $154 billion in 2006/07 (2018/19 NZD) to $611 billion in 2018/19, giving expected spending on maintenance (based on the 0.5-2% recommendation) from $385 million to $4.6 billion in 2006/07. In 2018/19, this range increases to $1.5 - $18.3 billion. For those with neither expenditure type, the total aggregate property value ranges from $97 billion in 2006/07 (2018/19 NZD) to $574 billion in 2018/19 giving expected spending from $0.24 to $2.9 billion in 2006/07 or $1.4 to $17 billion in 2018/19. Total expected expenditure would be expected to be from $2.9 to $ 35.3 billion in 2018/19.

The reported spending on maintenance by owner-occupiers in 2018/19 was approximately $2 billion, which is below the bottom end of the recommended range. By including both maintenance and improvements, the 2018/19 total spend is $5.5 billion, which is at the lower end of the recommended range.

In summary, the annual reported spending on maintenance – even when spending on Improvements is included – is at the lower end of the recommended range, with a maintenance underspend mid-range of $15.7 billion in 2018/19. It is this lack of ongoing annual maintenance which is leading to the very large under-maintenance estimate.

It is possible that spending on maintenance is lumpy, and the survey timing could result in some spending being missed. For example, if a household undertook a large project 13 months prior to the survey or plans to undertake a large project in the month following the survey interview, their expenditures would not be included. Even so, it appears that the percentage of owners spending on either maintenance or improvements is declining. On the other hand, the average spend is increasing, even in real terms. One possible interpretation of these results is that owner-occupiers are doing maintenance less frequently but spending more when it is undertaken.

One unexpected finding was the proportion of renters who reported expenditure on either or both Maintenance and/or Improvements. The Residential Tenancies Act 1986 specifies that it is landlords' responsibility to ensure the property is in reasonable condition and to ensure that any necessary maintenance or repairs are undertaken. However, depending on survey year, 8-13% of renters reported Maintenance expenditure while 2-7% reported Improvement expenditure.

4.3 Comparison

The 2018/19 HES reported household Maintenance and Improvements expenditure of almost $6 billion – with the vast majority from owner-occupiers, with an average expenditure of about $10,000 for owner-occupiers. The total is less than half of the estimated $14.5 billion investment needed based on owner-occupiers housing condition. The average is closer (around 75% of the estimated required spend), which is due to far fewer households investing in maintenance than is required: around 50% of owner-occupier households reported expenditures on Maintenance or Improvements in 2018/19, compared to an estimated 92% of dwellings *needing* some maintenance.

The reduction in expenditure with falling incomes is perhaps not surprising, but what was unexpected was that all income groups show a reduction in the proportion of households spending on property maintenance, with the turning point being the 2012/13 HES. This does not seem to be a survey methodological issue, as the falling trend continues in 2015/16 and 2018/19.

Based on the CPI increase of 20.1% from 2018 to 2023, the adjusted undone maintenance value of $27.5 billion is over four and a half (4.55) times the total cost of disasters in the six years 2018 to 2023. However, the consequences of the high cost of natural disasters have been seen in increased insurance premiums. Over the period 2019 to 2023 dwelling insurance costs increased by 22%, although they have increased a further 24.6% in the year to the end of March 2024[29]. If the same increases held true for the impact of undone maintenance, it would be

[29] Data source: www.stats.govt.nz Infoshare, Group: CPI, Level 3

expected that the value of each house would decline: if maintenance is not carried out, the house condition will deteriorate, it will not perform as expected and its life will be reduced.

Data sourced from the Reserve Bank of NZ shows the house stock price index increased by 33% from 2018 to 2023.[30] In other words, the price of houses increased while the house condition has decreased, or at least has not been maintained. What is more, the amount of undone maintenance is increasing, so logically it could be expected to have an ongoing negative impact on the long-term viability of the house as building in which people live, eat, sleep and potentially work.

This is a major future problem – for most new Zealanders their largest investment is in their home, yet while it is 'worth more' year on year, it in decreasing in its value as a building providing services.

5 Conclusion

This analysis has confirmed previous research that New Zealand houses are under-maintained, but added to that knowledge by showing that this is likely due to under-expenditure. It has also shown that the investment in maintenance differs with incomes and only those in the top quartile of income earners are spending appropriately on maintenance. The difference between the income groups is reinforced by the higher expenditure recorded in the Household Economic Survey on Alterations, Additions and Improvements in the top income quartile when compared to the lower three income quartiles, suggesting that households that can afford improvements can also afford maintenance, and these tend to be the wealthier households.

This is particularly evident in the time series analysis of the HES considering the different income quartiles. The two lower income quartiles account for only 25% of the total reported expenditure on property maintenance, with the top two responsible for 75%. In 2015/16, the top (4th) quartile is responsible for 66% of the total expenditure, and close to 50% in four of the other five survey years. This trend has been worsening over the period, with the inflection year 2012/13 – after this there is a decline in the proportion of households in all income quartiles spending on maintenance. When comparing Maintenace to Improvements, only the 1st quartile (lowest income) spends more on maintenance than improvement – and this seems to be driven by spending on services. Further, over time, it appears that fewer households are spending on Maintenance or Improvements, but when they do, they are spending more even in real terms.

Taken together, these findings raise the question as to whether (or even 'why') maintenance has become less important since 2012/13, even as house prices have continued to rise? This must also consider the requirement of the New Zealand Building Code with respect to durability (NZBC Clause B2). Since 1992 this has required "normal maintenance" for the intended life of the building. This legal requirement has not been promoted by the different agencies which have been responsible for the NZBC since its creation (Isaacs, 2022).

Due to the nature of the two surveys and the methods applied in this study, particularly in estimating the costs of 'undone' maintenance, this is not a perfect comparison of "like-for-like". Furthermore, the research has identified that the methodology used to cost the needed maintenance from an assessment of condition would benefit from some additional research to

[30] https://www.rbnz.govt.nz/statistics/series/economic-indicators/housing

bring it up to the current cost expectations and better reflect different materials and maintenance requirements.

However, despite those caveats, the significant difference observed between the estimates of desirable total maintenance expenditure and households reported spending on maintenance, alludes to a significant under-investment in maintenance. This is consistent with findings from previous BRANZ House Condition Surveys, in which both the condition of the dwelling and self-reported maintenance expenditures were reported. The last time this was done (2015/16), the results showed 30% of households reported some repair or maintenance had been undertaken within the last 12 months, with 40% of those spending over $2,600 (2015 NZD) (White et al, 2017).[31] This was far lower than the estimated required expenditure on maintenance of $13,000.

The maintenance deficit of $27.5 billion (NZD 2018) estimated in this analysis is significantly higher than the cost of natural disasters which have their own specialised agency. Not only is the level of under-maintenance ignored in policy, but there is also no active promotion of the existing NZBC requirement for durability, which is based on the various house components receiving ongoing maintenance, at least to the minimum level required by the manufacturer or supplier.

[31] Households were asked how much they had spent in category bands of $1 - $650; $651 - $1300; $1301 - $2600; and over $2600.

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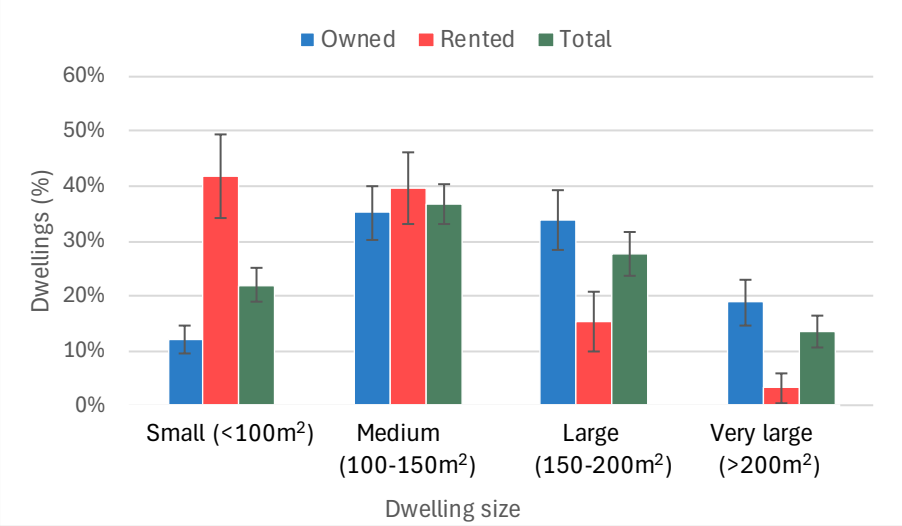
7 Appendix

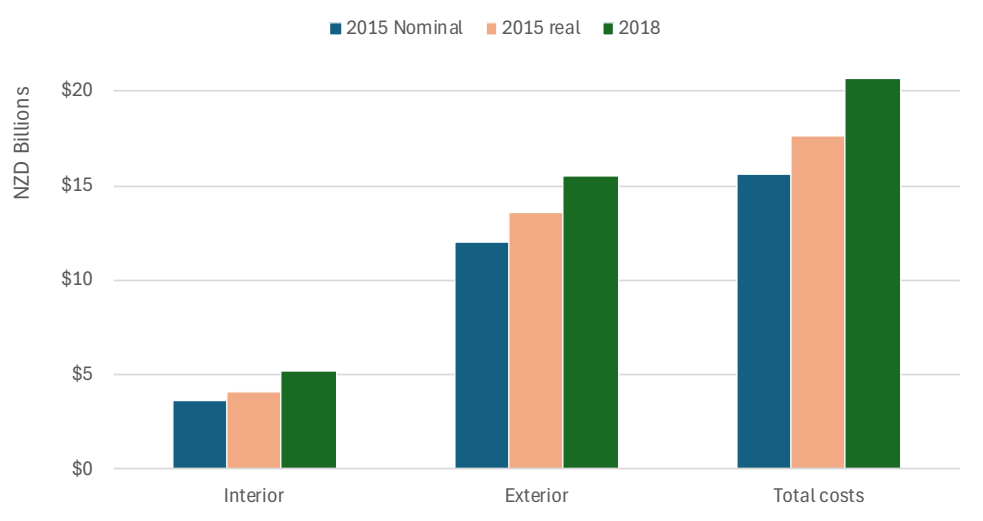
Annex Table 1. Assumed percentage of total replacement cost by component and condition

	Serious	Poor	Average	Good
Roof cladding	40%	32%	25%	13%
Wall cladding	40%	27%	17%	10%
Windows	37%	25%	18%	12%
Kitchen linings	100%	50%	10%	0%
Kitchen joinery	100%	50%	10%	0%
Laundry linings	100%	50%	10%	0%
Laundry fittings	100%	50%	10%	0%
Bathrm1 linings	100%	50%	10%	0%
Bathrm1 fittings	100%	50%	10%	0%
Other rooms	30%	16%	10%	4%

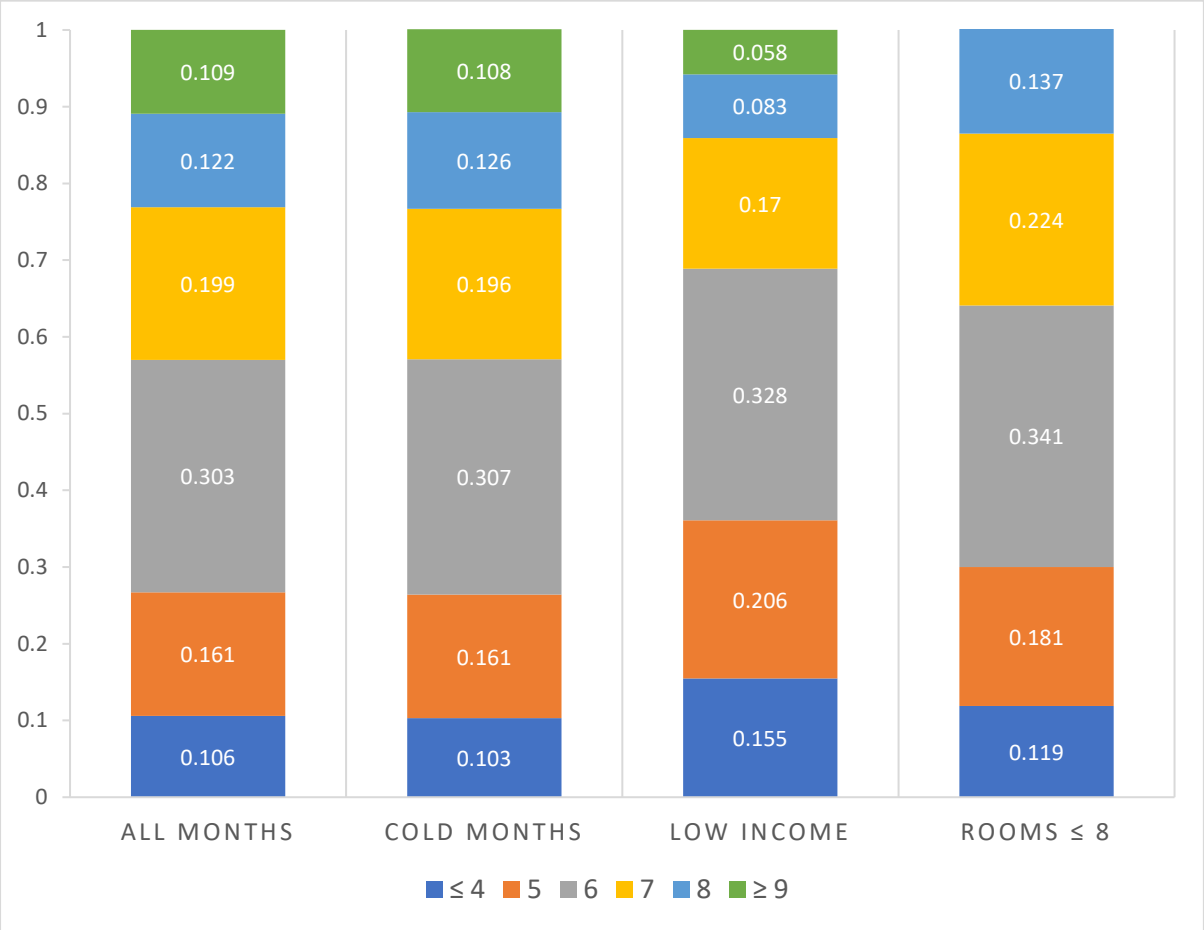
Annex Figure 1. Dwelling size by tenure (source: PHS 2018/19)



Annex Figure 2. Maintenance cost estimates from the 2015 HCS compared to 2018 PHS



Annex Figure 3. Maintenance cost estimates from the 2015 HCS compared to 2018 PHS



Source: (Riggs et al., 2023)