Positioning Paper

Risk management and efficient housing assistance provision: a new methodology

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EXECUTIVE SUMMARY

This positioning paper reviews current findings on affordable housing supply and demand and articulates why output concerns should be at the centre of housing assistance policy. The paper also raises questions about the efficiency of the bifurcated nature of current Commonwealth/State housing assistance. It reviews what little research exists on the relationship between housing assistance and risk. The paper then documents a precise methodology that will be used to assess the efficiency of housing assistance options as they relate to systemic risk.

The aims of the research project, of which this positioning paper is the subject, are to:

(a)   analyse 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:

(b)   comprehensively test 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;

(c)   the extent that mixed strategies are efficient, provide tools for determining the most efficient mixes of housing assistance options:

(d)   document the procedures necessary for housing authorities to apply the tools in their particular jurisdictions.

Chapter 2 of this Positioning Paper contains a glossary of the important concepts used.

Chapter 3 examines in more detail:

- 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 systemic risks, investment theory and its potential relevance to assistance efficiency, a potential hypothesis relating to housing assistance, and intergovernmental arrangements and social housing provision.

Chapter 4 contains a literature review of relevant material as it applies to concepts of risk, risk and housing; and assessment techniques. A comprehensive examination indicated no literature available on housing assistance options and government risk.

Chapter 5 details the methodology and relevant issues arising.

The chapter examines:

- issues relating to different assessment methods;

- the basis of the housing cost and systemic risk data;

- the impact of correlation analysis and inverse correlation or covariance analysis on the way in which Monte Carlo analysis might be conducted;

- details of the Monte Carlo simulation process; and

- some assumption issues.

Subject to qualifications set out in the paper the research hypothesis is that a strategy providing for the delivery of housing assistance using a variety of delivery options and dynamically adapted to trends in systemic 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.

For the purposes of this analysis, housing assistance options have been examined from the perspective of a financial appraisal for Government.

Key outcomes of the positioning paper review are:

- in the 1990's housing affordability has declined significantly whilst housing stress has increasing rapidly. Whilst both the maximum amount of Rent Assistance payable and the maximum rent paid threshold has increased the decline in housing affordability has been accompanied by an erosion of the effectiveness of the Rent Assistance Program and a substantial reduction in the range of affordable housing choices facing low to moderate-income households;

- the total real allocation of Commonwealth funds for housing assistance increased substantially from 1991 to 1996. Since then however this real allocation has declined somewhat and this has been accompanied by the erosion of diverse and integrated housing assistance delivery mechanisms. The diversity of mechanisms used by State governments to increase the supply of affordable and social housing in the late 1980's have narrowed to one or two. De-facto a bifurcated housing policy exists focused on maintaining the existing public housing stock and providing cash payments to improve affordability in the private rental market;

- debates about the efficiency of housing assistance have tended to focus on the desirability of using one method of assistance delivery viz a viz another. This debate has tended to be counterproductive and divert attention from an assessment of the efficiency of the total package of housing assistance programs;

- in the absence of new monies, improved efficiency is central to the ability to increase the long term output of housing assistance programs, now a major priority. The financial cost to government of the total package is a function of a variety of influences, the most important of which are the housing assistance options used, and the intergovernmental arrangements which apply to the delivery of these options. In this respect crystallisation of systemic risks will have a fundamental impact on long run real costs to both levels of government;

- there is little recognition in both Australia and internationally of the potential impact of systemic risks on the efficiency of housing assistance policy or on strategies to lower or mitigate that risk and hence increase efficiency. The paper documents these risks and begins to discuss the way in which they interact;

- a review of the literature suggests that whilst some researchers have started to discuss housing and risk it is predominately from the position of the impact on the housing assistance consumer, rather that the impact on the provider. Some authors have suggested that in a range public policy areas the last decade has been characterised by a transfer of risks from government to the individual;

- finally, the paper carefully examines the variety of issues pertaining to developing a robust and comprehensive approach to the method that should be used to quantify and assess monocentric (single option) versus polycentric (multiple or mixed options) approaches to the delivery of housing assistance. It establishes a framework for why a particular approach should be used.

The paper addresses all of the research questions and provides a related methodology for generating appropriate answers.

CHAPTER 1 INTRODUCTION

1.1 Background

Since the beginning of the 1990's 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.

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 (Commonwealth 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 quantums 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.

Some of the questions that need to be addressed when evaluating housing assistance efficiency are:

(a)   which assistance options are affordable for which household and income groups?

(b)   what are the risks associated with and subsidy costs of each of the assistance options when applied to each of the groups?

(c)   how much should be spent on?

- capital funding for public housing;
- private rental subsidy and housing allowances;
- home loan subsidy; and
- shared equity subsidy; and

(d)   what are the longer term implications of recurrent subsidies?

This project focuses on the issue of risk and risk management.

It builds on and extends the findings of an earlier AHURI study carried out by Berry and Hall and the Allen Consulting Group for the Affordable Housing National Research Consortium[1].

The project addresses the following questions:

(a)   what are the main systemic risks associated with the various housing assistance options?

What do we mean when we talk about systemic risks as they affect housing policy? In some cases, changes to a particular risk variable may have an opposing affect on different assistance options; increasing subsidy costs for one whilst decreasing it for another. For example if regular housing payment to income ratios are the same for the two forms of assistance, increasing real rents or rental yields will decrease the subsidy costs for public housing (because of higher net rents received) but increase the cost of rent assistance. Alternatively 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. Similarly, in Australia, one of the forms of government home purchase assistance, (Mortgage and Rent Relief Program, (MRRP)) is to help make payments on mortgages of households who may be facing hardship through temporary income loss. By contrast in Britain there have been recent developments in requiring home loan borrowers to obtain repayment insurance and pay the appropriate premiums. In the former example the State is accepting some of the risk of income loss, whilst in the latter, the price of this risk is left to the home purchaser.

Therefore:

(b)   historically, have the main systemic risks associated with housing assistance options varied significantly and therefore are they likely to vary significantly in the future?

(c)   In comparisons of housing assistance options are there possible scenarios of the systemic risks where the subsidy costs for one option may increase whilst the subsidy costs of another option may decrease? and hence;

(d)   are any of the covariances of the systemic risks of housing assistance options highly positive?

(e)   are any of the covariances of the systemic risks of housing assistance options near zero, zero or negative?

(f)   do the subsidy costs associated with each housing assistance option vary significantly under different scenarios of the main systemic risks?

If the answers to questions (b), (c), (e) and (f) are yes it is probable that a strategy which consistently uses a mix of means of providing housing assistance will assist more low-income households in the longer term. This follows from the basic theory of modern finance which identifies the conditions necessary for efficient investment, leading to the maximisation of financial returns, (in this case, the minimization of subsidy costs) at a given level of risk (see Berry, forthcoming, chapter 3.1).

1.2 Research Aims

The aims of this project are fourfold -- viz. to:

(e)   analyse 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:

The current housing assistance model developed for the Affordable Housing National Research Consortium (see footnote 1) can handle all of the systemic risk variables and two of the four main housing assistance options.

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[1] For details see the four relevant and summary reports published on www.consortium.asn.au

This model will be adapted and developed to include mainstream public housing and home purchase assistance delivery options.

The data already used for housing cost analysis in the Consortium project will be updated on advice from the NSW, Victorian and South Australian Housing Agencies.

Later sections of the Positioning Paper outline in detail the main systemic risks applying to each the housing assistance delivery options. The project will obtain the relevant data on these risks for Adelaide and Melbourne in addition to that obtained for Sydney.

We will then comprehensively sensitivity test the impact that positive or negative changes in each of these main systemic risk variables have on subsidy costs per tenant year and document these results.

(f) **comprehensively test 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;**

There are a number of assessment techniques that can be used to quantify subsidy cost comparisons and possible efficiency gains. There are however, substantial disadvantages associated with some of these techniques.

For example straight sensitivity analysis is really only useful for testing the effects of changes in one systemic risk variable at a time. In addition, sensitivity analyses tend not to bear any necessary relationship to the probability of certain scenarios of systemic risks arising.

Probability analysis is the main method by which insurance premiums are calculated. It works from the premise of documenting past events over long periods of time and identifying 'worst' (i.e. highest claims cost) through to 'best' (lowest claims cost) cases. These 'cases' are then ranked by isolating the probability of certain claims amounts being able to cover the universe of events, i.e. x amount will have a 25% probability of being sufficient to cover all potential future events (covers 25% of the cases which occurred in the past), y amount will have a 75% probability of being sufficient to cover all potential future events (covers 75% of the cases which occurred in the past). In our case we will calculate the various systemic risk scenarios according to their probability of occurring (based on past experience) using Monte Carlo simulations,(see page 6), derived from the @RISK probability software program.

We will then input a range of systemic risk scenarios covering different probability outcomes for each of our housing assistance models and calculate the required subsidy cost per tenant year. We will be devising and comparing a range of multiple or mixed housing assistance options with the four single options under a range of probability outcomes to determine how often a mixed option is cheaper than a particular single option. We will also be documenting the efficiency outcomes which occur viz a viz subsidy savings. Particular attention will be paid to comparisons with an assistance policy that includes only rent assistance and public housing.

(g) **the extent that mixed strategies are efficient, provide tools for determining the most efficient mixes of housing assistance options:**

AHURI and State Housing Authorities will be provided with a CD ROM, containing a range of generic financial models plus the detailed systemic risk data for the three States selected for analysis.

(h) **document the procedures necessary for housing authorities to apply the tools in their particular jurisdictions.**

A manual will be provided which sets out the instructions for:

- obtaining appropriate risk data;

- obtaining the @RISK software program;

- constructing probability schedules using the program and the risk data;

- inputing into the model; and

- running, compiling and analysing composite assistance option outcomes against individual assistance option results.

1.3 Structure Of This Paper

Chapter 2 of this Positioning Paper contains a glossary of the important concepts used.

Chapter 3 examines in more detail:

- 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 systemic risks;

- investment theory and its potential relevance to assistance efficiency;

- a potential hypothesis relating to housing assistance.

- intergovernmental arrangements and social housing provision.

Chapter 4 contains a literature review of relevant material as it applies to:

- concepts of risk;

- risk and housing; and

- assessment techniques.

A comprehensive examination indicated no literature available on housing assistance options and government risk.

Chapter 5 details the methodology and relevant issues arising.

The chapter examines:

- issues relating to different assessment methods;

- the basis of the housing cost and systemic risk data;

- the impact of correlation analysis and inverse correlation or covariance analysis on the way in which Monte Carlo analysis might be conducted;

- details of the Monte Carlo simulation process; and

- some assumption issues.

Chapter 6 sets out some preliminary conclusions and the next stages.

CHAPTER 2 IMPORTANT CONCEPTS

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.

Affordable Housing	'…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)
Assistance Output	Is the number of new households provided with longer term, (greater than two months), housing assistance in a given period.
Capital Asset Pricing Model	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, p12-13)
Correlation, Correlation Analysis	Correlation analysis is an investigation of the measure of statistical association among random variables based on samples.
Cost Benefit Analysis	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.
Cost Effectiveness Analysis	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.**
Co-variance	A measure of the relationship between two data sets. A covariance indicates where one variable increases the other declines.
Economic Appraisal	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).
Housing Accessibility	'the cost of becoming a home purchaser or entering a rental arrangement'(The National Housing Strategy, 1991, Issues Paper No 2, p ix)
Housing Affordability	'the ongoing cost of housing in relation to gross income'. (The National Housing Strategy, 1991, Issues Paper No 2, pix)

Housing Allowance	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.
Housing Assistance	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.
Housing Stress	'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, pix)
Monte Carlo Simulation	Monte Carlo simulation is the preferred method of generating probability distributions of exposure and risk
Rent Assistance	is a non-taxable income supplement paid to individuals and families who rent in the private rental market. Pensioners, allowees and those receiving more than the base rate of Family Tax Benefit Part A (FTB A) may be eligible for RA.
Risk	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, p6)
Risk Analysis	The process of identifying risks, estimating their likelihoods, and evaluating potential consequences.
Risk Consequence	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, p743)
Risk Consequences	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.
Risk Contingency	The pool of risks is latent, packed with potentiality and uncertainty.
Risk Crystallisation	An event (either individual or collective, chosen or imposed) causes the crystallisation of potential into something substantive.
Risk Exposure	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.
Risk Management	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.

Sensitivity, Sensitivity Analysis	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
Systemic Risks	*Systemic risks* 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.
Uncertainty	Uncertainty refers to *lack of knowledge* about specific factors, parameters, or models.
Unsystemic Risks	Unsystemic risks are risks specific to the asset or investment sector in question (residential property) and to the agencies involved. Unsystemic risk can, in a perfect capital market, be eliminated by the investor by thoroughly diversifying investment across all assets. (Berry & Hall, 2001, p7)

CHAPTER 3 NATIONAL POLICY CONTEXT

3.1 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% (Wulf 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 overall shortage of rental dwellings affordable for low-income households of 50,000 dwellings.(Wulf and Yates, p63)

Berry and Hall found that although nominal mortgage interest rates have fallen progressively through the 1990s and real rates are also down to below 5% per cent in the current year:

- 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 the 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, p10).

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.

Moreover, housing stress increased substantially for low-income tenants over the 1986-96 period.

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

In June 2000:

- *no household can affordably buy an average priced three bedroom house in any metropolitan location;*

- *39% of Adelaide's and 15% of Melbourne's salient households can 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 Melbourne's, and 3% of Sydney's salient households can 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 capital city can 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 are able to afford to rent an average one bedroom unit in inner Melbourne or Sydney locations (5%, Inner Melbourne only); and 38% of households can afford the rent of a one bedroom unit in Eastern Adelaide* (Berry and Hall, 2001, p11).

Moreover, housing stress increased substantially for low-income tenants 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.

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.

If the rate of growth of stressed households experienced in the last 10 years 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, p12-13).

3.2 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.

Methods For Maximising Households Assisted

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

(a)   by increasing the amount of funds available to provide long term housing assistance; or

(b)   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 new funds;

(c)   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 p23).

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. For example identification of say an 18% reduction in subsidy cost resulting from one approach to a housing assistance strategy as compared to another is tantamount to delivering the same increase in assistance output.

3.3 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 assistance options being used and **_potentially available_** 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.

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 exception being Federal exemption of owner occupied housing from the capital gains tax. The Commonwealth has also refrained (from the 1920s on) from taxing the imputed rental income of home-owners.

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

- direct assistance to private and public renters via untied (cash, rent assistance) or tied (vouchers) payments

- 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

3.3 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, changes to a particular variable may have an opposing affect on different assistance options; increasing subsidy costs for one whilst decreasing it for another. For example (if payment to income ratios are the same for the two forms of assistance), increasing real rents or rental yields will decrease the subsidy costs for public housing (because of higher net rents received) but increase the cost of rent assistance. 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).

Table 1: Assistance Options and The Opposing Effect Of Changes To Private Rental Yields

Commencing Case: Private Rental Yields 5.4%	% And Payment Amount (annual)
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%
CASE 1 OUTCOMES	
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
TOTAL PUBLIC HOUSING COSTS	$10,660
Market Rents	$7,020
Maximum Rents At 25% Of Income	$7,500
Therefore: *Rent Assistance Subsidy* *Public Housing Subsidy*	*-$480* *$3,160*
CASE 2: Private Rental Yields Increase to 6.15% (all other assumptions remain the same)	
Private Rental Yields	6.15%
Market Rents	$8,000
CASE 2 OUTCOMES AND COMPARISON WITH CASE 1	
Rent Assistance Subsidy *Increase On Case 1*	*$500* *+$980*
Public Housing Subsidy *Decrease On Case 1*	*$2,660* *-$500*

Alternatively 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, (as noted in chapter 2) 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 (NSW Department Of Public Works, 1993, p6).

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

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. Two 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 the 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 (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 which, whilst not primarily housing risks, impact significantly on housing risks. He also argues 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, (Berry and Hall, 2001, p41):

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.

Assumptions, Cases Examined And Results

Attachment 1 contains a copy of the Modeling assumptions as set out in Berry and Hall, (2001, p40).

All of these cases are externally consistent, one the 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 from Berry and Hall set out the result of such analysis.

GRAPH 1

HOUSING ASSISTANCE OPTIONS: BEST CASE: LOWEST SUBSIDY/HIGHEST NET PROFITS: CASE 1: (Home Loan and Housing Authority Funds Rate 4%, Gross Headleasing Yield 10%)
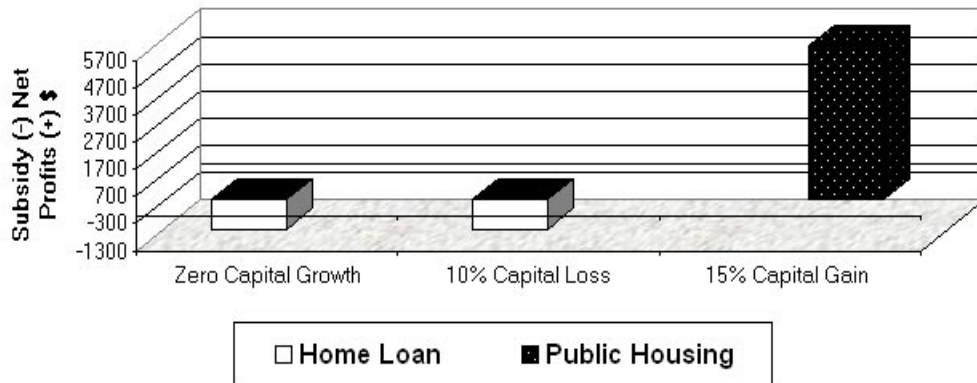
Source: Berry M, & Hall J, 2001, *Policy Options For Stimulating Private Sector Involvement in Affordable Housing Across Australia: Stage 2:* for the Affordable Housing National Research Consortium, DUAP Sydney pg 41.

GRAPH 2

HOUSING ASSISTANCE OPTIONS:LOWEST SUBSIDY/HIGHEST NET PROFITS: CASE 2: (Home Loan and Housing Authority Funds Rate 10%, Gross Headleasing Yield 4%)
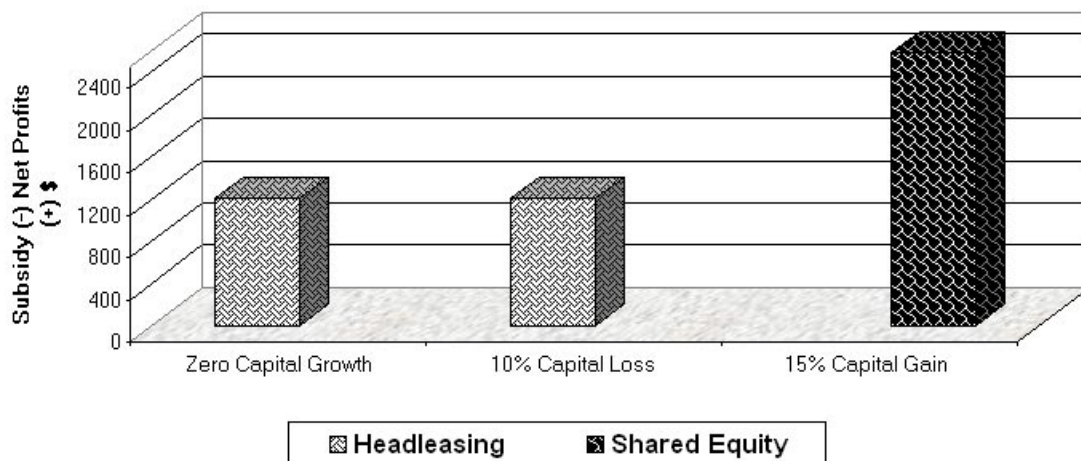
The graphs present the 'best case' option from the twelve scenarios drawn for each case. In case 1, if the capital growth of the dwelling is zero or negative, the cheapest subsidy option for government (both levels taken as a whole) is to provide mortgage loans. If, on the other hand, substantial capital 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 Berry and Hall demonstrate, there is no "first/best" cost effective delivery mechanism. All four methods of delivery are the most cost effective option depending on the state of the economy and, especially, of housing and finance 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.

3.5 Assistance Options and Systemic 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?

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

systemic 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.

unsystemic 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.

3.5.1 Capital Funding Risks

Systemic 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 systemic 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:

(a)   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.

(b)   Unemployment and/or Default Risk

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

c)   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.

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

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 systemic risks.

3.5.2 Home Purchase Programs

Systemic Risks

When providing home purchase finance under Home Purchase Programs governments face a number of similar systemic 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.

3.5.3 Shared Equity

Systemic Risks

Systemic 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 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 payment requirement.

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.

3.5.4 Direct Assistance: Rent Assistance or Housing Allowances

Systemic Risks

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 systemic 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.

3.5.5 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 systemic 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)
Systemic Risks				
Dwelling Price/Asset	Yes (High)	Yes (Moderate)	Yes (Low)	No
Rental Yield- 'Real Rents'	Yes (Low)	No	Yes (Low)	Yes (High)
Unemploy'mt Income Loss	Yes (Low)	Yes (High)	Yes (Moderate)	Yes (Moderate)
Unemploy'mt Default	Yes (Low)	Yes (High)	Yes (Moderate)	Yes (Moderate)
Interest Rate\Inflation	Yes (Moderate)	Yes (High)	Yes (Moderate)	Yes (Moderate)
Constr. Cost Escalation	Yes (High)	No	No	No
Structural and/Or Financing Risks				
Prepayment\ Reinvestment	Possibly	Possibly	Possibly	No
Earnings	Possibly	Possibly	Possibly	No
Vacancy	Yes (Low)	No	No	No
Agency or Issue Specific Risks				
Political	Yes	Yes	Yes	Yes
Project Management	Yes	Yes	Yes	Yes
Project Delivery	Yes	Yes	Yes	Yes
Human Error	Yes	Yes	Yes	Yes
Organisational	Yes	Yes	Yes	Yes
Systems	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 systemic 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 Systemic Risks

Risk	Capital Provision	Subsidised Home Loans	Shared Equity	Direct Assistance (RA or Vouchers)
Rising				
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
Falling				
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, (Berry and Hall, 2001, p42).

3.6 Investment Theory and its Relevance To Assistance Efficiency

There are two key techniques that are used and examined 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*,* p398).

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*,* p398).

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.*

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 *systemic risk*, whilst Naïve diversification asserts that simply by randomly increasing the number of stocks held the unsystemic portion of the total risk will decrease towards zero. Research has found that will this will usually occur until as many as 15 securities are added to the portfolio, (Francis,1976*,* p401).

Markowitz Diversification

Markowitz diversification requires a number of assumptions, viz:

(a)　　'the rate of return is the most important outcome of any investment;

(b)　　investors visualise the various possible rates of return from any asset in a probabilistic fashion;

(c)　　investors define risk as variability of return and are willing to base their investment decision on only two things - expected return and risk; and

(d)　　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*,* p421).

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*,* p404).

This is effected by measuring the covariance of returns of stocks. Whilst the correlation coefficient is a standardised measure of the way two variables covary, covariance is a statistical measure of the way two random variables covary together.

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
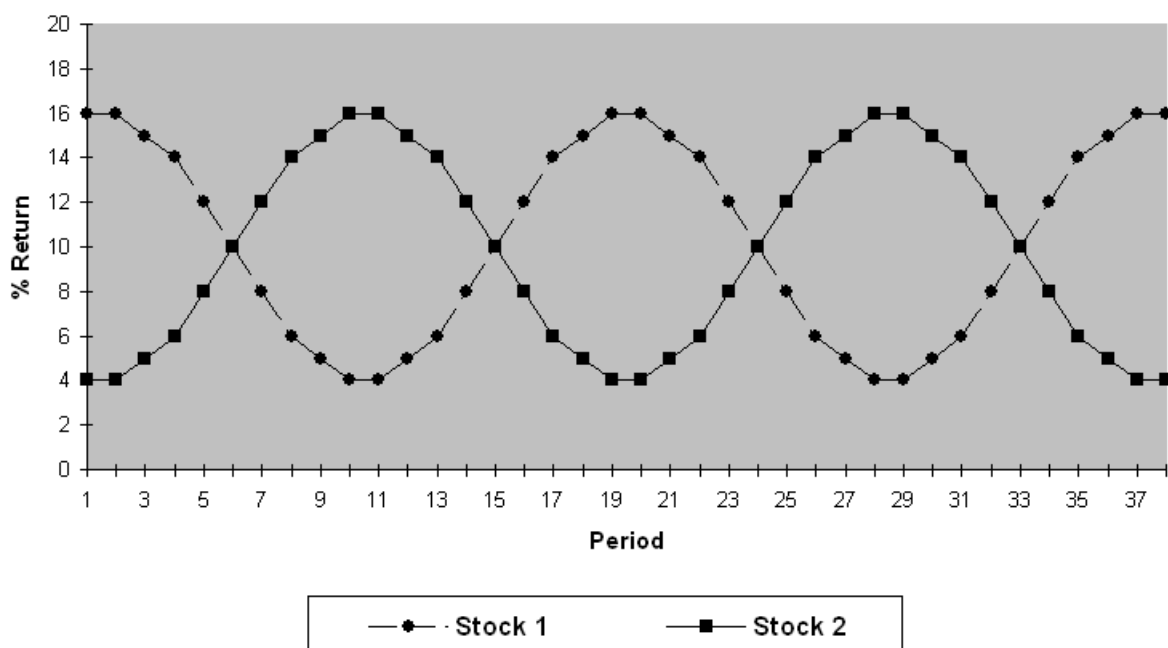
The essence of Markowitz diversification is to find securities with low positive correlations or negative covariances (Francis,1976, p455).

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.

3.7 Possible Hypothesis for Housing Assistance Efficiency

The hypothesis is if:

- the future experience of systemic risk will be 'bounded' by the range of past experience;

- unsystemic 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 systemic 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.

3.8 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,p81-83) have documented the major changes which have occurred in housing policy in the 1990's.

Yates (1997, p266) 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 subsides 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.

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 to 1999-2000, in constant 2000 dollars
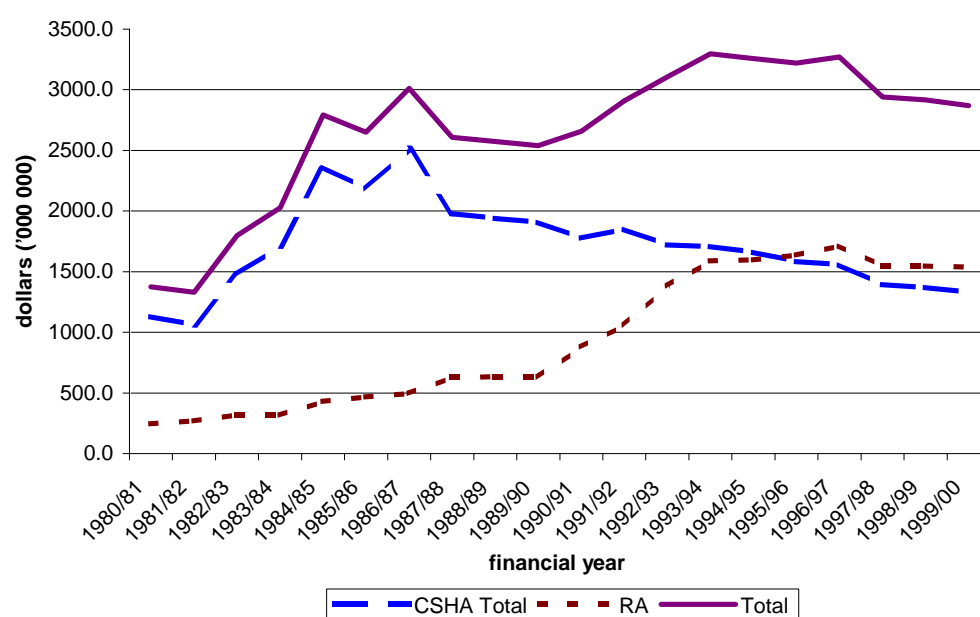
Source: Australian Housing Policy Project, Fact Sheet 3; Housing Assistance Funding Trends, Australian Housing and Urban Research Institute, Melbourne.

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 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[2]….

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.

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[2] 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.

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.

In 2002 additional supply responses to assistance needs has fallen to very low levels whilst the Commonwealth is 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.

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

CHAPTER 4 RELATED REFERENCES

An extensive and comprehensive literature review was conducted of all relevant international journals, academic publications, appropriate overseas research schools, State Government departmental sources and Australian university libraries. This search failed to identify any previous work on housing assistance options and systemic risks. It did however reveal related and tangential literature on:

- the nature of risk;

- risk and housing; and

- assessment methods.

Whilst the material outlined below has not directly changed any aspect of the approach in this research, it has helped to clarify and refine aspects of the methodology and research focus.

4.1 The Nature Of Risk

In *Risk Society* Beck (1992) discusses the multi-faceted nature of risk, raising issues around social change during modernity under two main themes: that of reflexive modernisation; and that of the developing salience of risk.

Beck suggests that modernity gives rise initially to social and economic constraints on the individual which arise from the nature of the means of production, while the process of modernity leads to increasing levels of risk which, as technological progress is made, become less and less connected in terms of time and space; what Giddens (1990, 1991) refers to as "time–space distanciation". One of the consequences is that no one may be held accountable for the hazards created, so there is a lack of compensatory possibilities, leaving the repercussions with the individual.

Beck questioned the current definitions of risk, viz;

"Quantitative definitions of risk can miss the intricacies of the causes or consequences of risk events, while enabling a strong empirical base through which some minority interests may be marginalised. Cultural approaches may dilute questions of social justice if they do not adequately question the source of world views, or may enable powerful ideologies to dominate by uniting groups of people within fixed and apparently incompatible typologies".

Croft (2001, p7), maintained that:

"While the notion of risk can be particularly helpful when considering factors connected with the affordability and sustainability of housing, issues around the conceptualisation of risk first need to be overcome. Existing fixed definitions of risk tend to be focused either narrowly on the identification of specific events or consequences, or widely on paradigmatic issues. Either way, they have difficulty in reflecting the cumulative and iterative nature of housing risk.

It has been suggested in the preceding discussion that risk may have acute or chronic causes or effects, but there is a further distinction to draw between risk events and risk consequences, which in turn can be sub-divided into contingent or potential risk (risk which is a future possibility) and actual risk (that which has crystallised into something tangible: homelessness; an illness; or a bill which can not be paid, for example).

To take this a stage further, if risk is viewed as a process, three stages might be defined:

Stage One: Contingency

The pool of risks is latent, packed with potentiality and uncertainty.

Stage Two: Crystallisation

An event (either individual or collective, chosen or imposed) causes the crystallisation of potential into something substantive.

Stage Three: Consequence

The 'fallout' from the crystallisation of risk may be short or longer term, gain or loss, but will often be a diachronic state. This situation may be subject to strategic responses from individual(s) or group(s), or from some outside agency such as a voluntary organisation or the state.

To return, then, to the subject of defining risk, a suitable definition might be: a diachronic process during which the uncertainties of contingency may crystallise into consequences which may or may not give rise to further contingent conditions. If such a definition of risk is taken as a starting point it becomes clear that any assessment of a social policy role in housing affordability issues requires the consideration of all three stages of the risk process."

Ewald (1991), looking at risk and insurance, suggests that there are different perceptions of what constitutes 'risk', which are dependent upon why the question is being mooted:

"In everyday language the term 'risk' is understood as a synonym for danger or peril, for some unhappy event which may happen to someone; it designates an objective threat. In insurance the term designates neither an event nor a general kind of event occurring in reality (that unfortunate kind), but a specific mode of treatment of certain events capable of happening to a group of individuals …Nothing is a risk in itself; there is no risk in reality. But on the other hand, anything can be a risk; it all depends on how one analyzes the danger, considers the event … As a technology of risk, insurance is first and foremost a schema of rationality, a way of breaking down, rearranging, ordering certain elements of reality. (1991, p199)"

Perri 6, (1998, p347) maintains that concepts of risk help us to understand how housing *politics* frames debates about housing *policy*, and therefore help housing policy advocates design their strategies.

"Yet it is also useful to look at other kinds of risk that housing policies are implicitly designed to deal with. These include:

- *risks closely related to housing outcomes such as risk of eviction, with which the design of possession procedures in different tenures is concerned*
- *risks to individual well-being such as poor educational achievement from lack of private space for school-age children to study in*
- *community risks such as fear of crime from poor physical design of housing estates (Matrix, 1984) and stigma of particular areas and community divisions (Cole, 1996)*
- *wider economic risks such as the consequences of house price inflation for the wider economy, for savings and investment, or the effects of the housebuilding industry business cycle on unemployment (Meen, 1994)*

The first two groups are concerned with risks of harmful outcomes to individuals and households; the last group is of systemic risks, or risks that affect the whole society; and the third is concerned with the intermediate level of the local community."

Risks and Public Policy

Perri 6 suggests that:

"broadly, public policy, understood as strategies of risk management, can seek to anticipate risks, and act preventively on the causes to reduce the magnitude or frequency of those risks, or act curatively, accept the risks of harm, but seek to reduce the damaging effects or to spread losses between individuals or over time across an individual's life through the use of legal rights, insurance and other institutional mechanisms.

In addition to this classification, it is important to distinguish between high and low risk pooling stances, where risk management strategies place the burden of particular risks between the individual and some group, such as taxpayers, or members of a risk pool such as the tenants of a single social rented housing agency's rent pool. In general, the number of risks shouldered by taxpayers is decreasing, although less rapidly than many neo-liberals had hoped at the beginning of the 1980s.

Again, risk management strategies differ in the way they classify and manage risks from a functional or organisational perspective (this is a housing problem; this is a health problem; this is an income maintenance problem, etc.), or by key problems or life events or some other holistic basis that begins with the experience of the individual of the way in which hazards are combined. It is argued below that this dimension is becoming increasingly important.

Finally, risk management systems may centralise or decentralise financial and organisational responsibility for handling certain hazards. During the era of the New Public Management (NPM: see below), the tendency in housing policy has been to decentralise implementation, but centrally to specify more and more process and financial accountability.

In risk management, the current academic fashion is to swing away from anticipationism, quantification, design and outcome specification, as demanding greater rationality than the world allows (Hood, 1996). Books on 'policy fiascoes' typically announce that unintended consequences will defeat the best laid plans of mice and men (e.g. Bovens & t'Hart, 1996)."

This discussion on risk has helped to refine the nature of the risks being assessed in this project. Essentially the risks analysis being conducted in this project is exclusively quantitative in nature and focused on agency rather than societal or individual consequences. It does however take account of the iterative and cumulative nature of housing risk as the analysis is conducted over long periods and includes provision for the impact of uncertainties associated with income, dwelling price and interest rate change.

4.2 Housing Risk

Croft discusses the concept of housing "careers" and refers to the notion that housing careers are prone to being undermined by risk and argues that there has been a marked shift from government to individual provision of support for risk:

"The idea of risk as a diachronic process has not been applied to housing, though links can be clearly seen, most fundamentally with the conceptualisation of housing as a 'career' which is prone to being undermined by risk (Forrest & Kennett, 1996).

Within housing, there has been a noticeable increase in 'risky positions' and a shift towards individual provision that can be associated with the changes described by Beck, Culpitt and others. These shifts in both incidence and form of housing debt, negative equity and homelessness have prompted work on the relationship of risk with housing policy, though there is little which overtly considers the theoretical dimensions".

Forrest suggests:

"there are now "more vulnerable households in less stable markets" (Forrest, 1999, p. 34), while some of the manifestations of risk, and the ways in which we consider them, have shifted over time."

Forrest and Murie present the argument that homeowners are now subjected to increased risk:

"….the most striking example of increased risk is that experienced by home owners in the housing market of the late 1980s and early 1990s, as the implications of recession and over-geared lending fed into the property market, causing an unprecedented number of households with housing debt problems (Burrows, 1998; Ford et al., 1995; Forrest & Murie, 1994).

Although mortgage arrears and repossessions are not new to the housing market, negative equity has only more recently been seen as a risk to home owners and, as such, is a new manifestation of housing risk."

Jenkinson (1992) is of the view that because of the unique characteristics of housing the State should properly accept more of the risks, since it is:

"comprising the largest single component of household expenditure and having an unparalleled role in providing security and social structure to individuals and households.

Housing has a role in shaping our lives and communities that other goods do not have…. Moreover, well-maintained dwellings and gardens benefit everyone in the community, not just the owner- occupier (the 'positive externality' argument). ***As such, housing and its consumption, though essentially a private purchase, justify public subsidy and support"***

Croft refers to the issue of affordability crises arising from income risks:

"Most mortgagors or tenants are positioned such that the capacity to retain their home is delineated within a specific set of financial possibilities; usually the earned wage or benefits entitlements. They are at risk of being affected by affordability problems, whether chronic or acute, and many of the situations which contribute to those problems are difficult to anticipate or protect against. Housing careers (Forrest & Kennett, 1996) are thus exposed to complex multiple risks which arise out of the uncertainties associated with identity, temporality and locality and which can result in an inability to pay."

Perri 6 points out that as far as housing policy issues are concerned the interests of the various parties and the risks they assume are not equal:

"In housing policy, for instance, the interests of mortgagors do not necessarily fit with those of their mortgagees, or those of landlords with tenants, especially over financial issues and, while there are clear market opportunities for insurance products to protect some people against the risks of unemployment and sickness, the financial interests of the parties to the insurance contract often conflict. The definition of what constitutes risk events and risk consequences is a key factor in deciding policy directions but the positions of the players involved are neither equal nor static."

Perri 6 reinforces the notion of the importance of the recognition of risk in housing policy:

"Starting with the simple fact that housing policy must be about all sorts of risks, not all of which are primarily housing risks, and that policy action in many other fields impacts enormously on housing risks. It has been said that one quickly comes to recognise the need for integrated policy responses and frameworks for understanding interactions between risks. Thinking in these terms moves us in the direction of more anticipatory and holistic government. More interestingly for housing politicians, it can be argued that re-framing housing policy in terms of risk is an important thing for housing policy advocates to do.

Governmental housing policy is at least sometimes explicitly, and still more often implicitly about the reduction, or elimination of certain kinds of risk."

Moreover, Perri 6 (1998, p343, p363, p373) suggests concerns about housing risk are being reflected in changing housing policy management styles

"There are signs, too, of a wider interest in anticipationist styles of management about housing risks.

It is possible that, with Labour in power, expectations among egalitarians could build up to the point that they exert a powerful effect again on the balance of risk cultures to which government must respond in the design of housing policy, and the range of risks to which more collective and egalitarian solutions would be considered acceptable.

In such a dynamic, one would expect the salience to rise, not only of acute housing risks such as homelessness or low incidence, high damage risks such as asbestos-related conditions, but also of wider concerns about housing affordability (Bramley, 1994),

Egalitarians wanting to shift Labour's priorities have already learned to talk about some systemic risks. For some time, they have tried to frame their arguments in terms of long run efficiency rather than simply in terms of claims to justice.

Under Sheila McKechnie, for example, Shelter shifted its ground toward arguments about macro-economic instabilities and inflation; recent Shelter policy statements have stressed the effects on labour supply from the poverty trap created by housing benefits, as well as links between solutions to homelessness and improved educational performance and competitiveness (National Housing Federation, 1997; Shelter, 1996)".

The discussion in the literature has two main themes,

- recognition of risk as central issue in housing policy debates; and
- the impact of particular types of housing risk on individual households.

This project, however, uses the framework and methodology of financial markets to inform the typology and assessment of risk consequences. The project looks towards the broader macro-economic context and its potential impact on the subsidy exposure associated with particular methods of delivering housing assistance.

4.3 Assessment Options

The NSW Total Asset Management Manual discusses the characteristics of Cost Benefit Analysis (CBA), (NSW Public Works Department, 1993, p 9).

"Costs and benefits should be valued in real terms over 20 years, that is they should be expressed in constant dollar terms and not include nominal increases due to inflation. Public Works suggests a real discount rate of 7% with sensitivity testing using discount rates of 4% and 10%"

McHugh, (1995, p250) has suggested a set of outcomes which should result from effective option analysis.

- *"the project objective is consistent with the goals of the organisation*
- *the most cost-efficient option has been proposed*
- *the benefits as stated are likely to be achieved*
- *the costs as presented represent a complete and accurate assessment of all costs likely to be incurred*
- *the rate of return, payback period, and NPV calculations are in accordance with the established guidelines*
- *the supporting analysis is rigorous and robust and would withstand critical external evaluation*
- *the potential cost of wearing the risk - where risks are involved - are outweighed by the costs of risk avoidance"*

The NSW Government's Asset Management Manual, (1993, p 10) concentrates on outputs as performance measures, viz:

"Outputs should include;

- *Net Present Value*
- *Net Present Value Per Unit of Service or Dollar of Capital Investment*
- *Benefit Cost Ratio (a project is potentially worthwhile if the BCR is greater than 1 (i.e., the present value of benefits exceeds the present value of costs)*
- *Internal Rate of Return"*

EPAC, (1995, p164) has noted the limitations of applying Cost Benefit Analysis to certain public programs:

"These 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; and*
- *concerns that Cost-Benefit Analysis can be readily manipulated to support a position."*

Garnham, (1995, p243) emphasised the importance of assessing and measuring the value of externalities:

"Governments have to be much clearer in their view of the value of externalities, and particularly social externalities. This is important when the payback is dependent on revenue streams which are a function of government directed pricing levels, especially where those pricing levels are heavily subsidised and relate more to social and political objectives than to commercial objectives."

The remainder of the literature analysed, focused on the differences between CBA, Cost Effectiveness Analysis and the method used in this work, Financial Appraisal, which are discussed further in the next chapter.

The above discussion helped to inform the choice of the assessment method to be used in the analysis.

CHAPTER 5 METHODOLOGY

This section of the paper canvasses the:

(a)   assessment method

(b)   model development

(c)   assessment process

(d)   details of the preferred probability analysis method using Monte-Carlo simulation

(e)   dependent and independent data and correlation and covariance

(f)   model cost data

(g)   risk data trends and content

(h)   assumption issues

5.1 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 used in the analysis;

- if financial analysis is to be used how are taxation effects to be dealt with?

Assessment Method

As outlined in the Terminology and the Literature Review chapters 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)

As outlined above, 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, p164).*

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

Item	Private (Financial Analysis)	Social (Cost-Benefit Analysis)
Overall Goal	Increase net income	Increase economic welfare
Choice Criterion	Net financial returns to the individual entity	Net benefits to society as a whole
Purpose	Indicate economic worth of an alternative to the entity	Indicate economic worth to society as a whole
Benefit Values	Prices received	Willingness to pay (usually exceeds price)
Cost Values	Prices paid	Opportunity Cost (=Real resource costs)
Taxes Paid	Included as a cost	Excluded as they are a transfer payment
Subsidies Received	Included as a benefit	Excluded as they are transfer payment
Discount Rate	Individual rate of time preference	Social rate of time preference (usually much less than the entity rate)
Government Costs	Excluded	Included
Externalities	Ignored	Included
Unpriced Benefits And Costs	Included	Included
Time Horizon	Usually two decades	Usually more than one generation
Interest Payments	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.

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.

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:

- *sales tax*; materials used in the construction of new dwellings will be subject to sales tax leading to an increase in sales 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 found (Glazebrook, Hall and Residex, 1995) 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 State 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 that 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 taxation impacts of housing assistance options.

5.2 Model Development

It is intended to modify the housing subsidy model developed for the Affordable Housing National Research Consortium 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. This component will be deleted.

The Housing Subsidy model essentially calculates the commencing amount of funds that should be put on deposit to pay required rental subsidy for social housing tenants and capital shortfalls on debt repayments (if any), for the term of the transaction.

The Model assumes dwellings required to house social housing tenants are initially purchased from the proceeds of a bond issuance, and that as time goes on the proceeds of sales of the dwellings are used to repatriate the principal owed on the bonds and to provide for any operational shortfalls. In the event that the net sale value of the dwellings exceeds the bond principal outstanding the Model reduces the initial capital injection required, and makes up for any operating shortfall by short term borrowings. This is calculated so at the end of the transaction the net proceeds from the sale of any remaining dwellings are exactly equal to bond and short term borrowing principal outstanding. The Model uses Excel Goal Seek capacities to exactly calculate the initial contribution required such that at the end of the transaction all liabilities are discharged, and the accumulated cash flow is zero.

The Model has two main modules.

Within the first module are 7 command buttons. These are:

- Housing Cost
- Financial.
- Housing Index.
- Tenant/Rent.
- TaxCom.
- Scenarios (the only input tables in the first module).
- Scenarios Choose.

and two reporting tables:

- Results (the main reporting table).
- Cash Flow (the second reporting table).

The Model requires users to estimate the 'real' interest rate currently applying and calculates the nominal interest rate from the two components of CPI and Real Interest Rates.

The Real Debt or Investment Rate is the difference between the assumed inflation rate and the nominal interest rate on borrowings/interest earnings.

The Model automatically calculates nominal debt and investment rates according to the formula $(1+n)*(1+i)-1$, where:

- **n** = the assumed real debt or investment rate.
- **i** = the Consumer Price Index (forecast) for Australia.

Users have a choice of debt instrument between floating, fixed and real rate instruments. Internalised within the Model are the Reserve Bank's formulas for calculating interest payments on the bonds (half yearly for nominal bonds, and quarterly for real rate bonds) and for calculating the bond price at any early redemption (i.e. before maturity). The formulas for calculating bond Prices can be further examined in the Reserve Banks Press Release NO 24, 1992, titled 'Pricing of Government Securities'.

Housing Indexation

These indexation functions set down the real percentage by which the initial dwelling prices, maintenance and rates and administration costs increase or decrease each year.

If zero is inserted then dwelling prices increase by inflation and maintenance, rates and administration costs are maintained at the same percentage of dwelling value that is inserted in the transaction at the beginning. If a plus or minus percentage is included the original cost or price is adjusted in the first year by the following formula.

- $(1+c)*(1+i)-1$, where:
- **c** = the Cost or Price Growth Rate.
- **i** = the Consumer Price Index (forecast) for Australia.

i.e. if inflation is say 2.5% and cost growth is 1% real then $100 becomes

- 100+{100* ((1+0.01)*(1+0.025)-1))} = 103.525
- or if real cost growth is −1%
- 100+{100* ((1-0.01)*(1+0.025)-1))} = 101.475.

The process is repeated for the second year and so on. Figures should be inserted as percentages. If CPI increases are assumed, zero is inserted in each of the three boxes.

The Model provides for up to three automatic and six manual economic scenarios to be tested.

These Scenario options will be modified to include scenarios generated by the probability analysis.

The results analysis sets out all of the details for the particular case and the quantified outcomes. These outcomes essentially comprise three components.

The outputs are:

- gross capital contribution required per $100M;
- the present value subsidy per tenant year per $100M; and
- net capital contribution after direct tax per $100M.

The suite of models will be developed that analyse the impacts of systemic risks on subsidies for a dwelling or household for each of the different assistance options. However they will not include the calculation of the direct tax implications inherent in the existing Model. They will also incorporate flexible client payment rates based on any agreed proportion of income. Diagram 1 on the next page sets out the existing (unmodified) model Components.

Diagram 1: Existing, (Unmodified) Model Components
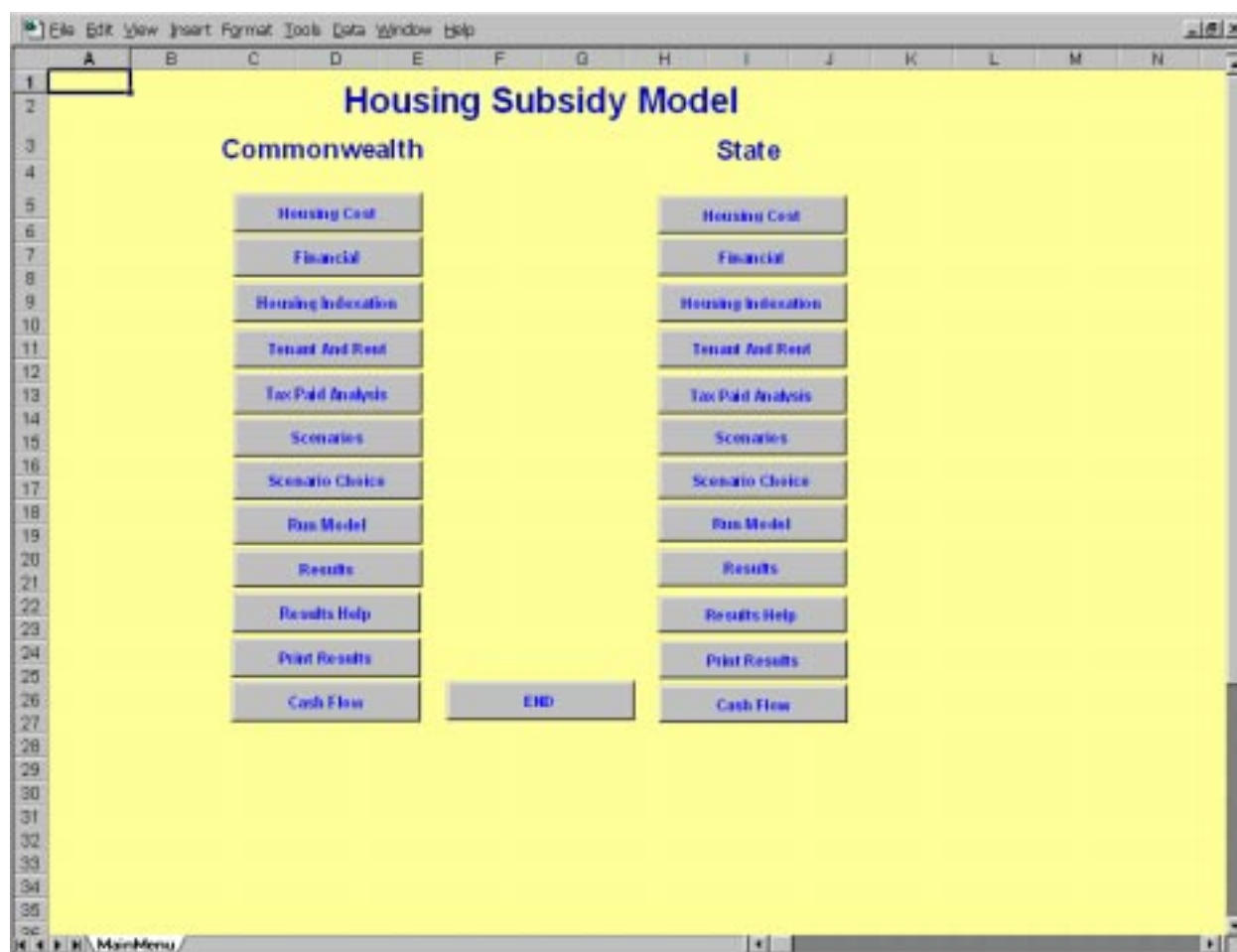
5.3 Assessment Process

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.

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 (ie percentage by which original income reduced)	All
Income Loss Duration (ie 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

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.

Scenario Analysis

Scenario analysis take 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.

5.4   The Preferred Method: Probability Analysis and Monte Carlo Simulation

Probability Analysis

A more rigorous approach is to apply probability analysis to the historical data (in this case, for each of the three selected states). 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.

Under this option we would develop 1000 scenarios of systemic risks that represent the probability of future outcomes ranging from 1% to 100%. Based on this range of 1000 scenarios of the future, particular scenarios of the systemic risk variables can be chosen consistent with a given 'confidence level' that the subsidy outcome will be sufficient to cover, say, 75% of the cases which have happened in the past, 50% of cases and so on.

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. Monte Carlo simulation techniques will be used to randomly generate the systemic risk scenarios.

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, p9), 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 of 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 manag*ers."

Furthermore in the comparative analysis contemplated in this research project it may be that the systemic risk scenarios generated at the high end of the probability range may 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, Poulter, (1988, p9).

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" Poulter, (1988, p14).

The principles and insights to be gained from this form of analysis are clearly articulated by the United States Environmental Protection Agency (USEPA), (1997, p1).

- *"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"*(USEPA, 1997, p2).

- "The USEPA further articulates the insights that can be obtained from using this form of analysis "(1997, p4).

- "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"*

5.5 Systemic Risk Data and Correlations and Covariances

It is possible that there may be horizontal interdependencies between systemic risk variables, both positive and inverse. For example, as income growth increases, housing prices might also increase or inversely, as income growth decreases mortgage and rent payment defaults may increase.

Similarly it may be that the change in the value of a single variable from one period to the next constrains the subsequent possible change in the value of that variable in the third period. For example, if say CPI increases by 20% between two periods it may be that analysis indicates it can only change by say, 10% in the third subsequent period.

Prior to finalising the Monte Carlo simulation runs it will be necessary to test the systemic risk values both horizontally and longitudinally for corrrelations or inverse correlations (co-variances). If such relationships are found to exist they will be entered into the @RISK software program prior to running the Monte Carlo simulation.

5.6 Housing Assistance Option Cost Data

In the Stage 4 Report for the Affordable Housing National Research Consortium data was obtained from all States on the housing cost components that will be updated and 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;

## 5.7 Systemic Risk Data and Trends

Systemic Risks

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

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

Consistent statistical data based on the Sydney Statistical Division and on which correlations and covariances can be analysed is only available from 1981. 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: Dec 78 = 100
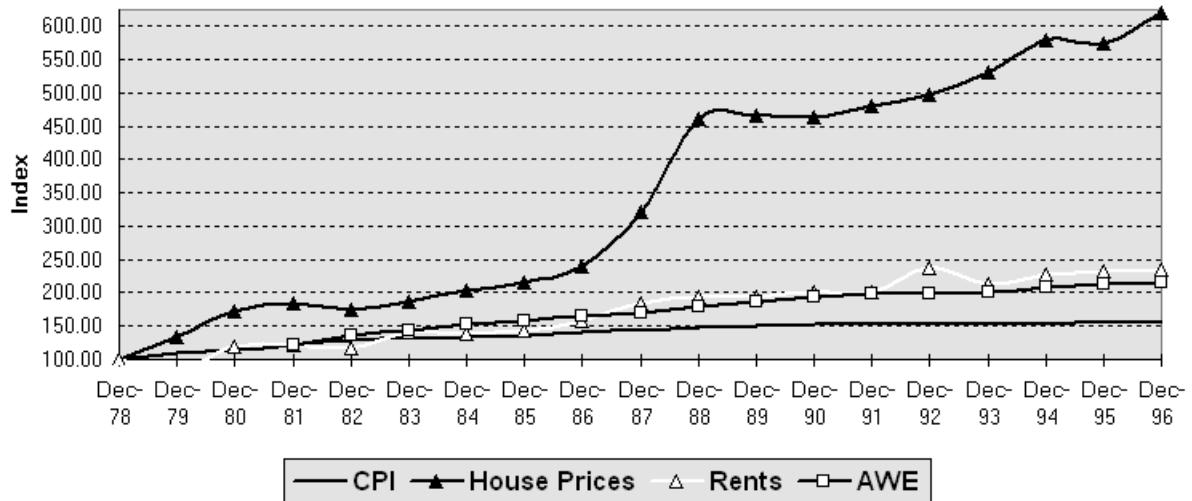
SOURCE: Australian Bureau Of Statistics, various series, Residex P/L house and rent price indices.

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 (next page) sets out the trends for 90 Day Bank Bills, 10 Year Treasury Bonds, Bank Variable Home Loan Rates, and the Unemployment Rate (all persons).

Graph 5 highlights the high degree of volatility and suggests both possible lagged positive and inverse correlations between certain variables.

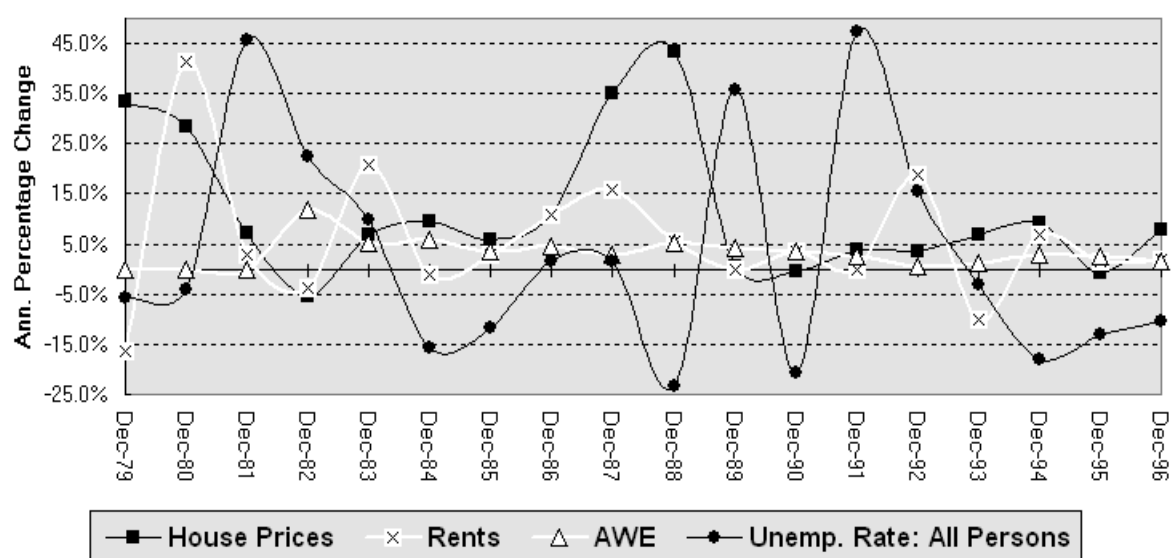## GRAPH 5

SYDNEY: SELECTED SYSTEMIC RISKS: Dec 78-Dec 96
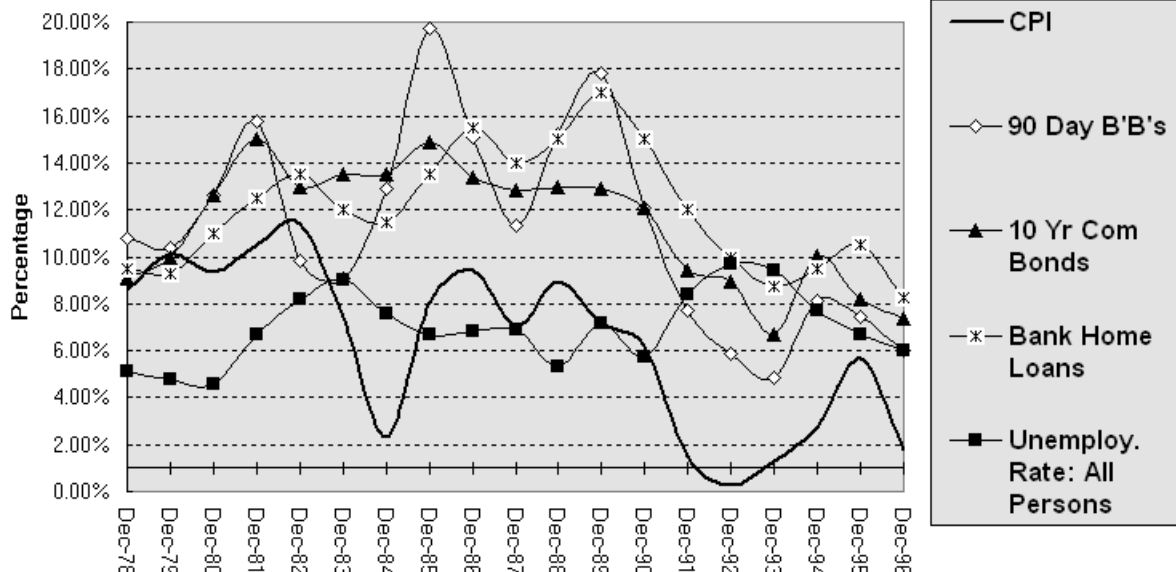
SOURCE: Reserve Bank Quarterly Bulletins, (various), Australian Bureau Of Statistics, Labour Force, 6203.1

In order to test for correlations and covariances the quarterly and annual percentage change and real percentage change in each of the systemic risks has been plotted. Graphs 6, 7 and 8 set out the annual percentage change over the period December 1980 to December 1996.
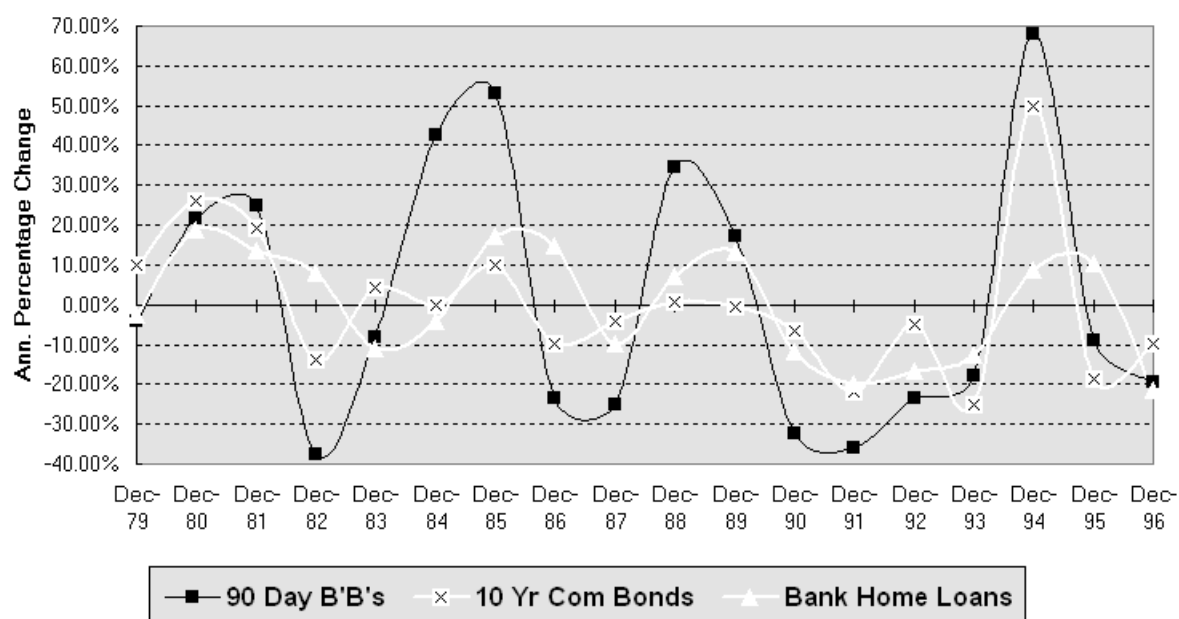
GRAPH 6

SYDNEY: ANNUAL YEAR ON YEAR PERCENTAGE CHANGE: SELECTED SYSTEMATIC RISKS
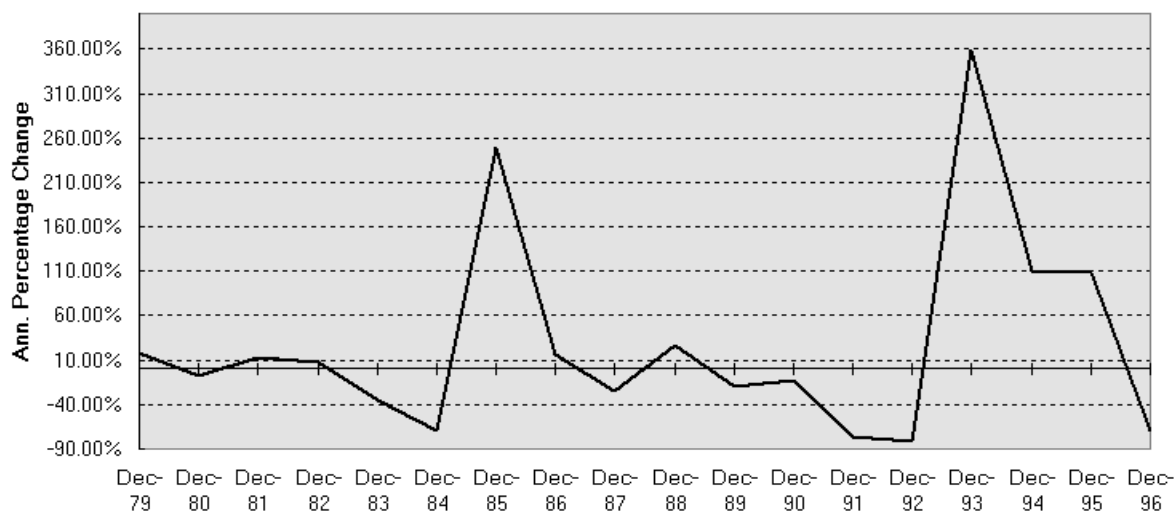

GRAPH 7

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:

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%.

This data will be updated to current year outcomes and extended to Melbourne and Adelaide. It will then be subjected to correlation and covariance testing and inputted to the Monte Carlo simulations.

5.8 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 will apply to:

- the systemic risk in the future is the same as that which applied to the past;
- defaults apply to all options at 2% of the portfolios and is assessed as 2% of the dwelling value experienced at commencement;
- all funding is by way of variable rate financing at the real rate derived from the scenarios (this includes the debt funding component of public housing);
- no income loss is experienced;
- the commencing dwelling value is that provided by all States for public housing average costs;
- no prepayments occur;
- purchasing and selling expenses are 1% of the dwelling value at both purchase and sale for the public housing and shared equity cases; and
- the maximum payment of the client including maintenance and rates expenditure is 25% of gross income p.a.

Specific Assumptions

The assumptions that must be specific are:

For the home loan option the margin for loan origination and establishment and management costs, is set at 0.88% pa of the principal outstanding. This cost is added to the real interest rate assessed for the borrower and is expected to be fully recovered from repayments.

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

- household incomes of:
  - $20,000 per annum;
  - $25,000 per annum;
  - $30,000 per annum; and
  - $35,000 per annum.
- for periods of 10, 20, 30 and 40 years.

CHAPTER 6   CONCLUSIONS AND NEXT STEPS

6.1 Conclusions

This positioning paper has posed a number of important questions regarding the efficiency of current housing assistance policy in Australia. The paper reviews current findings on affordable housing supply and demand and articulates why output concerns should be at the centre of housing assistance policy. The paper also raises questions about the efficiency of the bifurcated nature of current Commonwealth housing assistance. It reviews what little research exists on the relationship between housing assistance and risk. The paper then documents a precise methodology that will be used to assess the efficiency of housing assistance options as they relate to systemic risk.

Key outcomes of this review are:

In the 1990's housing affordability has declined significantly whilst housing stress has increasing rapidly. This has been accompanied by an erosion of the effectiveness of the Rent Assistance Program and a substantial reduction in the range of affordable housing choices facing low to moderate-income households.

The total real allocation of funds for housing assistance has been declining for a number of years and this has been accompanied by the erosion of diverse and integrated housing assistance delivery mechanisms. The various mechanisms used by State governments to increase the supply of affordable and social housing in the late 1980's have all but ceased. Defacto a bifurcated housing policy exists focused on maintaining the existing public housing stock and providing cash payments to improve affordability in the private rental market.

Debates about the efficiency of housing assistance have tended to focus on the desirability of using one method of assistance delivery viz a viz another. This debate has tended to be counterproductive and divert attention from an assessment of the efficiency of the total package of housing assistance programs.

In the absence of new monies, improved efficiency is central to the ability to increase the long term output of housing assistance programs, now a major priority. The financial cost to government of the total package is a function of a variety of influences, the most important of which are the housing assistance options used, and the intergovernmental arrangements which apply to the delivery of these options. In this respect crystallisation of systemic risks will have a fundamental impact on long run real costs to both levels of government.

There is little recognition in both Australia and internationally of the potential impact of systemic risks on the efficiency of housing assistance policy or on strategies to lower or mitigate that risk and hence increase efficiency. The paper documents these risks and begins to discuss the way in which they interact.

A review of the literature suggests that whilst some researchers have started to discuss housing and risk it is predominately from the position of the impact on the housing assistance consumer, rather that the impact on the provider. Some authors have suggested that in a range public policy areas the last decade has been characterised by a transfer of risks from government to the individual.

Finally, the paper carefully examines the variety of issues pertaining to developing a robust and comprehensive approach to the method that should be used to quantify and assess monocentric (single option) versus polycentric (multiple or mixed options) approaches to the delivery of housing assistance. It establishes a framework for why a particular approach should be used.

The paper addresses all of the research questions and provides a related methodology for generating appropriate answers.

6.2 Next Steps

The next steps are to:

1. Revise and develop a suite of generic models;
2. Obtain and update systemic risk data for Sydney, Melbourne and Adelaide;
3. Update housing cost data;
4. Conduct horizontal (between variables) and longitudinal (between periods for one variable) correlation and co-variance analysis;
5. Finalise assumption set;
6. Carry out Monte Carlo simulations;
7. Choose systemic risk scenarios according to appropriate confidence levels;
8. Establish income test ranges;
9. WORK IN PROGRESS REPORT.
10. Conduct modelling of subsidy outcomes, single versus multiple housing assistance options;
11. Conduct Sensitivity testing;
12. Document analysis and results;
13. Prepare manual on data inputs, method and model operation;
14. FINDINGS PAPER; and
15. FINAL REPORT.

The financial analysis will:

- apply the models for the three states using up-dated generic and state-specific data;
- incorporate hypothesis and income range changes;
- apply sensitivity testing;
- construct the probability distributions based on historical data for each State;
- calculate subsidy savings at each income range based on a range of probability outcomes say 20%, 40%, 60%, 80% and 95% for each State;
- prepare a report on subsidy savings per tenant year in each State; and
- prepare a report setting out quantum subsidy savings and assistance option strategies for different income ranges in each State.

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MODEL ASSUMPTIONS   ATTACHMENT 1

1. General

In all cases the client has an annual income of $20,800. The client pays a rent, mortgage payment or combined rent/mortgage payment equivalent to 25% of income, ie $100 per week. The difference between the payment required and $100 is subsidised. Dwelling value at commencement is $100,000.

2. Client Related Issues

Under all of the delivery mechanisms it is assumed that if client income rises or falls then the difference between 25% of income and the required repayment is subsidised. The only situation in which the client is at risk of losing the accommodation is if no payment is made at all. This is the same for all mechanisms. Under the purchase and shared equity options the client faces the risk of either capital losses or capital profits according to dwelling price movements (this is the same for the housing provider). However, the loan financing structure has no influence on whether capital gains or losses accrue. The delivery mechanisms are therefore outcome neutral for the client.

3. Assistance Options

Capital Funding (Social Housing, Direct Equity) Option

The assumptions are:

- purchasing and selling transaction costs: 4% of dwelling value;

- maintenance rates: 1.8% of dwelling value; and

- housing authority cost of funds: same as home loan borrowing rate.

In this and all cases subsidy cost is simply the difference between net rent payment ($100) and outgoings after sale; i.e. -- public housing maintenance, rates, interest costs on costs of funds plus or minus capital profits or losses. At the end of 12 months the property is sold.

Home Loan Option

In this example the housing authority pays the difference between the required mortgage payment and $100 per week. The loan is credit foncier for a 25 year term with 95% loan-to-value ratio (LVR). At the end of 12 months the property is sold. The dwelling value, transaction costs and mortgage interest rate are the same as those applying to the capital provision and shared equity cases.

Shared Equity Option

In this case the client purchases a 50% share and pays 50% of maintenance, rates and transaction costs. The home loan rate is the same as the state housing authority cost of funds rate and is for 25 years with a 95% loan to value ratio on the client share, i.e. $50,000. Only the rent payment component is subsidised. The difference between the rent payment received ($100 per week minus mortgage payment) and housing authority costs on the 50% equity is treated as subsidy. At the end of 12 months the property is sold.

Dwelling value, transaction costs, maintenance and rates costs, and housing authority cost of funds rate are the same as the capital provision option.

Direct Assistance Option

In this option the dwellings are headleased by social housing providers from private landlords. The Commonwealth pays the difference between the gross rental yield (gross rents) required and $100 per week in the form of rent assistance. Commencing dwelling value is (as in all cases) $100,000.

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