New Zealand Government

On the Falling Rate of Home Ownership in New Zealand

PREPARED BY

Philip S. Morrison

ACKNOWLEDGEMENTS

DISCLAIMER

The opinions in this report reflect the view of the authors and do not necessarily reflect those of the CHRANZ Board or the funding organisations. No liability is accepted by the CHRANZ Board for the accuracy or omission of any statement, advice or information in this research report and for any commercial, investment or other decisions made upon the reliability of this research report.

On the falling rate of home ownership
in New Zealand

December 2007

Philip S. Morrison

Prepared for

Centre for Housing Research Aotearoa New Zealand

Wellington

On the falling rate of home ownership in New Zealand

CONTENTS

Tables

Figures

On the falling rate of home ownership in New Zealand

Philip S. Morrison

Executive Summary

The year 2006 marked the third successive New Zealand census in which rates of home ownership have fallen: 72.4 percent of all private dwellings were owned by their occupants in 1991, 70.7 percent in 1996, 67.8 in 2001 and 66.9 in 2006. In 1936 half of all households owned their own dwellings. Fifty years later in 1986 almost three quarters of households were owners. A further 20 years on and this proportion had dropped back to the fraction prevailing in the mid 1950s.

Although comparatively late in analyzing tenure change, New Zealand is now asking the two questions which have dominated the tenure debate in Australia, UK, Canada and USA: is the recent decline in home ownership a permanent/structural shift towards a new tenure mix or is it merely a deferral of purchase by a new generation of buyers whose associated decisions – on marriage, final degree qualifications and fulltime job entry – are also being taken later in life?

This report traces the changing level and distribution of home ownership by the age of household reference person over the last four New Zealand censuses: 1991, 1996, 2001 and 2006. It does so by using a grouped logit model to statistically estimate the way the probability of ownership changes by age, across household types and income quartiles as well as by housing type and location.

Rather than relying on single point estimates we vary our estimates based on the assumptions we make about the tenure distribution of the five percent or so who do not respond to the housing tenure question in the census. On the basis of these assumptions we estimate both upper and lower bounds to the probability of ownership.

The decline in the probability of home ownership in New Zealand has been accompanied by a marked redistribution of housing equity across the age groups, income groups and above all, household type (to the relative disadvantage of individuals without partners and with children).   The likelihood of gaining home ownership has diminished considerably faster for the young and single parent households and those on relatively low incomes than they have for the population as a whole.

The research also uncovers a change in the close association between housing type, location and tenure in New Zealand. Historically, tenure has been closely associated with particular forms of housing consumption and the lifestyle options that accompany ownership.   These are now being challenged; instead of ownership being sought as a route to lifestyle, we infer that many more housing purchase decisions are being made

in order to purchase an asset rather than simply to purchase a stream of housing services as a consumer. This in turn is changing the relationship between tenure, housing type and location.

It would appear from the evidence that more and more households are attempting to compensate for the rising cost of ownership by transferring ownership status to dwellings in multiunit properties, traditionally the preserve of renters. This trend has been particularly marked in the 2001-2006 period and especially so outside the main urban areas. An initial (but tentative) inference is that many such households have also sought to trade off commuting against ownership, bearing the short(er) term cost of additional travel to work in an attempt to build up long term wealth through ownership.

A less widely considered feature of this response to ownership constraint concerns the societal costs of what may be individually rational decisions. An important question to ask from here on concerns the social, economic, ecological and sustainability implications of the adaptions certain households may be making in order to secure property ownership per se.

The above results reflect the main source of data currently available for tenure research in New Zealand, that is the cross sections from the quinquennial census. Late to address the issue of falling home ownership, New Zealand has also been slow to develop the longitudinal data sets necessary to fully understand the changing nature of the contemporary housing career and the new family and relationship contexts in which tenure decisions are now being made.

Many of the conclusions we draw about falling home ownership in this research come from comparing ownership by age cross-sections across successive censuses. If not interpreted carefully these differences can lead to misleading inferences about the investment and consumption decisions households actually make over their life time. In general we try to avoid drawing conclusions from census snap shots in order to characterise contemporary housing careers. Instead, in section 5 of the report, we combine the four cross sectional census files into a quasi-panel data set in order to analyse what are called 'synthetic cohorts'.

Analysis of these synthetic cohorts confirms the successive fall in ownership over time but also supports the thesis that younger households are delaying the transition from renting to owning until later in life. There are some caveats, however. For example we have limited ability to hold the size of the cohorts constant and are also unable to confirm the age stability of the household reference persons especially when changes in household composition is itself one of the reasons for tenure change. While acknowledged, there is little direct evidence to say that these uncontrolled features undermine our central thesis.

Policy implications must necessarily be tentative given the preliminary nature of the empirical analysis presented here and the absence of New Zealand longitudinal data sets of sufficient vintage to comprehensively model changing tenure decisions.

Nevertheless, several suggestions are made, covering the redistribution of wealth from young to older households, the behavioural consequences of delayed and possibly non-entry into ownership, consequences for pressure on the rental stock together with the geographical consequences that occur when households modify settlement decisions in the light of the differential cost of home ownership across the country.

On the falling rate of home ownership in New Zealand

Philip S. Morrison

Home ownership seems to be a national obsession. Everybody asks, "Are you buying or renting?" Sadly, we are renting, which is a bit like admitting you pull the heads off budgies.

Stefan Herrick. "Culture Shock". *The Dominion Post*, June 18, 2005

SECTION 1. INTRODUCTION

The year 2006 marked the third successive census in which rates of home ownership have fallen in New Zealand. Over the last fifteen years the proportion of households living in the dwellings they own fell from 72.4 according to the census to 66.9 percent marking the longest sustained drop in home ownership in the country's history. While other countries have seen either stable or rising rates of ownership over the last decade, New Zealand households have witnessed a marked decline in their propensity to own.

Home ownership remains an integral, and possibly *the* central component of New Zealand culture.   Access to property, privacy and security and a wealth generating asset around which to raise a family has been a prime motivation for immigration since Europeans began settling in numbers in the early nineteenth century. Promoted and sanctified by political parties of all hues, home ownership continues to be seen as central to both political and social stability.[1] Not surprisingly, falling rates of home ownership and the affordability issues surrounding tenure are assuming central stage in both main party agendas leading into the next New Zealand general election in late 2008.

The growing concern is reflected in the number of studies that have been devoted specifically to housing tenure in New Zealand over the last decade. They include commissioned reports (DTZ, 2005; Jameson & Nana, 2004; Mitchell, O'Malley, Murphy, & Duncan, 2007), papers in academic journals (Bourassa, 2000; Cochrane & Poot, 2007; Davidson, 1999; Hargreaves, 2003; Murphy, 2000; Stuart, Badcock, Clapham, & Fitzgerald, 2004) as well as reports issued by independent research groups (Skilling, 2004, 2005; Smith & Robinson, 2005).

These studies in turn have built on a number of earlier contributions addressing to housing tenure in New Zealand (Chapman, 1981; Davey, 1980, 1981, 1982, 1984;

---

[1] For a recent position statement on the role of home ownership in New Zealand see Skilling (Skilling, 2004)

Dupuis, 1991; Thorns, 1989, 1993, 2000) together with a number of university theses (Carne, 2004; Findsen, 2005; Sandbrook, 1999). The tenure question has also featured in the submissions currently before the Parliamentary Select Committee on Housing Affordability (http://www.parliament.nz/en-NZ/SC/).[2]

Levels of home ownership have ramifications in a number of areas including wealth distribution, savings and retirement provision and it is these areas that have received the bulk of attention from government (Briggs, 2006; Housing_New_Zealand_Corporation, 2004; Scobie, Gibson, & Le, 2005; Scobie, Le, & Gibson, 2007). Concern for the falling rate of home ownership per se appears limited. Under the current New Zealand Housing Strategy (Housing_New_Zealand_Corporation, 2005) the present Labour led government's emphasis, "remains on assisting those at the margins of home ownership rather than attempting to reverse the downward decline in the homeownership rate" (Stuart, Badcock, Clapham, & Fitzgerald, 2004 p. 10).[3]

Notwithstanding this policy position there is growing concern and recognition that falling rates of home ownership have not been accompanied by the research equal to the responses expected from government in several quarters. In this respect the country has been caught short, for not only is "the amount of research around tenure choice undertaken in New Zealand at once very limited and out of date" (DTZ, 2005 p. 60), but "there is a paucity of research in New Zealand to determine the relative importance of various factors and so it is difficult to make an accurate assessment of the drivers of the decline" (Stuart, Badcock, Clapham, & Fitzgerald, 2004 p. 9). Certainly New Zealand has seen little of the sustained research into tenure choice issues which characterise the international literature, despite the encouragement proffered in early scoping documents (Jameson & Nana, 2004).

1.1 Aim and outline

The aim of this report is to describe the pattern of present of home ownership decline in New Zealand, mainly by relating recent tenure shifts across the age groups by type of household and income quartile but also by suggesting that attaining ownership may have become increasingly contingent upon access to dwelling type and location.[4]

Behind the aggregate statistics lie a number of more complex stories. A number of these have to do with definitions (whose ownership?), arguments (whose age?) and with measurement error (who responds to the tenure question?).   Answers to these questions impose limits on the inferences we can reliably draw from census data and what we can reliably infer about change when comparing successive censuses.

---

[2] Search using 'Housing Affordability'.
[3] A minor exception is a small pilot scheme designed to insure mortgages taken by low/modest income first time buyers meeting lower deposit provisions.
[4] The request for this report was to update the earlier analysis of tenure change 1991 to 2001 (Morrison, 2005). Apart from the addition of 2006 census counts no change in data specification was requested from that earlier study.

The report is in six sections and an appendix. The first, **Section 1,** continues here with a brief historical overview of home ownership trends in New Zealand followed by a brief review of the way the tenure change debate has been conceptualized in the international literature.

Section 2 examines the relationship between the likelihood of owning and the age of the household and the way the distribution of ownership by age has changed over the 15 year period, 1991 through 2006.

Section 3 considers the changing influence of household attributes on tenure, especially the sensitivity of ownership to the presence of a partner as well as children and their vulnerably to the aggregate fall in ownership rates. The influence of both is moderated by income and we show how it is the low income households who have experienced the most marked reductions in ownership capability over the period.

Section 4 introduces the role of housing type and settlement in understanding ownership change. An argument is developed in which dwelling ownership per se becomes relatively more important for its own sake as rising housing prices lead to a rise in the supply of owner occupied dwellings in the multiunit market and an increase in the propensity to trade location against tenure in the quest for a wealth generating asset.

Section 5 draws attention to the limitations in drawing inferences from cross sectional relationships between ownership and age. In an attempt to address a number of these we construct synthetic cohorts using the age of the household reference person. We undertake a number of statistical tests concerning postponement of ownership decisions and the scope of subsequent catch-up in ownership rates. The methodological issues surrounding the conclusions are given special attention.

Section 6 concludes the report by placing the above results for New Zealand in a wider international debate over the falling rates of home ownership. Several policy implications are suggested.

Appendix 1 is devoted to a number of the measurement issues surrounding homeownership decline in New Zealand. It considers the concept of 'tenure' and the different ways in which it can be measured. The primary changes to the census dwelling questionnaire in 2001 and 2006 are outlined including the introduction of the Family Trust question. Not all census respondents complete the tenure question successfully which introduces bias into the estimates we make about who owns. In an attempt to accommodate this feature of the data we describe the method we use for identifying upper and lower bounds to the probability of owning.

1.2 Contribution

The following study contributes to the debate over housing policy in New Zealand in four different ways. Firstly, it shows quite clearly the widespread decline in homeownership by age group by household type and income.

Secondly, the report takes a modelling approach to depicting the relationship between homeownership and the above attributes of households so that a number of hypotheses about their successive cross sectional relationships to housing tenure can be quantified in a multivariate framework.

Thirdly, the report suggests how housing type and settlement may be having an increasing influence on tenure choice decisions and in ways which expand the possible range of effects resulting from falling rates of homeownership – to include environmental considerations for example.

Fourthly, the report generates and then traces the changing likelihood of ownership by synthetic cohorts based on the birth year of the household reference person. By tracking changes in the home ownership rate as cohorts age we are able to partially address one of the main criticisms levelled at simply comparing successive cross sections. We draw a number of tentative conclusions about the way the young in New Zealand have postponed ownership decisions and their subsequent 'catch-up' behaviour.

In light of this census evidence we raise a number of further questions which New Zealand researchers will soon be able to test. With the SOFIE panel data available from its initial wave in 2002 it will not be long before some of the insights generated by the Household Income and Labour Dynamics in Australia survey (HILDA) and the British Household Panel Survey and others can be tested in the New Zealand context.[5] The descriptive background in this report might therefore be viewed as an empirical prelude to a more sophisticated modeling exercise in which appropriate theory is brought to bear on *unit* record data from a New Zealand survey that traces individuals housing and related experiences over time. [6]

1.3 Historical overview

At the turn of this millennium David Thorns could write that, "New Zealand is a country which has high rates of owner occupation, over 70 percent in the 1990s, and low levels of state rental housing (under 5 per cent). Much of state policy has been directed historically to encouraging the growth of the owner-occupied sector with a variety of programmes to assist low and modest income families into their first house" (D.C. Thorns, 2000 p.129).

Until the 1930s the majority of households enumerated in New Zealand were living in someone else's dwelling. Not until the 1936 census would half the country's

---

[5] These insights include recognising the importance of prior events in the decision to own (including marriage, children) as well as the distribution of the lags involved. They also highlight the importance of 'surprises', unexpected life events which can lead to rapid changes in household composition and tenure change. Few if any of these temporal sequences can be identified using cross-sectional data.

[6] Indeed, since these words were written a specific initiative addressing a number of homeownership questions has received Marsden funding, (Grimes, Stillman, & Kim, 2007). Details of the Survey of Family, Income and Employment (SOFIE) may be found in http://www.stats.govt.nz/additional-information/survey-of-family-income-employment/default.htm (Statistics_New_Zealand, 2006)

households (50.2 %) report ownership of their usual residence; see Figure 1 and Table 1.[7] The decade following the Second World War gradually met the pent up demand for marriage, babies and homes, the combined force of which led to a steady growth in home ownership (Pool, Dharmalingam, & Sceats, 2007). Within fifteen years an additional twenty percent of a rapidly rising number of households had become home owners.[8] As Murphy observed, "the expansion of home ownership to 70 percent of the stock meant that the goal of creating a home owning democracy had largely been achieved" (Murphy, 2000 p. 395) and the state's role in assisting new and low income buyers through cheaper mortgage finance diminished accordingly.

With the end of the baby boom, home ownership rates stabilised at just under 70% of all households. However, after peaking at 73.7 percent in 1986 the homeownership rate fell steadily and, by the last census of 2006, had fallen to a rate of 66.9 percent (depending upon how the rate is calculated, see Appendix 1). Projections have homeownership rates falling a further five percentage points to 61.9 through to 2016 (DTZ New Zealand, 2007; Stuart, Badcock, Clapham, & Fitzgerald, 2004).

In 2003 Hargreaves drew attention to the way New Zealand has slipped down the European Union rankings to just within the top 10, noting that the leaders Singapore had 90 percent homeownership, Taiwan (85 percent) and Spain (80 percent) and Ireland (79 percent) (Haffner & Dol, 2000; Hargreaves, 2003 p.203). By 2006, using another estimate of 67.8 percent New Zealand appeared 'level pegged' with homeownership rates in Britain and the United States (68 percent) and a little lower than Australia (71 percent), well ahead of Germany (40 percent) but behind Ireland (80 percent) (Grimes, Stillman, & Kim, 2007).[9]

The two striking features of the international comparisons are their variability from source to source and their tendency to change from year to year. The New Zealand Treasury for example have suggested that New Zealand homeownership rates in 2000-2002 were actually lower than comparable countries (Scobie, Gibson, & Le, 2005; Scobie, Le, & Gibson, 2007).

None of the New Zealand studies appear to have closely compared rates of *change* in home ownership rates across countries over the last two decades. In aggregate terms, New Zealand would appear to be unusual in not holding homeownership levels at the levels reached in the late 1980s. At the same time, the aggregate homeownership rate may not be a very helpful statistic either in tracing changes within a country or in making inter-country comparisons. Even when an aggregate rate is found to be stable, there was, as Yates found for Australia, "a distinct change in home-ownership propensities which is

---

[7] For a detailed history of New Zealand housing with special attention to the state sector, see (Ferguson, 1994). and also (Davidson, 1994)
[8] For a graphical summary of change in tenure levels for Sweden, UK, Australia, Canada and New Zealand between 1915 and 1975 see (Bourne, 1981), Figure 3.3. New Zealand's tenure growth experience over this period would appear to be closest to that of Australia and the USA.
[9] The Dominion Post September 11, 2007.

neither uniform across age-groups, nor uniform for different household types with both the same and with different levels of income" (J Yates, 2000).

Figure 1. The proportion of private permanent dwellings occupied by their owners in New Zealand 1936-2006
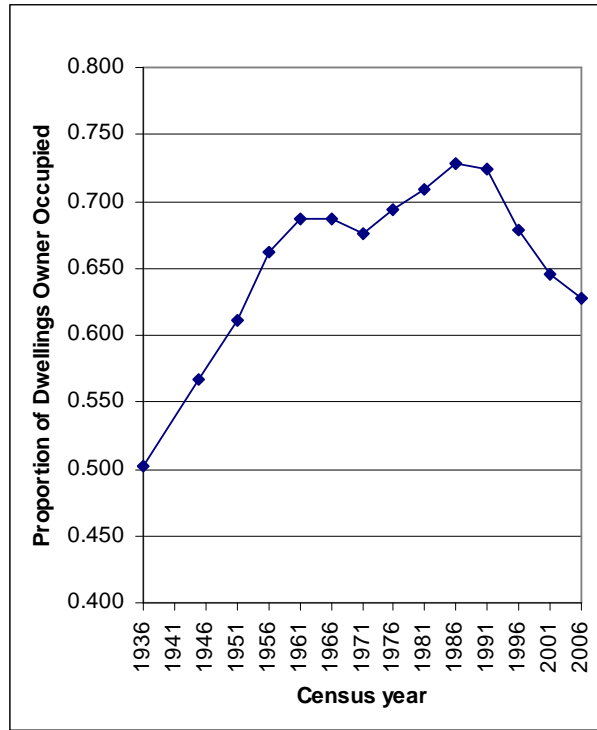
Table 1. The distribution of households over dwelling tenure categories in New Zealand, 1936-2006

a	b	c	d	e	f	g	h	i	j	k	l	m	n
Census Year	Renting or leasing	Free dwelling provided with job	Owned without payment (free not with job)	Buying with table mortgage	Buying with flat mortgage	Unspecified mortgage rates	Owned without mortgage	Family Trusts	Not specified	Total	Owner occupied	Proportion Owner Occupied	Source
1936	135194	37184		57618	54495		63651		1763	349,905	175,764	0.502	OYB 1950: 440
1945	142,717	24,690	6,475	72,217	54,265		102,358		612	403,334	228,840	0.567	OYB 1950: 440
1951	148,679	31,502	9,122	94,625	56,296	279	150,985		2,524	494,012	302,185	0.612	OYB 1961: 553
1956	144,721	34,270	9,224	130,947	72,760	553	168,383		2,194	563,052	372,643	0.662	OYB 1966: 544
1961	153,728	34,087	8,586	166,636	86,359	433	181,793		2,085	633,707	435,221	0.687	OYB 1966: 544
1966	177,429	35,387	7,919	213,807	80,885	226	197,085		3,366	716,104	492,003	0.687	OYB 1971: 549
1971	206,465	34,683	13,171	329,733			212,374		5,260	801,686	542,107	0.676	OYB 1981: 496
1976	248,356	22,678	8,649	387,078			253,567		2,929	923,257	640,645	0.694	OYB 1981: 496
1981	253,389	33,528		423,459			287,343		5,388	1,003,107	710,802	0.709	OYB 1989: 169
1986	249,894	30,585		446,253			339,420		11,853	1,078,005	785,673	0.729	OYB 1989: 169
1991	267,345	39,804		456,447			396,042		18,024	1,177,662	852,489	0.724	OYB 1997: 128
1996	290,124	66,939		466,683			394,074		50,271	1,268,091	860,757	0.679	SNZ web site
2001	358,890	53,307		455,109			413,550		63,411	1,344,267	868,659	0.646	SNZ web site
2006	388,272	63,690		431,796			312,159	167,922	90,336	1,454,175	911,877	0.627	SNZ web site

Notes: k = sum b through j
          l = sum e through i
          m = l/k

Source: Official Year Books and SNZ web site.

14

Stable aggregates in the presence of highly unstable rates for subpopulations implies significant redistribution and it is therefore helpful to ask exactly when falling home ownership is a problem and when it is not. To do this we need to briefly review how the falling rates of home ownership have been addressed in the international literature.

1.4 Conceptualising ownership decline

The anxiety surrounding the fall in home ownership rates might lead some to assume that New Zealand's recent housing market experience is unique. This is highly unlikely for there is growing evidence going back at least three decades of a shift in allocation of households across the tenure categories, certainly in Australia (Yates, 2000, 2002), Canada (Skaburskis, 2002), the U.S.A. (Greulich, Quigley, & Raphael, 2004) and the U.K. (Holmans, 1996, 2001). The relevance of the tenure experience in these countries may not have received the attention it deserves in New Zealand because the similarities in their underlying processes have been hidden under apparently stable aggregate rates of home ownership. In each case, however, the movement of large cohorts of household into older age groups with high rates of ownership have been counter-balanced by a reduced ability of younger households to secure ownership, a redistribution which leaves the aggregate homeownership rate largely unaltered (Yates, 2000).[10] With respect to the U.S.A. for example, Myers refers to the 'stagnant homeownership rate and the apparent paradox of declining ownership rates among young households in contrast to rising ownership among the elderly" (Myers, 1999, p. 474).

The movement of large cohorts of baby boomers into the middle age groups with high ownership rates is relatively well documented. So too, however, is the sustained demand for ownership as households age (Venti & Wise, 1987). The more novel evidence addresses the proposition that homeownership rates are declining among the young. As one housing expert observes, "older and younger cohorts are active in one housing market at the same time. It is often difficult to know if the behaviour of younger cohorts is just a function of their early stage in the life cycle or whether it is fundamentally different from the behaviour of previous cohorts that have now aged" (Dieleman, 2001).

Although both these features of the market have been discussed for some time what still remains unclear are the drivers, in particular the degree to which homeownership is simply being *postponed* by new generations of potential buyers or whether they are facing a *structural* shift in the housing market.

The conceptual basis for the analysis of tenure choice remains the concept of the housing career – the set of steps individuals take over their life time to secure accommodation appropriate to their changing needs. The housing career perspective sees change of tenure as part of an on-going household adjustment process. The concept, as represented schematically in Figure 2, has income and housing expenditure varying over the age domain in response to certain key events associated with career relationships, parenting and lifestyle.

---

[10] The relative importance of these age specific shifts is discussed in the decomposition literature under the heading of endowment vs composition effects (J Yates, 2000)

Figure 2. Housing careers: traditional and contemporary

a. Traditional housing career

$

Income   Expenditure

Family formation   Children leave home   Retirement

| Renting | Home purchase | Ownership | Aged care |

Age

20   30   40   50   60   70   80

b. Contemporary housing career

$

Income   Expenditure

Divorce   Providing care   Being cared for

Inheritance

| Renting | Home Purch. | Renting | Home Purch. | Ownership | Living in Aged units |

Age

20   30   40   50   60   70   80
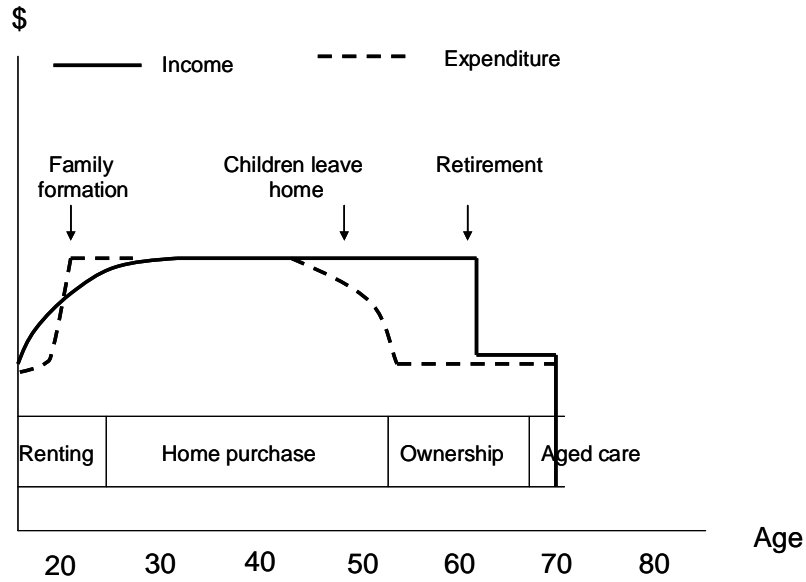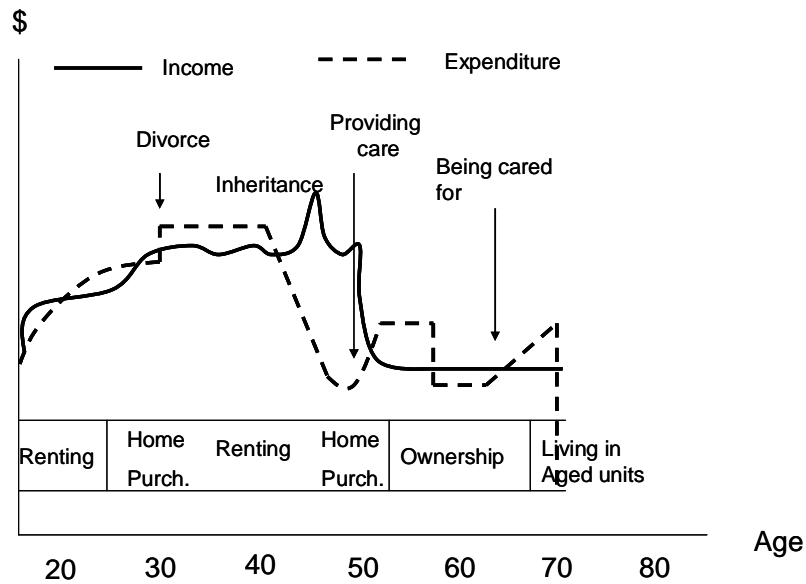
Source: Adapted from Flatau, Henderschott, Watson and Wood, 2004

What has complicated our interpretation of trends in home ownership over the last few decades is that the traditional housing career depicted in Figure 2a is being replaced by a delayed and more highly variable entry into (and exit from) home ownership represented

16

schematically in Figure 2b. The contemporary housing career is associated with greater uncertainty and more frequent switching between tenures; housing demands on income assume a different temporary pattern and shifts in the 'marriage' and 'partner' market alter household formation rates. The changing mix of different types of household generates more frequent and non sequential changes in tenure.

As the evidence in support of the contemporary housing career built up so there began a more careful scrutiny of the role tenure choice played as an adjustment mechanism (see for example Clark, Deurloo, & Dieleman, 1994). The longitudinal perspective on tenure change allows explicit recognition of past events, lagged responses and 'surprises' in understanding the tenure decision (as highlighted for example by Ioannides & Kan, 1996). Specific events like partnering, break-ups and spells of unemployment for example have been shown to precipitate tenure transition (Ermisch & Di Salvo, 1996).

Of particular concern in most societies is the apparent diminution of the ability of the young to purchase (Haurin, Hendershott, & Kim, 1994; Haurin, Hendershott, & Wacher, 1997; Haurin, Hendershott, & Wachter, 1996). Declines in purchasing by young buyers was noticed in the UK in the early 1990s (Holmans, 1996), in the USA (Myers, 1999; Myers & Wolch, 1995) and is one of the important drivers of research in Australia (Flatau, Hendershott, Watson, & Wood, 2004).

There have been several attempts to estimate the decline in ownership among young, first time buyers (Holmans, 2001) but this is a more complicated issue than often admitted. For one thing the decision to purchase is preceded by a series of steps each of which can be accelerated or retarded by the state of the housing market. Moreover there are a number of important links between youth labour, education and housing markets and it is the joint transition decisions involved in all these markets that increasingly need to be considered (McElroy, 1985).

Many of these joint or inter-market relationships are now receiving attention. The relationship between the entry of the young into the housing market and the housing price cycle is one example (Ortalo-Magne & Rady, 1999). The simultaneous nature of both household formation and tenure choice as has been documented for young Swedish adults (Asberg, 1999) as well as in the USA (Hendershott, 1987) is another. Several of these decisions, especially those involving leaving the parental home, have been shown to be heavily influenced by the cost of housing (Ermisch, 1999; Giannelli & Monfardini, 2003; Haurin, Hendershott, & Kim, 1992). It is not simply that housing demand reflects household formation but household formation can be accelerated or delayed depending upon the relative costs of staying or living in the family home or even changing residence. It is the endogeneity in these relationships that challenges contemporary research into tenure change.

The decision to leave the parental home together with the decision to work, to study and to form partnerships all have a bearing on the number (and type) of households coming through to potential ownership. Indeed, the so-called 'chaos' that characterises the labour market among the youth (e.g. Blanchflower, 1996) is paralleled by similar degrees of

churning, indecision and backtracking characteristic of the housing and 'partnership' markets (Giannelli & Monfardini, 2003). Among the young all three – housing, labour and partnership 'markets' - are to a large degree experimentations and it is this very simultaneity characteristic of a highly volatile period in people's lives that has thrown a spotlight on the methods used to model the tenure decision.

Methods

Much of the methodological debate surrounding 'tenure choice' centres on the need to recognise its inherently temporal nature. The key methodological points are most apparent when inferences possible from cross-sectional data are compared with those from longitudinal or housing career data. The potential for bias in longitudinal inferences derived from cross-sectional estimates has long been recognised and is one of the main drivers behind alternative methods (Pitkin & Myers, 1994). As Borsch-Supan has written, "Housing choices have almost exclusively been analysed either using survey data gathered at a specific point in time or by using time-series of aggregate data. Panel data permits use of both time-series and cross-sectional variation, thereby providing a substantially superior identification and separation of the various economic and demographic mechanisms underlying housing choice behaviour which are often confounded in the snapshot analysis of cross-sectional data and by aggregation in time-series analysis" (Borsch-Supan, 1990).

The methodological issues play an important role in this report and in contemporary tenure research within New Zealand in general. Partly in order to make these issues explicit sections 2, 3 and 4 of this report are based on comparing cross-sections from the four successive censuses, whereas section 5 takes an explicitly longitudinal approach by explicitly linking the four cross-sections. More sophisticated applications drawing on longitudinal or panel data are discussed as extensions.

New Zealand researchers into tenure decisions have been forced to draw heavily on cross-sectional or snap shot (usually census) data largely because of the lack of suitable panel data. Almost all commissioned studies on home ownership trends in New Zealand have employed cross sectional estimates, primarily from the census. While section 5 of this report offers a partial solution to this problem by constructing synthetic cohorts there remain limits to the method and the robustness of the evidence.

In summary, concern over the falling rate of homeownership internationally has been focussed primarily on the behaviour of the young – although there have been major studies of 'downsizing' and other forms of the tenure change that occurs as older households age (Venti & Wise, 1987). Although trends in aggregate homeownership rates appear noticeably different in New Zealand, the fact is that the young in New Zealand have been experiencing very similar declines in home ownership to their counterparts in Australia, the U.K., U.S.A. and Canada. Remarkably, apart from a study of homeowner aspirations (DTZ, 2005), there has been very little empirically based work on similar tenure issues in New Zealand. As a result, our ability to identify the magnitude, the dynamics of tenure choice and to differentiate, for example, between

permanent and temporary (deferred) ownership decisions is limited. Not surprisingly, contemporary policy makers suddenly find they have a very thin evidence base from which to work [11]

SECTION 2. THE CHANGING PROBABILITY OF HOME OWNERSHIP BY AGE

Of all the issues under which falling rates of homeownership are discussed, probably the most significant is the apparently unequal access of young and older households to owner- occupied housing. Figure 3 draws on the published census data to show how the proportion of households owning their usual residence changes with the age of the household reference person in each of the four census years. The reference person is the person who completes the census form on behalf of the household and can be anyone elected by the household.[12]

There are a number of respondents who for various reasons are unable to answer the tenure question and end up being coded as Not Elsewhere Included (NEI) on the tenure variable. This group, which makes up about five percent of the household census, varies demographically and in terms of socio-economic position; most are renters for example. The proportion of NEI also varies from one census to another and has grown as a proportion through to 2006 (see Appendix 1).

The variable presence of the NEI requires that we offer two estimates of the proportion owning, an upper and a lower bound. The former is calculated as the number of owners (including those in family trusts) divided by all owners and renters $o/(o+r)$ which we refer to as p_1. The lower bound $o / (o + r + a)$ we call p_2. The upper bound assumes that NEI respondents (a) are distributed in exactly the same way across the tenure categories as non NEI respondents, and the lower bound assumes that all NEI are renters. The true rate lies between the two. A full discussion is given in Appendix 1.

2.1 Tenure and age

The prevailing cross sectional pattern of home ownership in New Zealand is one in which the probability of owning rises at a diminishing rate with age, from around 20 percent of 20-25 year olds through to about 80 percent of those households in their 40s after which the growth in ownership with age is much slower. Figure 3 is plotted directly from the proportions of owners in each age group. These empirical probabilities suggest that in all except the 2006 census households in their 70s and 80s had lower rates of

---

[11] At the time of writing a House Price Unit operates from within the Department of Prime Minister and Cabinet (DPMC) focussed among other things on slowing housing price increases, lessening their volatility and managing their impacts.

[12] Analysis of who was actually chosen as the reference person was undertaken in a previous study and the vast majority of two adult or more cases were the adult male (Morrison, 2005)

ownership than those in their 60s.[13]   The differential diminishes with each successive census.[14]

Figure 3. The proportion of home owners by age of the household reference person 1991 to 2006. Upper bound (p_1)
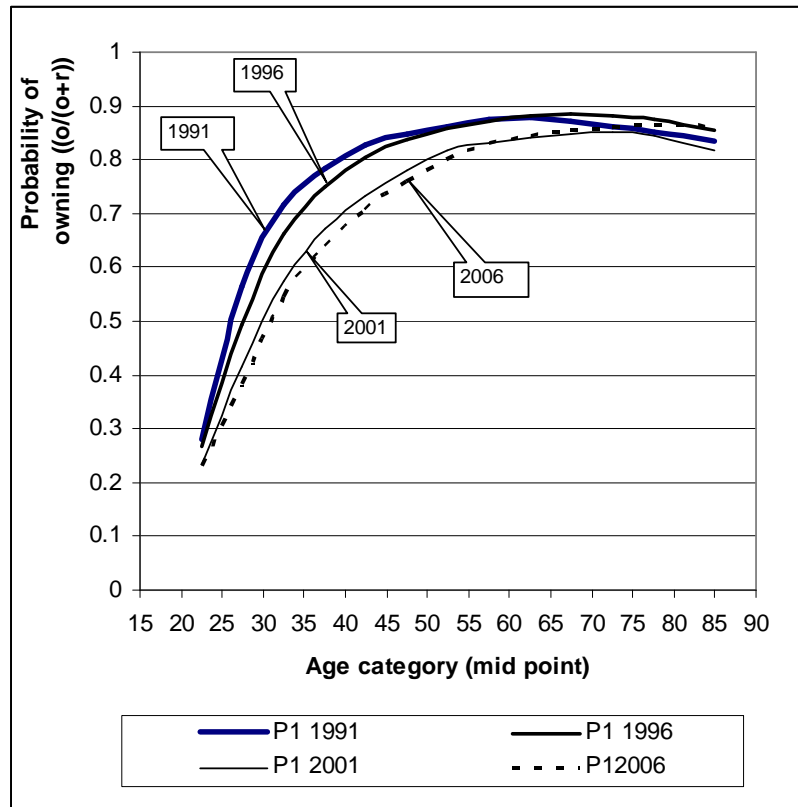
The cross-sectional relationship between the probability of ownership and age of the household reference person can be modeled succinctly from the data by regressing the log of the odds in favour of ownership (the dependent variable) on age as a quadratic function.

---

[13] One cannot infer from such cross sections that ownership falls as people get older, indeed there is considerable evidence from longitudinal surveys to the contrary.   The declining rates apparent at older age in cross sectional evidence is most likely driven by selection bias resulting from differential mortality rates - the fact that that owners, usually the richer households, live longer - a feature pointed out by (Shorrocks, 1975) and noted in (Crossley & Ostrovsky, 2003).   The bias is augmented in the 2006 case by the larger than usual proportion of older residents who did not respond to the question and they were disproportionately renters. There are in other words at least two sources of selection bias involved here.

[14] The age of the household reference person excludes those reference persons who were not usually resident in the household. Just the upper bound estimates are presented in this initial illustration.

(1) $$\log (p/1-p) = \alpha + \beta_1 \text{ age} + \beta_2 \text{ age}^2 + \varepsilon$$

The term p is the proportion of households owning their own dwelling and age is the mid point of the five year age range of the household reference person. [15]

The data on which Figure 3 and subsequent analysis is based is a seven-way cross-tabulation from the last four censuses of population and dwellings, that is 1991, 1996, 2001 and 2006. Variables include the tenure of household (5 categories) x age of the reference person (14) x household type (5) x income quartiles (5) x dwelling type (3) x location (6) x census year (4). The result is a cross tabulation with 126, 000 cells (5 x 14 x 5 x 5 x 3 x 6 x 4).

The seven-way table was subsequently converted to a full relational table in which each cell became a row and each variable a column. The data matrix in this form was submitted to the grouped logit regression the results of which we report below. Only the rows (cells) containing at least 6 households are used (the count being randomly rounded to base 3). The exclusion of cells with fewer than six households substantially reduces rows (observations) to those reported in each regression below. Each variable, their categories and their counts are described as they are introduced into the model.

To illustrate the method, the age quadratic model was fitted to responses to the tenure question by those living in a subset of settlements outside both the main and secondary centres in 1991. Over 70 percent of the variance in the log of the odds ratio was accounted for simply by the two age terms and returned highly significant coefficients for both age and age squared as shown in equation 2 (t statistics in brackets).

(2) $$\log (p/1-p) = -4.98 + -0.242 \text{ age} + -.0018 \text{ age}^2 \ ; \ N= 492$$
$$(-18.28) \quad (20.0) \quad (-15.1)$$

A clearer idea of the nature of the fit can be obtained from Figure 4. For the purpose of illustration we have represented the number of owners in each cell of our seven way cross tabulation as a circle which can be thought of as a weight based on the cell size. The circle is drawn proportionately to number of tenured households in each of the 492 cells included here (those who are owners or renters). So for example, in the case of our '85 year old' category (those over 80 years old, the top right hand of the Figure 3) there is one cell in the cross tabulation which contains a reasonably large number of such households which overlaps a number of cells with successively smaller counts. The line fitted through the weighted points represented by the circles in Figure 4 is the probability of ownership post-estimated from the fitted equation above (1). Again, just the upper bound is shown for a very similar graph results when applied to the lower

15 Mid points of the age categories are used to generate a continuous variable with the mid point of the open ended category, those over 80, set at 85. Missing ages are imputed by Statistics New Zealand as part of their routine processing and there are therefore no 'other' (age) categories are identified as there are for the other variables introduced below.

bound. The line itself is a median spline.[16]   The parameters from the grouped logit model employed here are estimated via weighted least squares so the estimated probabilities of ownership for any age reflects the more heavily weighted cells (the larger circles in Figure 4).   The 95 percent confidence bands hug the line quite tightly as would be inferred from the fit of equation 2 above. We use such median splines in the graphs throughout this report but Figure 4 is a useful reminder that they *are* estimates and there will always be a range of probabilities of ownership associated with any age band.

Figure 4. The estimated probability of home ownership by age of household reference person (upper bound, p_1). Fitted to settlements beyond the main and secondary centres (the Rest of New Zealand) in 1991

Circles are proportional to the number of owners plus renters in
each age group in 1991.
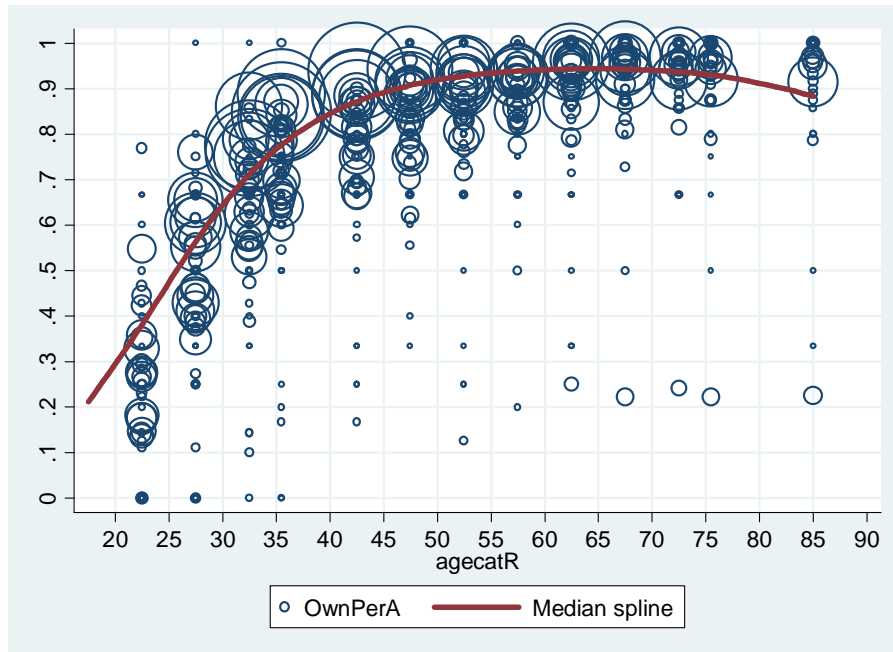
2.2 Upper and lower bounds of ownership

Applying the age quadratic model of equation 1 to the full set of households from each successive census year yields the coefficients shown in Table 2. The coefficient of determination remain reasonably stable across the four years and the confidence intervals retain a similar interval. Table 2 just presents results for the upper bound (p_1) for those of the lower bound are very similar.

Table 2 shows how the coefficient on age rise between 1991 and 2006 and how the negative coefficient on age squared falls over time.   Both these features of the fitted

---

[16] This plot is generated from the STATA9 command, 'twoway mspline' which calculates cross medians and then uses the cross medians as knots to fit a cubic spline. See STATA9 Graphics [G] manual page 223.

quadratic model are reflected in the graphs of the four post-estimated probabilities of homeownership plotted in Figure 5a and b using the upper and lower bound probabilities respectively. As expected, these largely replicate those graphed directly from the census cross tabulations of ownership by age in Figure 3.[17]

Table 2. Coefficients estimated from the regression of the log odds of home ownership on the age and age squared of household reference persons in the four successive censuses 1991 to 2006. Estimates for the upper bound, p_1.

Year		Constant	Age	Age^2	N	R^2
1991	Coeff	-5.17	0.253	-.0021	3124	0.375
	t stat.	-27.21	31.06	-25.62		
	CI upper	-5.54	.237	-.002		
	CI lower	-4.79	.269	-.002		
1996	Coeff	-5.52	0.254	-.00199	3009	0.427
	t stat.	-28.97	31.21	-24.71		
	CI upper	-5.89	.238	-.0021		
	CI lower	-5.15	.270	-.0028		
2001	Coeff	-5.27	0.226	-.0017	3999	0.403
	t stat.	-32.18	33.45	-26.3		
	CI upper	-5.59	.212	-.0018		
	CI lower	-4.95	.238	-.0016		
2006	Coeff	-4.89	0.199	-.0014	3616	0.472
	t stat.	-31.93	31.31	-22.61		
	CI upper	-5.20	.187	-.0015		
	CI lower	-4.59	.212	-.0013		

Source: Statistics New Zealand. Special tabulations from the 1991, 1996, 2001 and 2006 censuses of population and dwellings.

The first conclusion we can draw from Figure 5 is that homeownership rates for all except the very oldest age groups fell with each successive census (bearing mind the assumptions about the measurement of homeownership outlined in Appendix 1). In other words each successive fitted age function sits vertically below the previous census (except for the very oldest age group). The fall in the New Zealand home ownership rate has therefore been very widespread and not confined to any specific age range.

---

[17] The only possible compromise in using the estimated probabilities here is the slightly lower estimation of ownership rates in 2001 throughout the age domain.

Figure 5. The estimated probability of home ownership as a quadratic function of age of household reference person, 1991 to 2006.

a. Upper bound (p_1)
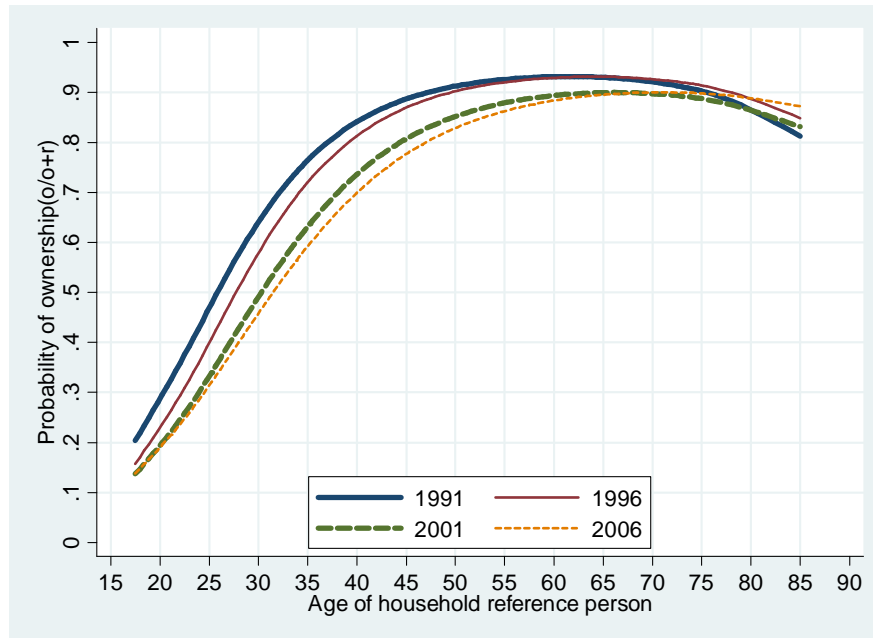
b. Lower bound (p_2)
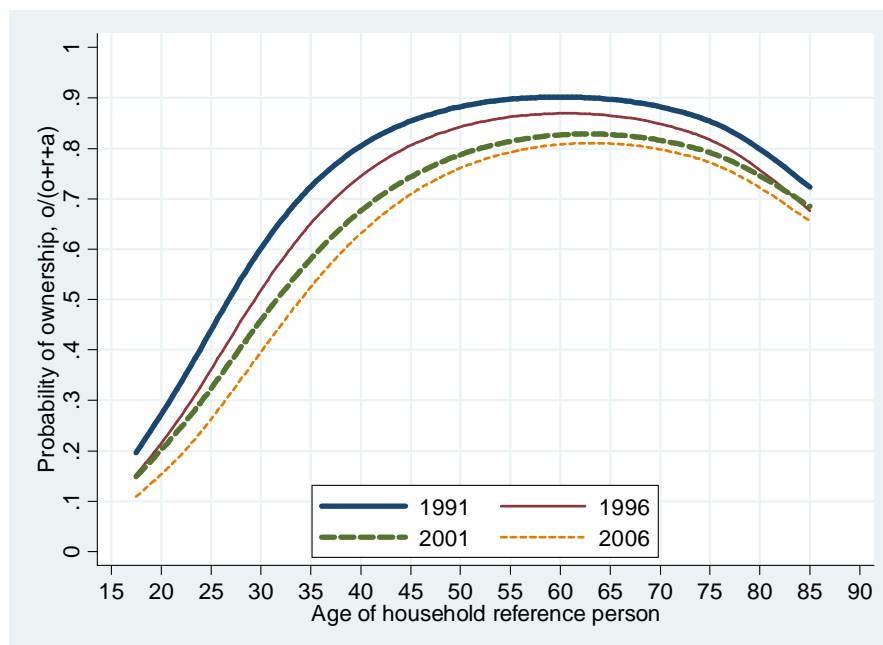
In Appendix 1 we plot the different between these two graphs (Figure A1) which shows how the lower bounded estimates sit below the upper but quite unevenly both across the age domain and across the four different census years. These results

highlight the fact that the difference between the upper and lower bounds differ by census, increasing between 1991 and 1996 and again between 2001 and 2006. They also show how the gap between the upper and lower bounds increase through to about 40 years of age depending on the census, remain relatively stable then rise at an increasing rate from 55 years onwards so the gap between the upper and lower bounds for the very old age groups is two to three times that of the younger age groups (see Figure A2).

Another way of viewing Figure 5 is to compare the successive fitted lines *horizontally* in each graph in order to obtain an implied time to achieve any given probability of ownership. For example, if we compare 1991 with 2006 at its widest point we find an almost a seven year extension in the time taken to achieve a given likelihood of ownership. In 1991 a household reference person had a 50 percent chance of owning at 25 years old whereas by 2006 they would have had to reach age 32 to have the same chance. The inference one could draw from these four estimated cross sections is either a fall in the likelihood of ownership in most ages or a delayed entry into ownership.[18]

In the two sections to follow we explore the extent to which this picture of ownership change holds across different types of household, income quartile and then by dwelling type and location. We then add controls to the quadratic age model of ownership in order to estimate the marginal impacts of each of these variables on the probability of owning.

Despite the intuitive appeal of comparing cross-sectional relationships (of home ownership with age) the results can be misleading as guides to what happens to individual households over their life course or housing career. As the literature makes very clear one should *not* interpret the cross-sectional evidence as representing the change in ownership which a typical household might pass through as they age. Doing so would confuse the age *group* with the age *cohort* (Pitkin & Myers, 1994). As we noted in section 1, the debate surrounding falling home ownership rates is largely about generations rather than age and therefore the distinction between the age group and the cohort needs to play a central methodological role in interpreting change in homeownership. Ideally of course we would draw on a suitable longitudinal file for this task. In the absence of such a file we link the cross-sections to generate synthetic birth cohorts as described in Section 5.

In sections 3 and 4 to follow we confine our attention to how different age groups (not cohorts) experienced the housing market over the 1991 to 2006 period. Our primary intention in doing so is to explore the *distributional* impacts of the increasing difficulties households faced in achieving home ownership. Any interpretations in life cycle or housing career terms we leave to the cohort analysis reported in section 5. The purpose of Section 3 and 4 is simply to show how the particular age groups in one census differed from the experience of the same age group one or more censuses later. With this important caveat in mind we turn to the evidence.

---

[18] A third way of using Figure 5 is to estimate the rate of change in ownership at any age along the four fitted curves. The slope of the tangent at any such point ($\delta p/\delta x$) can be estimated from the fitted model.

Section 3. The changing influence of household attributes on tenure

Notwithstanding the breakdown of the traditional housing career as a basis for conceptualising housing demand in general and homeownership in particular, there is still a very close relationship between the type of household and the demand for ownership. The reasons are manifold and extend from the commitment of couples not only to contribute jointly to purchase but to secure control over their housing environment in order to raise a family. Marriage and having children remain dominant influences on the propensity to own as they did even during the Second Demographic Transition when previous demographic relationships began to fall apart (Pool, Dharmalingam, & Sceats, 2007).   For these reasons we want to explore the way in which different types of households at different relative income levels have experienced a decline in ownership.

3.1 Household type and tenure

Household type plays a central role in any discussion of tenure and here we use the Statistics New Zealand division of households into Couples, Couples with Children, One Parent with Children, One Person Household and 'Other'.   In earlier work on New Zealand tenure patterns DTZ drew attention to the disparity between different household types in terms of their ownership rates noting how the rate for couples with children was well ahead of the average for all other household types (79.5% > 71.4%) (DTZ-New-Zealand, 2004). They also noted how this gap has widened since 1981 even though the absolute number of such households had fallen (by 13.7%). DTZ also noted how the number of Couple Only households had risen together with the proportion in ownership.[19] Table 3 shows the distribution of households across the five categories.

A comparison of the likelihood of each of the four household types owning their dwelling at each age in 1991 is presented in Figure 6.[20] According to this 1991 evidence couples exhibit the highest likelihood of owning in almost all age categories. (Similar results apply to the lower bound so just the upper bound estimates are shown here.) Couples not only began their adult lives with higher levels of home ownership but they acquire ownership much more rapidly over their life course than single adult households. Ownership accrues even earlier among Couples when children are present. While the influence of an additional adult on ownership was clearly more important than adding a child (in 1991), the presence of children had the effect of raising the probability of ownership by between a quarter and three quarters of a percent in couples as well as single adult households.

---

[19] An extended discussion of the change in number and proportion of households in New Zealand may also be found in Statistics New Zealand (2005)

[20] The probabilities of home ownership were generated by applying the same quadratic age model used above to each of the household types separately. Alternatively a single model could have been run with appropriate parameterisation in order to isolate the individual household effects.   Tables of parameter estimates not included in the text are available upon request. Coefficients from the fitted models are used in turn to compute the probabilities of ownership by age.

Table 3.   The distribution of households by type, 1991 to 2006[21]

	1991	1996	2001	2006
Couple	275,805	306,816	327,720	362,928
Couple & Children	386,010	372,543	351,993	386,025
One Parent & Children	105,813	109,869	119,397	126,951
One Parent	232,395	253,560	299,550	319,638
Other	146,460	190,143	206,121	219,291
Total	**1,146,483**	**1,232,931**	**1,304,781**	**1,414,833**

Proportions				
Couple	24.1	24.9	25.1	25.7
Couple & Children	33.7	30.2	27.0	27.3
One Parent & Children	9.2	8.9	9.2	9.0
One Parent	20.3	20.6	23.0	22.6
Other	12.8	15.4	15.8	15.5
Total	100.0	100.0	100.0	100.0

Source: Statistics New Zealand. Special tabulations from the 1991, 1996, 2001 and 2006 censuses of population and dwellings.

By contrast, single adult households experience much lower probabilities of ownership and reach their peak probabilities much later in life (although of course some will enter this household state as a result of dissolution of Couple based households). Whereas the likelihood of owning is highest among couples in their late 50s and early 60s the peak likelihood of ownership is experienced by those who are single in older age (again mainly because of the departure of a spouse).

The particular measure of homeownership we use has little effect on the difference between Couples and Couples with Children even though ownership rates are uniformly lower when we use p2 (see Appendix 1). Among single adult households not only are p2 rates lower but they are markedly lower for younger single adults with children - reflecting in turn their lower response rates to the tenure question.

A visual comparison of Figure 6 and 7 suggests a number of differences between the ownership probabilities of households in the two cross-sections 1991 and 2006 and these differences are highlighted in Figure 8.

---

[21] Includes all households in the data set. Not limited to cells with more than six households per cell. But excludes households with a household reference person under 20 years and those who are not usual residents.

Figure 6. **The estimated probabilities of home ownership by household type as a quadratic function of age of household reference person in 1991.**
Upper bound (p$_1$)
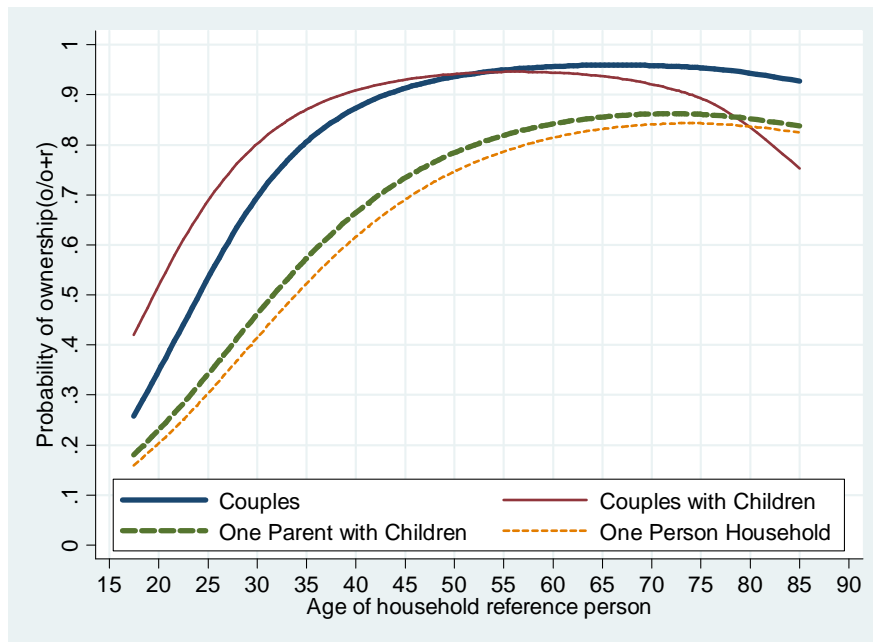
Figure 7. **The estimated probabilities of home ownership by household type as a quadratic function of age of household reference person in 2006.**
Upper bound (p$_1$)
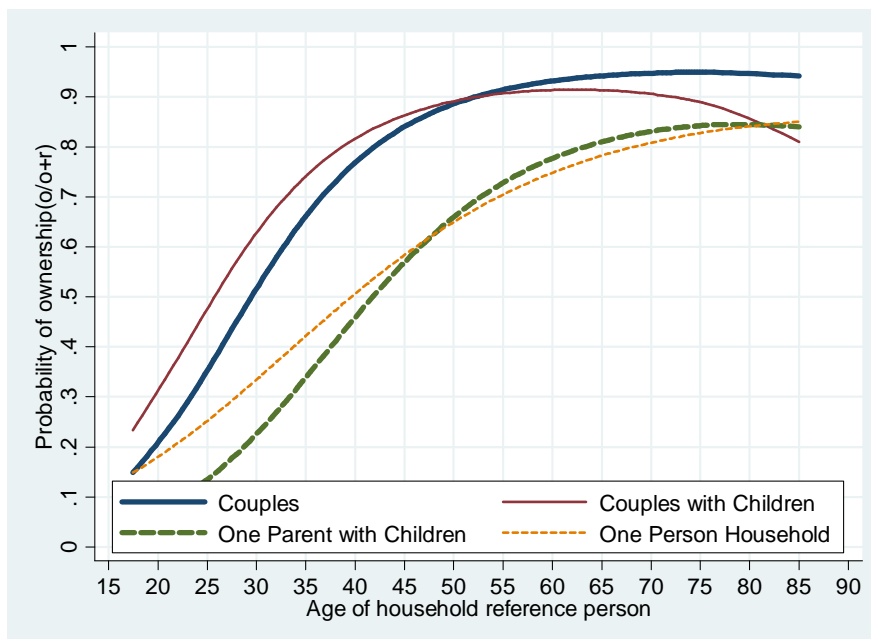
Figure 8. Decline in the probability of ownership between 1991 and 2006 by household type by age of household reference person. Upper bound (p_1)
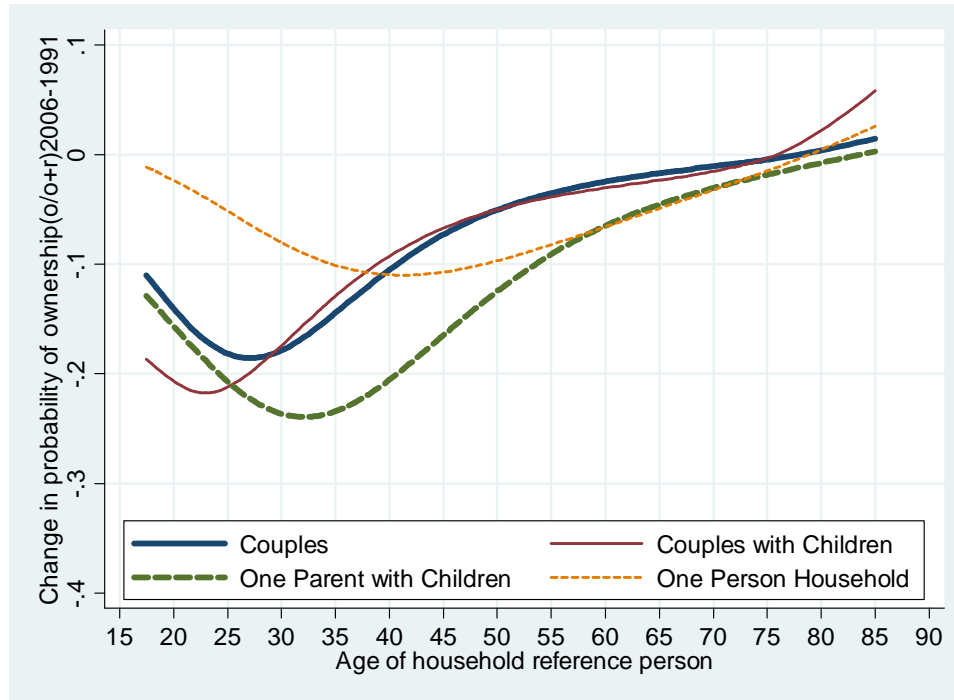
The differences in Figure 8 confirm the way the distribution in Figure 6 shift downward to the right ending up as Figure 7 as the probability of ownership fell over the study period. The most marked drop occurred among single parents raising children, a group whose ownership rates were also the lowest coming into the period. In the case of couples it was the younger families who experienced the greatest decline. The group which experienced least disruption in their access to home ownership over the period were the one person households and where the decline did occur it was most likely among the middle age groups. We analyse these and other effects statistically in section 4.

3.2 The influence of household income

Household income is compiled as the sum of responses of individuals who make up the household. Since household incomes change in nominal values with inflation, in order to identify relatively consistent positions in the distribution income quartiles have been used. The cut off points for the income distributions in each censuses were calculated by Statistics New Zealand and supplied as follows:

Quartile	1991	1996	2001	2006
Q1-Q2	$17,100	$18,800	$20,800	$22,251
Q2-Q3	$30,900	$34,700	$39,800	$51,596
Q3-Q4	$51,800	$59,900	$67,400	$89,259

So for example, households reporting a total income below $17,000 in 1991 were classified as being in quartile 1. To be so classified in 2001 a household would have to have reported an income of under $20,800, and in 2006 a nominal income of under $22, 251, and so on. The resulting distribution is shown in Table 4.

Table 4 Distribution of Households by Income Group, 1991 – 2006

	1991	1996	2001	2006
Income Quartile 1	249,531	258,783	265,623	297,189
Income Quartile 2	250,635	259,743	267,420	297,672
Income Quartile 3	251,679	260,802	268,518	299,316
Income Quartile 4	252,972	261,231	268,698	299,919
Total	**1,004,817**	**1,040,559**	**1,070,259**	**1,194,096**
Other	141,666	192,372	234,522	220,737
Grand total	**1,146,483**	**1,232,931**	**1,304,781**	**1,414,833**
	1991	1996	2001	2006
Income Quartile 1	24.8	24.9	24.8	24.9
Income Quartile 2	24.9	25.0	25.0	24.9
Income Quartile 3	25.0	25.1	25.1	25.1
Income Quartile 4	25.2	25.1	25.1	25.1
Total	100.0	100.0	100.0	100.0
Other	12.4	15.6	18.0	15.6
Grand total	100.0	100.0	100.0	100.0

Source: Statistics New Zealand. Special tabulations from the 1991, 1996, 2001 and 2006 censuses of population and dwellings.

There are three questions we want to ask about household income and its relationship to declining homeownership. Firstly, to what extent are the differences in ownership rates among household types simply a reflection of the fact that they occupy different positions in the income distribution? Secondly, what influence do these relative income positions have on the way tenure changes with age across the household types? And thirdly, how differently did the income groups experience the reduction in ownership?

The place households occupy in the income distribution clearly has a substantial effect on the propensity to own, throughout the age range and over each of the four census years: the greater the distance from the highest income quartile the lower the propensity to own (with the exception of the very oldest age groups). As Figure 8 shows, the influence on ownership of a household being in either of the two top quartiles is not that great but being located in the second or first quartile clearly has a considerable influence. [22]

---

[22] The exact interpretation of the income effect is complicated when it comes to durable goods such as housing where permanent or long term income, wealth and the ability to borrow all play an important role. Therefore the income quartile we use here should be viewed only as indicative of a relative position that may well carry over into other relevant variables such as permanent income and wealth. Obviously more sophisticated modeling using unit record data possibly from longitudinal surveys would be required

Between 1991 and 2006 in Figure 9 and Figure 10 we see the familiar shift downward to the right of the estimated ownership function. Note in particular how the differences between the probability of ownership between the first and fourth income quartiles are quite age specific, reaching a maximum 10 years older in 2006 than in 1991.

Figure 9.   The estimated probabilities of home ownership as a quadratic function of age of household income quartile in 1991. All household types.
Upper bound p_1
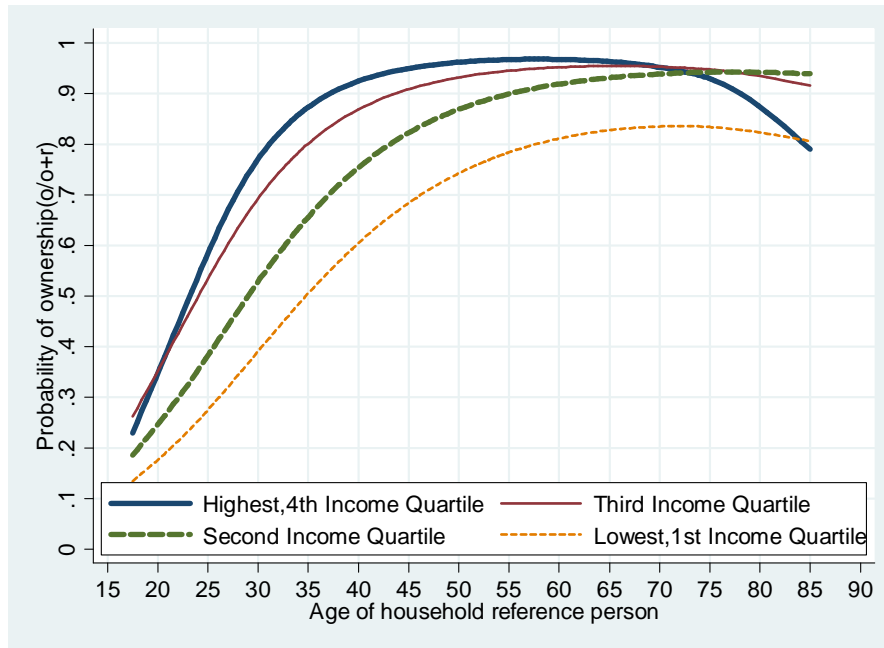
While the rate of increase in ownership with age has slowed over the years for all income groups the decline in the probability of ownership with age has been most marked among those in the bottom quarter of the income distribution and least among those in the top, a difference which is most apparent in the young age groups.

Sitting behind these trends in ownership by income are the changes in household type we documented earlier, for household income is heavily dependent on the number of earners in the household and, therefore, some of the change in income will undoubtedly reflect such changes in household composition.

In summary, a household's position in the relative distribution of household income clearly influences their chances of ownership. What is instructive is how the importance of this relativity grew over the period with the lower income groups noticeably less competitive in the ownership market in 2006 than they were in 1991, a feature that holds true throughout the age range.

---

to gain this deeper understanding. As Bourassa suggests, there are a range of other possible objections to using income as an argument in tenure choice models (Bourassa, 1995)

Figure 10. The estimated probabilities of home ownership as a function of age of household reference person by income quartile in 2006. All household types. Upper bound (p_1)
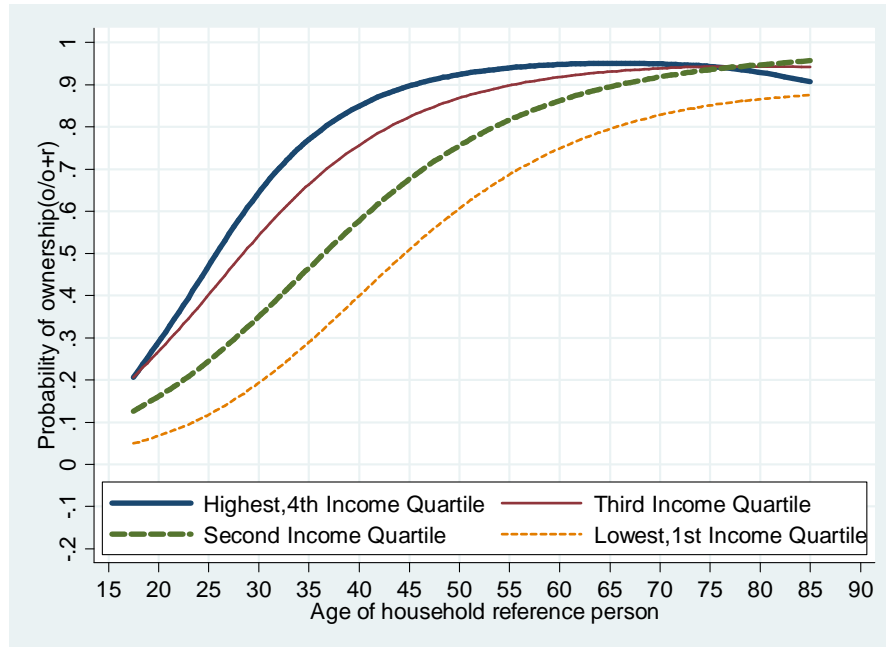
Despite their importance conceptually and empirically, age, household type and income are not the only dimensions of interest when it comes to understanding the widening tenure gap between households. *What* one buys and *where* one buys has an influence over and above the means to buy and the family circumstances triggering ownership largely because of the intimate relationship between dwelling type, residential location and the price of residential real estate. We turn to these additional dimensions in the following section.

SECTION 4. DWELLING TYPE, SETTLEMENT AND OWNERSHIP

In a recent paper Judith Yates and Daniel Mackay argued that, when making their housing choices households are faced with are decisions relating to tenure, dwelling type *and* location (Yates & Mackay, 2006). In practice, all three are interrelated: choice of dwelling type is highly constrained by tenure and the choice of both tenure and type reflect the housing demand pressures on particular locations.

In those parts of the world New Zealand compares itself to, smaller higher density accommodation is a well documented reaction to the increasing cost of single unit living. In North America rising price levels of the single detached dwellings has shifted demand toward all of the higher-density options, particularly toward high-rise rental apartments (Skaburskis, 1999). In Canada specifically there has been a steady decline in homeownership among household 'maintainers' under the age of 50 and a pronounced shift toward condominium ownership (Skaburskis, 2002). Such trends are no longer

foreign to those in the market for owned property. In New Zealand, however, only among the most recent generation of home seekers has the differential price of ownership by type of dwelling (and location) been quantitatively important enough to play a role in their decision making.

The aim of the following discussion is to show just how the relationship between type of dwelling and tenure choices in New Zealand has shifted over the past 15 years . We then extend the discussion into location and show how choice of tenure, type and location have simultaneously been affected by the increasing difficulty of securing ownership.

4.1 Dwelling type and tenure

Analysis of home ownership in New Zealand is confined to occupied private dwellings, that is dwellings which "accommodate a person or a group of people" and which is "not generally available for public use".   Statistics New Zealand defines "occupied private dwellings" quite widely to include houses, flats and apartments, flats or houses within a complex, residences attached to a business or institution. They include caravans, cabins and tents and even vehicles and vessels. They also include independent self-care units in retirement complexes, private dwellings within a non-private dwelling structure or complex, baches, cribs and holiday homes as well as Child, Youth and Family Service (CYFS) family homes. Homestays, farmstays are included as are bed and breakfasts (B&Bs) with fewer than five boarders, lodgers or guests.[23]

Occupied dwelling types are classified according to their structure and function.[24] There have been several changes in the way these classifications have been applied over our study period and in order to ensure continuity we have had to undertake a comparison at a high level of aggregation and simply compare single dwellings with non-single dwellings.

In 1991, households facing the non-single dwelling stock had a 42 percent chance of owning their unit; by 2006 this had risen to 45 percent.   So whereas the changes of ownership single unit dwellings with their much higher proportion of ownership was falling opportunities for purchasing non-single units were growing. However, the switch of tenure within the non-single sector was not sufficient to redress or compensate for the overall decline in the chances of ownership simply because of the predominance of the single unit stock.[25]

---

[23] Statistics New Zealand web page, http://www.stats.govt.nz. See Census and then Definitions.

[24] Note that the occupied dwelling type does not have a 'not classifiable' category, nor does it have any other residual categories. This is because all dwellings are classified during processing as either private or non-private, based on the information provided on the dwelling form by the collector and the respondent. If no further information is available about what type of private or non-private dwelling it is, then the dwelling is classified as an 'occupied private dwelling not further defined' or as an 'occupied non-private dwelling not further defined' whichever is appropriate (http://www.stats.govt.nz/census/2006-census-information-about-data/information-by-variable/occupied-dwelling-type.htm)

[25] In an observation that deserves closer attention, Hargreaves noted in his ecological study of the 2001 census results for the four cities in Auckland how, "the biggest swing to rental properties has occurred in established suburbs comprising mainly single-family detached homes. The biggest swing away from

Earlier in this report we showed how our upper bound rate of ownership (p_1), calculated over all dwelling types, had fallen from: 0.834 in 1991 to 0.818 in 1996, to 0.764 in 2001 and to 0.758 in 2006. Corresponding lower bound estimates (p_2) were as follows: 0.788, 0.729, 0.686 and 0.658. Somewhere between these estimated probabilities lay the 'true' rate. When we confine our estimation to *single* unit dwellings the ownership rates are predictably higher, for both the upper bound (0.886, 0.868, 0.832 and 0.794) and lower bound (0.845, 0.790, 0.762, and 0.721). The reason for the difference is that those Not Elsewhere Included are not as prevalent among the single households. The NEI respondents, with their lower incomes and younger ages are more characteristic of non-single dwellers as we discuss in Appendix 1.

Both the upper and lower bound estimates in Figure 11a and b show how marked the reduction in the tenure gap was between the two dwelling types regardless of the age of the household reference person. Regardless of whether households were represented by a 20 year old or 80 year old in 1991 the tenure gap between the types was rarely narrower than 30 percent. By 2006 the ownership rates of the two dwelling types had narrowed to within 10 percent in the lower bound and even more in the upper bound.

The interesting question in light of Figure 11 is the extent to which the growing supply of multiple and other dwellings for ownership actually helped relieve the demand for ownership by younger buyers, single persons, those with children as well as those in the lower income groups. We can address the first question through the preceding figures. In the early 1990s, not only was the likelihood of purchasing dwelling units outside the single dwelling market very low, but the probability of their purchase actually increased more slowly with age. What happened, particularly during the present decade, was a rise in the likelihood of finding such units for sale and the chance they would be purchased by older reference heads.

It is instructive to see how this 'transfer of tenure' played out among to the key household groups. We focus here on single parents whose collective income lay below the median (quartiles 1 and 2), with and without children, Figure 12, and repeat for those couples with and without children, controlling for age in each case, Figure 13. We confine the graphics to our lower bound estimates, p2, in each case simply because it is this sub-section of the population who are most likely not to respond to the tenure question.

What Figure 12 depicts quite succinctly is the way in which ownership opportunities in the single unit market fell for one person households with below median income in all age groups over the fifteen years to 2006. This category of household lost far less ground in the (much lower) probability of securing ownership in non-single units however. Given the general rise in the probability of ownership in this market, one person households lost out there as well.

---

rentals occurs in greenfield areas on the city fringes where the new housing is predominantly owner-occupied" (Hargreaves, 2003 p. 218).

By comparison one person households with children below the median income fared little better. In 1991 one parent households with children were more likely to secure ownership earlier than single adults of similar age but their comparative ability to do so dropped dramatically over the period as Figure 13 shows. So too did their relative ability to secure ownership in non-single units, although older single parents with children in the same year did fare a little better than their counterparts 15 years ago. This was hardly compensation for their marginal status in the single unit dwelling market for they were largely shut out of the single dwelling market and barely held their own in the multiple and other markets.[26]

Figure 11. The estimated probabilities of home ownership by type of dwelling as a quadratic function of age of household reference person in 1991 and 2006.

a. **Upper bound (p_1)**

---
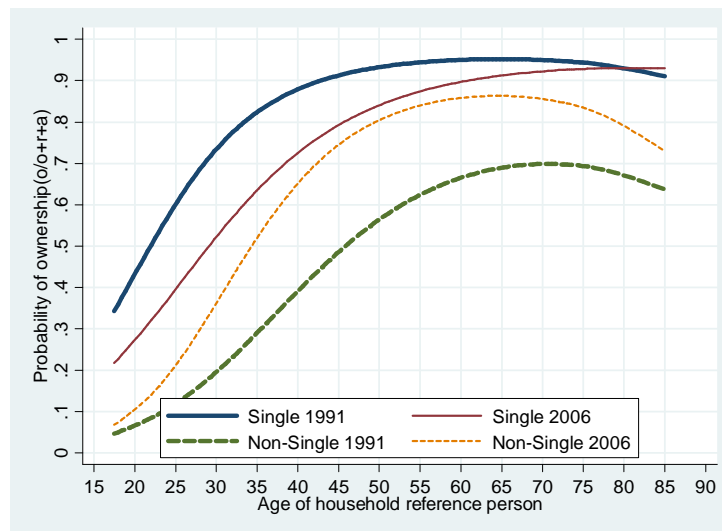
[26] Although not available from this data set, an inspection of Statistics New Zealand housing tables in both 2001 and 2006 show considerable heterogeneity across such dwellings, and it is likely that their increasingly marginal status lead to the occupancy of many marginal dwellings even though they may have secured ownership. Also in the interests of space I will not report the results for Couples or Couples with Children below the median income but these are available upon request.

b. Lower bound (p₂)
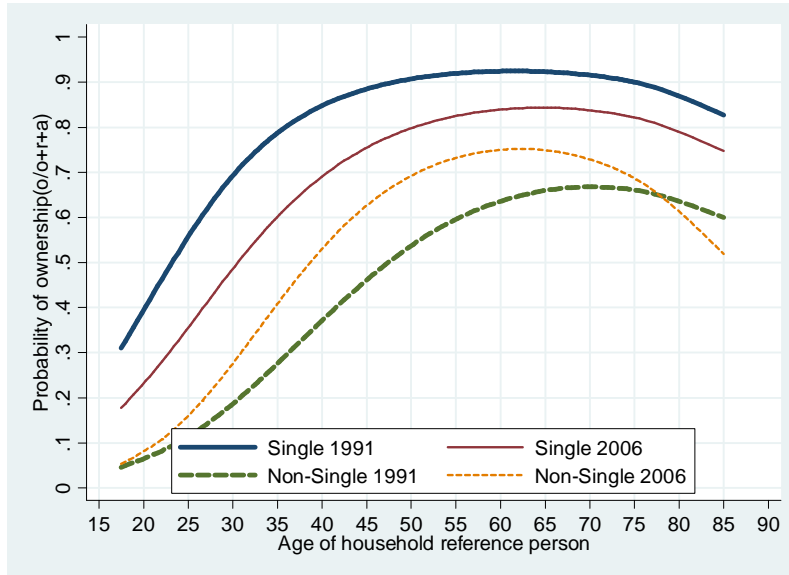
Figure 12. Change in the tenure mix experienced by One Person households below the median income, 1991 to 2006. Lower bound, p₂
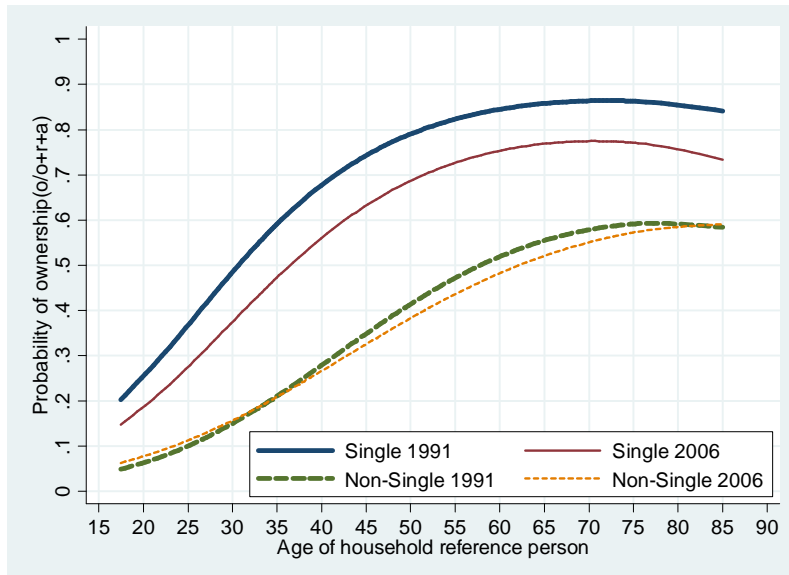
Figure 13. Change in the tenure mix experienced by One Person households with Children below the median household income, 1991 to 2006. Lower bound. p_2
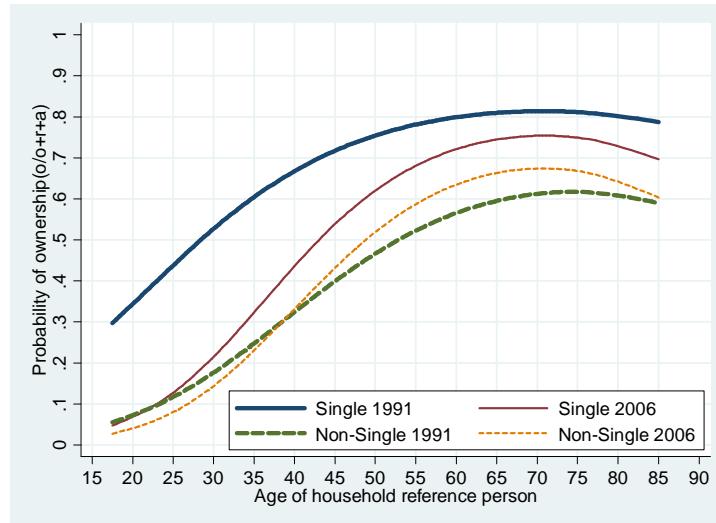
In summary, as the price of single unit housing has risen beyond the purchasing capability of an increasing proportion of households and as a result a growing number are transferring their demand for housing into the non-single dwelling unit market. While this has opened up opportunities for households who were less competitive in the single unit market the compromises in terms of size, accessibility and neighbourhood amenities are costs which may have to be borne by a wider population and, therefore, deserve closer research attention.

4.2 The influence of settlement type on tenure

One of the striking features of the market for owner occupancy as it evolved over the decade and a half has been the increasing importance of location in differentiating housing opportunities.[27] As Dieleman has argued, "housing conditions vary widely between housing market areas. If one wants to look at the housing market behaviour of households, the housing market areas must be defined at the metropolitan scale." (Dieleman, 2001). While a major theme in the contemporary research is focusessing on what is driving 'housing careers' (Flatau, Hendershott, Watson, & Wood, 2004), only a few of these have been complemented by an explicit awareness of the importance of the regional context (Deurloo, Clark, & Dieleman, 1994).

This geography of the New Zealand housing market has been documented elsewhere (DTZ New Zealand, 2007) but these authors do not consider the way ownership options

---

[27] There are many illustrations in the literature. One stimulating study from France traces the diffusion of homeownership to broader segments of the population and illustrates the key role played by the Paris region in both residential and social mobility (Lelievre & Bonvalet, 1994).

by dwelling type interact with location. This angle, together with a focus on settlement type rather than location per se, allows us to offer some complementary findings.

For the purpose of exploring the geography of tenure change New Zealand has been divided up into the three main urban centres: Auckland, Wellington and Christchurch, the Secondary Urban Centres and the Rest of New Zealand. It is clear from Table 5 that settlement location plays an important role in differentiating ownership opportunity and that the relative ability of the different locations to provide ownership opportunities did indeed shift over the decade and a half. In 1991 ownership rates for both single and non-single units dwellings were lowest in the two major centres and beyond urban New Zealand (Rest of New Zealand). Christchurch and the Secondary Centres offered the highest rates of ownership in both single and non-single unit properties.

While the chance of securing ownership of single units in Auckland had dropped substantially, from 71.7 percent to 59.2 percent, the chances of owning cheaper, non-single units rose, from 39 to 41 percent. Wellington experienced an even more marked increase in its non-single ownership rate, from 32.8 to 40 percent. But the most marked jump of all occurred outside the urban centres in the Rest of New Zealand where home ownership rates in non-single units rose from 45 to 56 percent.

Table 5. Home ownership rates by Settlement Type and Dwelling Type, 1991 and 2006

```
---------------------------------
            | Census year and dwelling type
            | ------ 1991 -----
     LocCat | Single   Non-single
------------+--------------------
    Auckland | .717       .390
  Wellington | .709       .328
 Christchurch | .758       .450
   Secondary | .750       .429
      RestNZ | .672       .448

 New Zealand | .728       .441
-------------------------------


-------------------------------
            | Census year and
            |   dwelling type
            | ------ 2006 -----
     LocCat | Single   Non-Single
------------+--------------------
    Auckland | .593       .413
  Wellington | .639       .399
 Christchurch | .661       .443
   Secondary | .636       .451
      RestNZ |  .615       .558

 New Zealand | .623       .454
-------------------------------
```

When it comes to understanding the geography of homeownership, locations can vary for reasons of population composition as much as physical context. That is, they can vary not simply because of their location and other physical settlement characteristics but also because of their population mix. In order to control for some of these *compositional* characteristics we allow the variables capturing household characteristics

38

to absorb their share of the variance in the log of the odds ratio before assessing the influence of the location fixed effects. The results are given in Table 6.

The results in Table 6 confirm the relative importance of age, household income and dwelling type, all of which display the expected odds of owning against their respective bases. What is new in Table 6 is the variation in the odds of owning across the respective locations. As in our tabular evidence, we find that odds of owning rise once leaving Auckland; only marginally and insignificantly compared to the Rest of New Zealand, but significantly relative to in Wellington, in the Secondary Centres and most spectacularly in Christchurch where the odds of securing ownership exceeded those of Auckland residents by a third.

Table 6. The odds of home ownship in New Zealand. Pooled model 1991-2006

```
Weighted LS logistic regression for grouped data

      Source |       SS       df       MS              Number of obs =    14131
-------------+------------------------------          F( 19, 14111) = 2963.01
       Model | 17647.0719     19  928.793255          Prob > F      =  0.0000
    Residual | 4423.26722  14111   .31346235          R-squared     =  0.7996
-------------+------------------------------          Adj R-squared =  0.7993
       Total | 22070.3391  14130  1.56194898          Root MSE      =  .55988


------------------------------------------------------------------------------
 households~d | Odds Ratio  Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
AGE          |
     agecatR |  1.168826   .0020091    90.75   0.000     1.164894    1.172771
    agecatRS |  .9989355   .0000164   -64.76   0.000     .9989033    .9989677
             |
HOUSEHOLD    |
     couplech |  1.264595   .0183463    16.18   0.000     1.229141    1.301073
     oneparch |  .5182366   .0098701   -34.51   0.000     .4992466     .537949
      oneparh |  .5601513   .0085307   -38.05   0.000     .5436771    .5771246
       otherh |  .3431252   .0056238   -65.26   0.000      .332277    .3543275
             |
INCOME       |
      hiq101 |  .2457351   .0044028   -78.33   0.000     .2372549    .2545185
      hiq201 |  .3751075   .0060527   -60.77   0.000      .363429    .3871612
      hiq301 |  .5941661    .009379   -32.98   0.000     .5760635    .6128376
      hiother |  .2505112   .0041474   -83.61   0.000     .2425123     .258774
             |
DWELLING TYPE|
     multiple |  .3475891   .0041128   -89.31   0.000     .3396203    .3557448
      otherdwg |  .1684309   .0042375   -70.80   0.000     .1603264    .1769451
             |
SETTLEMENT   |
   wellington |  1.064578   .0190558     3.50   0.000     1.027873    1.102592
  christchurch |  1.364112   .0245552    17.25   0.000     1.316819    1.413102
    secondary |  1.156688   .0137502    12.24   0.000     1.130048    1.183957
        restnz |  1.006526   .0166378     0.39   0.694     .9744363    1.039672
             |
CENSUS       |
       Y1996 |  .7515061   .0105418   -20.37   0.000     .7311244    .7724561
       Y2001 |  .6754014   .0093991   -28.20   0.000     .6572269    .6940785
       Y2006 |  .6501072   .0089389   -31.32   0.000     .6328199    .6678668
------------------------------------------------------------------------------
```

Source: Statistics New Zealand. Special tabulations from the 1991, 1996, 2001 and 2006 censuses of population and dwellings.

If the effect of location on the chances of owning varied over time as the tabular evidence suggests then we would expect these to register as relevant interactions. We find that relatively little happened to alter chances of owning in Christchurch and the Secondary

Centres but that the likelihood of owning in the Secondary centres showed a marked *decline*; see the settlement x census interaction effects in Table 7.

This relative fall in the ownership rate in Secondary centres is a significant result in light of what was also happening to ownership rates in the Rest of New Zealand. The outstanding feature here was how successively more attractive locations *outside* the metropolitan centres had became to home owners. As Table 7 shows, the interaction effects in favour of owning relative to Auckland grew, most particularly in the 1996 to 2001 period so that by 2001 the probability of owning in these areas was almost double that of households in Auckland. Much of this difference persisted into 2006. Even Wellington became a relatively more favourable site for homeownership to the point where in 2006 the odds in favour of ownership relative to Auckland had risen by a quarter.

Table 7. The odds of owning in New Zealand. Pooled model with settlement x census interaction effects 1991-2006

```
Weighted LS logistic regression for grouped data

       Source |       SS       df       MS              Number of obs =   14131
-------------+------------------------------           F( 31, 14099) = 1858.30
       Model | 17656.6563      31   569.569558          Prob > F      =  0.0000
    Residual | 4321.34927   14099   .306500409          R-squared     =  0.8034
-------------+------------------------------           Adj R-squared =  0.8029
       Total | 21978.0056   14130   1.55541441          Root MSE      =  .55362


-------------------------------------------------------------------------------
households~d | Odds Ratio  Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
AGE          |
     agecatR |   1.168476   .0019866    91.58   0.000    1.164589    1.172377
    agecatRS |   .9989381   .0000163   -65.31   0.000    .9989062    .9989699

HOUSEHOLD TYPE
     couplech |   1.266623   .0181713    16.47   0.000    1.231501    1.302747
     oneparch |   .5177876   .0097532   -34.94   0.000    .4990186    .5372626
      oneparh |   .5609693   .0084493   -38.38   0.000    .5446498    .5777779
       otherh |   .3435483   .0055689   -65.91   0.000    .3328041    .3546393

INCOME       |
      hiq101 |   .2471953   .0043797   -78.88   0.000    .2387578    .2559309
      hiq201 |   .3765273   .0060073   -61.22   0.000    .3649345    .3884885
      hiq301 |   .5944298   .0092764   -33.33   0.000    .5765221    .6128937
      hiother |   .2515425   .0041183   -84.30   0.000    .2435983    .2597458

DWELLING TYPE
     multiple |   .3444644   .0040421   -90.82   0.000    .3366318    .3524792
     otherdwg |   .1674502   .0041729   -71.71   0.000    .1594673    .1758327

SETTLEMENT   |
   wellington |   .9371003   .0354496    -1.72   0.086    .8701281    1.009227
  christchurch |  1.344868   .0529071     7.53   0.000    1.245061    1.452676
    secondary |   1.197139   .0303455     7.10   0.000    1.139111    1.258122
        restnz |   .7242741    .024904    -9.38   0.000    .6770677    .7747719

CENSUS       |
        Y1996 |   .7304103   .0197746   -11.60   0.000      .69266    .7702181
        Y2001 |   .6014479   .0159062   -19.22   0.000    .5710641    .6334484
        Y2006 |   .6504589   .0167832   -16.67   0.000    .6183797    .6842022

INTERACTION EFFECTS
      Wgtn1996 |   1.12439   .0587357     2.24   0.025    1.014958     1.24562
     Wgtn2001 |   1.163168   .0598876     2.94   0.003    1.051509    1.286683
     Wgtn2006 |   1.246888    .062666     4.39   0.000     1.12991    1.375975

      Chch1996 |  1.070045   .0572083     1.27   0.205    .9635853    1.188268
     Chch2001 |   1.069291   .0559301     1.28   0.200     .965093    1.184738
```

```
          Chch2006 |    .9331313    .047781    -1.35   0.177    .844021    1.03165

          Sec1996 |    .9728492   .0335575    -0.80   0.425   .9092465   1.040901
          Sec2001 |    1.038366    .035106     1.11   0.265   .9717837   1.109509
          Sec2006 |    .8755604   .0288815    -4.03   0.000   .8207403   .9340422

        RestNZ1996 |   1.221187   .0569809     4.28   0.000   1.114452   1.338144
        RestNZ2001 |   1.981987   .0924865    14.66   0.000   1.808745   2.171822
        RestNZ2006 |   1.429467   .0646994     7.89   0.000    1.30811   1.562082

        ------------------------------------------------------------------------------
```

Source: Statistics New Zealand. Special tabulations from the 1991, 1996, 2001 and 2006 censuses of population and dwellings.

In summary, the shifts in demand for ownership witnessed in New Zealand over the last fifteen years have been accompanied by a rising demand for property beyond the main urban centres. What we also learn from the above evidence was just how quickly the demand for ownership was transferred to properties outside the single unit market.

4.3 Ownership shifts by dwelling and settlement type

As the demand for housing rose from 1991 to 2006 New Zealand experienced a gradual, then accelerated, decline in the affordability ratio and a corresponding drop in the proportion of households able to buy. This shift was particularly marked in the case of single unit dwellings. The following combined graph Figure 14 shows how this decline in ownership of single units was experienced by the different age groups across the urban centres: Auckland and Wellington in the top two graphs and Christchurch and the Secondary Centres in the bottom two. The horizontal line at the 0.7 probability of ownership and at the 30 age group are provided as reference points to facilitate comparisons.

There are subtle geographic differences in the way changes the demand for home ownership have been expressed across New Zealand. The rate at which ownership rises with age as well as the levels of ownership achieved are lowest in Auckland and highest in Christchurch. There are also differences in the rate at which ownership falls by age across the centres. In particular, note the accelerated fall in ownership by age in Auckland initially between 1996 and 2001 and then most markedly over the five years leading up to the 2006 census. By contrast, the declines in ownership were more even over the inter-censal periods in Christchurch and Secondary Urban Centres.

It was not until the last inter-censal period that the pressure on housing assets began to be felt beyond the urban centres, a feature we can illustrate using the Rest of New Zealand in Figure 15. In the 1990s households living in the Rest of New Zealand were *less* likely to own but by 2006 their rate of ownership actually began to exceed those prevailing in Auckland, Wellington and Christchurch. Comparatively speaking, single dwelling units in these more dispersed, rural settlements experienced a less marked drop in ownership demand although comparatively speaking younger age households appeared slightly more affected.

41

Figure 14. The shift in demand for ownership in single unit dwellings across the four urban settlement categories: Auckland, Wellington, Christchurch and the Secondary Centres, 1991 to 2006
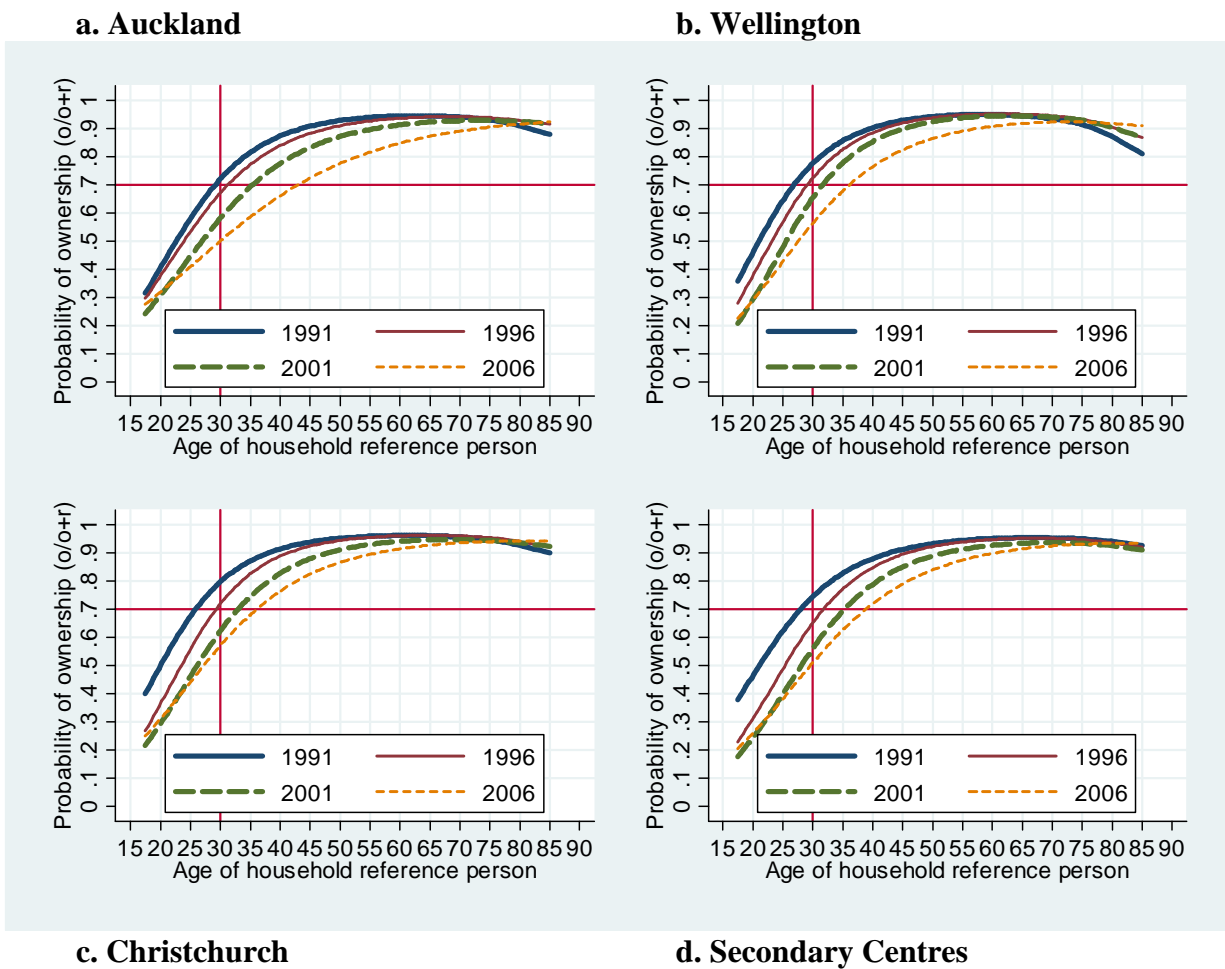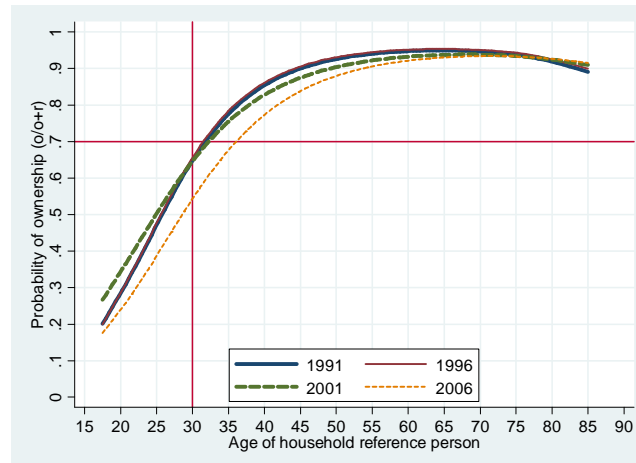
a. Auckland

b. Wellington

c. Christchurch

d. Secondary Centres

Figure 15. The changing demand for home ownership in single dwellings by age of household reference person in the Rest of New Zealand, 1991-2006

In summary, from the dwelling type and geographic evidence there would appear to be a strong demand for home ownership *per se*; a demand which households are willing to transfer beyond the traditional single unit property market into multi unit and other structures (including caravans, cabins, tents, vehicles and vessels covered by the non-single label).   Far from being confined to urban New Zealand, this demand has now spread to non-single units throughout the country particularly as more and more single unit properties get converted to rental units or otherwise removed from the owner occupied sector.

SECTION 5. SYNTHETIC COHORTS AND HOMEOWNERSHIP

The previous two sections of this report have analysed changes in homeownership from the perspective of the age group. Not only have we shown how age groups across the four censuses have realized different likelihoods of owning but that these differences vary with household type, income, dwelling type and location.

Although helpful, successive cross-sections do not allow us to trace what actually happened to individuals over the study period.   In order to do that we must be able to trace individuals and technically this requires re-interviewing within a longitudinal survey. Such surveys have only recently been initiated in New Zealand and none has yet been operating long enough to shed light on the questions we are asking here. We have chosen instead to modify the census cross sections so that they take on some of the characteristics of a longitudinal survey. In practice this involves reorganizing the data into cohorts rather than ages.

A 'cohort' is a temporally defined group of individuals, all of whom enter a system or given status in the same time period (Myers, 1999). With census data,

43

"we cannot literally trace the same individuals over time, as with panel or retrospective data. Instead, each census *samples* from true cohorts in different periods, and different markers can be used to define cohorts across the different cross-sections. Age is commonly used for identifying *birth* cohort membership that links observations across the different sample cross-sections" (Myers, 1999).

Myers goes on to note how cohort analysis used in this way meets many of the practical needs of researchers who seek understanding of longitudinal changes in housing in large part because cohorts have the analytical convenience of aggregates while retaining the temporal properties of individuals. With the passage of time, age, duration and other temporal properties advance for cohorts just as for individuals (Myers, 1999).

Cohorts become relevant in the study of tenure as in any other behavioural event to the extent that the age-specific history of the actors matters. If macro conditions change in ways that alter the chance of first time ownership then clearly the past history of a household becomes relevant. The primary advantage of the cohort for the study of tenure change, therefore, is that it allows us to separate the age effects from the cohort effects: the disentangling of life –cycle patterns from generational differences (Crossley & Ostrovsky, 2003). Specifically, if the history (of the cohort) *is* relevant then it should feature as an influence on home ownership independently of the age group in question and of the census year in which it is observed.

Four successive cross-sections are available in New Zealand over the 15 year time period. The cohorts we have constructed from these individual censuses we call synthetic because we are tracing the same (as well as some different) households that are surveyed each five years.[28] The method was introduced to the housing literature as Cohort Linked Cross Sections (CLCS) (Pitkin & Myers, 1994).[29]

Constructing synthetic cohorts involves taking a life table approach to data from the four census years. While we do not have access to histories of individuals or

---

[28] There are several New Zealand examples of the construction of synthetic cohorts from repeated cross sections. There are at least two examples using the Household Economic Survey (Gibson & Scobie, 2001; Stillman, 2006), There are relative few examples using the New Zealand census (Morrison, Papps, & Poot, 2006). They construct a synthetic sample of 20,302 observations over 30 New Zealand local labour markets derived from the 1986, 1991, 1996 New Zealand census data in order to analyse labour turnover in local labour markets. There have been a wide range of other application internationally; the classic is Borjas (1985) where synthetic cohorts were generated in order to examine the impact of successive wages of immigrants on wage levels. Age-wealth relationships have also been explored (Shorrocks, 1975), and rare life events have been studied in the context of aging (Campbell & Hudson, 1985).

[29] These authors originally applied CLCS to a measure of US housing demand in general but their findings and generated cohort demand trajectories are very similar to those they generated from homeownership measures. Most of the conclusions they draw about such trajectories are mirrored in our own results. A similar approach applied to the Australian census also produced similar results, see (Mudd, Tesfaghiorghis, & Bray, 2001). Two other applications of cohort analysis to housing careers have also been mentioned above, namely (Myers, 1999) and (Venti & Wise, 1987) and the Canadian study (Crossley & Ostrovsky, 2003).

households from the census we can identify the birth cohort of the current household reference person and it is the 'history' implied by his or her birth date which we use to generate the synthetic cohorts we analyse below. With only fifteen years available, we do not have access to the full life span of any cohort but we do cover the period over which many household reference persons are likely to be active in the home owner market (assumed to be from age 20 years onwards in this case).

5.1 The changing probability of home ownership

Table 8 and its accompanying Figure 16 tell an important story. Select any age group (not cohort) and trace its probability of ownership across the relevant *row* in the table from 1991 to 2006. As we move from left to right, see how each successive cohort reaches the selected age with a smaller proportion. Note also how this trend applies to *all* cohorts indicating that the falling rate of ownership has not been confined to younger buyers or more recent cohorts but is a shared experience across *all* cohorts. This suggests the occurrence of a structural or overall downward shift in the rate of ownership (of young, middle and early old households).

Table 8. Changes in the probability of ownership by cohort and earliest birth year (age) of household reference person, 1991 to 2006

| Cohort (earliest year born)	Age Group	Census Years			
		1991	1996	2001	2006
1911	80	0.774	0.730	0.713	0.674
1916	75	0.804	0.772	0.755	0.716
1921	70	0.823	0.797	0.766	0.748
1926	65	0.840	0.807	0.770	0.763
1931	60	0.847	0.808	0.768	0.768
1936	55	0.843	0.805	0.769	0.765
1941	50	0.831	0.799	0.763	0.739
1946	45	0.821	0.785	0.731	0.701
1951	40	0.800	0.748	0.690	0.651
1956	35	0.751	0.695	0.633	0.588
1961	30	0.678	0.605	0.540	0.499
1966	25	0.527	0.445	0.391	0.341
1971	20	0.261	0.235	0.216	0.202
	Total	**0.735**	**0.689**	**0.655**	**0.634**

Source: Statistics New Zealand. Special tabulations from the 1991, 1996, 2001 and 2006 censuses of population and dwellings.

Even accepting a common or structural shift towards lower rates of ownership and a deferral of purchase, we still want to ask whether the young cohorts were able to 'catch up' with the age-specific ownership rate of their immediately preceding cohort.

This is where Figure 16 is helpful. When the household reference persons from the 1971 cohort reached the 20<25 year old age group, only 26 percent owned their usual residence. By the time they reached the next age group, 44.5 percent were owning and when aged 30<35, over half were owning (54.0) and by 35<40, 58.8 percent. We will refer to this sequence of ownership rates as the cohort's tenure transition.

A comparison of the 1971 cohort's tenure transition with those that preceded it, the 1966 and 1961 cohorts, highlights two important things. Firstly, earlier cohorts entered any given age group with a larger proportion of their households as owner occupiers. Substantively, therefore, each new birth cohort began their housing career from a lower ownership base. The graphical evidence, however, suggests that each successive cohort caught up at a *faster* rate than its predecessor. By age 30<35 the gap in ownership terms between 1956, 1961, 1966 and 1971 cohorts had shrunk, from = 0.14 (0.69 - 0.54) to 0.12 (0.75-0.63) by age 35<40 and 0.11 (0.80-0.69) by age 40<45. In short, there was some evidence of catch up but the catch up was incomplete.

Figure 16. Changes in the Home Ownership Rate by Household cohort by earliest birth year of household reference person, 1991 to 2006
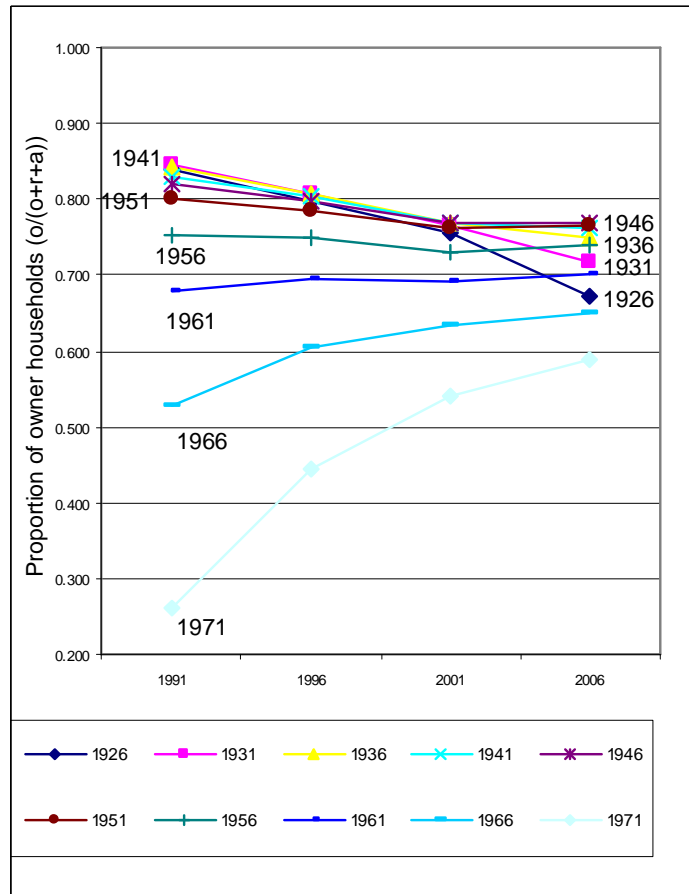
It is reasonable to expect a deferral of ownership to be followed by an attempt to catch up. Finding they were further behind in the ownership stakes than the cohort immediately preceding them, each new cohort makes a concerted effort to close the gap. As a result with each successive cohort we see a *greater rise* in ownership *but* from a lower initial base.[30] In other words these catch-ups of successive cohorts have not been sufficient to redress their successively lower starting positions. As a result younger cohorts have ended up with a lower rate of homeownership than their predecessors even after age and year effects are taken into account - a feature we confirm statistically below.

It is important that we link the age functions we estimated earlier in Section 2 and 3 with the cohort analysis just presented. This is quite easily done by superimposing the changing probability of ownership (p_1) on the estimated cross sections to produce Figure 17 (using the letter labels for the cohorts, given in Table 10).

Through Figure 17 we can see how the probability of each successive cohort of households owning their own home falls compared to its preceding cohort, a feature which replicates the Australian evidence (Mudd, Tesfaghiorghis, & Bray, 2001) and the USA (Myers, 1999). Each successive cohort recorded here faced a reduced probability of ownership but the speed at which they attempted to catch up exceeded their predecessor again as in the Australian case, (McDonald & Baxter, 2004).

Prima facie our data would support the deferral argument together with its implied association with later work entry, later marriage, later childbearing and deferred expenditure. Our point, however, is that deferral does not mean complete catchup. The more recent generations started their quest for homeownership later, but they started from a lower base and despite each generation catching up faster than the one before, they failed to match the home ownership rate of the cohort that preceded them. In fact, the gap between successive cohorts catchup rates increased over time and we turn now to a statistical verification of this point.

---

[30] There are a whole host of reasons why this might be occurring which lie outside the scope of this paper. However the depiction of changes in schooling, work and related patterns of New Zealand youth towards the older age groups is a valuable start (Stillman, 2006).

Figure 17. The changing probability of homeownership by age group and birth cohort, 1991 to 2006
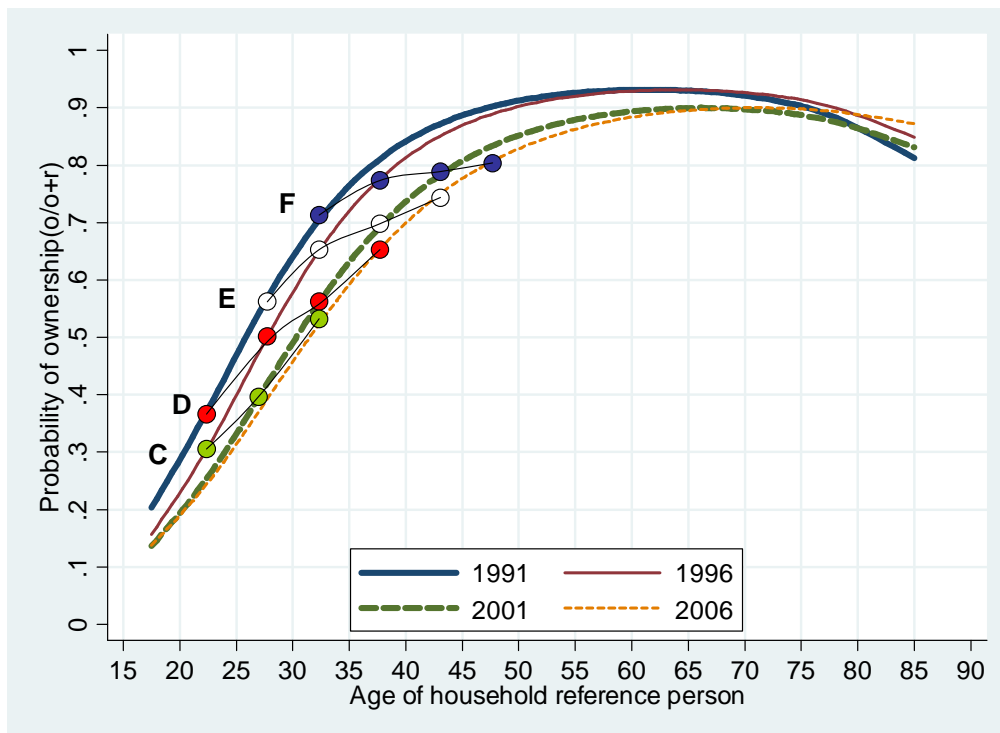
5.2 A statistical analysis

On the basis of the tabular and graphical evidence, our working hypothesis is that both structural *and* cohort specific deferral effects will have combined to lower the New Zealand home ownership rate over the 1991 to 2006 period. However the nature of the available New Zealand data is such that we have also had to confront several concerns expressed about drawing inferences from cohorts whose internal composition changes over time and also where the birth year may not be entirely exogenously set. In order to formally test these ideas we regress the log odds of home ownership against age, year and cohort fixed effects.

The age and year fixed effects have already been explained. How we measure cohort fixed effects is best illustrated via an example. The first cohort we identify is the very youngest and spans only three of the four censuses, 1996 through 2006 (recall Table 6). This cohort, which we label C22963206 identifies those household reference persons whose ages lie between 20 and 25 years in 1996. Their median age is taken as 22.5 years, hence the first part of the label, C2296. Over time this C cohort ages so that by 2006 their members take the median age of 32. This information is included at the end of the label, 3206. Labeling the cohorts this way makes it quite clear which years and ages the cohort refers to. Each such cohort is readily identifiable in Table 6.

The next oldest cohort is labeled D22913706, covering those with a median age of 22 years in 1991 who age over the full fifteen years to a median age of 37.5 in 2006 (the

lower non-shaded cohort identified in Table 8). This cohort in turn is preceded by the two earlier cohorts E27914206 and F32914706. It is these four cohorts that are identified as separate fixed effects in the regression below.

The concern here is that the membership of birth cohorts can be added (and lost) as a result of immigration and emigration (and mortality). If either of these migration events is systematically related to the probability of ownership, then suitable variables need to be incorporated explicitly into the model. As we show below, some age groups are very susceptible to net increases in membership through immigration. What is not at all clear either internationally or through the New Zealand literature is whether immigrants in these age groups are more or less likely than non-migrants to purchase and therefore whether migration induced changes in membership actually bias the probability of ownership or not.

More serious may be the fact that, unlike individuals, cohorts of *households* are affected by the household formation and dissolution rates (over and above any influence vital rates including migration may have). Therefore, household formation rates are likely to be endogenous in any model of tenure choice. Marriage and decisions to have children are well established triggers into ownership. At the same time, the chances of securing or failing to secure ownership may inhibit or at least defer the formation of certain types of households over others. In other words, the causation can run both ways. Couples may decide to postpone having children until they secure ownership, particularly since saving for a deposit usually requires both parents to work, and to work fulltime.   In order to include at least some control for these effects we have added household type fixed effects to the model. The results are given in Table 9. The base are Couples aged 20<25.

The age, household and census year effects behave as expected – with the odds in favour of ownership rising with age (in dummy form), child-based couple households showing much higher odds and singles much lower ownership rates than couples alone and ownership rates falling each census year. What we also see in these results is that cohort membership *also* matters; the later (young) the cohort, the lower the ownership rate. Even after age and census year effects are taken into account membership of the most recent cohorts has an *additional* negative effect on the probability of owning.[31] This confirms our reading of the tabular and graphical evidence. Experiencing noticeably lower changes of ownership were those households in the recent cohorts C and D, those born in the decade between 1961 and 1971.   While the negative effects on home

---

[31] Several tests on these coefficients were conducted over and above those shown in Table 9.   Firstly the block test that the cohort fixed effects as a whole were significant could not be rejected: $F(4, 7066) = 5.95$, Prob $> F = 0.0001$. Secondly, we tested whether the coefficients estimated for each successive cohort were significantly different from its predecessor. This alternative hypothesis could only be accepted when comparing cohort D and E, whose odds were 0.85 and 0.95 respectively $F(1, 7066) = 9.85$ Prob $> F = 0.0017$. In other words the negative cohort fixed effect on the chances of home ownership were essentially the same for those in the two latest cohorts C and D and the two earliest E and F. The noticeable fall in the likelihood of home ownership occurred between cohort D and E, that is, between those with a median age of 22 and 27 in 1991.

ownership were also characteristic of the two earlier cohorts (judging by their signs alone) none has been disadvantaged to the same extent as the most recent cohorts have been.

Table 9. Estimates of age and year effects for household reference persons cohorts born in the five year age group beginning 1971, 1966, 1961 and 1956.

```
Weighted LS logistic regression for grouped data

      Source |       SS       df       MS              Number of obs =     7083
-------------+------------------------------          F( 16,  7066) =   689.36
       Model |  8134.79422     16  508.424639          Prob > F       =   0.0000
    Residual |  5211.39993   7066  .737531833          R-squared      =   0.6095
-------------+------------------------------          Adj R-squared =   0.6086
       Total |  13346.1941   7082  1.88452332          Root MSE       =    .8588


------------------------------------------------------------------------------
households~d | Odds Ratio  Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     age2529 |   2.693155   .1304662    20.45   0.000     2.449171    2.961446
     age3034 |   5.329605   .2532848    35.21   0.000     4.855517    5.849983
     age3539 |   7.868495   .3750013    43.28   0.000     7.166674    8.639044
     age4044 |   10.89898    .534075    48.75   0.000     9.900743    11.99786
     age4549 |   14.80713   .7493865    53.25   0.000     13.40863    16.35149

     couplech |   1.402152   .0432708    10.95   0.000     1.319843    1.489594
     oneparch |   .2897021   .0112306   -31.96   0.000     .2685025    .3125754
      oneparh |   .3304327   .0129859   -28.18   0.000     .3059324    .3568951
       otherh |   .3854909   .0138831   -26.47   0.000     .3592142    .4136897

        Y1996 |   .8360484   .0253324    -5.91   0.000     .7878353    .8872118
        Y2001 |   .6022701    .018993   -16.08   0.000     .5661656     .640677
        Y2006 |   .5083465    .016647   -20.66   0.000     .4767387    .5420499

   C22963206 |   .8464618   .0401612    -3.51   0.000      .771284    .9289673
   D22913706 |   .8546647   .0329363    -4.08   0.000     .7924782     .921731
   E27914206 |   .9537988   .0320711    -1.41   0.160      .892957    1.018786
   F32914706 |   .9905731   .0305021    -0.31   0.758     .9325488    1.052208
```

Source: Statistics New Zealand. Special tabulations from the 1991, 1996, 2001 and 2006 censuses of population and dwellings.

In summary, what the results in this section suggest is that year, age and cohort fixed effects all appear to be operating against younger households, each depressing further their chance of home ownership. What is interesting about this result is that it is contrary to the Australian evidence developed from their analysis of young generations in the 1990s.   According to the Australian evidence, "once other characteristics are controlled, there is no indication of falls in home ownership across birth cohorts. If anything, more recent birth cohorts are *more* likely to be homeowners than earlier cohorts" (Baxter & McDonald, 2004 p. 2, my italics).   This certainly cannot be said for the recent household cohorts attempting to buy on the New Zealand market in the 2000s.   Unfortunately, without comparable data on both sides of the Tasman and the ability to estimate otherwise identical models this difference must remain speculative.

In the remainder of this section we want to illustrate a feature of the data whose bearing on the above results would warrant further attention than we have been able to give them here: changes in the size and membership of cohorts as they age.

50

5.3. Changes in cohort size and age distribution effects

Table 10 depicts the passage of 13 cohorts through one or more census years based on the ages of household reference persons (between twenty and eighty years old). Each cell contains the total number of households in the cohort as measured in the census year. We label each cohort by letter according to the first of their birth year interval: A through M.

Table 10. Synthetic cohorts based on the birth date of the household reference person 1991-2006. All households.

Earliest year born	Age Group	Census Years				Cohort
		1991	1996	2001	2006	
1911	80	44,400	53,436	62,787	75,489	M
1916	75	50,673	52,467	59,316	62,475	L
1921	70	63,081	68,706	70,641	68,631	K
1926	65	76,158	76,038	72,210	82,395	J
1931	60	80,832	73,692	82,401	96,660	I
1936	55	76,611	82,833	96,168	125,334	H
1941	50	86,523	96,660	124,065	134,622	G
1946	45	100,545	125,079	132,132	155,520	F
1951	40	127,452	132,744	149,703	166,311	E
1956	35	128,922	145,848	153,918	155,832	D
1961	30	133,662	142,764	136,269	133,134	C
1966	25	113,766	113,709	102,969	96,546	B
1971	20	68,121	73,491	64,911	68,928	A
	Total	**1,150,746**	**1,237,467**	**1,307,490**	**1,421,877**	

Source: Statistics New Zealand. Special tabulations from the 1991, 1996, 2001 and 2006 censuses of population and dwellings.

The total number of households (in privately occupied dwellings) rose from 1.15 million in 1991 to 1.42 million in 2006. If we convert the ten diagonals representing cohorts that pass all the way through the window in Table 10 to rows we can plot changes in their membership over the 15 year period as in Figure 6.

What we notice in Figure 18 is that the baby boomer cohorts, those born in 1946, 1951 and 1956 (together with 1941), remain fairly stable in terms of their size while there are gradual losses as the older cohorts age : 1936, 1931 and 1926 (the latter rises in 2006 only because this 80+ category includes *all* ages above 80). The least stable, and where we find the most marked net gains are those households formed most recently, those whose household reference persons were born in 1961, 1966 and, in particular, 1971.

51

Figure 18. Changes in the size of households cohort by earliest birth year of household reference person, 1991 to 2006
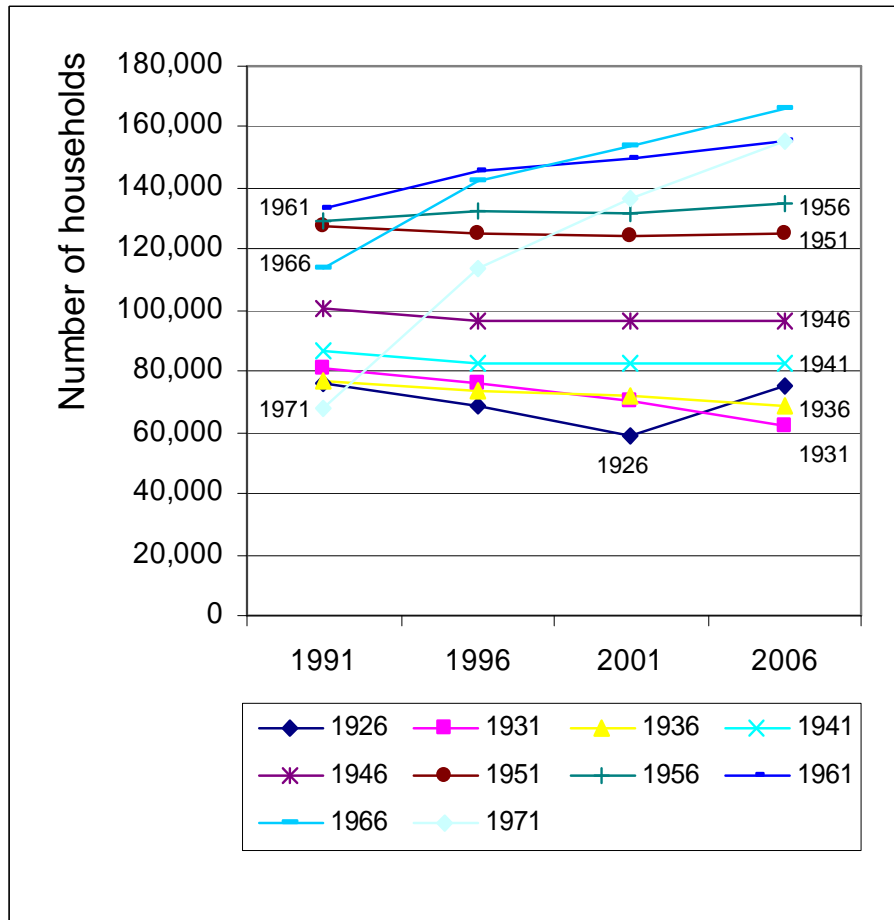

Figure 19 plots the successive age distributions that result from the passage of these cohorts. The figure is constructed by plotting the four *columns* in Table 10 and reflects the net cross sectional effect of changes in the size of cohorts over the fifteen year time window.[32] The rise in the age distribution upwards to the right in Figure 19, for example, reflects the successively higher number of households with reference heads between 40 and 55. As these baby boomer household cohorts (1951-1966) aged so they swelled the ranks of the large age groups. What we see in Figure 19 is not simply the aging of unequal sized cohorts, however, for that would simply result in a rightward shift of each separate graph. There is clearly something else happening to push the size of these cohorts upwards as well. What they reflect is a combination of net positive immigration and possibly a net rise in the household formation rate.

---

[32] The assumption here is that the process behind the assignment of household reference persons remains essentially unchanged across the censuses. For a discussion of this assumption in the method used by Mudd et and Yates , see (McDonald, 2003).

The passage of cohorts of different size through the housing market was accompanied by several other developments which had a profound influence on housing demand in New Zealand (as they did elsewhere). For example, these large cohorts were aging at the same time as the weight of housing demand was shifting towards the prime income earning age groups, a feature that was complemented by a rise in the female labour force participation rate, a trend which had the effect of substantially raising household incomes and hence their purchasing power. A possible counter to this trend was the increased marital instability that accompanied the rising labour force participation of women and the ensuing dissolution of households and a rise in new formation rates. Other factors also contributed to a fall in average size of households spreading more people over more households and lowering the average occupancy rate.

Figure 19. Successive age distributions of successive household reference persons, 1991- 2006
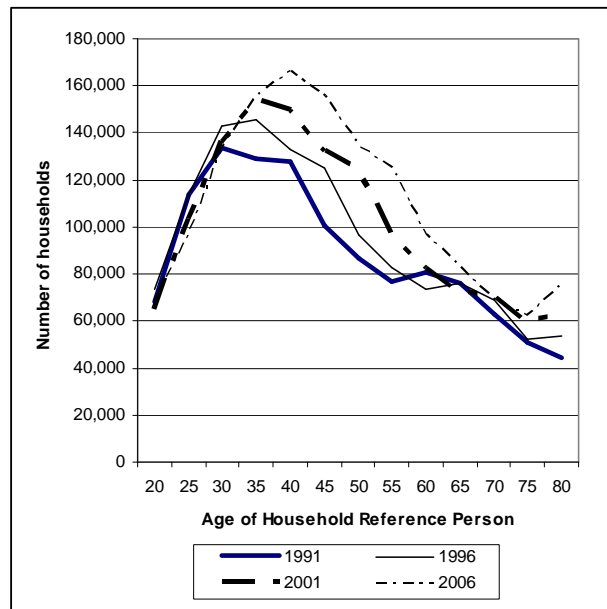
The result was a combination of demographic (size) and income effects associated with age together with an unprecedented growth in dual earner households which combined to place considerable pressure on a housing stock whose supply inelasticity inevitably resulted in a rapid rise in housing prices.

It is not possible with the data at hand to apportion the changes in the number of households to possible causes such as out-migration and deaths, for example, except to acknowledge that in *synthetic* cohorts these manifold composition effects are present and need to be acknowledged. In addition, since we are tracing cohorts of *households* and not simply individuals, there are also household formation and dissolution effects to consider as additional influences on the size of the cohort.

We also know that these trends affect the mix of household type and that this in turn could affect the age of the reference person. To the extent that the composition of household types will also change as the ages from which the synthetic cohorts are generated, they will compound the role of age in models such as those reported in Table 9. Unfortunately, without a detailed examination of how ages of household reference persons change, these questions must remain unresolved for now. At the same time it is unlikely that they will undermine the primary thesis being advanced here regarding structural deferral and catch-up effects on home ownership. The critical feature here is the extent to which these household type switches are associated with changes in the household reference person (and hence their age) and the extent of their age switch (within or across age boundaries).

SECTION 6. CONCLUSIONS

After rising throughout the post-war period the proportion of New Zealand households owning their own home reached its peak in 1986. While the *number* of households living in their own homes continued to rise past that census, home ownership *rates* declined and have continued to do so over the last one and a half decades. Debate surrounds both the magnitude, possible causes and meaning of the decline in home ownership rates and there is continuing political pressure for a policy response.

The attention given to recent tenure changes in New Zealand has been confined primarily to commentary rather than analysis. As a result, there remains a relatively thin evidence base upon which to reflect on the immediate, medium and long term consequences of falling home ownership rates. The aim of this report has been to assemble recent census evidence in order to encourage a more systematic analysis of the changing conditions under which tenure choices are made.

We have explored the way in which the fall in home ownership has been experienced by households whose reference persons belong to different age, household type and household income quartile.   In addition we have explored the interaction between ownership, dwelling type and settlement type over 1991 to 2006 period.   The probabilities of home ownership were estimated for non-zero cells in the seven-way cross-tabulation of age of reference person x household type x household income x dwelling type in five housing markets areas: Auckland, Wellington and Christchurch, secondary urban centres as a whole and the Rest of New Zealand in each of the four census years.   Both lower and upper bound estimates of the respective ownership rates were used in order to capture the variation in home ownership rates due to the varying presence non-respondents.

Much of the report was based on the way the probability of home ownership changes with age at each census. Rising rapidly with age, ownership rates typically slow, level off but rarely decline in older age. The temporal evidence had the probability of home ownership falling at each census across *all* the age groups with the exception of the very oldest.

Although not revealing the same continuous fall in aggregate ownership rates, analyses in comparable markets like Australia, the U.K., U.S.A and Canada have exposed similar underlying changes in ownership patterns, most notably a decline in the purchasing ability by the young and sustained preferences for ownership by an expanding older age population. The result has been a substantial redistribution of housing wealth.

The principal question asked internationally has to do with the behaviour of younger buyers, notably the extent to which their reduced rate of buying is a deferment along with several other decisions - like career entry, marriage, childbearing – or whether it reflects a structural shift towards a lower overall level of ownership associated with an increasing relative cost of housing and growing income stratification affecting households of all ages

The interesting feature of the New Zealand evidence is that the reduction in the ability of young households to purchase has also been accompanied by successive reductions in the home ownership rates of all but the very oldest age groups. This implies the presence of a structural shift in the parameters around ownership rather simply a deferment by the young.

What we have shown both graphically and statistically is that cohort membership does matter. The later (younger) the cohort the lower the home ownership rate even after age and census year effects have been taken into account and what these cohort effects imply is that lower levels of ownership will become characteristic of these cohorts as they age. Reduced home ownership rates, if sustained through into older age, will have a number of both consumption and savings implications as well as placing additional pressure on the rental stock.

While the evidence for 'catch-up' by the new generations of potential home buyers is strong, there is neither the graphical nor statistical evidence that cohorts entering homeownership later in life actually catch up to the levels secured by earlier generations who bought at an earlier age.

How much entry costs and costs of servicing loans *further* delayed entry to home ownership is unclear except to note the UK evidence that the combination of delayed entry into the labour market and the secure partnerships necessary to guarantee two incomes raised entry and servicing costs to income ratios (Andrew, 2004). This is a salient observation in light of Coleman's model which makes it clear that while the market as a whole might be most sensitive to interest rates, it is the ability to save for a down payment which is the primary restriction on the young purchaser (Coleman, 2006). The latter would be directly affected by relatively slower growth in earnings.

Most of the other results from the housing career literature is supported by the available New Zealand evidence. For example how home ownership rates rise throughout the age groups with the addition of a second adult and with the presence of children in the household. Household income has an important (but increasingly non-linear) positive

effect on home ownership; an effect which holds within the various household types but most clearly among couple based households. We were also able to show how the fall in ownership over the last two inter-censal periods   has been accompanied by a redistribution of home ownership away from younger to older households.

This report has also highlighted an emerging geography to home ownership resulting from the increasing constraints on securing owner occupancy in the major cities, most notably Auckland. More generally we have shown how ownership rates *declined* in the metropolitan centres while ownership rates *rose* probably as a reaction in the Rest of New Zealand. Our estimates showed that differences across locations increase once differences in the composition of households have been taken into account, implying the presence of high ownership inducing characteristics of people living in areas with high ownership rates.

A further contribution has been in the analysis of tenure change by type of dwelling. Although the declining probability of home ownership has been characteristic of multiunit as well as single unit dwellings, the evidence suggests that attached units are increasingly acting as substitutes for those unable or unwilling to enter the single unit dwelling owner occupied market. As a result, the proportions owning have declined more slowly among those living in multi-unit dwellings.

Each of these results feed into the global debate on the sustainability of homeownership (Berry & Dalton, 2000; Maclennan, Meen, Gibb, & Stephens, 1997; Radley, 1996), most notably as that debate has been couched in the UK and in Australia. A range of issues relating housing, family and wealth arise (Forrest, 1995).   Modelling possible tenure effects of housing policy actions and housing market shocks (via micro simulation model) may prove a useful tool in stimulating discussion over some of the consequences of these patterns (Wood, Watson, & Flatau, 2006) as well as allowing a range of other questions to be asked (Knight & Eakin, 1997), including the role of home ownership in saving for retirement (Scobie, Le, & Gibson, 2007)

One of the emerging questions concerns the way in which contemporary consumers are adapting to falling rates of ownership. There are potentially two issues here. One concerns the ownership decisions being made within the context of a falling ownership rate regime and here the issues centre on the changes households make in other types of consumption and investment in order to secure ownership: the increased demand for multiunit properties, for example, and/or purchasing beyond the periphery of the country's major urban labour markets. One of the results of the latter may be longer commutes, commensurate pressure on local authorities for services via the development industry to build for owner occupancy on lower priced land. To the extent that the full cost of these decisions are not all born by new owners then increasingly the costs of diminished access to ownership, will be carried by the wider public as negative externalities.

When ownership rates were stable or rising households' selection of tenure was based largely on their consumption preferences, the type of house, location etc. When tenure

and housing type and location were highly correlated ownership was a means rather than an end. Today, after a history of rising housing prices, the acquisition of wealth (and the security that is perceived to go with it) renders ownership increasingly an end in itself and the market is responding both through new configurations of tenure, dwelling type and location. How this demand for the home as an asset is satisfied over the next decade is going to have profound implications for the physical and social character of our cities and our countryside as well as for the degree of social stratification the society must bear.

6.1 Policy implications

There are at least four policy implications that arise from the above analysis: the redistributional consequences of falling home ownership rates, the rising relative demand for rental housing, the geographical and settlement implications and the possible implications of falling home ownership rates for housing choice.

1. Falling access to owner occupancy amounts to a transfer of wealth to the older owner occupiers and a widening of asset inequalities within the population. While much of the resulting tension is inter-generational there are few mechanisms that are likely to offer relief in the short term. There is little evidence internationally that older households 'downsize' and many are continuing to upgrade and remain owner occupants while living longer. The net result is a growing delay in the release of owner stock onto an active younger buyer market. The self-interested behaviour of young and old tends not to be complementary, therefore.

2. The possible consequences of the present generation of young households entering ownership later or not at all warrants much wider discussion than it is currently receiving. There is little international evidence that older households convert their equity into current income and therefore the dwellings actually may serve the savings function which other instruments might better fulfill. It may well be that what is really important about ownership is the quality, size and neighbourhood amenity characteristics of housing that ownership provides. At present we know little of the rental choices being made by those whose entry to owner occupancy is being delayed or the kinds of housing vs non-housing trade-offs in expenditure they are making.

3. Meanwhile, delayed ownership places additional pressure on the rental stock which is required to house households for longer periods in their life and to meet the lifetime needs of an increasing proportion of households. To the extent that households are unable to purchase dwellings the rental sector may not only be asked to supply larger but also higher quality units as substitutes. Patterns of conversion of dwellings between tenures reflect the investor responses to the returns to the respective markets but the extent to which these decisions are being made in the interests of consumers in any one local housing market is unclear. Certainly there is potential for substantial increases in rents in units which are

57

acting as short or medium term substitutes for those waiting to purchase, a feature which ironically further delays accumulation of funds required for a deposit.

4. One of the few avenues open to potential buyers is to substitute accessibility and amenities for assets, that is, to purchase further from major employment sites. The cost of earlier entry to the owner market by purchasing 'out of town' is the accumulated expense of the longer commute. And there may be longer term economic and social implications which follow: lower densities of both job opportunities and social contacts. There may also be environmental implications as additional households seek owner occupancy at lower points on the rent gradient.

Finally, in one controversial study of changes in ownership rate in the U.S. between 1980 and 1990 it was argued that, "the home ownership rate declined slightly because more people chose to remain single (i.e. putting off marriage) or become single (i.e. get a divorce)" and, therefore, because these are essentially shifts in the underlying demographics which determine tastes, "the stagnancy [in home ownership] should not be a cause for concern" (Green, 1996 p. 367).

We may not all agree with this statement but first of all we have to ask the question.

Appendix 1. Data issues

We use the word 'tenure' in everyday conversation without difficulty, but when it comes to measurement, to the counting of those who own their own homes, things become more difficult. One of the reasons is the multiple motivations we have for wanting to measure tenure. In some cases it is the dwelling we are interested in (as in the case of insurance companies when they require disclosure on change of tenure). In other cases we are interested in the household itself (when addressing rights to modify or sell the dwelling). In other cases it is the individual we are interested in (as when the issue of personal wealth and savings are at issue). Each generates a different measure of tenure and a different estimate of 'ownership', a simple example being the fact that the number of dwellings that are owned by their occupier is not the same as the number of occupiers who own simply because owners can be absent on census night. Tenure therefore does not have a single meaning nor is it confined to any one particular policy issue.

Since 2001 data on housing tenure have been collected through both the individual and household instruments of the census. The first generates data on the *tenure holder* and and the second on the *tenure of the household*. Any judgment about the distributional consequences of changing tenure patterns depends critically on this distinction. Although the differences lies outside the scope of a discussion of households the tenure holder data do provide an opportunity for a complementary analysis based on individuals which, apart from some basic tabulations by Statistics New Zealand and an initial exploration for Treasury (Hurnard, 2007) has received little attention. It is for this reason that this data source is covered briefly below

A1.1 Household tenure

The tenure of the household is what most people think of when they think of tenure: that is whether the household owns the dwelling or not and whether they have a mortgage or pay rent. It does not, as Statistics New Zealand readily points out, refer to the tenure or ownership of the land on which the dwelling is situated.

Any inter-censal comparisons of tenure involve an assessment of the impact of differences in questions, accompanying notes, medium of response, responses rates and post collection procedures. Suffice it for this study to note the similarity in questions asked in 1991 and 1996 and the departures introduced in 2001 and 2006.

1991: Q4. Do the occupants
                15. Own this dwelling with a mortgage?
                16. Own this dwelling without a mortgage?
                17. Occupy this dwelling rent free?
                18. Rent or lease this dwelling?

1996: Q4: Do you, or anyone who lives here, own this dwelling (even if it is with a mortgage, or only partly owned)?

If yes, Q9: Does anyone who lives here make mortgage payments for this dwelling?

2001:   Q8: Does anyone who lives here, make mortgage payments for this dwelling?
Q9. Do you, or anyone else who lives here, own or partly own, this dwelling?
If no, Q10, private person, private trust, Local Authority or City Council, Housing New Zealand, Other state-owned corporation or state-owned enterprise, or government department or ministry, a business or other organization, don't know.

2006:   Q7. Do you, or anyone else who lives here, hold this dwelling in a family trust?
If yes, Q8: Does that trust make mortgage payments for this dwelling?
If no or don't know, Q9: Do you, or anyone else who lives here, own or partly own this dwelling (with or without a mortgage)?
If yes: Q13, do you, or anyone else who lives here, make mortgage payments for this dwelling?

Over the fifteen years 1991-2006 the question relating to household ownership has gone from one question and four options in 1991 to the same question split in two in 1996 to the addition of a family trust question in 2006 after which mortgage liability was established with a 'if no' question on ownership. The family trust's mortgage liability was established prior to the households' tenure followed by the standard two part question on ownership and then mortgage liability.

The continuity in the questions seems clear enough. The main problems arise in how they have been interpreted by respondents. There are two issues here. The first, which is relatively easily dealt with, concerns Family Trusts and the second, which we spend more time on involves non-response and the third is misguided response.

Family trusts

In their own calculations from the 2001 data Statistics New Zealand treated dwellings in a family trust as *not* owned by the household. This was because the 2001 help notes instructed respondents to mark 'no' to the ownership of dwelling question if their dwelling was in a family trust. However, respondents who did not read the help notes may have answered 'yes' to the ownership of dwelling question. So it is likely that for 2001 some households whose dwelling was in a family trust were included in the 'dwelling owned or partly owned ' categories rather than the 'dwelling not owned…' category.

It is primarily for this last reason that Briggs went back and re-estimated likely levels of home ownership. His analysis suggests that the actual home ownership rate declined by between 2.8 and 4.3 percentage points between 2001 and 2006, not the 0.9 percentage points indicated by the raw data (Briggs, 2006). In other words, as DTZ point out, the

direct comparison of the 2001 and 2006 home ownership results underestimate the likely decline in home ownership rates over that period   (DTZ New Zealand, 2007).[33]

While the discussion of family trusts is relevant at one level, in practice most analysts including Statistics New Zealand simply add the family trust ownership response to the conventional ownership response in their calculation of overall ownership rates. SNZ themselves advise, "Comparisons of 2006 census data on home ownership with previous census data could be made by aggregating the three 'dwelling owned or partly owned by usual residents..' categories together with the three 'dwelling held in a family trust by usual residents…' categories for the 2006 data. However, this will still not provide an *exact* time series comparison, because of the different treatment of dwellings held in a family trust in the 2001 census."

The Statistics New Zealand stance is consistent with the advice offered to respondents on the individual questionnaire on how to respond if they hold the dwelling in a family trust Q24. Following the same convention DTZ add positive 2001 responses to question 10 and 11 together as an ownership rate and similarly for 2006, adding yes responses to question 7 and question 9.   This is the basis for DTZ's 1996 through 2006 home ownership figures of 70.7, 67.8 and 66.9 percent and the basis upon which they make their projections on home ownership through to 2016 (DTZ New Zealand, 2007). Largely for continuity and comparability with previous reports we have also adopted the same convention here.

Statistics New Zealand published Table A1 below partly to make explicit the basis upon which they draw inferences on changes in home ownership. If we add all households who own to those in family trusts and express them as a proportion of the total we get the following sequence of ownership rates: 67.9%, 64.6% and 62.7% for 1996, 2001 and 2006 respectively. Rates of 70.7, 67.8 and 66.9 percent were published by DTZ differ from these of by 2.8, 3.2 and 4.2 percent respectively (DTZ New Zealand, 2007).   These differences also imply different rates of decline over the two inter-censal periods - of 2.9 and 0.9 for the DTZ estimates, and 3.3 and 1.9 using the SNZ published tables.[34]   In correspondence DTZ explain, "we have assumed that the not elsewhere included responses are representative of the balance of the population (i.e. includes both owners and renters)". In other words, DTZ have opted for our upper bound and Statistics New Zealand for our lower bound.

---

[33] Appropriate adjustments would accordingly have to be made to the historical series we present in Figure 1 and Table 1 for they simply present calculations from the raw, reported data.

[34] What is not discussed explicitly in DTZ is ways of handling those who do not respond, the 'Not Elsewhere Classified'.

Table A1.   The changing tenure of households, 1996-2006 censuses

Tenure of household	1996	2001	2006
Dwelling Owned or Partly Owned by Usual Resident(s)[(2)]			
Mortgage Arrangements Not Further Defined	18,309	11,832	26,529
Who Make Mortgage Payments	448,374	443,277	405,267
Who Do Not Make Mortgage Payments	394,074	413,550	312,159
Total, Dwellings Owned or Partly Owned by Usual Resident(s)	**860,760**	**868,656**	**743,952**
Percent of all households who own	**0.679**	**0.646**	**0.627**
Dwelling Not Owned by Usual Resident(s)			
Rental Arrangements Not Further Defined	21,534	14,700	6,312
Who Make Rent Payments	290,124	358,890	388,272
Who Do Not Make Rent Payments	45,405	38,607	57,378
Total, Dwellings Not Owned by Usual Resident(s)	**357,063**	**412,200**	**451,965**
Percent of all households who do not own	**0.282**	**0.307**	**0.311**
Dwelling Held in a Family Trust by Usual Resident(s)[(2)(3)]			
Mortgage Arrangements Not Further Defined	..	..	13,386
Who Make Mortgage Payments	..	..	72,828
Who Do Not Make Mortgage Payments	..	..	81,711
Total, Dwellings Held in a Family Trust by Usual Resident(s)	**0**	**0**	**167,922**
Percent of all households in Family Trust dwellings			**0.115**
	860,760	**868,656**	**911,874**
Percent of all households who own or in Family Trusts	**0.679**	**0.646**	**0.627**
Not Elsewhere Included[(4)]	**50,271**	**63,411**	**90,336**
Percent of all households NEI	**0.040**	**0.047**	**0.062**
Total	**1,268,094**	**1,344,267**	**1,454,175**

(1) 'Tenure of household' refers to the nature of the occupancy of a household in a private dwelling, at the time of the survey. It does not refer to the tenure of the land on which the dwelling is situated.

(2) Due to classification and questionnaire changes, comparisons between 2006 and 1996 or 2001 should be

 treated with caution.

(3) Information on family trusts was first collected in 2006.

(4) Not Elsewhere Included includes Response Unidentifiable and Not Stated.

Note: This data has been randomly rounded to protect confidentiality.

Individual figures may not add up to totals, and values for the same data may vary in different tables.

A1.2 Non response

Non response rates are a non-trivial feature of many questions asked in the census. In the case of the household tenure question, the NEI (Not Elsewhere Included) rose from 4 to 5 to 6 percent over the last three censuses. By March 2006 a total of 90,336 *households* could not be allocated to the standard tenure categories.   Those households who fail to respond in a classifiable way are important not only because they affect the overall ownership rate but also because they are a non-representative sample of all households. Ignoring their presence biases any estimates of the ownership rate especially if the focus is relatively disadvantaged households (and, as we will see, older households).[35]

---

[35] Note throughout our empirical analysis that we are only dealing with households whose tenure characteristics are classified as NEI but their other attributes are known through their census responses.

If all household reference persons actually did respond to the tenure question the proportion owning their dwelling could be written simply as:

(1) $p_1 = o/(o+ r)$

where p_1 is the probability of home ownership and o and r are the number of households owning and renting (putting aside the question of freehold versus mortgaged dwellings which we do not address here and including paid and unpaid rents).

However the total number of households living in occupied private dwellings is actually o + r + a, with 'a' denoting NEI responses. It is this lower bound, p_2 which is used by Statistics New Zealand.

(2) $p_2 = o / (o + r + a)$.

If we used p_1 as the homeownership rate we would be assuming that NEI respondents were distributed in exactly the same way across the tenure categories as non NEI respondents, i.e. that 'a' is divided and added to the numerator and denominator according to the ratio o/r. Making this assumption is likely to return an over estimate of the true ownership rate. However, if we use p_2 then we are assuming that all NEI are in fact renters. But this too is unlikely to be correct, especially in the case of older respondents and therefore p_2 is likely to be an underestimate of the true ownership rate.

To give an idea of magnitude of these upper and lower bounds to the true ownership rate, imagine, quite realistically that we had 100 households, 70 of whom were owners, 24 were renters and 6 were NEI. The p_1 ownership rates would be 70/(70 + 24) = 74.5% and the p_2 rate would be 70 percent (70/(70+24+6)). If however 3 of the 6 NEI were in fact owners then the true rate would be 73/97= 72.2 percent.

Therefore we have two measures, p_1, our upper bound which we know is an over estimate of the true ownership rate, and p_2 our lower bound which we know to be an under estimate.[36] Somewhere in the middle is the true rate but we do not know what it is or how it varies by subpopulation. Probably the most useful thing to do under these circumstances is to use both measures, and this is the approach we adopted in this study.

The variability which non-response error introduces to any estimate of the home ownership rate can be captured by comparing the estimated age functions based on the upper and lower bounds of the probability estimates. A close comparison shows that while the lower bounded estimates do in fact sit below the upper, they do so quite *unevenly* both across the age domain and across the four different census years. One

---

[36] Strictly speaking p_1 is only the upper bound if we assume that non-respondents are more likely to be renters. Earlier analysis of non-respondents suggests that this is in fact the case as reported in (P. S. Morrison, 2005). If we are unwilling to make this assumption (and there is a case for this among the much older household reference persons) then the upper bound estimate would be (o+a) / (o + r + a).

way of highlighting these differences is to plot the differences, Figure A1.[37] Two important points emerge in addition to the fact that the differences (p1-p2) are positive throughout. Firstly, the differences between p1 and p2 vary by census, rising between 1991 and 1996 and again between 2001 and 2006.

Figure A1.   The difference between upper and lower bound estimates of probabilities of home ownership (p$_1$ - p$_2$) as a quadratic function of age of household reference person, 1991 to 2006
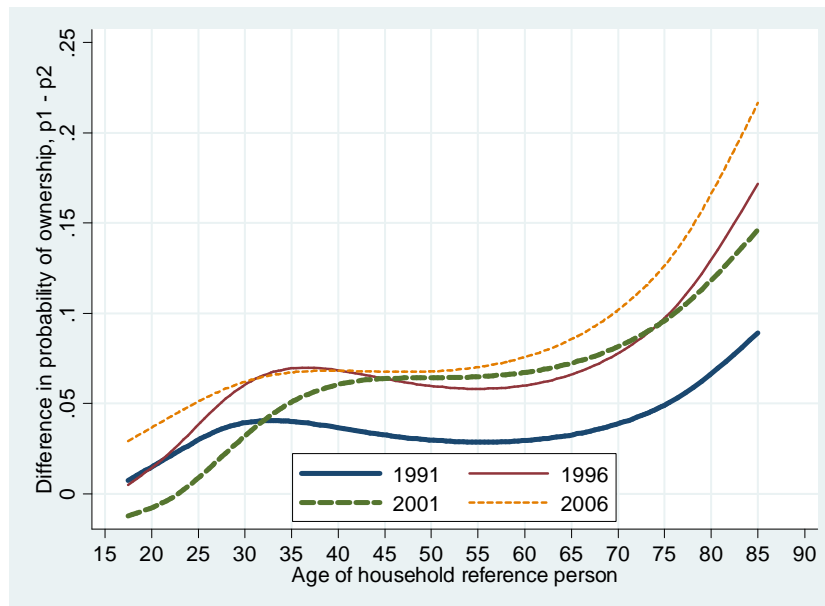
Secondly, the differences between p1 and p2 increase by age of the household reference person through to about 30 or 40 years of age depending on the census, remain relatively stable then rise between 55 and 70 years of age with the rate again depending on the census.

The substantive importance of these results is that part of the fall in the home ownership rate over the last inter-censal period in New Zealand is actually due to the gradual rise in the response error by virtually every age group but particularly the older age groups. Since older households are more likely to be owners, their higher non-response rates have a disproportionate effect on the ownership rate for all households (subject that is to the changing numbers of households in each age group) and this distortion increased over time.[38]

---

[37] Specifically we subtract the fitted median splines of the lower bound (Figure 5b) from the upper (Figure 5a) and graph the result here as Figure A1.

[38] Strangely, response errors for the tenure holder question are reported to have fallen (between 2001 and 2006) with Hurnard reporting that, "the 2006 census has succeeded in evoking a more complete response to the question on tenure" (Hurnard, 2007). Quite why responses of individuals should have improved while those of household reference persons declined is unclear at this stage except to note that the former does appear in the individual questionnaire and the later in the household questionnaire.

A1.3 The tenure holder question

We turn finally to the second of the tenure questions, those asked in the individual census questionnaire about the tenure holders. We have not requested data on tenure holders for this project and simply want to flag their relevance for any future analysis (beyond the initial work referred to above (Hurnard, 2007).

The 'tenure holder' refers to the home ownership status of the *individual* as opposed to the *household*. It was asked in the individual form for the first time in 2001 and is designed to ascertain whether the *individual* in question owns or partly owns the dwelling they usually live in. Note that the subject population for this question is confined to those age 15 and over.[39]

2001: Q22: Do you yourself own, or partly own, the dwelling that you usually live in? (If you own it with or without a mortgage mark yes).

2006: Q24: Do you yourself own, or partly own, the dwelling that you usually live in (with or without a mortgage)? (If you hold the dwelling in a family trust mark yes).

The important feature of the tenure holder question is that it allows us to identify the number of *individuals* who are owners, as opposed to whether one or more members of the usually resident household contained an owner, issues about which have been raised in the literature (Baxter & McDonald, 2004). The difference is worth noting. Whereas 65-67% of *households* (whose households whose reference person is living in their usual residence and is over 15 years of age) were owners in 2001, just over half of all *individuals* (over 15 years) were owners 51.1%.[40] By 2006 this had dropped to under half, to 49.9%. The tenure holder question therefore offers another estimate of the degree to which home ownership may be declining in New Zealand, albeit from a different base and only over the 2001 to 2006 period.[41]

---

[39] The tenure holder is what is known by Statistics New Zealand as a supplementary variable. It does not fit directly with the main purpose of a census but is still of importance to certain groups

[40] Unlike household tenure in which the age is that of the household reference person, the age of the tenure holder is unambiguously that of the individual. Thus, the tenure holder data would allow a future researcher to more accurately capture the way housing tenure changes with age. Having said that, the general downward trend in ownership between 2001 and 2006 based on the age of the household reference person described in sections two of this paper are very similar to those apparent from the ages of individuals: compare Chart 1 of Hurnard with Figure 5 (upper and lower bound) in section 2 of this report.

[41] Note that the Statistics New Zealand percentages used above differ slightly from those reported by Hurnard (54.9% vs 53.2%) probably because the latter is based only on those who actually answered the question.

Acknowledgements

References

Andrew, M. (2004). Permanent change in the route to owner occupation? *Scottish Journal of Political Economy, 51*(1), 24.

Asberg, P. (1999). Housing decisions of young Swedish adults. *Journal of Housing Economics, 8*(2), 116-148.

Baxter, J., & McDonald, P. (2004). *Home ownership among young people in Australia: in decline or just delayed?* Canberra: Demography and Sociology Programme, Research School of Social Science, Australian National University

Berry, M., & Dalton, T. (2000). Homeownership into the new millennium: a view from the margin. *Urban Policy and Research, 18*(4), 435-454.

Blanchflower, D. G. (1996). Youth labour markets in twenty three countries. A comparison using micro data. In D. Stern (Ed.), *School to work policies and practices in thirteen countries*. Cresskill: Hampton Press.

Borsch-Supan, A. (1990). Panel data analysis of housing choices. *Regional Science and Urban Economics, 20*(1), 65-82.

Bourassa, S. (1995). A model of housing tenure choice in Australia. *Journal of Urban Economics, 37*, 161-175.

Bourassa, S. (2000). Ethnicity, endogeneity and housing tenure choice. *Journal of Real Estate Finance and Economics, 20*(3), 323-341.

Bourne, L. S. (1981). *The Geography of Housing*. London: V.H.Winston & Sons.

Briggs, P. (2006). *Family trusts: ownership, size, and their impact on measures of wealth and home ownership*. Wellington Reserve Bank of New Zealand.

Campbell, R. T., & Hudson, C. M. (1985). Synthetic cohorts from panel surveys. An approach to studying rare events. *Research on Aging, 7*(1), 81-93.

Carne, S. (2004). *Home ownership: tenure of choice?* Unpublished Masters of Public Policy, Victoria University of Wellington, Wellington.

Chapman, R. (1981). *To rent or to buy? Housing tenure choice in New Zealand, 1960-80 with special reference to the private rental housing market: summary report.*: National Housing Commission.

Clark, W. A. V., Deurloo, M. C., & Dieleman, F. M. (1994). Tenure changes in the context of micro-level family and macro-level economic shifts. *Urban Studies, 31*, 137-154.

Cochrane, W., & Poot, J. (2007). *Homeownership and the New Zealand labour market.* Paper presented at the Labour, Employment and Work in New Zealand, Victoria University of Wellington.

Coleman, A. (2006). *The life-cycle model, savings and growth*. Wellington: Reserve Bank of New Zealand.

Crossley, T. F., & Ostrovsky, Y. (2003). *A synthetic cohort analysis of Canadian housing careers*. Hamilton, Ontario: McMaster University.

Davey, J. (1980). *New Zealanders and home ownership* Wellington National Housing Commission

Davey, J. (1981). *New Zealanders and home ownership: report of follow-up survey October/November 1980*. Wellington National Housing Commission

Davey, J. (1982). *New Zealanders and home ownership: report of fourth survey - Feburary 1982*. Wellington National Housing Commission

Davey, J. (1984). *New Zealanders and home ownership: report of fourth survey - February 1984*. Wellington Research Paper 84/2.

Davidson, A. (1994). *A home of one's own. Housing policy in Sweden and New Zealand from the 1840s to the 1990s*. Stockholm: Almqvist & Wiksell International

Davidson, A. (1999). Alternative models of social housing: tenure patterns and cost-renting in New Zealand and Sweden. *Housing Studies, 14*(4), 453-472.

Deurloo, M. C., Clark, W. A. V., & Dieleman, F. (1994). The move to housing ownership in temporal and regional context. *Environment and Planning A, 26*, 1659-1670.

Dieleman, F. M. (2001). Panel data in housing research: a reaction to the paper by Myers on cohort longitudinal estimation of housing careers. *Housing Studies, 16*(1), 115-121.

DTZ New Zealand. (2004). *Changes in the structure of the New Zealand housing market vol 1 and 2*. Wellington: Centre for Housing Research Aotearoa New Zealand.

DTZ. (2005). *Housing tenure aspirations and attainment*. Wellington: DTZ.

DTZ New Zealand. (2007). *Census 2006 and housing in New Zealand*. Wellington DTZ New Zealand.

Dupuis, A. (1991). Financial gains from owner occupation. The New Zealand case 1970-1988. *Housing Studies, 7*(1), 27-44.

Ermisch, J., & Di Salvo, P. (1996). Surprises and housing tenure decisions in Great Britain. *Journal of Housing Economics, 5*(3), 247-273.

Ermisch, J. F. (1999). Prices, parents and young people's household formation. *Journal of Urban Economics, 45*, 47-71.

Ferguson, G. (1994). *Building the New Zealand dream*. Wellington The Dunmore Press Ltd.

Findsen, A. T. (2005). *Buying a first home: generation X in the Auckland housing market.* The University of Auckland.

Flatau, P., Hendershott, P., Watson, P., & Wood, G. (2004). *What drives Australian housing careers? An examination of the role of labour market, social and economic determinants*: Australian Housing and Urban Research Institute (Western Australian Research Centre).

Forrest, R. (1995). *Housing and family wealth*. Routledge, U.K.

Giannelli, G., & Monfardini, C. (2003). Joint decisions on household membership and human capital accumulation of youths. The role of expected earnings and local markets. *Journal of Population Economics 16*(2), 265-285.

Gibson, J., & Scobie, G. (2001). A cohort analysis of household income, consumption and saving *New Zealand Economic Papers, 35*(2), 196-216.

Green, R. K. (1996). Should the stagnant homeownership rate be a source of concern? *Regional Science and Urban Economics 26*, 337-368.

Greulich, E., Quigley, J. M., & Raphael, S. (2004). The anatomy of rent burdens: immigration, growth, and rental housing. *Brookings-Wharton Papers on Urban Affairs:2004*, 149-187.

Grimes, A., Stillman, S., & Kim, B. (2007). *Homeownership and neighbourhood wellbeing: a Marsden proposal*. Wellington Motu Economic and Public Policy Research.

Haffner, M., & Dol, C. (2000). *Housing statistics in the European Union 2000*: Delft University of Technology, The Netherlands.

Hargreaves, R. V. (2003). Determinants of housing tenure choice in New Zealand. *Pacific Rim Property Research Journal, 3*, 203-223.

Haurin, D. R., Hendershott, P. H., & Kim, D. (1992). The impact of real rents and wages on household formation. *Review of Economics and Statistics, 75*(284-293).

Haurin, D. R., Hendershott, P. H., & Kim, D. (1994). Housing decisions of American youth. *Journal of Housing Economics, 35*, 28-45.

Haurin, D. R., Hendershott, P. H., & Wacher, S. M. (1997). Borrowing constraints and the tenure choice of young households. *Journal of Housing Research, 8*, 137-154.

Haurin, D. R., Hendershott, P. H., & Wachter, S. M. (1996). Wealth accumulation and housing choices of young households: an exploratory investigation. *Journal of Housing Research 7*, 33-57.

Hendershott, P. H. (1987). *Household formation and home ownership: the impacts of demographics and taxes*. Cambridge, MA: National Bureau of Economic Research

Holmans, A. (1996). A decline in young owner-occupiers in the 1990s. *Housing Finance, 29*, 13-20.

Holmans, A. (2001). First-time buyers in the United Kingdom: an updated age analysis. *Housing Finance, 49*(27-35).

Housing New Zealand_Corporation. (2004). *Local measures of the ability of working households to become home owners in New Zealand*. Wellington Research and Evaluation Team of Housing New Zealand Corporation.

Housing New Zealand_Corporation. (2005). *Building the future: towards a New Zealand housing strategy*. Wellington Housing New Zealand Corporation

Hurnard, R. (2007). *Housing tenure changes 2001-2006*.Unpublished manuscript, Wellington

Ioannides, Y. M., & Kan, K. (1996). Structural estimation of residential mobility and housing tenure choice. *Journal of Regional Science, 36*(3), 335-363.

Jameson, B., & Nana, G. (2004). *Furthering our understanding of tenure transition. The impact of financial circumstances on tenure choices in New Zealand*. Wellington: Centre for Housing Research Aotearoa New Zealand.

Knight, J., & Eakin, C. (1997). A new look at the home ownership decision *Real Estate Issues, 23*(2), 20-29.

Lelievre, E., & Bonvalet, C. (1994). A compared cohort history of residential mobility, social change and home-ownership in Paris and the rest of France. *Urban Studies, 31*, 1647-1665.

Maclennan, D., Meen, G., Gibb, K., & Stephens, M. (1997). *Fixed commitments, uncertain incomes: sustainable owner occupation and the economy*. York: Joseph Rowntree Foundation

McDonald, P. (2003). Changing home ownership rates in Australia: issues of measurement and interpretation. *AHURI positional paper*(January).

McDonald, P., & Baxter, J. (2004). *Trends in home ownership rates in Australia: the relative importance of affordability trends and changes in population composition*. Melbourne: AHURI.

McElroy, M. (1985). The joint decision of household membership and market work: the case of young men. *Journal of Labour Economics, 3*, 293-316.

Mitchell, I., O'Malley, S., Murphy, L., & Duncan, I. (2007). *The future of home ownership and the role of the private rental market in the Auckland region*. Wellington Centre for Housing Research

Morrison, P. S. (2005). *Changing patterns of home ownership in New Zealand, 1991 to 2001*. Wellington: Appendix 3 to DTZ Housing tenure aspirations and attainment. Prepared for Centre for Housing Research (CHRANZ)

Morrison, P. S., Papps, K. L., & Poot, J. (2006). Wages, employment, labour turnover and the accessibility of local labour markets. *Labour Economics, 13*, 639-663.

Mudd, W., Tesfaghiorghis, H., & Bray, J. (2001). *Some issues in home ownership. Aspirations and their determinants* (Research Paper No. 17). Melbourne: AHURI

Murphy, L. (2000). A profitable housing policy? The privatization of the New Zealand government's residential mortgage portfolio. *Regional Studies, 34*(4), 395-399.

Myers, D. (1999). Cohort longitudinal estimation of housing careers. *Housing Studies, 14*(4), 473-490.

Myers, D., & Wolch, J. R. (1995). The polarization of housing status. In R. Farley (Ed.), *America in the 1990s* (pp.??). New York: Russell Sage Foundation.

Ortalo-Magne, F., & Rady, S. (1999). Boom in, bust out: young households and the housing price cycle. *European Economic Review, 43*, 755-766.

Pitkin, J. R., & Myers, D. (1994). The specification of demographic effects on housing demand: avoiding the age-cohort fallacy. *Journal of Housing Economics, 3*, 240-250.

Pool, I., Dharmalingam, A., & Sceats, J. (2007). *The New Zealand Family from 1840. A demographic history*. Auckland: Auckland University Press.

Radley, S. (1996). *The economic and social limits to increases in sustainable homeownership*: Joseph Rowntree Foundation and Henley Centre for Forecasting.

Sandbrook, E. (1999). *Too close to home: the tenure decision in New Zealand in the 1990s*. Massey University Palmerston North

Scobie, G., Gibson, J., & Le, T. (2005). *Household wealth in New Zealand*. Wellington Institute of Policy Studies.

Scobie, G., Le, T., & Gibson, J. (2007). *Housing in the household portfolio and implications for retirement saving: some initial findings from SOFIE*. Wellington: New Zealand Treasury.

Shorrocks, A. (1975). The age-wealth relationship: a cross-section and cohort analysis. *Review of Economics and Statistics, 57*(2), 155-163.

Skaburskis, A. (1999). Modelling the choice of tenure and building type. *Urban Studies, 1999*(36), 13.

Skaburskis, A. (2002). Generational differences and future housing markets. *Canadian Journal of Regional Science, 25*(3), 377-409.

Skilling, D. (2004). *It's not just about the money: the benefits of asset homeownership* Auckland.

Skilling, D. (2005). *Opportunity for a lifetime: creating an ownership society in New Zealand*: The New Zealand Institute.

Smith, L., & Robinson, B. (2005). *From housing to homes - strategies to assist low and modest income New Zealand households into homeownership*: Salvation Army Social Policy Unit.

Statistics-New-Zealand. (2005). *New Zealand family and household projections, 2001(base)-2021*: Statistics New Zealand.

Statistics_New_Zealand. (2006). *Survey of family income and employment dynamics (SOFIE)*. Wellington Statistics New Zealand.

Stillman, S. (2006). *Trends in youth activity in New Zealand from 1985-2004*. Wellington Department of Labour.

Stuart, I., Badcock, B., Clapham, A., & Fitzgerald, R. (2004). Changing tenure: housing trends, financial deregulation and housing policy in New Zealand since 1990. *Housing Finance International, XVIII*(4).

Thorns, D. C. (1989). The impact of home ownership and capital gains upon class and consumption sectors. *Environment and Planning: society and space, 7*, 293-312.

Thorns, D. C. (1993). Tenure and wealth accumulation: implications for housing policy. In *New Zealand's ageing society: the implications* (pp. 97-121). Daphne Brasell Associates Press.

Thorns, D. C. (2000). Housing policy in the 1990s - New Zealand a decade of change. *Housing Studies, 15*(1), 129-138.

Venti, S. F., & Wise, D. W. (1987). *Aging, moving, and housing wealth*. Cambridge, MA.: National Bureau of Economic Research

Wood, G., Watson, R., & Flatau, P. (2006). Microsimulation modelling of tenure choice and grants to promote home ownership. *The Australian Economic Review, 39*(1), 14-34.

Yates, J. (2000). Is Australia's home-ownership rate really stable? An examination of change between 1975 and 1994. *Urban Studies, 37*(2), 319.

Yates, J. (2002). Housing implications of social, spatial and structural change. *Housing Studies, 17*(4), 581-619.

Yates, J., & Mackay, D. F. (2006). Discrete choice modelling of urban housing markets: a critical review and an application. *Urban Studies, 43*(3), 559-581.

Centre for Housing Research
AOTEAROA NEW ZEALAND