

# **Risk management and efficient housing assistance provision: Stage 2**

authored by

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# GLOSSARY

The concepts set out below are important to an understanding of the arguments developed in the rest of the paper. They help to clarify aspects of the discussion.

<b>Affordable Housing</b>	'...conveys the notion of reasonable housing costs in relation to income: that is, housing costs that leave households with sufficient income to meet other basic needs such as food, clothing , transport, medical care and education' (The National Housing Strategy, 1991, Issues Paper No 2, pix)
<b>Assistance Output</b>	Is the number of new households provided with longer term (greater than two months), housing assistance in a given period.
<b>Capital Asset Pricing Model</b>	Defines a benchmark for calculating correlation as an index of the market value weighted portfolio of all possible investments. In addition the CAPM creates an additional asset known as the risk free asset where there is zero variance and zero covariance-no risk. This class of asset has been traditionally represented by Commonwealth issued securities. The CAPM defines risk as the covariability of the security's returns with the market's returns. The CAPM then defines risk explicitly as the volatility of an asset's returns relative to the volatility of the market's portfolio returns. (Harrington, 1983, pp. 12-13)
<b>Correlation Analysis</b>	Correlation analysis is an investigation of the measure of statistical association among random variables based on samples.
<b>Cost Benefit Analysis</b>	A method to assess the relative desirability of competing alternatives, where desirability is measured as the economic concept of net benefit to society as a whole. CBA is basically about the comparative total benefits and costs to society of different policy responses to the same supply problem.
<b>Cost Effectiveness Analysis</b>	Where the output of a project is not readily measurable in monetary terms an alternative approach is cost effectiveness analysis. This type of appraisal compares the costs of different initial project options with the same or similar outputs.
<b>Co-variance</b>	A measure of the relationship between two data sets. A covariance produces the average of the products of deviation for each data point pair.
<b>Economic Appraisal</b>	Economic Appraisal is a method for analysing all of the cost and benefits associated with a particular project. There are two types of economic appraisal, Cost Benefit Analysis (CBA) and Cost Effectiveness Analysis (CEA).
<b>Housing Accessibility</b>	'the cost of becoming a home purchaser or entering a rental arrangement' (The National Housing Strategy, 1991, Issues Paper No 2, p. ix).
<b>Housing Affordability</b>	'the ongoing cost of housing in relation to gross income' (The National Housing Strategy, 1991, Issues Paper No 2, p. ix).

<b>Housing Allowance</b>	A Housing Allowance is a government cash payment designed to bridge, or lessen the gap between available gross household income and the level of household income required to obtain appropriate housing without incurring housing related stress. Housing allowances have traditionally been of two types: a cash payment direct to households; or 'vouchers' which are provided to households but which can only be redeemed for cash by the provider of the accommodation.
<b>Housing Assistance</b>	Housing assistance is therefore defined as any means of providing assistance to income units (or households) such that those income units in the lowest 40% of the income distribution range are wholly, or partially, protected from housing stress. The duration of this assistance is income related and may vary from a few months up to forty or more years.
<b>Housing Stress</b>	'Income units are said to be in financial housing stress if they pay more than 30% of gross income on housing and are in the lowest 40% of the income distribution range' (The National Housing Strategy, 1991, Issues Paper No 2, p. ix).
<b>Latin Hypercube Simulation</b>	'Latin Hypercube sampling is a recent development in sampling technology designed to accurately recreate the input distribution through sampling in fewer iterations when compared to Monte Carlo simulation. The key to Latin Hypercube sampling is the stratification of the input probability distributions' (Palisade Corporation, A Guide To Using @RISK, pg264). It is the preferred method of analysis.
<b>Monte Carlo Simulation</b>	'Monte Carlo sampling refers to the traditional technique for using random or pseudo random numbers to sample from a probability distribution. Monte Carlo sampling techniques are entirely random – that is, any given sample may fall within the range of the input distribution. (Palisade Corporation, A Guide To Using @RISK, pg 263)'
<b>Rent Assistance</b>	A non-taxable income supplement paid to individuals and families who rent in the private rental market. Pensioners and those receiving more than the base rate of Family Tax Benefit Part A (FTB A) may be eligible for RA.
<b>Risk</b>	The possibility that an expected outcome is not achieved or is replaced by another, or that an unforeseen event occurs. This is a broad view of risk that includes both uncertainty due to future events and the consequences of limited knowledge, information or experience. (NSW Department Of Public Works, 1993, p. 6).
<b>Risk Analysis</b>	The process of identifying risks, estimating their likelihoods, and evaluating potential consequences.
<b>Risk Consequence</b>	The 'fallout' from the crystallisation of risk may be short or longer term, gain or loss, but will often be a diachronic state. (Croft, 2001, p. 743).

<b>Risk Consequences</b>	The impacts on desired outcomes from the risk event occurring. Essentially the concern focuses on loss, since although windfalls may also result they do not create a liability or cost.
<b>Risk Crystallisation</b>	An event (either individual or collective, chosen or imposed) causes the crystallisation of potential into something substantive.
<b>Risk Exposure</b>	The possibility of economic, financial or social loss or gain, physical damage or injury, or delay. The significance of risks is the impact they may have on the achievement of project objectives, delivery goals or management effectiveness.
<b>Risk Management</b>	The set of activities concerned with identifying potential risks, analysing their consequences and devising and implementing responses so as to ensure that project or program objectives and delivery goals are achieved. This includes management of ongoing risks associated with the ownership of assets.
<b>Sensitivity, Sensitivity Analysis</b>	Sensitivity generally refers to the variation in output of a mathematical model with respect to changes in the values of the model's inputs. A sensitivity analysis attempts to provide a ranking of the model's input assumptions with respect to their contribution to model output variability or uncertainty
<b>Systematic Risks</b>	<i>Systematic risks</i> are risks stemming from the general economic or natural environment – i.e. from movements in the economy (business cycle boom and bust) and natural disasters.
<b>Uncertainty</b>	Uncertainty refers to <i>lack of knowledge</i> about specific factors, parameters, or models, as they may impact on future outcomes.
<b>Unsystematic Risks</b>	Unsystematic risks are risks specific to the asset or investment sector in question (residential property) and to the agencies involved. Unsystematic risk can, in a perfect capital market, be eliminated by the investor by thoroughly diversifying investment across all assets (Hall, Berry and Carter, 2001, p. 7).

## EXECUTIVE SUMMARY

Previous AHURI research has found that housing affordability is declining in Australia for many lower income households, especially those renting in the private sector. Similar conclusions concerning declining housing affordability have been reported in the draft report of the Productivity Commission Inquiry into first home ownership.

Governments in Australia already spend about \$3 billion per year to assist both public and private tenants and the need for assistance is increasing.

A traditional approach to the design and implementation of housing assistance packages tends to treat each option as a stand-alone alternative. This does not provide a framework or method for systematically evaluating and comparing the likely costs to government, over the longer term, of alternative housing assistance options and combinations of options. Such a framework needs, additionally, to encourage policy makers to take into account the factors that determine program cost outcomes across spatially differentiated housing markets.

The cost effectiveness of any housing assistance measure will be significantly affected by changes in economic variables such as interest rates, building costs and housing prices. These changing economic variables are not fully predictable. There is a risk or unexpected volatility attached to each that can take the form of 'upside' or 'downside' risk. Upside risks refer to unexpected outcomes such as lower than expected borrowing costs or higher than expected property prices that reduce the overall cost of assistance below expected levels. Downside risks result in program costs above expectations. When designing housing assistance programs in an inherently 'risky' world, governments need to know:

- the most likely cost outcomes (including best and worst case outcomes);
- where cost savings are achievable, and what the size of these is, and;
- what the most cost effective or efficient policy mixes are likely to be.

This *Stage 2 study* extends and applies a methodology developed in the earlier Stage 1 AHURI study – *Risk Management and Efficient Housing Assistance: A New Methodology* – to investigate these information needs and calculate the most efficient housing assistance 'policy mix' in Australia's eight major cities – Sydney, Melbourne, Adelaide, Canberra, Darwin, Perth, Hobart and Brisbane. The study also assesses whether there are specific policy mixes that are more efficient in each of these cities than the current dual focus on rent assistance paid to eligible private tenants and capital funding provided to state housing authorities to house public tenants.

## Research Questions

This study poses the following five research questions:

1. What is the likelihood of output gains (i.e. reduced subsidy cost requirements per assisted resident) from a national policy of mixing assistance options?
2. What is the extent of such output gains, in each city and nationally?
3. How different should regional policy responses be?
4. Where are current assistance policies most efficient?
5. Are there some simple management tools or tests that state governments can use to refine assistance strategies in order to increase the efficiency of assistance outcomes?

## The Economic Environment

Efficient housing assistance policies must be selected in the face of diverse risks facing governments. These risks mainly fall into two categories:

1. **Systematic risks** including:

- *general economic risks*, which includes such variables as inflation, capital growth or contraction rates, rental yield, unemployment and income growth or contraction, changes in nominal and real interest rates, and construction cost escalation rates; and
- *natural disasters*, such as landslip, earthquake, fire, flood, lightning, wind and weather.

2. **Unsystematic risks** including:

- *structural and financial risks*, including funding sources, ownership, and residual risks to the Authority where there is private sector involvement; contractual risks, and procurement planning; and
- *agency or issue specific risk*, including political, project management, project delivery (contract selection, tendering, negligence etc.), human error, organisational (including industrial relations, resources shortage, management, work practices etc.) and systems (including communications failure, hardware and software failure, etc.)

This study focuses on the **main systematic risks** associated with housing assistance policy options. They are:

- dwelling price growth or contraction;
- rental yield - 'real rents';
- income growth/loss, vacancy rates and defaults and therefore reduced payments;
- inflation;
- interest rates; and
- operating and construction cost escalation.

Under each of the various housing assistance options currently available (with the exception of rent assistance or housing allowances) governments face very similar systematic risks, with the main differences being related to the method of financing. In the current institutional environment the main risks associated with capital provision, subsidised home loans and subsidised shared equity reside with State government, while the risks of direct assistance (i.e. rent assistance) programs are borne by the Commonwealth.

## The Policy Options

This study follows Stage 1 and compares the relative efficiency or cost of five basic assistance options and three 'mixed' options across the eight capital cities, under conditions which reflect the crystallised risks experienced over the preceding 20 years.

The subsidy-driven policy options costed are:

- on-budget (grant funded) public housing
- off-budget bond funded social housing ('the Consortium model')
- rent assistance
- home loan option

- shared equity option – a combination of on-budget public housing and subsidised home loans)
- “all options mixed option” – arbitrarily created by dividing the total subsidy evenly across the above five basic options
- “partial mixed option” – a split of subsidy between rent assistance and on-budget public housing broadly reflecting the current division of housing assistance between these two options in the CSHA and Commonwealth Rent assistance programs
- “best two case” – a 50/50 split of subsidy between the two most efficient of the five basic options for each of the eight cities

Each of these options was costed using the housing subsidy model developed by the authors for the Affordable Housing National Research Consortium (details available at <http://www.consortium.asn.au>).

The model is used to construct specific scenarios, for each option, based on the probability of future values for the key risk variables like: inflation, rental growth, interest rates and tenant incomes, etc. The Monte Carlo simulation technique is used to generate a number of scenarios (one hundred) for each of the eight capital cities selected. This approach assumes that the future will mirror the past in relation to the relative frequencies of outcomes with respect to the key risk variables. Thus, the more probable past values of, for example, interest rates will figure in a correspondingly high proportion of the scenarios generated for each city.

The model calculates for each of the scenarios, the gross (and direct after tax) subsidy cost required for each of the assistance options (noted below), given the input data and probability distributions of risk variables. It is assumed that, in each case, an adequate subsidy will be provided to allow a household on an initial income of \$25,000 per year to pay 25 per cent of its income for housing.

## Key Findings

The study findings can be divided into (a) the **likelihood or probability** of housing assistance generating output gains (i.e. reduced subsidy costs per assisted resident) and (b) the **extent of gains** or subsidy cost savings.

With respect to the **likelihood of greater efficiencies**:

- in more than 50 per cent of cases, the all options mixed option delivered lower assistance costs than home loans, rent assistance and shared equity in six of the eight cities. The two exceptions were Adelaide and Hobart in which only rent assistance delivered cost savings over the all options mixed option in more than 50 per cent of cases.
- in the other six cities the bond funded and on-budget public housing options delivered lower assistance costs than the other three options and all options mixed option in at least 65 per cent of cases. In Sydney and Melbourne bonds and public housing were cheaper than the all options mixed option in more than 90 per cent of cases, indicating a very high probability that these former options would generate output gains compared to the other basic options and the mixed option.
- Aggregating across all eight cities (on an unweighted basis):
  - Only the public housing and bonds options generated savings over the all options mixed option in more than 50 per cent of cases; indeed, both generated savings in more than 70 per cent of cases
  - The home loan option was the least likely option to deliver savings (it did so in only 14 per cent of cases)

- The all options mixed option delivered cheaper assistance outcomes than all the individual options in 52 per cent of cases and the 'partial mixed option' (reflecting the current Commonwealth mix of public housing and rent assistance) in 45 per cent of cases
- However, the 'best two cases option' generated savings over the 'partial mixed option' in almost two-thirds of cases. This suggests that the probability of reducing housing assistance costs per assisted household is high if governments tailored policies to deliver assistance in each city by focusing on the two most efficient options in each case: bonds and public housing in Sydney, Melbourne, Perth, Brisbane, Canberra and Darwin; rent assistance and bonds in Adelaide; rent assistance and home loans in Hobart.

With respect to the **extent of possible savings (output gains)**:

- Aggregating for all eight cities, the average savings in assistance costs:
  - by the all options mixed option **in the cases where savings are achieved** range from a low of 8.5 per cent for shared equity to a high of 62.6 per cent for rent assistance.
  - by the all options mixed option over the partial mixed option is 62 per cent
  - by the best two cases option over the partial mixed option is 95.8 per cent. That is the former costs, on average, just over half the latter; in other words, for any given total subsidy amount almost twice as many households could be assisted by using the best two options in each city, than by dividing the total subsidy between rent assistance and public housing in similar proportions to the current split.
- The best two cases option delivers the following savings over the partial mixed option in each city: Adelaide (53%); Melbourne (139%); Sydney (112%); Canberra (57%); Hobart (26%); Perth (202%); Darwin (87%); Brisbane (92%).<sup>1</sup>

By averaging the assistance costs for each option across ***all*** 100 cases for each city the average cost per option can be calculated. The following table ranks the five basic options and all options mixed option for each city, in terms of their relative subsidy efficiency. It can be seen that the bond and public housing options deliver the cheapest cost for all but two cities (Adelaide and Hobart). That is, not only are these two options likely to generate savings in those six cities, when they do the level of savings is high.

**Ranking of Housing Assistance Policy Options by Real Mean Annual Subsidy Cost per Resident: Individual Options and 'All options mixed' Option, Eight Australian Capital Cities**

<i>Option</i>	<i>Adel.</i>	<i>Melb.</i>	<i>Syd.</i>	<i>Can.</i>	<i>Hob.</i>	<i>Perth</i>	<i>Dar.</i>	<i>Bris.</i>
RA	1	5	6	5	1	5	6	5
Pub. Housing	5	2	2	1	5	2	1	2
Bonds	6	1	1	2	6	1	2	1
Home loans	3	6	5	6	3	6	3	6
Shared Eq.	4	4	4	4	4	4	5	4
'All options'	2	3	3	3	2	3	4	3

<sup>1</sup> A savings outcome of more than 100% means that the average assistance cost for the option in question is less than half the cost of the other option. A saving of more than 200% means a cost of less than a third, and so on.

The average annual assistance cost per assisted household for all capital cities taken together was calculated as:

- \$1,200 for both the bond and public housing options
- \$2,000 for the all options mixed option
- \$2,200 for the shared equity option
- \$2,500 for rent assistance
- \$3,100 for the home loan option
- \$1,930 for the partial mixed option
- \$1,010 for the best two cases option

In other words, taking all cases, a policy of delivering housing assistance through the best two options for each city would support almost twice as many assisted households as the current split between rent assistance and public housing (assuming that a common affordability benchmark is met in all cases).

With respect to **maximum risk exposure**, what assistance costs for each option would eventuate from the worst case scenarios in each city?

- The home loan option carries the greatest downside risk in Melbourne, Sydney, Canberra, Perth, Darwin and Brisbane and the second highest exposure in the other two cities.
- The bond funded option has considerably higher downside risk than on-budget public housing, with the highest exposure in Hobart and the second highest exposure in Melbourne, Canberra, Perth, Darwin and Brisbane. Public housing has the lowest downside risk Melbourne, Sydney, Perth, Darwin and Brisbane and the second lowest exposure in the other three cities.
- The situation with respect to rent assistance is the reverse of the public housing case: i.e. lowest exposure in Adelaide, Canberra and Hobart and second lowest in the other five cities.

With respect to the **initial incomes of target households**: the relative efficiency of the various assistance options in each city did not change. That is, the relative cost savings were similar regardless of whether household income was assumed to be \$15,000, \$25,000 or \$35,000.

Similarly with respect to **the length of the period over which housing assistance is delivered** – with the exception of home loans – the relative subsidy efficiencies did not change for the eight options across the eight cities. In the case of home loans, required annual subsidies fell with the length of the transaction period.

Stepping back from the detailed findings some general conclusions can be drawn:

- If real capital gain on dwellings exceeds about 0.5 per cent, supply side subsidies, especially the bond and public housing options become very efficient ways of delivering housing assistance.
- Rent assistance comes into its own once real capital gains get close to zero, especially where initial dwelling values and rental yields are low.
- In interest rate regimes similar to the last 20 years, subsidised home loans only become reasonably efficient if offered over a long period (in excess of 25 years). However, it should be noted that if future interest rates actually mirror rates in the last 10 years rather than 20 years, the home loan option would be efficient over a much shorter period.



**In conclusion**, this study shows that there is considerable room for improvement in the long term output of housing assistance policy through implementation of more flexible, variegated and targeted assistance approaches. Simply continuing the current policy that regards housing assistance as an adjunct to income security policy is likely to perpetuate the inefficiencies and rigidities that exist within the current system.

# 1 INTRODUCTION

## 1.1 Background

Since the beginning of the 1990s access to secure, appropriate, and affordable housing has consistently declined for low to moderate income Australian households. Whilst the supply of low cost private rental housing and access to home ownership participation was falling the demand for affordable public and social rental housing was clearly increasing. Trends in affordability have been very adverse. In metropolitan locations low-income tenants have extremely limited affordable housing choices, both by location and dwelling type (Berry and Hall, 2001). At the time of writing the productivity Commission had just released its draft report on first home ownership, noting that housing affordability in Australia was at an historic low.

Whilst the supply of affordable housing has declined, demand, as reflected in statistics on housing stress, increased substantially for low-income tenants over the 1986-96 period. By 1996, almost three out of four low-income private tenants in the main metropolitan areas (excluding Canberra) were suffering housing stress (i.e. in the lowest two income quintiles and paying more than 30% of their gross income in housing payments) (Berry and Hall, 2001), when measured by the conservative National Housing Strategy benchmark. As a proportion of all households, these financially stressed renter households are growing much more rapidly than total renter households.

These trends in lower cost housing supply, affordability and housing stress have occurred against a background of significant change in Government housing assistance policies. At the beginning of the new Millennium the supply of new government assisted or sponsored public and affordable housing has fallen substantially when compared to late 1980's levels. Moreover, bifurcation between the two levels of government (Australian Government rent assistance and State public housing) of the delivery of different types of housing assistance raises important questions about the efficiency and the equity of the total housing assistance 'package'.

One of the goals of both Commonwealth and State Housing Authorities is to maximise the number of needy households provided with secure, appropriate and affordable housing. In this context, and given satisfaction of vertical (different quanta of assistance for different household incomes) and horizontal (the same quantum of assistance for households with the same incomes) equity issues, efficiency is therefore of fundamental importance, the lower the long term subsidy cost per household or per household year, the greater the number of households which can be assisted. For example, identification of, say, an 18% reduction in subsidy cost is tantamount to delivering the same increase in assistance output, a current urgent priority.

## 1.2 The Need for Efficient Housing Assistance Policy

The existence of political constraints on public expenditure therefore places a premium on the *efficiency* of housing assistance policies. In other words, governments are necessarily concerned to *maximize* the positive impact of whatever total volume of housing assistance they provide. In this way they can, collectively, improve housing affordability for the maximum number of households in stress allowed by available resources. Efficient outcomes, in this sense, can be achieved by *minimizing* the long term expected subsidy cost per assisted tenant per year.

*Key questions* that need to be addressed when evaluating housing assistance efficiency are:

- 1) which assistance options are affordable for which household and income groups?
3. what are the risks associated with and subsidy costs of each of the assistance options when applied to each of the groups?
4. how much should be spent on?
  - a) capital funding for public housing;
  - b) private rental subsidy and housing allowances;
  - c) home loan subsidy; and
  - d) shared equity subsidy; and
5. what are the longer term implications of recurrent subsidies?

### **1.3 The Stage 1 Study**

This study follows on from, and uses the same methodology as, the Stage 1 study<sup>2</sup>, which focused on the analysis of the relative efficiency of housing assistance policies in three cities – Melbourne, Sydney and Adelaide. The Stage 1 study addressed the following specific questions:

- 1) what are the main systematic risks associated with the various housing assistance options?
- 2) historically, have the main systematic risks associated with housing assistance options varied significantly and therefore are they likely to vary significantly in the future?
- 3) In comparisons of housing assistance options are there possible scenarios of the systematic risks where the subsidy costs for one option may increase whilst the subsidy costs of another option may decrease? and hence;
- 4) are any of the covariances of the systematic risks of housing assistance options highly positive?
- 5) are any of the covariances of the systematic risks of housing assistance options near zero, zero or negative?
- 6) do the subsidy costs associated with each housing assistance option vary significantly under different scenarios of the main systematic risks?

The first study

- 1) analysed the relative impact of each type of risk and combination of risks on subsidy requirements for different housing assistance options, given acceptable affordability benchmarks, utilising a suite of models developed for this purpose.
- 2) comprehensively tested whether a strategy providing for the delivery of housing assistance using a mix of delivery options will, in the longer term, be more efficient (i.e. impose lower real subsidy costs per household assisted) than any strategy which depends on a single assistance option, i.e. relying on one principal means of providing the assistance.

The housing subsidy model developed for the Affordable Housing National Research Consortium (see details at [www.consortium.asn.au](http://www.consortium.asn.au)) was modified into four models which can calculate real net subsidy costs for each of the five main housing assistance policy options, listed below.

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<sup>2</sup> J. Hall and M. Berry (2002) Risk Management and Efficient Housing Assistance: A New Methodology, AHURI Final Report, Melbourne, September.

The model was used to construct specific scenarios, for each option, based on the probability of future values for the key risk variables like: inflation, rental growth, interest rates and tenant incomes, etc. The Monte Carlo simulation technique was used to generate a number of scenarios (one hundred) for each of the three capital cities selected, Sydney, Melbourne and Adelaide.

This approach assumes that the future will mirror the past in relation to the relative frequencies of outcomes with respect to the key risk variables.

The model calculates for each of the scenarios, the gross (and direct after tax) subsidy cost required for each of the assistance options (noted below), given the input data and probability distributions of risk variables.

The **five basic assistance options** analysed in the Stage 1 study and replicated in the Stage 2 study are:

subsidy-driven policy options costed are:

- on-budget (grant funded) public housing
- off-budget bond funded social housing ('the Consortium model')
- rent assistance
- home loan option
- shared equity option – a combination of on-budget public housing and subsidised home loans)

Three further 'mixed options' were analysed.

An 'all options mixed option' was arbitrarily created by splitting the subsidy evenly across the five basic options: i.e. 20% weighting to each of the latter. In other words, one-fifth of the subsidy is devoted to each of: the public debt option; the rent assistance option; the home loan option; the grant funded public housing option, and; the shared equity option.

Secondly a 'best two cases' option has been developed based on 50% of the subsidy costs applying to each of the lowest two cost options applying in each metropolitan area of the three capital cities examined

Finally, a 'partial mixed option' (also called 'the Commonwealth funding mix') was specified broadly reflecting the current division of Commonwealth housing assistance between rent assistance and grant funded public housing. It should be stressed that this option does not reproduce the actual Commonwealth rent assistance regime currently in force in Australia, since the latter does not deliver assistance in relation to the standard affordability benchmark used in this study in order to render all options tested comparable.

## 1.4 The Central Components of Probability and Risk Analysis

Probability and risk analysis has two central components;

- the first is the **likelihood** that an event may occur; in the case of this study the likelihood of financial savings accruing from following an 'all assistance options' mixed option or a 'best two assistance options' option against any single option and the Commonwealth funding mix. Thus, the first part of the results analysis for the Stage 1 Study quantified the likelihood of savings if a mixed assistance or best two assistance option is pursued.
- the second is; once the likelihood has been determined what is the probable **impact** or **extent** of the event; in this case the extent of subsidy savings (or addition to output) that may accrue.

These two components are independent of each other. Thus the second part of the Stage 1 analysis is about *if* the event does occur.

The Stage 1 report handled this question in two ways:

- it documented the average extent of the savings from all those cases where savings are generated;
- for all of the 100 cases tested, for each city, it documented the mean value of subsidy per tenant year for each assistance option and the Commonwealth funding mix and compared that with the mean value of the subsidy per tenant year for the all options mixed or the best two options outcome with the difference between the means being the potential average savings.

Thus, the possible extent of savings or additions to output have been quantified. This is why potential savings can vary between over 100% (only savings cases) to 50% (comparisons of means).

This approach has been replicated in the Stage 2 Study.

## **1.5 Results of the Stage 1 Analysis**

The main findings of the Stage 1 research were as follows.

### **1.5.1 Likelihood**

1. If the economic environment of the future reflects the environments of the last twenty years, an all options mixed strategy (20% spending on each assistance option) would be superior in 54% of possible outcomes, for the three cities taken together. Thus, the probability of efficiency gains is moderate, in relation to the all options mixed approach modeled in this study. However, the probability of gains becomes very high under the 'best two cases' approach. Additionally, where gains are achieved (e.g. in the application of both the 'all options mixed' and the 'best two-case' approaches) they are very substantial.
2. It is likely that under current interest rate conditions and with the diversity of real residential rent and price regimes, a national capital city-specific approach would generate considerably higher probabilities of savings. That is, a national policy that tailored particular assistance options/mixes to each jurisdiction, or (more ambitiously) definable spatial housing market segments, would most probably generate significant overall savings in total subsidy costs. Put another way, significantly more affordable housing support could be delivered to households in housing stress for any given housing assistance budget allocation.
3. The research revealed a diversity of efficiency outcomes.
4. Whilst the particular all options mixed outcome tested was only just better than an even chance (54%) of being more efficient than any individual approach overall, if the most efficient two options are selected (rent assistance and bond funded social housing in Adelaide, public housing and bond funded social housing in Melbourne and Sydney), the probabilities of efficiency or output gains were much higher.
5. Furthermore, in more than 40% of the cases in Adelaide and in an overwhelming majority of possible outcomes in Melbourne (82%), and Sydney, (92%), the probability is that this strategy would be more efficient than the current predominant Commonwealth funding mix of primarily rent assistance and public housing

### **1.5.2 Impact or Extent of Effect**

1. It is obvious from the research that supply side assistance options such as public housing and bond funded social housing will always be much more efficient than rent assistance in circumstances where real capital gains are expected to be 0.5% p.a. or more.

At real capital gains being experienced in Melbourne and Sydney these efficiency benefits will be very large. By contrast, where real capital gains are falling and initial dwelling prices are relatively low (such as in Adelaide in the period tested) it also clear that there is a very high probability that rent assistance will be the most efficient housing assistance response.

2. In the cases where savings are indicated, the selection of the 'correct' assistance option strategy will itself generate very substantial improvements in the likely long term output (i.e. households assisted) of housing assistance options.

In aggregate, across all three cities, public housing and bond funded social housing generate assistance outcomes 60% higher than rent assistance. Overall, on average, the best two options outcome generates output gains of nearly 50% on the current Commonwealth funding mix.

3. In examining the worst case for all of the options it is obvious that bond funding has considerably greater downside risk attached to it than public housing or rent assistance in Adelaide, and again, public housing in Melbourne and Sydney. However, the worst case for bond funding in Melbourne and Sydney is not significantly greater than that for rent assistance. Changing income levels does not noticeably affect the above outcomes and increasing the term of the transactions simply makes home loan interest subsidies more efficient than rent assistance.

The research suggested that there is considerable room for improvement in the long term output of housing assistance policy through more flexible, variegated and targeted assistance policies.

The Stage 1 Study recommended that the research approach be extended from Adelaide, Melbourne and Sydney to include all capital cities and that the analysis be replicated for Canberra, Hobart, Perth, Darwin and Brisbane. The results for these capital cities would then be synthesised with the Stage 1 outcomes to clarify the results of an Australia wide study.

This study takes up that recommendation.

## **1.6 Research Aims**

The aims of this project are to refine and extend the methodology and analysis of the Stage 1 Project (AHURI project n. 30096) on a national capital city scale -- viz. to:

- test the likelihood of efficiency gains (i.e. impose lower real subsidy costs per household assisted) from a national capital city strategy delivering housing assistance using a mix of delivery options, versus delivery via a single assistance option, i.e. relying on one principal means of providing the assistance;
- identify and illuminate which assistance option strategies are likely to be most efficient in the smaller capital cities of Brisbane, Darwin, Hobart and Perth;
- quantify the extent of these efficiency gains both nationally and for the regional capital cities of Brisbane, Darwin, Hobart and Perth;
- clarify the efficiency need for differential regional assistance policies;
- clarify where existing national funding mix policies are least and most efficient; and
- provide a user friendly tool for SHA's to carry out analysis simply and quickly.

Note 1: Stage 1 was completed for Sydney, Melbourne and Adelaide, while Canberra has been modeled separately by the research team. Hence, completing Stage 2 will provide AHURI stakeholders with a very powerful risk assessment tool and analytical capacity covering all eight capital cities in the country.

### **1.6.1 Research Questions**

The research is addressing five key research questions:

- what is the likelihood of output gains from a national mixed assistance option strategy?
- What is the extent of such output gains?
- how different should regional policy responses be?
- where are current assistance policies most efficient?
- are there some simple management tools or tests that state governments can use to refine assistance strategies in order to increase the efficiency of assistance outcomes?

The first stage report suggested that the probability or likelihood of output gains from a mixed strategy was equivocal. Because of the different nature of the Melbourne and Sydney housing markets to the rest of capital city Australia it is probable that the results which were obtained in the first stage might be different or strengthened when an aggregate national capital city research result is obtained.

It is clear from the first stage work that the extent of efficiency gains from the 'correct' choice of assistance options is very significant. However, how significant cannot be determined except by an aggregate national outcome.

By completing this national analysis it will become crystal clear as to whether there is (and if so, the scale of) the real need for differentiated and targeted regional housing assistance funding strategies.

## **1.7 Structure of the Final Report**

The Stage 1 Report set out a detailed discussion of the National Policy Context, The Nature of Risk and the Methodology. The discussion on the Nature of Risk represented a review of the literature on the subject of housing risk. It is clearly not necessary to replicate this aspect of the Stage 1 Report.

However, Stage 2 is an identical approach to Stage 1, simply expanded to all capital cities. To ensure no confusion, and for the sake of completeness in this Study, it is appropriate to replicate all other relevant sections of the Stage 1 Report. Therefore

Chapter 2 replicates the Stage 1 discussion on:

- recent research into housing stress and affordability;
- goals of assistance policy;
- housing assistance options
- the concept of risk and housing risk and its relevance to housing policy;
- housing assistance options and systematic risks;
- investment theory and its potential relevance to assistance efficiency;
- a potential hypothesis relating to housing assistance.
- intergovernmental arrangements and social housing provision.

Chapter 3 details the methodology and relevant issues arising.

Chapter 4 documents the analysis results. For comprehensiveness of understanding and for clarity of comparative analysis the chapter replicates the results for Adelaide, Melbourne and Sydney and sets out for all the other capital cities the:

- probability of efficiency or output gains;
- extent of savings or increases in output;
- mean results; and
- maximum exposures.

Uniform results across all capital cities were registered for the nature and scale of effects of changes in income and term. For this reason they are only recorded for the first city and not reiterated in subsequent city analyses.

Chapter 5 sets out the findings and conclusions.

These findings and conclusions:

- clarify the most efficient mix of assistance options in each regional capital city and also nationally in aggregate for capital cities in Australia.
- identify the extent of possible output gains that could be obtained against the current Commonwealth funding mix and any single assistance option.
- quantify and comment upon the downside risks associated with changing the current funding mix and document the range of possible subsidy outcomes for each assistance option.
- exposes the strength of any efficiency case for differential regional policies for housing assistance in different capital cities of Australia.

Volume 2 of this report provides the detailed information on the data, sources, model and simulation results.



## **2 NATIONAL POLICY CONTEXT**

### **2.1 The Supply of and Demand for Affordable and Social Housing**

One of the most pressing issues facing housing policy makers is how to increase the number of new low to moderate income households provided with appropriate and affordable housing in the face of clear evidence of declining supply and burgeoning demand.

Although aggregate home ownership participation rates declined only slightly during the 1990's, participation by younger age and lower to moderate income households declined significantly (Yates, 1998). Concomitantly, average real house prices across the six State capital cities and Darwin increased by 2.8% compound per annum during the decade (Yong Tu, 2000).

The supply of low cost private rental housing also declined by a significant 18% over the period 1986-1996 at a time when the private rental market grew by 34% (Wulff and Yates, 2001). This decline in the low rent stock was widespread throughout Australia, although the loss of stock was most severe in the Sydney metropolitan region. In 1986, at an Australia wide level, there were almost two low rent dwellings for every low-income household in the private rental market. By 1996, there were less than 4 low rent dwellings for every 5 low-income households and an estimated overall shortage of rental dwellings affordable for low-income households of 50,000 dwellings (Wulff and Yates, p. 63).

Berry and Hall (2001) found that although nominal mortgage interest rates had fallen progressively through the 1990s and real rates were also down to below 5% per cent in 2001:

- the real prices and rents of units and houses increased faster than real incomes in the inner locations of Melbourne, Sydney and Adelaide (except rents in inner Melbourne)
- real mortgage payments rose by between 20 and 40 per cent in the two inter-censal periods, 1986-91 and 1991-96, with the largest increases in Adelaide and Sydney in the later period
- the proportion of households renting privately increased significantly during the 1986-96 period in all three cities. This occurred fastest when and where dwelling prices were rising quickest

Whilst the supply of low cost private rental housing and access to home ownership participation was clearly declining for these households, the demand for affordable public and social rental housing was just as clearly increasing (Berry and Hall, 2001, p. 10).

Berry and Hall also found that low-income tenants have extremely limited affordable housing choices, both by location and dwelling type. Moreover, where a small degree of choice appears to exist – viz. renting a one-bedroom unit on the fringe of metropolitan areas – this ignores the question of appropriateness. Clearly, this only represents a real choice for small households.

Overall, housing stress increased substantially for low-income tenants over the 1986-96 period (Berry and Hall, 2001)

Berry and Hall's main conclusions regarding housing stress in the bottom two income quintile households are as follows.

In June 2000:

- no household could affordably buy an average priced three bedroom house in the metropolitan areas of Sydney, Melbourne and Adelaide;
- 39% of Adelaide's and 15% of Melbourne's salient households could afford to buy an average one bedroom unit in North Adelaide and South East Melbourne (resp.), with no households in Sydney being able to affordably purchase any such dwelling in any location;
- only 9% of Adelaide's, and 3% of Sydney's salient households could afford to rent an average three bedroom house in South East Melbourne and Outer Western Sydney (resp.), with no households being able to rent the average three bedroom house in any Melbourne location.
- over 50% of salient households from each of the capital cities could afford to rent an average one bedroom unit in the outer locations (North Adelaide, South Eastern Melbourne and Outer Western Sydney);
- a very small proportion of households were able to afford to rent an average one bedroom unit in inner Melbourne or Sydney locations (5%, Inner Melbourne only); and 38% of households could afford the rent of a one bedroom unit in Eastern Adelaide (Berry and Hall, 2001, p. 11).

**Moreover, housing stress** increased substantially for low-income tenants in most capital cities over the 1986-96 period:

- Adelaide: up from 63.4% to 76.1%
- Melbourne: up from 60.5% to 74%
- Sydney: up from 67.3% to 80.7%
- Brisbane: up from 63.7% to 64.3%
- Hobart: up from 57.7% to 62.4%

The numbers of low-income tenants in housing stress increased over the period by 7,400 (Adelaide), 22,600 (Melbourne) and 28,600 (Sydney). The total increase for the seven capital cities was 90,000, so that by 1996, 227,480 low-income households were experiencing housing stress, as defined above. In addition:

Some higher income households will choose to commit a higher proportion of their incomes to housing and be able to afford it. However, other higher income tenants may be struggling and reasonably said to be suffering housing stress. This suggests that housing affordability problems may be climbing the income ladder, affecting not only unemployed and under-employed people but those who have been described as the 'working poor' and, even middle income households (Berry and Hall, 2001, pp. 65-6).

If the rate of growth of stressed households experienced in that 10 year period continues, then the number of households experiencing stress in metropolitan Australia will double in 15 years and reach nearly one million within 20 years. This does not include households struggling in regional Australia (Berry and Hall, 2001, pp. 12-13).

## **2.2 Goals of Housing Assistance Policy**

One of the implicit goals of both Commonwealth and State Housing Authorities is to maximise the number of new households in need that are provided with secure, appropriate and affordable housing.

### *2.2.1 Methods for Maximising Households Assisted*

There are three ways in which the number of new households being assisted can be expanded:

- by increasing the amount of funds available to provide long term housing assistance;
- by reducing the long term real subsidy cost per household assisted such that a greater number of households can be helped with the same amount of funds;
- By a combination of the preceding two ways.

In the context where the total real allocation of new funds for housing assistance is declining efficiency issues assume major importance (See Figure 1, p. 23). In this context, and given satisfaction of vertical and horizontal equity issues, the lower the long term subsidy cost per household or per household year, the greater the number of households who can be assisted.

## **2.3 Housing Assistance Options**

In order to comprehensively assess the efficiency of total government assistance to housing a number of steps must be followed. These steps are:

- first, the range of current and potential assistance options needs to be identified;
- second, the options need to be assessed, one compared to another, at a point in time;
- third, the options need to be subject to sensitivity tests of the range of variables that might affect subsidy costs;
- fourth, the options need to be subject to the same analysis over long periods of time using 'real' (actual historical) data on the variables; and
- fifth, combinations of assistance options need to be compared with different single options under real data conditions.

Only with this form of assessment can policy decisions be made with any confidence about the most efficient or cost effective housing assistance delivery options or mix of options and the best governmental and organisational context for delivery.

Demand side assistance is targeted directly at the low-income housing consumer and takes the form of either the provision of a cash payment or a 'voucher' (to buy housing services) in the hands of the housing consumer. Proponents of this form of assistance argue that, given markets are efficient, then the provision of allowances will bring about an increase in the supply of low cost housing at the most competitive price (subsidy). They also argue that this form of assistance permits closer and tighter targeting and removes the inequities associated with the differential levels of assistance available to public tenants viz a viz private tenants.

Supply side assistance is targeted initially at increasing the stock of dwellings available for either assisted purchase or rental. Funds are made available for capital acquisition and construction (public rental housing), subsidisation of the return on dwellings owned in the private sector but managed in the public sector (public rental housing, community housing programs), subsidisation of the mortgage repayment, deposit costs or risks (Government home loan schemes) and in the case of shared equity, subsidisation of the rent or mortgage repayment (or both). Equitable targeting is achieved by the development of income related eligibility criteria and in some, but not all programs, regular income reviews.

Proponents of supply side programs argue that demand side assistance is inefficient and that the number of households supported will never be able to be maintained or

increased (because of rising real rents). They also argue that demand side assistance cannot provide the same quality of housing support, because the standard of housing provided cannot be effectively guaranteed and security of tenure assured.

In some European and Scandinavian countries a mixture of demand and supply side assistance is delivered, complemented by the extensive use of special tax concessions for low cost-low-income targeted housing (Hall, Berry and Carter, 2001, pp. 29-38).

In Australia some minor tax concessions are available by way of stamp duty relief for the purchase of homes by certain classes of purchasers.

However, the use of tax concessions is mainly limited to the State Government sphere of operations, with the major exception being Federal exemption of owner occupied housing from the capital gains tax and the scope for private landlords to negatively gear their dwelling investments. The Commonwealth has also refrained (from the 1920s on) from taxing the imputed rental income of homeowners.

To summarise, notwithstanding special financing arrangements, the main forms of assistance comprise the following (or variations thereof):

- direct assistance to private and public renters via untied (cash, rent assistance) or tied payments (vouchers)
- on budget grant funded public housing (and within public housing, community, pensioner, and aboriginal housing, including subsidised but publicly or community non profit managed housing)
- off-budget (debt or equity funded) public housing (and within public housing, community, pensioner, and aboriginal housing, including subsidised but publicly or community non profit managed housing)
- directly and indirectly subsidised home loans (including mortgage assistance); whether in part (shared equity) or as a whole

## **2.4 Housing Policy and the Relevance of Risk**

There are many variables that can influence the real subsidy cost per household of different housing assistance options. In some cases (as noted earlier), changes to a particular variable may have an opposing affect on different assistance options; increasing subsidy costs for one whilst decreasing it for another. As an example, Table 1 below sets out a before and after subsidy comparison should private rental yields increase from say 5.4% to 6.15%, whilst renters pay the lesser of 25% of income, or private market rents (as in the current public housing system in most States). The higher rental yield effectively *increases* the required rent assistance subsidy (by \$980) and *reduces* the required capital subsidy for public housing (by \$500).

**Table 1: Assistance Options and the Opposing Effect Of Changes to Private Rental Yields**

<b>Commencing Case: Private Rental Yields 5.4%</b>	<b>% And Payment Amount (annual)</b>
Maximum Percentage Of Income In Payments	25%
Initial Private Rental Yield	5.4%
Public Housing Cost Of Funds	5.75%
Public Housing Administration Costs (% Of Dwelling Value)	0.88%
Rates And Maintenance (% Of Dwelling Value)	1.52%
<b>CASE 1 OUTCOMES</b>	
Initial Tenant Income (annual)	\$30,000
Initial Dwelling Value	\$130,000
Cost Of Funds (Public Housing)	\$7,475
Administration Costs	\$1,144
Rates And Maintenance	\$2,041
<b>TOTAL PUBLIC HOUSING COSTS</b>	<b>\$10,660</b>
Market Rents	\$7,020
Maximum Rents At 25% Of Income	\$7,500
Therefore:	
Rent Assistance Subsidy	\$0
Public Housing Subsidy	\$3,160
<b>CASE 2: Private Rental Yields Increase to 6.15% (all other assumptions remain the same)</b>	
Private Rental Yields	6.15%
Market Rents	\$8,000
<b>CASE 2 OUTCOMES AND COMPARISON WITH CASE 1</b>	
<b>Rent Assistance Subsidy</b>	<b>\$500</b>
<b>Increase On Case 1</b>	<b>+\$500</b>
<b>Public Housing Subsidy</b>	<b>\$2,660</b>
<b>Decrease On Case 1</b>	<b>-\$500</b>

Alternatively, in the cases compared in Table 1, the affordability benefit of one form of assistance (rent assistance) will not be equal to that provided by the other (public housing) for a given level of subsidy. The financial cost of each and every assistance option is therefore subject to certain risks, and hence risk is central to the issue of subsidy efficiency and assistance output.

What do we mean when we talk about risk? In this analysis risk is the possibility that an expected outcome is not achieved or is replaced by another, or that an unforeseen event occurs. This view of risk includes both uncertainty and the consequences of limited knowledge, information or experience.

In this context risk analysis is the process of identifying risks, estimating their likelihoods, and evaluating potential consequences.

It can be argued that this sort of definition of risk, whilst helpful in examining affordability issues does not reflect the cumulative and iterative nature of housing risk.

For example, a single increase in private rental yields may be able to be afforded by lower to moderate income tenants for a few months, but the subsequent continuous erosion of discretionary income may create financial pressures in other areas which then force a change (or loss) of residence. Similarly, one increase in mortgage interest rates might be able to be afforded but the margin of financial 'comfort' may be considerably reduced. A subsequent further increase in rates and therefore payments may force a dwelling sale and a 'trading down' of the housing consumption of the household.

It can also be pointed out that the trend in housing policy is a marked shift from government to individual provision for risk. Three examples are:

- in the case of public housing, secure tenure is assured by government policy whereas private market rent assistance carries no such guarantee. The major shift from supply subsidies to demand side assistance in the real amount of housing assistance funds available has hastened this shift in risk to individuals;
- similarly, should private rents increase, the quality of housing available at the deemed price is not affected. By contrast, the rent assistance recipient may need to reduce quality to maintain the same payment outcome; and
- finally, historically, many home purchase programs contained provisions to protect borrowers in the event of unintended income loss by maintaining payments at a set proportion of income. In Britain, for example, this type of support has been replaced by less generous and more restrictive mortgage payment insurance, the cost of which is borne by the individual borrower

Perri 6 (1998, p347-376) emphasises the importance of the recognition of risk in housing policy and argues that there are a range of general risks that, whilst not primarily housing risks, impact significantly on housing risks. They also argue that a large part of housing policy is implicitly about the reduction or elimination of certain kinds of risk. This work is discussed in more detail below.

These arguments deal with issues that apply to the recipients of the assistance. This project, in contrast, is primarily about the impact of risks on housing assistance efficiency, and hence on government assistance providers. The primary question therefore is (Hall, Berry and Carter, 2001, p41):

#### *2.4.1 Is There an Optimal Cost Effective Assistance Option?*

A simple way to test this question is to construct a basic model of the four main assistance options and compare the subsidy cost to government under different economic conditions. The following summary is drawn from Hall, Berry and Carter (2001, pp. 38-42).

For the Modelling assumptions see Hall, Berry and Carter (2001, p. 40) and Volume 2 (Attachment 2) to this report..

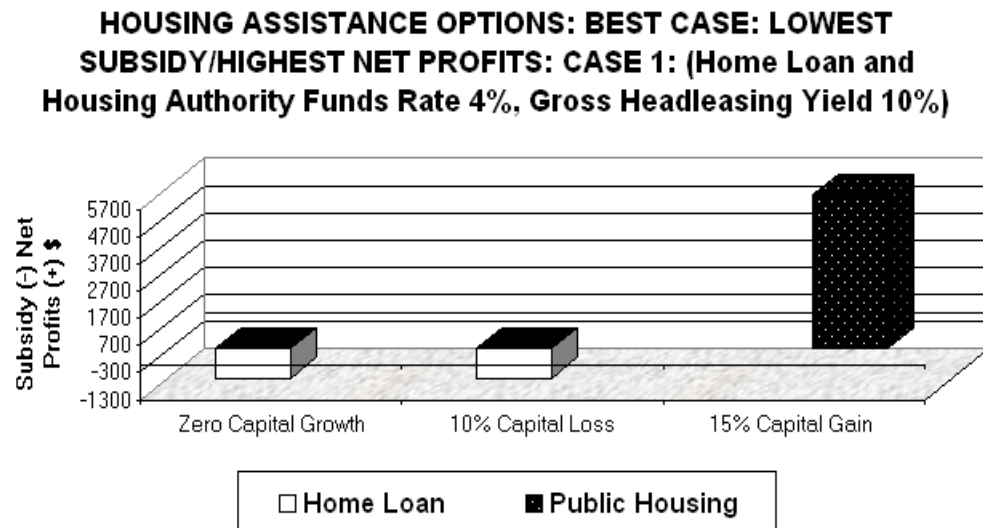
All of these cases are externally consistent, one with each other, with the only difference being that in the mortgage and direct assistance/headleasing options the impact of transaction costs and maintenance and rates does not affect the subsidy calculation because they are to the account of the borrower. Conversely, the benefit or cost of capital growth/loss is to the account of the client (home loan) or the lessor (headleasing).

Twelve possible variations to economic variables were tested: These involved two cases and three capital growth options. The cases are:

- Case 1: 4% mortgage and housing authority cost of funds, 10% gross rental yields, capital growth rates of -10%, 0%, and +15% p.a.;
- Case 2: in reverse, 10% mortgage and housing authority cost of funds, 4% gross rental yields, with the same capital growth outcomes, -10%, 0%, and +15% p.a.

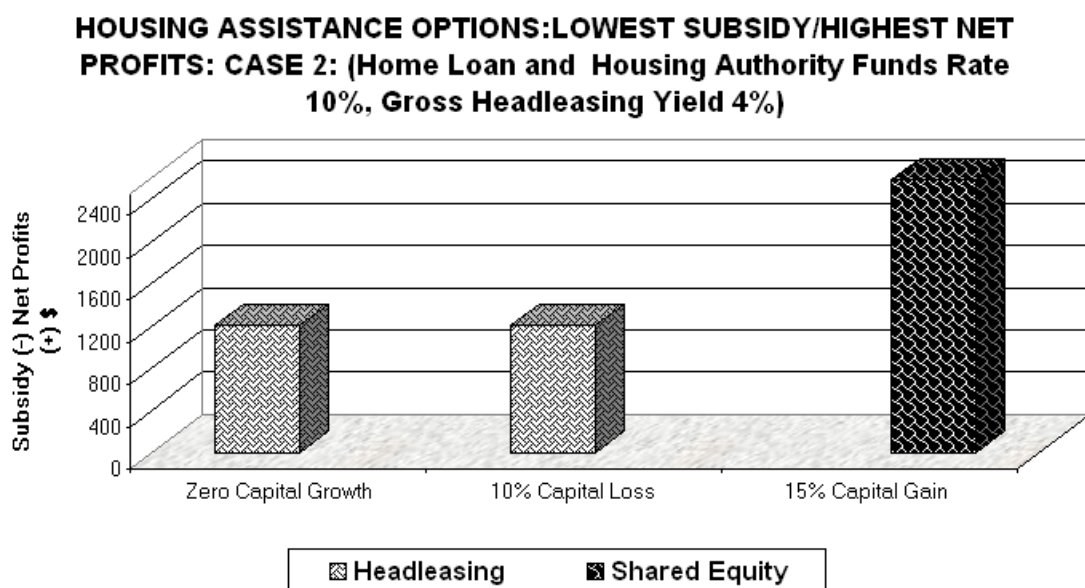
Graphs 1 and 2 set out the result of such analysis.

**GRAPH 1: Housing Assistance Options: Best Case: Lowest Subsidy/Highest Net Profits: Case 1**



Source: Berry M, & Hall J, 2001, *Policy Options For Stimulating Private Sector Involvement in Affordable Housing Across Australia: Stage 2*: for the Affordable Housing National Research Consortium, DUAP Sydney pg 41.

**GRAPH 2: Housing Assistance Options: Best Case: Lowest Subsidy/Highest Net Profits: Case 2**



Source: Berry M, & Hall J, 2001, *Policy Options For Stimulating Private Sector Involvement in Affordable Housing Across Australia: Stage 2*: for the Affordable Housing National Research Consortium, DUAP Sydney pg 41.

The graphs present the ‘best case’ option from the twelve scenarios drawn for each case. In case 1, if the capital growth of the dwelling is zero or negative, the cheapest subsidy option for government (both levels taken as a whole) is to provide mortgage loans. If, on the other hand, substantial capital growth occurs (15% in this example) then the best option from a strictly fiscal viewpoint is capital (e.g. public housing) provision, which in this case produces a negative subsidy or profit to government. This ‘profit’, of course, accrues in the form an appreciating asset portfolio.

In other words, if dwelling values are increasing at even moderate rates, social housing not only delivers the most cost-effective outcome but it also may actually deliver a surplus when the value of the equity is taken into account; in the case above this option delivers a \$5,600 surplus.

This assumes that the social housing stock is managed in an efficient and effective manner.

In case 2, on the other hand, direct assistance minimises subsidy costs in the negative or zero capital growth situations, while shared equity generates maximum profits in the high capital growth case.

In the former situation, direct assistance and headleasing actually delivers a \$1,200 surplus per client because the payment being generated is 1% more than the assumed market yield of 4%. In the latter situation, shared equity is the most efficient option generating net surpluses for the housing authority of \$2,581 per annum per dwelling.

As Hall, Berry and Carter (2001) demonstrate, there is no “first/best” cost effective delivery mechanism for all economic circumstances. Any one of the four methods of delivery could be the most cost effective option depending on the state of the economy and, especially, of housing and financial markets.

The basic principle that therefore applies to the assessment of delivery mechanisms for housing assistance is: if appropriateness and tenure considerations are equal there is no “best” cost delivery outcome *for government as a whole* in all circumstances.

Of course, the support costs vary in their impact *between* the two levels of government across the four delivery mechanisms in the wake of the changes in the economy that give rise to risk.

## 2.5 Assistance Options and Systematic Risks

Whether or not certain risks crystallise over the life of any housing assistance program is central to assistance efficiency. If these risks have different impacts depending on the assistance option, what then are the key risks faced by government? (This section summarises Hall, Berry and Carter, 2001, pp. 29-38).

There are four main types of risk which affect housing assistance options. These are:

**Systematic risks** including:

- *general economic risks*, which includes such variables as inflation, capital growth or contraction rates, rental yield, unemployment and income growth or contraction, changes in nominal and real interest rates, and construction cost escalation rates; and
- *natural disasters*, such as landslip, earthquake, fire, flood, lightning, wind and weather.

**Unsystematic risks** including:

- *structural and financial risks*, including funding sources, ownership, and residual risks to the Authority where there is private sector involvement; contractual risks, and procurement planning; and



- *agency or issue specific risk*, including political, project management, project delivery (contract selection, tendering, negligence etc.), human error, organisational (including industrial relations, resources shortage, management, work practices etc.) and systems (including communications failure, hardware and software failure, etc.)

Each of the four delivery mechanisms is analysed below with respect to these risk categories.

### **2.5.1 Capital Funding Risks**

When any social housing provider makes a direct investment in housing for on-renting to low to moderate income earners it assumes a number of systematic risks.

In Australia these risks are borne directly by the State governments (state housing authorities – SHAs) as the primary owner of social housing assets.

However, the Commonwealth is indirectly impacted through the funding demands of the States in the context of the Commonwealth State Housing Agreement (CSHA). Some of the risk can also be transferred to other social housing providers, as in the case of the small Community Housing Program in the first half of the 1990s.

These risks are:

#### **Dwelling Price or Asset Risk**

Any dwelling purchased by social housing providers may gain or lose value according to market price movements. Consequently, it is possible that at different times the asset base of SHAs and other providers may actually fall.

#### **Rental Yield Risk**

Many SHAs “mark to market”, that is, unrebated rents are set at the prevailing private rental market yields. For SHAs with any significant proportion of unrebated tenants, there is a risk that the unrebated rental income may either fall, or not increase, affecting the rent income received.

#### **Rental Payment Risk**

There are three payment risks associated with social rental housing and these are:

##### *(1) Unemployment and/or Income Loss Risk*

Research on low to moderate income earners has indicated that their income is highly volatile and in times of recession a significant proportion of this group may suffer substantial income loss. For a very high proportion of public housing tenants, pensions and benefits are the primary source of income and this risk may not be very high. However, for employed tenants in public or community housing there is a risk of income loss and the consequent reduction in rent received as a result of downward adjustments in rent paid.

##### *(2) Unemployment and/or Default Risk*

The second payment risk is the risk that tenants may completely default, and rental income is lost.

##### *(3) Vacancy Risk*

Finally, higher than anticipated vacancies may result in loss of rental income received, although this risk is not very high in public housing due to the large waiting lists. However, even here, difficult-to-let dwellings (such as some high rise estates) may experience above average tenant turnover and vacancy rates.

### **Interest Rate Risk**

If debt financing is used, whether directly by SHAs or on-passed as grants from central borrowing authorities, interest rate risk is present. If rates rise the cost of subsidies increases or (where the rate of capital growth outweighs the subsidy cost) the rate of return will be reduced.

### **Cost Escalation Risk**

Finally, social housing providers face the risk that maintenance and other costs may escalate at a faster rate than anticipated with consequent higher expenditures.

Agency or issue specific risks will be the same whichever housing assistance option is utilised and are:

- political;
- project planning;
- project management;
- project delivery (contract selection, tendering, negligence etc.);
- human error;
- organisational (including industrial relations, resources shortage, management, work practices etc.); and
- systems, (including communications failure, hardware and software failure, etc.).

Because structural or organisational risks have the same impact for all assistance options the remainder of the analysis is concerned only with systematic risks.

#### ***2.5.2 Home Purchase Programs***

When providing home purchase finance under Home Purchase Programs governments face a number of similar systematic risks but crystallisation results in somewhat different consequences. To date, these schemes have been implemented by the States but funded by the States and Commonwealth through the CSHA and by accessing the loan market.

### **Dwelling Price or Asset Risk and Defaults**

In the case of these programs, SHAs normally underwrite the risk of mortgage default even when the programs are privately financed. Mortgage defaults will only result in a loss where the outstanding balances plus termination costs are greater than the dwelling value at the time of sale. Consequently, if dwelling prices fall significantly the SHA is exposed to a potential loss.

### **Mortgage Repayment**

The repayment risks associated with home purchase programs are similar to those applying to public and community housing but because home loan portfolios usually consist of wage earners, income is not indexed to the CPI (as in the case of pensioners and beneficiaries) or protected from a reduction.

For the employed assisted home-owner there is a risk of income loss or decline with a consequent inability to meet the mortgage repayment. This will either mean a default or provision of additional subsidy support to bridge the gap between affordable repayments and the mortgage repayment requirement.

### **Interest Rate**

Where Variable or CPI Indexed debt is used to fund the mortgages, SHAs face a further risk that interest rate or inflationary increases will result in unaffordable payments for borrowers with increased subsidy or default the result.

### **2.5.3 Shared Equity**

Systematic risks will be the same as those for both capital provision and home purchase programs but depending on the relationships between the variables, the risks if crystallised, may have a lesser impact. To date, shared equity schemes have been seen to be the responsibility of State governments.

#### **Dwelling Price or Asset Risk and Defaults**

Mortgage defaults will only result in a loss where the outstanding balances plus termination costs are greater than the value of the clients' equity share, at the time of sale. Consequently, if dwelling prices fall significantly, the SHA is exposed to a potential loss.

#### **Mortgage Repayment**

For the employed assisted shared equity home-owner there is a risk of income loss or decline with a consequent inability to meet the mortgage repayment component, thereby raising the possible alternative outcomes of default and extra subsidy liability.

#### **Rental Payment**

Usually the rental repayment component of shared equity programs commences as a certain percentage of the investor's share and is indexed to CPI. Again, if incomes do not grow as fast as CPI, additional subsidy will be required to continue to meet the affordability benchmark.

Alternatively, if market rents increase faster than CPI and incomes also increase at the same rate, the housing provider will be foregoing the difference between the CPI indexed rent and the market rent.

#### **Interest Rate**

Where variable or CPI Indexed debt is used to fund the mortgages, SHAs face a further risk that interest rate or inflationary increases will result in unaffordable payments for borrowers with increased subsidy or default the result.

### **2.5.4 Direct Assistance: Rent Assistance or Housing Allowances**

Direct assistance in the form of rent assistance has, to date, been a primary Commonwealth responsibility. This form of assistance has grown substantially since the late 1980s, in total, and now exceeds supply side capital subsidies delivered through the CSHA. In the case of housing allowances, whilst the provider faces no dwelling price, asset or construction risk, the other systematic risks will have a much greater impact than in the case of capital provision through public or community housing.

#### **Rental Yield, Real Rent Risk**

Unlike the case of capital provision, where only a portion of the portfolio is subject to rental yield risk, in the case of direct assistance the amount of assistance required to support any given number of households will directly increase or fall according to changes in real rents or rental yields. If real rents increase faster than inflation, then for the majority of households on pensions and benefits, the 'gap' between an affordable (i.e. income related) rent payment and the market rent will increase necessitating a major increase in the amount of assistance provided, or a reduction in the quality of housing which can be rented. This gap will also grow for low-income tenants employed in occupations where incomes are not rising as fast as inflation – the so called 'working poor'. This risk is borne by the Commonwealth and is considerable, as experience in a number of European countries attests.

#### **Rental Payment**

The payment risks associated with capital provision also apply to direct assistance.

### Unemployment and/or Income Loss Risk

For employed tenants there is a risk of income loss or decline and the consequent reduction in rent received as a result of downward adjustments in rent required.

### Unemployment and/or Default Risk

The second payment risk is the risk that tenants may completely default, and rental income is lost. In the case of direct assistance, it is unlikely that any private investor would provide housing for assisted tenants unless the default risk is assumed by Federal or State Housing Authorities.

#### 2.5.5 Risk Conclusions

It can be seen that under each of the various options currently available (with the exception of housing allowances) governments face very similar systematic risks, with the main differences being related to the method of financing. In the current institutional environment the main risks associated with capital provision, home loans and shared equity reside with State government, while the risks of direct assistance programs are borne by the Commonwealth.

Table 2 sets out a summary of the major risks associated with the various housing assistance options and classifies these risks according to the likely severity of the impact on government subsidy costs.

**Table 2: Summary of Major Risks to Government**

Risk	Capital Provision	Subsidised Home Loans	Shared Equity	Direct Assistance (RA or Vouchers)
<b>Systematic Risks</b>				
<b>Dwelling Price/Asset</b>	Yes (High)	Yes (Moderate)	Yes (Low)	No
<b>Rental Yield- 'Real Rents'</b>	Yes (Low)	No	Yes (Low)	Yes (High)
<b>Unemploy'mt Income Loss</b>	Yes (Low)	Yes (High)	Yes (Moderate)	Yes (Moderate)
<b>Unemploy'mt Default</b>	Yes (Low)	Yes (High)	Yes (Moderate)	Yes (Moderate)
<b>Interest Rate\Inflation</b>	Yes (Moderate)	Yes (High)	Yes (Moderate)	Yes (Moderate)
<b>Constr. Cost Escalation</b>	Yes (High)	No	No	No
<b>Structural and/or Financing Risks</b>				
<b>Prepayment\ Reinvestment</b>	Possibly	Possibly	Possibly	No
<b>Earnings</b>	Possibly	Possibly	Possibly	No
<b>Vacancy</b>	Yes (Low)	No	No	No
<b>Agency or Issue Specific Risks</b>				
<b>Political</b>	Yes	Yes	Yes	Yes
<b>Project Management</b>	Yes	Yes	Yes	Yes
<b>Project Delivery</b>	Yes	Yes	Yes	Yes
<b>Human Error</b>	Yes	Yes	Yes	Yes
<b>Organisational</b>	Yes	Yes	Yes	Yes
<b>Systems</b>	Yes	Yes	Yes	Yes

Source: BERRY M, & HALL J, 2001, Policy Options For Stimulating Private Sector Involvement in Affordable Housing Across Australia: Stage 2: for the Affordable Housing National Research Consortium, DUAP Sydney.

To restate, **the main systematic risks** associated with housing assistance options are:

- dwelling price growth or contraction;
- rental yield - 'real rents';
- income growth/loss, vacancy rates and defaults and therefore reduced payments;
- inflation;
- interest rates; and
- cost escalation.

Table 3 sets out the impact on subsidy costs to government of variations in the main risks.

**Table 3: Impact On Subsidy Costs Of A Rise Or Fall In Each Of The Systematic Risks**

Risk	Capital Provision	Subsidised Home Loans	Shared Equity	Direct Assistance (RA or Vouchers)
<b>Rising</b>				
Dwelling Price/Asset	Reduce	Reduce	Reduce	No Impact
Rental Yield-'Real Rents'	Reduce	No Impact	Reduce	Increase
Unemploy'mt Income Loss	Increase	Increase	Increase	Increase
Unemploy'mt Default	Increase	Increase	Increase	Increase
Interest Rate\Inflation	Increase	Increase	Increase	Increase
Constr. Cost Escalation	Increase	No Impact	No Impact	No Impact
<b>Falling</b>				
Dwelling Price/Asset	Increase	Increase	Increase	No Impact
Rental Yield-'Real Rents'	Increase	No Impact	Increase	Reduce
Unemploy'mt Income Loss	Increase	Increase	Increase	Reduce
Unemploy'mt Default	Increase	Increase	Increase	Reduce
Interest Rate\Inflation	Reduce	Reduce	Reduce	Reduce
Constr. Cost Escalation	Reduce	No Impact	No Impact	No Impact

Source: BERRY M, & HALL J, 2001, Policy Options For Stimulating Private Sector Involvement in Affordable Housing Across Australia: Stage 2: for the Affordable Housing National Research Consortium, DUAP Sydney.

Assuming that the minimisation of subsidy costs to government as a whole is a major consideration, the guiding rules that might apply to the choice of delivery mechanism are that in times of:

- low to moderate interest rates and moderate to higher levels of gross private rental yields and capital growth; public and community housing options will prove to be most cost-effective;

- as interest rates rise, and capital growth declines shared equity will likely outperform public housing as the most efficient delivery mechanism;
- in periods of low housing interest rates, high gross rental yields and little capital growth subsidies on home loans will come to the fore; and
- when rental yields are low, dwelling prices are stagnant and mortgage rates are high, direct assistance will be most cost effective (Hall, Berry and Carter, 2001, p. 42).

## 2.6 Investment Theory and its Relevance to Assistance Efficiency

There are two key techniques that are used in modern portfolio theory, Naïve Diversification and Markowitz Diversification.

Portfolio analysis emphasises the ‘dominance principle’:

The dominance principle states that:

1. among all investments with any given expected rate of return, the one with the least risk is the most desirable; or
2. among all the assets in a given risk class, the one with the highest expected rate of return is the most desirable (Francis, 1976, p. 398).

If this is extended to portfolios of investments:

An efficient portfolio, then, is any asset or combination of assets which has the:

1. maximum expected return in its risk class or conversely;
2. the minimum risk at its level of expected return (Francis, 1976, p. 398).

The objective of portfolio management is to develop efficient portfolios. The group of all efficient portfolios is called the efficient set of portfolios. The grouping of the efficient set of portfolios is called the *efficient risk frontier*.

### 2.6.1 Naive Diversification

Long term analysis of the risks associated with investment in firms listed on the New York Stock Market has found that 25% of the variability of return is due to what we have described earlier as *systematic risk*, whilst Naïve diversification asserts that simply by randomly increasing the number of stocks held the unsystematic portion of the total risk will decrease towards zero. Research has found that this will usually occur until as many as 15 securities are added to the portfolio (Francis, 1976, p. 401).

### 2.6.2 Markowitz Diversification

Markowitz diversification requires a number of assumptions, viz:

- the rate of return is the most important outcome of any investment;
- investors visualise the various possible rates of return from any asset in a probabilistic fashion;
- investors define risk as variability of return and are willing to base their investment decision on only two things - expected return and risk; and
- investors prefer to hold the investment with the maximum rate of return in any given risk class they select, or conversely investors prefer to minimise risk at whatever expected rate of return they seek (Francis, 1976, p. 421).

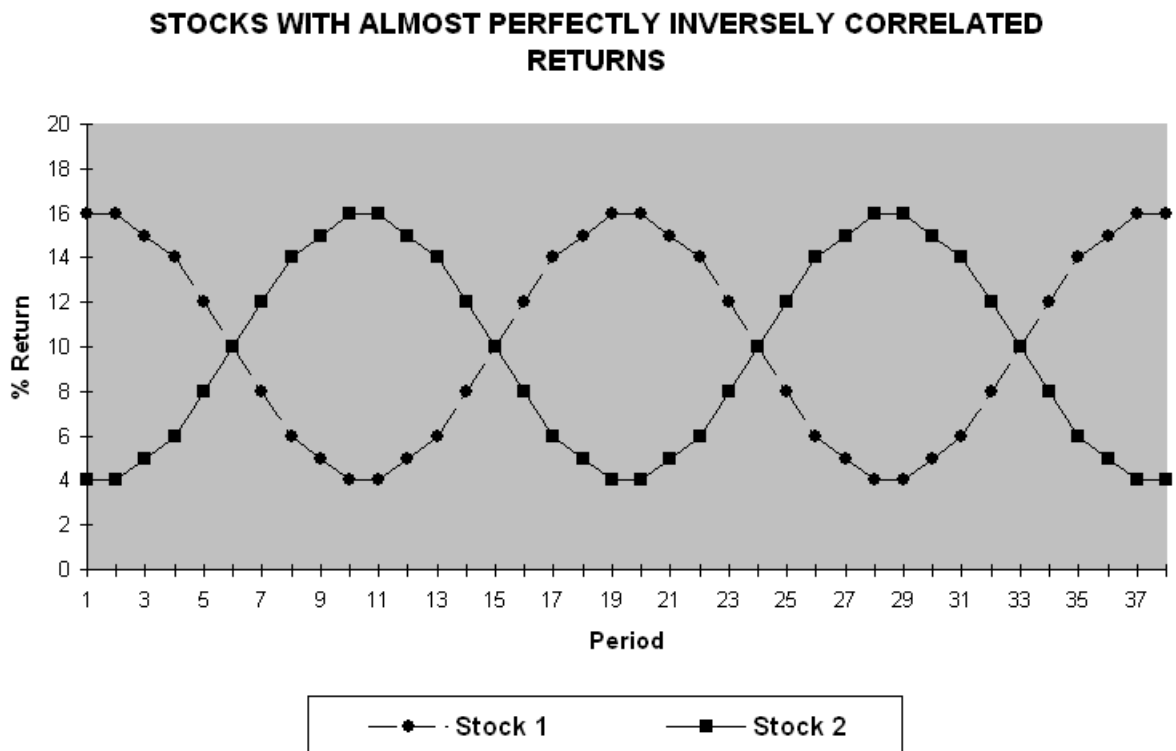
Markowitz Diversification is defined by Francis as combining assets whose returns are less than perfectly correlated in order to reduce portfolio risk without sacrificing portfolio returns (Francis, 1976, p. 404).

This is achieved by measuring the covariance of returns of stocks.

Finally, the correlation coefficient squared is the coefficient of determination and gives the percentage variation in the dependent variable which can be explained by concurrent variance in the independent variable.

Graph 3 sets out the returns on two hypothetical stocks which are almost perfectly negatively correlated.

**GRAPH 3: Stocks With Almost Perfectly Inversely Correlated Returns**



The essence of Markowitz diversification is to find securities with low positive correlations or negative covariances (Francis, 1976, p. 455).

If we substitute 'housing assistance options' for 'firms' and 'subsidy costs' for 'returns' it may be that this theory has significant relevance to the determination of the most efficient approach to the means of delivering housing assistance.

## 2.7 A Possible Hypothesis for Housing Assistance Efficiency

The hypothesis is if:

- the future experience of systematic risk will be 'bounded' by the range of past experience;
- unsystematic risk is zero for all housing assistance options;
- there is no difference in the cost or terms of finance available for all housing assistance options;
- funds are borrowed at the 'risk free' rate on fully variable terms with no prepayment penalties or other additional costs and fees at the 'real' 10 year Commonwealth Bond Rate;

- SHA's are responsible for all losses (the difference between the realised dwelling price minus the mortgage balance outstanding plus termination costs) or shortfalls (the difference between an 'affordable payment' defined as a percentage of household income and the required payment) arising from defaults or income loss for all housing assistance options.

then

- a strategy providing for the delivery of housing assistance using a variety of delivery options and dynamically adapted to trends in systematic risks will, in the longer term, be considerably more efficient (i.e. impose significantly lower real subsidy costs) than any strategy which is monocentric, i.e. relying on one principal means of providing the assistance.

This hypothesis is tested in chapter 4.

## **2.8 Assistance Efficiency, Housing Policy Developments and Intergovernmental Arrangements**

An efficient housing assistance system may demand the use of a variety of assistance options combined with constant dynamic management. Such a system would require a holistic and rapidly responsive approach to the management of housing policy. This has major implications for the delivery options used by State and Commonwealth Governments and the intergovernmental arrangements which apply to the provision of housing assistance.

Berry and Hall, (2001, pp. 81-83) have documented the major changes which have occurred in housing policy in the 1990s (reproduced below).

Yates (1997, p. 266) has commented:

Because of the changes which are taking place, the 1990s can be regarded as representing a watershed in relation to federal housing policies in Australia. In the immediate post-war period through to the 1980s, Australia's housing system was dominated by tenure-based policies which were directed towards home ownership and the provision of public housing with private tenants virtually being excluded from housing assistance of any form.... In the 1990s, however, we have seen, or are about to see, an apparent U-turn in federal housing policies with the elimination of explicit home ownership policies, the withdrawal of the Commonwealth from direct involvement in public housing funding and a rapid expansion of rental assistance for private tenants.

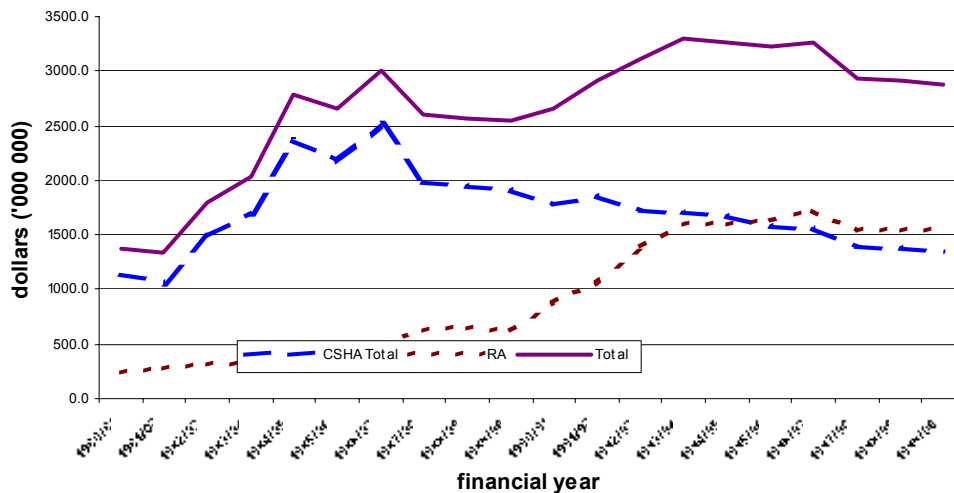
In fact, at the time Yates was writing, the Commonwealth pulled back from the major reforms that would have meant the replacement of capital subsidies for public housing in favour of demand-side subsidies in the form of rent assistance paid to both public and private tenants. The 1996 Commonwealth State Housing Agreement (CSHA), originally intended as an interim arrangement, was eventually extended to 1999 and was succeeded by the 1999 CSHA due to finish in 2003 and subsequently renegotiated until 2007

Under the 1999 agreement the Commonwealth undertook to continue to maintain capital grants to the SHAs, with state government matching, albeit at a falling real value. However, the general shift away from supply-side to demand-side subsidies is apparent in the funding contributions of the Commonwealth over the past 10 or 15 years (see Figure 1).



**Figure 1: Commonwealth and State Expenditure on housing assistance over the period 1980-81 and 1999-2000, in constant 2000 dollars**

**Figure 1 – Commonwealth and State Expenditure on housing assistance over the period 1980-81 to 1999-2000, in constant 2000 dollars**



Source: Australian Housing Policy Project, Fact Sheet 3; Housing Assistance Funding Trends, Australian Housing and Urban Research Institute, Melbourne.

The 1996 CSHA enshrined a number of changes from earlier agreements. The 1984 CSHA had clearly specified as a major objective the expansion of the public housing stock managed by the SHAs. A commitment was also made to providing housing assistance to all those in need as a way of solving existing housing-related poverty. Both the 1984 and 1989 CSHAs limited the extent to which CSHA funds could be directed towards financing owner occupation, in order to give precedence to the aim of building up the public rental stock. The States were encouraged to access private funds to finance their home ownership programs, which most did, with adverse consequences for some in the early 1990s, notably in N.S.W. As a consequence annual additions to the public rental stock ran at about 10,000 to 15,000 nationally during the 1980s.

The 1996 CSHA removed the objective of expanding public housing, and also removed any mention of providing levels of assistance to meet all housing-related needs. There was a desire to treat all tenants, public and private, on an equal footing. The 1996 agreement also targeted the homeless and Aboriginal and Torres Strait Islanders as groups with particular and pressing needs for assistance. Owner-occupiers would continue to benefit from taxation relief on capital gains and imputed rent.

This agreement freed up the earlier constraints on SHAs moving CSHA funds out of their public rental accounts to finance any Commonwealth allowable activity, including unrestricted funding of rental rebates and stock renovation. As a consequence of this change, allied to the falling real value of annual capital grants, a rising rental rebate bill and ballooning maintenance and upgrade costs, the annual additions to the public stock have fallen to less than 5,000 in the last few years.

This constraint on the public stock has been reinforced by relaxation of the terms on which public housing is sold. The proportion of sales to additions rose from less than 10 per cent in the mid-1980s to around 30 per cent in the mid-1990s<sup>3</sup>.

In 1990 a Special Premiers Conference was convened to put housing assistance on the agenda of microeconomic reform, in line with the general program of collaboration between the levels of government that culminated in 1992 with the formation of the Council of Australian Governments (COAG). COAG established the following four principles that should guide future housing assistance policy:

- clearer delineation of Commonwealth and State/Territory roles, with the Commonwealth assuming primary responsibilities for income support and the States and Territories bearing the responsibility for public housing provision and management;
- a national needs assessment that would ensure that the level of assistance would be determined on a consistent basis across all jurisdictions;
- output rather than input targets to be established and monitored. This suggested a regime that would focus on actual results rather than intended outcomes; and
- implementation of a charter of resident rights.

This process was influential in guiding the negotiations responsible for the 1996 CSHA and in subsequent developments. Bilateral agreements specifying output targets and agreed benchmarks for performance have, as noted above, been instituted between the Commonwealth and States/Territories. A number of States have moved towards tighter targeting of available public housing dwellings towards groups deemed to be in greatest need. For example, in 1997 Victoria moved to make eligibility for public housing the same as eligibility for social security benefits and pensions.

Victoria subsequently began raising rents for existing public tenants from 20 per cent to 23 per cent of assessed income and 25 per cent for new public tenants.

Over the past few years the SHAs have sought to rationalise and consolidate their activities in both public renting and support for home ownership, generally in the context of a slowly declining level of activities, in line with the falling real value of Commonwealth and State resource commitments to this policy field and some uncertainty as to the longer term future of the CSHA. Conversely, the Commonwealth's fiscal commitment to rent assistance has continued to grow in total dollar terms, as Figure 1 shows. A number of SHAs are also having to battle with fiscal and management problems posed by a rapidly obsolescing public stock and therefore to show interest in possible approaches to area regeneration, particularly in relation to their large estates<sup>4</sup>.

In 2002 additional supply responses to assistance needs has fallen to very low levels whilst the Commonwealth was almost exclusively focused on delivering a demand response via cash payments through the Rent Assistance Program. State Housing Authorities are basically in the business of managing their existing public dwelling stock and attempting a very small number of additions a year.

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3 The 1996 agreement also moved some way to identifying and separating Commonwealth roles and responsibilities in housing provision, introducing transparent monitoring and reporting relationships. Greater flexibility was also sought through introducing bilateral agreements between the Commonwealth and individual States and Territories.

4 A parallel AHURI project is being carried out by the authors, documenting the financial operating trends of the State and territory housing authorities over the 1990s (see J. Hall and M. Berry [2003] *Operating Deficits and Public Housing: Policy Options for Reversing the Trend*, AHURI Final Report, Melbourne, December).

We now have a bifurcated and monocentric housing policy that may (if the hypothesis tested in this study proves to be correct) be an inefficient assistance policy. The proposed analysis therefore reaches to very heart of housing policy and intergovernmental arrangements.

In this context, it should be noted, a 'Joint Communique of Australian Housing Ministers', released on 19 April 2002, concluded that:

Ministers expressed commitment to the development of positive options for a new CSHA that will:

- create a modern, sustainable housing system;
- support community development and the renewal of public housing estates;
- support wider government outcomes in health, education and labour market reforms;
- and
- stimulate private sector investment in the supply of low cost housing.

Ministers agreed that a national approach to these challenges is vital.

One of the key issues which this research also addresses is the extent to which private sector investment in 'supply side' options may be more or less efficient than other assistance options.

### 3 METHODOLOGY

This section of the Report canvasses the following steps in exploring the general hypothesis advanced in section 2.7 and the specific research questions proposed in Chapter 1 namely:

- assessment method;
- model development;
- assessment process;
- details of the preferred probability analysis method using Latin Hypercube simulation
- model cost data
- risk data trends and content

#### 3.1 Assessment Method

Before proceeding to the development or modification of assessment models there are two major issues which need to be addressed:

- what assessment method is to be used in the analysis;
- if financial analysis is to be used how are taxation effects to be dealt with?

##### 3.1.1 Assessment Method

There are three principal options for assessing the subsidy efficiency of housing assistance options:

- cost benefit analysis (CBA)
- cost effectiveness analysis (CEA)
- financial appraisal (FA)

The difficulties of using either CBA or CEA include:

- the difficulty of measuring all of the costs and benefits of a project
- the difficulty of putting monetary values on things like security of tenure and human life
- concerns that Cost-Benefit Analysis may not account for income distribution and equity effects
- concerns that Cost-Benefit Analysis can be readily manipulated to support a particular position (EPAC, 1995, p. 164).

One of the most difficult areas is the measurement and assessment of externalities. "Externalities" is a term used to describe 'third party' economic costs/benefits arising from a particular investment, i.e. costs and benefits which extend beyond the users or direct beneficiaries of that investment.

Some of the positive externalities arising from public housing might be:

- when compared to the private rental sector, public housing creates lower housing payments for households obtaining access. This means they will enjoy greater disposable income than previously.

They will thus be able to spend more on transport to pursue jobs, and on appropriate clothing for interviews, etc, resulting in a greater likelihood of gaining employment and ultimately, higher numbers of low-income households employed;

- again, because of higher disposable income and potentially greater self-esteem, households may be more willing to engage in job training and skill improvement and therefore generate higher productivity in the economy as a whole;
- greater expenditure on non housing related consumer needs due to the greater disposable income arising from the more affordable rents, etc.;

Financial Appraisal concentrates on effects on the agency sponsoring the project. Although there is much common ground between economic and financial appraisal there are a number of significant differences.

The main difference is the perspective: in a financial analysis the project is examined from the narrow perspective of the entity undertaking the project. It does not take account of effects on other enterprises or individuals, including externality effects.

Table 4 below (from Sinden and Thampapillai, 1995), shows the main differences between the two perspectives.

**Table 4: A Comparison Of The Private And Social Perspectives**

<b>Item</b>	<b>Private (Financial Analysis)</b>	<b>Social (Cost-Benefit Analysis)</b>
<b>Overall Goal</b>	Increase net income	Increase economic welfare
<b>Choice Criterion</b>	Net financial returns to the individual entity	Net benefits to society as a whole
<b>Purpose</b>	Indicate economic worth of an alternative to the entity	Indicate economic worth to society as a whole
<b>Benefit Values</b>	Prices received	Willingness to pay ( usually exceeds price)
<b>Cost Values</b>	Prices paid	Opportunity Cost (=Real resource costs)
<b>Taxes Paid</b>	Included as a cost	Excluded as they are a transfer payment
<b>Subsidies Received</b>	Included as a benefit	Excluded as they are transfer payment
<b>Discount Rate</b>	Individual rate of time preference	Social rate of time preference (usually much less than the entity rate)
<b>Government Costs</b>	Excluded	Included
<b>Externalities</b>	Ignored	Included
<b>Unpriced Benefits And Costs</b>	Included	Included
<b>Time Horizon</b>	Usually two decades	Usually more than one generation
<b>Interest Payments</b>	Interest payment as cost	Not usually included

For the purposes of this analysis, housing assistance options have been examined from the perspective of a financial appraisal for Government, since this allows the research questions specifying this project to be adequately addressed.

### **3.1.2 Taxation Issues**

Historically some analysts have argued that any consideration of the equity and efficiency of housing assistance options is not complete without a full consideration of the taxation benefits and implications of these options. Whilst this is fully acknowledged there are major practical difficulties in comprehensively assessing taxation impacts and implications.

These difficulties are set out below.

#### *Assessing the Net Impact on the Supply of Available Dwellings.*

The tax effects associated with any housing assistance option will crucially depend on whether or not the option results in an increase in the supply of available dwellings. In the case of on budget public housing the impact on supply is measurable and unequivocal. However, in the case of options involving housing allowances, subsidy of privately owned but publicly managed public housing, subsidised home loans and shared equity programs, the net impact on the supply of available dwellings is much more difficult to establish. For reasons of equity and efficiency subsidised privately owned public housing, home ownership and shared equity programs are not normally tied to new dwellings. However, it is clear that some portion of the recipients will buy or occupy new dwellings, but, because of data inadequacies, it is not possible to accurately predict what portion this will be. In the case of housing allowances there may be a supply response but there are no reliable methods of assessing the dimensions of such a response; more technically, there are no reliable data on the price elasticity of supply of rental housing in Australia.

Where new dwellings are provided there will be direct increments to Commonwealth tax revenue from the following sources:

- income tax, if the financing involves the use of private sector funding, returns to investor on interest paid will accrue additional income tax liabilities at the investor's marginal tax rate; and
- capital gains tax, where the structure involves private rental investment, additional capital gains tax liabilities will accrue.

and to State tax revenue from the following:

other than mainstream public housing, additional stamp duty on the purchase of the dwelling;

- for rental investment, land tax; and
- for home purchase, mortgage stamp duty.

Conversely, at the State level there will be tax subsidies where concessions apply, for example exemption from stamp duty on purchase for first home buyers.

#### *Taxation Impacts and Investor Categories*

In the case of private investment in housing assistance options it is impossible to quantify the likely tax benefit/cost unless the precise investor categories and proportions and financial structure are known. This is because, for example, in the case of a limited partnership, superannuation funds have different marginal tax rates and capital gains tax treatments to life assurance companies which are in turn different to banks which are also different to private individuals.

#### *Assessing the Cost or Benefit of Indirect Tax Effects and Welfare Payments.*

Whilst the direct tax impact can easily be identified, a housing assistance option providing new dwellings will have a host of indirect tax effects.

These indirect tax effects are mostly revenue positive, with the most important being:

- **goods and services tax:** materials used in the construction of new dwellings will be subject to GST, leading to an increase in tax revenue; and
- **income tax:** not only will there be an increase in revenue accruing from the tax on returns earned by investors but during the construction phase there will be an increase in income tax accruing from the income of builders and associated staff.

- **reduction in unemployment benefits:** research conducted by the NSW Department of Housing (Carter, Hall and Milligan, 1988) indicated a significant number of previously unemployed persons are employed in the construction of new housing when the market expands.

This results in a fall in the level of unemployment benefits which would otherwise be paid by the Commonwealth

These indirect tax effects are extremely difficult to quantify.

#### *Different Nature of the Principal Commonwealth and State Taxes*

A study for the National Youth Housing Strategy on financing youth housing (Glazebrook, Hall and Residex, 1995) found that the different nature of the principal Commonwealth and State taxes, means that different funding methods impact on the two levels of Government quite differently, and that certain economic conditions are more advantageous to one level of government than the other.

For example, income tax is a progressive tax, whilst stamp duty and land tax are predominately 'flat' taxes. This means, for example, where interest rates and the cost of funds are rapidly rising, and property prices are static, the income tax revenue available to the Commonwealth arising out of investments in residential rental property investments will also increase rapidly, yet the stamp duty proceeds payable to the State Government will remain unchanged. Conversely, where property prices are increasing, whilst rents and interest rates are falling, the tax revenue to the Commonwealth will fall whilst that to the States will increase.

Consequently, any assessment of the costs and benefits of housing assistance options must at the very least be prefaced by the question, *on behalf of which level of government are the costs and benefits being assessed?*

Finally, it should be noted that the *Financing Youth Housing Study* found that tax revenues provide a considerable hedge against subsidy risks, for example if debt servicing costs rise so too do the receipts from taxes on interest, if property prices increase rapidly so too do the State receipts from land tax and stamp duty.

#### *Possible Changes to Tax Regimes*

When conducting modeling of the likely range of outcomes for assessing the subsidy costs of different housing assistance options, analysts would normally conduct a 'bounded' analysis of the possible range of economic scenarios that might be tested. 'Bounded' analysis says that the future will not be any worse or better than the events of the past (say 20, 30 or 100 years) and that the analysis will test the 'worst' and 'best' cases having reference to the worst and best past experience. Whilst this may be an appropriate method for developing economic scenarios it cannot be applied to taxation regimes, in that taxation changes are subject to 'political risks' and it is impossible to bound the analysis in this way.

For all these reasons, the subsequent analysis ignores the detailed **indirect** taxation impacts of housing assistance options.

## **3.2 Model Development**

The housing subsidy model developed for the Affordable Housing National Research Consortium has been modified into four models which can calculate real net subsidy costs for each of the four main housing assistance options.

The current Model also calculates the **direct** tax effects.

### 3.3 Assessment Process

The assessment method and model structure canvass two of the three main elements of the methodology. One final major element remains to be detailed, the quantitative technique to be used in the assessment process.

Table 5 sets out the main quantitative risk analysis techniques that can apply to the assessment of housing assistance options. The second set of techniques pertain to the actual operation and monitoring of a particular capital project.

**Table 5: Quantitative Techniques**

Housing Assistance Options Techniques	Applications
Sensitivity Analysis	Very wide application, from economic appraisal and financial feasibility to operations and maintenance models
Scenario Analysis	Economic appraisals and feasibility studies
Probability Assessment	Quantification of risk probabilities and consequence distributions

#### Sensitivity Analysis

Sensitivity Analysis does not formally attempt to quantify risk. Rather, it focuses on determining how sensitive the output (NPV or IRR) is to changes in any of the input variables.

The main input variables for housing assistance options and the options to which they apply are set out in Table 6.

The normal method of sensitivity analysis is to hold every variable except one constant and (in turn) vary each particular input variable by a common factor, say 1% and document the effect on output. In this way the analysis helps to identify which variables the project is most sensitive to.

#### 3.3.1 Scenario Analysis

Scenario analysis takes sensitivity analysis further by **setting up a set of assumptions about all the input variables which is effectively a view about the assumed future conditions under which the option will be operating.**

From sensitivity analysis we know the variables which will most favourably (and adversely) affect the option outcomes. The normal process is to construct three scenarios, although a greater number is also common. These are usually called 'base case', 'best case' and 'worst case'.

The 'base case' usually most closely approximates current conditions and reflects the analyst's view of the 'most likely' future.

The 'best case' most closely approximates the changes to those variables required to produce the analyst's view of the practicable most favourable outcome.

The 'worst case' most closely approximates the changes to those variables required to produce the analyst's view of the practicable worst outcome.

Sensitivity and Scenario Analysis can be combined to obtain a more complex and sensitive understanding of the impact of different risks and potential futures on housing assistance costs.



Sensitivity testing and scenario testing have a marked weakness in that the range of situations examined might not approximate the combination of variable risk outcomes that may have happened in the past – and could happen in the future.

The choice of the values for the variables to be used in each of the ‘best’, ‘base’ and ‘worst’ cases is arbitrary and may not reflect any real *probability* of what might happen in the future, on the basis of what we know (for certain) has happened in the past.

**Table 6: Input Variables And Housing Assistance Options**

INPUT VARIABLES	ASSISTANCE OPTIONS
Assistance Period	All
Real Asset Appreciation	Public Housing, Home Loans, Shared Equity
Real Market Rental Yields	Pub. Hous., Hous. Allow., Shared Equity
Real Rent Growth	Pub. Hous., Hous. Allow., Shared Equity
Real Income Growth	All
Real Interest Rates	Pub. Hous., Hous. Allow., Shared Equity
Income Loss Magnitude (i.e. percentage by which original income reduced)	All
Income Loss Duration (i.e. period of income loss)	All
Default Rate	All
Commencing Income	All
Commencing House Value	All
Maximum Payment To Income	All
Establishment And Selling Costs	Pub. Hous., Shared Equity.
Equity to Debt Ratio	Pub. Hous., Shared Equity.
Cyclical Maintenance	Pub. Hous., Shared Equity.
Rates, Taxes And Administration	Pub. Hous., Shared Equity.
Loan Origination, Establishment and Operating Costs (margin %)	Home Loans, Shared Equity
Prepayment Period	Home Loans, Shared Equity
Rent Indexation Principle (CPI or fixed yield to dwelling value)	Pub. Hous., Hous. Allow., Shared Equity
Rent Rate (ie commencing percentage of investor share)	Shared Equity
Proportion of Rates And Maintenance Paid By Tenant, OR reduction in income assumed to enable payment	Shared Equity

### 3.4 The Preferred Method: Probability Analysis and ‘Smoothed’ Monte Carlo (Latin Hyercube) Simulation

#### 3.4.1 Probability Analysis

A more rigorous approach is to apply probability analysis to the historical data (in this case, for each of the selected capital cities). Probability Analysis is the most complex of the techniques that might be used to assess risks associated with potential housing assistance options. The *probability* associated with an event is the chance that it will occur.

Probability analysis makes one overriding assumption and that is that the economic events of the future will not be outside the boundaries of the events of the past.

It has been extensively used in the insurance industry to calculate premium and capital adequacy requirements.

It is possible to review the history of:

- dwelling price appreciation;
- market rental yields;
- rent growth;
- income growth;
- interest rates;
- default rates;
- recurrent cost growth;

and construct specific scenarios for the 'best' outcome, i.e. the probability being 1 in 100 of occurrence, and the worst outcome, the probability also being 1 in 100.

This will enable the savings associated with mixed assistance strategies to be evaluated at a number of selected probability outcomes in each of the states. 'Smoothed' Monte Carlo simulation techniques will be used to randomly generate the systematic risk scenarios.

#### *3.4.2 Monte Carlo Simulation*

Monte Carlo simulation is the preferred method of generating probability distributions of exposure and risk in both the insurance industry and in the context of environmental safety analysis. The advantages as discussed by Poulter (1988, p. 9), are set out below.

Distribution functions for the exposure or risk estimate display the range of exposure or risk and the probability associated with each value of exposure or risk. A point estimate such as a mean does not provide this information. For example, a point estimate of the central tendency of exposure or risk does not indicate the uncertainty of the estimate. It may be important to know both the high end of the range of risk as well as the central tendency, if the goal is to avoid an unacceptable outcome. Similarly, a high-end point estimate may be much higher than the central tendency; the point estimate does not indicate how much higher it is than the median or mean of the exposure or risk. Both kinds of information are useful to risk managers.

Furthermore, in the comparative analysis contemplated in this research project it may be that the systematic risk scenarios generated at the high end of the probability range generate different efficiency results (higher or lower) than those at the mean or lower probability ranges.

Additional advantages flow from information provided by Monte Carlo simulation. Results are conducive to sensitivity analysis, permitting the risk assessor to determine where additional data will be most useful in reducing uncertainty. The need to select a single value for the input parameters is avoided, which can be a contentious exercise (ibid., p. 9).

Monte Carlo techniques in and of themselves do not dictate any particular degree of protectiveness or conservatism, they provide more information for implementation of such policy choices. The use of Monte Carlo simulation to propagate uncertainty in the values of input variables to the output is also relatively straightforward and may be valuable to the consumer of the information, particularly if such techniques are combined with sensitivity analysis to determine the major and perhaps reducible sources of uncertainty in risk estimates (ibid., p. 14).

The principles and insights to be gained from this form of analysis are clearly articulated by the United States Environmental Protection Agency (USEPA) (1997, pp. 1-2).

- The purpose and scope of the assessment should be clearly articulated in a "problem formulation" section.
- The methods used for the analysis (including all models used, all data upon which the assessment is based, and all assumptions that have a significant impact upon the results) are to be documented and easily located in the report.
- The results of sensitivity analyses are to be presented and discussed in the report.
- The presence or absence of moderate to strong correlations or dependencies between the input variables is to be discussed and accounted for in the analysis.
- Information for each input and output distribution is to be provided in the report.
- Calculations of exposures and risks using deterministic (e.g. point estimate) methods are to be reported if possible. Providing these values will allow comparisons between the probabilistic analysis and past or screening level risk assessments.

The USEPA further articulates the insights that can be obtained from using this form of analysis (1997, p. 4).

- An appreciation of the overall degree of variability and uncertainty and the confidence that can be placed in the analysis and its findings.
- An understanding of the key sources of variability and key sources of uncertainty and their impacts on the analysis.
- An understanding of the critical assumptions and their importance to the analysis and findings.
- An understanding of the unimportant assumptions and why they are unimportant.
- An understanding of the extent to which plausible alternative assumptions or models could affect any conclusions.
- An understanding of key scientific controversies related to the assessment and a sense of what difference they might make regarding the conclusions.

### **3.5 Housing Assistance Option Cost Data**

In the Stage 4 Report for the Affordable Housing National Research Consortium (Hall, 2002) data was obtained from all States on the housing cost components that will be used in the current analysis. The variables are:

- initial average dwelling price;
- other purchasing expenses (the cost of legal and procurement costs);
- initial maintenance and rates costs (the operating cost of public housing minus interest expenses);

- initial administration costs (is the administration cost of public housing);
- other selling expenses (is the cost of legals and other disposal costs); and
- tenant vacancy rates.

## 3.6 Systematic Risk Data and Trends

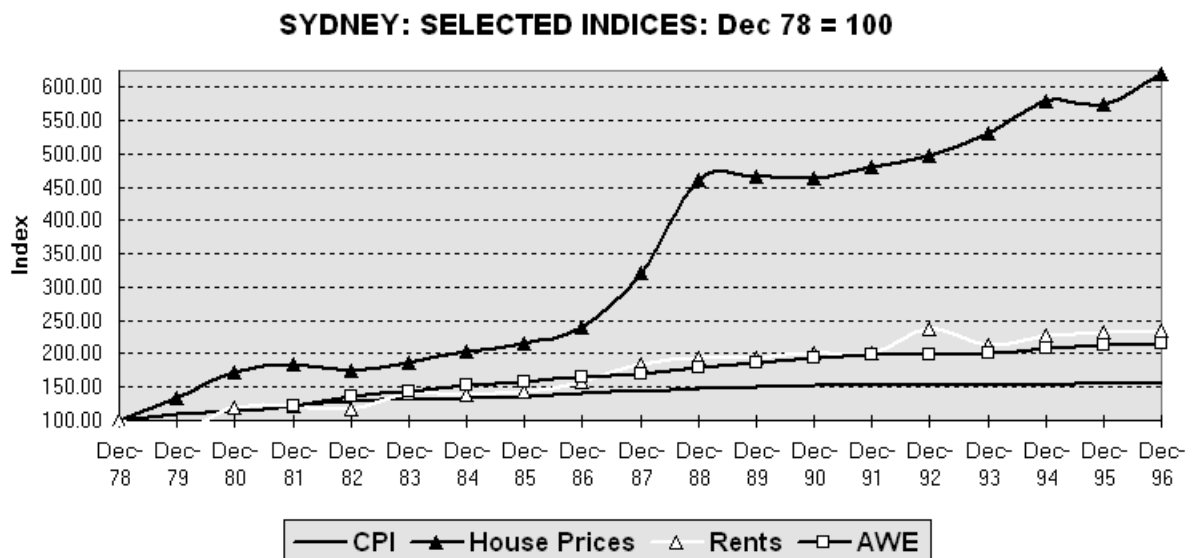
### 3.6.1 Systematic Risks

To restate, the main systematic risks associated with housing assistance options are:

- inflation;
- income growth/loss, vacancy rates and defaults and therefore reduced payments or losses through unemployment and other circumstances;
- interest rates;
- dwelling price growth or contraction;
- rental yields; and
- cost escalation

Graph 4 sets out the indices for the Consumer Price Index (CPI), house prices, house rents and Average Weekly Ordinary Time Earnings for the period December 1978 to December 1996.

**GRAPH 4: Sydney: Selected Indices**

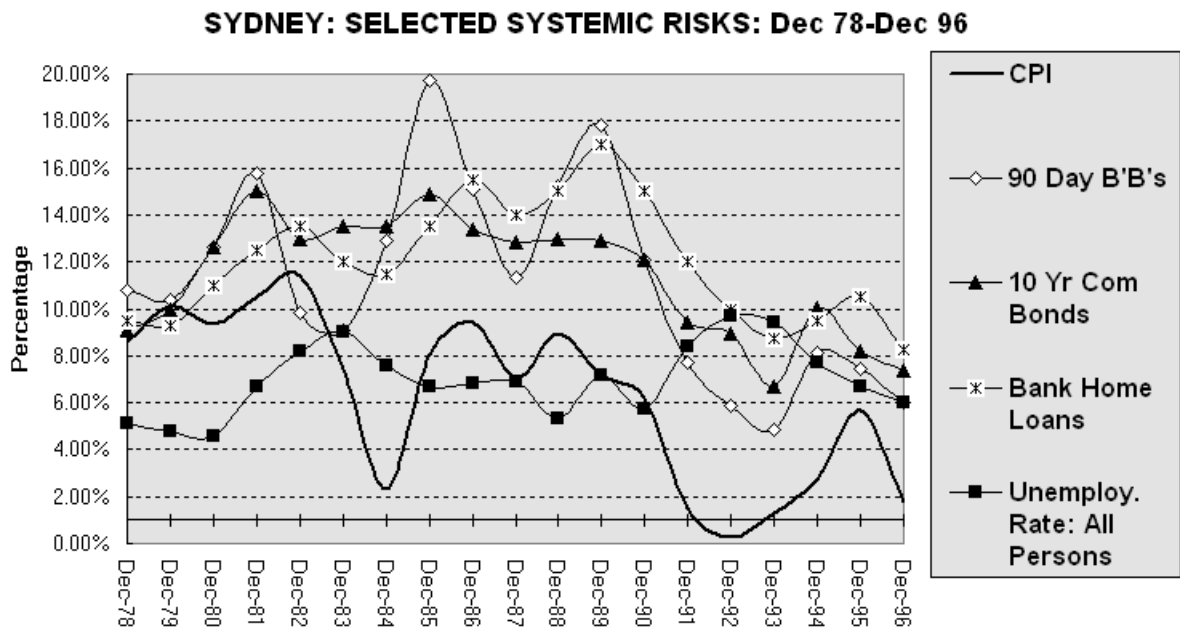


SOURCE: Australian Bureau Of Statistics, various series, Residex P/L house and rent price indices.

Graph 4 indicates that house prices have increased at a rate more than four times faster than CPI, rents have increased at the rate of 1.5:1(CPI), and AWE has increased at the rate of approximately 1.4:1.

Graph 5 sets out the trends for 90 Day Bank Bills, 10 Year Treasury Bonds, Bank Variable Home Loan Rates, and the Unemployment Rate (all persons). This graph highlights the high degree of volatility and suggests both possible lagged positive and inverse correlations between certain variables.

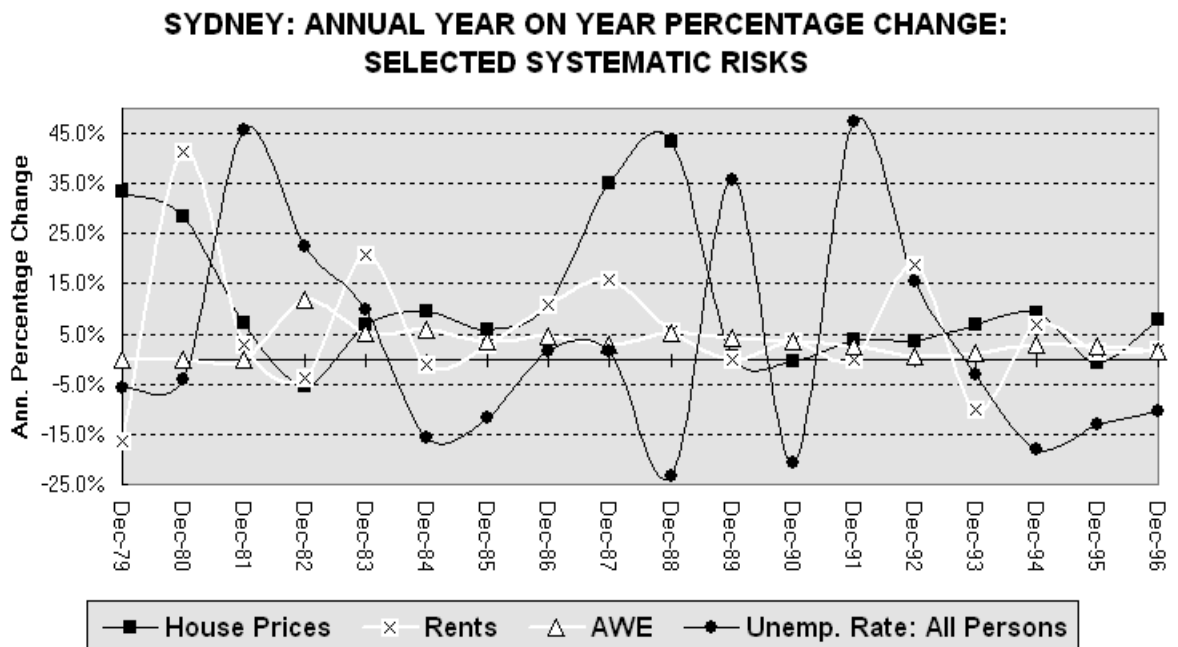
**GRAPH 5: Sydney Selected Systematic Risks**



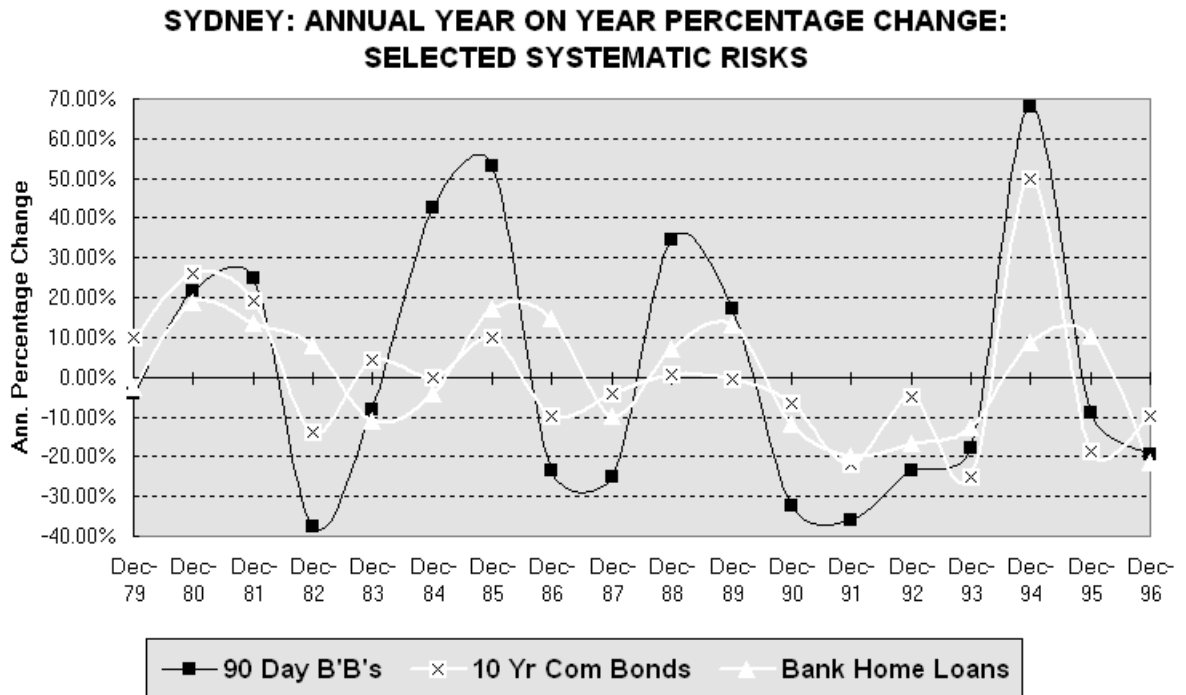
SOURCE: Reserve Bank Quarterly Bulletins, (various), Australian Bureau Of Statistics, Labour Force, 6203.1

Graphs 6, 7 and 8 set out the annual percentage change over the period December 1980 to December 1996.

**GRAPH 6: Sydney: Annual Year On Year Percentage Change: Selected Systematic Risks**

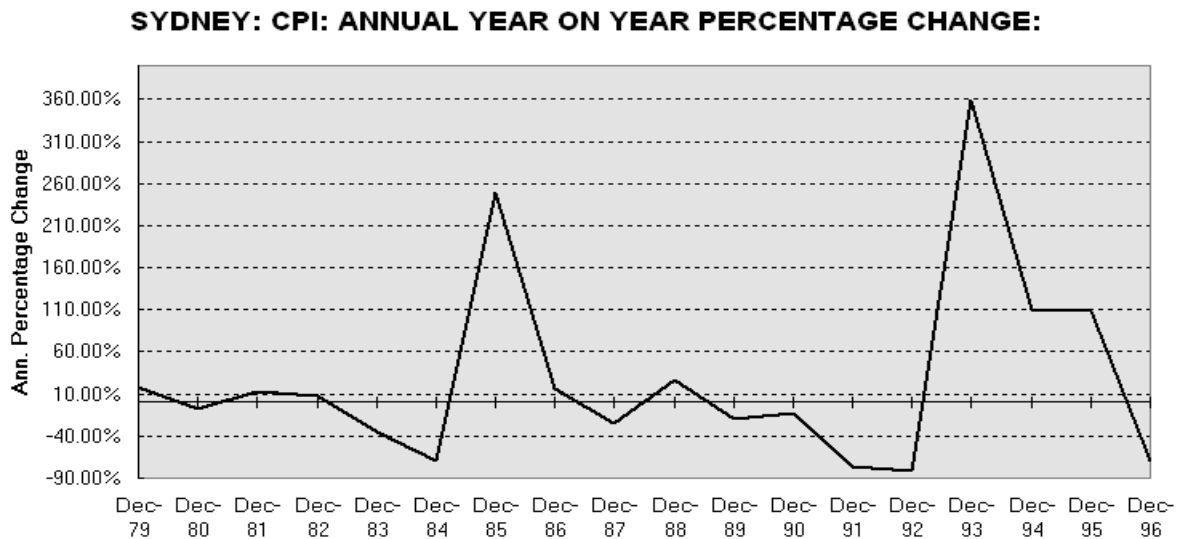


**GRAPH 7: Sydney: Annual Year On Year Percentage Change: Selected Systematic Risks**



SOURCE: Residex P/L House And Rent Price Indices, Australian Bureau Of Statistics, various series

**GRAPH 8: Sydney: CPI: Annual Year On Year Percentage Change**



SOURCE: Reserve Bank Quarterly Bulletins, (various), Australian Bureau Of Statistics, Labour Force, 6203.1

These graphs show the extensive range of each of the risks, and the very high volatility associated with each.

The ranges are:

- CPI, - 0.28% to 11.39%;
- house prices, - 0.7% to 43.3%;

- rents, -16.3% to 41.3%;
- AWE, - 0.5% to 11.7%;
- unemployment rate, - 23.2% to 47.4%;
- 90 day bank bills, - 5.99% to 19.75%;
- 10 year Commonwealth bonds, - 6.7% to 15%;
- bank variable rate home loans, -21.43% to 18.92%.

### **3.7 Assumption Issues**

Notwithstanding the use of appropriate data it will still be necessary to make a series of assumptions which, in order to ensure option neutrality, are common to all options tested. These common assumptions are:

- the systematic risk in the future is the same as that which applied to the past;
- funding is by way of fixed rate financing at the real rate derived from the scenarios (this includes the debt funding component of public housing);
- the commencing dwelling value is that provided by all States for public housing average costs;
- purchasing and selling expenses are 1.2% of the dwelling value at both purchase and sale for the public housing and shared equity cases; and
- the maximum rent or mortgage payment of the client is 25% of gross income p.a.

#### **3.7.1 Specific Assumptions**

To ensure that any results are robust enough to take account of all possible circumstances it is necessary to test a range of incomes over a range of different time periods.

Volume 2, Attachment 2 sets in details the process followed in the analysis whilst Volume 2, Attachments 1, and 3 to 7, provide the definitional and quantitative supporting documentation for the research. There is also a CD ROM which contains the Model and the 4,800 iterations for the simulations.

## 4 ANALYSIS RESULTS

Sections 4.1 and 4.2 deal with the *likelihood* of savings or output gains whilst Section 4.3 sets out the impact or *extent of savings* or output gains generated where savings cases are examined. Section 4.4 examines the *extent of savings* which would result if the means of the assistance option cases eventuated.

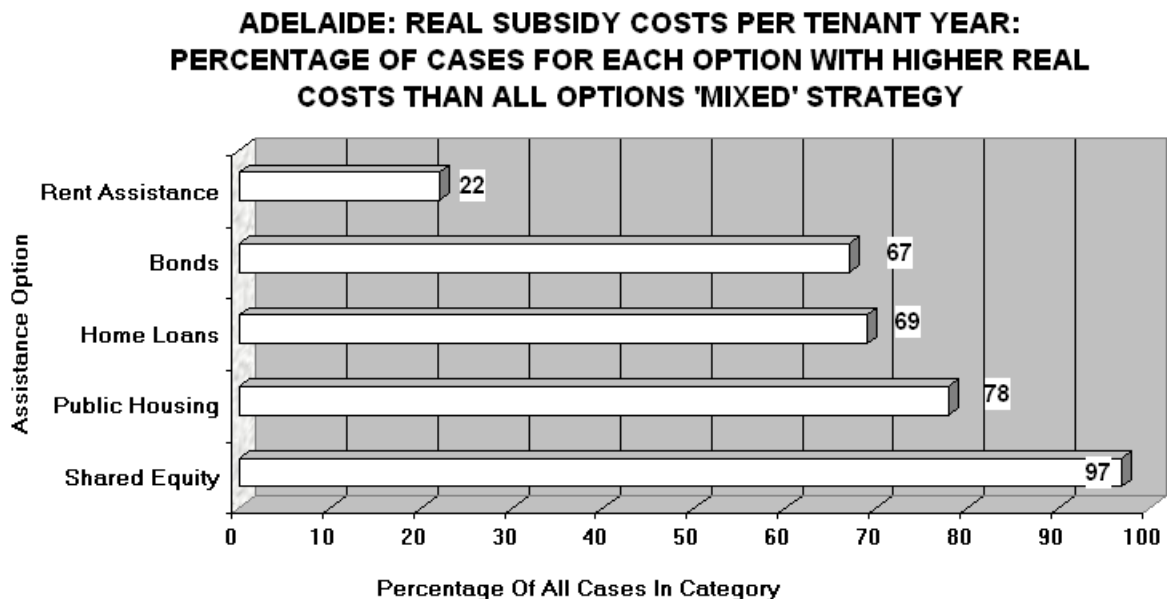
### 4.1 Probability of Subsidy Savings from a Mixed Strategy

Volume 2 Attachment 7 contains tables of every iteration result for the individual cases in the eight capital cities.

#### 4.1.1 Adelaide

Graph 9 sets out the percentage of total iterations for the assistance option category, where the “all assistance options mixed” produced a lower subsidy cost per tenant year than the corresponding individual option. To recap, the mixed options category selected for comparison in this study arbitrarily divides the total housing assistance budget evenly across the five specified options (four single assistance options plus shared equity). Of course, as already noted, the model presented here allows simulations to be run for any combination of those five options and the subsidy cost outcomes to be compared with each other and the five basic options.

**GRAPH 9: Adelaide: Real Subsidy Costs Per Tenant Year**



For four of the assistance options, bond funded social housing, home loans, public housing and shared equity, the mixed strategy was cheaper in nearly 70% of cases or more, with the mixed strategy being cheaper than public housing in 78% of cases. One assistance option, however, rent assistance, was significantly cheaper in nearly 80% of the 100 cases tested.

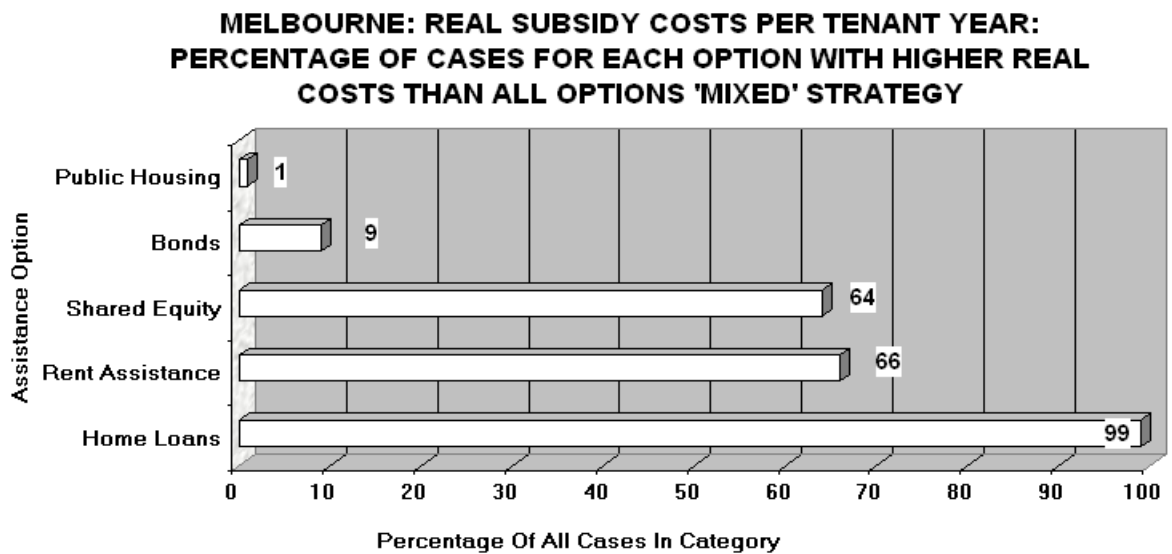
#### 4.1.2 Melbourne

Graph 10 sets out the same results for Melbourne.

Unlike Adelaide, in the Melbourne context, public housing outperformed a mixed strategy in over 99% of cases (compared to just 22% in Adelaide) and bond funded social housing was cheaper in over 90% of cases. For three options the mixed strategy was more efficient, being cheaper than shared equity in 64% of cases and rent assistance and home loans and in 66% and 99% of cases respectively.



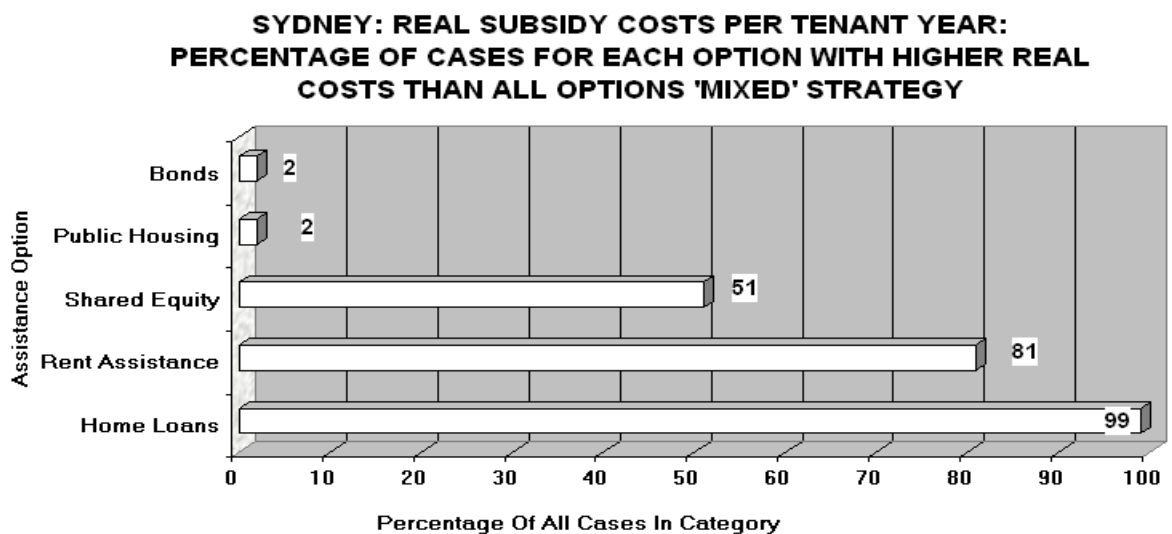
**GRAPH 10: Melbourne: Real Subsidy Costs Per Tenant Year**



#### 4.1.3 Sydney

Graph 11 sets out the same results for Sydney.

**GRAPH 11: Sydney: Real Subsidy Costs Per Tenant Year**

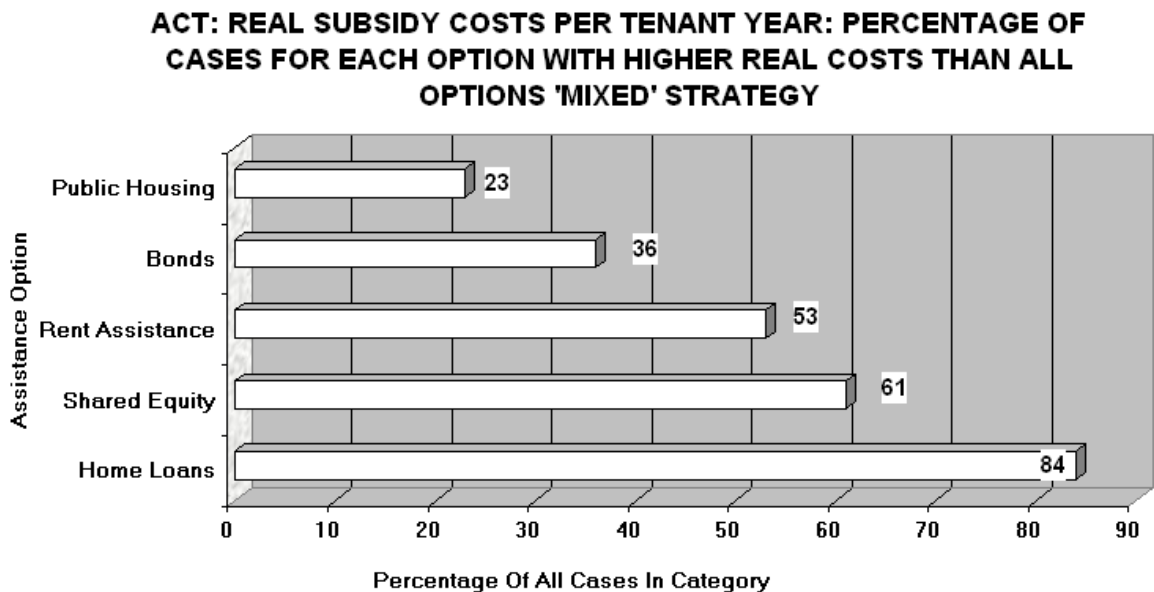


The trend in the results in Melbourne is even more extreme in the Sydney context, both public housing and bond funded social housing being cheaper than the all options mixed strategy in 98% of iterations. Rent assistance is an even more inefficient option in Sydney with the mixed strategy being cheaper in 81% of all cases or iterations. Home loans was the poorest performer. However, it must be remembered that the aggregate mean long term interest rate in the past 20 years has been close to 10%. Therefore at current long term interest rates the home loan result would dramatically improve.

#### 4.1.4 Canberra

Graph 12 sets out the same results for Canberra.

**GRAPH 12: ACT: Real Subsidy Costs Per Tenant Year**

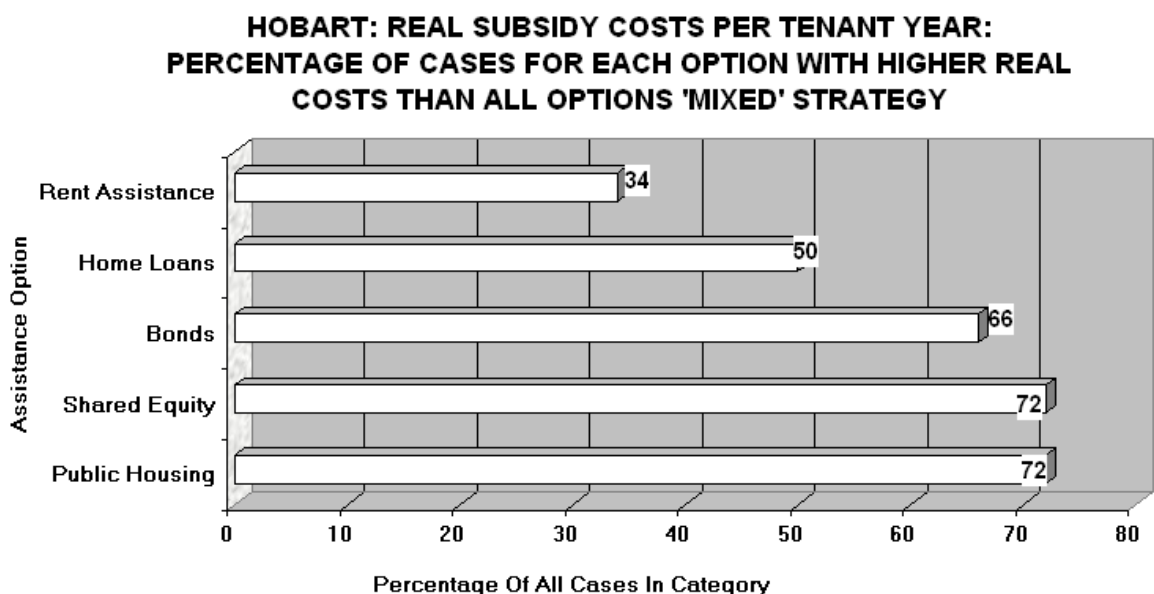


For three of the assistance options, rent assistance, shared equity and home loans the mixed strategy was cheaper in more than 50% of cases, with the mixed strategy being cheaper than home loans in 84% of cases. One assistance option, however, public housing, was significantly cheaper than all options mixed in more than 75% of the 100 cases tested.

#### 4.1.5 Hobart

Graph 13 sets out the results for Hobart.

**GRAPH 13: Hobart: Real Subsidy Costs Per Tenant Year**



The results in Hobart are diametrically opposed to those experienced in all of the other capital cities except Adelaide, due to similar trends in both property prices and operating costs for public housing.

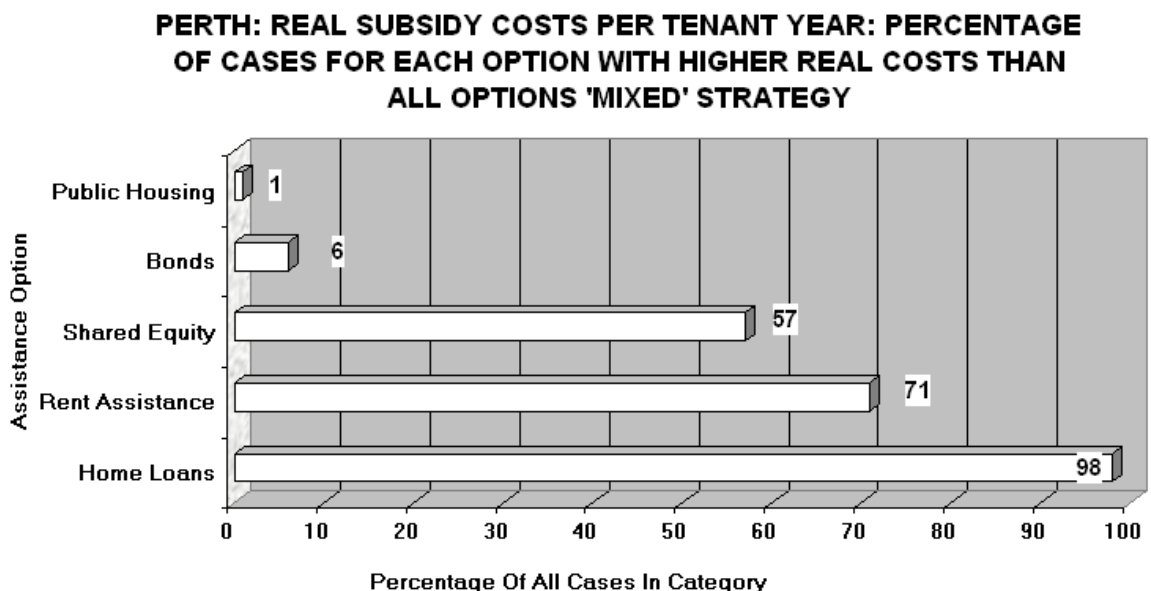
Real long term capital gain in Adelaide has been negative  $-0.78\%$  per annum, and in Hobart negative  $-0.28\%$  per annum. Similarly in 78% of cases in Adelaide rent assistance was more efficient than an all options mixed strategy whilst in Hobart, due to slightly lower negative real capital gain, rent assistance outperformed a mixed strategy in 76% of cases.

Home loans are a 50/50 proposition, whilst supply side options are only more efficient than a mixed strategy in less than one third of cases and less than 30% of cases for public housing.

#### 4.1.6 Perth

Graph 14 sets out the results for Perth.

**GRAPH 14: Perth: Real Subsidy Costs Per Tenant Year**



The results in Perth and to a lesser extent in Brisbane (see Graph 16), reflect three distinctive factors:

- compared to the majority of capital cities, relatively low initial residential property prices;
- robust long term real capital gains ( $1.96\%$  p.a. and  $1.72\%$  p.a. respectively); and
- compared to other States, relatively low public housing operating cost structures.

When this is combined with rental yields somewhat higher than those being experienced in Sydney and Melbourne, then supply side outcomes completely dominate the probability results, with public housing and bond funding being more efficient than an all options mixed strategy in more than 90% of cases. By contrast, rent assistance has the second lowest probability outcome after Sydney of all cities, only being more efficient in 29% of the cases examined.

#### 4.1.7 Darwin

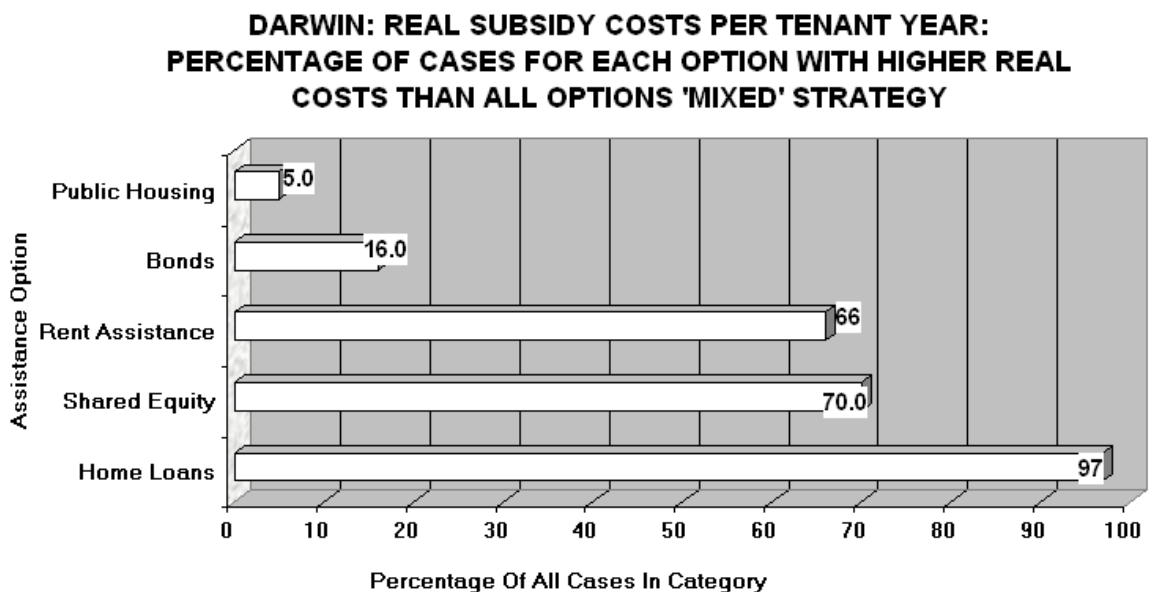
Graph 15 sets out the results for Darwin.

The results in Darwin are slightly less skewed towards supply side options than in Perth for three principal reasons;

- considerably higher initial residential property prices;
- lower rates of real capital gain (1.6% p.a.); and
- slightly lower long run average rental yields (7.1% p.a. compared to 7.3% for Perth).

Bonds and public housing are more efficient than an all options mixed strategy in more than 80% of cases, whilst rent assistance is only more efficient in less than one third of cases. As in all other cities (other than Adelaide and Hobart), home loans are the least efficient of all assistance options.

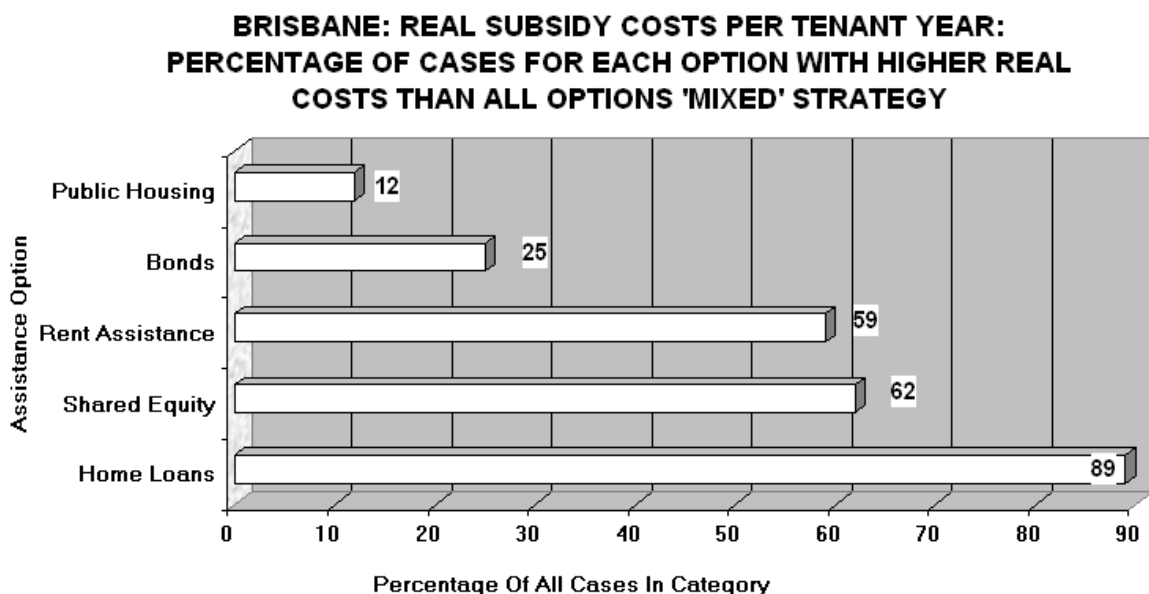
**GRAPH 15: Darwin: Real Subsidy Costs Per Tenant Year**



#### 4.1.8 Brisbane

Graph 16 sets out the results for Brisbane.

**GRAPH 16: Brisbane: Real Subsidy Costs Per Tenant Year**



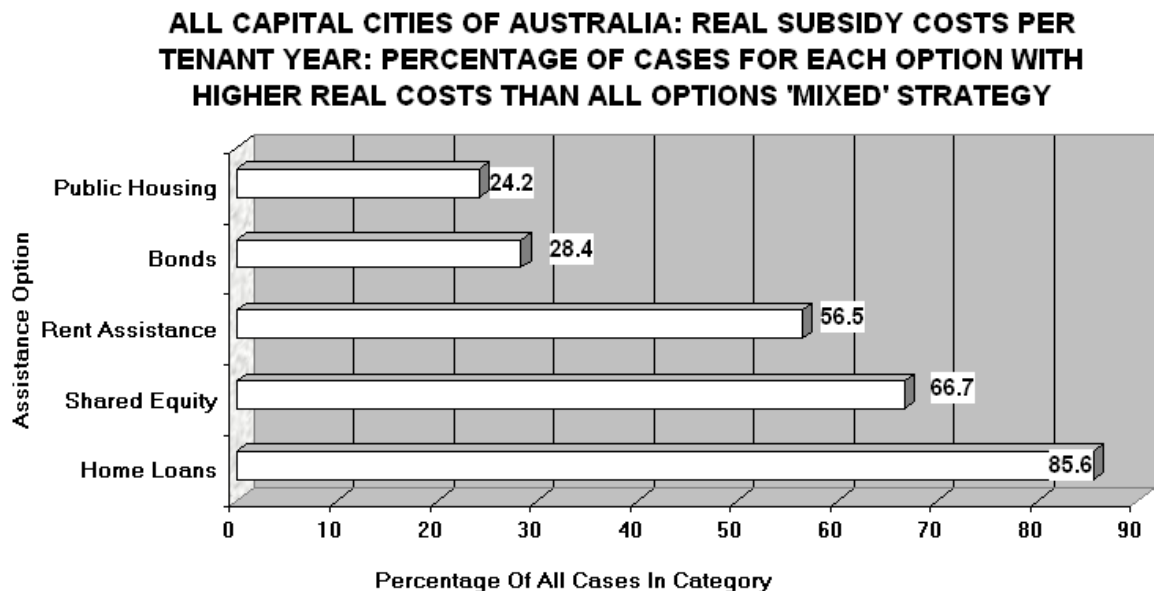
These results replicate all those other cities where there has been long term real capital gain for residential properties. In Brisbane because the long run real average capital gain is greater than in Darwin but the initial residential property price is lower the results are slightly less skewed towards supply side options. In more than 75% of cases both public housing and bonds perform better than a mixed option whilst rent assistance fares slightly worse than in the Darwin case with only 41% of cases performing better than a mixed strategy.

## 4.2 Australia: Aggregate Probabilities

In summary the results reflect the relationships between initial property prices, real long term capital gains and rental yields in the eight capital cities of Australia.

As would be expected where six of the eight cities have experienced long term real capital gains and relatively low rental yields supply side options dominate the final Australian result. Graph 17 sets out the aggregate results for Australia.

**GRAPH 17: All Capital Cities Of Australia: Real Subsidy Costs Per Tenant Year**



In summary supply side options are more efficient than a mixed strategy in 70% of cases, whilst rent assistance has a less than 50/50 probability of being more efficient than the mixed outcome. Because the costs of subsidy in home loans relate primarily to the interest rate, and the long term average rate for the last twenty years exceeded 10%, home loans are by far the poorest performer, with only 15 cases in a 100 being more efficient than a mixed assistance option outcome.

Subsequent to the above analysis we then examined the proportion of the 500 assistance cases for each city (100 cases multiplied by the five assistance option results) where the mixed strategy was cheaper than any individual option.

We then compared the all options mixed outcomes with the Australian Government funding mix (see Table 7 over) and the cheapest two options in each city with the current Australian Government funding mix. The outcome for this mix can be approximated by multiplying the public housing option outcome by 44.78% and the rent assistance option outcome by 55.22% and adding the two together.

**Table 7: Derivation Of Australian Government Funding Mix: 2000/2001**

Item	Amount \$M's
Base CSHA Funding	743.98
Additions To Base Funding	89.66
Aboriginal Rental Housing	91
Crisis Accommodation	39.655
Community Housing	63.99
State Matching	364.134
Total Grant funded social housing (public housing option)	1,392.419
Rent Assistance	1,717
TOTAL	3,109.419
<b>Percentage Of Total Funding</b>	
Grant funded social housing	44.78
Rent Assistance	55.22

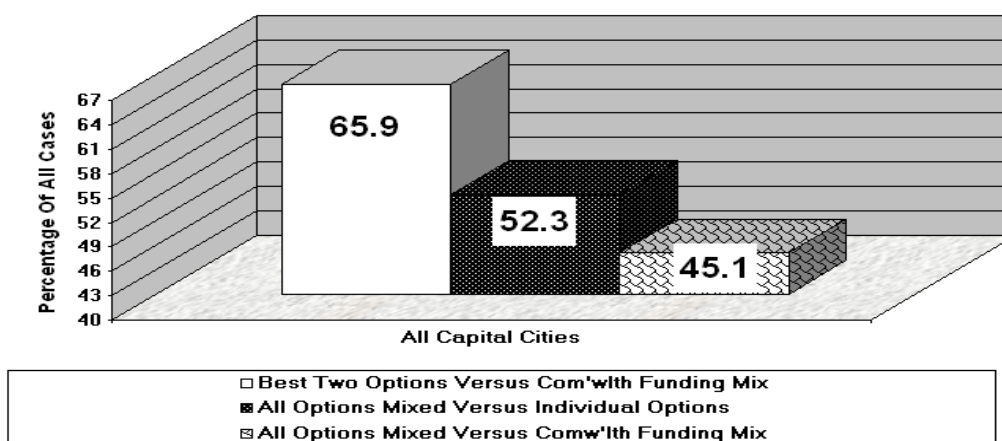
Source: Housing Assistance (Form Of Agreement) Determination 1999, Commonwealth Of Australia Australian Department of Family and Community Services Website.

Note: First Home Owners Grant excluded because of 'sunset' provisions

Graph 18 sets out the results.

#### **GRAPH 18: Probability Of Real Subsidy Savings Per Tenant Year**

##### **PROBABILITY OF REAL SUBSIDY SAVINGS PER TENANT YEAR: PERCENTAGE OF TOTAL CASES WHERE ALL OPTIONS MIXED STRATEGY IS BETTER THAN EITHER INDIVIDUAL OPTIONS OR COMMONWEALTH FUNDING MIX**

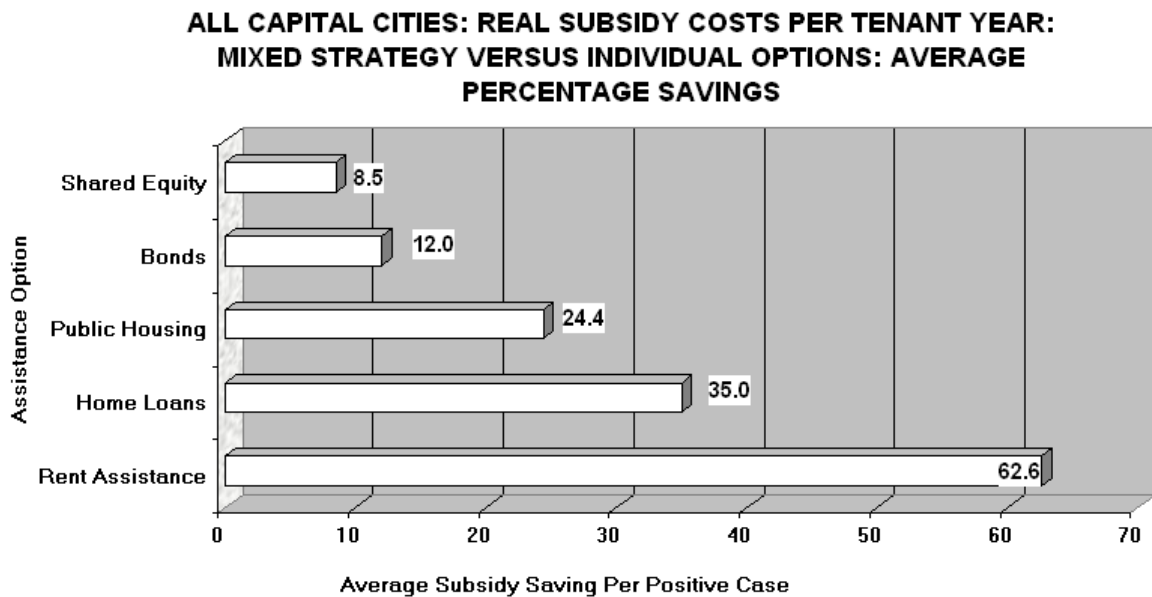


Overall careful targeting to the best two options is likely to be more efficient than the current Australian Government funding mix, in two out of three cases, with the an all options mixed strategy having a better than even chance of being cheaper than any random individual option. However, an all options mixed strategy has less than a 50% chance of being more efficient than the current Australian Government funding mix, primarily because of the uniformly poor performance of home loan subsidies.

### **4.3 Extent of Possible Savings (or Increase in Output)**

Graph 19 sets out the aggregate average subsidy saving for each option across all cases where savings occurred from an all options mixed strategy.

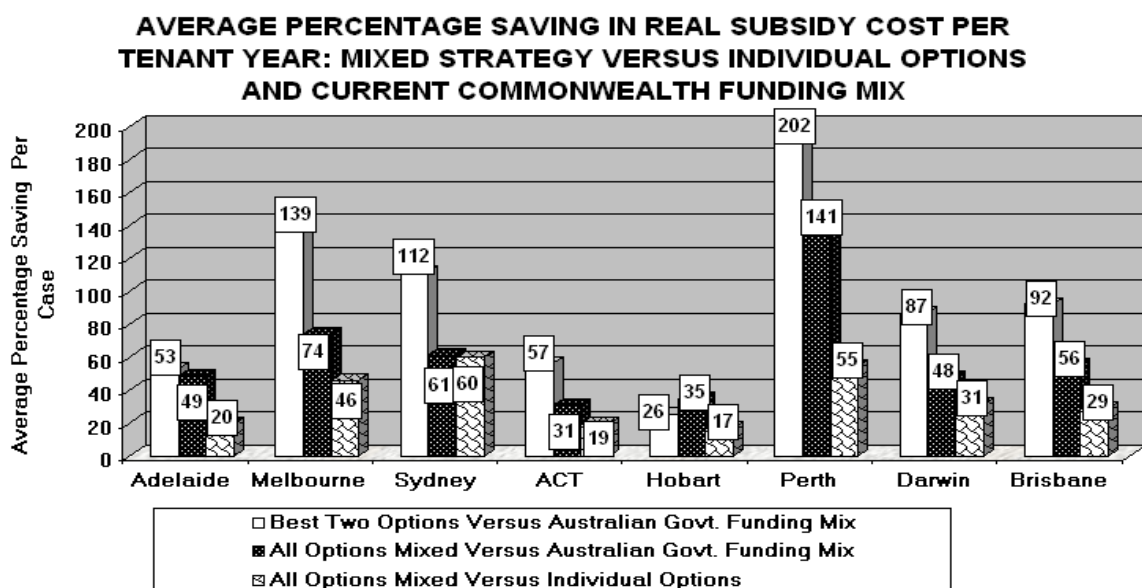
**GRAPH 19: All Capital Cities: Real Subsidy Savings Per Tenant Year: Mixed Strategy Versus Individual Options**



The graph indicates that whilst the shared equity option is more expensive than a mixed option in two thirds of cases it is only very slightly so, and is very efficient compared to a mixed strategy only producing aggregate average subsidy savings (in the positive cases) of 8.5%. However, both bonds and public housing are also very efficient with a mixed strategy only producing subsidy savings averaging less than 25%. Because of consistent real capital gains in 40% of the options, a mixed strategy does produce significant savings compared to rent assistance with the average subsidy saving being in excess of 60%. This suggests that the range of subsidy outcomes in this option is more extreme.

Graph 20 compares the average percentage saving in real subsidy costs per tenant year when the all options mixed strategy is compared with individual options and the current Australian Government funding mix, and the best two options are compared with that funding mix.

**GRAPH 20: Average Percentage Saving In Real Subsidy Costs Per Tenant Year**



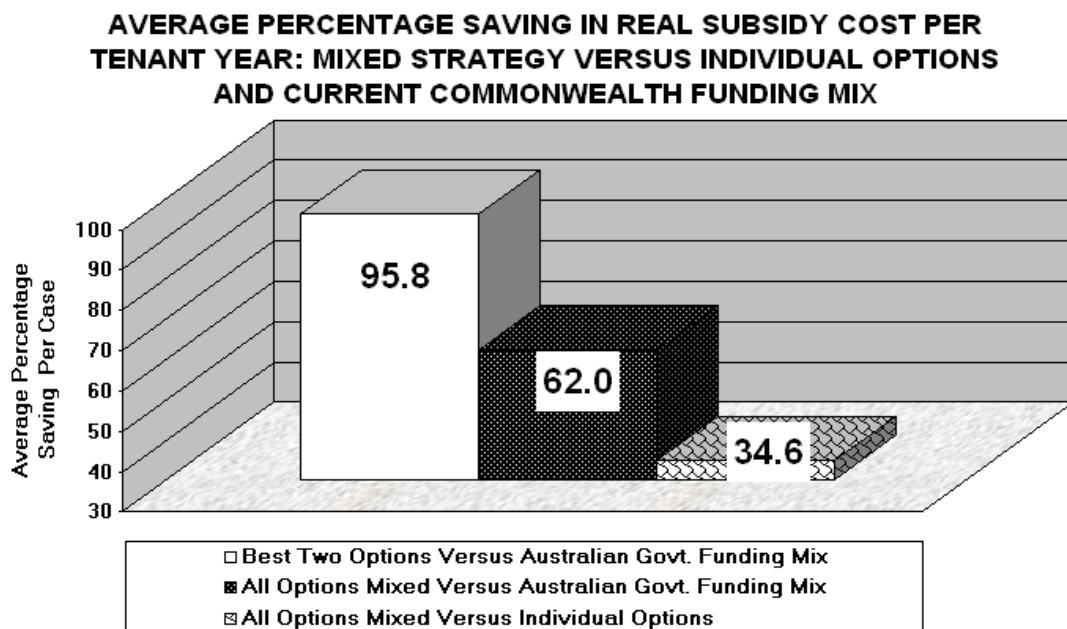
This graph shows that the all options mixed produces considerable average savings when compared to all individual options, for five cities producing savings of 30% or more, and savings of in excess of 50% in Sydney and Perth.

When we examine the all options mixed against the Australian Government funding mix we find the average aggregate saving in all positive cases exceeds 100% in Perth, approximately 50% or more in Adelaide, Melbourne, Sydney and Brisbane, and more than 30% in the remainder.

Finally, an examination of the best two options against the Australian Government funding mix, shows very large potential savings indeed, more than 100% in Melbourne, Sydney and Perth, more than 80% in Darwin and Brisbane, and more than 50% Adelaide and Canberra.

Graph 21 sets the aggregate position for all capital cities.

**GRAPH 21: Average Percentage Saving In Real Subsidy Costs Per Tenant Year: Mixed Strategy Versus Individual Options**



In summary, in two out of three cases it is probable that if an assistance strategy is targeted to the most efficient two options over the long term, and for the same subsidy dollars, assistance output could be almost doubled. There is also a better than even chance that a mixed strategy using all options evenly would produce savings, or increases in output re the current Australian Government allocations, of more than 60%.

#### **4.4 Mean Real Subsidy Costs per Tenant Year (All Iterations)**

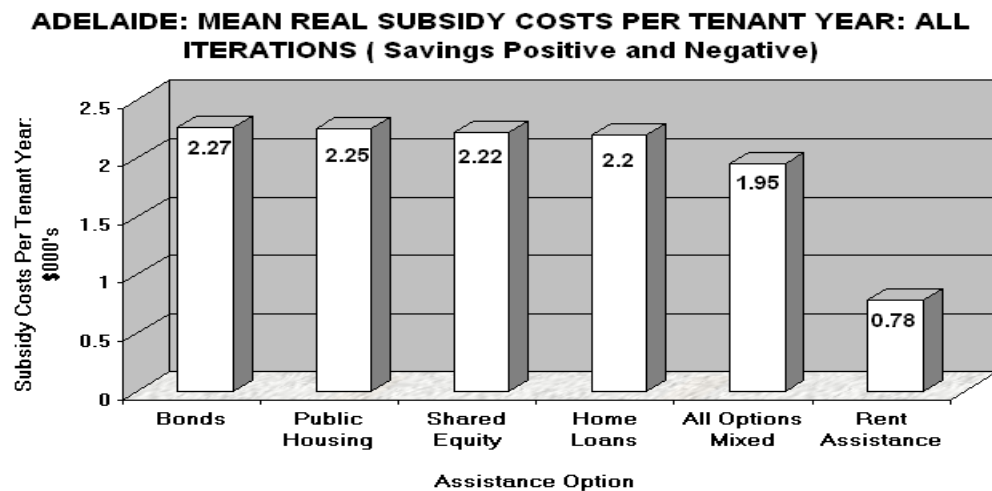
The above analysis may in fact be a partial perspective on the outcomes in that it is only examining the average for all the cases where the mixed or two best options produced savings viz a viz individual options or the Australian Government funding mix. Therefore, we have examined the mean real subsidy costs per tenant year for each option and compared this to the all options mixed outcome.

##### **4.4.1 Adelaide**

Graph 22 sets out the mean outcomes for subsidy costs per tenant year for Adelaide.



**GRAPH 22: Adelaide: Mean Real Subsidy Costs Per Tenant Year: All Iterations**

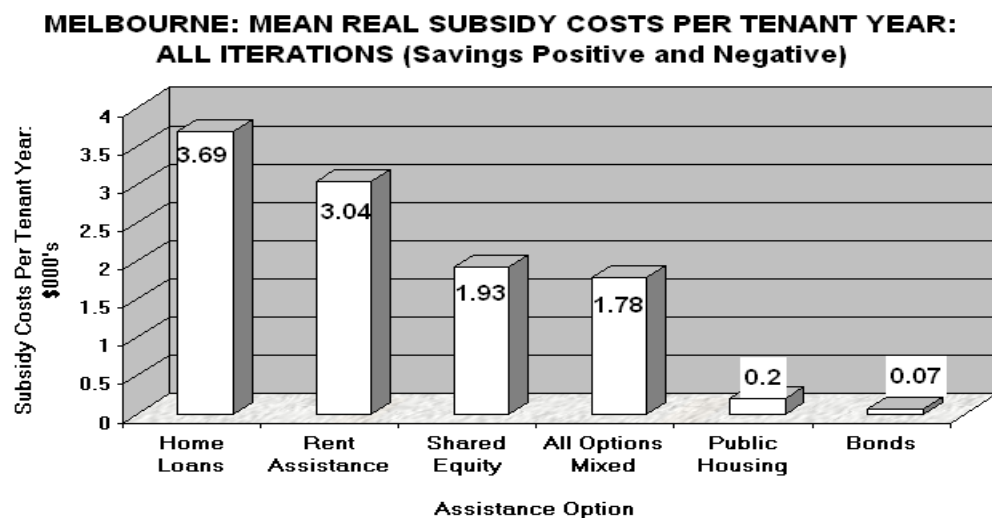


The mean outcome for rent assistance is clearly much cheaper than all other options in Adelaide, with there being little difference between the other four options.

#### 4.4.2 Melbourne

Graph 23 sets out the same result for Melbourne.

**GRAPH 23: Melbourne: Mean Real Subsidy Costs Per Tenant Year: All Iterations**

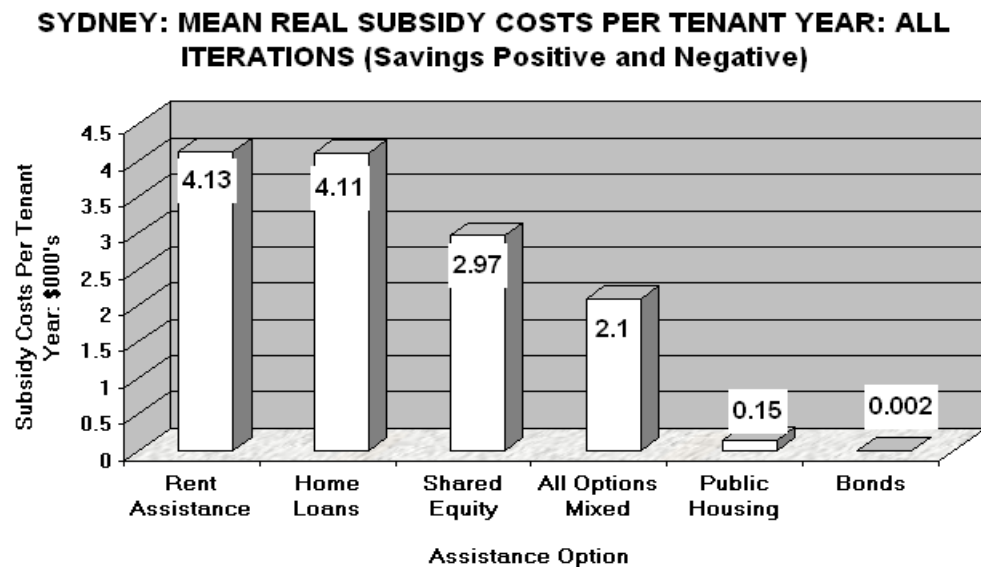


The results for Melbourne are similar to the positive savings outcomes with the mean outcome for home loans and rent assistance being many times the mean cost for bond funded social housing and public housing. Only public housing and bonds outperformed the all options mixed outcome with the mean for both bond funding and public housing being almost zero. This result occurs because of both the leverage obtained from the high real capital appreciation of the dwellings and the number of years in the cash flow where the buy-back price of the bonds is less than the original face value. Consequently, the net realised value of the dwellings is much higher than the principal obligation on the bonds with resultant capital surpluses occurring. These factors produce outcomes where almost half the cases tested generated actual profits thereby drastically reducing the average across all 100 cases.

#### 4.4.3 Sydney

Graph 24 sets out the same result for Sydney.

**GRAPH 24: Sydney: Mean Real Subsidy Costs Per Tenant Year: All Iterations**



The trends in Sydney are the same as in Melbourne, except more attenuated. Rent assistance and home loans are clearly the most expensive options for the delivery of housing assistance in both Sydney and Melbourne.

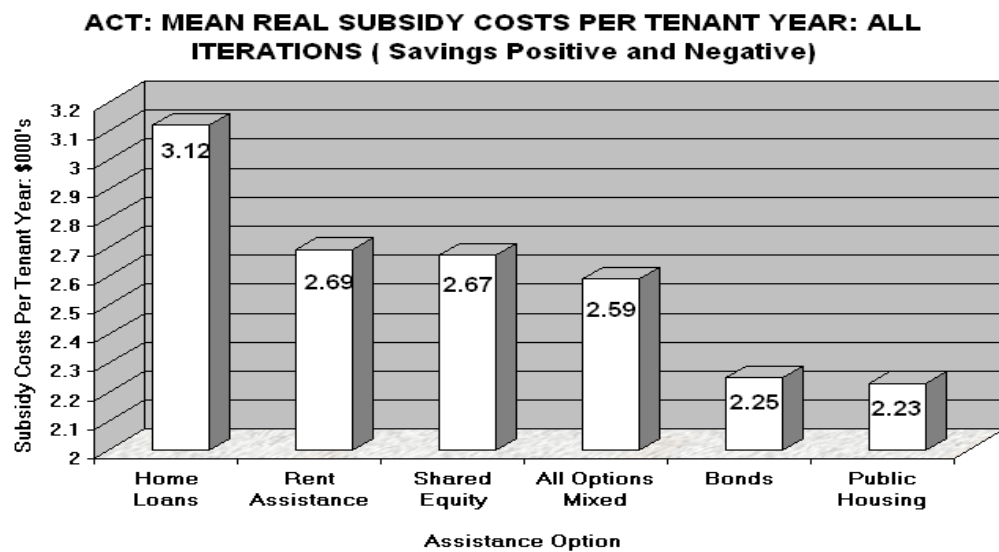
The mean outcome for rent assistance is again many times that for public housing and bond funded social housing, with public housing and bond funded social housing being clearly much more efficient than all options mixed.

Again, both bond funded and public housing options have almost as many cases where profits are generated as where subsidy costs are incurred because of the impacts outlined earlier and the higher real capital gain assumed on the basis of trends over the previous 20 years (3.8% real p.a.). It can be anticipated, however, that in the current interest rate environment home loans would decline significantly in cost.

#### 4.4.4 Canberra

Graph 25 sets out the same result for Canberra.

**GRAPH 25: ACT: Mean Real Subsidy Costs Per Tenant Year: All Iterations**



The mean outcome for both bond funded social or public housing and public housing is clearly cheaper than all the other options. being 27% more efficient than home loans and 18% more efficient than rent assistance.

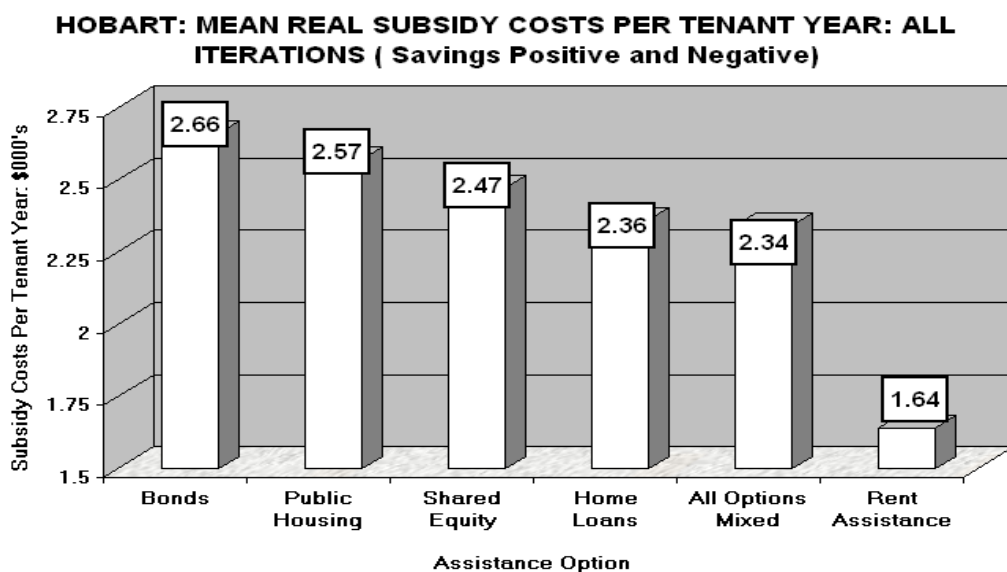
Again, both bond funded and public housing options have a considerable number of cases where profits are generated because of the real capital gain assumed on the basis of trends over the previous 20 years (1.44% real p.a.). It can be anticipated, however, that in the current interest rate environment home loans would decline significantly in cost.

Clearly public housing and bond funded social housing are considerably more efficient than other forms of delivering housing assistance with public housing being 17% cheaper than rent assistance and bond funding, 16%. Home loans are considerably more expensive than all other options.

#### **4.4.5 Hobart**

Graph 26 sets out the same result for Hobart.

**GRAPH 26: Hobart: Mean Real Subsidy Costs Per Tenant Year: All Iterations**



Unlike Canberra the mean outcome for rent assistance is clearly cheaper than all the other options being 38% more efficient than bonds 36% more efficient than public housing and 30% more efficient than home loans.

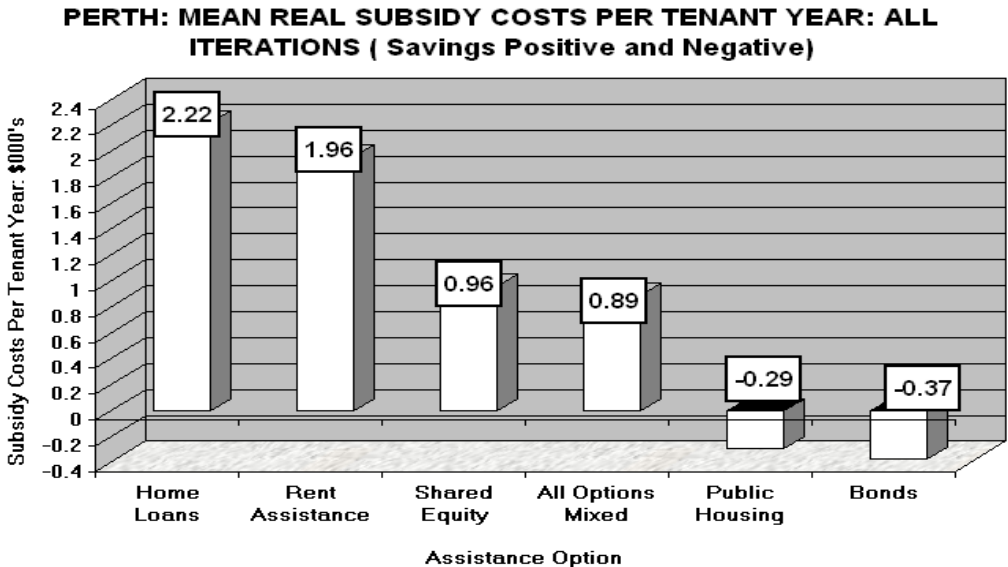
Because of negative capital gains and low initial property prices home loans are the next most efficient option being 20% and 16% more efficient respectively than bonds and public housing.

Clearly public housing and bond funded social housing are slightly more expensive than all other options

4.4.6 Perth

Graph 27 sets out the same result for Perth.

**GRAPH 27: Perth: Mean Real Subsidy Costs Per Tenant Year: All Iterations**



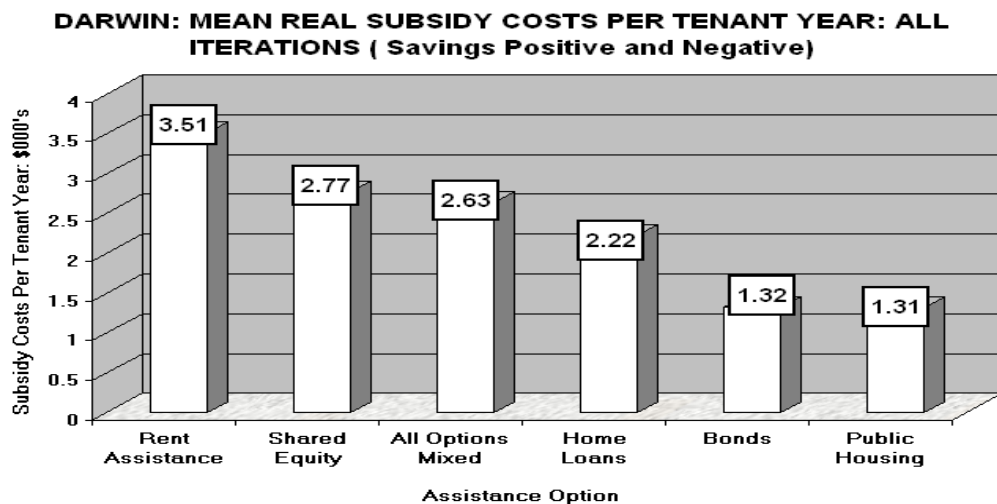
In Perth the low initial property prices, strong real capital gains and low operating costs for public housing indicate if asset realisation is taken into account, both bonds and public housing are likely to generate a small profit (i.e. require no subsidy). Given these small profits both bonds and public housing are more than 100% more efficient than any other option.

The next most efficient option shared equity is about 87% and 88% more efficient respectively than rent assistance and home loans. Home loans are by far the most expensive way to deliver housing assistance in this city.

4.4.7 Darwin

Graph 28 sets out the same result for Darwin.

**GRAPH 28: Darwin: Mean Real Subsidy Costs Per Tenant Year: All Iterations**



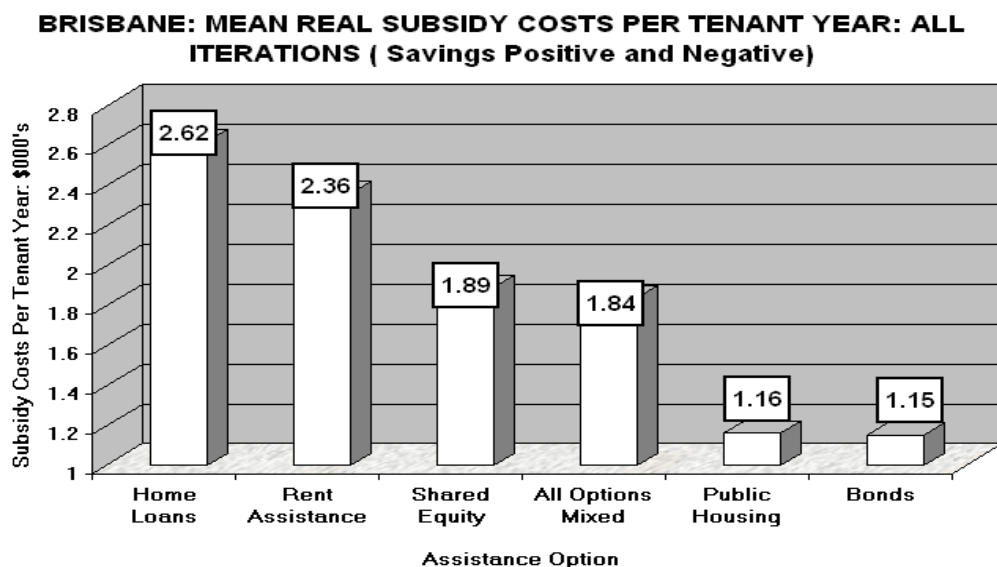
Again because of real capital gains and higher rent yields both bonds and public housing are the most efficient ways of delivering housing assistance in this city. This result is however more moderate than in Perth because of the relatively higher initial dwelling cost, with bonds and public housing being 62% and 63% more efficient than rent assistance.

Rent assistance is by far the most expensive option still being 21% less efficient than the next most expensive option, shared equity.

#### 4.4.8 Brisbane

Graph 29 sets out the same result for Brisbane.

**GRAPH 29: Brisbane: Mean Real Subsidy Costs Per Tenant Year: All Iterations**



The mean outcome for both bond funded social or public housing and public housing is clearly cheaper than all the other options, being 55% more efficient than home loans and 51% more efficient than rent assistance.

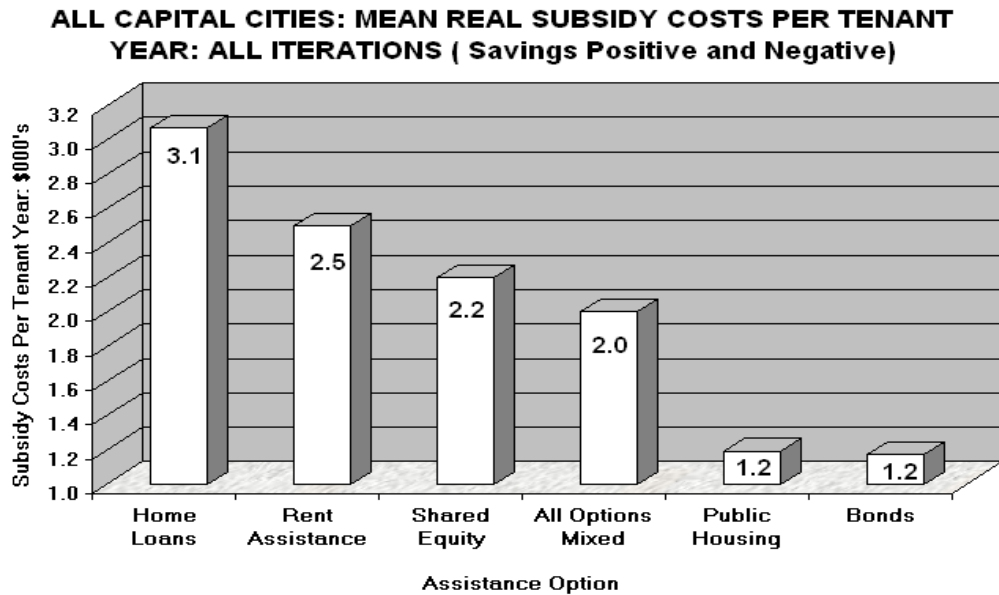
Again, both bond funded and public housing options have a considerable number of cases where profits are generated because of the real capital gain assumed on the basis of trends over the previous 20 years.

Home loans are less efficient than rent assistance because the implied interest rate is considerably higher than the long run average private rental yields.

#### 4.4.9 Aggregate Outcomes All Cities

Graph 30 sets out the (unweighted) mean for each option for all the cities combined.

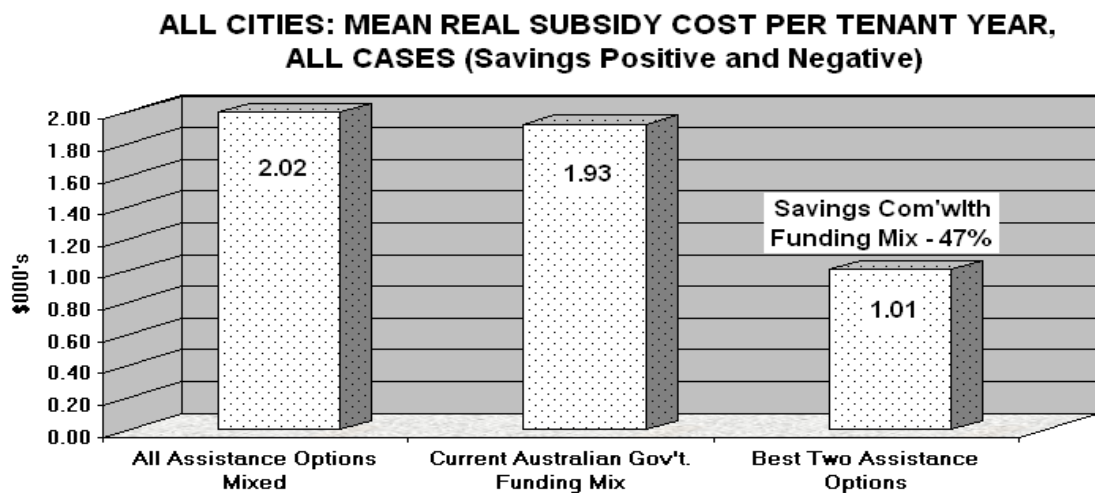
**GRAPH 30: All Capital Cities: Mean Real Subsidy Costs Per Tenant Year: All Iterations**



Clearly, public housing and bond funded social housing are considerably more efficient than other forms of delivering housing assistance, with bonds and public housing being 62% cheaper than home loans 52% cheaper than rent assistance and 40% more efficient than the all options mixed option. Home loans are considerably more expensive than all other options.

Graph 31 sets out the results for all assistance options mixed, current Australian Government funding mix and the best two assistance options.

**GRAPH 31: All Cities: Mean Real Subsidy Costs Per Tenant Year: All Cases**

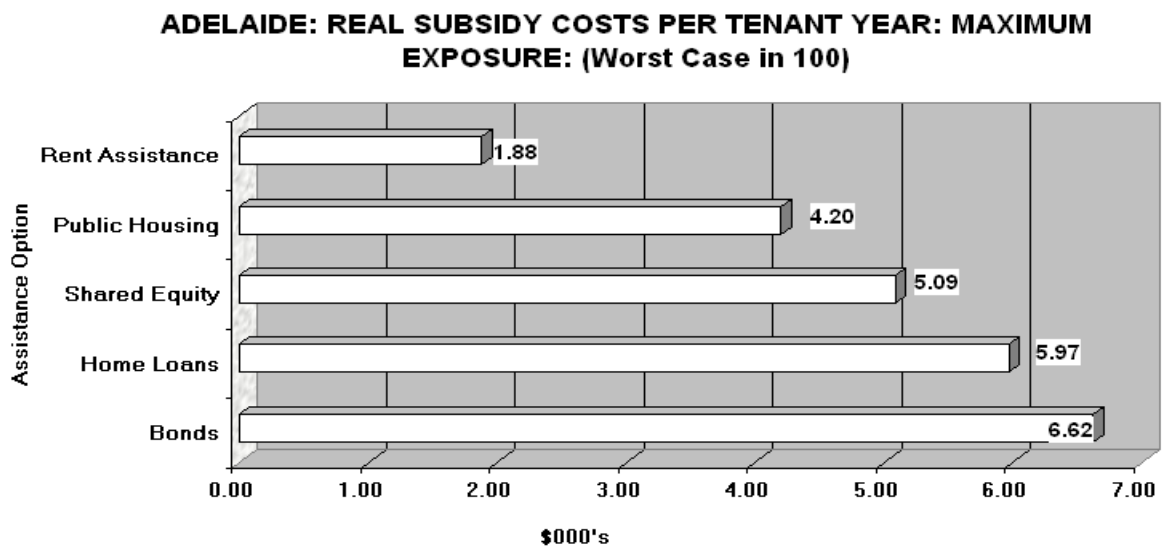


The graph shows that the mean for all assistance options mixed is slightly more expensive than the current Australian Government funding mix, with a combination of public housing and bond funded social housing being 47% cheaper than the current Australian Government funding combination.

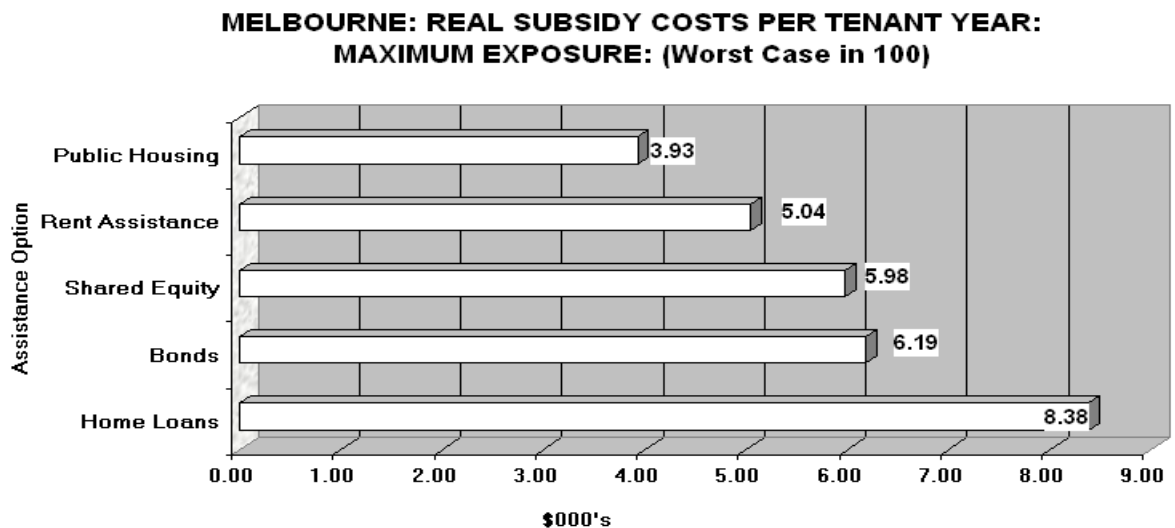
## 4.5 Maximum Exposure

It appears that bond funding and public housing both deliver significantly lower cost subsidy outcomes in most cases. However, it is important to examine the downside risk associated with the different options. Graphs 32 to 39 sets out the **worst case** subsidy result for the five options in the eight cities.

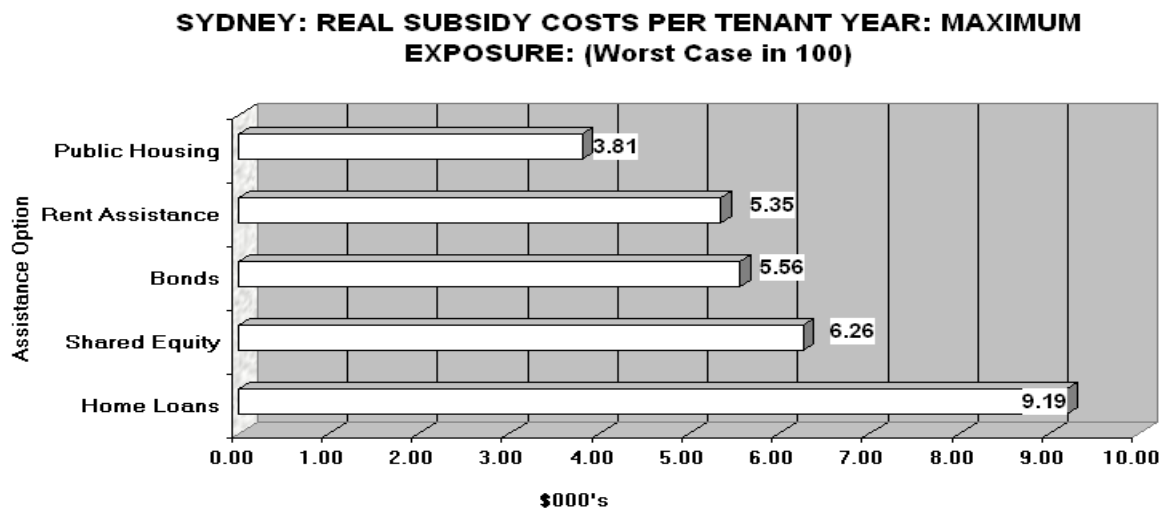
**GRAPH 32: Adelaide: Real Subsidy Costs Per Tenant Year: Maximum Exposure**



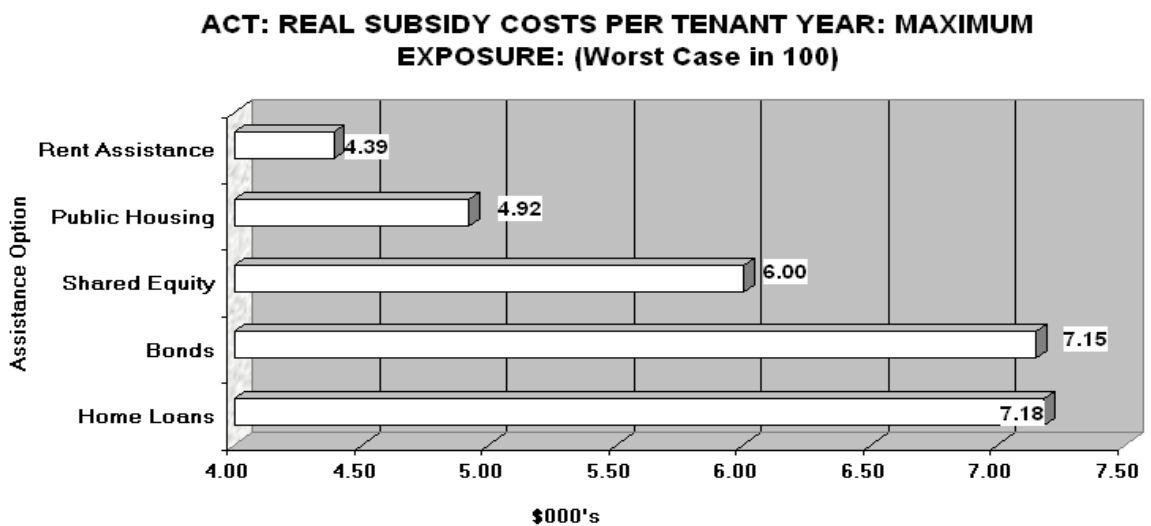
**GRAPH 33: Melbourne: Real Subsidy Costs Per Tenant Year: Maximum Exposure**



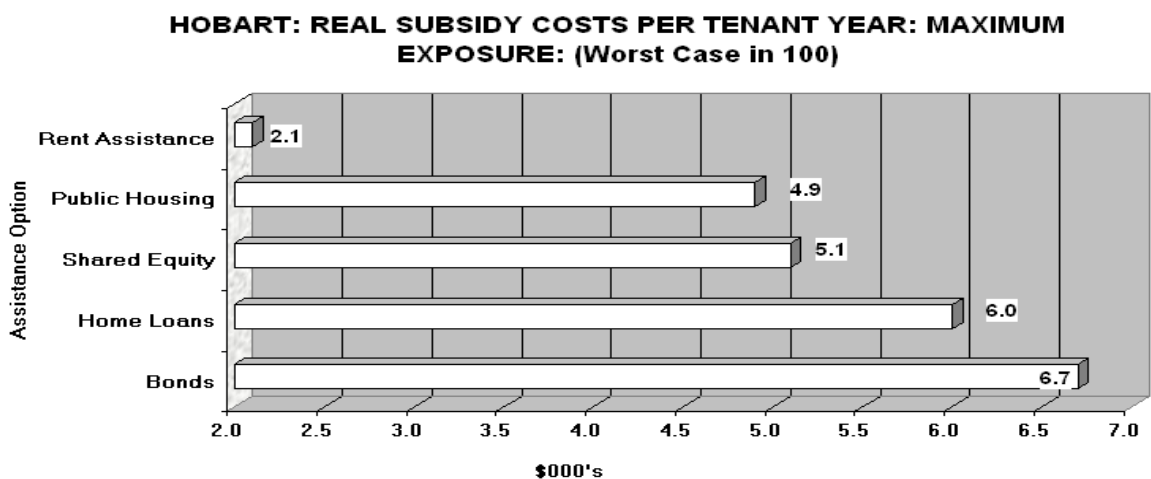
**GRAPH 34: Sydney: Real Subsidy Costs Per Tenant Year: Maximum Exposure**



**GRAPH 35: ACT: Real Subsidy Costs Per Tenant Year: Maximum Exposure**

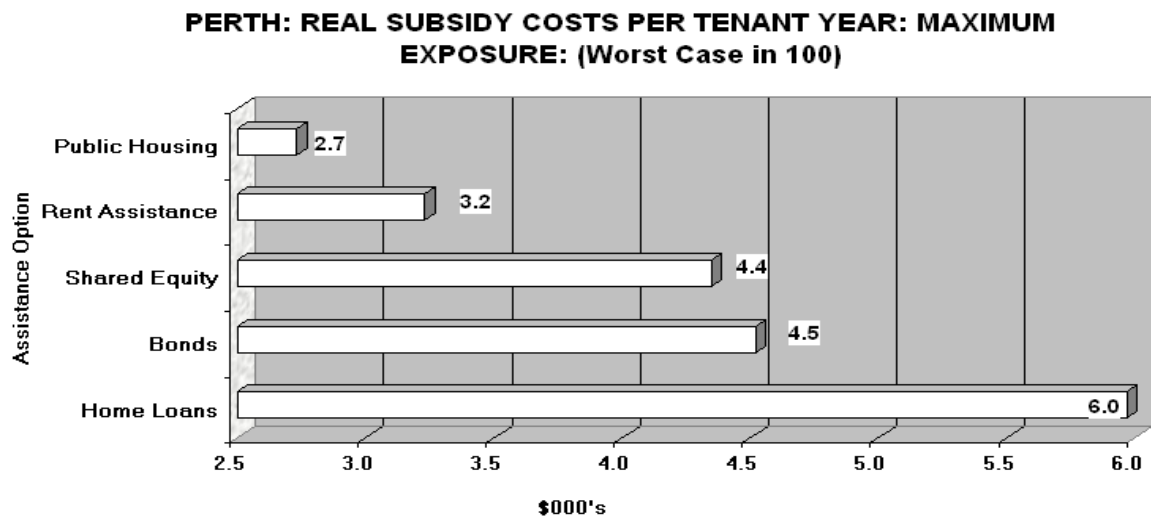


**GRAPH 36: Hobart: Real Subsidy Costs Per Tenant Year: Maximum Exposure**

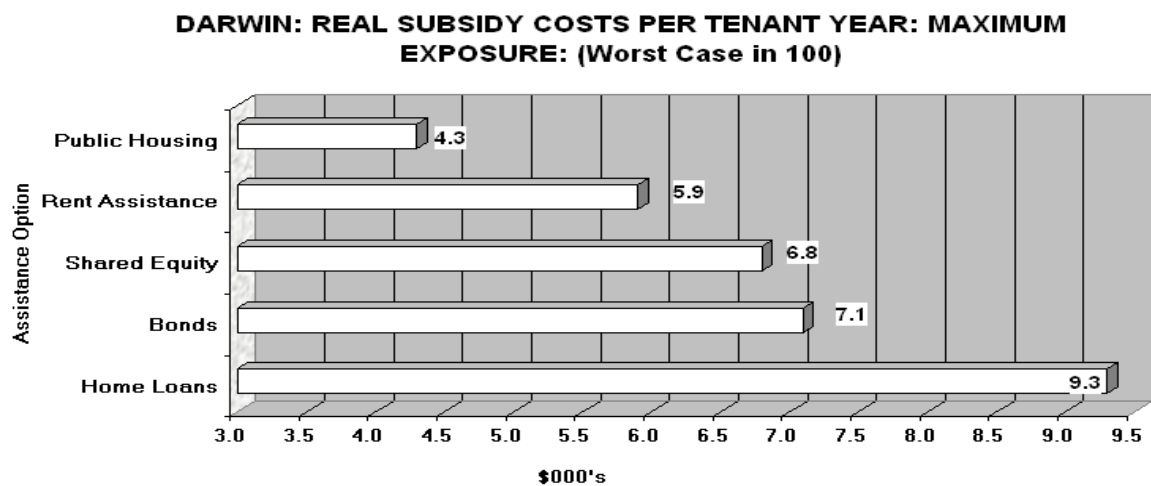




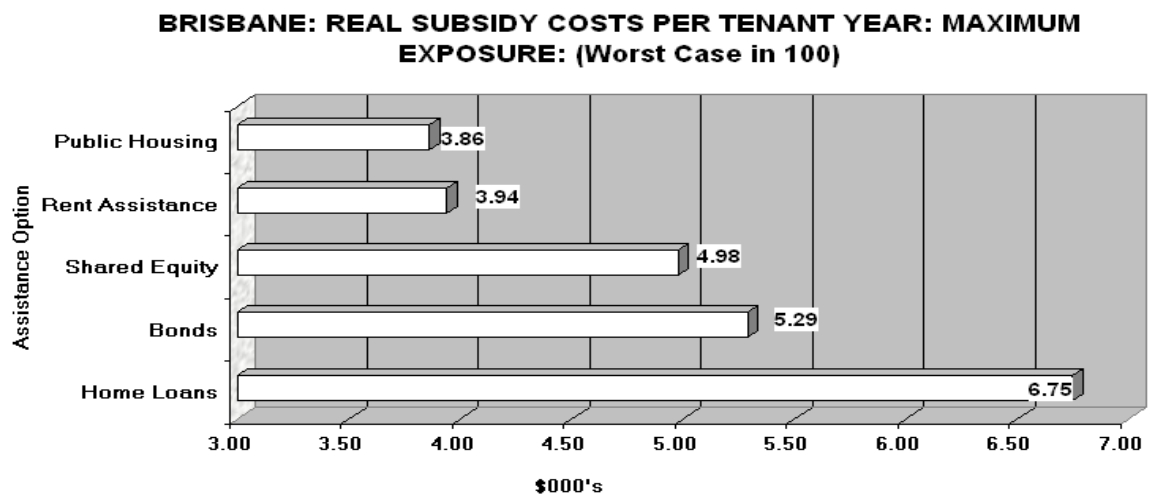
**GRAPH 37: Perth: Real Subsidy Costs Per Tenant Year: Maximum Exposure**



**GRAPH 38: Darwin: Real Subsidy Costs Per Tenant Year: Maximum Exposure**



**GRAPH 39: Brisbane: Real Subsidy Costs Per Tenant Year: Maximum Exposure**



The use of home loans for housing assistance carries the greatest potential downside risk, with the highest maximum subsidy exposure in six of the eight cities, Melbourne, Sydney, Canberra, Perth, Darwin and Brisbane, and the second highest exposure in Adelaide and Hobart.

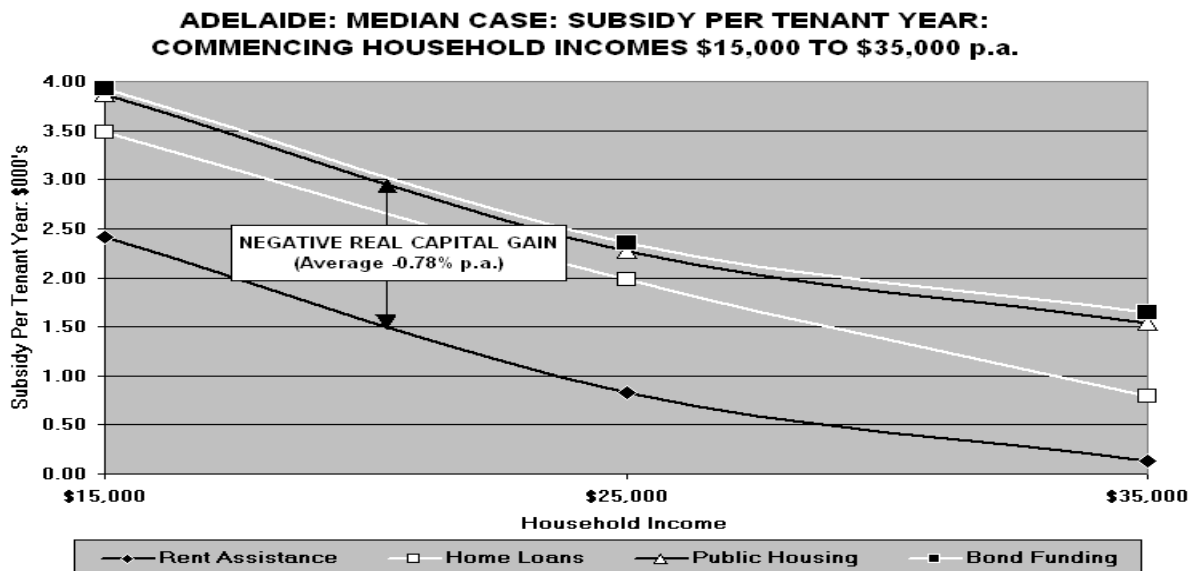
The use of bond funding for social housing carries significantly greater potential downside risk than that associated with public housing, with highest maximum subsidy exposure in Hobart, and the second highest in five of the eight cities, Melbourne, Canberra, Perth, Darwin and Brisbane.

Interestingly, public housing has the lowest downside risk of all options with the lowest maximum exposure in Melbourne, Sydney, Perth, Darwin and Brisbane and the second lowest in Adelaide, Canberra and Hobart. For rent assistance the positions are reversed, having the lowest maximum exposure in Adelaide, Canberra and Hobart, and the second lowest in Melbourne, Sydney, Perth, Darwin and Brisbane.

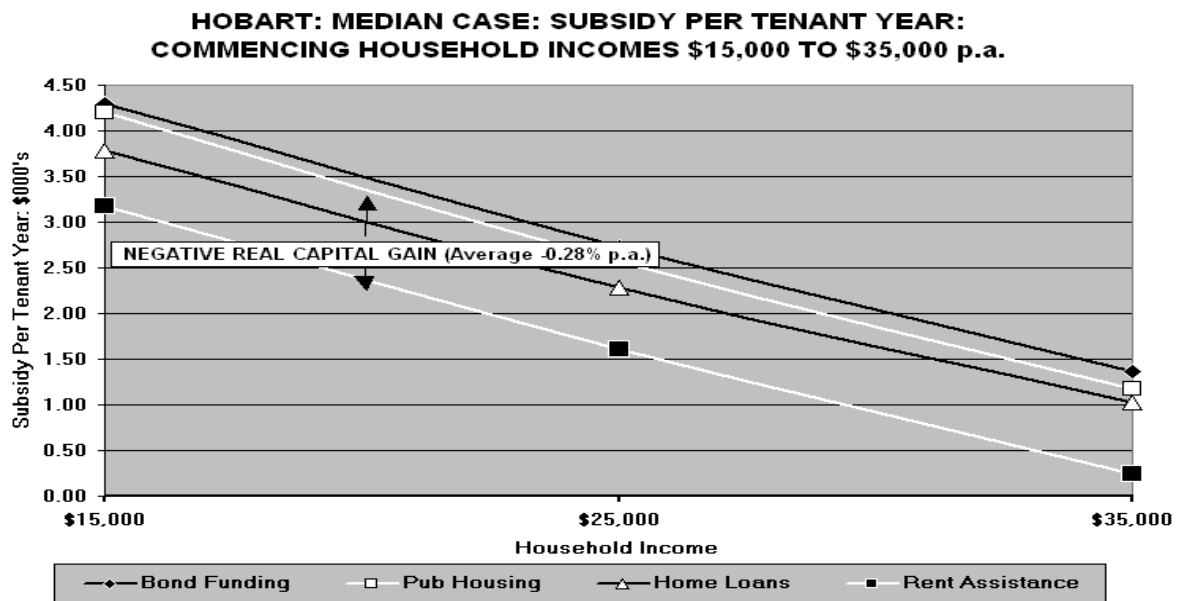
#### 4.6 Household Incomes and Assistance Efficiency

An examination of the subsidy per tenant year has been conducted for the first quartile, median and third quartile for assistance options for all cities and for the standard 25 year term. Commencing household incomes (CHI) of \$15,000, \$25,000 and \$35,000 were tested. **The relative subsidy efficiency of the different assistance options in each city did not change for the different cases nor for higher and lower commencing household incomes.** Where rent assistance is cheapest, the relative difference between rent assistance and other options remained the same, where public housing is cheapest, the relative difference between public housing and other options also remained the same. Graphs 40 and 41 demonstrate the rent assistance outcome in Adelaide and Hobart, whilst Graphs 42 and 43 demonstrate the public housing outcome in Sydney and Darwin.

**GRAPH 40: Adelaide: Median Case: Subsidy Cost Per Tenant Year: Commencing Household Incomes: \$15,000 to \$35,000 p.a.**



**GRAPH 41: Hobart: Median Case: Subsidy Cost Per Tenant Year: Commencing Household Incomes: \$15,000 to \$35,000 p.a.**



In Adelaide and Hobart the substantial difference between the subsidy per tenant year for rent assistance and public housing is almost entirely due to long term average real residential capital losses experienced in both cities.

For all options except home loans, subsidy per tenant year declines in an almost linear fashion until the \$25,000 commencing income is reached. Between \$25,000 and \$35,000 CHI, the rate of subsidy decline moderates substantially for the three assistance options of rent assistance, public housing, and bond funded social housing due to 25% of incomes being equal to market rents and the cessation of rent subsidies. This factor does not impact on the Hobart results.

Because home loans have much higher commencing repayments, the attainment of full repayments without subsidy necessitates higher income levels than in the other options. Between \$25,000 and \$35,00 CHI, therefore, subsidy per tenant year continues to decline at a greater rate than for the other options.

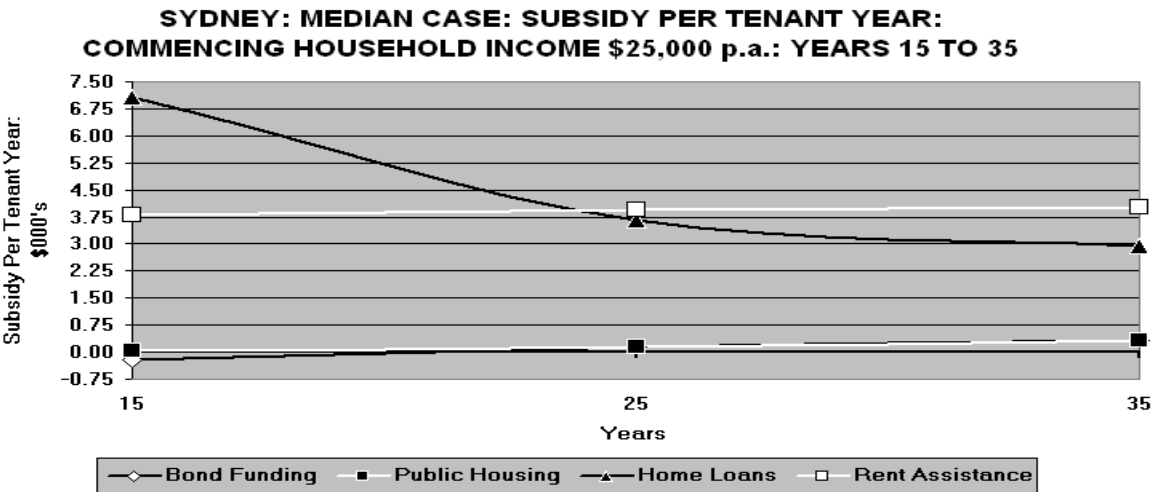
#### 4.7 Different Transaction Periods and Assistance Efficiency

The same distributed cases outlined above were modeled at commencing household incomes of \$25,000 and transaction terms of 15, 25 and 35 years. Dwellings are assumed to be sold or tenants vacate on a pro-rata basis i.e. 6.66% p.a. in the fifteen year case, 4% p.a. in the 25 year case and 2.85% p.a. in the 35 year iteration.

With the exception of home loans, the relative subsidy efficiency of the different assistance options in each city did not change for the different cases nor for shorter or longer terms. Where rent assistance is cheapest, the relative difference between rent assistance and other options remained the same, where public housing is cheapest, the relative difference between public housing and other options also remained the same, for each transaction period.

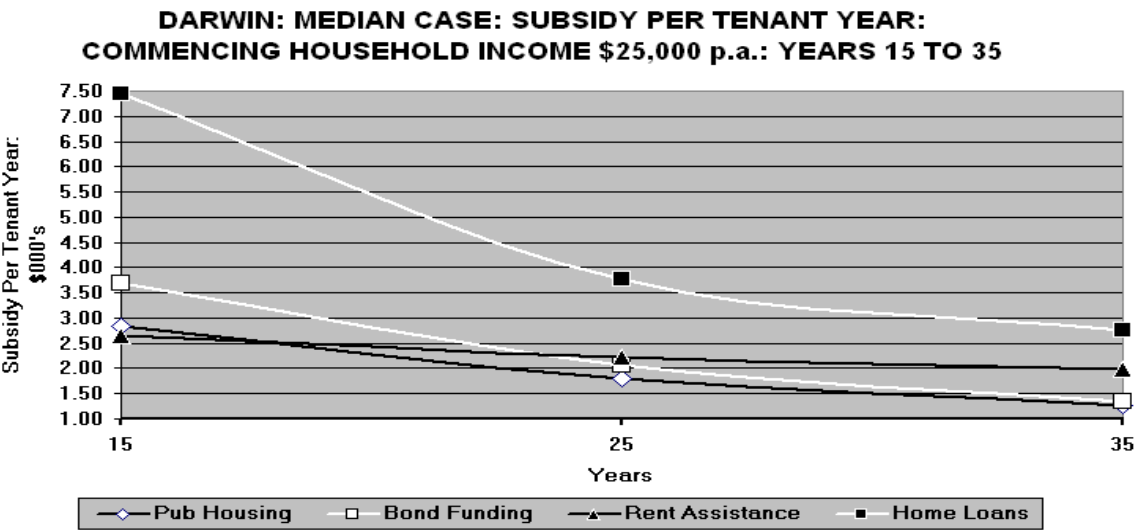
For home loans repayments rapidly reduce as the term is extended and loans become considerably more subsidy efficient as the length of the loan is increased. For all cities except Darwin home loans become more efficient than the most expensive assistance option between 23 and 30-year terms. The graph for Sydney demonstrates the case.

**GRAPH 42: Sydney: Median Case: Subsidy Cost Per Tenant Year: Commencing Household Incomes: \$25,000 p.a.: Years 15 to 35**



In Darwin, however because of very high initial property prices and a larger loan relative to income than in other cities, home loans remain the most expensive option even when 35 year terms are applied. Graph 43 sets out the case.

**GRAPH 43: Darwin: Median Case: Subsidy Cost Per Tenant Year: Commencing Household Incomes: \$25,000 p.a.: Years 15 to 35**



## **5 FINDINGS AND CONCLUSIONS**

### **5.1 Targeted Assistance: Probability of Efficiency Gains Is High**

If the economic environment of the future reflects the environments of the last twenty years, an all options mixed strategy (20% spending on each assistance option) would be superior in 52% of possible outcomes across all capital cities taken together. Thus, the probability of efficiency gains is moderate, in relation to the all options mixed approach modeled in this study. However, the probability of gains becomes very high under the 'best two cases' approach with more than two cases out of three generating gains. Additionally, where gains are achieved (e.g. in the application of both the 'all options mixed' and the 'best two-case' approaches) they are very substantial in dollar terms.

### **5.2 Factors Which Need to be Taken into Consideration**

The analysis demonstrates very clearly the risk variables or factors affecting subsidy outcomes in the different capital cities.

The extent of any efficiency gain so achieved depends primarily on three factors:

- initial property price;
- average rate of real capital gain per annum; and
- rental yields.

A deeper examination reveals that if real capital gains are close to or at zero, then the operating costs associated with public housing begin to affect the relative efficiency of this option, i.e. higher real operating costs increase the subsidy and relegate public housing below rent assistance.

The analysis also demonstrates that at the long run average interest rates experienced in the last two decades, loan terms need to be longer than 25 years for loans to be efficiently preferable to the next worse option.

It is also clear that under current interest rate conditions and with the diversity of real residential rent and price regimes a national capital city-specific approach would generate high probabilities of savings. That is, a national policy that tailored particular assistance options/mixes to each jurisdiction, or (more ambitiously) definable spatial housing market segments, would most likely generate very significant overall savings in total subsidy costs. Alternatively, significantly more affordable housing support could be delivered to households in housing stress for any given housing assistance budget allocation.

### **5.3 Efficiency Dominance of Supply Side Outcomes**

The research has revealed a diversity of efficiency outcomes, but these outcomes are only related to two or three risk factors.

It is obvious from the research that supply side assistance options such as public housing and bond funded social housing will always be much more efficient than rent assistance in circumstances where real capital gains are expected to be 0.5% p.a. or more.

Thus, whilst the extent of subsidy efficiency due to supply side options varies substantially between the eight cities, bonds and public housing dominate the efficiency outcomes being cheaper than rent assistance in six of the eight capital cities.

Only in Adelaide and Hobart do demand side options such as rent assistance outperform the efficiency of public housing.

## **5.4 The Probabilities of the Best Two Options Not Equivocal**

Whilst the particular all options mixed outcome tested has just better than an even chance (52%) of being more efficient than any individual approach overall, if the two most efficient options are selected the probability of efficiency or output gains is 66%.

## **5.5 Output Gains from a 'Correct' Assistance Option Strategy**

In the cases where savings are indicated, the selection of the 'correct' assistance option strategy will itself generate very substantial improvements in the likely long term output (i.e. households assisted) of housing assistance options. For example, when compared to the current Australian Government funding mix an all options mixed strategy generates average output gains of more than 60%, and if the best two options are selected in each capital city the aggregate assistance output (i.e. the number of households assisted) could nearly be doubled.

If we examine all cases, both those that generate savings and those that do not, the average subsidy cost for each assistance option across the 100 iterations for each city also reveals that substantial efficiency or output gains could be generated from the selection of the 'correct' mix of assistance options.

In aggregate, across all capital cities, public housing and bond funded social housing generate assistance outcomes 53% higher than rent assistance. Overall, on average, the best two options outcome generates output gains of nearly 50% on the current Australian Government funding mix.

In this regard it should be noted that because public housing is sold only spasmodically and intermittently, the capital benefits accruing to the States are locked up in the balance sheets of State Housing Authorities, and an appropriate focus would be on how these balance sheet benefits could be realised for future housing assistance investment. One possibility would be to settle on a appropriate asset sales program and tender the real capital gain stream for sale thereby releasing funds for new social housing investment ahead of the returns that would be achieved.

## **5.6 Are There Higher Risks in Selecting the Best Two Assistance Options?**

In examining the worst case for all of the options it is obvious that public housing also has the lowest downside risk in six of the eight cities. Bonds however have considerably greater downside risk attached than rent assistance. If we compare a policy which selected the best two options then we find that there is less downside risk than that attaching to the current Australian Government funding mix.

## **5.7 What About Different Incomes and Transaction Terms?**

Changing income levels does not noticeably affect the above outcomes and increasing the term of the transactions simply makes home loans more efficient than rent assistance.

## **5.8 In Conclusion**

The research suggests that there is considerable room for improvement in the long term output of housing assistance policy through more flexible, variegated and targeted assistance policies.

Simply continuing the current policy that tends to regard housing assistance as an adjunct to income security policy is likely to perpetuate the inefficiencies and rigidities that exist within the current system.

Whilst the outcome for the client may have the same effect as an income security approach, housing assistance does not perform like an income security payment for the provider of the assistance. There are, as demonstrated in this study, substantial costs associated with a cash payment approach.

A sophisticated risk management approach by both the Australian Government and the States would see the operation and maintenance of all of the main types of housing assistance monitored, with the emphasis changed between options as economic circumstances dictate.

Based on our research this approach is likely to generate output gains of between 50% and 100% for the same subsidy or grant dollars.

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