Final Report

A microsimulation model of the Australian housing market with applications to Commonwealth and State policy initiatives

authored by

Gavin Wood, Richard Watson and Paul Flatau

for the

Australian Housing and Urban Research Institute

Western Australia Research Centre

March 2003

AHURI Final Report No. 33

ISSN: 1834-7223
ISBN: 1 920758 27 5

AHURI

Australian Housing and Urban Research Institute

ACKNOWLEDGEMENTS

This material was produced with funding from the Commonwealth of Australia and the Australian States and Territories. AHURI gratefully acknowledges the financial and other support it has received from the Commonwealth, State and Territory governments, without which this work would not have been possible.

The authors wish to acknowledge the valuable comments on previous versions of this report made by Martin Burgess of the Commonwealth Department of Family and Community Services, Sally Jope of the Brotherhood of St Laurence, Caitlin McLeod of the Commonwealth Department of the Prime Minister and Cabinet, and Dominic Regan of the Commonwealth Treasury. Neither these individuals nor their organisations are in any way responsible for the views, findings or structure of this report. Appendix 2 of this report was prepared with the assistance of Matthew Forbes.

DISCLAIMER

AHURI Ltd is an independent, non-political body which has supported this project as part of its programme of research into housing and urban development, which it hopes will be of value to policy-makers, researchers, industry and communities. The opinions in this publication reflect the views of the authors and do not necessarily reflect those of AHURI Ltd, its Board or its funding organisations. No responsibility is accepted by AHURI Ltd or its Board or its funders for the accuracy or omission of any statement, opinion, advice or information in this publication.

AHURI FINAL REPORT SERIES

AHURI Final Reports is a refereed series presenting the results of original research to a diverse readership of policy makers, researchers and practitioners.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
Introduction i
The Australian Housing Market Microsimulation (AHMM) Model ii
Housing Demand and Supply ii
Borrowing Constraints, Federal and State Tax and Income Support Measures and Interest Rates iv
Policy Issues v
Housing Tenures: Preferences and Constraints v
Housing Tenure Assignment v
Relative Price Effects vi
Borrowing Constraints vi
Market inefficiency vii
Promoting the Supply of Affordable Rental Accommodation viii
Building Write-off allowances and Low Income Tax Credits viii
King-Fullerton Effective Tax Rate Impacts viii
Budgetary impacts ix
Land Taxes and Stamp Duties x
Promoting Access to Home Ownership x
The First Home Owners Grant xi
Housing Partnerships xii
Future Research Directions xiii
CHAPTER 1 INTRODUCTION 1
1.1 Aims of the Study 1
1.2 Scope of Final Report 4
1.3 Literature Review 5
Tax preferences and the supply of rental housing 6
Tax Arbitrage models 8
Econometric models of tenure choice; the role of borrowing constraints 10
CHAPTER 2 THE MODEL, METHOD AND MEASUREMENT 12
2.1 Theory 12
Investors' Reservation Rents and the Determination of Market Rents 12
Homeowners' Bid Rental Rates 14
Borrowing Constraints 16
Summary 17
2.2 Application of Assignment Rules 17
2.3 Measurement 22
Data Sources 22
Model Parameters 27
Baseline Parameters 28
Parameters Common to Homeowner and Investor Costs 29
Parameters Specific to Investors 31
Measurement Issues Specific to Housing Consumers 31
Borrowing Constraints 32
CHAPTER 3 MARKET INEFFICIENCY AND KEY FACTORS AFFECTING HOUSING TENURE OUTCOMES 36
3.1 Analysis of Tenure Choice 36
A Simulation at Baseline Parameter Values 36
3.2 The Determinants of Tenure Choice 41
Interest Rates 41
Nominal Capital Gains Rate 42
Agent's Fees 42
Market Rental Rate Determination 43

3.3 Conclusion 44
CHAPTER 4 PROMOTING THE SUPPLY OF AFFORDABLE RENTAL HOUSING 46
4.1 Introduction 46
4.2 The Issues 46
Affordable Rental Accommodation and the Building Write-off 46
Land Taxes and Stamp Duties 48
4.3 Method 48
4.4 Building Write-off and Low Income Tax Credits K-F Effective Tax Rates 49
4.5 Land Taxes and Stamp Duties 56
4.6 Concluding comments 59
CHAPTER 5 PROMOTING ACCESS TO HOME OWNERSHIP 61
5.1 Introduction 61
5.2 Method 62
5.3 First Home Owner Grants: Impact Analysis 64
5.4 Housing Partnerships: Impact Analysis 68
CHAPTER 6 CONCLUSION 72
6.1 Principal Findings and Key Policy Implications 72
6.2 Future Research Directions 74
APPENDIX 1 CALCULATING MARGINAL IMPLICIT INCOME TAX RATES 77
A1.1 The Income Unit's Tax Liabilities 77
Tax Rates 77
Medicare Levy 77
Superannuation Surcharge 77
Rebates 78
A1.2 Commonwealth Pensions and Allowances 78
Converting the 1997 Pensions and Allowances System to its 2001 Equivalents 79
A1.3 The Taxation Position of Rental Investors 80
Taxable Income 80
Pre-benefit Income and Asset Levels 80
A1.4 Housing Consumers 81
Taxable Income 82
Pensions & Allowances Income 82
Pre-benefit Income and Asset Amounts 82
APPENDIX 2 RENT ASSISTANCE IN AUSTRALIA 83
A2.1 Rent paid and the level of Rent Assistance 83
Relationship with Income 85
The Family Tax Benefit (Part A) and Rent Assistance 85
Social Security payments and Rent Assistance 88
APPENDIX 3 BENCHMARKING EXERCISE 94
A3.1 Bourassa's Model 94
A3.2 Empirical Results 94
APPENDIX 4 TENURE ASSIGNMENT SIMULATIONS USING FIRST HOME BUYER PROBABILITIES 97
REFERENCES 100

LIST OF TABLES

Table 1.1 Mean Property Value, Marginal Tax Rate and Economic Cost by Deciles of Economic Cost [1] 8
Table 2.1 Taxation and Investor Reservation Rents: Hypothetical Cases [a] 14
Table 2.2 Taxation and Housing Consumer Bid Rents: Hypothetical Cases [a] 16
Table 2.3 Income Units - Landlords – Descriptive Statistics 23
Table 2.4 Characteristics of Rental Investment Properties 24
Table 2.5 Income Units – Housing Consumers – Descriptive Statistics 25
Table 2.6 Characteristics of Principal Residence – Housing Consumers 26
Table 2.7 Loan-Value Ratios, Loan Repayment Ratios (LRR), & Advance to Income Ratios: Summary Statistics by Year of Acquisition: First Home Buyers 34
Table 2.8 Parameters – Mean Values 35
Table 3.1 Tenure Assignment in the reference system after application of relative price rules 37
Table 3.2 Tenure Assignment in the reference system after application of relative price rules 38
Table 3.3 The Socio-Economic and Demographic Characteristics of Tenants by Binding Borrowing Constraint 40
Table 3.4 Determinants of Tenure Choice – Interest Rates 41
Table 3.5 Determinants of Tenure Choice – Nominal Capital Gains Rate 42
Table 3.6 Determinants of Tenure Choice – Agents Fees 43
Table 3.7 Determinants of Tenure Choice – Market Rental Rate 44
Table 4.1 Financial Characteristics of Rental Investment Properties [1] 50
Table 4.2. Mean King and Fullerton Effective Marginal Tax Rates (%) by Expected Holding Period & Rate of Real Capital Gain [1] 51
Table 4.3 Mean King and Fullerton Effective Marginal Tax Rates (%) by Gross Weekly Rent Quartiles under Alternative Policy Settings, and Zero Real Capital Gains (b = Rate of BWO, c = Rate of Tax Credit) [1] 53
Table 4.4 Mean King and Fullerton Effective Marginal Tax Rates (%) by Gross Weekly Rent Quartiles under Alternative Policy Settings and One Per Cent Real Rate of Capital Gain Gains (b = Rate of BWO, c = Rate of Tax Credit) [1] 53
Table 4.5 Percentage of Investors who Realise Existing Ineligible Property Investments by Nominal Rates of Capital Appreciation, and Number of Years Before the Eligible Property Realised [1] 54
Table 4.6 The Number and Percentage of Investors who Realise Existing Ineligible Property Investments by the Number of Years the Existing Property has been Held [1] 55
Table 4.7 Mean K-F Tax Rates on Current and Additional Rental Investment Properties 58
Table 4.8 Mean K-F Tax Rates by State [1] 59
Table 5.1 Housing Partnerships and Bid Rents: Hypothetical Cases [1] 63
Table 5.2 Number of Income Units and Share of All Income Units Assigned to Homeownership After Application of Relative Price and Borrowing Constraint Assignment Rules 65
Table 5.3 First Home Owner Grants: Income Units Assigned to Homeownership Because of Relative Price Effects or Relaxation of Borrowing Constraints 65
Table 5.4. The Socio-Economic and Demographic Characteristics of Tenant Income Units Assigned to Rental Tenancies and Homeownership when FHOG Set at $14000 66
Table 5.5 'Trickle-down' Effects under First Home Owner Grants and Housing Partnerships by Quartile of Weekly Rent 67
Table 5.6 Optimal Housing Demand of Income Units Who Become Owner-Occupiers under First Home Owner Grants and Housing Partnerships by Quartile of Property Value in the Owner-Occupied Housing Market 68
Table 5.7 The Socio-Economic And Demographic Characteristics Of Tenant Income Units Assigned To Rental Tenancies And Homeownership Under Housing Partnerships 70
Table A1.1 Australian Income Tax Schedule as at 1st July, 2000 77
Table A1.2 Reported Pension & Allowance Types in the Income and Housing Costs Survey, 1997 & Their 2001 Equivalents 79
Table A2.1 Parameters for Rent Assistance 85

Table A2.2 Standard and Base Payments of FTB(A) 86
Table A2.3: Basic Parameters for the Calculation of Social Security Payments 92
Table A3.1 Logit Model of Tenure Choice 95
Table A3.2 Observed and Predicted Tenures under Simultaneous Application of Constraints and Relative Price Criteria – 90% LVR for Owner-Occupiers 96
Table A3.3 Observed and Predicted Tenures under Simultaneous Application of Constraints and Relative Price Criteria – Observed LVR for Owner-Occupiers 96
Table A4.1 Probability Income Unit is A First Home Buyer 97
Table A4.2 Number of Income Units and Share of all Income Units who Find Home Ownership Cheaper than Renting 99
Table A4.3 Number of Income Units and Share of all Income Units Assigned to Home Owners after Application of Relative Price and Borrowing Constraints Criteria 99

LIST OF FIGURES

Figure E.1 The Tenure Assignment Process For Housing Consumers iii
Figure 1.1 A Microsimulation Model of the Australian Housing Market 2
Figure 2.1 Housing Consumer Bid Rental Rate 18
Figure 2.2 Relative Price Assignment Rule in the Microsimulation Model 19
Figure 2.3 Binding Borrowing Constraints and Assignment Rules in the Microsimulation Model 20
Figure 2.4 Non Owner-Occupier Tenure Type/Landlord Classification in the SIHC and Sub-Tenure Groupings in the Microsimulation Model 27
Figure A2.1 Relationship Between Rent Assistance and Levels of Rent 84
Figure A2.2 Relationship between levels of adjusted taxable income and FTB(A) payments 87
Figure A2.3 Relationship between Ordinary Income and Pensions 89
Figure A2.4 Relationship Between Ordinary Income and Allowances 90

GLOSSARY AND ABBREVIATIONS

ABS	Australian Bureau of Statistics.
ACCC	Australian Competition and Consumer Commission.
Advance to Income Ratio	The ratio of household income to mortgage debt.
Affordable Rental Housing	Defined as properties with a weekly rent in the lowest quartile (25%) of all rents.
Agency Problem	A rental tenancy contract places obligations on both the tenant and landlord in relation to matters such as maintenance and repairs. Frictions arising from these obligations may deter landlords from investing in the low rent segment of the market and limit the creation of affordable rental housing.
AHMM	Australian Housing Market Microsimulation Model.
AHS	Australian Housing Survey.
Bid Rental Rate (Bid Rents)	The maximum rent (as a proportion of property value) that a housing consumer would be willing to pay as a rental tenant.
Borrowing Constraints	Mortgage lenders use 'rules of thumb' to assess the credit worthiness of loan applicants. These rules reduce the risk faced by the lender and are a response to information asymmetries between borrower and lender. As a result the amount a loan applicant can borrow is limited by their liquid asset holdings and income (See the entries for *Wealth Constraint* and *Income Constraint* in this glossary).
Building Write-off	An income tax deduction provided to rental investors who acquire newly constructed property. The rental investor is able to deduct 2.5% of the construction costs from income from all sources over a 40-year period.
CGC	Commonwealth Grants Commission.
Deposit Constraint	The requirement by mortgage lenders that a purchaser of owner-occupied property must have liquid assets equal to a given proportion of the property price and use these assets in the purchase.
Economic Costs	A measure of costs that includes the cost of alternative actions (opportunity cost), recurrent costs such as repairs and property taxes, and amortised lump-sum costs on the purchase or sale of an asset (e.g. stamp duty, brokerage fees and capital gains taxes).
FACS	Department of Family and Community Services.
Effective Marginal Tax Rate (EMTR)	Measures the change in income tax liabilities and social security benefits resulting from a change in income.
Family Tax Benefit	Commonwealth scheme that provides income assistance to families who meet income test criteria.
First Homeowner Grant	A Commonwealth scheme introduced in July 2001 that provides a lump-sum cash payment to first home buyers.
GST	Goods and Services Tax.

Housing Partnership	A scheme where financial institutions take an equity share in owner-occupied housing in return for a pro-rata share of capital gains on realisation. The scheme is currently being examined by a taskforce at the Menzies Research Institute.
Income Constraint	The requirement by mortgage lenders that mortgage repayments should not exceed a given percentage of income.
Income Unit	The decision-making unit used by the model. An income unit is one person or a group of related persons within a household whose command over income is assumed to be shared. For example, a married couple would be treated as a single decision making unit by the model.
King-Fullerton (tax rate)	A tax rate which measure the total share of capital income that is paid as tax. The measure includes income tax, capital gains tax, and other government taxes and levies such as property taxes and stamp duties.
Loan Repayment Ratio	The ratio of mortgage repayments to household income.
Loan to Value Ratio	The ratio of mortgage debt to property value.
Least Cost Investor	See *Multi-property least cost landlord* below.
Limited Partner	The government or financial institution in a housing partnership. They retain the rights to a pro rata share of capital gains as a return on their equity stake. They are not involved in the day to day running of the property.
Low Income Housing Tax Credit	A US policy that encourages the provision of low-income rental housing by private sector landlords. Eligible landlords receive a tax credit that can be used to offset taxes on income from other sources. It differs from a BWO allowance as each dollar of the tax credit represents a dollar of tax not paid whereas the value of a dollar of BWO depends on the landlord's marginal tax rate.
Lump Sum (Fixed) Costs	One-off costs incurred by property owners normally when acquiring or selling a property. Examples include stamp duties, brokerage fees and capital gains taxes. Amortised over the expected holding period of the property for the purposes of calculating economic costs.
Managing Partner	The housing consumer in a housing partnership. They retain the ownership rights with respect to the timing and type of improvements and the timing of any decision to sell. They also remain responsible for meeting operating costs.
Market Rental Rate	The ratio of gross rents to property value to which market rents converge in the long-run.
MLPS	Minimum Limited Partner Share. The minimum share of the equity value of a property acquired by a financial institution under a housing partnership at which the managing partner (housing consumer) is able to meet a mortgage lender's deposit and income requirements.
Microsimulation Model	A simulation model which exploits real-world data at a highly disaggregated level (person, household or income unit rather than broad socio-economic groups or populations).

Multi-property 'least cost' landlords	A landlords costs of providing rental housing are lower the higher is their marginal tax rate. In a perfectly competitive rental housing market, competition between landlords should lead to all rental property being provided by investors who pay the highest marginal tax rate.
Private Rental Tenants	Income units who rent from a real estate agent, a private landlord who does not reside in the same dwelling, or the 'other' landlord type in the SIHC.
Offer Rental Rate	The minimum rent (as a proportion of property value) at which a rental investor is willing to let a property.
Operating Costs	Recurrent costs incurred by property owners including items such as maintenance, property rates, and land taxes.
Relative Price Assignment Rule	The AHMM initially assigns housing consumers to a housing tenure using this rule. The rule compares the price of a constant quantity of housing under both owner-occupation and rental tenures. The housing consumer is then assigned to the cheapest of these tenures.
Rent Assistance (RA)	A cash payment to eligible low-income families and welfare recipients to meet a part of the costs of private rental housing.
Representative Project Models	An approach to analysing the impact of direct government interventions (usually in the form of taxation settings) on the supply of rental housing. A representative investor with given tax liabilities is specified, as is a representative project. The impact of a change in policy is then assessed using these parameters.
RIS	Rental Investors Survey.
Shared Dwelling Arrangements	Income units in the SIHC who live rent-free, generally in the home of a family member, or from a landlord who resides in the same dwelling.
SIHC	Survey of Income and Housing Costs.
Sunk Costs	Fixed costs that once incurred cannot be recovered. Stamp duties paid when acquiring a property are an example. The importance of sunk costs is that they drive a wedge between cost calculations made at the time of acquisition and the same cost calculations made when a property has been acquired in the past. In the latter case sunk costs do not enter into the calculation as current decisions cannot change them.
Wealth Constraint	Mortgage lenders often require a minimum deposit to be provided by a purchaser. Where an income unit lacks sufficient liquid assets to meet this requirement they are subject to a wealth constraint.

EXECUTIVE SUMMARY

Introduction

This report outlines the development of the Australian Housing Market Microsimulation (AHMM) model. The AHMM model is designed to provide housing market analysts and housing policy makers with a quantitative economic model to assess the impact on the housing market of both Federal and State policy measures, and of changes to the economic environment. As such, the development of the AHMM model for the Australian housing market represents a major step forward for housing economists and Federal and State Government policy analysts as it provides them, for the first time, with a microsimulation tool capable of analysing the impact of a broad range of housing policy measures on the Australian housing market.

The model captures the housing demand and supply decisions of individual housing consumers and investors. Using the detailed information contained in the unit record files of two Australian Bureau of Statistics (ABS) surveys, taxation liabilities, welfare entitlements, rent assistance, housing costs, and the capacity to obtain mortgage finance are simulated for each decision making unit. Housing consumers are initially assigned to the housing tenure, which offers them housing at the lowest cost. When a housing consumer is assigned to owner-occupation but lacks the capacity to obtain mortgage finance, the model reassigns that income unit to the tenure they reported in the survey. These decision rules are depicted in Figure E.1. In this report we utilise the AHMM model to examine the impact of a range of important Federal and State policy measures and taxes (e.g., the First Home Owners' Grant, the Building Write-off allowance, land taxes and stamp duties) on housing tenure decisions and the supply of private rental accommodation.

Chapter 1 lists the aims of the study and outlines the scope of this report. A review of relevant literature is also undertaken.

Chapter 2 discusses the theoretical underpinnings of the model. The role played by taxes in determining the costs faced by a landlord is identified and this leads into a discussion of models that explain the operation of the supply side of the private rental housing market. We then turn to the demand side of the housing market and discuss how the relative cost of housing in different tenures and borrowing constraints can be used to explain tenure outcomes. The rules followed by the simulation model to assign housing consumers to different tenures on the basis of economic costs and borrowing constraints are presented at this point. We close Chapter 2 with an outline of how key price and borrowing constraint parameters are measured.

Chapter 3 presents the results of a simulation run from the model using baseline parameter and policy settings. We then use the model to examine how factors such as interest rates and capital gains can impact on tenure outcomes.

Chapter 4 focuses on the supply of affordable rental housing and examines how tax allowances can be used to increases this supply in a targeted manner. We then consider how features of state government land tax and stamp duty regimes increase the costs of private rental investors, with potentially adverse consequences for the supply of affordable rental housing.

Chapter 5 examines policies that aim to improve access to home ownership. We begin with an analysis of First Home Owner Grants. The model's ability to produce detailed economic impact analysis is evident here. Not only do we gauge the impact on home ownership of these grants, we also present a distributional analysis and cost the policy. A similar exercise is undertaken for a housing partnership initiative of the type that has recently attracted much attention in the media and among policy makers and analysts.

Chapter 6 presents our conclusions and outlines future research directions. We have endeavoured to keep our presentation non-technical and readers who would like more technical detail are directed to the appendices and our associated working papers.

The Australian Housing Market Microsimulation (AHMM) Model

The AHMM model developed in this report is grounded on two key elements.

- A theoretical framework that specifies the decision-making processes of housing market participants.
- The implementation of that framework using representative Australian survey data.

We operationalise the AHMM model through the use of the confidentialised unit records of the Australian Bureau of Statistics (ABS) *1997 Rental Investors Survey* (*1997 RIS*) and *1996-97 Survey of Income and Housing Costs* (*1996-97 SIHC*). Use is also made, where necessary, of the ABS's *1999 Australian Housing Survey* and other economic and financial data necessary to the construction of relevant model parameters. The detailed financial information contained in these surveys permits precise measurement of the housing costs and incomes of both investors and housing consumers.

Housing Demand and Supply

The AHMM model takes both demand and supply side responses into account and is capable of disentangling quantitatively significant from quantitatively insignificant influences on outcomes.

- On the supply side of the model, private market rents are set equal to the economic costs of investors who can supply housing at the lowest rent-value yields.
- On the demand side of the model, we estimate the economic costs of existing homeowners and the potential economic costs of tenants if they became homeowners. We interpret these economic cost estimates as the maximum rents (the *bid rents*) that housing consumers are willing to pay before purchase becomes a cheaper alternative to renting.

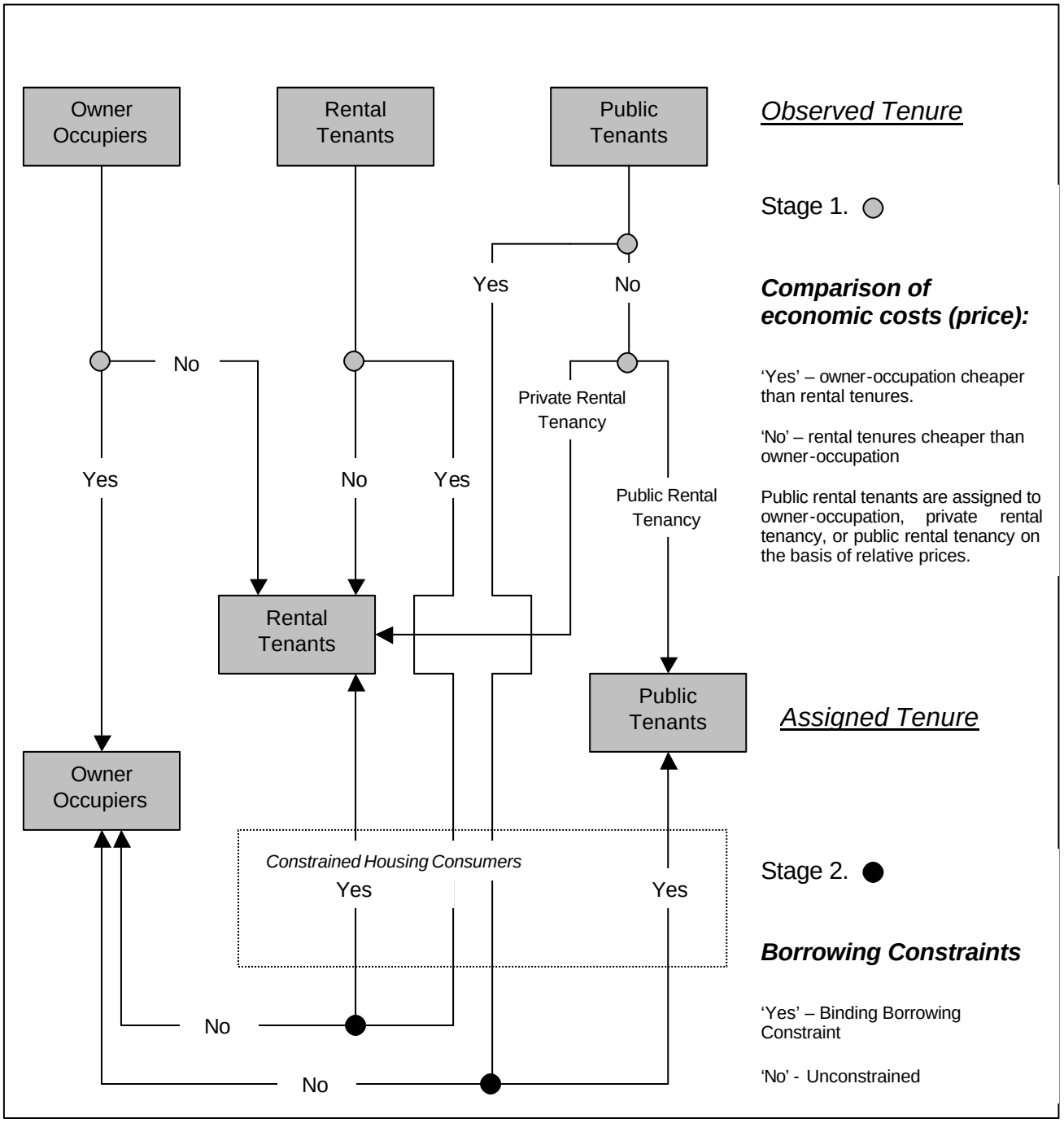
By comparing demand side bid rents with the market rents that our supply side analysis yields, income units can be assigned to one of two categories (See Figure E.1):

- Income units that find homeownership cheaper than renting.
- Income units who find renting cheaper than homeownership.

For example, consider an income unit that is seeking housing that we predict can be leased in the private rental market for $800 per month. However, this same housing can be purchased for $150,000 and a monthly economic cost of $750. This income unit finds homeownership cheaper than renting. Hypothetical tenure assignment according to the AHMM model can be compared to observed tenure outcomes. From this assignment process, we can identify income units who would be better off in homeownership, but are observed in rental housing tenures, and income units who would be better off in private rental housing but are observed in homeownership.

Consider, once again, our hypothetical income unit who is observed to be paying $800 per month as a tenant even though home ownership is cheaper. This is a potentially important observation because significant mismatch between assigned and observed tenures is symptomatic of market inefficiency. When an income unit is unable to access the tenure it prefers on cost grounds then there is a financial penalty involved and the income unit's consumption of non-housing goods and services, and consequently its material standard of living, will suffer.

Figure E.1 The Tenure Assignment Process For Housing Consumers



Borrowing Constraints, Federal and State Tax and Income Support Measures and Interest Rates

The AHMM model also accounts for three important features of the Australian housing market:

- Borrowing constraints faced by housing 'consumers'.
- Federal and State tax, income support and subsidy measures.
- Interest rate effects.

Borrowing constraints are an important component of the AHMM model because they help explain why we observe some income units renting housing even though they would be better off as homeowners. These housing consumers are constrained because they do not have the savings to meet deposit requirements, or they have insufficient income to meet mortgage repayments. In addition, the inclusion of borrowing constraints allows the model to estimate the impacts on tenure choice of a broader range of policies (e.g., First Home Owners Grants). Ignoring these non-price constraints on tenure choice would lead to incorrect estimates of the impact, and budgetary costs, of policies which lower the cost of owner-occupied housing.

Our microsimulation model addresses borrowing constraints by applying financial intermediaries' typical underwriting criteria to potential first homebuyers in the *1996-97 SIHC* sample (Stage 2 in Figure E.1). A potential first homebuyer who finds homeownership cheaper than renting is required to meet these underwriting criteria before being assigned to homeownership by the AHMM microsimulation model.

The role of Federal and State Government tax, subsidy and income support programs is a crucial feature of the AHMM model.

- Federal government income taxation provisions impact on the economic costs of investors and (potential) homeowners because their marginal income tax rates are a critical determinant of these costs.
- State and local government taxation imposes recurrent charges on both investors and (potential) homeowners, but they also add to the deposit requirements of first homebuyers and hence have an influence on whether borrowing constraints bind. They will also be a critical determinant of housing affordability for low-income groups.
- The Federal Government's welfare system is an important source of disposable income for many housing consumers, and some investors, and is then a relevant factor in relation to the repayment criteria applied by financial institutions in gauging credit worthiness.

Monetary policy also has an important role to play in the AHMM model. Under the so-called 'Inflation Targeting Regime', the Reserve Bank of Australia currently targets the cash rate and through this instrument retail interest rates with potentially significant consequences for the economic costs and hence rents charged by investors, as well as the economic costs of housing consumers as (potential) homeowners.

Interest rates impact on both the demand side and the supply side of the AHMM model.

- When interest rates rise (fall), homebuyers will find homeownership less (more) affordable and repayment underwriting criteria become harder (easier) to satisfy. This is a demand side impact.
- When interest rates rise (fall), (potential) investors find that their economic costs have risen (fallen). Upward (downward) pressure on market rents eventuates. This is a supply side impact.
- The overall tenure choice outcomes will reflect the interplay of these demand and supply side responses.

Policy Issues

This study reports the findings from a number of policy simulations conducted on the basis of the AHMM model. Policy simulations are conducted with respect to:

1. The role that relative costs and borrowing constraints play in determining housing tenure outcomes.
2. Alternative measures to promote the supply of private rental housing that is affordable to low-income households.
3. The role of land taxes and stamp duties as a possible impediment to the emergence of multi-property 'least cost' landlords is explored.
4. The impact which changes in interest rates (and other key economic variables) have on tenure choice decisions.
5. The role of First Homeowner Grants and housing partnerships as policy instruments to improve the accessibility of homeownership.

The policy simulations are of value because they offer quantitative measures of the impact of policies and parameters (e.g., interest rates) that take into account interaction of the supply and demand sides of the housing market. These impacts include identification of the different socio-economic groups who benefit from a policy.

Housing Tenures: Preferences and Constraints

In Chapter 3 of the report, we utilise the AHMM model to examine important policy questions concerning housing tenure decisions and outcomes. The particular policy question that is of interest to us is: Are preferred housing tenure choices prevented by market inefficiencies?

Housing Tenure Assignment

Income units are notionally assigned to housing tenure locations using the following five-step procedure.

- Step 1. A market rental rate in the private rental sector is determined by the rents that will just cover the economic costs of investors belonging to the highest tax bracket. (We choose this investor group because they have the lowest economic costs and are more likely to 'survive' in the market in the longer term.)
- Step 2. All income units other than public housing tenants and 'rent-free' income units are assigned to either homeownership or renting, given application of a *relative price assignment rule*.
    - The relative price assignment rule assigns income units to homeownership if their bid rental rate is less than the market rental rate and assigns income units to the rental tenures if bid rental rates are greater than or equal to the market rental rate. Market rental rates are adjusted for receipt of rent allowances when the income unit is eligible to receive the allowance.
- Step 3. Those income units that are observed in private rental housing are assigned to homeownership if they satisfy both the relative price and borrowing constraint criteria, otherwise they are assigned to private renting. Borrowing constraints are applied using estimates of optimal housing consumption conditional on choice of homeownership.
- Step 4. Public housing tenants are assigned according to a sequential choice process in which tenants are assigned to the private rental tenure if the market rent is less than the actual rent paid as a public housing tenant. Public housing tenants are assigned to homeownership if the bid rent is less than the market rent and the rent paid for public housing, and borrowing constraints are not binding. Otherwise, the income unit is assigned to the public rental tenure.

- Step 5. There are income units who pay no rent in their current residence. Typically these are young single person income units living with parents or relatives. They are assigned to this sub-tenure even if their bid rental rate exceeds the market rental rate, as they are financially better off remaining in rent-free housing. However, if the bid rental rate is less than the market rental rate and borrowing constraints do not bind, the income unit is assigned to homeownership. If borrowing constraints bind the income unit is assigned to the 'rent-free' tenure category regardless of the relative price assignment rules. This rule represents an attempt to capture the household formation decision of young individuals and couples. It assumes that most housing consumers aspire to homeownership and those able to live 'rent-free' will delay their transition into homeownership until borrowing constraints are relaxed. A more rigorous modelling of this decision is part of the future development plans for the model.

Relative Price Effects

On the basis of relative price effects alone (using the relative price assignment rule):

- 66.5% of all private renters find owner-occupation cheaper given the relative costs they face. This represents a significant latent demand for owner-occupation.
- Only 7.9% of public renters find owner-occupation cheaper than either private rental (7.7%) or remaining in public rental housing (84.5%). This outcome reflects: (a) the low incomes and hence high relative price of owner-occupation, (b) access to rent assistance payments if public renters became private rental tenants, and (c) subsidised rents in public housing.
- A substantial number of *owner-occupiers* (21.8% of all owner-occupiers) are assigned by the model to a private rental tenancy because the latter offers cheaper housing. These income units are predominantly outright owners rather than purchasers (77.3% are outright owners), are often income units with older household heads (56.3% of these income units have at least one member who is over 65 years of age, whereas this is true for only 16.9% of income units in the sample), and receive pension or allowance income that would entitle them to rent assistance as private rental tenants.

The considerable latent demand for homeownership among income units in private rental markets is an important finding. This is evidence of housing market inefficiency. Our owner-occupier findings imply that a considerable number of older income units who own their homes outright, would be able to rent the equivalent amount of housing at a lower economic cost. These homeowners are either prevented from making a preferred choice, or have non-price related reasons for continuing to reside in their current homes as owner-occupiers such as a desire to pass on the family home as a bequest.

Borrowing Constraints

The role played by borrowing constraints in generating inefficient outcomes in housing markets is particularly important. These constraints take two forms, an income or repayment requirement, and a wealth or deposit requirement. Whereas 66.5% of all income units in private rental tenancies found homeownership preferable on the basis of a relative price comparison, only 3.7% of tenants are able to meet income and wealth constraints as well as the relative price criterion.

- Wealth constraints *alone* are binding for 27.2% of tenants.
- Income constraints *alone* are binding for 4.5% of tenants.
- Income and wealth constraints *together* are binding for 62.7% of tenants.

The mean savings of tenants subject to a binding wealth constraint alone is $1634, while those with binding wealth and income constraints have mean savings of only $416.

- The gap between tenants' savings and the 10% deposit requirement utilised in the AHMM model is an average 8.6% ($10,059) of housing demand ($116,703) for those confronting a wealth constraint alone, and 9.6% ($9,990) of housing demand ($104,033) for those subject to both wealth and income constraints.

- In the case of those income units facing an income constraint alone, the gap between the maximum affordable mortgage and the housing demand ($129,301) averages 32.4% ($41,916) of housing demand for those facing the income constraint alone, and 42.2% ($43,928) of housing demand for those income units subject to both wealth and income constraints.

These findings suggest that many tenants will have to delay purchase for a considerable number of years while their incomes grow, and their savings accumulate to levels sufficient to relax borrowing constraints. They also provide an insight into why the First Homeowner Grants have been so successful in promoting home ownership. As is detailed below, a significant number of wealth constrained housing consumers find that First Homeowner Grants are effective in overcoming this constraint.

The characteristics of tenants who are income or wealth constrained are as follows;

- The *income constrained,* tend to belong to an older age bracket, have comparatively high levels of investment income, and depend more on government benefit payments than do the wealth constrained.
- The *wealth constrained* have higher annual incomes, higher labour force participation rates and are more likely to be renting from a private landlord who does not reside in the same dwelling, and is not a family member than the income constrained.
- Income units who are *both wealth and income constrained* are far more likely to experience unemployment in comparison to the income or wealth constrained, although in the former case a low participation rate may reflect hidden unemployment. Four fifths of all income units in this group are sole person income units. It is those experiencing both binding income and wealth constraints that find homeownership most inaccessible.

Market inefficiency

Our analysis of tenure assignment points to market inefficiency resulting from the rules employed by mortgage lenders to assess loan applications of income units who would find owner-occupation cheaper than renting. A potential source of further inefficiency has been identified in the apparent cost effectiveness of renting as an option for some older Australian owner-occupiers. While further research is needed to improve our understanding of why these income units remain in owner-occupation, this is also an important finding given an ageing population in Australia. A key component of future research is to develop a capacity to analyse dynamic issues such as population ageing.

For many housing consumers the most significant constraint on becoming owner-occupiers is the absence of sufficient financial assets to meet deposit requirements associated with obtaining a mortgage. However, we also find considerable evidence that the incomes of many housing consumers are insufficient to meet underwriting requirements for a mortgage that would allow them to purchase their desired value of owner-occupied housing. The 'desired value' of owner-occupied housing is imputed from a statistical model of the determinants of housing demand as expressed by owner-occupiers who recently purchased housing

Our results also point to the importance of considering the effect of changes in parameters such as interest rates and rates of capital gain on the housing costs of both owner-occupiers and rental investors. A fall in the mortgage interest rate may well make owner occupied housing more affordable from the point of view of a income unit's cash flow situation (advantaging existing owner-occupiers), but in terms of the relative cost of alternative housing tenures it may make rental tenures more attractive. This is because rental investor costs fall by more than do the costs of owner-occupiers due to the taxation treatment of rental investor's interest payments. In a competitive rental housing market these savings are passed on to rental tenants in the form of lower rents.

Promoting the Supply of Affordable Rental Accommodation

Chapter 4 of the report is concerned with the supply-side of the housing market and the role-played by tax and subsidy measures in influencing investment decisions in the private rental property market.

Growing concern about a lack of rental housing affordable to low-income Australian households has prompted consideration of possible policy interventions.

The key policy questions addressed are:

- What is the impact of current policy measures on the incentive to invest in low-cost rental accommodation?
- How can governments promote the supply of affordable private rental housing?

Building Write-off allowances and Low Income Tax Credits

One important existing Federal tax measure that impacts on the supply side of the rental property market is the Building Write-off (BWO) allowance.

The BWO allowance is applied on an annual basis and limited to 100 per cent of the construction expenditure. Deductions are allowable for both the construction of the dwelling and for extensions to existing dwellings but apply only for the period the property is rented or is available for rent. The current annual building write-off rate is 2.5 per cent of construction costs. This annual deduction can be written off against pre-tax income over a forty-year period from the date construction was completed. BWO allowances reduce the effective tax burden of investors and, via this channel, influence an investor's rental property decisions.

The AHMM model is utilised to assess the impact on an investor's tax burden of the following policy scenarios:

- The existing Federal Government BWO allowance.
- The reintroduction of the original BWO allowance rules that allowed investors to write-off 4% of construction costs against pre-tax income over a twenty-five year period.
- The introduction of a Low Income Housing Tax Credit (LIHTC).

The LIHTC has been applied in the USA. Our simulation is based on a tax credit that is offered at a 4% per annum rate against construction costs, without time limit, but conditional on weekly gross rents being less than some threshold level.

King-Fullerton Effective Tax Rate Impacts

We use, as our measure of the effective tax burden of BWO allowances and LIHTCs, the King-Fullerton (K-F) effective marginal tax rate measure. Taxes introduce a wedge between the pre-tax real rate of return that an investor requires from a rental housing project, and the after-tax real return that an investor could obtain on savings at the market rate of interest. When this tax wedge is divided by the investor's required pre-tax real rate of return, we obtain the King-Fullerton (K-F) effective marginal tax rate.

K-F effective marginal tax rates are estimated using the detailed financial records of investors who financed the construction of 387 rental-housing units. Our analysis shows that average K-F effective tax rates are high by both international standards and relative to marginal tax rates on income. This indicates that when both Commonwealth and State government taxes are taken into account, private rental investment is not taxed leniently. However the average K-F tax rates disguise a considerable amount of variation between investors.

The BWO allowance under current arrangements has little effect on effective tax burdens.

- The mean K-F marginal tax rate is reduced by only 1 percentage point, from 64 per cent to 63 per cent as a result of the BWO allowance.

- The small relief afforded by the allowance is due to its amortisation over the investor's holding period, the presence of most landlords in tax brackets lower than the top bracket and its recapture under capital gains tax on realisation.

- If the BWO allowance was granted at a higher rate of deduction (4 per cent, instead of 2.5 per cent) and not recaptured under capital gains tax, the impact on the K-F effective tax rate remains small with mean rates of tax falling by 3 percentage points from 64 per cent to 61 per cent.

If we replace the BWO allowance by a targeted LIHTC significant reductions in K-F effective tax rates are found.

- In the lowest rent quartile, K-F effective tax rates are lowered from 61 per cent to 41 per cent (given zero real capital growth).

The LIHTC therefore represents a potentially powerful incentive effect in helping to retain low-income rental housing.

- Existing investors in low-income rental housing will find that their effective tax burdens are cut by one-third or more depending upon rates of capital appreciation.
- This is a substantial inducement to the retention of existing real estate investments in this segment of the market.
- Taking displacement effects in other segments of the rental market into account, we forecast a doubling of the number of investors who provide affordable rental housing under a low-income housing tax credit.

Budgetary impacts

We estimate that the first year Australian federal tax revenue loss from introduction of LIHTC (at 1996-97 prices) would be $42.1m. If the current BWO allowance arrangements were abolished we estimate a first year compensating tax revenue gain of $37.3m. The package of measures would then be approximately revenue neutral. However, by targeting the tax credit there is a large reduction in the tax burden for investors in newly constructed units affordable to low-income Australian households.

This budget policy analysis assumes no displacement effects that could arise as a result of investors adjusting their real estate portfolios to take advantage of targeted tax credits. The tax credit could serve to both retain existing real estate investments in the low rent segment and attract new investors into the segment.

If we include displacement effects into our tax expenditure budget estimates we no longer have a tax neutral package. The first year tax revenue increase of $188.1 million, a figure that takes payment of taxes on accrued capital gains and stamp duty into account, as well as the tax revenue gain on removing BWO allowances. The tax revenue foregone because of the introduction of the targeted tax credit is now $125.4 million, leaving a net revenue gain in the first year of $62.6 million. The capital gains tax and stamp duty receipts are non-recurrent revenue gains in the year of portfolio adjustment. On a recurrent basis there is net revenue loss of $88.1 million per annum at 1996-97 prices. This is a relatively low figure in view of the approximately $1 billion cost of rent assistance programs in Australia in 1996-97. Moreover, we consider this to be the upper limit to estimates of tax revenue forgone with respect to investments in newly constructed properties, because the assumption of uniform capital appreciation, operating costs, land taxes and property taxes is unrealistic.

In view of the substantial impact on the incentive to invest in rental housing affordable to low-income households and its relatively small budgetary impact, the targeted tax credit measure deserves serious consideration by Australian policy makers.

Land Taxes and Stamp Duties

State Government policy measures also impact on the supply-side of the rental market and investor decision-making. Two measures in particular have potentially important effects, namely, Land Taxes and Stamp Duties. The policy issue we are concerned in respect to these two measures is: Does the structure of State Government Land Taxes and Stamp Duties deters investors from moving from single property holdings to multiple-property investment portfolios?

The small number of multiple property investors is a feature of Australian private rental markets. Land tax is levied on the aggregate site value of the rental properties held by an investor, rather than levied on each rental property independently of the site value of other property holdings of the investors. The calculation of land tax liabilities uses a progressive rate schedule with rates increasing as the aggregate site value increases. Land tax liabilities might then rise rapidly as a single property investor adds to their portfolio. Our research involves calculation of the rise in effective tax burdens if a sample of existing investors were to increase their holdings of rental property by adding an extra rental-housing unit. Our findings suggest that land tax liabilities would appear to act as an impediment, but that there are other factors at work that also restrict the number of multi-property investors.

The application of the AHMM model to measure the effect of Land Taxes and Stamp Duties reveals that:

- K-F effective tax rates on existing properties increases with the number of rental properties held by a landlord. This reflects the combined impact of the progressive nature of Land Tax schedules and the application of Land Tax rates to the total value of residential rental land that the investor owns.
    - For single property investors, the K-F effective tax rate rises from 47.9 per cent to 50.9 per cent for the additional property, representing a 3-percentage point increase.
    - For property investors with two existing properties, the K-F effective tax rate rises from 50.6 per cent to 55.3 per cent for the additional property, representing a 5-percentage point increase.
    - For property investors with three existing properties, the K-F effective tax rate rises from 52.1 per cent to 58.1 per cent for the additional property, representing a 6-percentage point increase.
- The disincentive effect of land tax will differ between states because of differences in the land tax rate schedules and because the value of residential land varies, particularly between the capital cities. The effect of any disincentive on the part of land taxes to the emergence of multi-property landlords is at its strongest in metropolitan NSW where relatively high land values interact with the structure of the land tax schedules.
    - For a single property investor in Sydney, the K-F tax rate on an additional property is almost 9 percentage points higher than that on the existing property. This represents a 17.5% increase in the K-F tax rate.
    - In Victoria, a Melbourne based investor with one property has a K-F tax rate that is 1.45 percentage points higher on the additional property, a 2.95% increase.
    - In Queensland, the corresponding percentage point increase is 2.32 percentage points.

Promoting Access to Home Ownership

The AHMM model predicts considerable latent demand for homeownership. Government interventions that can promote access to homeownership have the potential to lift homeownership shares in the short run, particularly if they are targeted in such a way that they relax borrowing constraints.

In Chapter 5 of the report, we examine two direct interventions that promote access to homeownership.

- The First Home Owners Grant.
- Housing Partnerships (Defined below).

The First Home Owners Grant

The Federal Government introduced the FHOG on 1st July 2000 to offset the impact of the introduction of the goods and services tax. It was initially set at $7000. The grant was not means tested but the eligible home must be occupied by the successful applicant as their principal place of residence.

- On 9th March 2001 the Federal Government announced an increase in the grant to $14000 for first homeowners who build their home, or purchase a newly constructed home.
- From 1st January 2002 until 30 June 2002 the grant was scaled back to $10000.
- Since 1st July 2002 the grant has been wound back to its initial $7000 value.

Relative Price Effects and Borrowing constraints

We use the AHMM model to undertake a number of policy simulations. Our first concern is to determine how many potential first homebuyers are predicted to switch to homeownership as a result of the FHOG program.

- Do potential first homebuyers find homeownership attractive because the FHOG program make homeownership cheaper than renting (a relative price effect), and/or because these programs relax borrowing constraints?

Simulations conducted using the AHMM model indicate that the percentage of all income units who find homeownership cheaper than renting increases by 1.3 percentage points, when the FHOG is set at $7000. If the FHOG is doubled to $14000, the proportion of income units increases by an additional 2.3 percentage points. Hence, the relative price effect of the FHOG is small.

- The relative price effect is muted because the grant is amortised over the period of time an income unit expects to be a homeowner.

The FHOG has a much more important impact in relaxing borrowing constraints when it is set at $14000. Under the reference system, where there is no FHOG, the AHMM microsimulation model estimates that 44.5% of all income units satisfy both relative price and borrowing constraint hurdles and are hence assigned to homeownership. (Note that tenure shares are calculated using income units rather than households, and so the share of homeowners is lower than when using households as the unit of measurement.) This share rises by 0.8 percentage points to 45.3% when the FHOG is set at $7000. A doubling of FHOG to $14000 has a more than proportionate impact with the share now increasing by 6.4 percentage points to 50.9%. This represents a market penetration rate of 12% of all income units assigned to the rental tenures under the reference system. The $14000 FHOG has a large impact because it is very effective in meeting the gap between potential homebuyers savings and their deposit requirement.

The buoyant residential construction figures in the period following introduction of the $14000 FHOG are consistent with these findings.

Almost one-half of those income units forecast to take up FHOG at $7000 and $14000 were in shared dwelling arrangements, and are therefore forming a new household when using the grant for home purchase. This is a key finding as it confirms that FHOG will have a significant stimulatory impact on aggregate demand in the economy, since they will typically need to furnish the dwelling they purchase, and they do not vacate a dwelling unit when making the transition to homeownership. A second noteworthy finding about previous living arrangements is that FHOG holds little appeal to public housing tenants.

Cream-skimming, tenure polarisation and trickle-down effects

In addition, to understanding the important role played by the FHOG in relaxing the borrowing constraints faced by renters we are also interested in the effect of the FHOG on cream-skimming, tenure polarisation and whether the FHOG exhibits trickle-down effects.

- The FHOG results in 'cream-skimming' if it largely benefits income units who would ultimately become homeowners in its absence.
- Tenure polarisation occurs if FHOG interventions attract 'better-off' young, well-educated professionals, leaving rental tenures increasingly dominated by older lower-income groups with marginal or no attachment to the labour force.
- Trickle-down effects result when substantial numbers of 'better-off' tenants vacate low rent housing in response to the FHOG and there is a consequent improvement in the supply of rental housing affordable to low-income tenants.

Our analysis reveals significant FHOG 'cream-skimming' effects.

- Most income units predicted to take up the FHOG would have purchased once accumulated savings met deposit requirements, or rising incomes enable repayment requirements to be satisfied.
- The FHOG primary impact is then to bring forward the home purchase plans of most recipients.

The findings from the AHMM model offer support for the tenure polarisation hypothesis.

- Those assigned to homeownership with the assistance of a FHOG tend to be young, single, without children and enjoy wage and salary incomes that are on average $15,649 higher than eligible income units who continue to be assigned to rental tenancies, and $13245 higher than ineligible tenant income units.
- They are also better qualified, far more likely to be labour force participants and less likely to be unemployed when they are in the labour force relative to the other two sub-groups.

Almost 70% of private rental tenants assigned to homeownership (at $14000 FHOG) would vacate rental units in the bottom two quintiles of the rent distribution. With FHOG set at $14000 we can then expect a significant expansion in the supply of affordable private rental housing; at $7000 these trickle-down effects are insignificant because of the relatively low projected take-up of FHOG.

Our analysis also reveals that home purchases under the FHOG scheme are likely to be concentrated at the lower value end of the home purchase price spectrum.

Housing Partnerships

Housing Partnerships (HPs) are a blueprint for expanding homeownership via equity partnerships between housing consumers and financial institutions.

In a HP arrangement the government or a financial institution offers to take an equity stake in a home purchase.

- The housing consumer is the *managing partner* who retains ownership rights with respect to the timing and type of improvements and the timing of any decision to sell.
- As the *limited partner,* the government or financial institution offers to take a percentage equity stake. In return, the managing partner agrees to forgo a pro rata percentage share of capital gains (on realisation) that is a return on the limited partner's equity stake.

After application of the AHMM model's relative price and borrowing constraint assignment rules, we predict that the introduction of a HP arrangement will result in the share of homeownership increasing from 44.5% of income units to 53.3%, or by 8.8 percentage points with 15.9% of all income units assigned to rental tenures in the AHMM model finding it financially advantageous to enter a HP. The equity shares at which housing partnerships are entered into reflect the joint

influence of relative prices and borrowing constraints. A housing consumer must be able to meet deposit and mortgage repayment requirements on the financing of their share. This requirement sets a maximum managing partner share in the housing partnership. The minimum limited partner share (MLPS) is then calculated as the residual value of equity on the property. The mean managing partner share in the HP is predicted to be 17%, which implies an 83% ($84,603) mean share for the limited partner.

- We estimate that this is equivalent to Financial Institutions and/or Government taking a $73 billion equity stake in the purchases of 846,381 eligible first homebuyers at 1996-97 prices across Australia.
    - By way of comparison, we predict that 65,854 first homebuyers take up the First Home Owners Grant at $7,000 across Australia, giving an outlay of $461 million. For the $14,000 grant forecast to be taken up by 632,970 income units the outlay is $8.86 Billion.

Further key findings from our AHMM model HP simulations include:

- Capping the limited partner share reduces significantly the number of tenant income units predicted to enter HP arrangements. Hence, any financial institution reluctance to purchase high equity stakes, could severely limit the short-term effectiveness of the HP as a vehicle capable of meeting the considerable latent demand for homeownership.
- If we assume that financial institutions place no upper limit on limited partner shares, HP will appeal to more tenants than FHOG at $14000 or $7000. This is because the annual economic costs of homeownership are lower under housing partnership arrangements than FHOG-aided purchase, and is more effective in relaxing borrowing constraints.
- In comparison to FHOG, Housing Partnerships are more effective in helping public rental tenants to become owner-occupiers.
- HPs hold strong appeal to those income units in shared dwelling arrangements, with just under one-half of those entering Housing Partnerships coming from shared dwelling arrangements.
- Tenants expected to enter a HP also have relatively high levels of savings, low unemployment rates and high labour force participation rates, better educational qualifications and a higher incidence of professional occupations relative to those who continue to be assigned to the rental tenancy.
- HPs are more likely to be taken up by lower income tenants as compared to FHOGs.
- HPs are less likely to 'cream skim' as compared to FHOGs.
- The HP impact in terms of improving the supply of affordable housing will be greater than that for the FHOG scheme.

Our predictions from the AHMM model generally suggest that HPs will have more significant impacts on housing markets than the FHOG scheme. This conclusion is dependent on the preparedness of financial institutions to acquire high equity shares. If there is a reluctance to purchase high equity shares, potential managing partners must wait until they have saved a deposit sufficient to finance a share that is acceptable to financial institutions. They may in the meantime choose to conventionally finance home purchase.

Future Research Directions

In this research project we have applied the AHMM model to two key areas: Access to homeownership and the supply of affordable private rental housing. A major area of application that awaits attention is the use of the AHMM model to measure the impacts of government welfare reform on housing affordability and housing insecurity (e.g., sustaining preferred tenure choices).

There are a number of specific findings that warrant further investigation.

- *Housing Partnerships*: Further work is required in terms of the sensitivity of forecast take up to capping of limited partner shares, and the potential market for HP beyond first homebuyers.
- *Outright owners*. Relatively large numbers of older outright owners are found to be in housing circumstances that leave them financially worse off than if they rented the same amount of housing. Further work is required in terms of knowing whether these households want to remain outright owners, but wish to trade-down and are prevented by high transaction costs or alternatively, whether these households might welcome the opportunity to rent given eligibility for rent assistance, but a lack of suitable rental housing alternatives deters a tenure change.
- *Agency problems.* Agency problems refer to a broad range of frictions that can emerge between landlord and tenant such as a failure on the part of either party to a tenancy agreement to carry out repairs or maintenance for which they are responsible. Landlords may be deterred from investment in the low rent segment of the market as a result of these problems and this may limit the creation of affordable rental housing resulting from policies such as the LIHTC. Further research is required to uncover possible policy responses to agency problems.

CHAPTER 1 INTRODUCTION

1.1 Aims of the Study

This final report presents the findings from an economic study of housing market outcomes, with particular reference to tenure choice. The principal aim is that of designing a microsimulation model that is capable of measuring the impact of direct and indirect government interventions in the Australian housing market.[1]

A microsimulation model uses data records containing the socio-economic and demographic characteristics of decision makers (persons, households, income units) to analyse choices in different settings or scenarios with respect to important parameters (interest rates, capital appreciation rates, tax rates and inflation). In the present study, we make use of the confidentialised unit records of the Australian Bureau of Statistics (ABS) *1997 Rental Investors Survey* (*1997 RIS*) and *1996-97 Survey of Income and Housing Costs* (*1996-97 SIHC*) in the development of our microsimulation model, the Australian Housing Microsimulation Model (AHMM).[2]

The surveys contain detailed information on income and its sources including welfare payments. The SIHC provides detailed information on housing circumstances, demographic characteristics such as age, gender, marital status, education and employment. Family structure is also reported. The RIS provides details of the residential rental property holdings of Australian investors including value, rent levels and operating costs such as maintenance. The survey also provides information on the investment intentions of current investors.

The detailed financial information contained in these surveys permits precise measurement of the housing costs and incomes of both investors and housing consumers. These housing cost and income estimates take into account the impact of housing programs such as building write-off allowances and rent assistance (i.e., direct interventions), tax and benefit parameters such as age pension income tests (i.e., indirect interventions) and key economic variables such as interest rates that government authorities can influence.[3]

In this report, we concentrate on the housing market impacts of direct government interventions and key economic variables on the rents charged by and the supply decisions of investors, the housing costs that housing consumers incur on acquiring housing and the tenure choices the latter make in view of these rents and prices.

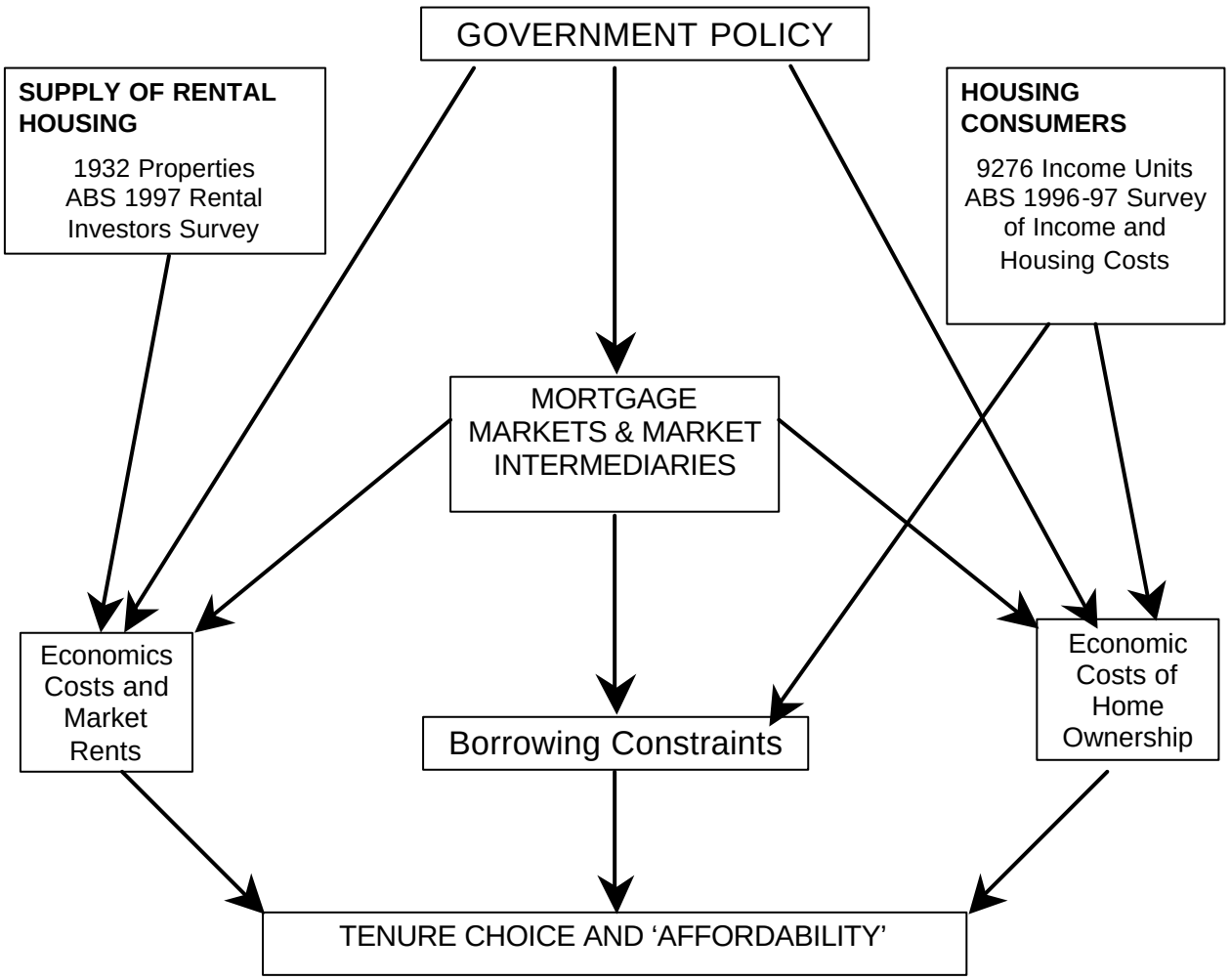
The following policy analyses are conducted using the microsimulation model:

- A comparison of alternative measures to promote the supply of private rental housing affordable to low income households.
- The role of land taxes and stamp duties as a possible impediment to the emergence of multi-property 'least cost' landlords.
- The impact that changes in interest rates (and other key economic variables) have on tenure choice decisions is measured.
- An evaluation of first-homeowner grants and housing partnerships as policy instruments to improve the accessibility of homeownership.

The institutional basis and key economic variables comprising the AHMM model are examined in Figure 1.1.

[1] The reader who just wants an overview of the AHMM microsimulation model and is principally interested in the policy analyses should read chapter 1, section 1.1 and then skip to chapters 3, 4 and 5.
[2] See ABS (1999a, 1999b) for details of both the *1997 RIS* and *1996-97 SIHC*.
[3] The model does then strive to achieve a 'whole of government' approach to housing market analysis of the short run impacts attributable to government policy.

Figure 1.1 A Microsimulation Model of the Australian Housing Market



The goal of the model is to predict the housing tenure outcomes of housing consumers using assignment rules that capture the role of relative prices and borrowing constraints that result from the rules applied by financial institutions when assessing an application for a mortgage. We begin the description with the supply side component on the left hand side of the figure. It is based on detailed estimates of the economic costs of 1576 investor income units who hold 1932 rental properties.[4] [5] If the rental market is competitive we can expect market rents to converge on the economic costs of least cost investors (Narwold, 1992). This assumption is invoked to arrive at measures of the market rents that housing consumers must pay in the private rental housing market.[6]

Next consider the demand side component of the model on the right hand side of Figure 1.1. It is operationalised using the *1996-97 SIHC* and its detailed financial records of 9276 housing consumer income units who express a demand for housing in either independent or shared

[4] Economic costs include the outlays an investor incurs on operating costs (eg repairs), financing costs and suitably amortised transaction costs. Economic costs differ from accounting measures because they also include the return sacrificed on the investor's equity stake, and are defined net of expected capital gains. All components in the economic cost measure are defined after taking into account tax provisions including capital gains tax.

[5] An income unit 'is one person or a group of related persons within a household, whose command over income is assumed to be shared. Income sharing is assumed to take place within married (registered or de facto) couples and between parents and dependent children' (ABS, 1999b). The household is defined as 'a group of people who usually reside and eat together' (ABS, 1999b).

[6] The AHMM model also includes public housing and an analysis of the choices made by public sector tenants. See section 2.2 for details.

dwelling arrangements.[7] These records permit precise estimation of the economic costs of existing homeowners in the sample, and the potential economic costs of tenants if they became homeowners. We can interpret these economic cost estimates as the maximum rents (bid rents) that housing consumers are willing to pay before purchase becomes a cheaper alternative to renting.

By comparing these maximum rents with the market rents that our supply side analysis yields we can assign income units into two categories:

- Income units who find homeownership cheaper than renting.
- Income units who find renting cheaper than homeownership.

By comparing these tenure assignment outcomes with observed tenure outcomes we can identify income units who would be better off in homeownership, but are observed in rental housing tenures, and income units who would be better off in private rental housing but are observed in homeownership. This is a potentially important exercise because significant mismatch between assigned and observed tenures is symptomatic of market inefficiency. When a market operates inefficiently income units face higher costs in terms of their housing choices than they would in an efficient market. Housing is purchased from a rental investor (or as an owner-occupier) at a cost greater than the cost at which the income unit could purchase it as an owner-occupier (or as a rental tenant). Consumption of other goods and services suffers and standards of living are lower as a consequence.

The economics literature highlights borrowing constraints as a potential source of such market inefficiency. The third major component of the AHMM model addresses these constraints by applying financial intermediaries' typical underwriting criteria to potential first homebuyers in the *1996-97 SIHC* sample (see the bottom half of Figure 1.1). A potential first home buyer who finds homeownership cheaper than renting is required to meet these underwriting criteria before being assigned to homeownership by the microsimulation model. A potential influence on borrowing constraints and housing consumers' bid rents are the fees charged by market intermediaries. A charge that is of particular interest in this context is lenders mortgage insurance and we have taken care to accurately measure the incidence of this up front fee.

An overriding influence over all other components of the model is government fiscal interventions (see the top half of Figure 1.1). Federal government income taxation provisions impact on the economic costs of investors and (potential) homeowners because their marginal income tax rates are a critical determinant of these costs. As investors can deduct rental losses from other sources of income a higher tax rate investor will receive a larger reduction in taxation liabilities than a low tax rate investor. The investor's tax rate also determines the extent of capital gains tax liabilities on sale of a residential rental investment. However, the preferential treatment of capital gains means that the income tax benefits tend to outweigh additional capital gains taxes due to a higher marginal tax rate. As a result, high tax rate investors will normally have lower economic costs as a landlord than low tax rate investors. In the case of homeowners, the exempt status of capital gains results in a larger benefit to a high tax rate investor than to a low tax rate investor. State and local government taxation imposes recurrent charges on both investors and (potential) homeowners, and 'up-front' stamp and mortgage duties also add to the deposit requirements of first homebuyers and hence have an influence on whether borrowing constraints bind. Taxes will also be a critical determinant of housing affordability for low income groups. The Federal Government's welfare system is an important source of disposable income for many housing consumers, and some investors (primarily age pensioners), and is then a relevant factor in relation to the repayment criteria applied by financial institutions in gauging credit worthiness.

Finally, government monetary policy can target interest rates with potentially significant consequences for the economic costs and hence rents charged by investors, as well as the economic costs of housing consumers as (potential) homeowners. The analysis of interest rates highlights an important attribute of the AHMM model. When interest rates rise (fall) we typically hear market analysts comment that first homebuyers will find homeownership less (more)

[7] Using income units as the unit of measurement has the advantage of permitting analysis of household formation. Income units who are living rent free with relatives are assumed to be in shared dwelling arrangements in the empirical work.

affordable and repayment underwriting criteria become harder (easier) to satisfy. This is a demand side impact. But we less frequently hear of the impact on (potential) investors, who now find that their economic costs have risen (fallen), and upward (downward) pressure on market rents eventuates. This is a supply side impact. The overall tenure choice outcomes will reflect the interplay of these demand and supply side responses. Our microsimulation model takes both demand and supply side responses into account and is capable of disentangling quantitatively significant from quantitatively insignificant influences on outcomes.

1.2 Scope of Final Report

In the remaining section of Chapter 1 we review the literature that has been influential in the design of the modelling exercises described above. The antecedents of the AHMM microsimulation model are largely economic, and so this strand of the literature is emphasised.[8] As tax factors are thought to play an important role in shaping tenure patterns, this section also outlines key aspects of Australian and overseas countries tax treatment of housing.

Chapter 2 begins by explaining the technical details associated with model design, application and measurement. Care is taken to present this material in a form accessible to the non-specialist. The reader who wants to understand exactly how the different components of the model relate to each other, how parameters and variables are estimated and how housing consumers are assigned to tenures should read sections 2.1 – 2.3. Appendices offer detailed explanations of how the tax and benefit system has been modelled, and how rent assistance eligibility and entitlements are determined.

In Chapter 3 the tenure assignment outcomes are analysed, with particular emphasis on evidence that preferred tenure choices are prevented by market inefficiencies. These findings are reported for a reference system comprising policy settings as of July 2001, and baseline values for key parameters (e.g., interest rates) that are prevailing values at the survey date (1997). We have chosen to deflate taxation and welfare system parameters back to their 1997 levels rather than age the survey data. Indexed taxation and welfare parameters are indexed to the general price level (CPI). Survey data items such as house prices, rents, and incomes all require individual deflators. Our approach to deflating model components has been motivated by a desire to minimise the potential for introducing measurement error in the deflation process. The chapter concludes by conducting simulations that examine the response of predicted tenure choices when key parameter values are allowed to change. Particular attention is paid to the role of interest rates, inflation and rates of house price appreciation, but we also explore the role of agency costs as a determinant of tenure choice (see Wood, 2001b). An appendix benchmarks the AHMM model by comparing its predictive power with that of 'best practice' tenure choice models that are estimated using standard statistical (econometric) techniques.

Chapter 4 is the first to adopt an explicit policy focus. As the supply side component of the AHMM model was the first to be designed and developed, we began our policy analyses by focusing on the important question of how government could promote the supply of affordable private rental housing. The model is most suited to an examination of measures targeted on private rather than corporate investors who face a vastly different taxation regime with respect to income and are able to offset income from one source against losses in other business areas.

In Chapter 4 we contrast the present building write-off tax preference that provides a tax incentive to investors who develop an income generating building structure, including residential rental property, with a tax credit that is targeted on affordable private rental housing. Estimates of the impact on effective tax rates, investment patterns and budget costs are presented. Chapter 4 concludes by looking at state government taxes and the incentive to invest in private rental housing. The key issue here is whether land taxes and, to a lesser extent stamp duties, deter multiple-property investors. A finding in support of this hypothesis has great significance because we observe many cost inefficient investors surviving alongside cost efficient investors. The

[8] It should be noted that a focus on the economic does not imply that non-economic factors are irrelevant. It is the view of the authors that economic determinants drive tenure choices in the short run and economic modelling techniques are most appropriate in this context. A different focus and a broader methodological toolkit are required for an understanding of long run trends in tenure patterns.

deterrent effect of state government taxes could be impeding an increase in supply from cost efficient investors, and permitting the survival of cost inefficient investors.[9]

Chapter 5 shifts the emphasis from affordable rental housing to affordable owner occupied housing. The Federal Government introduced First Homeowner Grants (FHOG) on 1st July 2000 to help offset the impact of the Goods and Services Tax (GST) on the prices of newly constructed and established homes, and an anticipated post-GST downturn in building industry activity. Initially set at $7000 for all first time purchasers, an additional $7,000 was later made available to first time purchases of newly constructed dwellings. Though a direct intervention in the housing market, the measure was probably motivated by macroeconomic policy concerns as much as housing policy goals.

The AHMM model is used to predict the numbers of potential first homebuyers who find it financially attractive to purchase under the FHOG scheme. We also test three hypotheses. The 'cream-skimming' hypothesis proposes that FHOG advances the purchase date of income units who would otherwise have become homeowners at a later date. 'How much later?' is a question that depends on the rate at which income units save the required deposit and we intended to investigate this issue in future research. We restrict our attention to the extent of 'cream-skimming' in this report. A second closely related hypothesis claims that socio-economic and demographic differences between residents according to housing tenures is accentuated by FHOG, a process commonly referred to as tenure polarisation. The third 'trickle-down' hypothesis states that higher income, wealthier tenants are attracted out of rental tenures by FHOG, and many of these income units have been occupying low rent units. On vacating these properties, the supply of affordable rental housing is boosted.

We also examine the value segment in which FHOG beneficiaries are likely to purchase. The same research exercises are conducted in an appraisal of housing partnerships (Caplin, et al. 1997). In a housing partnership (HP) the government or a financial institution offers to take an equity stake in the dwellings purchased by first homebuyers. While similar 'equity-sharing' arrangements have operated on a limited scale both in Australia and overseas the proposals currently being examined by the Prime Ministers' Home Ownership Taskforce based at the Menzies Institute is more ambitious in scope. The proposal relies on a secondary market in the equity shares of the financial institutions to provide liquidity and depth so that housing partnerships can be made widely available. The feasibility of such a secondary market is beyond the scope of the microsimulation model. However, we are able to address the equally important issue of the appeal of partnerships to Australian income units. There are theoretical grounds for believing that HP would appeal to lower income groups as compared to FHOG beneficiaries as they would allow an income unit to address income as well as wealth constraints that prevent them from becoming owner-occupiers. For example, owner-occupation may become feasible for a single person on disability benefits if the minimum managing partner's share is not capped. Our findings are reported in the second half of Chapter 5, and we examine the sensitivity of the model results to alternative assumptions about the identity of homebuyers entitled to FHOG and HP arrangements in Appendix 4.

Chapter 6 presents concluding comments. The main findings of the research are listed and policy implications are drawn. The chapter also suggests some more or less tentative directions for future research.

1.3 Literature Review

There are three facets of the economics literature that have been drawn on in order to specify the microsimulation model of the Australian Housing Market.

The first are representative investor simulation models (project models) that have been designed and applied by North American researchers to measure the impact of direct interventions that aim to promote the supply of private rental housing. These direct interventions typically take the form of tax preferences.[10]

A second influential strand in the literature is the tax arbitrage process in housing markets, which focus on the circumstances under which a mutually advantageous landlord-tenant match can arise.

---

[9] See Wood and Watson (2001) where this argument is developed.

[10] Also referred to as tax expenditures. Tax allowances, tax credits and rate reliefs are alternative forms of tax expenditures (see Wood, 1990).

Finally, recent economic models of tenure choice that emphasise the role of borrowing constraints have had considerable success in explaining differences in the incidence of homeownership across populations of housing consumers. Their success warrants the inclusion of such constraints in any model that purports to analyse the underlying tenure choices that create these differences.

Tax preferences and the supply of rental housing

Governments commonly grant tax preferences to investors in rental housing to promote supply. Accelerated depreciation allowances and low income housing tax credits are examples in the USA (Hendershott and Ling, 1984; McClure, 2000). In Australia, there has been a building write-off allowance since 1987, and losses can be deducted from other sources of income.[11] In the UK various tax efficient vehicles for the promotion of investment in private rental housing have been created (Wood and Kemp, 2003, forthcoming). A capital cost allowance is used in Canada to stimulate the construction of rental housing (MacNevin, 1997a). In all of these countries there is preferential treatment of real estate capital gains as compared to ordinary sources of income such as rents, and this turns out to be a critical factor, as we will demonstrate in Chapter 2.

Measurement of the impact of these tax preferences on rents and supply has been generally based on simulations using the typical project model approach. The approach discounts future cash flows for a representative rental housing development, and finds the minimum rent at which an investor can earn an after-tax return equal to that on the next best alternative investment of savings (see, for example, Brueggeman, Fisher and Stern 1982; De Leeuw and Ozanne 1981; Fisher and Lentz 1986;, Follain, Hendershott and Ling 1987; Hendershott and Ling 1984; Hendershott, Follain and Ling 1987; Ling 1992; and MacNevin 1997a, 1997b).[12]

The gross cash inflows consist of gross rents and the cash sum realised on sale of the property. The gross cash outflows include debt payments, operating expenses (maintenance and property management fees), economic depreciation, rates and land tax payments. These gross cash flows are defined after allowance for income and capital gains tax liabilities. Tax reform will change these liabilities and result in a different solution value for the minimum rent value and an estimate of the likely impact of tax reform on rents.

The findings of these North American studies are not necessarily transferable to Australian rental markets. The economic environment will of course differ; there are also important differences in the tax treatment of rental housing and comparable assets. Though operating expenses, interest payments on debt, property and land taxes can be deducted from taxable income, Australian landlords cannot access depreciation allowances with respect to existing property structures.[13] Landlords in the USA can depreciate the full purchase price less the value of land over a 27.5-year tax life according to the straight-line method (DiPasquale and Wheaton, 1996, p207). Since the US Tax Reform Act of 1986 landlords have been able to use real estate losses to offset income from other investments, but not other sources of ordinary income such as wages (Hendershott, Follain and Ling, 1987, p77). In Australia, landlords are currently permitted to use losses on real estate activities to offset income from all other sources.

Capital gains are also more generously treated under the Australian tax regime. Only one-half of Australian landlords' capital gains are chargeable to tax at the investor's marginal rate. The US landlord is taxed on all capital gains realised, which are added to ordinary income from all other sources, and taxed at the marginal rate in the income bracket of the landlord. Furthermore, capital

[11] In Australia, this is known as negative gearing. It can be argued that this is not a tax preference because it puts rental-housing investments on an equal footing with leveraged investments in other assets such as shares.

[12] The discounting technique involves converting future cash flows into their equivalent present value. Discounting future cash flows is necessary because a dollar received now is worth more to the recipient than a dollar received at some future date (say in two years time). The dollar that is received now could be placed in an interest bearing deposit account and will then grow to a larger future dollar value in two years time.

[13] Internal amenities such as furniture, washing machines and carpets can be written off over their estimated lives. A 'special building write-off' of 2.5% per annum is permitted for 100% of construction expenditure incurred on building a rental property or development. This tax allowance will only affect the economic costs of Australian landlords that have financed the purchase of a newly constructed unit.

gains are measured with depreciation taken while the property was owned, recaptured at the time of sale (DiPasquale and Wheaton, 1996, p208).[14]

Other than Wood and Watson (2001) there are no Australian studies of the impact of investor tax preferences on rents and supply. Wood and Watson (2001) show on theoretical grounds that investors in the highest tax bracket will have the lowest economic costs, because investors paying tax at the highest marginal rate of tax benefit most from tax preferences. We use the Australian Bureau of Statistics 1993 Rental Investors Survey to measure the marginal income tax rates and economic costs of investors.[15] We find that of the sample of 2906 individual investors, only 315 belong to the top marginal income tax bracket. Thus many cost inefficient investors survive alongside least cost investors. There are at least three explanations for this finding; capital market imperfections (Litzenberger and Sosin, 1978), an insufficient number of top bracket investors (Sunley, 1987) or institutional impediments to multi-property portfolios (Wood and Yong, 2001). This last explanation receives empirical scrutiny in Chapter 3 below. Whatever the explanation the implications are important. In order to attract rental investors from lower tax brackets, market rents must rise above the levels that would provide investors from the top bracket with a satisfactory after-tax return. The latter end up earning excess returns and only part of their tax shelter benefits are passed on to tenants in the form of lower rents.

In Table 1.1, the landlords comprising the Wood and Watson (2001) study are arranged in deciles according to a measure of economic cost, and mean economic cost, property value and marginal tax rate are listed in each decile. The importance of tax preferences in driving variation in economic cost is illustrated by the strong negative relationship between the investor's marginal tax rate and her economic cost. The latter increases from a mean of 4.3% in the lowest decile to a mean value of 12.1% in the highest economic cost decile. There is a systematic increase in mean market rental rates from 5.9% in the lowest decile, to 9.0% in the highest decile (see Wood and Watson, 2001, footnote 41). These figures indicate that investors in the lowest economic cost deciles are making excess returns, while low tax bracket marginal suppliers in the highest deciles are typically suffering economic losses.[16]

In the longer run, we can anticipate exit of these marginal landlords. This brings us to a particularly worrying aspect of the findings reported in Table 1.1. The column listing mean property values indicates that marginal suppliers are concentrated in low-income rental housing. Any stock losses due to poor returns will then typically occur in this low value segment of the stock. It is significant that Yates and Wulff (2000) find that, in Australia between 1986 and 1996, there has been a healthy expansion in the total stock of rental housing, yet they observe a contraction in the stock of low- income rental housing in that same period. It is observations like these that have prompted the search for interventions that will promote the supply of low-income private rental housing. In Chapter 3, we report AHMM model findings on the effectiveness of a low-income housing tax credit that is targeted on low rent properties.

[14] In Australia, building write off allowances claimed by the investor are recaptured on realisation by subtracting them from the cost base used to calculate taxable capital gains. These current arrangements are significantly different from capital gains tax provisions applying before reforms introduced in 1999. Transitional arrangements are in place for landlords who acquired property before reforms were introduced (see Wood and Kemp, 2003, forthcoming).

[15] An advantage of the Wood and Watson study is the use of a representative sample of private investors who hold property investments in different market segments and locations. This enables measurement of the differential impact of fiscal interventions in different value and spatial segments of the market. The project model approach is hampered in this respect.

[16] An economic loss arises when the after-tax return of the investor is lower than the after-tax return on the next best alternative investment.

Table 1.1 Mean Property Value, Marginal Tax Rate and Economic Cost by Deciles of Economic Cost [1]

Decile	Mean Property Value AUD$	Marginal Tax Rate %	Economic cost[2] %
1	177,560	48.2	4.25
2	143,466	41.8	6.17
3	142,873	37.1	6.91
4	133,944	33.3	7.48
5	122,050	29.9	7.98
6	125,003	26.0	8.43
7	119,327	20.6	8.91
8	104,543	20.2	9.41
9	94,147	15.5	10.07
10	63,604	13.9	12.05
All	122,654	28.7	8.17

Notes:
[1] Marginal landlords (those in the highest economic cost decile) typically have relatively low effective marginal rates of tax. They are also concentrated at the bottom end of the rental housing market.
[2] The economic cost estimates are computed as a percentage of property value.
Source: Wood and Watson (2001, Table 2).

Tax Arbitrage models

Tax preferences are extended to both landlords and homeowners and are commonly thought to have an important influence on tenure choice. In fact, the budgetary impacts of 'official' housing policy can be overwhelmed by taxation measures (Yates and Flood, 1987). The significance of this observation is underlined by a widespread belief that tax systems are biased in favour of homeownership. This bias is particularly evident among individuals who belong to high tax brackets. The market rent payable by a potential occupant of a private rental-housing unit is the same regardless of the tax bracket to which they belong. But because homeowners' net imputed rents and capital gains are tax exempt, a high tax bracket individual can obtain the same housing at a lower economic cost, if they are able to purchase it as an owner occupier, than can a low tax bracket individual.[17] From this perspective, the tax system subsidises homeownership among high-income individuals (Tucker, 1978).

This literature has a United States orientation, but the similarities in the taxation of homeownership in Australia give reason to believe that the argument can be expressed with similar conviction here. Under the Australian tax system homeowners' imputed rental income and all capital gains are tax-exempt, as they are in the USA.[18] But there is one important difference. In the US, homeowners who do not take the standard deduction, can deduct interest expenses from ordinary income, a tax allowance that is not available to Australian homeowners.

However, as Litzenberger and Sosin (1978), Keifer (1978; 1980) and Titman (1982) have shown, among individual housing consumers belonging to low tax brackets, there is a sense in which the tax system is biased in favour of renting. In a competitive housing market with progressive income taxes, the tax shelter benefits from investment in rental housing by high tax bracket investors will be passed on in the form of lower market rents. In principle, landlords from high tax brackets will be able to offer housing services to low bracket taxpayers at a rent that places home purchase at an

[17] See chapter 2, p.13 for a thorough discussion of the net imputed rent concept.
[18] In the USA homeowners' imputed rental income are not taxed and capital gains are exempt if the homeowner uses the gain to purchase another home. For homeowners over the age of 55, there is a one-time exclusion. Imputed rents were taxed in Australia until 1923.

after-tax cost disadvantage. This mutually advantageous matching is a result of tax arbitrage.[19]

Anstie, Findlay and Harper (1983) in Australia, Gordon, Hines and Summers (1987), Follain and Ling (1988), and Hendershott (1988) in the USA, and Nordvik (2000) in Norway investigate this tax arbitrage process using so-called breakeven tax rate models. These models assume that housing consumers have some quantity of housing that they are seeking to obtain, and choose that tenure which supplies this housing at least cost. Once the economic cost of obtaining housing in each tenure have been specified, the models are solved for the marginal income tax rate at which an individual housing consumer's economic costs are the same whether they own or rent, and landlords are just willing to let housing. [20] [21] If the housing consumer's marginal income tax rate exceeds the breakeven tax rate, he will be better off as a homeowner. If the housing consumer's marginal income tax rate is less than the breakeven tax rate, tax arbitrage makes him better off as a renter.

The model predicts that housing consumers from high tax brackets with rates exceeding this breakeven rate are more likely to own, because the tax advantages from ownership are greater the higher is the consumer's income. This model provides the theoretical underpinning for the measurement of relative prices in rental and homeownership tenures in our microsimulation model of the Australian housing market (see Chapter 2, section 2.1).

In the USA, the breakeven tax rate calculated by Gordon et al. (1987) is for the time period 1965 – 1985. Surprisingly the proportion of American taxpayers with marginal income tax rates less than the breakeven tax rate indicates that before 1982, tax arbitrage made it financially attractive for most US taxpayers to rent. Similar findings are obtained in the simulations conducted by Keifer (1980), which show that US taxpayers in low tax brackets gain no monetary advantage from homeownership. In contrast to the Keifer (1980) and Gordon et al. (1987) findings, Nordvik's (2000) numerical simulations indicate that there are few mutually advantageous landlord-tenant matchings in Norway. Thus differences in country tax systems may have profound implications for tenure patterns (Freeman et al., 1996).

Anstie et al. (1983) and Follain and Ling (1988) use their breakeven models to simulate the impact of inflation and hence housing capital gains on tenure choice. This is an issue that we also address using our AHMM model (see Chapter 2, section 2.5). Inflation is found to impact favourably on the relative economic cost of renting, a result predicted by Titman's (1982) theoretical model of tenure choice which has been a strong influence on breakeven models.[22] However, these findings imply that US homeownership should have declined in the 1970s, and then recovered in the first half of the 1980s (Hendershott 1988). This is precisely the opposite of actual trends in homeownership. Gordon et al. (1987) argue that homeownership remains predominant in the absence of monetary advantage because of agency problems associated with rental contracts.[23] These problems are solved when people 'rent from themselves' as owner-occupiers.

Wood (2001a) also finds that the conventionally defined economic costs of obtaining housing offers no explanation for observed tenure patterns in Australia. He argues that the puzzle can be resolved on recognizing the Gordon et al. (1987) argument that there are certain costs unique to rental housing that arise due to the separation of ownership from occupancy. Since it is impossible for landlords to design and enforce rental contracts that will cover all possible contingencies,

---

[19] High tax bracket investors take advantage of tax preferences by investing in rental housing and then leasing it on terms that low tax bracket households could not match if they provided themselves with housing via purchase. Low tax bracket households indirectly benefit from the tax preferences targeted on high bracket investors as a result of this process. Tax arbitrage is in effect the rationale for tax-subsidised leverage of institutional private finance to construct social housing.

[20] For the housing consumer considering purchase for owner occupation, the economic cost will include the sacrifice of an after-tax return on the equity stake that he plans to hold in the property and are net of expected capital gains.

[21] The Anstie et al. (1983) model has a different behavioural assumption. Instead of choosing the least cost tenure, individuals choose the tenure that maximises net wealth. Though similar in spirit to the breakeven tax rate models, it has different and less plausible implications (see Wood, 2000a, p4).

[22] Our own findings reported below (see chapter 3) confirm this pattern.

[23] Agency problems in landlord-tenant relationships arise because it is impossible for landlords to write rental contracts that cover all possible contingencies. Thus resources are devoted to screening tenants, negotiating contracts, compiling inventories, conducting property inspections, collecting rents and other monitoring or policing activities accompanying management of landlord-tenant relationships.

tenants do not pay the total cost of their utilization of rental property (Henderson and Ioannides, 1983). Landlords devote resources or pay agents to screen tenants, negotiate contracts, compile inventories, conduct property inspections, collect rents and police contractual terms in order to manage those agency problems associated with landlord-tenant relationships.[24] These agency costs turn out to be an important factor explaining observed tenure patterns in Australia, and in particular the predominance of owner occupation (Wood, 2001a, pp11-14). Our AHMM model of tenure choice in Australian housing markets is careful to take these agency costs into account.

Econometric models of tenure choice; the role of borrowing constraints

Economists frequently use statistical techniques to detect the relative importance of variables thought to be important in determining tenure choice. Typically, cross section data sets containing the detailed financial records and socio-economic and demographic characteristics of housing consumers are the 'raw material' of such econometric studies. The early literature focussed on the role of tax-driven relative prices and income as determinants of tenure choice. The main policy issue addressed was the consequences of extending a tax exemption to homeowners' imputed rents. In an early study of this kind Laidler (1969) calculates the impact of tax subsidies on price, and estimates that the stock of housing in the USA would be 17.1% lower if imputed rents had been taxed. King (1981) estimates that in the UK taxation of imputed rent would result in a 13.7% decline in the long run consumption of housing, a figure very similar to that obtained by Laidler (op. cit.).

Rosen (1979) used a cross section database to jointly estimate the determinants of the quantity of housing services demanded and tenure choice. If there were taxation of imputed rent this study projects that in the USA the incidence of owner occupation would be 4.4% lower. Rosen and Rosen (1980) estimate a time series model of the tenure choice decision for the period 1949-1974. Their model estimates indicated that the incidence of owning would fall from 64% to 60% if homeowner tax preferences were eliminated. Using the homeownership rate adjusted for changes in the demographic structure of the population, Hendershott and Shilling (1982) project that the incidence of homeownership would be 59% if property taxes and mortgage interest were not deductible.

More recently there has been a shift in the emphasis of econometric models of tenure choice. Instead of income and the relative prices of housing in rental and owner occupied tenures driving the decision, the work of Jones (1989; 1995) and others emphasize current net wealth and the asset price of housing as the relevant variables.[25] [26] From this theoretical perspective, tax distortions and relative prices are not a solid foundation for a theory of tenure choice. Rather, households have a fundamental preference for ownership; the only households who rent are those credit constrained households who have not yet accumulated liquid assets sufficient to meet deposit requirements, or cannot afford to meet the repayment requirements on a mortgage.[27] Binding borrowing constraints are a wealth effect that impedes market efficient outcomes (Milgrom and Roberts, 1992, pp35-43). When these constraints bind and homeownership is the preferred choice the household is unable to meet the cost, which it is necessary to incur, in order to switch from renting to the preferred choice of homeownership. The underwriting criteria used by lenders to protect themselves against the risk of loan default can then be the source of market failure in the housing market.

---

[24] These agency problems are in fact two-way rather than uni-directional.

[25] Important contributions have also been made by Linneman and Wachter (1989), Haurin, Hendershott and Wachter (1996; 1997), Linneman, Megbolugbe, Wachter and Cho (1997), Goodman and Nichols (1997) and Rosenthal (2001).

[26] Net wealth is the value of all physical and financial assets minus debt. Commonly the focus is on liquid assets as a determinant of access to homeownership, because illiquid assets such as pension wealth cannot be accessed at the time of the purchase decision. The asset price is purchase price, and is to be distinguished from the prices that enter econometric tenure choice models, which is the annual economic cost of housing in different tenures.

[27] Haurin, Hendershott and Wachter (1996) find that renters' wealth accumulates rapidly in the year before and year of first homeownership, and that marriage and gifts and inheritances are related factors. First home buyers are becoming more reliant on gifts from relatives and less on their own accumulated liquid assets in meeting deposit requirements, according to the aggregate data analysed by Mayer and Engelhardt (1996).

Econometric models containing variables that attempt to identify whether a housing consumer is credit constrained, and if so the extent to which the constraints are binding, have had considerable success in explaining tenure choice. The most important contribution in the Australian literature is Bourassa (1995) who estimates econometric tenure choice models that include borrowing constraint measures for households with heads with ages 25-34. The borrowing constraint variables are found to be significant determinants of the probability of homeownership in the tenure choice model.[28] In view of this empirical evidence, the appropriate specification of borrowing constraints became a prominent aim in the design of our microsimulation model. Particular attention has been devoted to capturing the contribution of up front transaction costs such as stamp duties to borrowing constraints.

[28] We estimate Bourassa's model using the same dataset we employ to operationalise our microsimulation model. Results are reported in Appendix 3.

CHAPTER 2 THE MODEL, METHOD AND MEASUREMENT

2.1 Theory

Our model is based on the premise that housing consumers compare the relative price of acquiring their desired amount of housing in homeownership and rental tenures. In the case of homeowners, the price is equated to annual economic costs that include the cash outlays on items such as repairs, as well as the sacrifice of an after-tax return that could have been earned on their equity stakes.

If a rental tenure is chosen, the price is the annual market rent net of any rent assistance that the housing consumer may be entitled to. Housing consumers choose the tenure that offers housing at the lowest cost. This is of course an oversimplification of the tenure choice decision. It abstracts from considerations such as whether the desired housing is available in both tenures, or if it is possible to leverage purchase of the desired amount of housing given homeownership is the preferred choice. But as the literature review reveals, empirical evidence suggests that these relative prices play an important role in determining tenure choice, and so at this stage we ignore other factors and focus on relative prices. The remaining sub-sections of 2.1 discuss the underlying principles we employ to calculate the economic costs of rental investors (2.1.1), homeowners (2.1.2), and the specification of the borrowing constraints resulting from mortgage lending criteria (2.1.3). Section 2.2 describes how we specify the assignment rules the model follows when allocating housing consumers to housing tenures. Section 2.3 is devoted to an explanation of the measurement of the models parameters. A detailed discussion of the data used by the model is conducted (2.3.1) and this is followed by a description of the manner in which individual model parameters are specified (2.3.2). However, in the private rental tenure we need a theory of how market rents are determined, and it is this issue that we address first.

Investors' Reservation Rents and the Determination of Market Rents

Critical to the analysis of market rents is an assumption that earning an economic return is necessary for at least a sizeable minority of investors and potential investors, and that positive economic returns will then attract new investment. It follows that market rents will closely reflect the economic costs of the most 'efficient' investors. To illustrate, consider the introduction of a new tax incentive granted conditional on investment in rental housing. Some if not most investors will be unaware of the new incentive, and their decision-making will be unaffected at this stage. However, we can still anticipate a fall in market rents. Some investors, perhaps better informed because they employ tax accountants or financial advisors, become aware of the incentive that, if sufficiently attractive, will encourage new investment. The supply of rental housing expands. When rental units fall vacant ill informed investors will find that it takes longer to find a new tenant willing to pay the previous rent. Some investors will have debt repayments to meet and cannot afford to wait until a willing tenant is found; a lower rent might be offered by those that can earn an economic return from a lower rental income while others, particularly those with higher costs and lower returns, are forced out of their property investments. Market rents are then driven down to levels that just cover the economic costs of those investors with the lowest economic costs.[29]

The technical issues are those of defining the economic costs of investors, and what constitutes an economic return. Conventional investment appraisal techniques are applied for this purpose. We imagine that rental projects are financially appraised by informed investors calculating the net present value of the project's cash flows over the years that they expect to hold the investment (the holding period).[30] This can be defined as:

Net Present Value = realised capital gains – equity contribution + after-tax net rents - capital gains tax liabilities

The financial sums on the right hand side are discounted at the after-tax interest rate, on the grounds that an investor who realises their rental property can deposit the proceeds in an interest bearing account. The minimum rent that sophisticated investors will accept can be found from the

[29] It is worth noting that this market adjustment occurs without assuming that all investors are perfectly informed and motivated by economic return considerations.

[30] This is probably an unrealistic description of how most investors behave. But it will be a good approximation of how a minority of sophisticated investors (with financial advisors) behave. As argued above, we only need a minority of investors to act in this fashion.

net present value appraisal. Wood, Watson and Flatau (2002) call this the reservation rent and on solving the present value appraisal find a readily measurable definition:

Reservation rent = annual financing costs + annual operating costs – annual capital gains + amortised[31] value of (capital gains tax liability + transaction costs)

The reservation rent definition on the right hand side of the equals sign is the economic cost of holding a rental property investment, and of providing accommodation to tenant occupants. The holding costs include the financing costs net of after-tax capital gains and transaction costs. The financing costs include repayments on debt and the after-tax return sacrificed on the investor's equity stake in the rental property investment. The costs of providing accommodation include meeting rates and utility charges, repairs, property management fees and land taxes.

The critical determinant of investor economic costs is the marginal income tax rate. This is because investors can negatively gear a property, sheltering other sources of income from tax, while earning part of their return in the form of lightly taxed capital gains.[32] As a result low tax bracket investors are 'inefficient' suppliers of rental housing because they require higher rents to meet their higher economic costs.

Consider Table 2.1, which highlights this point for two hypothetical investors A and B who are contemplating the acquisition of the same $100000 property leveraged by a 100% mortgage that need not be amortised. Both investors expect to hold the property for 12 months before realising the investment with a capital gain of 2% ($2000) that we assume is tax exempt. The interest rate on debt is assumed to be 6%, so that financing costs are $6000 and operating costs are $2500.[33]

Investor A has a marginal tax rate (47%) in the top bracket (ignoring the Medicare levy and superannuation surcharge). In order to cover all economic costs she needs a reservation rent that will generate an after-tax net rent loss that is no greater than $2000, the tax exempt capital gain anticipated at the end of 12 months. Table 2.1 tells us that this condition is satisfied by a reservation rent of only $4727, which is well below the sum of financing costs and operating costs ($8500). But under Australian tax rules the net rent deficit of $3773 can be deducted from other sources of income, so that after tax the net rent loss is much smaller at $2000. Now consider Investor B who has a lower marginal income tax rate of 20%. She needs a much higher reservation rent of $6000 because the tax shelter saving from any net rent deficit is correspondingly lower. Investor B cannot sustain a net rent deficit in excess of $2500 if she is to cover all economic costs. When she deducts this from other sources of income the tax shelter saving is only $500; Investor A makes a tax shelter saving of $1773 on her net rent deficit of $3773.

[31] Capital gains tax and transaction costs are lump sum cash amounts rather than recurrent cash flows like operating costs. To find an annual equivalent figure they are amortised or spread over the investor's holding period.

[32] Capital gains are lightly taxed by comparison to increments in ordinary sources of income such as rents, because capital gains are taxed when they are realised rather than when they accrue. Furthermore only one-half of capital gains are taxed.

[33] These assumptions are not necessary but they help simplify the arithmetic. The illustration is based on Wood (2001b, pp426-428). The propositions are generalised in Wood, Watson and Flatau (2002b) where these assumptions are relaxed.

Table 2.1 Taxation and Investor Reservation Rents: Hypothetical Cases[a]

		Investor A	Investor B
Property Value $	(1)	100,000	100,000
Marginal Tax Rate (MTR) %	(2)	47	20
Capital Gains $	(3)	2000	2000
Finance Costs $	(4)	6000	6000
Operating Costs $	(5)	2500	2500
Reservation Rent $	(6)	4727	6000
Net Reservation Rent $	(7) = (6) – (5) – (4)	(3773)	(2500)
After-Tax Net Rent $	(8)=(1-MTR)*(7)	(2000)	(2000)
After-Tax Economic Return $	(9) = (8) + (3)	Zero	Zero

a It is assumed that the investor has a loan – value ratio of 1, and the interest rate is 6%. Operating costs and capital gains are 2.5% and 2% respectively of property value. The investor holds the property for 12 months. It is assumed that the investor acquires an established property and is not therefore entitled to the building write-off allowance. Depreciation and transaction costs are also ignored. Figures in parenthesis represent negative values.

If investment in rental housing assets by some investors is sensitive to economic returns low tax bracket investors will be driven out of the market in the longer run, since the highest bracket investors can always afford to charge a lower rent. We make use of this proposition in our estimation of market rents in the microsimulation model.

Homeowners' Bid Rental Rates

Given market rents determined by the process described above the next 'building block' in this theory of tenure choice is a process describing the formation of bid rents – the maximum rent a housing consumer is prepared to pay as a tenant before it becomes cheaper to purchase the desired amount of housing as an owner occupier. The bid rent will then equal the annual economic cost of supplying oneself with the desired amount of housing as a homeowner. To derive this bid rent we envisage a present value appraisal of an investment in owner occupied housing for the planned period of residence of the housing consumer. The net present value of cash flows has a similar looking definition to that of investors; though homeowner capital gains are tax exempt and financing costs are more complicated, as we will see below. The definition is

Net Present Value = realised capital gains – equity contribution + bid rents – operating costs

When bid rents ensure that the present value of net cash flows is zero, they will exactly offset the costs of holding owner occupied housing and the costs a homeowner incurs in supplying himself with accommodation. This solution value for the bid rent is then the value that the housing consumer places on the housing asset and the services it yields to the occupant as a homeowner.[34] Wood (2003) shows that on solving such a present value appraisal for the bid rent we obtain the following definition:

Bid Rent = annual financing costs + annual operating costs – annual capital gains + amortised value of transaction costs

On the right hand side of the equals sign are the economic costs of holding owner occupied housing of the desired quantity, and supplying oneself with accommodation services as an

[34] It is more commonly referred to as a homeowner's imputed rents. The term bid rent is preferred here, because we are designing a tax arbitrage type model where we are determining the circumstances under which a housing consumer is prepared to pay (bid) a rent for the desired quantity of housing that is more than the minimum rent an investor is willing to accept.

occupant. The holding costs include financing costs net of tax-exempt capital gains and transaction costs. The financing costs include repayments on debt and the after-tax return sacrificed on the homeowner's equity stake in the housing asset. The costs of providing accommodation include meeting rates and utility charges and repairs. If a housing consumer is offered the desired amount of housing at a market rent less than the bid rent, he is financially better off renting.

There are a couple of important differences between the economic costs of homeowners and those of investors. The first arises because the homeowner supplies himself with accommodation, and there are therefore none of the agency problems that potentially confound the investor, who owns a property that is occupied by someone else. There are then agency costs (such as property management fees) that are unique to rental housing. Second the tax treatment of financing costs differs. Unlike investors, homeowner interest payments are not deductible from taxable income. Thus debt finance is more expensive than equity finance, since the return a homeowner sacrifices on the next best alternative investment will invariably be taxed.[35]

The (potential) homeowner's marginal income tax rate will be a critical determinant of his annual economic costs. Consider Table 2.7, which highlights this point for two hypothetical housing consumers X and Y who are contemplating the purchase of the same $100000 property leveraged by a $35000 mortgage that need not be amortised. Both homeowners expect to reside in their home for 12 months before realising the investment with a capital gain of 2% ($2000) that is tax exempt. The interest rate on debt is assumed to be 6%, so that financing costs on debt are $2100 and operating costs are $2500.[36] We have deliberately kept the same property value, capital gain, interest rate and operating cost assumptions as for the investor illustration. This permits comparison of Investor A and B reservation rents with housing consumer X and Y bid rents.

Housing consumer X belongs to the highest tax bracket, where marginal tax rates are 47%. Housing consumer Y has a marginal income tax rate of 20%. The former is prepared to pay much less as a tenant ($4667) of the desired housing because the after-tax return sacrificed on his 65% equity stake is reduced by a relatively high marginal tax rate[37]. On the other hand X obtains a capital gain on the investment that is tax-exempt. Though Y also benefits from the same tax-exempt capital gain, this is not as attractive in view of the higher after-tax return sacrificed on his equity stake. Housing consumer Y has a significantly higher bid rent of $5720.

We find in this illustration that housing consumer X is unwilling to rent from either Investor A or B because neither can offer the desired housing at a rent that is financially attractive enough. If relative price criteria are the sole consideration, consumer X will become a homeowner. The lower income-housing consumer Y is willing to rent from A, but not B because the latter's reservation rent of $6000 is financially unattractive at a bid rent of $5720. If X and Y are the only types of housing consumer investor B will drop out of the supply side of the rental housing market, leaving only investors of type A. Housing consumers of type Y will choose to become tenants of type A investors if the relative price criterion is the sole consideration. This mutually advantageous landlord-tenant 'match' is the product of a tax arbitrage process, which enables type A investors to lease housing at rents below the economic cost that type Y consumers would incur, if they purchased the same housing.

---

[35] Note that for an investor a dollar increase in financing costs increases the reservation rent by a dollar regardless of whether the increase is due to debt or equity finance. This is because an investor's rental income is taxable and her financing costs are deductible. But for homeowners there is not this symmetry in tax treatment. Bid rents (imputed rents) are tax-exempt. When equity financing costs rise by a dollar the after-tax return sacrificed by the homeowner is (1 – MTR), and since bid rents are tax exempt the latter need increase by only (1 – MTR), where MTR is the marginal income tax rate. But when debt finance costs increase by a dollar, they are not tax deductible and so bid rents must increase by a dollar.

[36] As with the investor illustration these assumptions are not necessary but they help simplify the arithmetic. The propositions are generalised in Wood (2003**)** where these assumptions are relaxed.

[37] An objection here is that pre-tax returns available on savings is assumed to be 6% for both high and low tax bracket consumers. But it would take a very large differential in favour of the high tax bracket consumer to eliminate the difference in financing costs on equity in this example. Suppose consumer A were able to get a 50% higher return on savings (at 9%) as compared to consumer B. Financing costs on equity are still lower at $3101 for consumer A as compared to $3120 for consumer B.

Table 2.2 Taxation and Housing Consumer Bid Rents: Hypothetical Cases[a]

		Housing Consumer X	Housing Consumer Y
Property Value $	(1)	100,000	100,000
Marginal Tax Rate (MTR) %	(2)	47	20
Interest Payments on Debt $	(3)	2100	2100
After-tax return sacrificed on equity	(4)	2067	3120
Financing costs $	(5) = (3 + 4)	4167	5220
Capital Gains $	(6)	2000	2000
Operating Costs $	(7)	2500	2500
Bid Rent $	(7) = (5 – 6 + 7)	4667	5720

[a] It is assumed that the housing consumer has a loan – value ratio of 0.35, and the interest rate for borrowing and saving is 6%. Operating costs and capital gains are 2.5% and 2% respectively of property value. The housing consumer expects to reside in the property for 12 months. Depreciation and transaction costs are ignored, as are a minor component of economic costs, which is the tax benefit due to erosion of the real value of outstanding debt.

Borrowing Constraints

Financial institutions apply underwriting criteria in processing mortgage loan applications from housing consumers. These criteria serve to protect lenders from the risk of default, and sharpen the borrower's incentive to maintain the asset value of the property. The underwriting criteria commonly impose two conditions on borrowers, a deposit requirement and a repayment ratio requirement (Linneman and Wachter, 1989).

Consider the first of these requirements. Typically, a financial institution will lend to a housing consumer up to a limit determined by a maximum loan-value ratio. For first home buyers, this is thought to be 90% and there is evidence to substantiate this belief. The residual 10 per cent deposit must be met from the accumulated liquid assets of prospective first homebuyers. If liquid assets are insufficient to meet the 10% deposit requirement at the desired amount of housing consumption, borrowing constraints are said to be binding provided homeownership is the preferred choice on relative price criteria. There is then market inefficiency. The housing consumer has lower annual economic costs as a homeowner, but is unable to meet the up-front charge necessary if he is to switch from renting to the preferred choice of homeownership.[38]

There is another component of home purchaser acquisition costs that will directly contribute to borrowing constraints, and this component is transaction costs. These are charges that must be met in coordinating and closing a house purchase, and will add to claims on the prospective purchasers accumulated liquid assets. State governments contribute to transaction costs in the form of stamp and mortgage duties. For first homebuyers and highly leveraged repeat homebuyers there is also a lender's insurance premium to meet. These fees and levies are by no means trivial. Consider a typical first homebuyer who we estimate would seek to purchase a $104780 (1996-97 prices) home to meet his desired housing consumption. Stamp duty is an average 2.5 per cent of purchase price while the lender's insurance premium will be 1.4 per cent of the mortgage sum secured given a maximum loan-value ratio of 90%. These transaction costs alone add $4035 to the $10478 deposit requirement. Among all housing consumers mean liquid assets are estimated to be $26864. But for rental tenants, most of whom would be first homebuyers if they purchased, mean liquid assets are $12,348[39]. We can then expect the deposit requirement to be an important

[38] Milgrom and Roberts (1992) describe such outcomes as market inefficiency due to wealth effects.

[39] Wealth distributions are often highly uneven. The median liquid assets of rental tenants derived from income streams reported in the SIHC is $0.

influence on the timing of purchase, and the feasibility of purchase over housing careers.[40] The repayment ratio requirement makes a loan conditional on repayments being below some fraction of the housing consumer's gross income. Housing consumer income units with a single earner typically have higher repayment ratio limits than 'double-income' housing consumer income units. The repayment ratio requirement is unlikely to be as important as the deposit requirement.[41]

Summary

There are then two determinants driving this model of tenure choice, relative prices and borrowing constraints. However, each determinant has important components, which mean that the model is more complex than it might first appear. So, for example, it can be used to analyse the roles played by interest rates, inflation rates and agency costs in determining tenure choice outcomes (see Chapter 3). As government tax, pension and allowance programs contribute to a determination of both relative prices and borrowing constraints, the multifaceted role of government in shaping tenure outcomes can be explored. Finally, note that the model has demand and supply side components so that variables such as interest rates that have impacts on both 'sides' of the market can be analysed more satisfactorily than in conventional demand-driven models.

2.2 Application of Assignment Rules

The theoretical model is operationalised by assigning income units (housing consumers) to tenures in the following five-step sequential procedure.

Step 1. A market rental rate in the private rental sector is determined according to the hypothesis that in the longer run 'surviving' investors will belong to the highest tax bracket, because they have the lowest economic costs, and rents will just cover these economic costs.

Step 2. All income units other than public housing tenants and 'rent-free' income units (see below) are assigned to either homeownership or renting, given application of a relative price assignment rule. This rule assigns income units to homeownership if their bid rental rate is less than the market rental rate and assigns income units to the rental tenures if bid rental rates are greater than or equal to the market rental rate. Market rental rates are adjusted for receipt of rent allowances when the income unit is eligible to receive the allowance.

[40] The estimates reported in this paragraph have been measured by the authors from the *1996-97 SIHC*. The methods used to arrive at the estimates are described in section 2.3.

[41] As Linneman and Wachter (1989) argue, housing consumer with ample liquid assets but a binding repayment constraint can use those liquid assets to lower the mortgage loan with a view to relaxing the repayment constraint.

Figure 2.1 Housing Consumer Bid Rental Rate

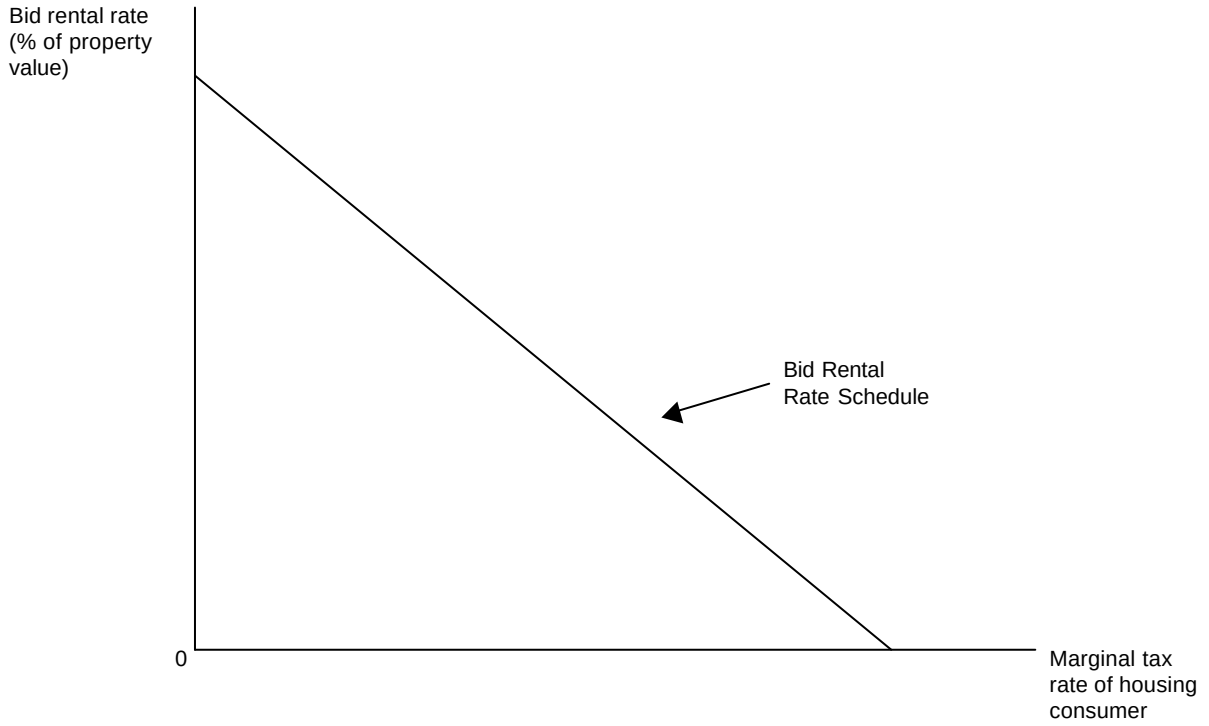


Figure 2.1 shows the general relationship between bid rental rates and marginal income tax rates, as suggested by the theoretical model in section 2.1 above.[42] It is downward sloping because higher tax bracket income units benefit more from the tax privileged treatment of homeownership. In Figure 2.2 the market rental rate is added.[43] In this diagram the market rental rate line is drawn as if the rate of operating costs and capital gains of 'efficient' investors is the same, so that each will end up charging exactly the same market rental rate. The bid rental rate schedule intersects the horizontal market rental rate line at the 'breakeven' marginal tax rate; at this tax rate the income unit is indifferent between renting and purchasing the desired amount of housing consumption. To the right of this 'breakeven' tax rate the income unit is better off purchasing than renting and so all income units satisfying this condition are (initially) assigned to homeownership. To the left of this 'breakeven' tax rate the income unit is better off renting than purchasing and so income units satisfying this condition are assigned to the rental tenure. We interpret these tenure outcomes as optimum tenure choices given relative price considerations. If income units are prevented from achieving these optimum tenure outcomes there is market inefficiency.

Step 3. Those income units that are observed in private rental housing are assigned to homeownership if they satisfy both the relative price and borrowing constraint criteria, otherwise they are assigned to private renting. Borrowing constraints are applied using estimates of optimal housing consumption conditional on choice of homeownership.

[42] The bid rental rate is bid rents as a proportion of property value.
[43] The market rental rate is market rents as a proportion of property value.

Figure 2.2 Relative Price Assignment Rule in the Microsimulation Model

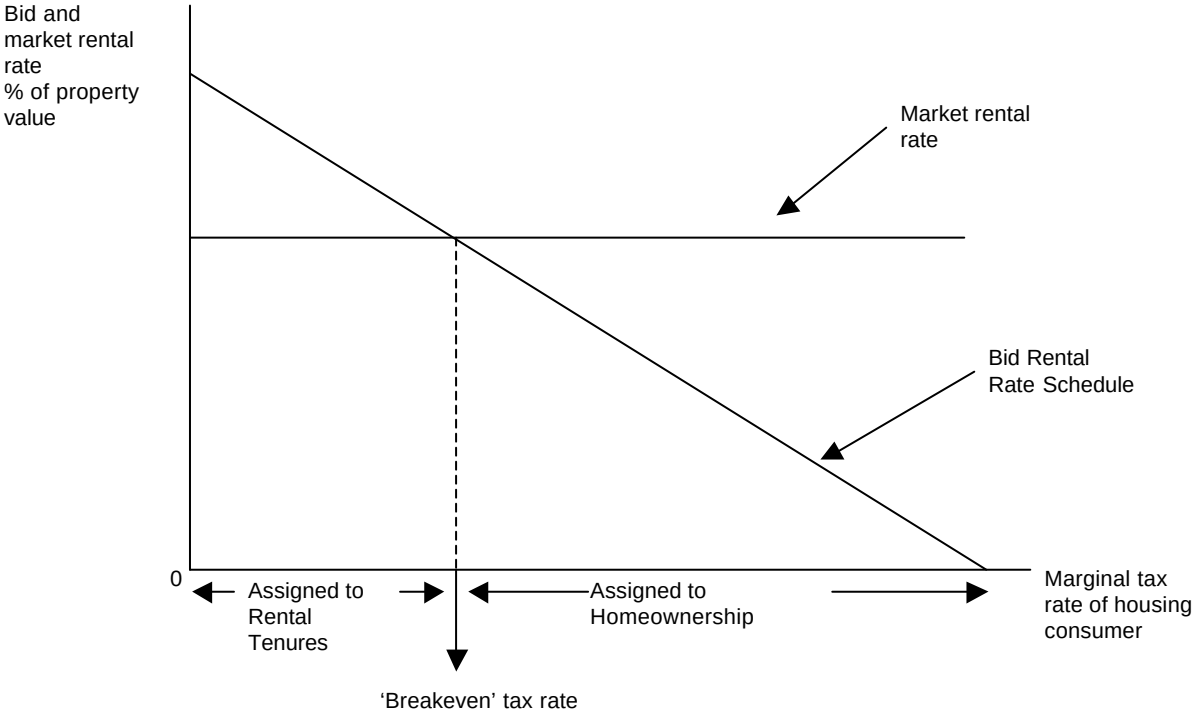


Figure 2.3 illustrates this assignment rule for a case where the annual economic costs of the income unit are lower on becoming a homeowner. The after-tax income that is available for spending on non-housing consumption is measured on the vertical axis. The amount of housing consumed is measured along the horizontal axis. The point B on the vertical axis is the after-tax income position if it is possible to consume zero housing at no cost; acquisition of housing means forfeiting non-housing consumption, but with annual economic costs assumed to be lower in homeownership for this income unit, the gradient of the line BB′ describing feasible choices on purchasing housing is less steep than the line BT, which describes feasible choices on renting housing. Suppose the income unit has an optimal housing consumption of H_0 if he purchases, but borrowing constraints are binding because no more than H* can be financed with a mortgage. The model assigns such people to the rental tenure where their optimal consumption is H_1. If the 'tightest' borrowing constraint lies to the right of H_0 then it is not binding and our income unit is assigned to homeownership.

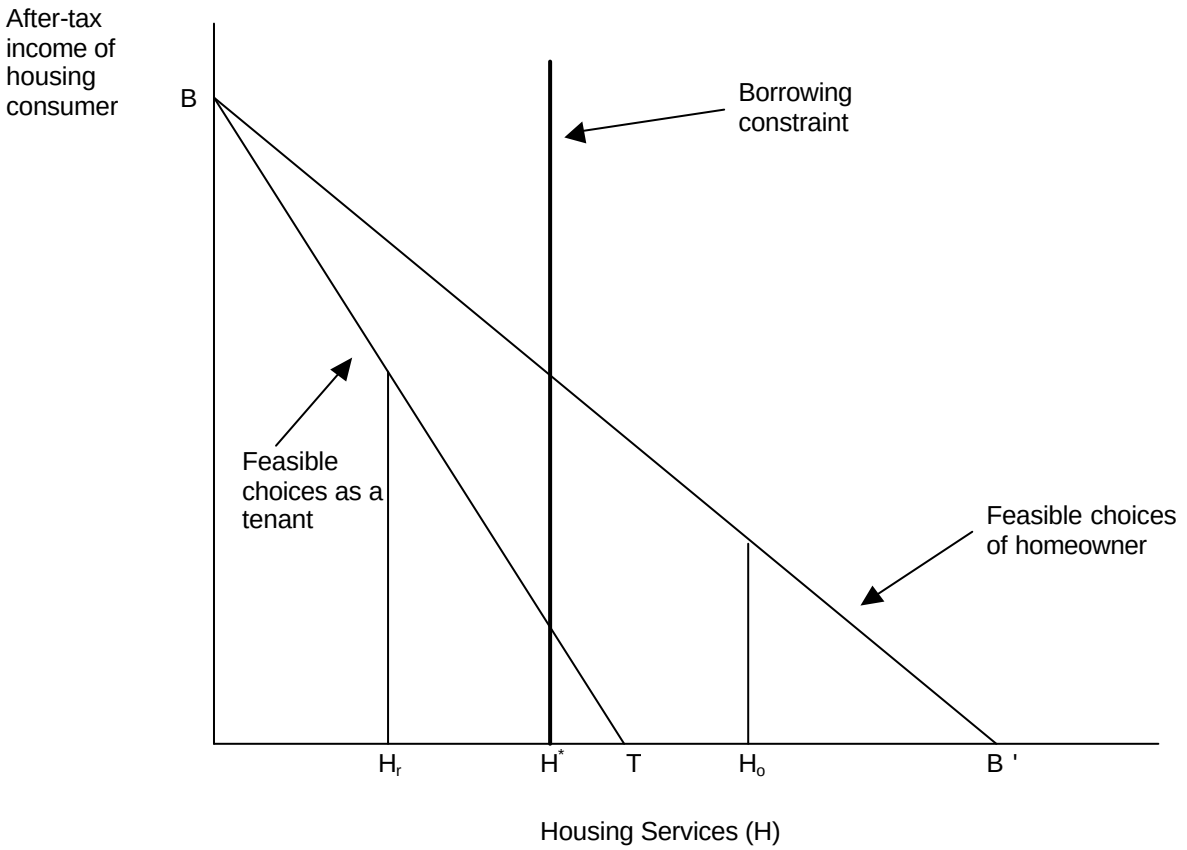
The application of borrowing constraint assignment rules relies on an important assumption. Consider once again the binding borrowing constraint H* given optimal housing consumption as a homeowner of H_0. The income unit could respond by economising on housing consumption so as to meet the constraint; this is a possibility we rule out. Suppose that an income unit wants to purchase a three bedroom dwelling because they plan to have another child, but financial institutions will only advance them sufficient funds to purchase two bedroom dwellings. We assume the income unit is deterred by transaction costs from first buying a two bedroom dwelling and then purchasing a three bedroom property at a later date when borrowing constraints are relaxed.

Step 4. Public housing tenants are assigned according to a sequential choice process in which tenants are assigned to the private rental sub-tenure if the market rent is less than the actual rent paid as a public housing tenant. Public housing tenants are assigned to homeownership if the bid rent is less than the market rent and the rent paid for public housing, and borrowing constraints are not binding. Otherwise, the income unit is assigned to the public renting sub-tenure. Market rents, bid rents and borrowing constraints are applied using estimates of optimal housing consumption conditional on homeownership.

Step 5. There are income units in the *1996-97 SIHC* who pay no rent in their current residence. Typically these are young single person income units living with parents or relatives. They are assigned to this sub-tenure even if their bid rental rate exceeds the market rental rate, as they are financially better off remaining in rent-free housing. However, if the bid rental rate is less than the

market rental rate and borrowing constraints do not bind, the income unit is assigned to homeownership[44]. If borrowing constraints bind the income unit is assigned to the 'rent-free' tenure category regardless of the relative price assignment rules.

Figure 2.3 Binding Borrowing Constraints and Assignment Rules in the Microsimulation Model



There are some detailed methodological points that deserve attention here. We have experimented with two alternative methods of determining market rental rates. In the first, we assume competitive housing and capital markets. In the long run, property acquisitions by top bracket investors will drive out high cost investors from lower tax brackets and the market rental rate can be set equal to the typical reservation rental rate of top tax bracket investors. Capital market imperfections that result in the application of underwriting criteria, and/or fiscal measures that penalize multiple property portfolios can impede the supply of rental housing. Market rental rates must then rise to attract investors from lower tax brackets. A second pragmatic solution is to set the market rental rate equal to the weighted average reservation rental rate of all investors, where the weights are the proportion of investors in each tax bracket (Keifer, 1980). We report the results of these two alternatives in Chapter 3.

The market rental rate that is entered into the relative price assignment rule is adjusted for rent assistance entitlements when a housing consumer is eligible. All private rental tenants receiving a Commonwealth pension or benefit, or receiving family tax benefit at the base rate, and who pay rent above a certain threshold are entitled to rent assistance. Eligible private rental tenants' entitlements to rent assistance are calculated at their optimal housing consumption conditional on homeownership.[45] For owner-occupiers that would be eligible if they became tenants, entitlements are calculated at current levels of housing consumption as measured by the market value of their current property. Details on how Commonwealth pensions, benefits and allowances are incorporated into the AHMM microsimulation model are presented in section 2.3 below.

---

[44] This rule follows Jones' (1989; 1995) view that households have a fundamental preference for homeownership. Most of our income units living 'rent-free' reside with their parents. The assignment rule implies that such income units will delay household formation until it is cheaper to own rather than rent in the private rental sub-tenure.

[45] Public housing tenants are not eligible for Commonwealth rent assistance. While tenants in community housing do receive rent assistance the SIHC does not allow us to directly identify this group.

Rental tenants rent assistance entitlements, bid rental rates and borrowing constraints require an imputation method that will generate the market value of their optimal housing consumption conditional on homeownership. This is set equal to the predicted values obtained from statistical estimation of a housing demand equation. Details of these estimates are also reported in section 2.3 below.

The income unit is the unit of analysis chosen in this study. An income unit 'is one person or a group of related persons within a household, whose command over income is assumed to be shared. Income sharing is assumed to take place within married (registered or de facto) couples and between parents and dependent children' (ABS, 1999b). The household is defined as 'a group of people who usually reside and eat together' (ABS, 1999b). When calculating tenure shares using the household as the unit of analysis, we are in effect computing the tenure composition of the housing stock. On the other hand, when using income units we are computing the tenure composition of an aggregate of adult units, who are potentially or actually economically independent and are or could choose to pay for housing services. The principal advantage of using income units is that it permits a much richer analysis, which includes aspects of the household formation decision. This is particularly relevant in the analysis of First Homeowner Grants (see Chapter 5).

2.3 Measurement

Data Sources

The data used to operationalise the supply side of the AHMM model is drawn from confidentialised unit record data from the 1997 *Rental Investors Survey* (1997 RIS) conducted by the Australian Bureau of Statistics in June 1997 and based on a survey of approximately 30,000 households across Australia.[46] The *1997 RIS* identified the following four Australian sub-populations:

1. 584,200 income units who are current investors in residential rental property[47];
2. 222,700 income units who had sold residential rental property in the previous five years;
3. 113,500 income units who were intending to sell residential rental investments in the following two years; and
4. 215,500 income units who were intending to invest in residential rental property in the next two years (ABS, 1999a).

The survey collected demographic and financial data for these populations. It also collected detailed dwelling characteristic and financial information on the properties owned by current investors.[48] These details were recorded for up to the six most recently acquired properties owned by the income unit.[49]

The confidentialised unit record file (CURF) for the Rental Investors Survey (ABS, 1999a) contains complete records for 1576 income units who hold 1934 individual residential rental properties. Investors who finance the construction of residential property for rent, or who purchase a newly constructed property for the purpose of making it available to lease or rent are entitled to deduct the building write-off allowance from assessable income. There are 387 properties that were new when first rented out by investors.[50] The remaining real estate investments were established properties when first rented out by investors, and are not eligible for a building write-off allowance. Background information on the rental investors holding the newly constructed and established properties is presented in Table 2.3, while characteristics of the properties themselves are presented in Table 2.4.

The data used to operationalise the demand side of the AHMM model is drawn from confidentialised unit record data from the 1996-97 Survey of Income and Housing Costs (*1996-97 SIHC*) conducted by the Australian Bureau of Statistics from July 1996 to June 1997. The survey provides detailed information on the income and housing situation of income units throughout Australia. The survey operates on a continuous basis, collecting information on a sample of 650 households each month as part of the Monthly Population Survey. Households enter and leave the survey population on a regular basis throughout the survey year. The result is a unit record file containing information on 9276 income units across Australia. Background information on housing consumers is presented in Table 2.5, while the characteristics of their principal residence is presented in Table 2.6.

---

[46] The 1997 Rental Investors Survey (ABS, 1999a) was included as an attachment to the regular 'Monthly Population Survey' (MPS) used for calculating national employment and unemployment rates.

[47] An income unit is defined as one or more individual persons who represent the unit making the decision to invest and income from the residential investment is likely to be shared between the person's comprising the unit (ABS, 1999b).

[48] The 1997 Rental Investors Survey (*1997 RIS*) is broadly comparable with the *1993 RIS* in terms of the data reported. See Wood and Watson (2001) for a detailed discussion of the 1993 survey.

[49] The survey contains property records for up to the 3 most recently acquired properties per individual giving a maximum of six properties for couple income units.

[50] Background information on the rental investors holding these 387 properties and the dwellings themselves can be found in Wood, Watson and Flatau (2002a, Tables 1 and 2).

Table 2.3 Income Units - Landlords – Descriptive Statistics

	Full Sample (1934 Properties)
Annual Gross Income (mean)	$59,950
Annual Gross Rent (mean)[1]	$10,908
Income Unit Type	
Couple With Dependents	41.1%
Couple without Dependents	32.0%
One Parent	3.0%
One Person	24.0%
State of Usual Residence	
NSW	16.7%
VIC	17.8%
QLD	24.3%
SA	10.6%
WA	14.7%
TAS	4.9%
NT & ACT	11%
Tenure Type of Principal Residence	
Owner with mortgage	31.4%
Owner without mortgage	41.8%
Renter	26.8%
Number of Children (0-14 years)	
0	64.3%
1	14.1%
2	15.3%
3	5.1%
>3	1.2%
Number of Investment Properties Owned	
1	80.7%
2	15.7%
3	3.4%
>3	0.1%
Number of Employed Adults in the Income Unit	
0	10.7%
1	37.6%
2	51.7%

1. Aggregate gross rent from all rental properties owned by the income unit.

Table 2.4 Characteristics of Rental Investment Properties

		Full Sample (1934 Properties)
Mean Estimated Market Value	$138,900	
Mean Annual Rent[1]	$8,732	
	Number	Percent of Total
Dwelling Type		
Separate House	1,222	63.2
Semi-Detached/Terrace House	232	12.0
Single Flat/Apartment	417	21.6
Block of Flats/Apartments/Terrace Houses	58	3.0
Other	5	0.30
Number of Bedrooms		
1	126	6.5
2	667	34.5
3	907	46.9
4	199	10.3
5+	28	1.4
None/Bedsitter	7	0.4
State (Capital City)		
New South Wales (Sydney)	338	17.5%
	(213)	(63.0%)
Victoria	360	18.6%
(Melbourne)	(282)	(78.3%)
Queensland	497	25.7%
(Brisbane)	(235)	(47.3%)
South Australia	219	11.3%
(Adelaide)	(174)	(79.5%)
Western Australia	275	14.2%
(Perth)	(216)	(78.5%)
Tasmania	93	4.8%
(Hobart)	(41)	(44.1%)
Northern Territory	37	1.9%
(Darwin)	(24)	(64.9%)
Australian Capital Territory	115	5.9%
(Canberra)	(115)	(100%)
Age of Property		
Less than 1 year old	44	2.3
1 – 4 years	231	11.9
5 – 9 years	201	10.5
10 – 19 years	344	17.8
20 – 50 years	750	38.7
50 years and more	301	15.6
Unknown	60	3.1
Management of Property		
Self/Spouse/Partner	695	35.9
Real Estate Agent	1124	58.1
Relative	46	2.4
Other	69	3.6

1. The mean annual rental value is below that for Table 2.3 as the figure included in Table 2.3 is on a property portfolio basis rather than a single property basis.

Table 2.5 Income Units – Housing Consumers – Descriptive Statistics

	Outright Owner	Owner with a Mortgage	Renter /Boarder	Rent-free	All
N	2952	2121	3169	1034	9276
	31.8%	22.9%	34.2%	11.1%	
Mean Annual Gross Income	$34,045	$52,157	$24,357	$18,160	$33,020
Mean Income from Wages & Salaries	$19,900	$44,494	$18,242	$12,973	$24,186
Mean Income from Investments	$3,826	$603	$379	$518	$1,543
Mean Income from Government Transfer Payments	$5,096	$2,095	$4,147	$2,509	$3,797
Income Unit Type					
Couple with Dependents	20.4%	51.3%	13.9%	3.6%	23.4%
Couple without Dependents	43.7%	24.9%	10.7%	7.1%	24.1%
Sole Parent	2.1%	5.1%	10.4%	2.2%	5.6%
One Person	33.8%	18.6%	65.1%	87.1%	46.9%
State of Usual Residence					
NSW	24.1%	19.7%	24.4%	24.8%	23.3%
VIC	22.2%	21.3%	19.2%	24.2%	21.2%
QLD	17.2%	16.9%	19.4%	16.7%	17.8%
SA	12.7%	11.9%	10.6%	11.0%	11.6%
WA	12.2%	15.8%	13.4%	13.4%	13.6%
TAS	7.8%	6.4%	6.2%	4.8%	6.6%
NT/ACT	3.8%	8.0%	6.8%	5.0%	5.9%
Number of Dependent Children					
0	77.4%	43.6%	75.8%	94.2%	71.0%
1	8.3%	18.0%	10.4%	2.3%	10.6%
2	8.9%	24.9%	8.4%	2.4%	11.7%
3	4.1%	10.6%	3.6%	0.9%	5.1%
4+	1.3%	2.9%	1.8%	0.2%	1.7%
Labour Force Status of Income Unit Reference Person					
Employed Full-Time	39.3%	85.1%	52.9%	52.8%	55.9%
Employed Part-Time	5.8%	4.5%	9.7%	9.9%	7.3%
Unemployed	3.0%	2.8%	11.2%	11.0%	6.6%
Not in the Labour Force	51.9%	7.6%	26.2%	26.3%	30.1%

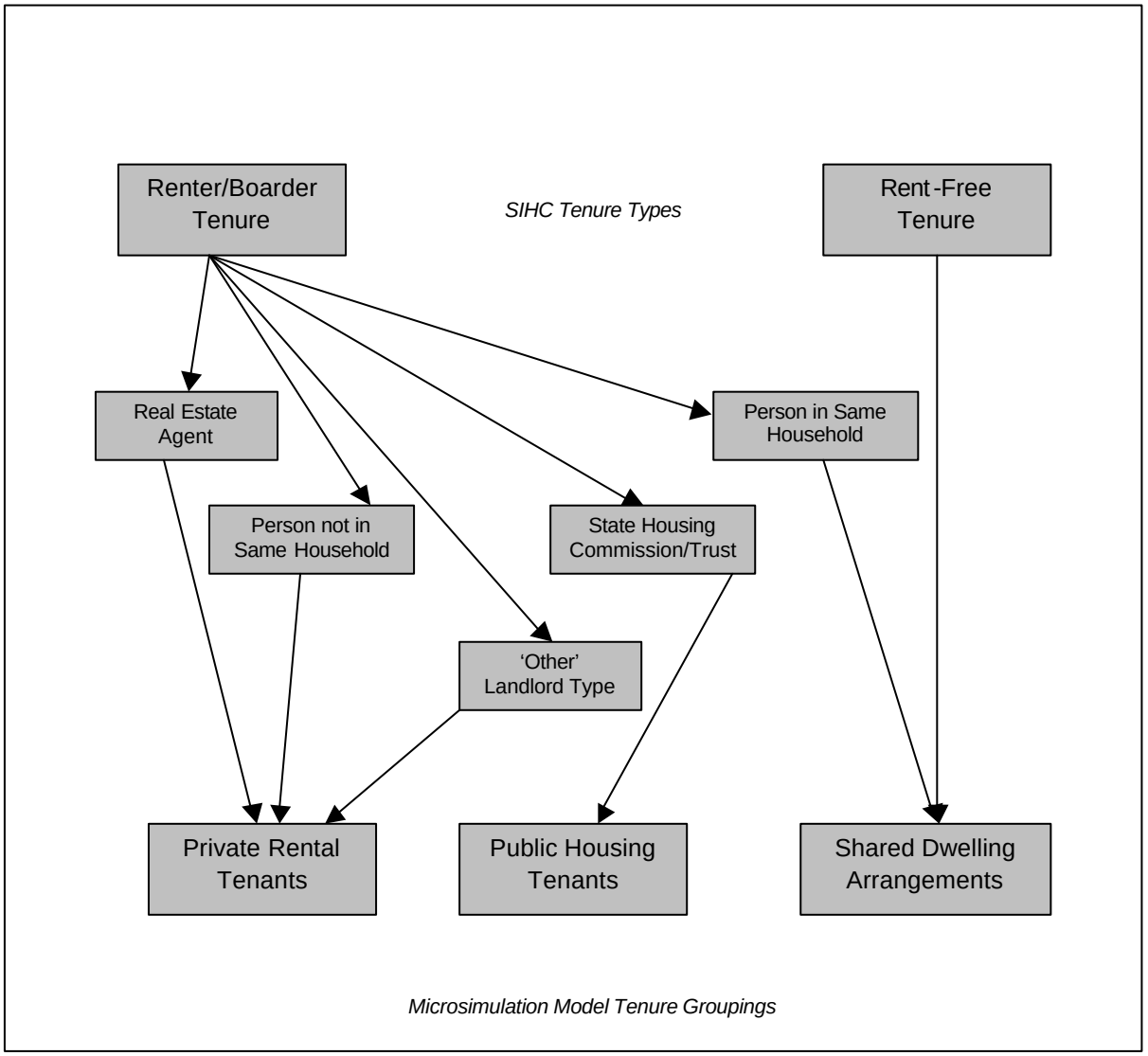
Table 2.6 Characteristics of Principal Residence – Housing Consumers

	Outright Owner	Owner with a Mortgage	Renter/Boarder	Rent-free
N	2952	2121	3169	1034
Mean Estimated Market Value	$165,669	$162,615		
Mean Mortgage Debt		$60,498		
Mean Annual Loan Repayments		$8,812		
Mean Annual Rent			$4,836	
Dwelling Type				
Separate House	89.5%	91.8%	64.6%	88.5%
Semi-Detached/Terrace	5.5%	4.6%	13.5%	4.6%
Flat/Apartment	4.3%	3.3%	21.1%	5.6%
Other	0.7%	0.3%	0.8%	1.3%
Number of Bedrooms				
0	0.1%	0.1%	0.4%	
1	1.7%	0.9%	8.6%	3.0%
2	18.7%	11.6%	28.5%	13.2%
3	54.8%	55.0%	46.4%	48.2%
4	21.1%	27.2%	13.6%	28.9%
5+	3.5%	5.2%	2.5%	6.8%
Landlord Type				
Real Estate Agent			34.7%	
State Housing Commission/Trust			15.2%	
Person not in same household				
Parent/Other Relative			4.3%	
Other Person			17.7%	
Person in same household				
Parent/Other Relative			20.0%	
Other Person			2.8%	
Other			5.3%	
First Home Buyers*	1.7%	17.4%		

*The *1996-97 SIHC* records whether an income unit purchased the property in the 3 years prior to the survey. This information is used to describe owner-occupiers as first home-buyers.

Table 2.6 lists a number of landlord types reported in the SIHC records. It also reports results for 2 tenure types other than owner-occupation: 'Renter/Boarder' and 'Rent-Free'. Rather than report results for each individual tenure type and each individual landlord type we report results for three 'rental' sub-tenures. The derivation of these sub-tenures is shown in Figure 2.4. The first of these, which we term 'Private Rental Tenancy' combines income units reporting the landlord types of 'Real Estate Agent', 'Person Not In Same Household' and 'Other'. The second sub-tenure includes income units who either rent from a 'Person In the Same Household' or are included in the 'Rent-Free' tenure type. This group is referred to as 'Shared Dwelling Arrangements'. We make the distinction between 'Private Rental Tenant' and 'Shared Dwelling Arrangements' because when we analyse policies that lead to changes in the share of home ownership we are also interested in the magnitude of net changes in housing demand. When an income unit renting from a landlord who does not reside in the same household, becomes a home owner, there is no net change in housing demand.

Figure 2.4 Non Owner-Occupier Tenure Type/Landlord Classification in the SIHC and Sub-Tenure Groupings in the Microsimulation Model



A rental property is vacated and an owner-occupied property is occupied.[51] However, when an income unit renting from a landlord in the same household or living rent-free in the family home becomes an owner-occupier, the effect is to increase the demand for housing by one dwelling unit. Our final 'sub-tenure' is 'Public Rental Tenancy'. We treat public rental tenancy separately as these income units are of particular interest to policy makers and because the model assigns tenants between public rental housing, private rental housing and owner-occupation.

Model Parameters

This section outlines the measurement of parameters used in the microsimulation model. We begin with a discussion of the baseline parameters in the model. Baseline parameters are values common to both rental investors and housing consumers that form the basic economic environment in which decisions are made.

An overview of the method used to calculate the (effective) marginal income tax rate, which is similar for both the investor and the housing consumer then follows. One complication that arises is that the data sets from which measures are derived differ for the two groups (the *1997 RIS* in the case of the investor and the *1996-97 SIHC* in the case of the housing consumer). We then move on to discuss the measurement of other components in the annual economic cost definitions, first

[51] The simplest example of this is if the rental tenant purchases the property from the landlord. Conceptually, even when the rental tenant moves to a new property to become an owner-occupier the effect on housing demand is the same as that in this simple example.

dealing with common parameters in the investor and the housing consumer expressions, and then turning to parameters specific to the reservation rent or bid rent rate.

The final measurement issue addressed is how the tenure allocation rules are operationalised. Namely, how are optimal housing demand, rent assistance entitlements and borrowing constraints specified? A table containing the mean value of parameters appears at the end of the chapter.

Baseline Parameters

Depreciation Rates

Following a survey of past research, Wood and Watson (2001) adopted a depreciation rate of 1.4% of the value of the building structure per annum. We have again adopted this rate. This rate is consistent with that chosen by De-Leeuw and Ozanne (1981), Brueggeman et al. (1982) and Gordon et al. (1987) in similar measurement exercises.

House Price Appreciation, Inflation and Interest Rates

The expected rate of house price appreciation is set equal to 3.9% per annum in the baseline case.[52] The rate of consumer inflation is set at 2.5 per cent. In 1997, the Reserve Bank of Australia targeted an inflation range of between 2 per cent and 3 per cent, and we have chosen a rate in the midpoint of this range (Reserve Bank of Australia Bulletin, November 1997, p.1). Consequently, the real rate of house price appreciation is 1.4% per annum. The interest rate is set equal to the variable home loan rate charged by major banks in 1996-97 of 7.2 per cent (ABS, 1998).

Holding Periods

The time an investor or housing consumer expects to hold a property plays an important role in determining the economic costs associated with the property as it determines total capital gains and the amortisation of lump-sum transaction costs. The expected holding period of both rental investors and housing consumers is set equal to ten years in the baseline case. Evidence on the expected holding period of rental investors cannot be obtained directly from the Rental Investor's Survey. Regression modelling was used to test the appropriateness of alternative holding period assumptions. To do this, we calculated reservation rental rates under the alternative assumptions. We then used these rates as the independent variable in a regression model that used reported gross rental yields as the dependent variable. The 10-year expected holding period assumption proved to have the most explanatory power with respect to these reported yields.

The 1999 Australian Housing Survey provides information on holding periods for owner-occupiers. Around 55.5% reported a holding period of less than 10 years while 45% report a holding period of between 10 and 14 years.

An Overview of Marginal Income Tax Rate Computation

Marginal income tax rates in our model capture both changes to the income unit's income taxation liabilities on receipt of income and to Commonwealth government pension and allowance payments, where the income unit receives such payments. This is an important dimension of the AHMM microsimulation model because marginal tax rates are a critical parameter in the annual economic cost expressions and hence the relative price variables. Modelling Commonwealth pension and allowance payments also allows the analysis to address 'whole of government' questions about the impact of welfare reform on the housing sector. Calculation of the marginal tax rates proceeds in the following manner (for both rental investors and housing consumers):

1. Using the information contained in the relevant surveys the income unit's pre-benefit gross income is calculated. This gross income measure is inclusive of net rents earned from rental investments, and the return that homeowners would receive if their housing equity were invested at market rates of interest.
2. The July 2001 pension and allowance system is applied to those income units who received benefits in 1997 and would still be eligible to receive benefits under the current system once income and asset thresholds have been deflated, where relevant. The computed or estimated pensions, benefits and allowances are added to pre-benefit gross income.

[52] This rate of 3.9 per cent is inferred from regressions of gross rental yields on reservation rental rates of investors at alternative values for the expected rate of house price appreciation. The rate of 3.9% yields the best fit regression estimates.

3. For all income units we now have an adjusted gross income figure. From this adjusted gross income figure, we subtract non-taxable income such as pension payments resulting in an assessable income measure. From this assessable income figure we subtract an estimate of deductions based on average deduction rates calculated from the Australian Taxation Office's reported statistics (ATO, 1998).[53] This yields adjusted taxable incomes.
4. We then apply current income tax arrangements to these adjusted taxable incomes. Tax liabilities incorporate both the Medicare Levy and the Superannuation surcharge. Rebates are also calculated for eligible income units.
5. We then calculate the Family Tax Benefit payments based on eligibility criteria discussed in Appendix 1 of this report.
6. At this point, we calculate the increment in income that an income unit receives from rental property investments, in the case of investors, and the increment in income that an owner-occupier would receive if their housing equity were realised and invested at the prevailing market rate of interest.

On subtracting these increments in income, and repeating steps 1 through 6, we are able to compute the change in benefits and tax liabilities due to these increments in income. The ratio of these magnitudes is the implicit marginal income tax rate used in our model (Hendershott and Slemrod, 1983).[54]

The computation of implicit marginal income tax rates is a lengthy and complex process. As a result, we have chosen to include this detail in Appendix 1.

Parameters Common to Homeowner and Investor Costs

Building to Value Ratio

Cost components such as depreciation rates are applied to that part of the market value attributable to the building structure. The ratio of the value of the building structure to the market value of the property will vary between metropolitan and non-metropolitan residential housing markets. Wood and Watson (2001) derived building to value ratios from information on site values of residential land published in the Commonwealth Grants Commission's (CGC) Report on General Grant Relativities (CGC, 1995) and the landlord estimates of the property value in the *1993 Rental Investors' Survey*.

A building to value ratio was calculated for each state/area division as:

Building to value ratio = (Mean Estimated Market Value – Mean Site Value)/Mean Estimated Market Value

These computed building to value ratios are applied to the properties in the *1997 Rental Investor's Survey*.

Maintenance Costs

Maintenance expenditures are likely to be lumpy in nature and modelling of this component of annual economic costs should take this into account. Maintenance expenditures for owner-occupiers and investors are based on the mean expenditure by property value/State segment, obtained from the *1999 Australian Housing Survey* and the *1997 RIS*.[55] Owner-occupiers' mean maintenance expenditures are 0.618% of property value, which is low in comparison to the 1.9% of property value spent on maintenance by rental investors.[56] However, because tenants have less incentive to carry out routine maintenance, and because investors can claim a tax deduction for maintenance expenditures this difference is not unexpected.

---

[53] The income source information is more detailed for housing consumers than it is for rental investors. As a consequence, the range of Commonwealth payments measured for the former is larger than that for rental investors. Deduction calculations are also more detailed for housing consumers than for rental investors.

[54] The implicit marginal tax rate is relevant to ordinary sources of income. We assume that landlords realize capital gains in years where they have no benefit or allowance entitlements. The statutory marginal tax rate is, therefore, used to compute capital gain tax liabilities in landlord economic cost measures.

[55] The property value segments are defined by decile of market value in each State for rental investors and for housing consumers on segments equal to 5% (20 segments) of reported market values in the AHS (Resulting in estimates for 20 value segments in each State).

[56] Further investigation of rental landlord and owner-occupier maintenance expenditures is warranted.

Property Taxes

Property taxes include other government charges and rates levied by Local Governments. They also include utility connection fees, waste disposal charges and other imposts. These costs are reported in the *1996-97 SIHC* and we estimated the statistical relationship between property taxes as a proportion of estimated market value, dwelling characteristics and state to provide property specific measure. A detailed description of the estimated equation can be found in Wood, Watson and Flatau (2002b).

Insurance

Wood and Watson (2001) calculated the insurance premium on a property with common construction and security characteristics by location for the 1993 Rental Investor Survey using an on-line premium calculator. Premium rates will change if there are changes in either the risk associated with particular properties or increased competition in the housing insurance industry reduces the portion of the premium that covers administrative costs. Given the relatively small proportion of building value that premiums represent we estimate the insurance premium rate by calculating the mean rate in metropolitan and non-metropolitan locations by state from the estimates made for the 1993 survey. These mean rates are then applied to the building value in accordance with rental investors' and homeowners' property locations. The result is an imputed annual premium.

Body Corporate Fees

Body corporate fees are levied on flats and apartments by the body corporate.[57] These fees are used to cover common maintenance and utility charges for blocks of flats and units. To avoid double counting where the investor owns a block of flats or apartments we calculate body corporate fees only when the investing income unit owns a single apartment or flat. Body corporate fees are set at 7.2% of gross rent, which is the rate used by the ACCC (2000). For owner-occupiers who reside in a flat or apartment the calculation of body corporate fees involves inferring the gross rent stream that the property would earn if it was a rental property. This is done by applying the market rental rate to the owners' estimate of the current market value of the property. Body corporate fees are then calculated in the same manner as for rental investors.

Brokerage Fees

Brokerage fees are charged by real estate agents as a proportion of the sale price of a property and are paid by the vendor. Wood and Watson (2001) estimated brokerage fees on sale for use with the *1993 RIS*. These fees were based on the regulated fee schedules in place in the individual States at that time and have been subject to deregulation. We have not been able to arrive at a way of estimating brokerage fees as of 1997 and set the brokerage rate, the ratio of brokerage fees to property value equal to their mean values by state calculated from the *1993 RIS*. These rates are applied to the properties of investors and homeowners.

Stamp Duties

Stamp duties are levied by state governments on contracts including those involving the sale of a property and are paid by the purchaser. The applicable rates used in this study were estimated using the schedules in Commonwealth Grants Commission (CGC, 2000). Stamp duties indirectly impact on investor's reservation rental rates as they are subtracted from the cost base used to calculate taxable capital gains. There is no impact on existing investors' reservation rental rates, as stamp duties are a sunk cost, i.e., they cannot be avoided or reduced once incurred. Tenants considering purchasing a property incur stamp duties at the time of purchase. Rates of stamp duty for first home buyers are calculated at their estimated optimal levels of housing consumption.[58]

[57] The body corporate is the body that makes management decisions in relation to the block of flats or apartments on behalf of the owners. In general, it is a committee formed by the tenants and owners.

[58] It should be noted that first home buyers receive concessions on stamp duties as discussed below (CGC, 2000).

Parameters Specific to Investors

Agent's Fees

The Australian Competition and Consumer Commission (ACCC) (2000) estimate that letting and property management fees represent 9.1 per cent of gross rents. Using regulated fee schedules from the early 1990s the mean rate for agent management and letting fees, as calculated from the *1993 RIS Survey*, was 17.9 per cent (Wood and Watson, 2001). The significantly lower rate of agent's fees estimated by the ACCC will reflect the impact of deregulation and the use of maximum, regulated charges in Wood and Watson (2001). We assume that all landlords engage a real estate agent to screen tenants, arrange lease contracts and manage the property during the lease term. The *1997 RIS* reports that a real estate agent manages 58.1 per cent of properties. For those properties that are not managed by an agent, we assume that the agent's fees capture the opportunity costs of self-management.

Land Taxes

Australian state governments levy land taxes on the unimproved site value of rental properties. In general, they are calculated on the basis of a graduated schedule of rates although specific exemptions apply in certain states. Land tax liabilities are not reported in the *1997 RIS* and so we impute values for each property in the sample. The Commonwealth Grants Commission (2000) published schedules of land tax rates for 1997 have been employed.[59] To calculate the aggregate, unimproved site value of residential rental housing properties held by each investor, building to value ratios have been applied to investor estimates of the market value of each investment property owned. The schedule of land tax rates is then used to estimate land tax liabilities.[60]

Vacancy Rate

Rental investors need to take into account the impact of periods of vacancy on their economic costs. The *1997 RIS* reports the vacancies experienced by a landlord over the 12 months leading up to the survey. However, in a manner similar to maintenance expenditures, periods of vacancy are irregular in nature. To allow for this, we estimated the statistical relationship governing vacancies and have used the predicted vacancy rate from the estimated relationship in our calculations of economic costs. A more detailed discussion of the estimating equation and the determinants of the vacancy rate can be found in Wood, Watson and Flatau (2002b).

Measurement Issues Specific to Housing Consumers

Optimal Housing Demand

Estimation of the bid rate and borrowing constraints of rental tenants in the simulation model requires a measure of their optimal housing demand.[61] Using the reported market value of existing owner-occupiers in the *1996-97 SIHC* who had purchased their property in the three years prior to the survey we estimated a regression equation that explains housing values as a function of:

1. The owner-occupier's bid-rental rate;
2. The income unit's current weekly income;
3. The income unit's liquid asset holdings;
4. Demographic characteristics of owner-occupier income units reported in the survey; and
5. Whether the income unit was a first home buyer.

A fuller discussion of our estimated equation can be found in Wood, Watson and Flatau (2002b). The predicted values from the estimated equation are used as estimates of tenants' optimal housing consumption conditional on them becoming homeowners.

---

[59] Land tax rates are reviewed sporadically by State governments and the rates and property value bands reported by the CGC in 2000 are the same as rates in place in 1997.

[60] Calculation of land tax liabilities on multiple property portfolios is explained in Wood, Watson and Flatau (2002b).

[61] Optimal housing demand also plays a role in determining rent assistance payments. This is discussed in detail below.

Rent Assistance [62]

Rental tenants who are in receipt of a Commonwealth government pension or benefit, or who satisfy given eligibility criteria in relation to the Family Tax Benefit, can receive a fortnightly rent assistance payment that depends on the weekly rent paid. Rent assistance is paid when the weekly rent on the property exceeds a threshold that varies with family structure and whether the income unit is eligible for rent assistance under the *Social Security Act 1991* or under the *New Tax System (Family Assistance) Act 1999*. Subject to the rent exceeding the threshold, rent assistance is paid at the rate of 75 cents per dollar of rent paid above the threshold level up to a specified maximum level of rent. Eligible income units who pay a rent greater than the maximum rent receive the maximum rate of rent assistance. A fuller discussion of the Rent Assistance system can be found in Appendix 2 of this report.

To be able to measure the relative price of housing in different tenures, we must model the rent assistance payments of current rental tenants and the rent assistance that would be received by current owner-occupiers and public housing tenants, if they were to change their tenure. The rent assistance entitlements are calculated at the market rental rate estimated using the supply side of the microsimulation model.

To calculate rent assistance payments at these market rents, we apply the market rental rate to either:

1. The value of the property currently held by owner-occupiers; or
2. In the case of private and public rental tenants, the value of the property generated from the optimal housing demand equation.

This provides us with an estimate of the market rent that each housing consumer must pay in order to consume housing services at the level demanded as homeowners. Using this rent we then apply the qualification and threshold arrangements associated with the rent assistance scheme to arrive at the rent assistance payments that would be received. These rent assistance payments are subtracted from the market rent, and the resulting figure is expressed as a proportion of the value of housing consumption.

Borrowing Constraints

There are two constraints, which have to be met by a potential homebuyer to obtain a mortgage. The first of these is a deposit requirement. Typically financial institutions will lend up to a maximum loan to value ratio, and buyers must meet the residual from net liquid assets. Application of this constraint requires estimation of the maximum loan to value ratio applied by financial institutions in their underwriting criteria and the net liquid assets of potential buyers. To address the loan to value measurement issue we examined the borrowing characteristics of first-homeowners from the *1999 Australian Housing Survey*. In Table 2.7, we list the mean and median loan to value ratio of first home buyers who purchased in the years 1997, 1998 and 1999. The median is 90% in each of these years suggesting that this is a reasonable value to assume for the maximum loan to value ratio. Net liquid assets of potential buyers are estimated by application of a yield multiplier to the income streams from assets reported in the *1996-97 SIHC* (See Appendix 1 for details).

The second constraint we need to measure is the underwriting criteria applied to a borrower's repayments. Financial institutions check that income units have sufficient income to meet loan repayments. In the USA income qualification constraints on FHA mortgage loans require repayments to be less than or equal to some fraction of household income (loan repayment ratio). However, Garratt (2000) presents evidence for the United Kingdom that the loan repayment ratios at which mortgages are established are volatile. Average advance to income ratios, the ratio of mortgage debt to annual income, are relatively stable over time. He shows that in the period 1993 - 1999 the average advance to average income ratio (for all buyers) fluctuated between 2.08 and 2.18, while the average initial mortgage repayments to average income fraction fluctuated between 0.128 and 0.155. Over the longer 1969 to 1999 period the advance to income ratio for first-time buyers is stable at about 2.0 (see Garratt, chart 5), but the initial mortgage repayments as a

[62] We wish to acknowledge the helpful comments of Mr Martin Burgess of the Commonwealth Department of Family and Community Services in relation to the operation of rent assistance programs.

percentage of income for first-home buyers fluctuates between a low of approximately 10% in the late 1960s and a peak of around 26% at the onset of the 1990s (see Garratt, chart 8).

In the USA the use of loan repayment ratios as underwriting criteria reflects the dominance of fixed rate mortgages. In countries such as the UK and Australia where variable (adjustable) rate mortgages are predominant, the evidence offered by Garratt would appear to suggest that repayment criteria are based on maximum advance to income ratios. In table 2.7 we report the mean and median advance to income ratios of first home buyers classified by income unit type. To obtain the loan repayment ratios implied by these advance to income ratios, the latter can be multiplied by the baseline interest rate. These implied loan repayment ratios have been used to operationalise income constraints. Consider a borrower who has borrowed $100,000 and has an annual income of $50,000. The advance to income ratio is 2. To derive the loan repayment ratio of this loan we simply multiply the advance to income ratio by the baseline interest rate (7.2%) giving a loan repayment ratio of 14.4%.[63] If the interest rate increases to 10% the advance to income ratio that presents satisfaction of the 14.4% loan repayment ratio falls to 1.44, and the maximum loan advance falls to $72,000.

It is evident from table 2.7 that advance to income ratios differ according to the type of income unit.[64] The mean value for lone person income units calculated directly from the survey was 5.5. However a small number of income units in this group (6) have calculated advance to income ratios in excess of 10. An advance to income ratio of 10 means that 70% of the income unit's gross income is required to meet debt service obligations and this does not appear reasonable. We have therefore excluded these income units from the calculation of the mean advance to income ratio for lone persons and report this estimate (3.73) in table 2.7. To allow for this variation in advance to income ratios by income unit type we set the advance to income ratios in our simulations equal to:

Couples: **= 2.5**

Lone persons and sole parents: **= 3.5.**

The other significant components influencing borrowing constraints are the transaction costs incurred by buyers. These transaction costs include stamp duty and mortgage insurance and effect the borrowing constraints by reducing net liquid assets available to meet the deposit requirement.

First homebuyers receive concessions on stamp duty in all states of Australia although the form of the concession varies in terms of the form it takes and the amounts involved. These concessions, which are described by the Commonwealth Grant Commission (2000), are taken into account in calculating the stamp duties paid by first homebuyers at their chosen level of housing consumption.

Mortgage insurance in Australia is paid for by the borrower but protects the lender against losses resulting from a failure to cover the outstanding mortgage in the event that the property is subject to a mortgagee sale. First home buyers are typically required to take out mortgage insurance when they borrow more than 80% of the value of the property. The insurance premium is collected from the borrower and the applicable rate is greater the higher is the loan to value ratio. There is a 'one-off' premium payable at settlement, and this premium is calculated as a percentage of the loan advance. GEMICO Australia provided us with the rate schedules for 2002 that they apply to mortgage insurance contracts along with the stamp duty schedules applicable to these contracts in each state.[65] We apply the rates applicable to a regulated mortgage that is consistent with the National Consumer Credit Code adopted by the State Governments.

Consider a single person who wishes to purchase a property with a price of $100,000. She has $7,000 in liquid assets and annual earnings of $25,000. If the maximum loan to value ratio at which a mortgage can be obtained is 90% then the home buyer in our example can obtain a mortgage of not more than $70,000. She would need to find an additional $3,000 in net liquid assets in order

[63] The mathematical derivation of the relationship between advance to income ratios and loan repayment ratios can be found in Wood, Watson and Flatau (2003).

[64] Banks appear to be more cautious with respect to double income couples because of the risk that one source of income will be lost in the future due to additional child rearing responsibilities.

[65] The insurance premium ranges from 0.43% of the principal advance for loans under $300,000 with a loan to value ratio of greater than 80% to 1.62% for loans under $300,000 with a loan to value ratio of 95%. At a loan-to-value ratio of 90% the premium is 1.13% for loans under $300,000.

alleviate this wealth constraint and borrow the amount required to purchase her desired quantity of housing.

However, even if our potential homebuyer were able to meet the $10,000 deposit requirement she would still not be able to borrow an amount sufficient to allow her to purchase the property. This is because she faces a binding income constraint. A single person can borrow up to a maximum of 3.5 times their annual earnings. Given annual earnings of $25,000 this equates to a maximum loan of $87,500.

The above example has excluded the impact of stamp duties and mortgage insurance on the wealth constraint. If stamp duties and mortgage insurance are both levied at the rate of 1% of property value then our potential homebuyer needs to meet $2,000 in up-front transaction costs from her available net liquid assets. As a result, the maximum deposit she can raise is $5,000 and the maximum amount that she can borrow is $45,000.

Table 2.7 Loan-Value Ratios, Loan Repayment Ratios (LRR), & Advance to Income Ratios: Summary Statistics by Year of Acquisition: First Home Buyers

	Year of Acquisition	1999	1998	1997
Loan – Value Ratio	Mean	0.8655	0.8744	0.8559
	Median	0.9027	0.9004	0.9004

Advance to Income Ratios[1] & Loan Repayment Ratios (LRR)[2]

Income Unit Type	Number	Mean Advance to Income Ratios	Implied LRR[3]	Measured LRR
Couple with Dependents	36	2.51	0.18	0.18
Couple no dependents	43	2.69	0.19	0.23
One parent with dependents	6	3.41	0.24	0.16
Lone Person	42	3.73	0.26	0.33

Source: ABS, 2001, Australian Housing Survey - 1999

1. Advance to income ratios are calculated as (Dwelling cost – deposit)/(annual earnings). The sample is income units acquiring their first home in 1999.

2. Loan repayment ratios are calculated as the ratio of annualized weekly mortgage repayments to annual income.

3. The implied loan repayment ratio is calculated by multiplying the mean advance to income ratio by the baseline interest rate (7.2%).

Table 2.8 Parameters – Mean Values

As a percentage of property value unless otherwise stated	Rental Investors	Housing Consumers
Baseline Parameters		
Interest Rate	7.2%	7.2%
General Inflation	2.5%	2.5%
Constant rate of House Price and Rent Appreciation	3.9%	3.9%
Rate of Economic Depreciation	1.4%	1.4%
Holding Period	10 years	10 years
Loan to Value Ratio		0.9
Investor Specific Parameters		
Vacancies		
Reported (Weeks)	5.04	
Predicted (Weeks)	2.62	
Agents Fees[1]	9.1%	
Building Write-off Allowance	0.48%	
Land Tax[2]	0.21%	
Property Portfolio	$201,390	
Housing Consumer Specific Parameters		
Optimal Housing Demand		$104,780
Net Liquid Wealth		$26,884
Income Constraint		$78,250
Wealth Constraint		$91,819
Parameters Common to Investors and Consumers		
Brokerage Fees	2.41%	3.2%
Stamp Duties	2.41%	2.49%
Building to Value Ratio	42.7%	42.9%
Property Tax	0.76%	0.77%
Body Corporate Fees[1]	7.2%	7.2%
Expected Maintenance	0.93%	0.64%
Annual Gross Rent[3]	$8,751	$6,438
Estimated Market Value	$138,900	$165,700
Insurance	0.37%	0.16%
Marginal Income Tax Rate	30%	21%

1. As a percentage of gross annual rent.
2. As a percentage of unimproved site value.
3. For housing consumers the mean annual rent for private rental tenants is reported.

CHAPTER 3 MARKET INEFFICIENCY AND KEY FACTORS AFFECTING HOUSING TENURE OUTCOMES

The previous chapter explained how the components of the economic costs of housing consumers and landlords, and the borrowing constraints of rental tenants, have been measured. This chapter presents the results of a simulation using the baseline values of key parameters such as interest, inflation and house price appreciation rates and considers how changes in these parameters influence the tenure composition of the Australian housing market.

Section 3.1 reports an analysis of tenure choice using the baseline values of parameters. These results confirm that owner-occupation is more attractive than rental tenancy for most Australian income units. The results also demonstrate that the principal barrier to achieving owner-occupation for most income units is their inability to meet deposit requirements on their desired home purchases.

Section 3.2 examines how the level of a few key model parameters – the interest rate, nominal capital gains, agent's fees and the market rental rate, effect tenure outcomes in the Australian housing market. A key finding of this section is that because outcomes are the result of the interaction of supply side and demand side factors, propositions such as 'higher interest rates make homeownership less affordable' can be misleading in terms of their implications for housing tenure outcomes.

In appendix 3 we conduct a benchmarking exercise that allows us to gauge the predictive power of the simulation model.

3.1 Analysis of Tenure Choice

A Simulation at Baseline Parameter Values

Relative Prices

Table 3.1 presents the results of tenure assignment on the basis of the relative prices of alternative tenures for the model at the baseline values of the interest rate (7.2%) and nominal rate of capital gains (3.9%).

The observed tenure is the tenure reported by the income unit in the *1996-97 SIHC* unit record file. The assigned tenure is the tenure to which the simulation model allocates the income unit under the price criterion. The figures along the main diagonal (the box owner-occupier/owner-occupier, for example) represent the number and percentage of income units for which the assigned tenure from the AHMM model concurs with the observed tenure of the income unit given the price criterion. The figures in the off-diagonal boxes represent income units who are allocated to a different tenure to that reported in the survey. The row totals in the final column show the total number of income units allocated to a given tenure by the simulation model, while the column totals in the final row of Table 3.1 show the total number of income units that are observed in each tenure.

Table 3.1 Tenure Assignment in the reference system after application of relative price rules

		Observed Tenure				
Assigned Tenure		Owner Occupier	Private Rental Tenant	Public Rental Tenant	Shared Dwelling Arrangement	Total
Owner-Occupier	N	3968	1446	38	1309	6761
	Col. %	78.2%	73.6%	7.9%	74.5%	72.9%
Private Rental Tenant	N	1105	518	37		1660
	Col. %	21.8%	26.4%	7.7%		17.9%
Public Rental Tenant	N			408		408
	Col. %			84.5%		4.4%
Shared Dwelling Arrangement	N				447	447
	Col. %				25.5%	4.8%
Total	N	5073	1964	483	1756	9276
	Row %	54.7%	21.2%	5.2%	18.9%	100%

Application of the relative price assignment rule in Table 3.1 suggests that 66.5% of all income units in rental tenancies (tenants) would find owner-occupation preferable on the basis of relative prices[66]. Almost three-quarters of all private rental tenants and income units in shared dwelling arrangements find housing cheaper as homeowners than as tenants paying market rents.[67] In the case of public rental tenants, only 7.9% of income units find owner-occupation cheaper than either private rental (7.7%) or remaining in public rental housing (84.5%). This reflects the low incomes of public tenants and hence high relative price of owner-occupation, access to rent assistance payments if they became private rental tenants, and subsidised rents in public housing. The considerable latent demand for homeownership among income units in private renting and shared dwelling arrangements is an important finding. We estimate that almost three quarters of these income units are, for reasons that will become apparent, unable to express this demand. This is evidence of housing market inefficiency.

A substantial number of owner-occupiers (1105 or 21.8% of all owner-occupiers) are assigned to the private rental tenancy. These income units are predominantly outright owners rather than purchasers (77.3% are outright owners), are often income units with older household heads (56.3% of these income units have at least one member who is over 65 years of age, whereas this is true for only 16.9% of income units in the sample), and receive pension or allowance income that would entitle them to rent assistance as rental tenants. (The mean annual government transfer payment income received by the reference person is $6,636 compared to $2,846 for the sample.)

This finding implies that a considerable number of older income units who own their homes outright, would be able to rent the equivalent amount of housing at a lower economic cost. These homeowners are either prevented from making a preferred choice, or have non-price related reasons for continuing to reside in their current homes as owner-occupiers such as a desire to pass on the family home as a bequest. [68]

Borrowing Constraints

The role played by borrowing constraints in generating inefficient outcomes in housing markets is evident in Table 3.2, which presents assigned tenure outcomes once income and wealth constraints are applied to all tenants. Whereas 66.5% of all income units in rental tenancies found homeownership preferable on the basis of a relative price comparison, only 3.7% of tenants are

[66] The total number of income units observed in tenures other than owner-occupation is 4203 (9276 – 5073). The model assigns 2793 tenant income units to owner-occupation (6761 - 3968) under the relative price criterion.

[67] Recall that if the tenant is eligible for rent assistance, the entitlement has been taken into account.

[68] In total, 28% of all income units are in tenures where housing is more expensive than if they acquired that same quantity of housing in the competing alternative tenure. This 28% does not include those residing in shared dwelling arrangements who are assigned to owner occupation.

able to meet income and wealth constraints as well as the relative price criterion.[69] These constraints are a powerful influence on tenure choice outcomes. In Table 3.2, 7977 of the 9276 income units are correctly assigned to a housing tenure by the model. This is 86% of the sample. Since the observed tenure status of income units is used to guide application of borrowing constraints, this assignment exercise is not a true guide to predictive accuracy. In Appendix 3 we report the results of benchmarking exercises that gauge predictive accuracy and confirm the high degree of predictive accuracy achieved by the model.

Table 3.2 Tenure Assignment in the reference system after application of relative price rules

		Observed Tenure				
Assigned Tenure		Owner Occupier	Private Rental Tenant	Public Rental Tenant	Shared Dwelling Arrangement	Total
Owner-Occupier	N	3968	95	0	62	4127
	Col. %	78.2%	4.8%	0%	3.5%	44.5%
Private Rental Tenant	N	1105	1869	37		3011
	Col. %	21.8%	95.2%	7.7%		32.5%
Public Rental Tenant	N			446		446
	Col. %			92.4%		4.8%
Shared Dwelling Arrangement	N				1694	1694
	Col. %				96.5%	18.2%
Total	N	5073	1964	483	1756	9276
	Row %	54.7%	21.2%	5.2%	18.9%	100%

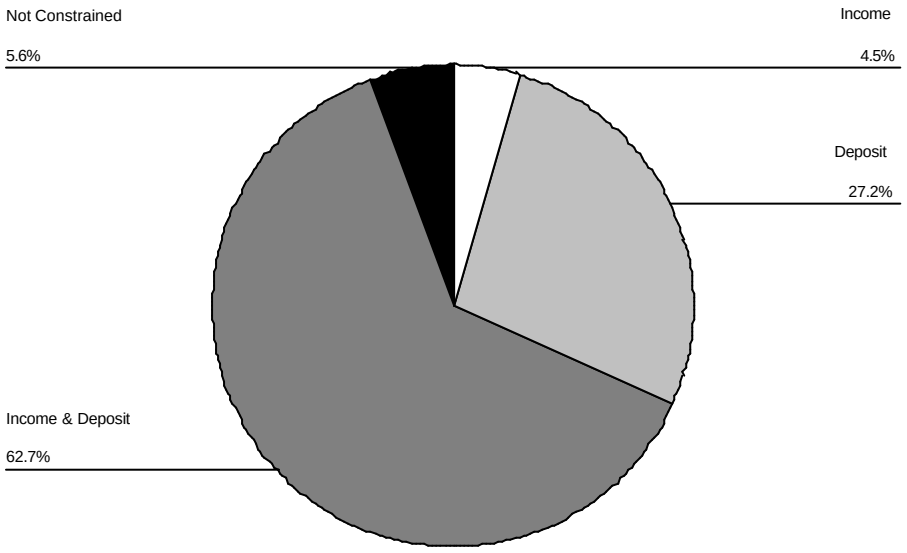
Chart 1 identifies the relevant binding constraints for those tenants in the sample who find owner-occupation cheaper given the relative prices they face. Income and wealth constraints are binding for 62.7% of these tenants, while wealth constraints alone are binding for 27.2%. Only 4.5% are subject to a binding income constraint alone; so wealth constraints are the more important impediment. Linneman and Wachter (1989) offer an intuitively appealing rationale for the importance of wealth constraints relative to income constraints. If a household cannot make a deposit requirement on its desired home, its most viable alternative is to rent. However, if only income constrained with respect to a desired home, the household can reduce its loan-to-value ratio in order to meet payment to income criteria, and still be able to purchase the desired home.

The mean liquid assets of tenants subject to a binding wealth constraint alone is $1634, while those with binding wealth and income constraints have mean liquid assets of only $416.[70] This means that the gap between tenants' liquid assets and the 10% deposit requirement is an average 8.6% ($10,059) of optimal housing demand ($116,703) for those confronting a wealth constraint alone, and 9.6% ($9,990) of optimal housing demand ($104,033) for those subject to both wealth and income constraints. In the case of those income units facing an income constraint alone, the gap between the maximum affordable mortgage and the optimal housing demand ($129,301) averages 32.4% ($41,916) of optimal housing demand, and 42.2% ($43,928) of optimal housing demand ($104,033) for those income units subject to both wealth and income constraints.

[69] The 158 rental tenants who satisfy both relative price and borrowing constraint criteria could be highly mobile income units for whom transaction costs not captured in the model make rental tenancies preferable to owner-occupation, or tenants in company owned housing or people in a transitional state between rental tenancy and owner-occupation (For example, those waiting for settlement to occur on a recently purchased property). The characteristics of these income units will be investigated in a forthcoming paper.

[70] Liquid assets include bank interest bearing deposits, rental investments and shares. Values for these assets can be inferred from the investment income from these sources reported in the *1996-97 SIHC*. The method used to determine asset values is described in appendix 1.

Chart 1. Renting Income Units: Sample



Excludes income units who find renting cheaper.

Table 3.3 cross-tabulates the socio-economic and demographic characteristics of credit-constrained tenants by borrowing constraint. The income constrained, who tend to belong to an older age bracket, have comparatively high levels of investment income, and depend more on government benefit payments than do the wealth constrained. The latter have markedly different characteristics to the income constrained. They have higher annual incomes, higher labour force participation rates and are more likely to be renting from a private landlord who does not reside in the same dwelling. They have obtained higher educational qualifications than those who are both wealth and income constrained. They are also more likely to be in a profession or be employed as a manager/administrator than the wealth and income constrained.

Income units who are both wealth and income constrained are far more likely to experience unemployment in comparison to the income or wealth constrained, although in the former case a low participation rate may reflect hidden unemployment. Four fifths of all income units in this group are sole person income units, which is presumably related to their younger age profile. On the basis of both wage income and income from investments, and the deposit gap measures cited above, it is those experiencing both binding income and wealth constraints that find homeownership most inaccessible.

Table 3.3 The Socio-Economic and Demographic Characteristics of Tenants by Binding Borrowing Constraint

	Sample	*Income Constrained*	*Wealth Constrained*	*Income & Wealth Constrained*
Demographic Characteristics				
Median Age of Reference Person (Years)	45-49	50-54	25-29	23-24
Proportion of income units with 1 or more persons aged over 65.	17.9%	13.7%	0.26%	2.4%
Dependent Children	29.0%	15.3%	12.7%	12.2%
Sole person income units	46.9%	69.4%	72.3%	80.1%
Housing				
Current Weekly Rent*	$75	$55	$93	$64
Optimal Housing Demand*	$137,381	$129,301	$116,703	$104,033
Shared Dwelling Arrangments[1]	41.7%	50.8%	37%	51.6%
Private Rental Tenancy[2]	39.5%	37.9%	53.5%	41.6%
Metropolitan Residence	60.7%	60.5%	59.6%	66.4%
Deposit Gap			$10,158	$9,884
Income, Assets & Employment[3]				
Annual Income from Wages & Salaries*	$18,770	$17,811	$33,889	$12,713
Annual Income from Investments*	$1,050	$1,904	$83	$32
Liquid Assets	$36,405	$21,416	$1,512	$519
Annual Income from Government Cash Transfers*	$2,846	$1,296	$167.50	$1,625
Not in labour force	30.1%	25.8%	3.0%	14.5%
Unemployed	6.63%	3.2%	3.0%	12.2%
Highest Educational Qualification				
Post-Graduate	4.2%	6.5%	6.2%	1.9%
Under-Graduate	17.7%	29.8%	26.5%	15.7%
Vocational	23.8%	21.8%	25.8%	19.9%
No Qualifications	54.2%	41.9%	41.4%	61.9%
Occupation[4]				
Managers and Administrators	9.9%	10.2%	5.6%	3.0%
Professionals	29.3%	51.1%	37.6%	19.2%
Tradespersons	18.7%	14.8%	18.3%	18.0%
Clerical	21.9%	17.0%	21.5%	36.0%
Production and Transport	10.9%	4.5%	10.6%	10.7%
Labourers	9.0%	2.3%	6.2%	12.9%
Sample Size	9276	124	755	1740

* - Mean value.

1. 'Shared Dwelling Arrangements' is defined in the glossary.

2. Proportion of all renter/boarder income units.

3. Statistics refer to the income unit reference person.

4. Reference person's occupation in current job. Excludes the unemployed and those persons not in the labour force.

3.2 The Determinants of Tenure Choice

Interest Rates

Table 3.4 presents the results of an analysis of the impact of interest rate variations on the predicted tenure of income units. It reports the proportion of income units assigned to homeownership when the relative prices of alternative tenures are compared (column 2) and when borrowing constraints are allowed to impact on the tenure choice of the income unit (column 3).

Changes in the mortgage interest rate lead to modifications to model predictions through their influence on several key parameters in the model. These are:

1. The market rental rate (through the influence of interest rates on the reservation rental rates of investors);
2. The housing consumer's bid rental rate; and
3. The repayment or income constraint where the interest rate plays a role in determining the advance to income ratio. Changes in the interest rate, holding the share of income that can be used to meet mortgage repayments (loan repayment ratio) constant, reduces the maximum amount an income unit can borrow.

In practice, changes in interest rates will lead to changes in the optimal housing demand of housing consumers. In order to be able to examine the direct impact on predicted tenures resulting from alternative assumptions about the level of interest rates, optimal housing demand is held constant at baseline values for the purpose of these simulations.

Column 2 of Table 3.4 shows the percentage of all income units who find home ownership cheaper than renting, on economic cost grounds. Higher interest rates relative to the baseline value (7.2%) result in an increasing proportion of income units who would prefer to be owner occupiers increasing. This unanticipated finding comes about because the imputed rents of homeowners are tax exempt. At an interest rate of 5.2% the mean market rental rate exceeds the mean bid rental rate by 0.87 percentage points. At the baseline value of 7.2% the corresponding differential is 1.06 percentage points. If the interest rate is set at 9.2% then this gap increases to 1.34 percentage points. As a result, more income units find home ownership preferable on relative price grounds.

Table 3.4 Determinants of Tenure Choice – Interest Rates

	Assigned Owner-Occupier Shares				
Interest Rate	Preferred Tenure (Relative Price Comparison)	Predicted Tenure (Borrowing Constraints)	Market Rental Rate	Mean Bid Rental Rate	Assigned Rental Tenants Subject to a Binding Constraint
5.2%	71.8%	44.9%	4.478%	3.608%	59.5%
6.2%	72.0%	44.6%	5.440%	4.498%	60.5%
7.2%	72.9%	44.5%	6.443%	5.379%	62.7%
8.2%	73.6%	44.5%	7.469%	6.280%	64.2%
9.2%	74.3%	44.5%	8.509%	7.171%	65.8%

Column 3 lists the model's predictions about changes to the share of homeownership given application of both relative price and borrowing constraint assignment rules. Though more income units find homeownership cheaper on economic grounds, rising interest rates result in a tightening mortgage repayment constraint. Of those assigned to rental tenures by the model, a rising proportion are subject to a binding borrowing constraint. The overall outcome is a marginal fall in the share of homeowners.

Nominal Capital Gains Rate

The rate at which the price of housing appreciates also has a significant impact on tenure choices of Australian income units. The baseline nominal capital appreciation rate is 3.9%. The analysis of the impact of changes in the nominal capital gains rate in Table 3.5 allows the nominal capital gains rate to vary between 1.9% per annum and 5.9% per annum. It should be noted that this range is associated with significant variation in the real rate of capital gains earned by rental investors and owner-occupiers. Given a baseline rate of general inflation of 2.5%, real rates of capital gain modelled range between – 0.4% and +2.4% per annum.

Higher nominal and real capital gains reduce the economic costs of both owner-occupied and rental housing so that both the market and bid rental rates in the third and fourth column of table 3.5 fall as capital gains rates rise. However, the impact on the bid rental rates of housing consumers is moderate when compared to the impact on the market rental rate. Investor's capital gains are taxed more lightly compared to rental income. As the rate of capital gains rises they are able to lower reservation rental rates; in fact, because capital gains are preferentially taxed they can lower reservation rental rates by more than one dollar for every one dollar increase in capital gain. Homeowners (imputed) rental income and capital gains are both tax exempt, so that rental income and accrued capital gains are equally valuable to the homeowner. As a result, higher capital gains lead to a fall in the share of owner-occupiers based on relative price comparisons and the predicted tenures once borrowing constraints have been allowed for. The gap between the market rental rate and the mean bid rental rate at a nominal capital gain rate of 1.9% is 1.87 percentage points. At a nominal capital gains rate of 5.9% this gap is 0.49 percentage points. Among the increasing number of income units who are assigned to rental tenures as rates of capital gains rise, binding borrowing constraints are less important. This is because there are a growing number of income units not subject to binding borrowing constraints, who choose rental tenures on relative price grounds.

Table 3.5 Determinants of Tenure Choice – Nominal Capital Gains Rate

	Assigned Owner-Occupier Shares				
Nominal Capital Gains Rate	Preferred Tenure (Relative Price Comparison)	Predicted Tenure (Borrowing Constraints)	Market Rental Rate	Mean Bid Rental Rate	Assigned Rental Tenants Subject to a Binding Constraint
1.9%	81.6%	49.7%	9.554%	7.683%	70.4%
2.9%	76.7%	46.8%	7.985%	6.536%	66.1%
3.9%	72.9%	44.5%	6.443%	5.379%	62.7%
4.9%	66.8%	41.4%	4.957%	4.243%	56.1%
5.9%	61.9%	38.4%	3.591%	3.098%	51.7%

Agent's Fees

Agent's fees (property management, letting fees and body corporate fees) increase the reservation rental rates of landlords. Setting the agency cost parameters equal to zero changes the predicted tenure choices of housing consumers generated in two ways. First, it reduces the market rental rate of landlords who no longer face a financial cost associated with screening rental tenants and monitoring the behaviour of tenants once the property is let. Second, for those housing consumers who own or are purchasing a property type where body corporate fees must be paid, there will be a reduction in their bid rental rate. The latter are relatively unimportant since the majority of homeowners (96%) live in property types that do not require the payment of body corporate fees.

Thus agent's fees are a cost that landlord's incur because of the divorce of ownership from occupancy, but which homeowners avoid by occupying the property they own. These 'agency costs' may put rental housing at a cost disadvantage relative to homeownership, and could account for the high rates of homeownership we observe in Australia. This hypothesis is tested below.

Table 3.6 Determinants of Tenure Choice – Agents Fees

	Assigned Owner-Occupier Shares			
Agents Fees	Preferred Tenure (Relative Price Comparison) Agents costs =0	Preferred Tenure (Relative Price Comparison)	Market Rental Rate (Agents costs =0)	Market Rental Rate
Baseline	64.2%	72.9%	5.824%	6.443%
Interest Rate				
5.2%	65.7%	71.8%	4.084%	4.478%
6.2%	64.9%	72.0%	4.930%	5.440%
8.2%	64.1%	73.6%	6.745%	7.469%
9.2%	64.0%	74.3%	7.682%	8.509%
Nominal Capital Gains				
1.9%	72.4%	81.6%	8.626%	9.554%
2.9%	68.5%	76.7%	7.210%	7.985%
4.9%	60.1%	66.8%	4.502%	4.957%
5.9%	56.0%	61.9%	3.296%	3.591%

The agent fee parameter determines the reservation rental rate of landlords in conjunction with the interest rate and the rate of nominal capital gains. As a consequence, the impact of agent fees on tenure choice will depend on these rates. Our results are presented in Table 3.6.

Columns 1 and 2 of Table 3.6 report the preferred tenure outcomes generated by the model when agent's fees are set equal to zero and when agent's fees are taken into account. Results are presented for alternative interest rate and nominal capital gain rate values. In the absence of agency costs, we find that the share of owner-occupation falls by 8.7 percentage points. The higher the interest rate the greater is the reduction in owner-occupation as the preferred tenure when agent's costs are set equal to zero. At an interest rate of 9.2% the reduction is 10.3 percentage points. The fall in the share of owner-occupiers in preferred tenures is also greater the lower is the rate of nominal capital gains.

Columns 3 and 4 of Table 3.6 report the market rental rates when agency costs are ignored (column 3) and when these costs are included in the calculation of individual reservation rental rates (column 4). The reason why the interest rate and capital gain rate assumptions are important in determining the ultimate effect of agency costs on preferred tenure outcomes is evident from the columns reporting the market rental rate. At higher interest rates or lower capital gains rates the contribution of these costs to the landlord's reservation rental rate is greater. The agent's fees modelled here are determined as a proportion of the gross rents charged on a rental property. In contrast, higher rates of capital gain lower reservation rental rates. Thus the share of agent's fees in net rental income decreases as rates of capital gain increase. Higher interest rates require increases in reservation rental rates. The result is that the share of agency costs in net rental income increases as interest rates increase.

Market Rental Rate Determination

The process for determining the market rental rate from the reservation rental rates of individual landlords has been discussed above. If rental housing markets are competitive we would not expect 'cost inefficient' investors from low tax brackets to survive. Expansion of rental housing investments by high tax bracket investments will then drive market rental rates down until they equal the reservation rental rates typical of the 'cost efficient' investors. Impediments preventing the expansion of supply by high tax bracket investors (see Chapter 4, section 4.4) will enable 'cost inefficient' investors to survive, but at the expense of higher marginal tax rental rates. Table 3.7 presents a comparison of model estimates under these alternative processes. The baseline case sets the market rental rate equal to the mean reservation rental rate of landlords whose marginal

implicit tax rate is at least equal to the highest statutory marginal tax rate (47%). The 'weighted average' estimates sets the market rental rate equal to a weighted average of the reservation rental rates of all landlords where the weights are the proportion of landlords in each tax bracket.[71]

Under the weighted average method, the market rental rate is slightly higher than the rate calculated under the baseline assumptions due to the higher reservation rental rates of investors outside the top income tax bracket.

The market rental rate is 0.338 percentage points higher under the weighted average method. This differential results in the share of housing consumers assigned to owner occupation increasing by 3.1 percentage points when relative price criteria alone determine tenure choice. However, when we allow for the impact of borrowing constraints, the share of owner-occupation increases by only 1.6 percentage points. These relatively small changes in the predicted shares of owner-occupation suggest that the process determining market rental rates will not lead to significantly different tenure outcomes at baseline parameter values. In the policy modelling exercises reported below we assume that market rental rates are determined given competitive market conditions.

Table 3.7 Determinants of Tenure Choice – Market Rental Rate

	Assigned Owner-Occupier Shares				
	Preferred Tenure (Relative Price Comparison)	Predicted Tenure (Borrowing Constraints)	Market Rental Rate	Mean Bid Rental Rate	Assigned Rental Tenants Subject to a Borrowing Constraint
Baseline	72.9%	44.5%	6.443%	5.379%	62.7%
Weighted Average	76.0%	46.1%	6.781%	5.379%	66.0%

3.3 Conclusion

The results of an initial simulation and an analysis of factors that play a significant role in determining the relative prices of housing consumers and rental investors provide important insights into the operation of the Australian housing market. We find evidence of market inefficiency resulting from the rules employed by mortgage lenders to assess loan applications from income units who would find owner-occupation cheaper than renting. A potential source of further inefficiency has been identified in the apparent cost effectiveness of renting as an option for some older Australian owner-occupiers. While further research is needed to improve our understanding of why these income units remain in owner-occupation this is also an important finding given an ageing population.

For many housing consumers the most significant constraint on becoming owner-occupiers is the absence of sufficient financial assets to meet deposit requirements associated with obtaining a mortgage. However, we also find considerable evidence that incomes for many housing consumers are insufficient to meet underwriting requirements for a mortgage that would allow them to purchase their desired value of owner-occupied housing.

The results reported above also point to the importance of considering the effect of changes in parameters such as interest rates and capital gain rates on the housing costs of both owner-occupiers and rental investors. We find that the changes in predicted tenures resulting from interest rate changes depend on the impact they have on the capacity of housing consumers to service a mortgage that would allow them to consume their preferred quantity of housing. However, the predicted outcomes also depend on the impact of interest rate changes on preferred tenure outcomes based on relative price comparisons on the part of housing consumers. Differences in the tax treatment of owner-occupiers and landlords result in an increasing preference for owner-occupation in the face of rising interest rates. When alternative rates of

[71] Marginal implicit tax rates can exceed the highest statutory tax rate when income units experience a reduction in pension and allowance income due to the operation of means testing arrangements.

capital gains are modelled, we find that the treatment of landlords' capital gains results in them being able to offer rental housing under terms that are increasingly attractive to housing consumers as the capital gains rate increases.

CHAPTER 4 PROMOTING THE SUPPLY OF AFFORDABLE RENTAL HOUSING

4.1 Introduction

In this chapter, we turn our attention to the supply-side of the housing market and to the role played by tax and subsidy measures in influencing investment decisions in the private rental property market. Our discussion focuses on the following important policy questions: What is the impact of current policy measures on the incentive to invest in low-cost rental accommodation? How can governments promote the supply of affordable private rental housing?

In sharp contrast to the large body of research that is evolving in relation to the impact of rent assistance measures on the position of private renters, we know very little about the effect of corresponding supply-side policy measures and their effect on investors' decisions, particularly vis-à-vis investment in low-cost rental accommodation.

One important existing Federal tax measure that impacts on the supply side of the rental property market is the Building Write-off (BWO) allowance. BWO allowances reduce the effective tax burden of investors and, via this channel, influence an investor's rental property decisions. We shall utilise the AHMM model to assess how the current Federal Government BWO allowance affects the investor's tax burden. The effects of current BWO allowance provisions will then be compared with alternative BWO allowance structures and with a policy measure utilised in the US, the Low Income Housing Tax Credit (LIHTC). The BWO allowance is not targeted towards low-rent accommodation investment while a LIHTC, by its very nature, is a targeted low-cost rental investment measure.

State Government policy measures also impact on the supply-side of the rental market and investor decision-making. Two measures in particular have potentially important effects, namely, Land Taxes and Stamp Duties. The major policy issue investigated in this section is whether land taxes and stamp duties impede the expansion of the supply of rental housing provided by 'least cost' high tax bracket investors.

The structure of the chapter is as follows. We begin with an extended discussion of the policy context to our analysis of Federal and State tax measures (4.2). In 4.3 we describe how the AHMM model can be utilised to examine the two sets of supply side issues. Section 4.4 presents the results of our analysis of the building write-off allowance and a low income housing tax credit. An analysis of stamp duties and land taxes is undertaken in Section 4.5.

4.2 The Issues

Affordable Rental Accommodation and the Building Write-off

In recent years, concerns have been raised over the availability of low-income rental housing. Malpezzi and Green (1996) demonstrate that, in the US, there was a contraction in the stock of low-income market rental units (less than US$300 per month at constant 1989 prices) between 1974 and 1989, but this reduction was accompanied by expansion in the remaining stock of unsubsidised rental units. In Canada, Miron (1995) has documented similar trends. Using Australian census data for the period 1986 to 1996, Yates and Wulff (2000) show that while there has been a significant increase in the number of low-income renters in the private residential housing market, the availability of affordable low-cost rental accommodation has declined significantly.

A key determinant of the incentive to invest in private rental accommodation is the tax and subsidy regime that applies. Taxes introduce a wedge between the pre-tax real rate of return that an investor requires from a rental housing project, and the after-tax real return that an investor could obtain on savings at the market rate of interest. When this tax wedge is divided by the investor's required pre-tax real rate of return, we obtain a measure of what is termed the King-Fullerton (K-F)

(1984) effective marginal tax rate. The K-F measure is widely accepted as a description of the actual incentives offered by the tax system to investors.[72]

Capital cost allowances have been used in Australia and Canada (MacNevin, 1997a; 1997b) to stimulate new construction.[73] The capital cost allowance is commonly referred to as the building write-off allowance in Australia. Allowances are applied on an annual basis and limited to 100 per cent of the construction expenditure. Deductions are allowable for both the construction of the dwelling and for extensions to existing dwellings but apply only for the period the property is rented or is available for rent.

The current annual building write-off rate is 2.5 per cent of construction costs. This annual deduction can be claimed over a forty-year holding period from the date construction was completed.[74] The 2.5 per cent rate applies to construction after 15 September 1987. For properties completed prior to that date (but after 18 July 1985), a 4.0 per cent deduction applies. The claimant period for such properties is 25 years. Construction beginning prior to 18 July 1985 attracts no building write-off allowance.

Building write-off allowances reduce the effective tax burden because write-offs yield tax savings by sheltering rents or other sources of income.[75] The higher the building write-off rate (for a given holding period), the lower the effective tax burden. However, an important offset to this tax benefit arises due to capital gains tax provisions. Under these provisions, 50 per cent of net capital gains are chargeable to tax at the investor's marginal rate. Building write-off allowances that the investor deducted from assessable income during the holding period are subtracted from acquisition costs. The effect of this recapture provision is to increase, by 50 per cent of the value of the building write-off deductions, the net capital gains chargeable to tax at the investor's marginal rate.

The Australian building write-off allowance is not targeted to the supply of *low-income* private rental accommodation. An alternative to a building write-off allowance is a targeted low-income housing tax credit or rebate. Therefore, we extend our AHMM model microsimulations to consider the case of an open-ended tax credit that is offered at a particular rate of construction costs, but conditional on weekly gross rents being less than some threshold level. The tax credit is not recaptured on realisation. The levels of the estimated effective marginal tax rates allow comparisons of the incentive to invest under these different tax arrangements. A Low-Income Housing Tax Credit (LIHTC) was introduced by the US Federal Government in 1986 as part of a larger tax reform package. Its principal intent was to provide incentives for private investors to undertake the development of affordable rental housing. The credit is received over a ten-year period and yields a present value of 70 per cent of the eligible basis of the building for new construction or substantial renovation of an existing building (McClure, 2000).[76] Cummings and DiPasquale (1999) note that the LIHTC appears to have led to the production of substantial amounts of low-income housing of different types, and has served a broad range of populations. McClure (2000) argues that the efficiency of the LIHTC suffers as a result of the inability of the fixed credit rate to generate financial feasibility for inner-city projects with very low rents relative to the market rate, and high development and construction costs. A key objective of this chapter is to ascertain whether a variant of the US LIHTC would sharpen the incentive to invest in Australian low-income rental housing, as evidenced by a substantial reduction in K-F effective marginal tax rates.

In this chapter, we use the AHMM microsimulation model to simulate the impact of building write-off allowances on K-F effective marginal tax rates using the *1997 RIS* CURF. Unit record survey

---

[72] Modifications to the K-F approach have been suggested by Scott (1987) and MacNevin (1997a, 1997b), and these are taken into account in this chapter.

[73] Depreciation allowances on investments in existing residential rental buildings are not extended to rental investors in Australia.

[74] The maximum period that building write-offs can apply is simply given by the inverse of the rate itself.

[75] Under current Australian tax rules investors can deduct net rental (passive) losses from other sources of assessable income.

[76] To qualify the building must satisfy certain conditions relating to rents and the occupants annual income relative to the mean in the area.

[77] The credit reduces to 30 per cent of the eligible basis in present value terms when an existing building is acquired or federally subsidised financing is used for the construction of a new property. The eligible basis depends on the location of the property and includes the value of some amenities over and above the construction costs. The credit rate itself ranges from around 9 per cent to 4 per cent per annum.

data with detailed financial records on rental investors is rare. Most previous studies have had to adopt a typical project model approach to measurement of the impact of tax measures, as in Brueggeman, Fisher and Stern (1982), De Leeuw and Ozanne (1981), Fisher and Lentz (1986), Follain, Hendershott and Ling (1987), Hendershott and Ling (1984), Hendershott, Follain and Ling (1987), Ling (1992), and MacNevin (1997a; 1997b). As Yinger (1987) points out, this precludes analysis of how the impact of tax measures may vary according to the distribution of investors with different characteristics and the distribution of rental housing with different attributes such as age, size etc. Use of the *1997 RIS* permits an analysis of this kind.

Land Taxes and Stamp Duties

While the BWO is a Federal measure, there are also important State Government based measures that influence investor behaviour. Two such measures are Land Taxes and Stamp Duties.

Land taxes are periodic taxes levied by State Governments on the unimproved site value of land that is used for commercial purposes including residential rental use. The unimproved site value is the freehold market value of the land in that use yielding the highest return but disregarding the value of improvements that are separable from the land. Improvements to the land that are included in the calculation of the unimproved site value include items such as earthworks and drainage. Land tax rates vary between states. However, across all states, land taxes are levied on the total value of all applicable properties held by the investor. Land tax rates rise as the unimproved site value of the relevant land increases.

The progressive structure of land tax schedules and the calculation of land tax liabilities based on the property portfolio rather than on each property taken one at a time, act as a disincentive for landlords to acquire additional rental properties. The application of higher land tax rates to the investor's entire portfolio results in marginal land tax rates that are higher than the statutory rate schedules would suggest. Some investors may, therefore, choose to invest in a single property holding when they might otherwise have wished to expand their property holding portfolio. The evidence from the *1997 RIS* is revealing. Among investor income units, 80.6% of all investor income units have only one investment property, while 15.8% have 2 investment properties with the remainder having three or more investment properties.

Stamp duties are levied by State Governments when real estate is purchased and are paid by the purchaser. While the rate of stamp duties is independent of any existing property holdings they still have the potential to reduce the number of properties held by landlords. From the perspective of a landlord who currently holds a property, stamp duties are sunk and so have no bearing on current decisions or the reservation rental rate[78]. From the perspective of a potential buyer, stamp duties represent an acquisition cost and consequently influence decision-making through their impact on the reservation rental rate.

4.3 Method

To examine the impact of Federal and State tax measures on investor incentives, we calculate K-F effective tax rates derived using the AHMM model.[79] The K-F effective tax rate is specified as:

$$t = \frac{r - s}{r}. \qquad (4.1)$$

Here r represents the pre-tax rate of return (r) on a rental investor's project and (s) the post-tax rate of return that can be paid on the savings used to finance the project.

King-Fullerton effective marginal tax rates are estimated for each of the following cases:

1. Current BWO allowance arrangements. The BWO rate is set at 2.5 per cent over 40 years. The tax benefit of the BWO allowance is partially offset under current tax arrangements as BWO allowances that the investor deducted from assessable income during the holding period, are

[78] Sunk costs do not effect current decisions because no current decision can change those costs.

[79] See Wood, Watson and Flatau (2002a) for details of how the AHMM model is utilised to derive the K-F effective tax rates used in this report.

subtracted from acquisition costs for capital gains tax purposes. The effect of this recapture provision is to increase the net capital gains chargeable to tax at the investor's marginal rate.

2. The original BWO arrangements. The building write-off allowance was originally introduced at a higher rate of 4.0 per cent over a write-down period of 25 years, and with no recapture on realisation.
3. A LIHTC is introduced (replacing the BWO allowance). Our AHMM model microsimulations are based on a tax credit that is offered at 4% of construction costs, without time limit, but conditional on weekly gross rents in the lowest gross weekly rent quartile. The tax credit is not recaptured on realisation and is extended to existing rental properties in the lowest weekly rent quartile, and newly constructed properties that are leased in this rent quartile. Under this scenario, many properties benefiting from the current BWO allowance will be ineligible for low-income housing tax credits.
4. Land Taxes and Stamp Duties. We examine the impact on an investor's K-F tax rate when an additional property is acquired.

The data used in this K-F effective tax burden AHMM model exercise is drawn from the *1997 RIS*. The *1997 RIS* survey contains detailed dwelling characteristic and financial information on the properties owned by current investors. These details were recorded for up to the six most recently acquired properties owned by the income unit. Investors who finance the construction of residential property for rent, or who purchase a newly constructed property for the purpose of making it available to lease or rent are entitled to deduct the BWO allowance from assessable income. There are 387 properties that were new when first rented out by investors.[80]

4.4 Building Write-off and Low Income Tax Credits K-F Effective Tax Rates

Table 4.1 provides summary statistics for the AHMM model cost components and for net rent on a property basis for the selected sample of 347 new dwellings, as estimated from the detailed financial records contained in the *1997 RIS*.

In our microsimulations, we set the expected rate of property price appreciation as a percentage point mark-up on the rate of consumer inflation. The rate of consumer inflation and mortgage rate of interest are set at the baseline values as explained in chapter 2, and as applied in chapter 3. The only difference here is the different baseline rate of capital appreciation (2.5%). The sensitivity of our results to alternative assumptions is explored by microsimulations conducted with a real rate of capital appreciation equal to minus 1%, plus 1% and 2%.

The tax credit is targeted on newly constructed rental investments in the lowest gross weekly rent quartile. A landlord investing in such a rental housing unit can take advantage of the tax credit regardless of their income, the occupant's income, or whether it is part of a multiple or single property portfolio. However, we assume that the tax credit is quarantined such that investors, who have retrospectively invested in properties ineligible for the BWO allowance, cannot realise these properties and re-invest the proceeds in a tax credit eligible property. On the other hand, investors who acquired BWO eligible rental investments above the weekly rent threshold are permitted to adjust their real estate portfolio to take advantage of the tax credit. Finally, landlords who invested in BWO eligible properties below the weekly rent threshold, will become eligible for the tax credit though they lose entitlements to BWO allowances.

There is an important difference between a tax allowance such as the building write-off allowance and a tax credit. A tax allowance is the same as a deduction in the Australian personal income tax system. Each dollar of the allowance reduces the claimant's taxable income by a dollar. The value of the allowance will then depend on the claimant's marginal income tax rate. At a tax rate of 40% each dollar of the allowance results in a $0.40 reduction in income tax. At a tax rate of 10% the tax reduction is $0.10. The building write-off allowance will be worth more to high tax-rate investors than it will to low tax-rate investors. A tax credit is the same as any credit in the Australian personal

[80] Background information on the rental investors holding these 387 properties, and a detailed description of the method used to construct relevant parameters for the microsimulations can be found in Wood, Watson and Flatau (2002a).

income tax system.[81] Each dollar of a credit reduces the income tax liabilities of the claimant by a dollar. The value of a credit is independent of the claimant's marginal tax rate.

The tax credit has an open-ended deduction period and is applied at the rate of 4 per cent of construction costs.[82] The spatially uniform rent threshold determining eligibility means that in high cost housing markets, it will be smaller properties with fewer amenities that qualify for the tax credit. In low cost housing markets, larger properties with more amenities will be eligible. However, the uniform rent threshold ensures symmetry with the rules determining eligibility to the demand side rent assistance program in Australia.

Table 4.1 Financial Characteristics of Rental Investment Properties[1]

	Mean	Maximum	Minimum
Annual Gross Rent	$9,922.64	$65,312	$1,560
	($8,732.36)	($65,312)	($0)
Estimated Market Value	$161,400	$762,000	$45,000
	($138,900)	($762,000)	($15,000)
Vacancies			
Reported (Weeks)	2.3	39	0
	(2.87)	(52)	(0)
Predicted (Weeks)	2.51	10.4	0.31
	(2.62)	(14.1)	(0.31)
Net Rent Cost Components			
Agents Fees	$902.99	$5,943.39	$141.96
	($794.66)	($5943.39)	($141.96)
Expected Maintenance[2]	1.91%	4.16%	0.12%
	(2.50%)	(8.97%)	(0.12%)
Land Tax	0.24%	2.16%	0%
	(0.21%)	(2.16%)	0%
Property Tax	0.73%	1.12%	0.18%
	(0.76%)	(1.12%)	(0.18%)
Body Corporate Fees	$176.56	$4,702.46	$0
	($130.59)	($4,702.46)	($0)
Mortgage Interest	$2,594.80	$37,435	$0
Payments	($2,378.27)	($37,435)	($0)
Other Property Cost Components			
Brokerage Fees	2.75%	3.63%	2.33%
	(2.41%)	(3.63%)	(2.33%)
Stamp Duties	2.6%	5.33%	1%
	(2.41%)	(5.33%)	(1%)
Building to Value Ratio	41.1%	78%	20%
	(42.7%)	(78%)	(20%)

[1] Values in parentheses are for the full sample of properties in the *1997 RIS* (1934 properties).
[2] Unless other wise stated statistics are as a percentage of estimated market value.

Table 4.2 presents estimates of the K-F effective marginal tax rate for different rates of real capital gain and loss over expected holding periods of up to 40 years. These estimates are based on a reference model in which no BWO allowance or tax credit is available.

For a relatively short holding period (5 years) and zero real capital gains, the K-F effective marginal tax rate is 66 per cent. The AHMM model microsimulation results show that K-F effective marginal tax rates fall with increases in the expected holding period and increases in the rate of real capital gains. If we take an extreme case in which landlords hold their rental property investments for 40 years, and benefit from an annual 2 per cent rate of real capital gain, the K-F effective marginal tax rate falls to 38 per cent. The preferential Federal tax treatment of capital gains relative to ordinary income ensures a fall in the effective tax burden at higher real capital gain appreciation rates. State

[81] The Australian Taxation Office has recently replaced the term 'rebate' with the term 'credit'
[82] Construction costs are measured in the same way as for building write-off allowances. This tax credit measure is much simpler than the low-income housing tax credit (LIHTC) in the US, where there is a complex set of rules governing eligibility (McClure, 2000). We have modelled a much simpler version because data limitations prevent us from incorporating the detailed US eligibility criteria into our analysis.

government stamp duties are amortised and this effect is stronger at longer holding periods, hence the fall in K-F effective marginal tax rates as holding periods lengthen. At higher rates of real capital gain, stamp duties become a more important component of the effective tax burden, and amortisation becomes correspondingly stronger. Furthermore, the lock-in effect with respect to capital gains taxes is more significant at higher rates of real capital gain (Gravelle, 1994, pp.136-140).[83] For these reasons, declines in K-F effective marginal tax rates with respect to holding period are steeper at higher rates of real capital gain.

Why are the K-F effective marginal tax rates reported in the previous paragraph so high when the top statutory marginal income tax rate is 47%? It is often forgotten that there are a large number of taxes, including State Government taxes, for which rental investor's are liable. These taxes, including property rates which we model as a tax rather than a user charge, all increase the tax burden on income from rental property.

Table 4.2. Mean King and Fullerton Effective Marginal Tax Rates (%) by Expected Holding Period & Rate of Real Capital Gain[1]

Expected Holding Period	Real Rate of Capital Loss = 1 per cent	Real Rate of Capital Gain = 0 per cent	Real Rate of Capital Gain = 1 per cent	Real Rate of Capital Gain = 2 per cent
5	70.5	65.5	58.5	47.7
10	69.7	64.3	56.5	44.2
15	69.4	63.8	55.6	42.4
20	69.3	63.5	55.0	41.1
25	69.2	63.3	54.6	40.2
30	69.1	63.1	54.2	39.3
35	69.0	62.9	53.7	38.6
40	69.0	62.9	53.7	38.0

[1] All estimates in this table are for the base tax system in which no BWO allowance or tax credit is present.

Tables 4.3 and 4.4 present our findings on effective tax burdens shouldered by landlords of newly constructed housing units in different value segments of the private rental housing market. Mean K-F effective marginal tax rates are computed in each quartile by gross weekly rent given a zero real capital gain in Table 4.3, and a rate of real capital gain equal to 1 per cent in Table 4.4.[84] An expected holding period of 10 years is assumed in both cases.[85] A number of important policy relevant implications can be drawn from inspection of these tables.

Consider first a comparison of the reference tax arrangements in column 4 and the current tax arrangements in column 5 of Table 4.3. The building write off allowance under current arrangements has little impact on effective tax burdens. The reduction in the sample mean K-F marginal tax rate is only 1 percentage point, from 64 per cent to 63 per cent. The small relief afforded by the allowance is due to its amortisation over the investor's holding period, substantial numbers of landlords in tax brackets lower than the top bracket, and its recapture under capital gains tax on realisation. Even if granted at a higher rate of deduction (4 per cent, instead of 2.5 per cent) and not recaptured, the impact remains small with mean rates falling by 3 percentage points

[83] Capital gains taxes are paid on realisation rather than as they accrue. By delaying realisation, taxes on capital gains accrued up to the current period are deferred. This contributes to the lock-in effect.

[84] A 1 per cent real rate of capital gain has been considered typical in Australian housing markets (Berry, 2000). Using quarterly house price indexes (Australian Bureau of Statistics, 2000, House Price Indexes, Cat. No. 6416.0) for the period June 1986 – June 2000 to estimate log-linear regressions of the exponential growth curve, we obtain the following estimates of the quarterly *real* house price appreciation rates in the six state capitals of Australia:

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart
0.69%	0.30%	0.66%	-0.19%	0.41%	0.23%

Nakagami and Pereira (1997, p.452) claim that zero real capital appreciation is historically a good approximation in the USA. Since actual experience in Australia varies considerably across the state capitals we conduct microsimulations at alternative rates.

[85] Burman and Ricoy (1997, p.5) find from tax file records that the typical sale of real estate or land was for an asset held 10 or more years. The mean holding period for real estate or land was 13.5 years.

to 61 per cent. Similar findings are reported at 1 per cent real capital growth in Table 4.4. Table 4.3 also shows that the contribution of state and local government taxes is around 8 percentage points in the reference tax model. However, the contribution is more significant at shorter holding periods. At a holding period of 5 years, for example, the contribution is 9.3 percentage points.[86]

[86] The contribution is larger because stamp duties are amortised over a shorter investment term.

Table 4.3 Mean King and Fullerton Effective Marginal Tax Rates (%) by Gross Weekly Rent Quartiles under Alternative Policy Settings, and Zero Real Capital Gains (b = Rate of BWO, c = Rate of Tax Credit)[1]

Gross Weekly Rent (1)	Mean Estimated Market Value (2)	Contribution to EMTR of State and Local Government Taxes[2] (3)	EMTR No building write-off allowance (4)	EMTR b=2.5% Recaptured (5)	EMTR b = 4% No Recapture (6)	EMTR Tax Credit c = 4% (7)	Excess Return (8)
$30 - $140	$104,000	8	61	60	57	41	-2.9%
$140-$165	$129,000	8	64	63	61	64	-2.8%
$165-$205	$159,000	7	65	64	61	65	-2.8%
$205-$1256	$254,000	8	67	66	64	67	-2.6%
ALL	$161,000	8	64	63	61	59	-2.8%

[1] Expected holding period = 10 years. All dollar figures are at 1996-97 prices.
[2] Percentage point contribution for the baseline case of no BWO allowance or tax credit. As stamp duties enter into the capital gains tax calculations there is some variation of this contribution under the different policy regimes.
[3] The excess return is measured as the difference between the market rental rate (gross rent divided by estimated market value) and the landlord's economic costs under the reference tax arrangements.

Table 4.4 Mean King and Fullerton Effective Marginal Tax Rates (%) by Gross Weekly Rent Quartiles under Alternative Policy Settings and One Per Cent Real Rate of Capital Gain Gains (b = Rate of BWO, c = Rate of Tax Credit)[1]

Gross Weekly Rent	Mean Estimated Market Value	Contribution to EMTR of State and Local Government Taxes[2]	EMTR No building write-off allowance	EMTR b=2.5% Recaptured	EMTR B = 4% No Recapture	EMTR Tax Credit c = 4%	Mean Excess Return[3]
$30 - $140	$104,000	12	52	51	47	20	-1.4%
$140-$165	$129,000	12	57	55	51	57	-1.3%
$165-$205	$157,000	11	57	56	51	57	-1.3%
$205-$1256	$254,000	13	60	58	55	59	-1.1%
ALL	$161,000	12	56	55	51	48	-1.3%

[1] See footnote 1, Table 4.3. [2] See footnote 2, Table 4.3. [3] See footnote 3, Table 4.3.

[87] The contribution is larger because stamp duties are amortised over a shorter investment term. At one per cent real capital growth and 5 year holding period the state and local government contributions are 12 percentage points.

An important focus of the present study is the impact of alternative tax arrangements in low-rent segments of the private rental housing market. Tables 4.3 and 4.4 demonstrate that under the baseline tax model (see column 4) effective tax burdens are somewhat lower in the lowest gross weekly rent quartile segment. But this differential is to be expected given that excess returns obtained by investors are slightly lower in this segment (see column 8), and the lower implicit marginal income tax rate of investors in this segment (at 27.2 per cent as compared to a sample mean of 30.2 per cent). In the low rent segment, as in all gross weekly rent quartiles, the impact of the BWO allowance is small, and will do nothing to alter the pattern of investment in favour of low-income rental housing (see columns 5 and 6).

But suppose we replaced the BWO allowance by a targeted tax credit. In the lowest rent quartile, K-F effective tax rates are lowered from 61(52) per cent (reference tax model) to 41 (20) per cent given zero (one per cent) real capital growth (see columns 4 and 7). The tax credit has a potentially powerful incentive effect in helping to retain low-income rental housing; ceteris paribus, the excess rate of return at zero real capital gains increases by 2.46 percentage points from –2.9 per cent (see column 8) to –0.4 per cent. Thus the typical investor holding tax credit eligible properties earns an after-tax return almost equal to that obtained on saving at the market rate of interest, even when rates of capital appreciation merely match the rate of inflation. At a 1 per cent real rate of capital gain the typical investor now earns positive excess returns of 0.9 per cent.

Table 4.5 Percentage of Investors who Realise Existing Ineligible Property Investments by Nominal Rates of Capital Appreciation, and Number of Years Before the Eligible Property Realised[1]

N(Years)	1.5%	2.5%	3.0%	3.5%
5	65.9%	64.5%	64.1%	25.2%
10	100%	100%	99.7%	36.6%
15	100%	100%	100%	47.9%
20	100%	100%	100%	49.3%

1 The sample is 290 properties with a weekly rent in the highest three quartiles.

Using the population weights in the *1997 RIS*, we estimate that the first year Australian federal tax revenue loss from introduction of the targeted tax credit (at 1996-97 prices) would be $42.1m. If the current BWO allowance arrangements were abolished we estimate a first year compensating tax revenue gain of $37.3m.[88] The package of measures would then be approximately revenue neutral in the years over which there is a BWO allowance entitlement, and would have minor impacts on the effective tax burdens of investors in tax credit ineligible properties; however, by targeting the tax credit there is a large reduction in the tax burden for investors in newly constructed and existing units affordable to low-income Australian households.

This analysis assumes no displacement effects that could arise as a result of investors adjusting their real estate portfolios to take advantage of targeted tax credits. The tax credit could serve to both retain existing real estate investments in the low rent segment and attract new investors into the segment.

Displacement effects are addressed by analysing whether a landlord that had invested in a newly constructed tax credit ineligible housing unit, would find it financially worthwhile to switch into a tax credit eligible property investment.[89] We make the following assumptions;

- An investor holding a tax credit ineligible property in period T (and who acquired this property in period 0) would continue to hold the property for N years, giving a total holding period of T+N years. Building write-off allowances can no longer be claimed.
- If the investor realises her current real estate investment in favour of an eligible property investment, the new property investment would be realised in N years. Building write-off

[88] We assume that recapture of retrospective building write-off allowances under capital gains tax provisions is unchanged given that proceeds are not re-invested in tax credit eligible properties.

[89] The tax credit is quarantined such that landlords, who had retrospectively invested in building write-off ineligible properties, are unable to realise these investments and reinvest the proceeds in a tax credit eligible property (see page 12).

allowances that have been claimed over the T year holding period are not then recaptured under capital gains tax provisions.

- Real estate investments are perfectly divisible[90].
- Operating costs (maintenance, management expenses), property taxes and land taxes per dollar of market value are uniform across eligible and ineligible property investments.

Consider an investor who under these assumptions realises her current tax credit ineligible property investment in favour of tax credit eligible investments of the same capital value. The financial inducement is the present value of tax credits over the N year holding period. But there is a financial cost, which includes the stamp duty payable on the eligible property investments, and acceleration in the payment of capital gains taxes on capital gains accruing from period 0 to period T. These tax liabilities would have been paid in year T+N if there had been no portfolio adjustment. There is, therefore, an overall increase in the present value of capital gains tax liabilities. In addition, a brokerage fee is payable. Without portfolio adjustment, brokerage fees would be equal to the present value of fees payable on the sale proceeds from the property in T+N years time. But in the event of portfolio adjustment there is in addition a brokerage fee payable on the sale proceeds from the existing property.

The portfolio adjustment condition that must be satisfied if real estate portfolio adjustment is to be worthwhile can be written as:

Present value of tax credits > Stamp duties *plus* The increase in the present value of accrued capital gains tax liabilities and brokerage fees.

Table 4.6 The Number and Percentage of Investors who Realise Existing Ineligible Property Investments by the Number of Years the Existing Property has been Held[1]

Holding Period	Number of Properties	Percentage Switching
0-2 Years	72	74.2%
3-5 Years	31	24.0%
6-8 Years	3	7.9%
9+ Years	0	0%
Total	106	36.6%

[1] The sample is 290 properties with a weekly rent in the highest three quartile. The nominal capital appreciation rate is 3.5% and the holding period for the eligible property (N) is assumed to be 10 years.

Table 4.5 presents the percentage of currently ineligible investors who will find it financially advantageous to invest in eligible properties at alternative values of the holding period (N) and nominal capital appreciation. All investors with N $\geq$ 10 years will switch to eligible investments at low rates of nominal capital appreciation of 2.5 per cent or less, because the gain from deferring capital gains tax liabilities is insufficient to outweigh the financial advantages offered by tax credits. At nominal rates of capital appreciation of 3.0 per cent or 3.5 per cent deferring accrued capital gains tax liabilities becomes more appealing, and the proportion of investors willing to adjust their portfolios falls below 100 per cent. At N= 5 years and nominal capital appreciation of 3.5 per cent only one-quarter of investors will find it financially worthwhile to substitute eligible for ineligible real estate investments. Deferring capital gains is more financially attractive the longer an ineligible property investment has been held. In Table 4.6 we assume N = 10 years and that nominal capital appreciation is equal to 3.5 per cent. All investors who have held their ineligible properties for 9 years or more find portfolio adjustment financially unattractive, and will continue to hold those property investments at these parameter values. On the other hand, recent investors who have held their ineligible properties for 2 years or less typically find portfolio adjustment attractive, with 74 per cent switching in favour of tax credit eligible property investments.

[90] By assuming the divisibility of real estate investments we are assuming that a high weekly rent property can be sold and all sale proceeds reinvested in low weekly rent property. This assumption simplifies the analysis as we do not need to account for the use of 'left-over' funds as we would if we assumed that real estate investments were indivisible.

If we include these displacement effects into our tax expenditure budget estimates we no longer have a tax neutral package. Assuming that nominal capital appreciation is equal to 3.5 per cent and N = 10 years there is a first year tax revenue increase of $188.1 million, a figure that takes payment of taxes on accrued capital gains and stamp duty into account, as well as the tax revenue gain on removing BWO allowances. The tax revenue foregone because of the introduction of the targeted tax credit is now $125.4 million, leaving a net revenue gain in the first year of $62.6 million. The capital gains tax and stamp duty receipts are non-recurrent revenue gains in the year of portfolio adjustment. On a recurrent basis there is net revenue loss of $88.1 million per annum at 1996-97 prices. This is a relatively low figure in view of the approximately $1 billion cost of rent assistance programs in Australia in 1996-97 (Wulff, 2000, p15). Moreover, we consider this to be the upper limit to estimates of tax revenue forgone with respect to investments in newly constructed properties, because the assumption of uniform capital appreciation, operating costs, land taxes and property taxes is unrealistic.[91]

4.5 Land Taxes and Stamp Duties

In chapter 2, it was noted that in a competitive rental housing market, we would expect that investors subject to high tax rates should hold most, if not all, rental property. The higher is the landlord's tax rate, the lower are their economic costs. These high tax rate investors are then able to provide rental housing at a lower cost than landlords with lower tax rates. Previous research on the characteristics of Australian rental investors (Wood and Watson, 2001) using the *1993 RIS* found that only 10.8% of landlords face marginal effective tax rates equal to or greater than the top statutory tax rate in Australia. In light of this finding, the reasons why low cost landlords do not dominate rental housing in Australia deserve to be explored as they imply higher rents and a less affordable rental housing stock than might otherwise be the case.

One possible explanation for the low proportion of high tax rate landlords noted above is that multi-property landlords are relatively uncommon: 80.7% of all landlords have only one investment property. If high tax rate investors dominated the rental housing market we would expect to see a higher proportion of multi-property landlords as high tax rate investors increased their property holdings. This section examines whether state government taxes such as land taxes and stamp duties place multi-property landlords at a cost disadvantage relative to single property landlords.

Land taxes are periodic taxes levied by State Governments on land that is used for commercial purposes including residential rental properties. Two features of land tax regimes may place multi-property landlords at a disadvantage, and provide an explanation for why multi-property landlords are less common than might be expected. First, land taxes are levied on the total value of commercial land owned by the investor rather than on the basis of individual properties. Second, land tax schedules are generally progressive in nature with the rate at which the tax is calculated rising as the value of the investor's land portfolio increases.

As an example, consider a land tax regime in which land taxes are levied at the rate of 1% of land value up to $100,000 and at a rate of 2% on any excess over this amount. An investor (investor A) holding one property with a land value of $90,000 will then pay $900 per year in land taxes. If the investor adds another property with a land value of $90,000 to their portfolio annual land taxes on the additional property will be $1,700. A potential investor (investor B) who does not currently hold any commercial property could acquire the same property and would pay only $900 per year in land taxes on the property.

Stamp duties are levied by state governments on both the conveyance of residential land and on financing instruments used to facilitate the exchange, such as mortgages secured for the purposes of purchasing dwellings. This charge represents a further disincentive to the acquisition of an additional rental property. While the stamp duties charged on the purchase price of an additional property are independent of the value of properties already held by a landlord they can still present a barrier to the acquisition of rental properties by low cost landlords. If high tax bracket investors

[91] We know from evidence reported in Wood and Watson (2001) that these costs and taxes (per dollar of capital value) are typically higher in the low rent housing stock, which is one reason why excess returns are lower in this segment of the stock. Furthermore, Wood and Yong (2001) have developed a tax clientele model of housing markets a corollary of which is that currently low rent or market value properties will exhibit relatively low rates of capital appreciation in the future. Both observations strengthen the case for tax credits in order to promote the stock of housing affordable to low-income households.

have a marginal reservation rental rate on incremental property investments, that exceeds the reservation rental rate of lower tax bracket investors on their existing property investments, 'cost inefficient' investors can survive. If the relatively high marginal reservation rates of high tax bracket investors is due to state taxes, the latter can be considered an impediment or market imperfection. This observation is different to the observation made with respect to land taxes on the previous page where the problem was the discouragement of the expansion of rental housing supply by least cost landlords. Here, we are noting that a barrier to the trading of the existing supply of the rental housing from high cost investors to least cost investors may exist.

Consider the impact of stamp duties on the economic costs of two income units, one who holds a property (landlord A) and the other who is seeking to purchase that property (landlord B). Stamp duties are levied at the rate of 1% of property value and the property is worth $100,000. From the perspective of the current landlord (A), the stamp duties paid at the time the property was purchased do not add to their current economic costs.[92] They are a sunk cost and have no bearing on future decisions. However, for the intending purchaser (B) who will incur stamp duties of $1,000 if they purchase the property there is a direct impact on the economic costs of the potential investment in the rental property. The effect of stamp duties is to create inertia with respect to the trading of properties by increasing the costs of potential buyers relative to an existing owner.

To investigate barriers to the emergence of multi-property landlords created by stamp duties and land taxes, we again calculate King and Fullerton effective tax rates. We first calculate the K-F tax rate for properties held by landlords reported in the *1997 RIS*. We then calculate the KF tax rate that would apply to an additional rental investment. A comparison of the K-F tax rates on existing holdings and on the additional rental property is then made.

We assume that the landlord acquires an existing 3 bedroom, separate house whose current market value, and building to value ratio, are equal to the median values in the geographic market segment (state and non-metropolitan or metropolitan area) in which the investor resides.[93] Given the current market value and the building to value ratio we then calculate the unimproved site value of the hypothetical additional rental property. The unimproved site value is the freehold market value of the land in that use yielding the highest return but disregarding the value of improvements that are separable from the land.[94] Improvements to the land that are included in the calculation of the unimproved site value include items such as earthworks and drainage. The rates applied vary between states both in terms of their level and the number of value bands used to determine the applicable land tax liabilities. Rates of land tax are levied on the total value of all eligible properties held by the investor and are progressive with respect to the aggregate unimproved site value. Stamp duties on conveyance are calculated using the appropriate state schedules. The full sample of properties is used in the analysis of land taxes and stamp duties.

Simulations are conducted using the baseline values for the rate of nominal capital gain (3.9%), the general inflation rate (2.5%), the interest rate (7.2%) and the holding period (10 years). Mean K-F tax rates reported below will differ slightly from those reported for the owners of newly constructed properties in the discussion of building write-off allowances due to the difference in the nominal capital gains rate used in the simulations. Mean K-F tax rates will also differ because the owners of properties that were not newly constructed when purchased do not qualify for building write-off allowances.

---

[92] Stamp duties paid on acquisition do enter into the current owner's economic costs by reducing the value of accrued capital gains tax liabilities as they are added to the purchase price and reduce taxable capital gains. This effect has been ignored as it is small.

[93] Assumptions about the dwelling structure are necessary because our method of estimating property taxes uses these variables. We assume that the property is not newly constructed so that building write-off allowances are not claimed on the existing property. Certain State Governments provide some concessions on land taxes for non-metropolitan properties so the division into geographic market segment is necessary to capture the effect of these policies. A building to value ratio is needed to calculate the unimproved site value on which land tax liabilities are calculated.

[94] Zoning restrictions in relation to permissible forms of commercial use of land limit the choices from which this 'use yielding highest return' can be calculated.

Table 4.7 presents the results of this analysis for the 1533 income units in our sample by the number of properties held at the time of the *1997 RIS*.[95] 80.7% (1237) of all investor income units have only one investment property, 15.7% (241) have 2 investment properties and 3.5% (53) have 3 investment properties. 2 income units have 5 investment properties and this group are excluded from Table 4.7. The existing property column reports the K-F tax rate on properties currently held by the income unit[96]

The K-F tax rates exhibited in Table 4.7 show the effect of land tax and stamp duty charges when an additional property is acquired by an investor. The first point to note is that the average K-F tax rates on existing properties increases with the number of rental properties held by a landlord. This reflects the progressive nature of land tax schedules and the application of the rates to the total value of residential rental land that the investor owns. The additional impost of stamp duties on intending investors is also noticeable when the K-F tax rates for the existing property holding are compared against the K-F tax rate on an additional property. Average K-F tax rates increase from 0.479 for a single property to 0.521 for three properties, a difference of 4.2 percentage points. The acquisition of an additional property involves the payment of stamp duties so that when an investor with a single property acquires a second property the K-F tax rate increases to 0.509 (an increase of 3 percentage points). For an investor who currently holds 3 rental properties acquiring an additional property result in a 6 percentage point increase. K-F tax rates are, on average, 0.3 of a percentage point (0.509 minus 0.506) higher for an investor with a single property considering purchasing a second property relative to that of an investor who currently has 2 rental properties. In the case of an investor considering purchasing a third property the difference between their K-F tax rate and that of an investor with 3 existing properties is 3.2 percentage points (0.553 minus 0.521). Finally, an investor acquiring a fourth property faces an average K-F tax rate of 0.581, 10.2 percentage points higher than an investor holding just one property.

Table 4.7 Mean K-F Tax Rates on Current and Additional Rental Investment Properties

	K-F Tax Rate		
Number of Properties	Existing Property (1)	Additional Property (2)	Percentage Point Increment (2) – (1)
1	0.479	0.509	3
2	0.506	0.553	4.7
3	0.521	0.581	6

As the land tax schedules and concessions on land tax liabilities vary by state, Table 4.8 presents results for single property landlords (1237) by state and area. Results are presented for the K-F tax rate on the existing property and the K-F tax rate on the additional property. We have omitted multi-property landlords from the table due to the small numbers in many state/area divisions.

The influence of specific characteristics of state based legislation is obvious from the results in Table 4.8. In NSW and Victoria landlords pay land tax when the aggregate unimproved site value of their holdings exceed thresholds of $176,000 and $85,000 respectively. Above these thresholds, investors in NSW pay $100 plus 1.85% of the excess of value over the threshold. In Victoria, landlords pay no more than 0.5% of the excess over the threshold, as long as the aggregate unimproved site value remans below $675,000.

The effect of any disincentive on the part of land taxes to the emergence of multi-property landlords is at its strongest in metropolitan NSW, where relatively low building to value ratios and relatively high property values, interact with the structure of land tax schedules.

[95] Converting the data to an income unit rather than a property level avoids double counting of tax liabilities where an income unit currently owns two or more properties.

[96] Where an income unit currently holds more than one property the KF tax rate reported is the average rate on the investor's portfolio.

Table 4.8 Mean K-F Tax Rates by State[1]

		N	Existing Property	Additional Property
NSW				
	Capital City	129	0.4978	0.5848
	Rest of State	80	0.4380	0.4659
VIC				
	Capital City	169	0.4910	0.5055
	Rest of State	50	0.4660	0.4814
QLD				
	Capital City	149	0.4697	0.4929
	Rest of State	153	0.4311	0.4493
SA				
	Capital City	100	0.4649	0.5000
	Rest of State	30	0.4571	0.4725
WA				
	Capital City	131	0.4796	0.5006
	Rest of State	59	0.4510	0.4811
TAS				
	Capital City	26	0.5178	0.5352
	Rest of State	37	0.5018	0.5839
ACT/NT		124	0.5496	0.5875

1. Results reported in this table are for landlord income units with one rental property.

How great is the disincentive to the emergence of multi-property, low cost landlords created by land taxes and stamp duties? In NSW, for a single property investor in Sydney the K-F tax rate on an additional property is almost 9 percentage points higher than that on the existing property. This represents a 17.5% increase in the tax burden. In Victoria, a Melbourne based single property investor has a K-F tax rate that is 1.45 percentage points higher on an additional property, a 2.95% increase. In Queensland, the percentage point increase is 2.32 percentage points. Despite the significant difference between NSW and its two neighbouring states the proportion of multi-property landlords in each is very similar at just over 19% of all rental investors which might suggest that these differential tax burdens are unimportant.

4.6 Concluding comments

Growing concern about a lack of rental housing affordable to low-income Australian households has prompted consideration of possible policy interventions. In this Chapter we consider the use of tax expenditure measures as a means of promoting the supply of such rental housing. Under current tax arrangements BWO allowances are granted to all investors in newly constructed rental housing. We contrast this tax expenditure measure with a tax credit that is targeted on rental housing affordable to low income households.

King-Fullerton (K-F) effective marginal tax rates are estimated using the detailed financial records of investors who financed the construction of 387 rental-housing units. We find that BWO allowances have a small impact on K-F effective marginal tax rates. More importantly, in the context of this chapter, these allowances will do nothing to divert investment into low-income rental housing.

These findings are contrasted with those obtained from estimation of K-F effective marginal tax rates under a targeted tax credit. Not surprisingly, a targeted tax credit provides a financial incentive for rental investors to consider the low-income rental segment of the housing market. What our results show, however, is that the financial incentive from a targeted tax credit is particularly strong. Existing investors in low-income rental housing will find that their effective tax burdens are cut by one-third or more depending upon rates of capital appreciation. This is a substantial inducement to the retention of existing real estate investments in this segment of the

market. A feature of our analysis is the incorporation of displacement effects. The lower effective tax burdens and boost to after-tax returns from a targeted tax credit will prompt some investors to realise ineligible properties in favour of investments in eligible properties. We estimate that such displacement effects could be sizeable. Even if investors expect to hold eligible properties for only 5 years, the portfolio adjustment is financially favourable (given 1 per cent real capital appreciation) to almost one-quarter of those investors currently holding ineligible properties, though this figure does assume that operating cost parameters are uniform across the housing stock.

In view of the substantial impact on the incentive to invest in rental housing affordable to low-income households and its relatively small budgetary impact, the targeted tax credit measure deserves serious consideration by Australian policy makers.

The results on Land Taxes and Stamp Duties provide mixed evidence on the extent to which land taxes and stamp duties prevent the emergence of multi-property landlords. Clearly, the structure of land tax schedules and the need to take into account the stamp duties paid on acquisition in cost calculations, places potential multi-property landlords at a cost disadvantage relative to existing single property landlords. However, interstate variation in the K-F tax rates facing an investor considering adding another rental property to their portfolio do not seem to be reflected in the proportion of multi-property landlords observed in each state. Further research is needed to identify why this variation in K-F tax rates does not lead to the difference in the proportion of multi-property landlords that we might expect.

CHAPTER 5 PROMOTING ACCESS TO HOME OWNERSHIP

5.1 Introduction

In chapter 3 above, we found convincing evidence of a considerable latent demand for homeownership. Of the 4203 tenants in our sample, we estimate that 2793 (66%) would find homeownership cheaper than renting but borrowing constraints impede access. Government interventions that can promote access to homeownership do then have the potential to lift homeownership shares in the short run, particularly if they are targeted in such a way that they relax borrowing constraints.

In this chapter we look at two direct interventions of this kind. These are the First Home Owner Grant (FHOG) and Housing Partnerships (HP).[97] The former were introduced by the Federal government on 1st July 2000 to offset the impact of the introduction of the goods and services tax. The latter is a blueprint for expanding homeownership via equity partnerships between housing consumers and financial institutions.

FHOG was initially set at $7000 and eligible housing consumers include any income units who have never owned a home prior to 1st July 2000.[98] The grant is not means tested but the eligible home must be occupied by the successful applicant as their principal place of residence. On 9th March 2001 the government announced an increase in the grant to $14000 for first homeowners who build their home, or purchase a newly constructed home. From 1st January 2002 until 30 June 2002 the grant was scaled back to $10000, and since 1st July 2002 the grant has been wound back to its initial $7000 value.

In a housing partnership arrangement the government or a financial institution offers to take an equity stake in a home purchase. The housing consumer is the *managing partner* who retains ownership rights with respect to the timing and type of improvements and the timing of any decision to sell. As the *limited partner* the government or financial institution offers to take a percentage equity stake. In return, the managing partner agrees to forgo a pro rata percentage share of capital gains (on realization) that is a return on the limited partner's equity stake. In the arrangements envisaged by Caplin, Chan, Freeman and Tracy (1997) a secondary market in equity shares develops, so that the originators of equity shares can bundle them up and on sell them to intermediaries who issue securities backed by the equity shares. The housing partnership allows homebuyers to divorce decisions about how much housing to consume from decisions about the value of housing assets to hold in wealth portfolios. This sort of arrangement can be, but need not be, targeted on first homebuyers. In this study we assume that Housing Partnerships (HP) are only offered to income units who have never previously owned a home. The Prime Minister announced in September 2002 the creation of a task force, based at the Menzies Research Centre, who would examine the feasibility of housing partnership arrangements between financial institutions and housing consumers.

We use our AHMM model to estimate the number of potential first homebuyers who find FHOG and HP attractive because they either make homeownership cheaper than renting, and/or because they relax borrowing constraints.[99] A key aim here is to gauge the extent to which these interventions can satisfy the latent demand for homeownership. A range of other interesting issues is addressed. An important objective of FHOG, and a potentially significant benefit from HP, is stimulation of the housing construction industry and the wider economy. These macroeconomic benefits are boosted if FHOG and HP promote homeownership and *new household formation.* This is because the housing demand prompted by new household formation requires a net addition to the stock of housing, by either new construction or conversion. In addition new households typically require furnishings and white goods on moving into the house they have purchased. Our

[97] Housing partnerships can also be referred to as equity splitting arrangements, home reversion plans, equity loans, and shared homeownership programs.

[98] For details see http:/www.firsthome.gov.au

[99] This means that we ignore the question of whether HP would appeal to financial institutions in Australia. It also means that we do not ask whether such arrangements will appeal to existing homeowners. Arguably HP would have the greatest appeal to older asset rich income poor homeowners. This is the subject of a research project for which funding is currently being sought.

estimates include a measure of the number of new households among those income units we forecast will take up FHOG and enter HP.

The view that FHOG and HP will result in 'cream-skimming' is also addressed. The term 'cream-skimming' is borrowed from labour market analyses of training programs targeted on the unemployed. If programs typically select unemployed persons who would have found jobs in any case, they are said to be 'cream-skimming'. FHOG and HP result in 'cream-skimming' if they largely benefit income units who would eventually become homeowners in their absence. A closely related hypothesis is that FHOG and HP will contribute to tenure polarisation because these interventions will typically attract 'better-off' young, well-educated professionals, leaving rental tenures increasingly dominated by older lower-income groups with marginal or no attachment to the labour force. The 'other side of the same coin' is represented by the trickle down hypothesis. If FHOG beneficiaries and HP participants are typically 'better-off' tenants, and substantial numbers of them vacate low rent housing, there will be an improvement in the supply of rental housing affordable to low-income tenants. A related issue is to what extent FHOG are regressive. Do the majority of FHOG applications come from income units who already enjoy higher incomes and standards of living? A final issue is the important one of where FHOG and HP participants are buying. We explore whether there are spatial variations in their forecast incidence, and whether purchases are likely to be concentrated at the lower value end of the home purchase price spectrum[100].

5.2 Method

Impacts are measured by comparing the microsimulation model's tenure assignment of housing consumers under a reference system without FHOG or HP, and the assignment when FHOG and HP are made available given key parameters are set at baseline values. The interventions will impact on relative price and borrowing constraint assignment rules in the model.

Consider first the effect FHOG have on relative prices. The grant is a subsidy that will lower the annual economic cost of housing once a housing consumer becomes a homeowner. In interpreting its effect it is important to recognise that the grant is not a recurrent sum advanced each time a home purchase is completed, as is the case with say transaction costs. The grant is then received on purchasing the first home but not on successive home purchases. To measure its impact on annual economic costs it should then be spread over the period a first home purchaser expects to be an owner-occupier. It is evident that the first homeowner's grant will have little impact on the annual economic costs of young first homebuyers who expect to remain in owner occupation for the rest of their lives.[101]

The grant is more likely to have a significant impact on borrowing constraints. If the latter are binding, the FHOG is taken into account by subtracting the grant from the optimal housing consumption that has been estimated for the income unit. So, for example, if we estimate that a first homebuyer's optimal housing consumption requires purchase of a $100,000 home the minimum deposit requirement is $10000, given a maximum loan-value ratio of 90 per cent. Without a grant the housing consumer must have at least $10000 in accumulated liquid assets. With a grant we add estimated liquid assets to the maximum permitted loan ($90000 in this case), and calculate whether this sum exceeds the optimal housing consumption net of the grant ($93000 given a grant of $7000). The constraint is relaxed if this condition is satisfied.

Now suppose that a tenant can meet deposit requirements but faces a binding repayment constraint on a mortgage of $90000. With a FHOG of $7,000, the effective purchase price is now $93,000, and loan repayments must now be met on a mortgage of $83,700 (90 per cent of $93,000) instead of $90,000. Income units who have not previously been owner-occupiers are entitled to FHOG regardless of income or wealth holdings. The housing tenure careers of income units is not established by the SIHC; we have assumed that tenant income units with reference

[100] In this report 1996/'97 values are obtained by deflating the FHOG using the CPI. In future research exercises we deflate the grant using house price deflators for each capital city and this will improve our analysis of the spatial impacts of FHOGs.

[101] We assume that receipt of the first homeowner's grant leaves the loan-value ratio unchanged. The grant allows housing consumers to hold more liquid assets in their wealth portfolio, and still purchase their desired housing for consumption purposes.

persons older than 34 years have previously been homeowners and are not therefore eligible for assistance under the FHOGS.[102]

Now consider the effect that a HP will have on the relative price assignment criteria. Wood, Watson and Flatau (2002b) demonstrate that there are complex impacts. The housing consumer's annual economic costs (bid rents) are lowered because he no longer has to meet financing costs on the equity stake acquired by the limited partner, but he is able to enjoy the imputed stream of rents from the limited partner's share of the property. Offsetting this is the limited partner's pro rata share of capital gains that the managing partner must hand over on sale of the property. Consider Table 5.1, which calculates the hypothetical bid rents of two housing consumers where the key parameter values are the same as those chosen to calculate bid rents under conventional financing arrangements in chapter 2 (see Table 2.2). The table imagines a variant of the partner arrangement in which the limited partner acquires a 50 per cent equity stake at par value, and receives a pro rata share of capital gains each year.[103]

Table 5.1 Housing Partnerships and Bid Rents: Hypothetical Cases [1]

	Housing Consumer X	Housing Consumer Y
Property Value $(1)	100,000	100,000
Marginal Tax Rate (MTR) % (2)	47	20
Interest Payments on Debt $ (3)	1050	1050
After-tax return sacrificed on equity $ (4)	1034	1560
Financing costs $ (5) = (3 + 4)	2084	2610
Accrued MP[2] Capital Gain $ (6)	1000	1000
Accrued LP[3] Capital Gain $ (7)	1000	1000
Operating Costs $ (8)	2500	2500
Economic Cost (Bid Rent) $ Partner Finance (9) = (5 - 6 + 7 + 8)	4584	5110
Economic Cost (Bid Rent) $ Conventional Finance (See Table 2.3)	4667	5720

[1] It is assumed that the limited partner (housing consumer) has a loan – value ratio of 0.35 with respect to the 50 per cent they finance, and the interest rate for borrowing and saving is 6%. The mortgage loan is not amortised. Operating costs and capital gains are 2.5% and 2% respectively of property value. Depreciation and transaction costs are ignored, as are a minor component of economic costs, which is the tax benefit due to erosion of the real value of outstanding debt.
[2] Managing Partner.
[3] Limited Partner.

For the high tax bracket consumer, financing costs fall from $4167 under conventional financing, to $2084 under the partnership arrangement, a reduction of one-half. The low tax bracket consumer's financing costs also benefit from a reduction to one-half their previous level (to $2610), however since the after-tax return sacrificed on equity is higher, the absolute size of the reduction is larger. But there is an offsetting impact on economic costs. Both consumers must give up a pro rata share of capital gains to the limited partner, which in both cases involves a $1000 payment. The net impact is decrease in the economic costs (bid rental rates) of both housing consumers, but the decrease is greater for the low tax bracket consumer suggesting that HP are more likely to appeal to lower income tenants.

It turns out that economic costs as a housing partner are typically lower than as a conventionally financed home purchaser.[104] Furthermore, economic costs as a housing partner decrease with the

[102] The ABS *1999 Australian Housing Survey* reveals that of the 692 first home buyers who purchased their home after 1997, 67.2% of reference persons where under 35 years of age at the time of the survey. The results are not sensitive to a relaxation of this assumption. An analysis based on probabilities of having been an owner-occupier classified by age cohort, generates predicted homeowner shares of 45.6% (at $7000 FHOG) and 53.2% (at $14000 FHOG). This is close to predicted shares using the simpler assumption that first homebuyers must be younger than 35 years (see Table 5.2). See appendix 4 for details.
[103] In fact, the limited partner's share of capital gains are paid on sale of the home, along with their equity stake. With a 50-50 HP arrangement, this assumption simplifies the arithmetic without affecting the conclusion.
[104] At extremely high rates of capital gain high tax bracket consumers can find that economic costs are greater under housing partnerships than conventionally financed home purchase.

limited partner's share.

If relative prices are the sole determinant of the HP decision, eligible housing consumers will be willing to accept any limited partner share that is sufficient to relax the most binding borrowing constraint. This, of course, ignores potentially important caveats. Asset portfolio considerations may deter a housing consumer from entering a housing partnership when the limited partner's share has to be very high in order to satisfy the most binding constraint. Financial institutions could be unwilling to offer high limited partner shares because they fear that blunter managing partner incentives will deter maintenance of the property. Finally, financial institutions may also be unwilling to offer par value for an equity stake. The microsimulations reported below put these qualifications to one side. Other factors, such as the higher anticipated transaction costs associated with HPs have also been ignored. Further research is contemplated (see Chapter 6). Assignment rules governing projected take-up of HPs are applied to those eligible housing consumers assigned to the rental tenancy by the microsimulation model, and their application is operationalised by finding the minimum limited partner share at which the most binding borrowing constraint is relaxed. Consider the following example. An income unit wishes to purchase a $100000 home and has sufficient income to meet repayments on a $90000 mortgage, but only has $6000 in liquid assets and cannot therefore meet the $10000 deposit requirement. Assuming the same deposit requirement on the managing partner's share, the minimum limited partner share that will relax the deposit requirement is $40000. At this equity splitting arrangement the managing partner can finance his share with a $54000 loan and a $6000 deposit.

On calculating the minimum limited partner share (MLPS), a bid rental rate is computed under partnership arrangements, which assumes that a financial institution or government body is willing to take an equity share at the MLPS. If this bid rental rate is greater than the market rental rate, the income unit is assigned to the rental tenancy, because renting is cheaper than purchase under partnership arrangements. If less than the market rental rate the income unit is assigned to homeownership, as he will find it financially worthwhile to enter HP. We are then able to estimate the number of tenant income units who enter partnership arrangements, and the impact this has on the rate of homeownership. Comparisons can also be drawn with FHOG, which we now analyse.

5.3 First Home Owner Grants: Impact Analysis

Simulations conducted using the AHMM model indicate that the percentage of all income units who find homeownership cheaper than renting increases from 72.9% to 74.2%, or by 1.3 percentage points, when FHOG is set at $7000. If FHOG is doubled to $14000 the share increases to 75.2%, which is only 2.3 percentage points higher. The relative price effect is muted because the grant is amortised over the period of time an income unit expects to be a homeowner.[105] Once account is taken of the impact that FHOG has on borrowing constraints a different picture emerges. Under the reference system, where there is no FHOG, the AHMM microsimulation model estimates that 44.5% of all income units satisfy both relative price and borrowing constraint hurdles and are hence assigned to homeownership. This share rises by 0.8 percentage points to 45.3% when the FHOG is set at $7000 (see Table 5.2). A doubling of FHOG to $14000 has a more than proportionate impact with the share now increasing by 6.4 percentage points to 50.9%, or by 601 income units. This represents a market penetration rate of 12% of all income units assigned to the rental tenures (5151) under the reference system.

A FHOG of $7000 has a relatively small effect because it offers insufficient assistance in relation to binding borrowing constraints. So, for example, the mean deposit requirement for eligible tenants bound only by the wealth constraint is $10,758 yet the estimated mean liquid assets of those tenants are just $1,260, a mean deposit gap of $9498. The $7000 grant is insufficient to bridge this mean deposit gap, but the $14000 grant does so with a margin of $4502 to spare. The buoyant residential construction figures in the period following introduction of the $14000 FHOG are consistent with these findings.[106]

[105] The mean bid rental rate of eligible tenants decreases from 5.54% to 5.21% when FHOGS is set at $7000, and to 4.89% when FHOGS is set at $14000.

[106] Information provided by the West Australian Department of Housing and Works shows that applications for the $7,000 First Home Owner's Grant averaged 1460 per month over the period July to December 2000. For the same period in 2001 under the $14,000 grant applications averaged 2091 per month. Applications for

Table 5.2 Number of Income Units and Share of All Income Units Assigned to Homeownership After Application of Relative Price and Borrowing Constraint Assignment Rules

	Number of Income Units	Increase in Number of Income units[1]	Share %	Percentage Point Increase in Share %[1]
Reference System	4125	N/R	44.5	N/R
$7000	4198	73	45.3	0.8
$14000	4726	601	50.9	6.4

1 By comparison to reference system.

Almost one-half of those income units forecast to take up FHOG at $7000 and $14000 were in shared dwelling arrangements, and are therefore forming a new household when using the grant for home purchase. This is a key finding as it confirms that FHOG will have a significant stimulatory impact on aggregate demand in the economy. A second noteworthy finding about previous living arrangements is that FHOG holds little appeal to public housing tenants.

Table 5.3 analyses the factors that trigger a change in assigned tenure due to FHOG. The relative price effect row presents the number and per cent of income units whose assigned tenure has changed because FHOG now makes homeownership cheaper than renting. It is likely that these income units would remain tenants in the absence of FHOG. They represent a small minority of those whose assigned tenure changes as a result of FHOG. The remaining rows represent income units who are credit constrained; they find homeownership cheaper even without FHOG, but access is impeded by these binding constraints.

Relaxation of borrowing constraints, and the wealth constraint in particular, are the most important trigger factors in the FHOG home ownership impact. FHOG is evidently successful in tapping the latent demand for homeownership we identified in chapter 3 above. The 'cream-skimming' effects of FHOG are also evident. Most of these income units would surely have purchased once accumulated savings met deposit requirements, or rising incomes enable repayment requirements to be satisfied. The FHOG primary impact is then to bring forward the home purchase plans of most recipients.

Table 5.3 First Home Owner Grants: Income Units Assigned to Homeownership Because of Relative Price Effects or Relaxation of Borrowing Constraints

	FHOG $7,000		FHOG $14,000	
	Number of Income units	Per cent	Number of Income Units	Per Cent
Relative Price Effect	1	1.4	10	1.7
Relaxed Borrowing Constraint				
Wealth	60	82.2	403	67.1
Income	4	5.5	12	2.0
Wealth & Income	8	10.9	176	29.2
Total Number of Income Units	73	73	601	601

Table 5.4 scrutinises the tenure polarisation argument by comparing the socio-economic characteristics of three groups within the sample of rental tenants.

In the last column of Table 5.4 we list the characteristics of tenants whose assigned tenure has changed because of FHOG (at $14000). In the fourth column the group of tenant income units who are eligible for the FHOG but continue to be assigned to rental tenancies is examined. In the third

established homes, which continued to attract the $7,000 grant averaged 1367 per month in the second half of 2000 and fell to an average of 1336 over the second half of 2001.

column we look at the characteristics of rental income units who were ineligible for the grant. Finally, the second column of the table looks at all rental income units.

Those assigned to homeownership with the assistance of a First Home Owner's Grant tend to be young, single, without children and enjoy wage and salary incomes that are on average $15,649 higher than eligible income units who continue to be assigned to rental tenancies, and $13245 higher than ineligible tenant income units. They are also better qualified, far more likely to be labour force participants and less likely to be unemployed when they are in the labour force relative to the other two sub-groups. Given age, employment rates and family composition, it is not surprising to learn that income from government benefits and pensions is relatively low. These findings offer some support for the tenure polarisation hypothesis.

The observation in Table 5.4 that mean weekly rents paid by those projected to benefit from FHOG is below the mean for all tenants in the tenure, suggests that properties vacated might trickle-down to low income tenants. This possible improvement in the supply of affordable private rental housing is explored in Table 5.5.

Table 5.4. The Socio-Economic and Demographic Characteristics of Tenant Income Units Assigned to Rental Tenancies and Homeownership when FHOG Set at $14000

	Observed Rental Income Units	Ineligible for FHOG	Eligible Income Units Assigned to Rental Tenancy	Assigned to Homeowner-ship due to FHOGS
Demographic Characteristics				
Median Age of Reference Person (Years)	30-34	45-49	24	24
Persons aged over 65.	9.3%	23.9%	0	0
Dependent children	19.7%	25.0%	20.9%	2.8%
Sole person income units	70.3%	58.9%	73.9%	90.2%
Housing				
Current Weekly Rent*	$70	$83	$62	$61
Optimal Housing Demand*	$104,780	$114,376	$97,920	$97,752
Shared Dwelling Arrangements[1]	41.8%	28.7%	50.5%	48.4%
Private Rental Tenancy[2]	46.7%	49.4%	43.0%	51.2%
Metropolitan Residence	61.9%	59.9%	64.5%	59.2%
Income, Assets & Employment[3]				
Annual Income from Wages & Salaries*	$16,947	$15,723	$13,121	$28,968
Annual Income from Investments*	$413	$789	$40	$128
Liquid Assets	$12,401	$22,303	$2,837	$2,668
Annual Income from Government Cash Transfers*	$3,743	$5,769	$3,197	$431
Not in labour force	26.2%	45.5%	17.7%	4.2%
Unemployed	11.1%	8.3%	15.6%	5.5%
Highest Educational Qualification				
Post-Graduate	3.1%	3.6%	2.4%	3.2%
Under-Graduate	16.4%	13.7%	15.1%	24.1%
Vocational	19.8%	19.2%	17.9%	26.6%
No Qualifications	60.6%	63.5%	64.1%	46.1%
Occupation[4]				
Managers and Administrators	4.4%	8.4%	2.8%	3.0%
Professionals	27.2%	34.8%	20.8%	27.6%
Tradespersons	16.7%	12.4%	17.7%	21.0%
Clerical	29.6%	20.6%	34.4%	32.1%
Production and Transport	6.5%	11.3%	10.7%	9.2%
Labourers	11.7%	12.6%	13.7%	6.8%
Sample	4203	1629	1898	601

* - Mean value.

1. 'Shared dwelling arrangements' is defined in the glossary.
2. Proportion of all renter/boarder income units.
3. Statistics refer to the income unit reference person.
4. Reference person's occupation in current job. Excludes the unemployed and those persons not in the labour force.

Table 5.5 partitions the projected beneficiaries of FHOG into two groups, those who were private rental tenants and therefore acquired their housing in an unfettered private rental market, and those living rent-free or renting from a parent or relative living in the same household (shared dwelling arrangements). This second group accounts for approximately one-half of those income units assigned to homeownership as a result of FHOG, and few trickle-down effects can be anticipated as the housing space vacated is unlikely to be offered in the private rental market. However, almost 70% of private rental tenants assigned to homeownership (at $14000 FHOG) would vacate rental units in the bottom two quintiles of the rent distribution. This is about one-third of the housing stock vacated by all income units assigned to homeownership because of FHOG, and approximately 8% of the housing stock occupied by all tenants under the reference system. With FHOG set at $14000 we can then expect a significant expansion in the supply of affordable private rental housing; at $7000 these trickle-down effects are insignificant because of the relatively low projected take-up of FHOG.

Another interesting aspect of the changing demand for housing is the value segment of the owner occupied housing sector chosen by forecast FHOG recipients. We have estimated the value of housing that housing consumers will seek to purchase by standard modelling techniques (see chapter 2), and used these estimates in the analysis reported in Table 5.6. Once again the sample is divided into the same two groups as Table 5.5. At $7000 projected FHOG purchases are concentrated in the lowest value segment, and this is evident among those who were private rental tenants and those that were in shared dwelling arrangements. The more important findings relate to the $14000 FHOG, as this higher grant level is conditional on the purchase of a newly constructed house. The purchases of those forming new households all represent net additions to the housing stock, and we estimate that almost all such purchases will have been in the lowest two value quartiles. A similar pattern is evident among those who were private rental tenants, but their demand will not necessarily translate into a net addition to the housing stock. The quantitative significance of the former group and the pattern of their housing demand will encourage developers to raise residential densities, or build in cheaper locations on the urban fringe.[107]

Table 5.5 'Trickle-down' Effects under First Home Owner Grants and Housing Partnerships by Quartile of Weekly Rent

Weekly Rent[1] Quartile		First Home Owner Grants *$7,000*	First Home Owner Grants *$14,000*	Housing Partnerships
1	$0-$70	52.8%	32.9%	36.6%
2	$71-$100	16.7%	36.2%	24.2%
3	$101-$147	8.3%	15.0%	18.2%
4	$147+	22.2%	16.0%	21.2%
Shared Dwelling Arrangements		37	291	394
Total Income Units Assigned to Homeownership		73	601	818

1. Quartiles of weekly rent: all private rental tenant income units

[107] We also explored spatial variations in FHOG impacts between capital cities and between capital cities and rest of state locations, but found no significant patterns.

Table 5.6 Optimal Housing Demand of Income Units Who Become Owner-Occupiers under First Home Owner Grants and Housing Partnerships by Quartile of Property Value in the Owner-Occupied Housing Market

Estimated Market Value[1]	First Home Owner Grants		Housing Partnerships
	$7,000	*$14,000*	
Private Rental Tenants			
$1 - $100,000	63.9%	39.1%	38.5%
$100,001 - $140,000	30.6%	57.3%	47.4%
$140,001 - $200,000	5.5%	3.6%	13.1%
$200,001+			1.0%
Shared Dwelling Arrangements			
$1 - $100,000	64.9%	51.5%	57.6%
$100,001 - $140,000	35.1%	47.4%	38.6%
$140,001 - $200,000		1.1%	3.6%
$200,001+			0.2%

[1] Quartiles of owner-occupier's estimate of current market value.

5.4 Housing Partnerships: Impact Analysis

The AHMM model simulation results reported in this section assume that a financial institution or the Federal government offers to take a limited partner's share that has no upper limit as a fraction of the purchase price. The share is acquired at par value and the partnership arrangement is only available to first homebuyers who, as in the FHOG simulations, are assumed to be tenant income units with reference persons aged 34 years or under. Under the partnership arrangements tenants who have never been owner occupiers are offered the choice between entering a housing partnership, conventionally financing home purchase at a maximum loan to value ratio of 90% or remaining a tenant at the market rental rate.

After application of the relative price and borrowing constraint assignment rules, we predict that the share of homeownership will increase from 44.5% of income units to 53.3%, or by 8.8 percentage points. There are 818 tenants who would find it financially advantageous to enter a housing partnership, which is 15.9% of all income units assigned to the rental tenures (5151) under the reference system.

The mean managing partner share is 17%, which implies an 83% ($84,603) mean share for the limited partner assuming that the managing partner has to leverage his share with a 90% mortgage. We estimate that this is equivalent to Financial Institutions and/or Government taking a $73 billion equity stake in the purchases of 846,381 eligible first homebuyers at 1996-97 prices across Australia. By way of comparison, we predict that 65,854 first homebuyers take up the First Home Owners Grant at $7,000 across Australia, giving an outlay of $461 million. For the $14,000 grant forecast to be taken up by 632,970 income units the outlay is $8.86 Billion.[108] The very high estimated mean share for the limited partner suggests that HP market potential is critically dependent upon financial institutions (or government) willingness to purchase these high equity

[108] Population estimates are calculated using the income unit weights provided in the *1996-97 SIHC*. These forecasts on take-up assume that the measure has no fixed timeframe within which applications must be submitted, eligible potential first homebuyers are fully informed, and act in response to a change in relative prices or borrowing constraints that warrant a change in tenure choice on economic grounds. Imperfect information and transaction costs that have not been taken into account in the model will mean that tenure choice responses will be lagged rather than instantaneous. We have also revised our costings to incorporate the timing of changes to the grant by assuming that all income units who would find homeownership cheaper under the $7,000 grant, and who find that the grant at this level relaxes borrowing constraints, become homeowners. The additional $7,000 grant is then introduced. We cost the scheme at $3.15 billion under these assumptions. This is close to the actual cost for the scheme ($3.21 billion) from July, 2000 through to the end of the 2002/03 fiscal year.

stakes. Simulations conducted when limited partner shares are capped confirm this hypothesis. When the limited partner share is capped at 75% of property value the number of tenant income units predicted to enter HP falls from 818 to 202 income units. When the limited partner share is capped at 50% only 85 income units are expected to enter HPs. Many of those impeded from immediately entering HPs will do so at a later date when borrowing constraints on the managing partner's share are relaxed. However, these simulations do indicate that any financial institution reluctance to purchase high equity stakes, could severely limit the short term effectiveness of the HP as a vehicle capable of meeting the considerable latent demand for homeownership.[109]

If we assume that financial institutions place no upper limit on limited partner shares, HP will appeal to more tenants than FHOG at $14000 or $7000. This is because the annual economic costs of homeownership are lower under housing partnership arrangements than FHOG-aided purchase. The limited partner's equity share, including capital gain, is relinquished on realisation but this is not sufficient to offset the benefits of separating the housing consumption and wealth accumulation decisions of constrained potential first homebuyers. The mean bid rental rate decreases from 5.59% under conventional financing to 4.03% under a Housing Partnership arrangement. Under FHOG (at $14000) it falls to 4.74%. The HP program is evidently more attractive to housing consumers on relative price criterion.[110]

In comparison to FHOGs, Housing Partnerships are more effective in helping public rental tenants to become owner-occupiers although the high proportion of public tenants who report no liquid assets limits take-up in our simulations.[111] But because housing partnerships significantly reduce bid rental rates a greater number of public tenants find that the relative price advantage of public housing is removed as compared to the relative price comparison under FHOGs. Another finding, this time in common with the FHOG results, is the appeal of HPs to those income units in shared dwelling arrangements, with just under one-half of those entering Housing Partnerships coming from shared dwelling arrangements. As demonstrated in Table 5.7 it is the young, single person income unit with a relatively low housing demand that is attracted to Housing Partnerships. They have relatively high labour force participation rates and relatively low unemployment rates in comparison to other rental tenants. Average wage and salary incomes are some $6,000 higher than the mean wage and salary income of all rental income units, and $9,000 higher than the average earned by eligible income units who continue to be assigned by the model to rental tenures.

[109] Note that the Caplin et al. (1997) proposals are much broader than those considered here.

[110] The FHOG program also has a budget cost to the government. There is no budgetary cost to government if HPs are a private sector initiative.

[111] 98.7% of all eligible income units who do not take up the housing partnership do so because they have no liquid assets that would allow them to meet the deposit requirement on the mortgage required to fund their equity stake. We have excluded these income units from access to housing partnerships as they would require the limited partner to take a 100% share.

Table 5.7 The Socio-Economic And Demographic Characteristics Of Tenant Income Units Assigned To Rental Tenancies And Homeownership Under Housing Partnerships

	Observed Rental Income Units	Ineligible for Housing Partnership	Eligible Income Units Assigned to Rental Tenancy	Assigned to Homeownership due to Housing Partnership
Demographic Characteristics				
Median Age of Reference Person (Years)*	30-34	45-49	23	25-29
Persons aged over 65.	9.3%	23.9%	0	0
Dependent children	19.7%	25.0%	20.2%	9.2%
Sole person income units	70.3%	58.9%	75.5%	82.6%
Housing				
Current Weekly Rent*	$70	$83	$61	$64
Optimal Housing Demand*	$104,780	$114,376	$95,399	$102,978
Shared Dwelling Arrangements[1]	41.8%	28.7%	50.9%	48.2%
Private Rental Tenancy[2]	46.7%	49.4%	43.3%	51.0%
Metropolitan Residence	61.9%	59.9%	63.5%	62.7%
Income, Assets & Employment[3]				
Annual Income from Wages & Salaries*	$16,947	$15,723	$14,008	$22,942
Annual Income from Investments*	$413	$789	$3	$1,233
Liquid Assets	$12,401	$22,303	$151	$8,233
Annual Income from Government Cash Transfers*	$3,743	$5,769	$3,163	$179
Not in the Labour Force	26.2%	45.5%	17.2%	8.7%
Unemployed	11.1%	8.3%	17.0%	5.5%
Highest Educational Qualification				
Post-Graduate	3.1%	3.6%	1.3%	4.9%
Under-Graduate	16.4%	13.7%	12.0%	28.1%
Vocational	19.8%	19.2%	19.5%	20.9%
No Qualifications	60.6%	63.5%	66.4%	46.1%
Occupation[4]				
Managers and Administrators	4.4%	8.4%	2.8%	2.8%
Professionals	27.2%	34.8%	16.6%	32.8%
Tradespersons	16.7%	12.4%	20.6%	15.7%
Clerical	29.6%	20.6%	34.4%	32.6%
Production and Transport	6.5%	11.3%	11.6%	8.1%
Labourers	11.7%	12.6%	14.0%	8.0%
Sample	4203	1629	1681	818

* - Mean value.
1. 'Shared dwelling arrangements' is defined in the glossary.
2. Proportion of all renter/boarder income units.
3. Statistics refer to the income unit reference person.
4. Reference person's occupation in current job. Excludes the unemployed and those persons not in the labour force.

Tenants expected to enter a HP also exhibit differences when we compare other sources of income. They evidently have relatively high levels of liquid assets, because income from investments is much higher than it is for those not entering HPs. The negligible levels of such income for eligible tenants not choosing a HP arrangement is a telling indication of their need for 100% limited partner shares. Low unemployment rates and high labour force participation rates among HP managing partners is reflected in low income receipts from government cash transfers. Their superior income and employment profiles is matched by better qualifications and a higher incidence of professional occupations relative to those who continue to be assigned to the rental tenancy.

As anticipated (see Table 5.1), HPs are more likely to be taken up by lower income tenants as compared to FHOGs. The mean wage and salary income of the latter (at $14000 FHOG) is $28968 (see Table 5.4) as compared to $22942 for the former. However, the data presented in Table 5.7 suggests that tenants entering a HP are typically in the early years of careers with positive age-wage profiles, while tenants who continue to be assigned to the rental tenancy are either older with low rates of labour force participation (see column 3, Table 5.7), or young but less well qualified and in occupations that offer flatter age-wage profiles (see column 4, Table 5.7).

HPs are less likely to 'cream skim' as compared to FHOGs. Of the 818 tenants predicted to enter a HP 111 (14%) found conventionally financed homeownership unattractive on relative price grounds. This sub-group would most likely have remained tenants. The comparable number of FHOG (at $14000) recipients is 21 (3.5%). The HP arrangement is less likely to 'cream skim' because of its more significant impact on the relative price of homeownership. It is then more likely to increase rates of homeownership in the medium to long run.

Table 5.5 above suggests that the HP impact in terms of improving the supply of affordable housing will be greater than that for the FHOG scheme. A similar proportion will vacate properties in the lowest two rent quartiles, but the quantitative impact is greater because more tenants enter HPs than benefit from FHOGs. As with FHOGs, nearly one-half of HPs are chosen by income units originating from shared dwelling arrangements, and no 'trickle down' effect can be anticipated from this group. Housing consumers entering HP are forecast to buy housing that is typically located in the lowest two value quartiles, a pattern also evident among FHOG recipients (see table 5.6 above).

These forecasts generally suggest that HPs will have more significant impacts on housing markets than the FHOG scheme. However, the findings are subject to more stringent caveats because of uncertainties concerning the propensity of financial institutions to purchase high limited partnership shares. There is also a need to conduct microsimulations at alternative parameter values to gauge the sensitivity of HP projections to different assumptions about interest rates, rates of capital gains etc.. We take up these issues in more detail in Chapter 6.

CHAPTER 6 CONCLUSION

This concluding chapter serves two purposes. Firstly we summarise the principal findings and key policy implications that have emerged as a consequence of our research. Secondly we list issues that have not been addressed in this research project but which deserve attention in future research.

6.1 Principal Findings and Key Policy Implications

It is evident from the analysis of the determination of tenure choice that many tenants would choose, on the basis of the economic costs of alternative tenures, to become homeowners earlier in their housing careers, but are prevented from doing so by borrowing constraints. There is then a considerable latent demand for homeownership. This latent demand is symptomatic of market inefficiency because these tenants would be financially better off if they owned. A main reason why these households are financially better off is the tax advantages that accrue to homeowners. The most important borrowing constraint that is binding on potential first homebuyers is the deposit requirement. Thus the most effective policy intervention for easing access to homeownership in the short run, is some form of grant that will help to bridge the gap between a household's savings and the deposit they must provide to finance the purchase of desired amounts of housing.

We also find that there is a considerable number of older, outright owners who would be financially better off if they rented rather owned the housing they presently occupy. These people have large amounts of wealth locked in to housing assets because of their outright ownership status. Since many of them are eligible to receive age pensions they would also be entitled to rent assistance if they became tenants. These are two important reasons why the present housing circumstances of this sub-group of homeowners place them at a financial disadvantage by comparison to the alternative of renting. Their position is symptomatic of market inefficiency because there are impediments preventing housing market transactions that could improve their economic well-being. Further research into what these impediments might be is warranted. Our simulations suggest that, if all income units in owner occupation for whom relative prices favour renting were to change tenure, this would add $1.95 billion to rent assistance payments at 1997 prices.

The project has thoroughly analysed the impacts of First Home Owner Grants (FHOG) in Australian housing markets. Our findings confirm the success that FHOG (at $14,000) have achieved in stimulating the demand for housing from first homebuyers. This stimulus is larger than might have been anticipated because we forecast that almost one-half of FHOG recipients were in shared dwelling arrangements and form new households. Their housing requirements must be met either by conversion or new construction, and typically the houses they buy must be furnished by the purchase of new white goods and other internal amenities. It should also be noted that most FHOG recipients are expected to purchase at the cheaper end of housing markets. This will encourage housing developers to build at higher residential densities in established suburbs, or build on cheaper locations at the fringes of urban areas.

Our analysis also suggests that almost all FHOG beneficiaries found homeownership cheaper than renting but borrowing constraints impeded the preferred tenure transition. Most of these households would have become homeowners at a later date in their housing careers when borrowing constraints are relaxed. (This can be referred to as 'cream-skimming'.) The policy has then been successful in meeting the latent demand for homeownership that our research suggests has been pent up in Australian housing markets. FHOG does not change the choices of households who found renting cheaper in its absence. That is it does not change the relative price comparison in favour of homeownership for these people. FHOG typically brings forward the purchase decisions of those who would have bought anyway, and produces a short-term stimulus to rates of homeownership.

'Trickle-down' benefits that improve the supply of affordable private rental housing can be anticipated if higher income groups who occupy relatively low rent homes take up FHOG. Our research indicates that FHOG beneficiaries do indeed have higher than average incomes; they are more likely to be employed, active in the labour force and better qualified in comparison to those households who remain in rental tenancies. 'Trickle-down' effects are smaller than might have been anticipated because we forecast that almost one-half of those taking-up FHOG were in shared dwelling arrangements. The housing they vacate is unlikely to become available in the private rental sector. However, because many of those previously renting in the private market

vacate cheaper rental properties, an improvement in the supply of affordable rental housing can be anticipated, and this will have been particularly evident in the period coinciding with the availability of FHOG at $14000. The 'other side of the same coin' becomes evident when we explore impacts on tenure polarisation. The departure of economically 'better-off' tenants to homeownership will contribute in the short run to a widening disparity in the socio-economic and demographic characteristics of rental tenants and homeowners. Critics have pointed to social exclusion effects accompanying tenure polarisation.

In the past twenty years, there have been a variety of government sponsored shared ownership programs in Australia and Europe. These programs have typically involved the use of government funding to promote low-income households access to homeownership. The practicalities of a blue-print for the attraction of private finance into shared ownership arrangements is currently being explored by the Menzies Research Foundation in Australia. The initiative is modelled on the Housing Partnership (HP) concept advocated in the USA; the prospective homeowner becomes the managing partner in an equity splitting arrangement with a limited partner who could be a financial institution. The managing partner retains ownership rights over use and sale of the property, and benefits because he does not meet the financing costs of the limited partner's share. But on sale the managing partner forfeits a pro rata share of capital gains to the limited partner. The latter's share can be used to back the issue of financial securities in secondary 'equity share' markets.

Our research suggests that more tenants would enter homeownership as a result of HPs than under FHOG, even when the latter are offered at the higher rate of $14000. This is because a HP has a big impact in reducing the annual economic costs of managing partners relative to those they incur as tenants. 'Cream-skimming' effects are not as evident with HPs; some tenants find that the relative cost comparison across tenures is changed in favour of homeownership, and this occurs for some public as well as private rental tenants. HPs could then be more effective than FHOG in lifting the share of homeownership in the long run. This difference between FHOG and HP arises because the latter is more effective in improving access for lower income groups, who typically find renting cheaper than conventionally financed home purchase.

These findings have a very important qualification attached to them. Our research suggests that HPs are effective if financial institutions are prepared to acquire high limited partner shares in excess of 80%. Financial institutions willingness to acquire such high shares is uncertain. If, for reasons of financial prudence, they place a cap on limited partnership shares our simulations suggest that the market potential of HPs would be adversely affected.

Our policy analysis has also addressed supply side issues in private rental markets. In Australian and other Anglo-American countries there is evidence to suggest that though private rental housing investment is expanding, these investment flows are bypassing the rental housing segments that are affordable to low income households. One cause of this phenomenon is tax arrangements that result in depressed returns in these segments. A potential policy response is the introduction of targeted tax incentives that are designed to improve returns to investors in these segments. Our research work focuses on calculating the effective tax burden on investors in different segments of the rental housing market, and estimating the extent to which this burden can be lifted by alternative tax incentive measures. The policy goal is that of designing a tax instrument that will promote supply in those segments affordable to low-income households.

An important finding of our work is that tax burdens on rental housing investments are high in all segments of the market. The effective tax rates borne by investors on net rental income are generally higher than the marginal income tax rate of top tax bracket investors (47%). These high rates arise whether or not negative gearing is permitted. One cause of the high effective tax burden is the number of taxes that investors are liable to pay; these include income tax, capital gains tax, and stamp duty on conveyance, mortgage duty, land tax and local government rates.

The principal tax incentive promoting investor acquisition of newly constructed housing is the building write-off allowance. It permits the investor who has financed the acquisition of a newly constructed housing unit that is subsequently leased to deduct 2.5% of construction costs from taxable income. We estimate that this measure has a small impact in terms of reducing tax burdens no matter what the market segment. There are two main reasons. Firstly, the building write-off allowance deductions claimed during an investor's period of ownership are reclaimed and taxed as a capital gain on realisation of the investment. Secondly, the tax shelter benefit from the allowance is a function of the marginal income tax rate of investors. Many investors belong to tax

brackets below the top bracket and this reduces the allowance's effectiveness in reducing tax burdens.

Our policy analysis includes an evaluation of a hypothetical tax reform package in which the building write off allowance is replaced by a low income housing tax credit. The latter is a measure that we base on a US tax incentive of the same name. It offers investors an annual tax rebate equal to 4% of the building value of rental housing investments. The critical feature of the measure is that an investor is only eligible to receive the credit if she charges a rent less than some threshold value. In the reform package we envisage, an investor currently leasing a rental unit at a qualifying rent is eligible to receive the credit, so the measure is designed to retain existing stocks of affordable housing. It is also available to new investors who offer a rental unit for lease at a qualifying rent. If an investor offers to adjust their residential portfolio investment by replacing an ineligible property investment by an eligible property investment, we assume building write off allowances on the ineligible property are not recaptured on sale. This offers an additional incentive to investors in affordable rental housing.

We estimate that the effective tax burdens of existing investors who hold eligible properties is cut by a third. Before the tax credit measure is taken into account, these investors make economic losses. Once the credit is introduced the typical investor in this segment will more or less break even. Equally importantly we estimate that around one-third of investors holding ineligible properties would find it financially attractive to switch into a tax credit eligible property investment. The recurrent public sector budget cost is estimated to be $88m, but there is a first year net revenue gain of $63m to partly offset this recurrent cost.

A potentially important concern on the supply side of the private rental market is the prevalence of 'cost inefficient' investors and their concentration in low rent segments of the private rental housing market. The term 'cost inefficient' is not pejorative. It refers to low tax bracket investors who gain less from the tax shelter benefits offered by rental housing investments, and therefore have higher economic costs and lower economic returns on their investments relative to high tax bracket investors. Since high tax bracket investors 'win out' in the competition to invest in buoyant submarkets offering healthy capital gains, low bracket investors are typically found in the submarkets offering lower capital gains. These tend also to be the markets in which affordable rental housing is concentrated. The outcome at the bottom end of the rental housing market is rents that are high in relation to capital values and the quality and quantity of housing offered.

An important question is why do the 'cost inefficient' investors survive? In competitive markets 'cost efficient' investors would replace the 'cost inefficient' investors because they can earn higher returns at the rents required by 'cost inefficient' investors. The evidence reported here and by the authors in previous work suggests that this competitive supply side adjustment process is not working. The research issue revolves around the search for impediments that might explain why 'cost-efficient' investors do not increase the size of their rental housing portfolios.

The small number of multiple property investors is a feature of Australian private rental markets. A possible explanation is that the operation of state land taxes deters the emergence of multiple property investors. The rationale is that land tax is levied on the aggregate site value of the rental properties held by an investor, rather than levied on each rental property independently of the site value of other property holdings of the investors. Land tax liabilities might then rise rapidly as a single property investor adds to their portfolio. Our research involves calculation of the rise in effective tax burdens if a sample of existing investors were to increase their holdings of rental property by adding an extra rental-housing unit and our findings suggest that land tax liabilities act as an impediment, but that there are possibly other factors at work that also restrict the number of multi-property investors. Existing tax burdens are high and effective tax rates are pushed even higher once incremental investments are added.

6.2 Future Research Directions

The findings that we report above are obtained from a microsimulation model of the Australian housing market. The supply and demand side of the housing market is modelled as well as the impacts of market intermediaries and, most important of all, government intervention. The research approach is intended to faithfully capture a 'whole of government' approach to policy analysis. Government intervention in housing markets can take two general forms; these are direct and indirect measures that can impact on housing choices and circumstances. Direct government interventions are programs that have explicit housing policy goals (though they might have non-

housing goals as well) such as First Home Owner Grants and the panoply of measures that comprise the Commonwealth State Housing Agreement. Indirect government interventions are any measure that has non-housing policy goals but which can have important impacts on housing choices and circumstances. So, for example, capital gains taxation impacts on housing supply side decisions while government welfare policy impacts on housing affordability. The AHMM model has been designed such that government pension, benefit, allowance and taxation measures are taken into account. This means that the incomes, cost and prices paid by decision makers on the demand and supply side of the housing market are measured after allowance for the full range of government interventions.

This research project has concentrated on direct government interventions and their impacts on access to homeownership and the supply of affordable private rental housing. A major area of application that awaits attention is the use of the AHMM model to measure the impacts of government welfare reform on housing affordability and housing insecurity (eg sustaining preferred tenure choices). The model is suited to the measurement of typical housing affordability measures, as well as estimation of the housing subsidies that households receive as a result of indirect government interventions such as the non-neutral tax treatment of the housing circumstances of housing consumers.

There are a number of specific findings that warrant further investigation. The market potential of Housing Partnerships or Equity Splitting Arrangements needs more work to be completed before firm conclusions can be drawn. The most obvious of these is a detailed examination of outcomes when financial institutions cap limited partner shares. Microsimulations of take up of Housing Partnerships at alternative values for key parameters is a second important requirement. The results reported above assume baseline values for interest rates and rates of capital gains. But we suspect that findings are sensitive to alternative assumptions, and in particular alternative outcomes for the rate of capital gains on housing assets. The higher is the latter the less attractive is a Housing Partnership from the perspective of housing consumers. Finally, the Housing Partnership idea has been explored in relation to potential first homebuyers, but the potential market for HP is much wider than this. Older outright owners who are holding more housing assets in wealth portfolios than is preferred are a case in point. Housing Partnerships could provide these homeowners with a vehicle that enables them to divorce choices about how much housing to consume and invest in, while enabling them to increase levels of non-housing consumption. Though reverse annuity mortgages have not proved popular among this group in Australia, Housing Partnerships could prove to be a more secure way of maintaining an older person's present housing circumstances, while giving them the opportunity to improve their general economic wellbeing.

This latter research exercise is related to another important but under-investigated aspect of our research. Large numbers of older outright owners are found to be in housing circumstances that leave them financially worse off than if they rented the same amount of housing. At this stage of our investigations we cannot be sure of what is impeding these outright owners from improving upon their circumstances. It could be that these households want to remain outright owners, but wish to trade-down and are prevented by high transaction costs. Alternatively, these households might welcome the opportunity to rent given eligibility for rent assistance, but a lack of suitable rental housing alternatives deters a tenure change. These alternative hypotheses need to be tested in order to design evidence based policy solutions for this growing group of households in the Australian population.

The modelling of tax incentives to promote the supply of private rental housing deserves further development. At present the tax reform packages address tax related causes of depressed returns in affordable rental housing segments, but they do not address other causes. Evidence is beginning to emerge that agency problems – the frictions that can emerge between landlord and tenant – are more severe at the bottom end of the housing market. These problems if sufficiently apparent to landlords could deter investment in this segment of the market. One approach to this issue is to make tax incentives such as the Low Income Housing Tax Credit considered above, conditional on a head leasing arrangement with a social housing agency. The latter manages the allocation function and housing consumer relationship, and guarantees that a property will be returned to the investor in an acceptable condition. A service fee payable by the investor to the social housing agency cements the partnership. Financial modelling of the service fee and tax

incentive can help measure whether such partnerships offer satisfactory returns to the investor, and cost recovery to the social housing agency.

The degree to which land taxes and stamp duties prevent the emergence of least-cost, multi-property landlords is another supply side issue that requires further investigation. In a limited framework we have shown above that these charges do create disincentives for high tax rate investors to expand their property portfolios. However, the extent to which this can explain the significant numbers of low tax rate, high cost landlords observed in the Australian market is not yet clear.

Tax incremental financing of private rental housing construction could also be subjected to financial modelling. With tax incremental financing a partnership is forged between local and state government, on the one hand, and Federal government on the other. In return for a Federal Government Grant that permits housing units to be constructed, or purchased, at a capital cost that would enable a social housing agency to charge affordable rents, local and state governments agree to forgo incremental property related tax revenue until the grant is repaid. The incremental tax revenues then revert back to the relevant tier of government. The modelling questions concern the financial viability of such partnership arrangements. What size of grant is required to enable housing to be leased at affordable rents? How long would local and state governments forgo incremental tax revenues before the grant is repaid? What is the budgetary cost to Federal government of what is in effect an interest free loan?

APPENDIX 1 CALCULATING MARGINAL IMPLICIT INCOME TAX RATES

A1.1 The Income Unit's Tax Liabilities

Tax Rates

The key component of the determination of the model's marginal tax rate is personal income tax rates. Australian personal income taxes are based on a graduated scale with a tax-free income threshold that depends on the structure of the taxpayer's family. The marginal tax rates and tax brackets applied to an individual's income are those in Table A1.1.

Table A1.1 Australian Income Tax Schedule as at 1st July, 2000

Ineligible for Family Tax Assistance

Taxable Income	Tax Rate
<$6,001	0
$6,001-$20,000	17%
$20,001-$50,000	30%
$50,000-$60,000	42%
>$60,000	47%

Source: Australian Tax Office (2001) Taxpack 2001, Canberra: Australian Taxation Office.

Medicare Levy

An additional levy on taxable income is used to fund the public health system. Following recent changes this levy is partially offset if taxpayers have private health insurance through either a part rebate of insurance premiums or through a reduction in those premiums at the time of payment. High-income individuals who do not have private health insurance are penalised by an additional 1% surcharge over and above the standard Medicare Levy. We are not able to identify privately insured individuals, so the tax liabilities of the privately insured are potentially over stated.

The Medicare levy is charged on the sum of the income unit head and partner's taxable income.[112] For single persons who earn less than $13,807 per annum no levy is applicable. For singles earning between $13,807 per annum and $14,927 the levy is calculated at 20 cents in every dollar above $13,807. When income exceeds $14,907 the levy is calculated at 1.5% of taxable income. For married couples that have no dependent children the exemption applies if family income is less than $23,299 per annum. The 20 cents in the dollar levy applies between this lower threshold and $25,188 after which the levy is calculated at 1.25% of taxable income. Each dependent child or student increases the lower limit of the phase-in region by $2140 and the upper limit by $2,313.[113]

Superannuation Surcharge

Subject to certain eligibility criteria, Australian workers receive compulsory superannuation contributions from their employer and are able to make discretionary contributions to 'top-up' their superannuation. Employer contributions are subject to much lower tax rates than remuneration paid in the form of wages and salaries. In order to discourage the use of superannuation as a tax shelter, the Federal Government levies a surcharge when adjusted annual income, the sum of taxable income and employer contributions, exceeds $78,208 (1999-2000). The surcharge is levied on employer superannuation contributions at a rate that reaches a maximum of 15% at an upper threshold of $94,944 (1999-2000).[114]

[112] This is a simplified explanation of the arrangements for calculating the levy. In practice, unused amounts of the threshold can be transferred between partners.

[113] Sole parents are also assessed for the levy under the married couple arrangements.

[114] In 1996-97, the thresholds were $70,000 and $85,000 with the rate of surcharge increasing by 1 percentage point for each $1000 increment in adjusted income in this range.

The *1997 RIS* and *1996-97 SIHC* do not contain information on the superannuation contributions made by employers on behalf of investors and housing consumers in employment. However, there is a minimum employer contribution that is set at 7% of the employee's gross salary. We assume that all employed investors benefit from this 7% contribution, and set it equal to 7% of investor's income after subtraction of net rent[115]. This minimum contribution is then added to the taxable income of employed investors to arrive at an estimate of adjusted annual income, which is then used to calculate the superannuation surcharge liabilities. For housing consumers, the surcharge is applied in the same manner outlined above using the calculated taxable income of the income unit. However, the *1996-97 SIHC* provides a breakdown of gross income by source, so that employer contributions are set at 7% of a housing consumer's gross salary.

Rebates

Australian taxpayers who meet certain eligibility criteria are entitled to rebates that reduce tax liabilities. We are able to identify eligibility for the following rebates that can be claimed by Australian taxpayers in 1996-97:

1. Low Income Tax Payer Rebate;
2. Low Income Aged Person Rebate;
3. Dependent Spouse Rebate;
4. Sole Parent Rebate; and
5. Commonwealth Government Aged Person Rebate.

The July 2000 tax reforms made significant changes to the structure of the rebate system. The dependent spouse and sole parent rebate have been abolished and a new rebate, the 'Family Tax Benefit' (FTB) has been brought in to replace the abolished rebates and the Family Allowance.[116]

In practice, Family Tax Benefit can be accessed by eligible income units either as a reduction in the weekly tax paid under the 'pay as you go' (PAYG) system achieved by adjusting the taxpayer's tax-free threshold, as a rebate at the end of the financial year, or as a payment from CentreLink. We are unable to determine in what form an income unit would take the Family Tax Benefit payment given the information available in the survey. Consequently, we assume that all eligible income units receive the payments as an end of year tax rebate. The determination of Family Tax Benefit entitlements is discussed in an appendix that explains both the calculation of FTB eligibility and rent assistance payments.

A1.2 Commonwealth Pensions and Allowances

Both the *1997 RIS* and the *1996-97 SIHC* provide information on the pension and allowance income of surveyed income units. Under Australian social security practice, welfare payments are subject to a regime of income and asset testing that determines eligibility and the rate of payment received by the income unit. When housing consumers exercise a tenure choice, the resulting change in wealth portfolios 'triggers' adjustments to income and assets assessable under means tests. Similarly, an investor who becomes a landlord engineers an adjustment in assessable income and assets. In both cases, there can be a change in eligibility and/or rates of payment, which is relevant to the calculation of their user costs as consumers and landlords, and is relevant to measures of housing affordability in the case of consumers.[117]

The AHMM microsimulation model incorporates the income and asset test rules as applicable in 2001-2002 and outlined in Centrelink's *A Guide to Commonwealth Government Payments*. For rental investors the change in benefit entitlements is estimated by applying income tests to the net rent stream from rental investments. The asset test is not relevant as realizing a rental investment

[115] The *1997 RIS* does not breakdown gross income by source, but we can identify investors who are in the employed labour force. It is assumed that all income other than net returns from residential housing investments is sourced from employment.

[116] Where the taxpayer receives the FTB and pays no tax or an amount of tax insufficient to cover the FTB the treatment is similar to that of a benefit paid via the tax system.

[117] The change in welfare payments impact on the implicit marginal income tax rate parameter in the user cost expressions.

property still leaves the income unit with an asset[118] – the result is that, from the point of view of the assets test no change occurs in the value of the income unit's asset base.

For owner-occupiers, the asset test is relevant. Owner-occupied housing is, up to a certain value, exempt from the assets test whereas other asset types are not. If a homeowner sells up and chooses to rent, their assessable assets increase given reinvestment of their equity in some alternative asset. In the case of rental tenants, the opposite impact is observed. Rental tenants must convert asset test eligible liquid assets to meet deposit requirements.

Now consider the application of income tests in the context of housing tenure decisions. Converting owner-occupied housing equity into another asset type generates an income stream that is taken into account under the income test criteria. For rental tenants, converting an income generating liquid asset into owner-occupied housing results in a fall in their assessable income.

It should be noted that assessable income from financial assets is an imputed value under income test criteria used for determining welfare payments. To reduce the impact of fluctuations in the rate of return on financial assets held by beneficiaries, the Commonwealth government's method of calculating financial asset income employs a set of extended deeming rates. To calculate income for the purposes of the test, actual income from financial assets is replaced by 'deemed income' from financial assets. We employ these extended deeming rates in our calculations of eligibility and payment rates in the model.

Converting the 1997 Pensions and Allowances System to its 2001 Equivalents

The pension and allowance system has undergone significant reform since the SIHC survey in 1997. In particular, the NewStart allowance has been reformed so that beneficiaries under the age of 21 are now covered by the Youth Allowance Scheme. A number of other allowance programs have also been rationalised in the course of this reform.

Table A1.2 lists the benefit types reported in the *1996-97 SIHC*, their 2001 equivalents and whether the benefit types are subject to income and asset means testing under current administrative arrangements. The 2001 pension and allowance programs are applied to the *1996-97 SIHC* data. Where thresholds have been indexed they have been deflated to 1996-97 prices.

Table A1.2 Reported Pension & Allowance Types in the Income and Housing Costs Survey, 1997 & Their 2001 Equivalents

Payment Type 1997	2001 Equivalent	Payment Rates
Family Payments	Family Tax Benefit (FTB)	(FTB)
Age Pension (AP)	Age Pension	AP
NewStart Allowance (NSA)	NSA	NSA
Mature Age Allowance	Mature Age Allowance	NSA
DVA Service Pension	DVA Service Pension	DVA
Disability Support Pension	Disability Support Pension	AP
Sole Parent Pension	Parenting Payment (PP)	PP
Wife/Carer Pension	Carer Payment	AP
Sickness Allowance	Sickness Allowance	NSA
Special Benefit	Special Benefit	NSA/YA
Partner Allowance	Partner Allowance (PA)	(PA)
Youth Training Allowance	Youth Allowance (YA)	YA
DVA War Widows Pension	DVA War Widows Pension	DVA
DVA Disability Pension	DVA Disability Pension	DVA
Austudy/Abstudy	Austudy	Austudy
Parenting Allowance	Parenting Payment (PP)	PP
Child Disability Allowance	Carer Allowance (CA)	CA

[118] It is assumed that net proceeds are reinvested in an alternative asset.

A1.3 The Taxation Position of Rental Investors

We base our estimate of the investors' tax liabilities on their income from all sources including a measure of the net rent yielded by an investor's incremental investment in rental property. The *1997 RIS* reports the actual profit or loss on a property over the previous twelve months, but this will include transitory components due to the lumpiness of maintenance expenditures and the irregular nature of vacancies. An *expected* net rent measure that adjusts for transitory components is a more accurate basis for measurement of expected marginal income tax rates. We, therefore, adopt the following measure of net rent for the i[th] property (NR_i):

$$NR_i = TR_i(1-v_i^e) - \left[\Phi_i(1-v_i^e) + \Lambda_i^e + T_i^L + T_i^P + \Psi_i + \Omega_i + I_i^m\right] \qquad \text{(A1.1)}$$

where $TR_i(1-v_i^e)$ is annual gross rent (TR_i) weighted by one minus the *expected* vacancy rate[119] $\left(n_i^e\right)$; $\Phi_i(1-v_i^e)$ is letting and property management fees (agency costs), which are a function of collected rents. Φ_i is agency costs when there is a zero vacancy rate; Λ_i^e is *expected* annual maintenance costs;[120] T_i^L is annual land tax; T_i^P is annual property taxes including utilities such as water and sewerage; Ψ_i is insurance premiums; Ω_i is body corporate fees; and, I_i^m is mortgage interest payments.[121]

A critical variable in the investor's user cost of capital is the investor's marginal income tax rate. We have in fact measured the investor's implicit marginal income tax rate, which is the ratio of the additional Federal income taxes and foregone benefits or allowances to the net rent yielded by the investment property. Thus we have, in the case of investors:

$$t_k = \frac{\Delta T_k + \Delta Ben_k}{NR_k} \qquad \text{(A1.2)}$$

where ΔT_k is the change in the k[th] investor's income tax liabilities when net rent (NR_k) is included in taxable income, and ΔBen_k is pension and welfare benefits foregone under Australia's means test provisions when NR_k is received.

Taxable Income

The 1997 RIS provides information on gross income earned by both the reference person and spouse of an income unit. However, in comparison to the information provided in the 1996-97 SIHC the information about sources of income is more restricted, providing only an indication of the sources of that income rather than amounts of income from different sources.

As a consequence, we calculate taxable income by determining the amount of non-taxable income in the form of pensions that the income unit receives, subtracting this from the reported gross income figure and applying a deduction rate by income band on income net of proceeds from rental properties. This deduction rate is calculated from the tables in the Australian Taxation Office's *Taxation Statistics: 1996-97*.

Pre-benefit Income and Asset Levels

In the absence of direct information on the amounts of pension and allowance income that Rental Investors receive we are able to measure a limited number of benefits based on other information contained in the survey. These payment types are:

- Commonwealth Age Pensions
- NewStart and Youth Allowance
- Sole Parent's Pension, and

---

[119] The expected vacancy rate is derived from information in the *1997 RIS* on the reported number of weeks that a property has been vacant in the 12 months prior to the survey. A tobit regression is estimated and the predicted values are employed in the calculation of the relevant terms.

[120] Expected annual maintenance costs are estimated by procedures explained below.

[121] Where these parameters/variables have been calculated from publicly available schedules, the methods employed are reported below in discussing user cost parameters. In the case of annual gross rent and mortgage interest payments reported values from the *1997 RIS* have been employed.

- Parenting Payment.

In order to apply the income tests applicable to the benefit types listed above we need to derive the income unit's pre-benefit income. Our methodology for arriving at the pre-benefit income amount can be demonstrated as follows.

A simple, hypothetical benefits scheme pays B dollars per year when gross income from other sources, Y, is less than the income threshold, T, at which benefit withdrawal commences at the rate of e cents for each dollar of income above the threshold. The investor's gross income inclusive of any benefit payment (Y_B) will then be:

$$Y_B = Y + (B - e(Y - T)) \quad \text{if } Y > T \text{ and } B \geq e(Y-T) \quad \text{(A1.3)}$$

otherwise $Y_B = Y$ if $Y > T$ and $B < e(Y-T)$

$$\boldsymbol{Y_B = Y + B} \quad \text{if } Y \leq T. \quad \text{(A1.4)}$$

Rearrangement yields the following expression for gross income from other sources, the actual benefit payment ($\hat{B}$), and the amount of the benefit withdrawal (W_B).

$$Y = \frac{Y_B - B - eT}{1 - e} \quad \text{(A1.5)}$$

$$\hat{B} = Y_B - \left(\frac{Y_B - B - eT}{1 - e} \right) \quad \text{(A1.6)}$$

$$W_B = B - \left[Y_B - \left(\frac{Y_B - B - eT}{1 - e} \right) \right] \quad \text{(A1.7)}$$

Equation (A1.5) can then be used to infer gross income from other sources. Given this information we are then able to calculate the amount of any benefit withdrawal using equations (A1.6) and (A1.7).

In practice, pension and allowance means testing is more complex than the simple system outlined above with multiple withdrawal rates and, for some benefit types, the spouse's income entering into the calculation. However, in all cases it is possible to arrive at an expression for the benefit withdrawal that is a variant of equation (A1.7).

With respect to the application of the assets test to pension and allowance recipients we are again limited by the lack of detailed information about landlords income by source. However, as pointed out above, the asset test is not relevant.

A1.4 Housing Consumers

For housing consumers who are rental tenants the implicit marginal income tax rate is derived by calculating the change in tax and benefit positions when the income unit has realised liquid assets to allow it to meet the deposit requirements on the acquisition of a property. In the case of an existing owner-occupier the change in the tax and benefit position is based on the change in taxable income and benefits resulting from the realisation of the income unit's equity in the property. Thus:

$$t_k = \frac{\Delta T_k + \Delta Ben_k}{Y_k^A} \quad \text{(A1.8)}$$

where Y_k^A is the income stream from the liquid assets realised to finance the deposit, or the income stream resulting from investment of housing equity in liquid assets. This income stream is calculated by applying the baseline interest rate to the realised equity from sale of the owner-occupier's property. For rental tenants the change in income is calculated using the investment income reported in the survey.

The *1996-97 SIHC* contains far more detailed information on the structure of income received by income units and as a result the technical details of the calculation of tax liabilities and benefit payments are somewhat different to that reported in relation to rental investors.

Taxable Income

The *1996-97 SIHC* reports gross annual income by source for both the reference person and partner where appropriate. As a result we are able to refine our estimates of taxable income using a more comprehensive calculation procedure for pension and allowance income and through a more detailed treatment of deductions.

In the case of rental investors we used average deductions net of rental deductions by income band for 1997 as reported by the Australian Taxation Office (ATO, 1998). This approach reflects the lack of detailed information on amounts of income earned from each source. Deduction rates vary considerably across income categories reported by the ATO in their summary of taxation statistics referred to above. Using the detailed income sources in the *1996-97 SIHC* our treatment of deductions can be more precise. In particular:

1. The average deduction rate for a given deduction class (for example, interest income) is applied to the individual's reported income from that class.
2. The average deduction rate includes deductions on rental income

Pensions & Allowances Income

The *1996-97 SIHC* provides pension and benefit payment amounts for the range of government benefit schemes in place at the time of the survey. As a result, we do not face the difficulty of inferring the payment type and amount received on the basis of an individual's reported characteristics, as we do with rental investors. With better financial information available to us we are able to generate more detailed measures of the pre-benefit income and asset amounts used to calculate reductions under the relevant means testing programs. The process used to arrive at these estimates is discussed in the following subsection.

Pre-benefit Income and Asset Amounts

Benefit payments are subject to both asset and income means tests that are calculated on the basis of pre-benefit income. Income received by an applicant is adjusted in two ways to arrive at this pre-benefit income level.

1. Any net rental losses are added back into the applicant's income. The 1996-97 SIHC reports net rental income and the inclusion of this adjustment is straightforward;
2. Income from financial assets is adjusted by the use of extended deeming rates. The extended deeming rates are applied to the dollar value of financial assets held by the applicant and provide a mechanism for smoothing the impact on any volatility of returns on these assets that might effect the benefit payment. The 1996-97 SIHC reports the dollar value of income from financial investments but does not report the value of these assets. The asset values associated with these income streams is calculated using the yield multiplier methodology adopted by Dilnot (1990). The value of rental investments is calculated using mean values derived from the 1997 RIS for metropolitan and non-metropolitan areas and age bands of the income unit reference person. The value of shares held by the income units is calculated by applying the monthly average dividend yield over 1995-96 reported in the Reserve Bank of Australia Bulletin. The baseline interest rate is used to calculate the value of interest bearing deposits and 'other' sources of investment income reported in the survey. This estimated financial asset base is then used to calculate the income from financial assets under the extended deeming rules that is relevant to the determination of pre-benefit income. (The estimated financial asset base also enters into the calculation of the asset based means test.)

APPENDIX 2 RENT ASSISTANCE IN AUSTRALIA

As described by the Department of Family and Community Services (FACS), Rent Assistance (RA) is 'a supplementary payment added to the pension, allowance or benefit of income support recipients and low income families in the private rental market, in recognition of the housing costs they face'.[122] This payment is received fortnightly as a supplementary payment, along with the recipient's main pension, allowance or benefit payment.[123]

In order to receive RA, a number of criteria must be fulfilled. Eligibility for RA is contingent upon the receipt of a social security pension, allowance or benefit.[124] The criteria for the receipt of such payments and the eligibility for RA are presented in the *Social Security Act 1991*. If the income unit receives only the Family Tax Benefit Part A [FTB(A)], then the criteria for the receipt of this benefit and RA are set out in the *A New Tax System (Family Assistance) Act 1999.* Under this Act, eligibility requirements entail that families must have at least one 'RA child'. An 'RA child' is a child that entitles the recipient of the FTB(A) to a level of benefit that is above the base rate of FTB(A) payments.[125]

In addition to receiving such benefits, pensions or allowances, recipients must rent a home within Australia, and pay, or be liable to pay rent above a specified minimum rent threshold. In the event that RA is allowed, the rate received is 75 cents for each dollar of rent paid above the minimum threshold, subject to a specified maximum level of rent[126]. Rent thresholds and maximum rents also vary according to whether the recipient is eligible under the *Social Security Act 1991* provisions, or the *New Tax System (Family Assistance) Act 1999.* Thresholds are indexed are indexed every six months.[127] Factors that affect eligibility include whether the recipient is single, a member of a couple (and the status of that couple), and their family circumstances.

It must be noted that a number of criteria, if fulfilled, preclude the receipt of RA. These include people who own their own home, aged care residents, those having a partner in receipt of FTB(A) at a rate greater than the base rate, or a recipient of Austudy.[128] Full-time students, as recipients of Youth Allowance, are eligible for RA.[129]

A2.1 Rent paid and the level of Rent Assistance

If an income unit is in receipt of a benefit, pension or allowance, making them eligible for RA, entitlements are determined under the *Social Security Act 1991*. The rent assistance payment (S_i^r) that is made to income unit *i* is determined according to the formula;

$$S_i^r = S_i^m - s\left[b\left(R_i^h - R_i\right)\right] \qquad \text{(A2.1)}$$

where: R_i - is the rent paid by income unit *i*.

R_i^h - is the threshold rent at which the maximum entitlement to rent assistance is paid to income unit type i.

S_i^m - is the maximum entitlement to rent assistance for income unit type i.

---

[122] DFACS (2002) 'Guide to Social Security Law - 1.2.7.10 Rent Assistance (RA) – Description' http://www.facs.gov.au/guide/ssguide/12710.htm

[123] Eligible people with dependent children receive RA with their fortnightly Family Tax Benefit payments through the Family Assistance Office. Those eligible, but without children, receive RA with their regular payment through Centrelink (Centrelink document CH14).

[124] As defined under Section 23 (1) of the Social Security Act 1991 http://www.facs.gov.au/ssleg/ssact/ssasec37.htm#ssa-Section23%281%29-%27socialsecuritybenefit%27

[125] The FTB received must be calculated using Method 1, as set out in; http://www.facs.gov.au/faguide/guide/31430.htm

[126] http://www.facs.gov.au/guide/ssguide/12710.htm

[127] http://www.facs.gov.au/guide/ssguide/51710.htm

[128] This means the income unit is eligible for RA through the partner.

[129] http://www.facs.gov.au/guide/ssguide/38110.htm

$s = 1$ if $R_i < R_i^h$

$s = 0$ if $R_i \geq R_i^h$

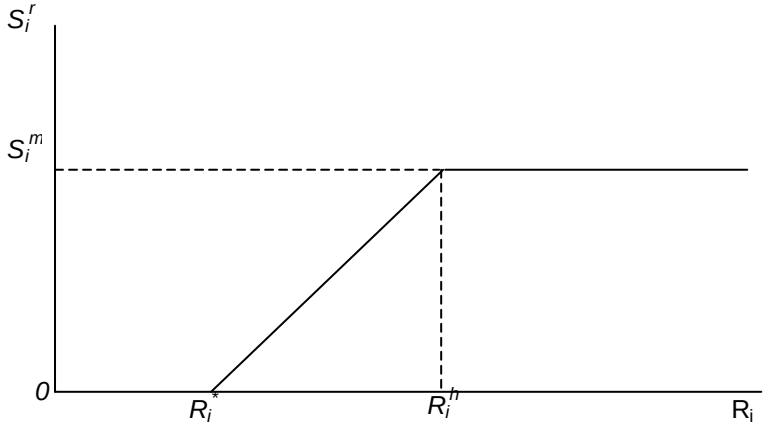
and β = rate of subsidy = 0.75

Note that S_i^r is zero if;

$$R_i \leq R_i^* = R_i^h - \frac{S_i^m}{b} \qquad \text{(A2.2)}$$

where R_i^* is the minimum threshold rent. If the rent paid by an otherwise eligible renter is equal to or less than R_i^*, then no RA will be paid, as is shown between 0 and R_i^* in Figure A2.1.

Figure A2.1 Relationship Between Rent Assistance and Levels of Rent



Suppose, for example, rent paid is greater than R_i^*, but equal to or less than R_i^h. The amount of RA to be received by an eligible renter is three-quarters of the amount by which the rent due exceeds the minimum threshold. That is, for every $1 of rent paid in excess of R_i^*, the eligible renter will receive $0.75 in RA up to the maximum threshold R_i^h. For instance, if an unemployed single person renter were to pay $100 per fortnight in rent, they would be eligible for a fortnightly RA payment of $15.45, since their minimum rent threshold is $79.40 per fortnight (see Table A2.1). If the rent paid is equal to or greater than $198.87 per fortnight, an unemployed single person renter is eligible for a maximum rent assistance payment of $89.60 per fortnight.[130] Once rent exceeds this maximum threshold, RA remains fixed at the maximum. Thus, an eligible single person renter paying $250 per fortnight would receive the same amount of RA ($89.60) as one in similar circumstances paying $198.87.

[130] A schedule for such payments may be found at;
http://www.facs.gov.au/guide/ssguide/51710.htm

Table A2.1 Parameters for Rent Assistance

Customer Status	Minimum Rent Threshold (R_i^*) $ per fortnight	Maximum Rent Threshold (R_i^h) $ per fortnight	Maximum Rent Assistance (S_i^m) $ per fortnight
Under Social Security Act 1991[a]			
Single	79.40	198.87	89.60
Single, shared accommodation	79.40	159.00	59.70
Partnered	129.40	241.93	84.40
Partnered[1]	79.40	198.87	89.60
Partnered[2]	79.40	191.93	84.40
Under Family Assistance Act 1999[b]			
Full-care, 1-2 children	102.62	240.00	103.04
Full care, 3 or more children	151.90	307.21	116.48
Shared care[3]	77.98	195.58	88.2
Shared care[4]	127.26	237.58	82.74
Shared care[5]	77.98	188.30	82.74

1 – Illness separated couple, respite care couple, partner in gaol.
2 – One of a temporarily separated couple.
3 – Is single; or has a partner in gaol; or is a member of an illness separated couple; or is a member of a respite care couple.
4 – Is partnered.
5 – Is a member of a temporarily separated couple.

a – Source; Guide to Social Security Law, with figures correct as of 20th September 2001 http://www.facs.gov.au/guide/ssguide/51710.htm
b – Source; Family Assistance Guide, with figures correct 2 July 2001.
http://www.facs.gov.au/faguide/guide/31430.htm#3.1.4.30

Relationship with Income

The recipient's income does not directly affect the level of RA. However, payments of benefits, allowances and pensions *are* dependent upon the recipient's level of income, and eligibility for RA is contingent upon the receipt of such payments. Payment of RA is thus indirectly dependent upon the recipient's level of assessable income. However, assessable income is measured in different ways, depending upon which benefit, pension or allowance is being assessed.

The Family Tax Benefit (Part A) and Rent Assistance

If an income unit is not in receipt of any other pensions, allowances or benefits, then in order to be eligible for RA, they must receive FTB(A) in excess of the base rate. Income units that satisfy rent payment criteria will then receive RA as a supplementary payment within FTB(A) entitlements. Designed principally to aid families with the cost of raising children, eligibility for the FTB(A) depends upon the recipient having a dependent child up to and including the age of 20, or a dependent full-time student between the ages of 21 and 24 years, who does not receive Youth Allowance (YA) or a similar payment.[131] The recipient must also be an Australian resident and have an 'adjusted taxable income' under a certain level.

Adjusted taxable income is the sum of a recipient's taxable income, reportable fringe benefits, net rental property losses, foreign income, certain tax-free pensions or benefits, minus any child maintenance that is paid. Social Security payments that are to be included in the definition of adjusted taxable income are: Age Pension; Widow Pension; Parenting Payment; Bereavement Allowance; Newstart Allowance; Youth Allowance; Widow Allowance; Mature Age Allowance; Austudy, Abstudy Living Allowances, Carer Payments, Wife Pensions, Disability Support Pensions.[132] Tax free benefits and pensions that are not part of adjusted taxable income include

[131] http://www.familyassist.gov.au/Internet/FAO/FAO1.nsf/Payments/FTBA.html
[132] In this list are payments that regarded as taxable and non-taxable by the Australian Taxation Office, but are both included in adjusted taxable incomes.

Rent Assistance, Pharmaceutical Allowance, Remote Area Allowance, Multiple Birth Allowance and Large Family Supplement.[133] If a member of a couple is applying for FTB(A), then the adjusted taxable income to be assessed is that of the family as a whole. FTB(A) payments themselves are also not included.

The level of FTB(A) payment received varies in relation to both the level of adjusted taxable income and the number of dependents in the claiming family. If an income support payment is received from either Centrelink or Veteran's Affairs, and the other eligibility criteria are fulfilled, then such a recipient automatically becomes eligible for the maximum rate of FTB(A), without having to undergo an income test.[134] This 'maximum rate' is comprised of what is referred to as the standard rate of FTB(A), plus any supplementary payments that may include Multiple Birth Allowance (MBA), and the Large Family Supplement (LFS), as well as RA. There is no assets test for FTB(A).[135]

The 'standard rate' is the highest level of FTB(A) that may be received, prior to the implementation of the income test and the addition of any supplementary payments. This is shown in Figure A2.2 as F_i^s. The standard rates that each child entitles an eligible family to receive are shown in Table A2.2.

Table A2.2 Standard and Base Payments of FTB(A)

For each child	FTB(A) payment $ per fortnight
Standard Rate	
Under 13 years	122.92
13-15 years	155.82
16 –17 years	39.48
18 – 24 years	53.06
In an approved care organisation	39.48
Base Rate	
Under 18 years	39.48
18-24 years	53.06

Source: Centrelink, *A guide to Commonwealth Government Payments*, p.2

The 'maximum rate', is equal to the standard rate plus any supplementary payments. The maximum rate, F_i^m in Figure A2.2, will be received whilst the recipient's adjusted taxable income is within the 'income free area' – to the left of Y_i^m, which is currently set at $29857.[136] This income free area does not vary with regards to individual circumstances. Once the recipient's adjusted taxable income exceeds Y_i^m, the payment received until this point, F_i^m, is reduced by 30 cents for every dollar that is earned above the income free area[137]. This tapering of the maximum rate will continue until the base rate of payments is achieved, F_i^b.

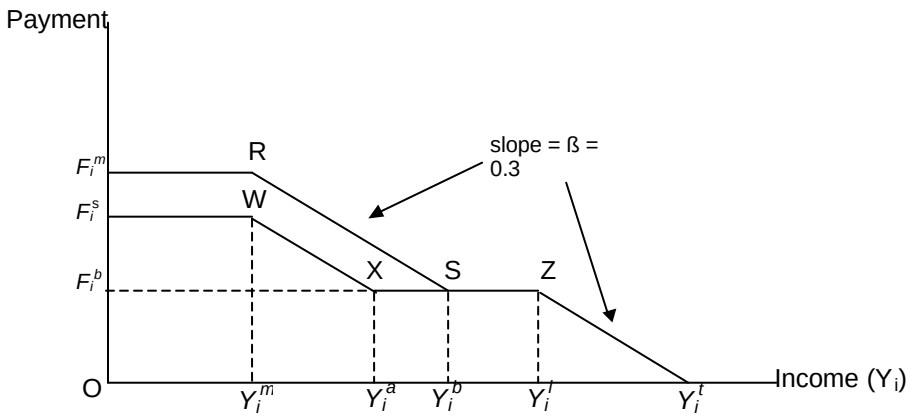
The base amount of FTB(A) payments that may be received varies according to the age of the children in the eligible family. For each child under 18 years of age the base FTB(A) payment is $39.48 per fortnight, or $1029.30 per year. For each eligible child over 18 years of age, the base payment is $53.06 per fortnight or $1383.35 per year. As both the maximum rate, which is the level of payments from which the 'taper' begins, and the base rate are both contingent upon family circumstances, the level of income at which the base rate is initially received, Y_i^b, will also vary.[138]

In Figure A2.2, the base rate is the level of FTB(A) payments that will be received until Z. At this point, the recipient's adjusted taxable income exceeds what is referred to as the 'higher income free area', designated as Y_i^l. The higher income free area ends with an annual adjusted taxable

[133] A Guide to Commonwealth Payments (1 July 2001-19 September 2001), Chart F, page 23. http://www.familyassist.gov.au/Internet/FAO/FAO1.nsf/Income/whatis.html
[134] http://www.familyassist.gov.au/Internet/FAO/FAO1.nsf/Payments/FTBA.html
[135] Family Assistance Office. July 2000. Guide to Payments. p.4.
[136] FAA - Schedule 1-Clause 19.
[137] http://www.facs.gov.au/faguide/guide/31420.htm
[138] If no supplementary payments are received, then the base rate will be received at the income level Y_i^a.

income of $77,234 plus $3,139 for every additional child after the first.[139] After this level of income is surpassed, another taper takes effect, where the base FTB(A) payments are reduced by 30 cents for every extra dollar of income that is earned, until point Y_i^t is reached, and no more payments will be received.[140]

Figure A2.2 Relationship between levels of adjusted taxable income and FTB(A) payments



Consider an FTB(A) receiving income unit who is paying $R_i = R_i^*$, and is therefore ineligible for RA. Assuming that the income unit is not receiving MBA or LFS, the standard rate, F_i^s, is also the unit's maximum rate. This relationship between the FTB(A) payment and the income unit's adjusted taxable income is designated by the line in Figure A2.2; F_i^s –*W- X- Z-* Y_i^t. The standard rate is reduced at the rate of 30 cents for every dollar of adjusted taxable income that exceeds Y_i^m until the base rate F_i^b is received. The base rate is received until the adjusted taxable income reaches the level Y_i^l. From this point, a second taper begins, and the base rate is reduced at the same rate as previously noted until no further payment is received (Y_i^t).

Now consider a similar income unit paying rent $R_i > R_i^*$, and thus entitled to RA. This income unit's maximum rate of FTB(A) is the standard rate F_i^s, plus the RA entitlement as given by equation (1). This is the level of payments shown by F_i^m in Figure A2.2. Once this income unit's adjusted taxable income exceeds Y_i^a, the level of RA received is reduced by 30 cents for every extra dollar of income that is earned.[141] At income level Y_i^b, RA is zero. This income unit has an FTB(A) payment schedule designated by the line F_i^m *-R -S -Z -*Y_i^t.

If $Y_i > Y_i^a$, then the initial level of RA begins to decrease, as Y_i increases. The payment of RA received, S_i, IS be given by;

$$S_i = S_i^r - a\left(Y_i - Y_i^a\right) \qquad \text{(A2.3)}$$

where S_i^r is determined according to equation (1) and where α is equal to 0.3. Thus, S_i is equal to zero when;

$$Y_i = Y_i^b = \frac{S_i^r}{a} + Y_i^a \qquad \text{(A2.4)}$$

Incorporating the 'indirect' income tests, the relationship may be expressed more succinctly as;

$$S_i = S_i^m - s\left[b\left(R_i^h - R_i\right)\right] - d\left[a\left(Y_i - Y_i^a\right)\right] \qquad \text{(A2.5)}$$

where: $d = 1$ if $Y_i > Y_i^a$

$d = 0$ if $Y_i = Y_i^a$

[139] FAA, Schedule 1, Clause 2.

[140] The income thresholds for the calculation of FTB(A) payments are indexed annually. http://www.facs.gov.au/faguide/guide/31160.htm

[141] In administering payments the authorities do not distinguish between FTB(A) and RA, since the latter is a supplementary payment paid with FTB(A). However, conceptually, we can talk in terms of an RA 'taper'.

$S_i = 0$, if either $R_i = R_i^*$ (See equation 2), given $d = 0$, OR,

$$Y_i \geq Y_i^b = \frac{S_i^m}{a} + Y_i^a, \text{ given } s = 0. \qquad \text{(A2.6)}$$

Social Security payments and Rent Assistance

To be eligible for RA under the *Social Securities Act 1991*, one must be entitled to receive a social security pension, benefit or allowance.[142] Recipients of such payments who also satisfy the rent payment criteria receive RA as a supplementary payment. As with FTB(A), receipt of RA is indirectly dependent upon the level of income earned by the recipient, and the methods of calculating total payments of RA to be received are essentially the same. However, the definitions of income applied in the tests determining eligibility for Social Security payments are different from those implemented with regards to FTB(A), as are the parameters determining the levels of payments to be received.

The receipt of pensions, benefits and allowances are contingent upon a number of basic conditions specific to each type of payment. For example, to qualify for an Age Pension, a claimant must be over a certain age, and fulfil specific residency requirements.[143] Other examples of pensions include the Disability, Wife, Widow, and Parenting Pensions and the Carer and Parenting Payments. Similarly, a recipient of Newstart Allowance must be unemployed; capable of and available for undertaking work; aged over 21 whilst still under the Age Pension age; and willing to participate in a Preparing for Work Agreement if required. Other allowances include Youth Allowance, Austudy and Abstudy payments, Partner Allowance, Widow Allowance, Sickness Allowance and Mature Age Allowance.

Despite the diversity and specificity of the requirements for the various pensions, benefits and allowances, the methods of determining levels of payment once the basic eligibility requirements have been met are essentially the same, although levels of payments differ quite significantly.[144] A 'maximum basic rate' is determined using schedules set out within the *Social Securities Act 1991*.[145] This is the maximum level that a recipient is eligible for solely on the basis of qualifying for a specific pension, benefit or allowance. For example, the maximum basic rate to be received by a single person on the Age Pension, is $410.50.[146] Assuming that a single recipient does not receive any Pharmaceutical Benefits, but pays a private rent of $150 per fortnight, they are then eligible for RA of $52.95 per fortnight (see Table A2.1). This supplementary benefit is then added to the maximum basic rate to achieve what is referred to as the 'maximum payment rate' of $463.45. If no supplementary payments are to be received, then the maximum payment rate is equivalent to the maximum basic rate.

Following the calculation of a maximum payment rate, the Ordinary Income Test is applied to ascertain the effect of a person's ordinary income on the payment they will actually receive.[147] A

---

[142] http://www.facs.gov.au/guide/ssguide/38110.htm

[143] http://www.centrelink.gov.au/internet/internet.nsf/payments/qual_how_agepens.htm

[144] A difference between the pension and benefit calculators is that the pensions are based upon annual income whereas the benefits are based upon fortnightly income. For the sake of convenience, all figures referred to will be fortnightly.

[145] For example, the Pension Rate Calculator A, which pertains to the Age Pension, Disability Support Pension, Wife Pension, Carer Payment, and Mature Age Allowance is found at:
http://www.facs.gov.au/ssleg/ssact/ssas1457.htm
The Benefit Rate Calculator B, which pertains to the Newstart Allowance, Sickness Allowance, Partner Allowance and Widow Allowance is to be found at:
http://www.facs.gov.au/ssleg/ssact/ssas2542.htm
The Youth Allowance Rate Calculator schedule may be found at:
http://www.facs.gov.au/ssleg/ssact/ssas1756.htm

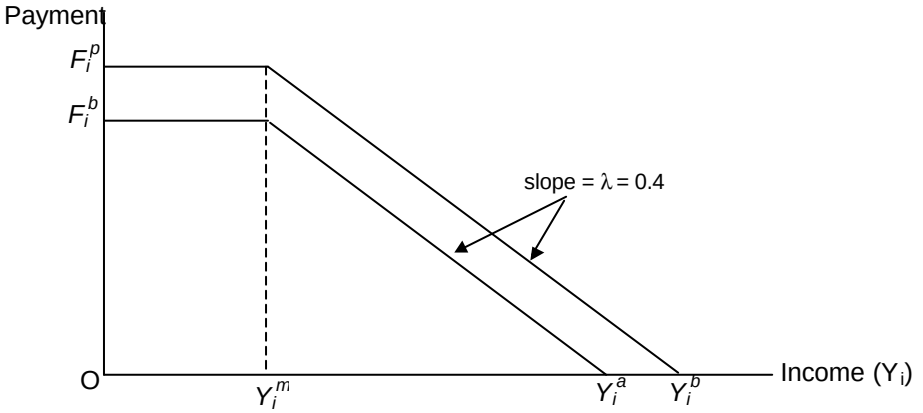
[146] http://www.facs.gov.au/guide/ssguide/51810.htm
In compensation for the introduction of the Goods and Services Tax, a pension supplement is added to maximum basic amount. This supplement is 4 percent of what the person's maximum basic rate would have been at July 1 2000, rounded to the nearest multiple of $2.60.
(cf. http://www.facs.gov.au/ssleg/ssact/ssas1460.htm)

[147] http://www.facs.gov.au/ssleg.ssactssas1466.htm The rate of pension received is actually dependent upon both an income and an asset test. The pension is calculated under both tests and, the lower rate is applied.

similar test is also to be applied to the ordinary income of a recipient's partner.[148] The actual level of payment received by an individual is dependent upon their maximum payment rate, their 'ordinary income' and the specified 'ordinary income free area'.

Ordinary income is the sum of an individual's gross income from earnings, including fringe benefits, deemed income from financial investments, net income from businesses, including farms, net income from rental property, income from boarders and lodgers, superannuation, overseas pensions and income from income stream products.[149] It does not include tax-free pensions, benefits and allowances.

Figure A2.3 Relationship between Ordinary Income and Pensions[150]



So long as an individual's ordinary income (Y_i) does not exceed the ordinary income free area (Y_i^m), the maximum payment rate (F_i^p) is received, as shown in Figures 6 and 7. The relationship depicted in Figure A2.3 is specific to pensions, such as the Age Pension, whilst that shown in Figure A2.1 is relevant to allowances such as the Newstart Allowance. The maximum payment rate is equal to the maximum base rate (F_i^b), plus any supplementary payments including RA. If the level of ordinary income of the individual is greater than the ordinary income free area, the difference between the two is referred to as the 'ordinary income excess'. The rate of payment received, assuming the recipient is single, is then the maximum payment rate minus a proportion of the ordinary income excess. This amount is referred to as the 'ordinary income reduction'. The proportion by which the payment is reduced differs, depending on what type of payment is received.

The relationship seen in Figure A2.3 depicts the receipt of a pension. As Y_i exceeds Y_i^m, the maximum levels of payment to be received begin to taper downwards at a rate of – 0.4. [151] That is, for every 1 dollar of ordinary income that is earned above the ordinary income free area, the recipient will lose forty cents of their maximum payment rate, until no further payment is received.

The relationship between the income of a pension recipient and the RA that is received is thus defined by the equation;

$$S_i = S_i^m - s\left[b\left(R_i^h - R_i\right)\right] - e\left[l\left(Y_i - Y_m^i\right)\right] \qquad \text{(A2.7)}$$

where; Y_i = ordinary income of recipient

Y_i^m = ordinary income free area

$\varepsilon = 1$, if $Y_i^m < Y_i < Y_i^b$

$\varepsilon = 0$, if $Y_i = Y_i^m$ or $Y_i > Y_i^b$

$\lambda = 0.4$.

All other parameters are as for the previous equations.

---

[148] http://www.facs.gov.au/ssleg.ssactssas2545.htm

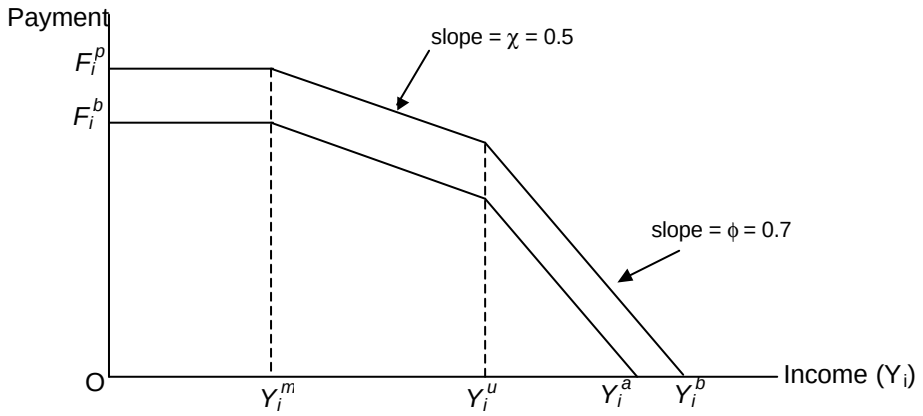
[149] http://www.facs.gov.au/guide/ssguide/11o30.htm

[150] The relationship with a single taper applies to the Age Pension, Disability Support Pension, Bereavement Allowance, Widow 'B' Pension, and the Mature Age Allowance (granted before 1 July 1996).

[151] http://www.facs.gov.au/guide/ssguide/42110.htm

The relationship between levels of ordinary income and payment received is slightly different for individuals receiving allowances such as Newstart. As previously, eligible individuals will receive the maximum payment rate until the ordinary income free area is reached, at Y_i^m. At this point, payment will decrease at a rate of 0.5. The recipient will lose 50 cents in their payment for every extra dollar earned over the ordinary income free area. This decline in payment will continue until the 'upper personal income taper' (Y_i^u) is reached, whereby the rate of reduction will increase to 0.7, or 70 cents for every extra dollar earned.[152] This will continue until the recipient is eligible for no further payment. This relationship is displayed graphically in Figure A2.4. The levels of income at which this taper begins are set out in Table A2.3.

Figure A2.4 Relationship Between Ordinary Income and Allowances[153]



This upper personal income taper entails an extra term being added to equation (A2.7) to produce the relationship between RA and income given receipt of allowances such as Newstart. This relationship can be written as;

$$S_i = S_i^m - s\left[b\left(R_i^h - R_i\right)\right] - t\left[c\left(Y_i - Y_i^m\right)\right] - p\left[f\left(Y_i - Y_i^u\right)\right] \qquad \text{(A2.8)}$$

where; Y_i^u = upper personal income taper

Y_i^m = ordinary income free area

$t = 1$, if $Y_i^m < Y_i = Y_i^u$

$t = 0$, if $Y_i = Y_i^m$ or $Y_i > Y_i^u$

$c = 0.5$

$p = 1$, if $Y_i^u < Y_i$

$p = 0$, if $Y_i = Y_i^u$ or $Y_i > Y_i^b$.

$f = 0.7$

and all other parameters are as defined earlier.

The relationship depicted in Figure A2.1 differs slightly with regard to Youth Allowance. The 'Full-time Student Income Bank' allows YA recipients to accumulate up to $6000 of any unused portion of their ordinary income free area in the form of 'income bank credits'. Such credits can then be used to offset any income earned that exceeds the fortnightly income-free area. In the long-term, the relationship is that which is shown in Figure A2.4.

When calculating the level of benefits to be received by persons who are members of a couple, certain additional provisions must be considered. For the purposes of calculating the level of

[152] Guide to Commonwealth Government Payments, p. 21.

[153] The relationship with a dual taper applies to the Youth Allowance, Newstart Allowance, Sickness Benefits and the Mature Age Allowance (granted after 1 July 1996).

pensions to be paid, the ordinary income of a member of a couple is defined as being half of the couple's combined ordinary income.[154]

The treatment of recipients of benefits and allowances with partners is generally more convoluted. If a recipient has a partner, then the 'partner income free area' must be calculated. This is subject to a number of provisions. If a recipient's partner is not receiving a social security benefit, the recipient's partner income free area is the amount of income that, if the partner was hypothetically receiving Newstart Allowance, would preclude them from receiving it.[155] That is, the partner income free area is that level of income which, if the partner was to claim Newstart, would exclude them from receiving any payments, because their income would be too high. In terms of the relationship between payments and income, such as that shown in Figure A2.4, this would be designated by Y_i^b – where social security payments cease with regards to income. If the partner is receiving a social security benefit, then the partner income free area is the amount where the partner would cease to receive that benefit (again at Y_i^b).

The amount by which the partner's ordinary income exceeds the designated partner income free area is referred to as the 'partner income excess'. This is multiplied by 0.7 to calculate the 'partner income reduction.'[156] This amount is then combined with the recipient's ordinary income reduction, as described above, to calculate the overall 'income reduction', which is then subtracted from the maximum payment rate to calculate the level of payment received.

Various ordinary income free areas, and maximum basic rates are specified. These levels differ according to which pension or benefit is to be received, and the recipient's family situation, as shown in Table A2.3.

[154] http://www.facs.gov.au/ssleg/ssact/ssas1586.htm
[155] http://www.facs.gov.au/ssleg/ssact/ssas1856.htm
nb. If the partner was under the age of 18, then the provision would apply to receipt of Youth Allowance. In both cases the partner's income refers to any amount earned, derived or received, including periodical payments and benefits. This excludes home equity conversion agreements of less than $40,000. (cf. http://www.facs.gov.au/ssleg/ssact/ssasect8.htm#ssa-Section8%281%29-%27income%27).
[156] http://www.facs.gov.au/ssleg/ssact/ssas1997.htm

Table A2.3: Basic Parameters for the Calculation of Social Security Payments

Category	Maximum Basic Rate (F_i^b) $ per fortnight	Ordinary Free Income Area (Y_i^m)[1] $ per fortnight	Upper Personal Income Taper Area (Y_i^u)[2] $ per fortnight
Age Pension[3]			
Single	402.00	112	-
Couple	335.50	100[5]	-
Disability Support Pension[3]			
Single, age <18, at home	240.80[4]	112	-
Single, age <18, independent	372.10[4]	112	-
Single, age 18-20, at home	272.90[4]	112	-
Single, age 18-20, independent	372.10[4]	112	-
Single, age > 20	402.00	112	-
Member of couple	335.50	100[5]	-
Newstart			
Single, age > 21, no children	357.80	62	142
Single, age > 21, with children	386.90	62	142
Single, age = 60, after 9 months	386.90	62	142
Couple	322.80	62	142
Youth Allowance			
Single, age < 18, at home	158.80	236	316
Single, age < 18, away from home	290.10	236	316
Single, age > 18, at home	190.90	236	316
Single, age > 18, away from home	290.10	236	316
Single, with children	380.10	236	316
Couple, no children	290.10	236	316
Couple, with children	318.60	236	316

1 – For pensions, payment is reduced by 40 cents for every dollar of ordinary income in excess of this amount. For the allowances listed, payment is reduced by 50 cents for every dollar in excess of this limit, until the upper personal income taper is reached.
2 – Payment is reduced by 70 cents for every dollar of ordinary income that exceeds this limit.
3 – The ordinary income free area is increased by $24.60 for each dependent child of a recipient of either the Age or Disability Support Pension. If both members of such a couple are receiving a pension, the ordinary income free area is extended by only $12.30 for each dependent child.
4 – If a person in these circumstances has a child, their maximum benefit payment is $402.
5 – Ordinary income is determined by halving the couple's combined ordinary income in these cases.

Source: Centrelink 'Guide to Commonwealth Payments'

Consider again the single recipient of the age pension, receiving a maximum basic payment (F_i^b) of $410.50 and a RA payment of $52.95, leading to a maximum payment rate (F_i^p) of $463.43.[157] This maximum payment rate will be received so long as the recipient's ordinary income levels remain below the ordinary income free zone (Y_i^m) of $112. If such a recipient generates an ordinary income of $200 per fortnight, then they will receive a fortnightly payment of $428.25, which includes RA. This is because for every dollar they have earned over the income free zone their maximum payment rate is reduced by 40 cents. If ordinary income was equal to or above $1270.62 per fortnight, then no payment would be received. This is shown in Figure A2.3 as Y_i^b.

Now consider a single person, aged over 21, with no children, and receiving both Newstart at the maximum basic rate of $357.80 per fortnight and a RA payment of $52.95 per fortnight, leading to a maximum payment rate of $410.75 per fortnight. Again, this amount will be received so long as the recipient's ordinary income remains below the ordinary income free zone of $62 per fortnight. If the recipient is generating an ordinary income of $100 per fortnight, their payment will be reduced by 50 cents for every dollar of ordinary income over the ordinary income free zone, leading to a total payment of $391.75 per fortnight. If the recipient was to earn an ordinary income of $200 per

[157] This is based on the assumption that the subject is paying $150 per fortnight in rent.

fortnight, a figure greater than the upper personal income taper of $142 per fortnight, they would receive a total of $330.15. In this case, $40 is deducted for the $80 of ordinary income in excess of the ordinary income free area, but less than the upper personal income taper, and $40.60 is deducted for the $58 in excess of the upper personal income taper area.

APPENDIX 3 BENCHMARKING EXERCISE

In order to benchmark the performance of our model we compare the results of simulations conducted using the model against the performance of a logit regression model based on that used by Bourassa (1995).

A3.1 Bourassa's Model

Bourassa conducts an analysis of the impact of borrowing constraints on the tenure choices of Australian households using the 1990 Income and Housing Costs and Amenities Survey conducted by the Australian Bureau of Statistics. The principal similarities and differences between our model and Bourassa's are outlined below:

1. A common approach exists in the specification of borrowing constraints although we include transaction costs on acquisition in our specification. We also set both the maximum loan-to-value ratio and the maximum earnings multiple using information derived from the 1999 Australian Housing Survey (*1999 AHS*). Our maximum Loan-to-value ratio is higher (0.9 compared to 0.75) and our earnings multiples depend on the structure of the income unit.
2. We adopt Bourassa's specification of the borrowing constraints, defining moderately and highly income or wealth constrained in the same way. We also adopt the same specification of what Bourassa refers to as the *Haurin-Kamara* borrowing constraints.
3. Three logit models of tenure choice are estimated for income units with a household head aged between 25 and 34 years. These models are:
4. A standard tenure choice model which specifies the probability of ownership as a function of expected and transitory income (including the square of expected income), the cost of owner-occupation relative to the cost of renting, and a set of socio-economic variables. For the purposes of this benchmarking exercise we estimate the expected and transitory income components using the same approach adopted by Bourassa and use the same socio-economic variables. However, we make use of the long-run economic costs of owner-occupation and renting used by our simulation model.
5. A tenure choice model incorporating borrowing constraints that allows for an income unit to be either moderately or highly constrained, the latter being the case when the income units optimal housing value is more than 1.2 times the value of the constraint.
6. A tenure choice model incorporating the borrowing constraints that allows for a dollar value measure on the constraint, allow for some effect of the gap between optimal value and constraint on unconstrained income units and allows for a discontinuity at the point where the gap equals zero.

A3.2 Empirical Results

Using a logit model to predict the tenure choices of households yields results that are close to, but not superior to, the allocation of tenures achieved by the simulation model. The result of the logit regression models are presented in Table A3.1 on the following page. In the absence of any borrowing constraints the logit model accurately predicts 78.2% of tenure outcomes for housing consumers. Introducing borrowing constraints to the model increases the predictive accuracy of the logit models to 91.8% in the case of the model using borrowing constraint dummies and to 91.4% using the Haurin-Kamara constraint specification.

Table A3.1 Logit Model of Tenure Choice

	Coefficient /(Significance level)		
Variable	Standard Model	With Borrowing Constraint Dummies	With Haurin-Kamara Constraints
Constant	**-5.002**	**-0.618**	**-8.688**
	.000	0.523	0.213
Income			
Expected Income	**$1.304*10^{-4}$**	**$8.267*10^{-5}$**	**$7.087*10^{-5}$**
	.000	0.001	0.004
Expected Income Squared	**$-6.789*10^{-10}$**	**$-8.003*10^{-10}$**	**$-6.827*10^{-10}$**
	0.002	0.002	0.009
Transitory	**$1.986*10^{-5}$**	**$4.032*10^{-6}$**	**$-1.295*10^{-5}$**
	.000	0.538	0.030
Relative Cost Ratio	**-0.427**	**0.391**	**-1.497**
	0.200	0.385	0.001
Head Aged 30-34	**0.667**	**0.825**	**1.336**
	.000	.000	.000
Marital Status			
Never Married	**0.057**	**-1.527**	**-1.196**
	0.822	0.000	0.001
Divorced, separated or widowed	**0.343**	**-0.958**	**-0.789**
	0.275	0.046	0.066
Female Head	**0.010**	**0.363**	**0.250**
	0.957	0.187	0.326
Household Size	**0.241**	**0.319**	**0.569**
	.000	0.002	.000
Borrowing Constraints			
ModW		**-0.8**	
		0.204	
HighW		**-4.676**	
		.000	
ModY		**-0.562**	
		0.085	
HighY		**-0.662**	
		0.022	
GAPPOS			**$-4.001*10^{-5}$**
			.000
GAPNEG			**9.003**
			0.195
GAPINT			**8.615**
			0.215
Log-likelihood	1689.49	856.386	953.796
Cox-Snell R-Square	0.322	0.568	0.544
Prediction Error Rate	0.218	0.082	0.086

The results from the logit model can be compared with the results from the AHMM microsimulation model when the relative price rule, income constraint and wealth constrain are applied simultaneously. Two sets of results are presented. The first set are based on the assumption that the loan-to-value ratio of existing owner-occupiers is set at 90% of the estimated value of the property. The second set of simulations used the loan-to-value ratios reported by these income units in relation to the property they own.

When the loan-to-value ratio is set at 90% of the reported property value the AHMM microsimulation model accurately predicts 90.3% of the 3292 cases with a reference person aged under-35. The accuracy rate for existing rental tenants is 99.8% so that much of the overall prediction error is composed of owner-occupiers allocated to rental tenancy. Part of the reason for this misallocation is the use of the 90% assumption in relation to the loan to value ratio that is used to specify the constraints. Using the loan-to-value ratio the predictive accuracy for current owner-occupiers increases from 57.9% to 78.6%. Of the remaining owner-occupiers allocated to rental tenancy by the AHMM microsimulation model, 62.2% would be eligible for rent assistance payments if they were to move to a rental tenancy.

Table A3.2 Observed and Predicted Tenures under Simultaneous Application of Constraints and Relative Price Criteria – 90% LVR for Owner-Occupiers

Observed Tenure	Owner – Occupier No Mortgage	Owner – Occupier No Mortgage	Rental Tenant	Total
Predicted Tenure				
Owner-Occupier	72 60.0%	344 57.5%	17 0.7%	433 13.2%
Rental Tenant	48 40.0%	254 42.5%	2557 99..3%	2859 86.8%
Total	120	598	2574	3292

Table A3.3 Observed and Predicted Tenures under Simultaneous Application of Constraints and Relative Price Criteria – Observed LVR for Owner-Occupiers

Observed Tenure	Owner – Occupier No Mortgage	Owner – Occupier No Mortgage	Rental Tenant	Total
Predicted Tenure				
Owner-Occupier	106 88.3%	458 76.6%	17 0.7%	581 17.6%
Rental Tenant	14 11.7%	140 23.4%	2557 99..3%	2711 82.4%
Total	120	598	2574	3292

APPENDIX 4 TENURE ASSIGNMENT SIMULATIONS USING FIRST HOME BUYER PROBABILITIES

Survey responses in the Australian Bureau of Statistics' 1999 Australian Housing Survey (*1999 AHS*) can be used to derive an alternative method for identifying first home buyers who are able to take advantage of policies such as Housing Partnerships and First Home Owner Grants. Respondents to the survey are asked whether they have ever been an owner-occupier or purchaser. To generate probabilities for the proportion of first homebuyers the frequency distributions by age-tenure/landlord cohort are calculated for rental tenants and reference persons of income units in 'other' tenure types. These proportions are then used to generate a random assignment of first homebuyers, using a uniform distribution, by corresponding cohort in the *1996-97 SIHC*. The advantage of this method is that first homebuyers are not arbitrarily restricted to a particular age cohort.[158]

The probabilities derived from the *1999 AHS* are reported in Table A5.1. 'Boarder' landlord types generated from the *1999 AHS* are rent paying income units where the landlord resides in the same dwelling as the income unit. Assuming all income units under 35 years of age are first home buyers results in 61.2% (2574) of all non-owner occupier income units being eligible for targeted policies such as the First Home Owner Grant. Using the probabilities in Table A4.1 73.4% (3084) of all non-owner occupier income units are identified as potential first homebuyers.

Table A4.1 Probability Income Unit is A First Home Buyer

	Other Tenure	Public	Private Landlord	Boarder	Other
Age Band					
15-19	1.0	1.0	1.0	1.0	1.0
20-24	0.9	1.0	1.0	1.0	1.0
25-29	0.8	0.9	0.9	0.9	0.9
30-34	0.7	0.9	0.7	0.8	0.9
35-39	0.4	0.8	0.5	0.7	0.6
40-44	0.4	0.7	0.4	0.5	0.4
45-49	0.5	0.8	0.4	0.6	0.3
50-54	0.3	0.7	0.3	0.6	0.4
55-59	0.3	0.6	0.4	0.3	0.3
60-64	0.1	0.7	0.3	0.4	0.6
65-69	0.3	0.7	0.2	0.6	0.5
70-74	0.3	0.6	0.4	0.5	0.6
75 and Over	0.2	0.7	0.4	0.4	0.5
Total	0.5	0.8	0.6	0.8	0.6

Based on the ABS 1999 Australian Housing Survey person records.

Table A4.2 and A4.3 compare the results of simulations using both methods of identifying first home buyers. The difference in predicted owner-occupation shares for the reference system and first home owner grants show some variation under the alternative methods when relative prices are used to assign income units to tenures. The factors that drive the change in the homeownership share under the relative price criterion deserve further explanation. Given that the value of the grant to an income unit is amortised over the life expectancy of the reference person in the income unit the grant should have a higher value to older first home buyers. We might expect that this would lead to a larger increase in the number of income units who find that homeownership becomes cheaper relative to renting. However, the results reported in table A4.2 show a decrease in the assigned homeownership share under both the $7,000 and $14,000 grant. Three factors appear to lead to this result. First, while the value of the FHOG does indeed increase as the age of the income unit reference person increases, mean bid rental rates for rental tenants

[158] They are still arbitrarily identified in the sense of being randomly assigned to first homebuyer status.

decline between the ages of 15 and 50 years but increase from that point on[159]. The greater contribution of the grant at older ages is offset by higher mean bid rental rates and this will limit the number of income units who find that homeownership becomes economically optimal. Second, income units with reference persons aged between 35 and 64 years have lower mean bid rental rates than older or younger income units. The proportion of income units with a reference person aged between 15 and 34 years who are eligible for the grant and who find that renting is optimal on relative price grounds in the absence of the $14,000 grant is 88.4%. For income units with a reference person aged between 35 and 64 years this proportion falls to 64.2%. . As a result, the proportion of FHOG eligible income units who find homeownership cheaper in the absence of a grant is higher when age based probabilities are used to identify first home buyers. Third, for those income units who find that renting is cheaper than homeownership in the absence of a grant, the cost disadvantage of owner occupation, the mean difference between their bid rental rate and the market rental rate, increases with age. This mean difference is less than 0.7 percentage points for income units with a reference person aged less than 25 years. For income units with a reference person older than 25 years the mean difference increases to over 1 percentage point and is around 2 percentage points for income units with a reference person over 64 years old. These observations suggest that there is a sample selection effect at work in the results. Over time, income units with bid rental rates close to the market rental rate are able to enter into home ownership[160]. When we examine older income units in rental tenancy using the SIHC data what we then see is an increasing proportion of income units with high bid rental rates as we move from young to old. Again this limits the number of income units who will then find that homeownership becomes cheaper when we model the effect of the FHOG grants using age based probabilities to identify first home buyers.

Homeownership increases more dramatically when housing partnerships are modelled using the age based probabilities. As noted in Chapter 5 housing partnerships reduce the bid rental rates of eligible tenants because they allow the income unit to enjoy the (imputed) rent stream on the limited partner's share without incurring the financing costs they would incur on that share as a full owner-occupier. As the only restriction we place on the managing partner's share is that it remains positive. It is possible for an income unit to select an equity share that overcomes the third point in the previous paragraph. That is, the bid rental rate can be lowered far enough to make homeownership economically viable. As a result, the assigned homeownership share is 0.6 percentage points higher when we use age based probabilities to identify first home buyers.

When borrowing constraints are taken into account only small variations in the predicted share of owner-occupiers occur in the case of the reference system and the First Home Owner grants. This suggests that the wealth and income constraints that we described in Chapter 3 are also important in terms of explaining the tenure choices of older Australian rental tenants. Again, because our modelling of housing partnerships allows a wide range for the managing partner's share housing partnerships are effective in overcoming borrowing constraints. The increase in the share of homeownership for housing partnerships under the relative price criterion is reproduced when tenure assignment is based on both borrowing constraint and relative price criteria.

[159] The $14,000 FHOG reduces the mean bid rental rate (6.24%) by 0.9 percentage points for income units with a 15-year old reference person. The corresponding reduction in the mean bid rental rate (6.68%) for income units with a reference person aged over 75 years is 1.7 percentage points. Income units with a reference person aged between 40-44 years have a mean bid rental rate of 5.53% and the grant reduces this by 0.6 percentage points.

[160] Time gives an income unit the opportunity to save the deposit necessary to satisfy the wealth constraint.

Table A4.2 Number of Income Units and Share of all Income Units who Find Home Ownership Cheaper than Renting

	Number of Income Units	Increase (Decrease) in Number of Income units	Homeownership Share (%)	Percentage Point Increase in Share
First Home Buyers (Reference Person < 35 years of age)				
Reference System	6735	-	72.6%	
$7000	7001	276	75.5%	2.9
$14000	7097	364	76.5%	3.9
Housing Partnership	6840	105	73.7%	1.1
1999 AHS First Home Buyer Probabilities				
Reference System	6759	-	72.9%	
$7000	6880	121	74.2%	1.5
$14000	6981	237	75.3%	2.4
Housing Partnership	6890	131	74.3%	1.6

Table A4.3 Number of Income Units and Share of all Income Units Assigned to Home Owners after Application of Relative Price and Borrowing Constraints Criteria

	Number of Income Units	Increase in Number of Income units	Homeownership Share %	Percentage Point Increase in Share %
First Home Buyers (Reference Person < 35 years of age)				
Reference System	4127	N/R	44.5	N/R
$7000 FHOG	4198	73	45.3	0.8
$14000 FHOG	4726	601	50.9	6.4
Housing Partnership	4945	818	53.3	8.8
1999 AHS First Home Buyer Probabilities				
Reference System	4125	N/R	44.6	N/R
$7000 FHOG	4199	74	45.3	0.7
$14000 FHOG	4738	613	51.1	6.5
Housing Partnership	5036	911	54.3	9.7

[1] By comparison to the reference system.

REFERENCES

Anstie, R., Findlay, C. and I. Harper (1983), The Impact of Inflation and Taxation on Tenure Choice and the Redistribution Effects of Home-Mortgage Interest Rate Regulation, *The Economic Record*, June: pp.105-110.

Australian Bureau of Statistics (1998), *Australian Economic Indicators: August 1998*, Cat. No. 1350.0, Canberra: Commonwealth of Australia.

Australian Bureau of Statistics (1999a), *Rental Investors Survey June 1997; Confidentialised Unit Record File (CURF)*, Cat. No. 8711.0, Canberra: Commonwealth of Australia

Australian Bureau of Statistics (1999b), *1996-97 Survey of Income and Housing Costs Australia Confidentialised Unit Record File (CURF)*, Technical Paper ABS Catalogue No. 6541.0.30.001.

Australian Bureau of Statistics (2001), *Australian Housing Survey, 1999: Confidentialised Unit Record File (CURF)*, ABS Cat. No. 4186.0.30.001, Canberra, Commonwealth of Australia

Australian Competition and Consumer Commission (2000), *GST Talk 4: Residential Rents*, April 2000, Canberra: ACCC Publishing Unit,

<http://gst.accc.gov.au/publications/talkr4esrents.pdf>

Australian Taxation Office (1998) *Tax Statistics: 1996-97*, Canberra: Australian Government Publishing Service

Berry, M. (2000), 'Investment in Rental Housing in Australia: Small Landlords and Institutional Investors', *Housing Studies,* **15** (5), 661-681.

Bourassa, S.C. (1995), 'The Impacts of Borrowing Constraints on Home-Ownership in Australia', *Urban Studies*, **32** (7), 1163-73.

Brueggeman, W. B., Fisher, J.D. and J. Stern (1982), 'Rental Housing and the Economic Recovery Tax Act of 1981', *Public Finance Quarterly,* **10** (2)**,** 222-241.

Burman L.E. and P.D. Ricoy (1997), 'Capital Gains and the People who Realise them', *National Tax Journal,* **50** (3), 427-451.

Caplin, A., Chan, S., Feeman, C. and J. Tracy (1997), *Housing partnerships: A new approach to a market at a crossroads*, Cambridge and London: MIT Press.

Commonwealth Grants Commission (1995), *Report on General Revenue Grant Relativities: 1995 Update,* Canberra: Australian Government Publishing Service.

Commonwealth Grants Commission (2000), *General Grant Relativities 2000*, Canberra: Australian Government Publishing Service.

Cummings J.L and D. DiPasquale (1999), 'The Low-income Housing Tax Credit: An Analysis of the First Ten Years', *Housing Policy Debate*, **10**(2), 251-307.

De Leeuw, F., and L. Ozanne (1981), 'Housing' in *How Taxes Affect Economic Behaviour,* ed. H. J. Aaron and J.A. Pechman, Washington DC: Brookings Institution.

Dilnot, A.W. (1990), 'The Distribution and Composition of Personal Sector Wealth in Australia', *Australian Economic Review*, **89**, Autumn, 33-40.

DiPasquale, D. and W.C. Wheaton (1992), The Cost of Capital, Tax Reform and the Future of the Rental Housing Market, *Journal of Urban Economics*, Vol.**31**: pp.337-359.

Fisher, J.D. and G.H. Lentz (1986), 'Tax Reform and the Value of Real Estate Income Property', *AREUEA Journal*, **14**(2), 287-315.

Follain, J.R., Hendershott, P.H. and D.C. Ling (1987), 'Understanding the Real Estate Provisions of Tax Reform: Motivation and Impact', *National Tax Journal*, **40** (3), 363-327.

Follain, J.R. and D.C. Ling (1988), 'Another Look at Tenure Choice, Inflation and Taxes', *AREUEA Journal*, **16** (3), 207-229.

Freeman, A. J. M., Holmans, A.E. and C. M. E. Whitehead (1996), *Is the UK Different? International Comparisons of Tenure Patterns.* Council of Mortgage Lenders, London.

Garratt, D. (2000), 'Affordability', *Housing Finance*, No.47, 16-21

Goodman, J.L. Jr. and J.B. Nichols, (1997), 'Does FHA Increase Home Ownership or Just Accelerate It?', *Journal of Housing Economics*; **6** (2), 184-202.

Gordon, R. H., Hines, Jr. J.R. and L. H. Summers (1987), 'Notes on the Tax Treatment of Structures', in M. Feldstein (ed.) *The Effects of Taxation on Capital Accumulation,* Chicago: Chicago University Press.

Gravelle, J.G. (1994), *The Economic Effects of Taxing Capital Income*, MIT Press, Cambridge.

Haurin, D.R., Hendershott, P.H. and S.M. Wachter (1996), *Expected Home Ownership and Real Wealth Accumulation of Youth*, National Bureau of Economic Research Working Paper: 5629, June 1996, pages 18.

Haurin, D.R., Hendershott, P.H. and Wachter, S.M. (1997), 'Borrowing Constraints and the Tenure Choice of Young Households', *Journal of Housing Research*; **8** (2), 137-54.

Hendershott, P.H. (1988), 'Home Ownership and Real House Prices: Sources of Change, 1965-1985', *Housing Finance Review,* **7,** 1-18.

Hendershott, P.H., Follain, J.R. and D.C. Ling (1987), 'Effects on Real Estate' in J.A. Pechman (ed.), *Tax Reform and the US Economy*, Brookings Institution, Washington D.C., pp.71-102.

Hendershott, P.H. and D.C. Ling (1984), 'Prospective Changes in Tax Law and the Value of Depreciable Real Estate', *AREUEA Journal*, **12** (3), 297-317.

Hendershott, P.H. and J.D. Shilling (1982), 'Capital Allocation and the Economic Recovery Tax Act of 1981', *Public Finance Quarterly*, **10** (2), 242-273.

Hendershott, P.H. and J. Slemrod (1983), 'Taxes and the User Cost of Capital for Owner-Occupied Housing', *American Real Estate and Urban Economics Association Journal*, **10** (4), 375-393.

Henderson, J.V. and Y.M. Ioannides (1983), 'A Model of Housing Tenure Choice', *American Economic Review*, **73** (1), 98-113.

Jones, L.D., (1989), 'Current Wealth and Tenure Choice', *American Real Estate and Urban Economics Association Journal*; **17** (1), 17-40.

Jones, L.D., (1995), 'Testing the Central Prediction of Housing Tenure Transition Models', *Journal of Urban Economics*; **38** (1), 50-73.

Kiefer, D.M. (1978),The Equity of Alternative Policies for the Australian Homeowner, *The Economic Record*, April: pp.127-139.

Kiefer, D.M. (1980), The Interaction of Inflation and the U.S. Income Tax Subsidies of Homeownership, Discussion Paper No.11/80, *Economics Discussion papers*, La Trobe University.

King, M. A. and D. Fullerton (eds), (1984). *The Taxation of Income from Capital. A Comparative Study of the United States, the United Kingdom, Sweden, and West Germany.* The University of Chicago Press, Chicago and London.

King, M.A. (1981), 'An Econometric Model of Tenure Choice and Demand for Housing as a Joint Decision', *Journal of Public Economics*, **14**, 137-159.

Laidler, D. (1969). Income Tax Incentives for Owner-Occupied Housing, in A.C. Harberger and M.J. Bailey (eds), *Taxation of Income from Capital*, pp.50-76, Washington, D.C., Brookings Institution.

Ling, D.C. (1992), 'Real Estate Values, Federal Income Taxation and the Importance of Local Market Conditions', *Journal of the American Real Estate and Urban Economic Association*, **20** (1), 122-139.

Linneman, P.D. and S. Wachter (1989), 'The Impacts of Borrowing Constraints on Homeownership', *American Real Estate and Urban Economics Association Journal*; **17** (4), 389-402.

Linnemann, P., Megbolugbe, I.F., Wachter, S.M. and M. Cho, (1997) 'Do Borrowing Constraints Change U.S. Homeownership Rates?', *Journal of Housing Economics*, **6**, 318 – 33.

Litzenberger, R.H. and H.B. Sosin (1978), 'Taxation and the Incidence of Homeownership across Income Groups', *The Journal of Finance*, **33**(3), 947-961.

MacNevin, A.S. (1997a), 'Marginal Effective Tax Rates on Canadian Rental Housing Investments: An Asset Pricing Model Approach', *Public Finance Review*, **25**(3), 306-326.

MacNevin, A.S. (1997b), 'Tax Effects on Rental Housing in Halifax, Nova Scotia', *Canadian Tax Journal*, **45**(1), 87-113.

Malpezzi, S. and R.K. Green (1996), 'What Has Happened to the Bottom of the U.S. Housing Market?', *Urban Studies*, **33**(10), 1807-1820.

McClure, K. (2000), 'The Low-income Housing Tax Credit as an Aid to Housing Finance: How Well has it Worked?', *Housing Policy Debate*, **11**(1), 91-114.

Mayer, C. J. and G.V. Engelhardt (1996), 'Gifts, Down Payments, and Housing Affordability', *Journal of Housing Research, **7*** (1), 59-77.

Milgrom, P. and J. Roberts (1992), *Economics, Organisation and Management,* Prentice Hall. First Edition.

Miron, J. R. (1995), 'Private Rental Housing: The Canadian Experience', Urban Studies, **32**(3), 579-604.

Nakagami, Y. and A. M. Pereira (1997), 'Inflation, Housing Taxation and Homeowner Uptrading', *Public Finance,* **50**(3), 442-469.

Narwold, A. (1992), 'The Distribution of the Benefits of Tax Arbitrage in the Housing Market', *Journal of Urban Economics*, **32**, 367-376.

Nordvik, V. (2000), 'Tenure Flexibility and the Supply of Private Rental Housing', *Regional Science and Urban Economics*, **30**, 59-76.

Rosen, H.S. (1979), 'Housing Decisions and the US Income Tax: An Econometric Analysis', *Journal of Public Economics*, **11**, 1-23.

Rosen, H.S. and K.T. Rosen (1980), 'Federal Taxes and Homeownership: Evidence from Time Series', *Journal of Political Economy*, **88** (1), 59-75.

Rosenthal, S.S. (2001), *'Eliminating Credit Barriers to Increasing Homeownership: How Far Can We Go?'*, Working Paper No. 0101, Research Institute of America

Scott, M.F.G. (1987), 'A Note on King and Fullerton's Formulae to Estimate the Taxation of Income from Capital', *Journal of Public Economics,* **34**(2), 253-264.

Sunley, E. M. (1987). 'Comment on Gordon, R. H., Hines, J. R. Jr. and Summers, L. H.' In M. Feldstein (ed.), *The Effects of Taxation on Capital Accumulation,* 254-257. Chicago, Chicago University Press.

Titman, S. D. (1982), 'The Effect of Anticipated Inflation on Housing Market Equilibrium', *Journal of Finance, .***37,** 827-842.

Tucker, D. (1978). 'Comments on Litzenberger and Sosin', *Journal of Finance*, **33** (3), 962 – 964.

Wood, G. A. (1990), 'The Tax Treatment of Housing: Economic Issues and Reform Measures', *Urban Studies,* **27** (6), 809-830.

Wood, G. A. (2000a), Tax Arbitrage, Agency Costs and the Relative Cost of Renting versus Ownership, Murdoch University, School of Economics Working Paper Series No.177, World Wide Web page

http://wwwtlcl.murdoch.edu.au/teach/econs/wps/wpslist.html#Online

Wood, G. A. (2000b), Effective Capital Gains Tax Burdens Under Alternative Tax Rules: Microsimulation Results for Real Estate Investments. Murdoch University, School of Economics Working Paper Series No.178, World Wide Web page

http://wwwtlcl.murdoch.edu.au/teach/econs/wps/wpslist.html#Online

Wood, G.A. (2001a), 'Are There Tax Arbitrage Opportunities In Private Rental Housing Markets?', *Journal of Housing Economics*, **10**(1), 1-20.

Wood, G. A. (2001b) 'Promoting the Supply of Low-Income Rental Housing', *Urban Policy and Research*, **19**(4), 425-440.

Wood, G. A. (2003), Taxation, Subsidies and Housing Markets in O'Sullivan, A. and Gibb, K. (eds) *Housing Economics and Public Policy*, Blackwell Publishing.

Wood, G. A. and P.A. Kemp (2003). The Taxation of British landlords: An International Comparison. *Urban Studies.*

Wood, G.A. and R. Watson (2001), 'Marginal Suppliers, Taxation and Rental Housing: Evidence From Microdata', *Journal of Housing Research*, **12**(1): 91-114.

Wood, G. A., Watson, R. and P.R. Flatau (2002a), 'The Incentive to Invest in Residential Rental Housing: The Role of Alternative Supply-side Policies' Murdoch University School of Economics Working Paper Series No. 185, World Wide Web Page http://wwwtlcl.murdoch.edu.au/teach/econs/wps/wpslist.html#Online

Wood, G.A., Watson, R. and P.R. Flatau (2002b), 'A Microsimulation Model of Tenure Choice in the Australian Housing Market', Murdoch University, School of Economics, Working Paper Series No. 188.

http://wwwtlcl.murdoch.edu.au/teach/econs/wps/wpslist.html#Online.

Wood, G. A. and T. Yong (2001) *Are their Rent Clientele Groups among Investors in Rental Housing?* Centre for Real Estate Studies Working Paper Series, CRES 2001-023, Department Of Real Estate, National University of Singapore.

Wulff, M. (2000), *The 1998 Survey of Rent Assistance Recipients: A Report on Key Findings*, Department of Family and Community Services: Canberra.

Yates, J. and J. Flood (1987), Housing Subsidies Study, Housing Research Council, Project Series No. 160.

Yates, J. and M. Wulff (2000), 'Whither Low Cost Private Rental Housing?' *Urban Policy and Research*, **18**(1), 45-64.

Yinger, J. (1987), 'Comments on Hendershott, P. H., Follain, J. R. and Ling, D. C.' in J. A. Pechman (ed.), *Tax Reform and the US Economy*, 97-102. Washington D. C: Brookings Institution.

AHURI Research Centres

Sydney Research Centre

UNSW-UWS Research Centre

RMIT NATSEMResearch Centre

Swinburne-Monash Research Centre

Queensland Research Centre

Western Australia Research Centre

Southern Research Centre

Affiliates

Northern Territory University

National Community Housing Forum

AHURI

Australian Housing and Urban Research Institute

Australian Housing and Urban Research Institute

Level 7 20 Queen Street, Melbourne Victoria 3000

Phone +61 3 9613 5400 Fax +61 3 9629 8536

Email information@ahuri.edu.au Web www.ahuri.edu.au