WELFARE DIVISION WORKING PAPER NO. 8

Measuring financial housing stress

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January 1995

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Acknowledgments

The author thanks Judith Yates, Peter Phibbs, Rosangela Merlo and Glenn Foard for the comments they provided on the draft of this working paper. As well, Rosangela Merlo and Stephen Collett provided valuable input during initial discussions on the definition of financial housing stress.

The working paper aims to advance an Institute project assessing housing need in the Australian Capital Territory which is being carried out for ACT Housing and their assistance is also acknowledged.

Abstract

Financial housing stress is an important aspect of housing need. However, measures often used to estimate the incidence of such housing stress in the Australian population have significant limitations. This working paper discusses and critically reviews measures used in Australia and Canada and proposes enhanced approaches. It concludes by outlining remaining problems and areas for further work.

Any inquiries or comments on this working paper are welcome and should be directed to:

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1. Introduction—what is financial housing stress?

In order to decide on the 'best' measure of financial housing stress we first need to state what exactly it is we are trying to measure. A proposed definition is:

> People are experiencing financial housing stress if they cannot afford 'adequate' housing, where 'adequate' housing is that which has sufficient rooms so that the household is not living in overcrowded conditions, is in reasonable repair, provides the basic amenities considered essential by the community, has adequate security of tenure and is in a suitable location.[1]

Conceptually, individuals and families in financial housing stress can be divided into three groups:

A. Those on very low incomes and in such financial stress that any expenditure on housing causes additional hardship. This group includes at least those whose *before-housing* income is below some specified very low income limit. These people have a fundamental income problem and are likely to require more than housing assistance.

B. Those on low incomes whose expenditure on housing puts them in financial stress. This group includes those on low incomes whose *after-housing* income is below some specified very low income limit. It should be noted that housing costs may not be the main cause of their financial stress, but that housing costs are fairly easily identified as contributing to financial stress (and thus can be targeted).

C. Those on low or very low incomes who may not currently be in financial housing stress, but who cannot afford to change their type of housing to something more suited to their stage in life. This group includes adults living rent-free, with their parents or other relatives, who cannot afford to enter the private rental market on their own or with a group of their choice. Individuals or families in this group are very hard to identify and this working paper is concerned primarily with the measurement of people in financial housing stress of types A and B.

Individuals or families are *not* considered to be in financial housing stress if they have a medium to high income, and so can afford adequate housing, but choose to spend so much on housing that their after-housing income is below the specified very low income limit.

The above suggests that in order to determine those in financial housing stress we need to determine two cut-off incomes:

- a 'very low' income cut-off, to determine those in basic financial stress who require more than housing assistance; and
- a 'low' income cut-off, to differentiate between those whose housing costs put them in financial stress, and those who choose to 'overspend' on housing.

This working paper critically examines measures used previously to assess the incidence of financial housing stress and proposes enhancements to such measures.

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[1]The concepts which specify adequate housing also need to be defined. Operational definitions for all but 'reasonable repair' were presented in the 1994 Institute publication *Public Housing in Australia*.

2. The National Housing Strategy 'affordability' measure

The measure

The measure used in the Institute's report *Public housing in Australia* (Foard et al, 1994), and first put forward by the National Housing Strategy (NHS 1991), is as follows:

> income units with income in the bottom 40% of the income distribution that spend more than 25% of their income on housing costs are said to have housing affordability problems.

The measure is for income units, and excludes single-income units living with their parents in its calculation.

In this approach there is no *very low* income cut-off below which any housing costs could be considered to be causing hardship. The *low* income cut-off is the fortieth percentile of the income distribution of income units (with some exclusions).

The properties of the measure

Affordability as defined above treats all income units the same regardless of size or location, and this causes several problems, both through having a fixed low income cut-off and allowing a fixed percentage of income to be spent on housing:

a. The 40% cut-off is the same regardless of the number of persons in the income unit. This is problematic since households of different household size and composition require different levels of income to obtain the same standard of living, and this measure does not allow for the higher costs of large units. The different costs of living for different types of households are illustrated in the standard Henderson poverty lines (see table 1). These poverty lines estimate the amount of post-tax income required by a range of income unit types to obtain an equivalent (low) standard of living, and in December 1990 ranged from about $150 for a single non-working person (before housing) to $450 for a couple with working head and four children. At that time 40% of income units, excluding single-income units living with their parents, had incomes below $336 (AIHW 1993). Accordingly, units considered to be at risk of having affordability problems under this measure would have a wide range of living standards, with some units below the NHS affordability low income cut-off having a standard of living considerably higher than that indicated by the poverty line, while others would have a much lower standard of living.

b. The 40% cut-off is the same regardless of the area in which the unit is living. Thus no account is taken of housing costs which vary with area; for example the high rents of Sydney compared to the low rents of Adelaide are not taken into account.

Table 1: *Poverty lines, December quarter 1990*

Income unit type	Before-housing poverty line $	After-housing poverty line $	% allowed for housing costs at the poverty line	Before-housing poverty line $	After-housing poverty line $	% allowed for housing costs at poverty line	*Average % allowed for housing costs, head in and not in work force*
	Head in work force			Head not in work force			

Couple	246.8	180.5	27	211.9	145.6	31	*29*
Couple+1	296.6	224.3	24	261.7	189.4	28	*26*
Couple+2	346.5	268.2	23	311.6	233.3	25	*24*
Couple+3	396.3	312.1	21	361.4	277.2	23	*22*
Couple+4	446.2	355.4	20	411.3	320.6	22	*21*
Single	184.5	124.1	33	149.6	89.2	40	*37*
Single +1	236.8	170.5	28	201.9	135.6	33	*30*
Single +2	286.6	214.4	25	251.7	179.5	29	*27*
Single +3	336.5	258.2	23	301.6	223.3	26	*25*
Single +4	386.3	302.1	22	351.5	267.2	24	*23*

Note: In 1990 40% of income units, excluding single-income units living with their parents, had incomes below $336 (AIHW 1993).

Source: Institute of Applied Economic and Social Research, *Poverty Lines: Australia, December Quarter 1990*

c. The 25% cut-off is the same regardless of income. As a result an income unit on a very low income would not be considered to have an affordability problem unless it was spending more than 25% of its income on housing, even though it may be in extreme financial need, for example with income below the after-housing poverty. Table 2 shows, for a range of income unit types, the income below which 'affordable' housing costs of 25% of income would place the income unit in after-housing poverty. Several different percentages on which the affordability measure could be based are given for purposes of comparison.

   As an example, using a 25% rule and ignoring the complicating factor of tax, table 2 shows that a couple with one partner working on a weekly income of $240.00 (in December 1990) with housing costs of 24.9% of their income would not be considered to have an 'affordability' problem but would be in after-housing poverty, having an after-housing income of $180.24 (see table 1). All income units of this type with income below $240 would be in a similar situation, except that as the income decreased the percentage of income that could be spent without putting the unit in after-housing poverty would also decrease, until for units on less than $180 per week any expenditure on housing, let alone 25%, would add to the already extreme financial stress of the unit. If a 30% rule were to be used such couples on $257 or less would be in an equivalent situation. Thus, as incomes get lower a greater percentage of income units would be in considerable financial stress without being said to have 'housing affordability' problems.

d. The 25% cut-off is the same regardless of the size of the income unit. As discussed above, non-housing living costs increase with the size of the unit. This relationship is observed by comparing the after-housing poverty lines across household size (see table 1), and suggests that, for a *given* income, allowable housing costs as a percentage of income should decrease as the size of the income unit increases. An affordability rule could be developed in which the percentage allowed for housing is based on household size.

   The after-housing poverty lines in table 1 suggest that, in 1990, for each additional person in the unit an extra $45 to $55 was needed to maintain the unit's (non-housing) standard of living. This is around 15% of the cut-off income of $336, and is very large compared to the $84 of housing costs allowed for those on $336 per week. The before-housing poverty lines suggest that spending 25% of an income of about $336 on housing for up to four person income units is reasonable, with adjustments required only for larger

households. The need to spend about $50 per extra person (or 15% of $336) on non-housing costs suggests that a variable affordability rule could allow 25% to be spent on housing costs for income units of four or fewer people, 10% to be spent by five person households and nothing for six or more person households on incomes below the low income cut-off. This approach is illustrated in table 2, and even under this scheme there are households that would not be considered to have affordability problems, either because of high income or low housing costs, but who would have a very low standard of living, and be in 'after-housing poverty'.

Table 2: *Income below which units would be in after-housing poverty after spending the amount on housing allowed under the affordability rule, December quarter 1990*

	$							
	Affordability rule: maximum housing costs, as percentage of income							
Income unit type	20%	25%	30%	Variable	20%	25%	30%	Variable
	Head in work force				Head not in work force			
Couple	225.6	240.7	257.9	240.7	182.0	194.1	208.0	194.1
Couple+1	280.4	299.1	320.4	299.1	236.8	252.5	270.6	252.5
Couple+2	*335.3*	*357.6*	*383.1*	*357.6*	291.6	311.1	333.3	311.1
Couple+3	*390.1*	*416.1*	*445.9*	*346.8*	*346.5*	*369.6*	*396.0*	*3308.0*
Couple+4	*444.3*	*473.9*	*507.7*	*355.4*	*400.8*	*427.5*	*458.0*	*320.6*
Single	155.1	165.5	177.3	165.5	111.5	118.9	127.4	118.9
Single +1	213.1	227.3	243.6	227.3	169.5	180.8	193.7	180.8
Single +2	268.0	285.9	306.3	285.9	224.4	239.3	256.4	239.3
Single +3	*322.8*	*344.3*	*368.9*	*344.3*	279.1	297.7	319.0	297.7
Single +4	*377.6*	*402.8*	*431.6*	*335.7*	*334.0*	*356.3*	*381.7*	*296.9*

Notes

1. The 'variable' rule allows income units of up to 4 people to spend 25% of income on housing, 5 person units to spend 10% on housing and larger households to spend nothing on housing.

2. In 1990 40% of income units, excluding single-income units living with their parents, had incomes below $336 (AIHW 1993). Cells in italics show income units whose before-housing poverty line is above $336, and so would not be considered to have an affordability problem.

Source: table 1.

Having a rule which specifies that all large units with income below the low income cut-off are in financial housing stress if they spend any money on housing suggests that this cut-off is too low. Therefore either the cut-off should be increased, and the allowed housing costs adjusted accordingly, or different low income cut-offs should be used for units of different sizes. The former proposal still has the shortcomings of a fixed cut-off discussed in point a) above, while the latter does not overcome the problem of allowing a fixed percentage to be spent on housing irrespective of income (point c).

In addition to the problems caused by the fixed 25%:40% rules, the NHS measure has one other drawback—the use of income units as the measurement unit. Since incomes are often not pooled in a household, using income units rather than households is in some ways the better unit of analysis. However, it is hard to combine an income unit based measure with household based measures in order to look at multiple types of housing need—for example, affordability problems in conjunction with overcrowding. Also, income unit based measures may be more

difficult to use operationally than household based measures, such as when applying eligibility criteria, so that a measure that uses households is to be preferred in many circumstances.

The above discussion shows that there are several major flaws in affordability measures based on simple income and housing costs limits.

3. The Canadian measure

The measure

Canada has a straight-forward affordability measure: a household is said to have affordability problems if it spends more than 30% of its income on housing costs (including utilities) (see Canada Mortgage and Housing Corporation [CMHC] 1991:4 for detailed definitions of housing costs for renters and owners). However, not all households with an affordability problem, as defined above, may be in financial housing stress since some households may *choose* to spend more than 30% of their income on housing. Therefore, the idea of a 'norm rent income' was introduced to overcome the element of choice of expenditure for higher income households. The 'norm rent income' value is used as the low income cut-off to determine which households with affordability problems are in housing need. Under the Canadian definition no very low income cut-off is used. A household is then said to be in housing need due to housing affordability problems if

> the household spends more than 30% of its income on housing *and* its income falls below the norm rent income required to rent an average dwelling suitable (in terms of number of bedrooms) and adequate for that household's purposes.

The *'norm rent income'* is 'the minimum a household requires to rent suitable, adequate housing without spending 30 per cent or more of its income' (CMHC 1991:7). The *'norm rent'* is calculated

- by size of dwelling, so that the appropriateness of the dwelling for the household can be taken into account;
- by location, to account for regional differences in housing costs (see for details van Dyk 1993: 6–7);
- the 'norm rent' is the average rent of non-subsidised, non-farm housing units in adequate condition (that is, possessing all basic plumbing facilities, and needing only regular maintenance' [CMHC 1991:7])—calculated by dwelling unit size by location.

The *norm rent income* is therefore {norm rent/.3}.

The properties of the measure

a. The Canadian measure allows for different household compositions by incorporating 'suitability' into its definitions.

b. It allows for regional differences. The level at which regional differences are taken into account varies with the data source. The measure is used to allocate resources, and Census data are needed for allocation within provinces, while Labour Force Survey based data are used for inter-provincial allocations.

c. The measure reduces to a simple two-level test, testing income and then housing costs, and allows to some degree for household composition and location.

d. Households with housing affordability problems but with higher incomes are considered to be in *'voluntary housing need'*.

e. The rule is applied to both renters and buyers.

f. There is no very low income cut-off, and the housing costs 30% cut-off is the same regardless of income. The problems of this approach have already been detailed in section 2.

g. The measure does not allow for costs varying with age structures in the household apart from those associated with bedroom needs. Poverty line analysis shows that costs vary with the age of people (see section 5).

h. Being applied to households, the measure assumes pooling of resources in households, which is known not to hold.

i. The rule does not take into account the availability of suitable, adequate and/or affordable housing; ie the household may have the required income but there may not be appropriate housing available to rent or buy.

j. The rule could be made more robust by using median rather than average rents.

From the above it can be seen that the Canadian measure addresses some, but not all, of the problems noted for the NHS measure. In particular, its low income cut-off varies with household size and location. Its main drawback is that the same percentage of income is allowed for housing costs regardless of the income of the household.

4. The poverty lines

The poverty lines for different income unit types could be used to provide a measure of financial housing stress. Under this approach the *before-housing* poverty lines would be used as the low income cut-off, while the *after-housing* poverty lines would be used as the very low income cut-off. Using these two cut-offs we could then estimate two groups of income units in financial housing stress:

> those income units in basic financial stress, with after-tax income below the appropriate after-housing poverty line (type A); and
>
> those income units on low incomes (between the before- and after- housing poverty lines) whose housing costs are such that their after-housing income is below the relevant after-housing poverty line (type B).

The properties of the measure

a. As with the NHS measure of affordability, poverty lines would necessarily use income units rather than households as the unit of analysis. Analysis by income unit better reflects income use patterns but problems arise when only household data are available, or the measure needs to be integrated with household based data.

b. The detailed composition of income units is taken into account when determining the cut-offs, and therefore who is and is not experiencing financial housing stress.

c. The varying housing costs associated with different locations is not taken into account.

d. The poverty lines are based on after-tax income which would have to be estimated from gross income in most data collections. This is a minor problem.

e. The poverty lines are determined by 36 parameters, and require knowledge of the age, sex, employment status, and relationship to head of household of all members of the income unit before they can be applied.

f. The low income cut-off is based on the before-housing poverty lines, so that units with incomes above this low level are not considered to experience financial housing stress. This cut-off may be too low.

g. The poverty lines are based on analysis carried out in 1973, which in turn used results from a 1956 New York study. Even since the 1970s there have considerable social changes which may have affected the relative costs for households of different compositions. For example, rates of youth unemployment, female participation in the work force and part-time employment have all risen since the early seventies. Thus the poverty lines may not provide the appropriate cut-offs for Australian society in the 1990s.

h. In the poverty line analysis a 'worker' is someone engaged in or looking for full-time work. There is no separate allowance for the unemployed (full-time or part-time) or those employed part-time.

The poverty line approach overcomes the problem of varying costs associated with changing household size and composition. However, it is a complex measure to apply, it does not allow housing costs to vary with location and its relevance to Australian conditions has not been confirmed.

5. Another possible measure—an estimated poverty line

The poverty lines are calculated by allocating points to an income unit according to the number of people in that unit in each of 36 distinct categories. The categories are based on age, sex, work status and relationship to the unit head, with the points reflecting the relative living costs of each type of person. On examining the poverty lines in the Henderson report (Commission of Inquiry into Poverty 1975: 354) it was noted that:

- the standard costs of workers varied between 17.15 and 20.80 points;
- the standard costs of non-workers varied between 8.10 and 14.80 points ('wives' varied between 8.10 and 10.00 and 'other adults' between 10.85 and 14.80);
- the standard costs of children varied between 5.08 and 13.00 points, depending mainly on age;
- housing costs increased linearly with the number of people in the income unit.

Looking at the spread of standard points for the various types of people, a simplified poverty line could reasonably be based on the number of people in the income unit in each of just six categories, instead of the full 36. Points for each of these types of people could be based on the average number of points in the full model, averaging over age and sex as required. (This does not take into account the

frequency of the different age and sex combinations found in income units.) The model resulting from this process is:

standard costs

number of workers	19.7 points
non-working spouse	9.3 points
number of other non-workers —(not a spouse or dependent child)	12.6 points
number of dependent children under 6	5.1 points
number of dependent children 6 to 14	8.4 points
number of dependent children 15 and over	12.0 points

per person costs

housing costs	11.3 points plus 1.1 points per person
all per person costs (including housing)	15.6 points plus 2.3 points per person

Poverty lines can then be calculated simply as a linear combination of the numbers of six types of people in the income unit. In order to allow analysis by household the estimated poverty lines could be applied to the household composition. It is not known how appropriate the resulting poverty lines would be, but it is felt that they would provide a reasonable approximation.

The poverty line for a particular household type is then:

{Standard family before-housing poverty line income/standard family before housing poverty line points} x

19.7 x number of workers
+ 9.3 x non-working spouse
+ 12.6 x number of other non-workers
+ 5.1 x number of dependent children under 6
+ 8.4 x number of dependent children 6 to 14
+ 12.0 x number of dependent children 15 and over
+ 15.6
+ 2.3 x number of people in the household
(- 11.3 - 1.01 x number of people in the household if excluding housing costs)

By dividing the above parameters through by the points for a 'standard family' and expressing the before-housing poverty line for this 'standard family' as % AWE (full-time, ordinary time, adult), the poverty lines can be expressed as % AWE, and would therefore be automatically updated according to AWE. (This assumes there is a stable relationship between the before-housing poverty line and AWE. This matter requires further investigation).

Using the 2 adult (one worker) with a boy aged 6–14 and a girl aged 5 or less as the standard family, the standard points are then 67.1 (compared to 68.26 under the full model in the Henderson report [Commission of Inquiry into Poverty 1975: 355]). In December 1990 the before-housing poverty line for this household was $346.50 per week. This was 62.4% of AWE at that time, and multiplying the above parameters by 62.4/67.1 the model becomes:

Poverty line for a household as % AWE =

18.3 x number of workers
+ 8.6 x non-working spouse
+ 11.9 x number of other non-workers
+ 4.7 x number of dependent children under 6
+ 7.8 x number of dependent children 6 to 14
+ 11.2 x number of dependent children 15 and over
+ 14.5
+ 2.1 x number of people in the household
(- 10.6 - 1.0 x number of people in the household if excluding housing costs)

Note that no allowance has been made in the above for the fact that poverty lines are based on after-tax income. Allowance can be made for this by estimating a household's after tax income before expressing it as % AWE and then comparing it with the poverty line.

In table 3 the actual before-housing poverty lines are compared with those estimated using the above model for December 1990. It can be seen that the differences are in general small, with no difference being more than 2 percentage points. In relative terms, the model works worst for singles where the estimated poverty line is about 5% too high. The worst case of underestimating the poverty line occurs for the non-working single parent with one child, where the model underestimates the poverty line by 3%.

The above model could be used in the same way as the full poverty lines to determine those who are in financial housing stress. It could also be adjusted for area differences by adding an area allowance, in terms of % AWE. The regional adjustment factors would have to be derived from an external source, say the census; for example they could be the difference between the national and statistical division median rents, expressed as % AWE. Area allowances under this approach may be positive or negative. Regional poverty lines would then be:

Regional poverty line for a household as % AWE =

18.3 x number of workers
+ 8.6 x non-working spouse
+ 11.9 x number of other non-workers
+ 4.7 x number of dependent children under 6
+ 7.8 x number of dependent children 6 to 14
+ 11.2 x number of dependent children 15 and over
+ 14.5
+ 2.1 x number of people in the household
+ regional allowance as % AWE
(- 10.6 - 1.0 x number of people in the household - regional allowance if excluding housing costs)

The properties of the measure

a. The measure adjusts fairly simply for various household compositions and regional housing cost differences, allowing for different costs according to broad household type and area.

b. The measure allows for easy updating, with AWE (adult, full-time, ordinary time) being the implied deflator. The appropriateness of this needs to be checked.

c. The measure does not allow for costs varying with the complete age and sex structure of the household.

d. The measure assumes pooling of resources in households, which is known not to hold.

e. One method of deriving the regional allowances has been suggested. This may not be optimal, being based solely on rents. Also it could only be updated every 5 years unless another source could be found.

f. As with the full poverty line approach, the measure is based on arbitrary very low and low income cut-offs, that is, the before- and after- housing poverty lines, and it is not known whether these cut-offs are the right ones. It may be better to say that a particular household type (say 4 person with one worker) on AWE should not spend more than 25% on housing costs and go from there, with household type and regional allowances, using the above as a guideline.

g. As with the other measures considered, this measure assumes that we know housing costs. In many instances this will not be the case, and we will only know rent or mortgage payments. Adjustments need to be made to allow for this.

h. In many collections, primarily those conducted by the ABS, age is recorded in 5 year age groups. Therefore, it may be preferable to use age categories for dependent children of '0 to 4', '5 to 14' and '15 and over', with the corresponding points being 5.1, 8.4 and 12.0 as before. This approach will lead to a slight inflation of the poverty line for households with children aged 5, but the overall effect should be marginal.

Table 3: *Before-housing poverty lines as % AWE, actual and estimated, December 1990*

	Actual before-housing poverty line		Estimated before-housing poverty line	Actual compared to estimated poverty lines	
	$	As % AWE	As % AWE	Difference	Difference as % actual
Household type					
Head in work force					
Couple	246.8	44.5	45.6	-1.1	-2.5
Couple+1	296.6	53.4	52.4	1.0	1.9
Couple+2	346.5	62.4	62.3	0.1	0.2
Couple+3	396.3	71.4	72.2	-0.8	-1.1
Couple+4	446.2	80.4	79	1.4	1.7
Single	184.5	33.2	34.9	-1.7	-5.0
Single +1	236.8	42.7	41.7	1.0	2.3
Single +2	286.6	51.6	51.6	0.0	0.1
Single +3	336.5	60.6	61.5	-0.9	-1.4
Single +4	386.3	69.6	68.3	1.3	1.9
Head not in work force					
Couple	211.9	38.2	39.2	-1.0	-2.7
Couple+1	261.7	47.2	46	1.2	2.4
Couple+2	311.6	56.1	55.9	0.2	0.4
Couple+3	361.4	65.1	65.8	-0.7	-1.0
Couple+4	411.3	74.1	72.6	1.5	2.0

Single	149.6	27.0	28.5	-1.5	-5.7
Single +1	201.9	36.4	35.3	1.1	3.0
Single +2	251.7	45.4	45.2	0.2	0.3
Single +3	301.6	54.3	55.1	-0.8	-1.4
Single +4	351.5	63.3	61.9	1.4	2.3

Note: When estimating the poverty lines it was assumed that at most one adult was working, and certain assumptions had to be made about the age of the children.

Overall, this measure has very similar properties to the full poverty lines approach, but is simpler to apply and allows for regional differences in housing costs.

6. Combined estimated poverty line and Canadian method

A measure of household level financial housing stress can be obtained by combining some aspects of the Canadian approach with the estimated poverty line approach as follows:

- use the estimated after-housing poverty lines as the very low income cut-off;
- use the Canadian method to derive the low cut-off household income, or norm rent income, by dwelling size by location. However, it would seem more appropriate to allow 25%, rather than 30%, for housing costs when calculating this value in the Australian situation since utilities would not generally be included;
- use a sliding scale of allowable housing costs, going from 0% for households with income at or below the estimated after-housing poverty line to 25% for those with income equal to the norm rent income.

A household is then considered to be in financial housing stress if:

> household income is below the norm rent income required for households renting same sized dwellings in that location, *and* housing costs are more than the amount allowed, as determined by the very low income cut-off and the sliding scale of allowable housing costs.

The properties of the measure

a. This measure allows, to some extent, for the varying costs of different types of households in different areas, both through varying the norm rent income with the size of house and area, and through varying lower cut-offs according to household composition.

b. It overcomes the problems encountered for very low income households when using a fixed percentage of income for the housing costs cut-off, regardless of income, to define financial housing stress. The cost of overcoming these two problems is increased complexity, especially when comparing the measure to the NHS affordability benchmark approach.

c. For households on income between the very low income cut-off and the norm rent income there is a quadratic relationship between income and the amount that can be spent on housing. This is a result of expressing the limiting housing costs as a percentage of income.

d. It is household based, and so can be easily combined with other household based measures. (Conversely, it assumes income sharing among income units in the household.)

e. It can be specified algebraically, requiring the 8 estimated after-housing poverty parameters, and the norm rent incomes (by area and house size).
f. Expressing allowed housing costs as a percentage of income allows for easy updating when a household's income changes.

The problem of choosing a fairly arbitrary very low income cut-off associated with using the estimated poverty line still remains. The after-housing poverty line was chosen as it allows for household composition, being the sum of standard person costs and non-housing per person costs.

Alternatives

The above is just one way to use the estimated poverty lines and the norm rent income. In this approach housing costs are expressed as a percentage of income—is this a sensible approach? This method is used because of its ease of application, but other assumptions concerning allowable housing costs could just as easily be made. For example:

Maximum allowable housing costs increase linearly with income

In this approach the maximum allowable housing costs increase linearly with income (rather than increasing linearly as a percentage of income) from $0.00 to 25% of the norm rent income, as income increases from being equal to the after-housing poverty line to the norm rent income.

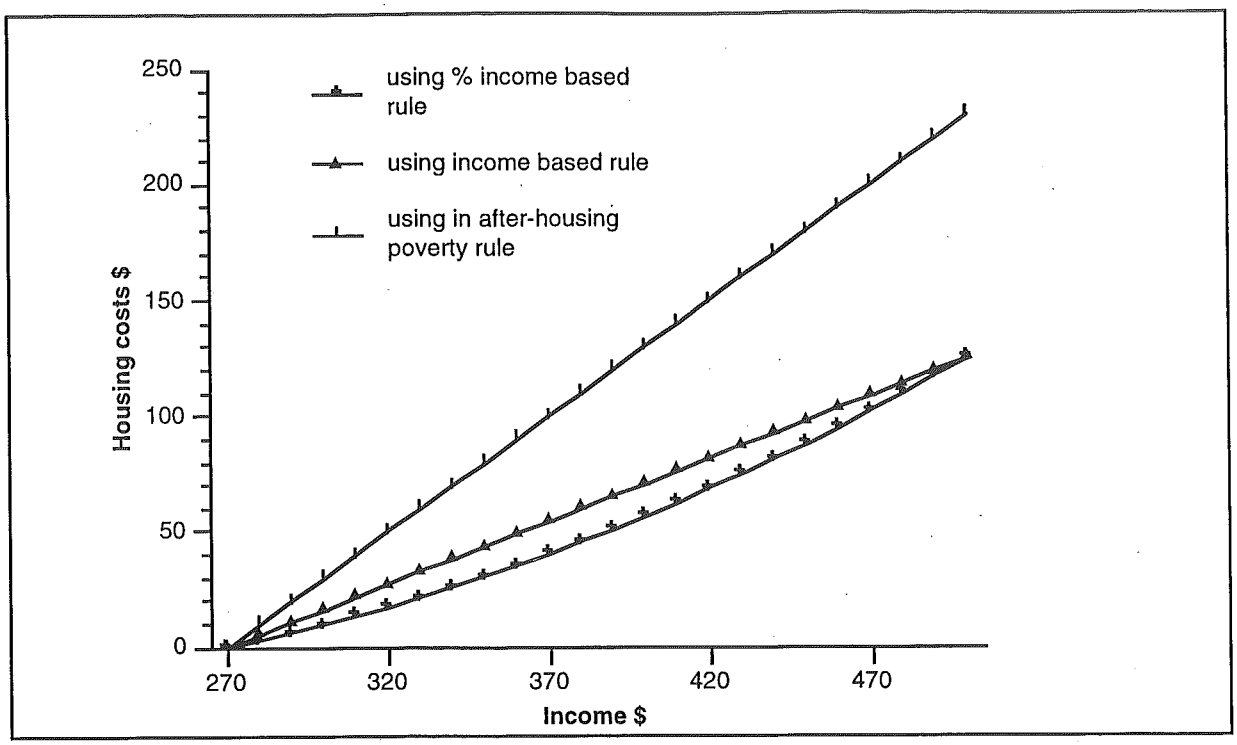
Housing costs must not put the household into after-housing poverty

This approach is very similar to the full poverty line approach in section 3, except that the low cut-off is the norm rent income rather than the before-housing poverty line. Thus under this approach a household is in financial housing stress if its income is below the norm rent income, and its housing costs place the household in after-housing poverty. This assumes that it is acceptable to put all income above the after-housing poverty line into housing.

Figures 1 and 2 show maximum allowable housing costs in dollar amounts and as a percentage of income for the three approaches in this section, assuming a norm rent income of $500, and an after-housing poverty line of $270 (for example for a couple, one working, with two children). From these it can be seen that basing the rule on a percentage of income results in the lowest housing cost limits of the three methods, although there is little difference in dollar terms in the allowed housing costs resulting from the (quadratic) percentage based method and the (linear) income based method (in this example there is a maximum difference of about $15 at an income of $380—see table 4). Using the after-housing poverty line based rule, housing cost limits rise rapidly and are substantially higher than those specified by the other two rules—allowable costs are more than double those allowed under the percentage income based rule for all incomes below $460 and 84% higher (or $105) for households on the norm rent income (figure 1). From figure 2 it can be seen that the rule using the after-housing poverty criterion results in households paying very high percentages of their income on housing—over 45% for households on the norm rent income. It is therefore felt that the assumption that all income in excess of the after-housing poverty line can be spent on housing is unreasonable.

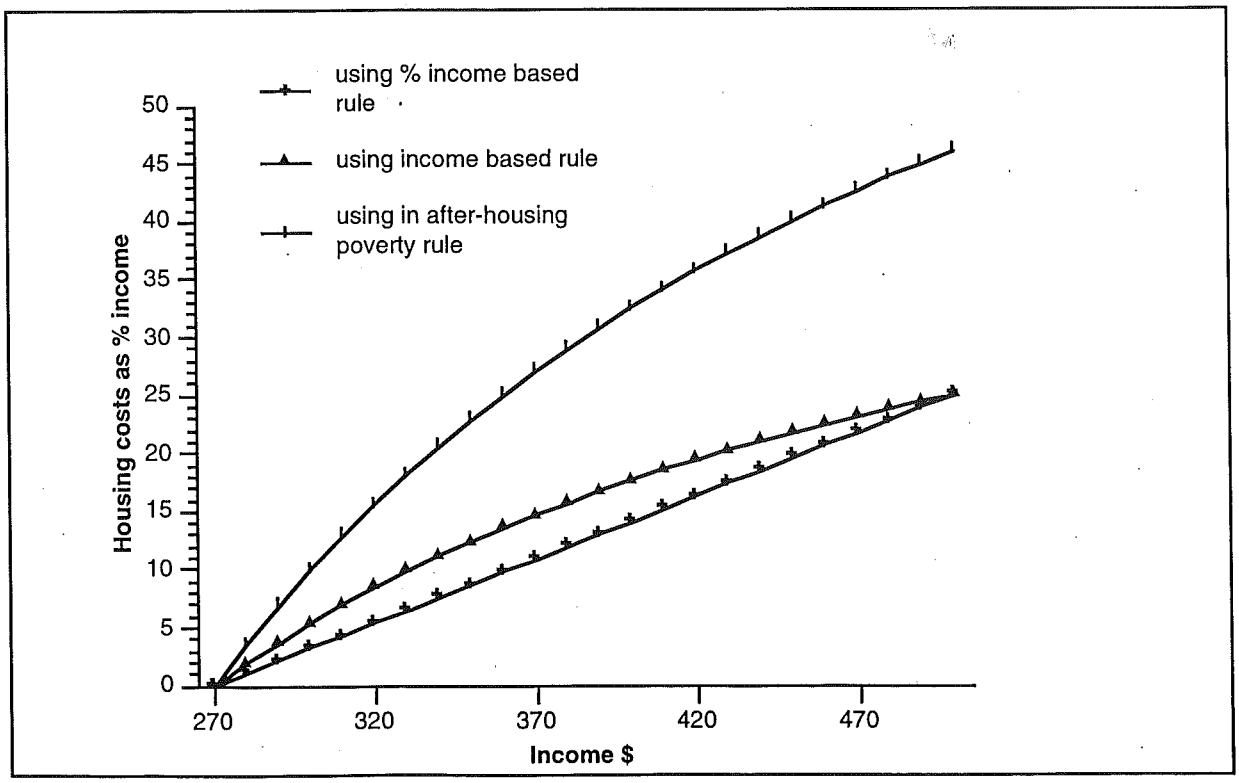
The algebraic descriptions of the three rules in this section, along with that of the NHS affordability rule, are given in the appendix.

Figure 1: *Housing costs ($), above which a household is said to be in financial housing stress, as a function of income, using three rules*



Source: table 4

Figure 2: *Housing costs as a percentage of income, using three rules, above which a household is said to be in financial housing stress*



Source: table 4

Table 4 : *Housing costs in dollars and as a percentage of income, using three rules*

Household income $	Housing costs $			Housing costs % income		
	Using % income based rule	Using income based rule	Using in after-housing poverty rule	Using % income based rule	Using income based rule	Using in after-housing poverty rule
270	0	0	0	0	0	0
280	3	5	10	1	2	4
290	6	11	20	2	4	7
300	10	16	30	3	5	10
310	13	22	40	4	7	13
320	17	27	50	5	8	16
330	22	33	60	7	10	18
340	26	38	70	8	11	21
350	30	43	80	9	12	23
360	35	49	90	10	14	25
370	40	54	100	11	15	27
380	45	60	110	12	16	29
390	51	65	120	13	17	31
400	57	71	130	14	18	33
410	62	76	140	15	19	34
420	68	82	150	16	19	36
430	75	87	160	17	20	37
440	81	92	170	18	21	39
450	88	98	180	20	22	40
460	95	103	190	21	22	41
470	102	109	200	22	23	43
480	110	114	210	23	24	44
490	117	120	220	24	24	45
500	125	125	230	25	25	46

Notes:

1. The example is based on an after-housing poverty line (after tax) of $270. For example, poverty lines for a couple, one working, with two children is about $270 per week (see table 1).

2. Norm rent income was set at $500 per week after tax.

7. Comparing the three types of measures

Three main approaches have been discussed:

- The NHS-type affordability measure, which allows all income units with income below a low income threshold to spend up to a fixed percentage of income on housing costs. In the simplest measures of this type the low income threshold and the allowed percentage are the same for all income units, irrespective of size and location. The Canadian measure is a refinement of this approach which allows household composition and location to influence the low income threshold.
- The poverty line approach, which dictates that, for low income units, housing costs should not place the unit in after-housing poverty. Low income units are defined as those with income below the before-housing poverty line, and units

with income above this level are not considered to have affordability problems. Using poverty lines may be somewhat arbitrary, but they allow detailed household composition to be taken into account.

- A combined approach, which says that for very low income households any expenditure on housing costs increases their financial stress, while for low income units housing costs should not result in a household having after-housing income below some very low income threshold. As well, housing costs can be an increasing percentage of income for units on very low to low incomes. The after-housing poverty line and norm rent income have been used as the very low and low income cut-offs in the example given in section 6.

The maximum allowed housing costs resulting from specific examples of the three methods are illustrated in figure 3. The example is based on the December 1990 (estimated) poverty lines for the standard household of one worker, one at-home spouse, one 3 year old child and one 8 year old child. A simple 25%:40% affordability rule was used for the NHS-type measure. The (before tax) 40% cut-off for the NHS measure was $336 in 1990 and the norm rent income was set arbitrarily at $500 (that is, assuming a median rent of $125 per week for the household type in question). The poverty lines have been adjusted for tax (using the 1993–94 tax regime). The before- and after-housing poverty lines for the particular household type, the 40% NHS income cut-off and the norm rent income, all before tax, have been marked on figure 3 to provide points of reference. In this example income unit and household are identical.

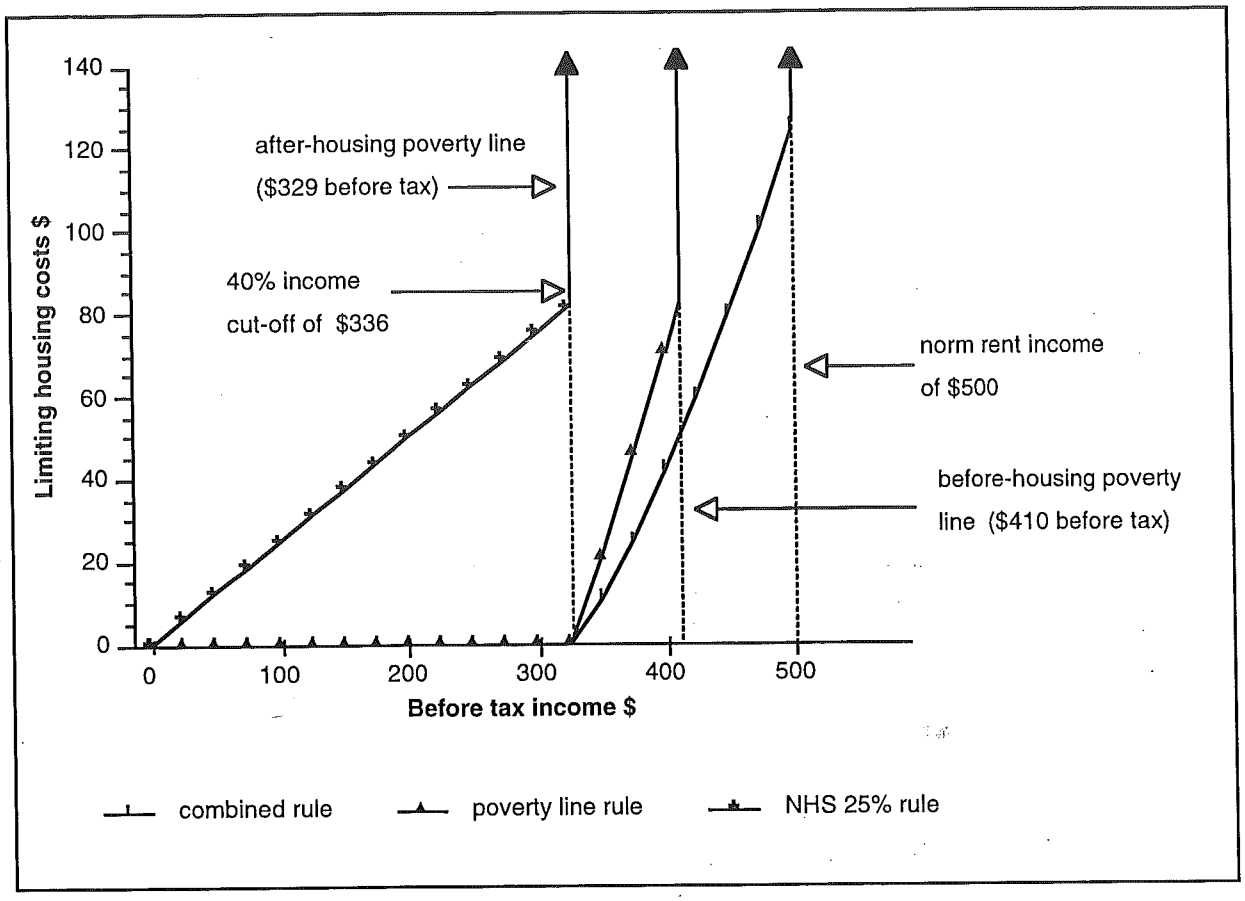
It can be seen that, for this household type, the NHS measure is only concerned with households that are already below the after-housing poverty line, and that maximum allowable housing costs increase steadily with income. Under both the poverty line and combined approaches it is assumed that for such very low income households of this composition any housing costs are an additional burden, increasing the financial stress of the household and therefore placing the household in financial housing stress.

Using the poverty line based rule, households with income above the before-housing poverty line are not considered to be in danger of experiencing financial housing stress, while those between the after- and before-housing poverty lines are allowed to spend all income in excess of the after-housing poverty line on housing before they are considered to be in financial housing stress. Therefore under this approach housing cost limits rise rapidly from zero for households with income equal to the after-housing poverty line to over $80 for those with income on the before-housing poverty line.

The combined poverty line and affordability example here assumes that all households with income below that which is needed to rent a medium-priced appropriate dwelling are at risk of being in financial housing stress. These households are expected to spend a proportion of their income on housing, with that proportion starting at zero for those on or below the after-housing poverty line and then steadily increasing to 25% (or $125) of income for households with income equivalent to the norm rent income. Because households are not expected to spend all income in excess of the after-housing poverty line on housing before they are considered to be in financial housing stress, this approach has lower housing cost limits than the pure poverty line approach for households with income above the after-housing poverty line. This is reflected in figure 3 in the more gradual rise in allowable housing costs, with limiting costs being about 60% (or $50) of those for the full poverty line method for households with income on the before-housing poverty line.

In this example, the NHS affordability measure would give the smallest estimate of the number of households in financial housing stress, due to its very low cut-off income and fixing the limiting housing costs at 25% of income for all low income households. The poverty line approach would result in a higher estimate of the number in financial housing stress, while the combined method, with its sliding scale of limiting housing costs and higher cut-off income is the most generous, and would result in the highest estimate.

Figure 3: *Comparing three approaches: maximum allowable housing costs as a function of income*



8. Conclusion—remaining problems and queries

This working paper has reviewed a number of methods to assess the incidence of financial housing stress. However, a number of questions remain.

a. All of the methods outlined in this paper have problems to some degree. Which, if any, of these approaches is the most appropriate?

b. Why use 25% based rules? Could we determine theoretically or empirically what is a reasonable percentage of income to spend on housing, so that justifiable affordability rules or norm rent incomes can be specified? One way would be to look at households that spend the equivalent of a median rent on housing and see what proportion of their income it is, or we could compare median rents to the median income of renters.

c. The ease with which a measure can be updated should be taken into account. For example, should the measures be expressed in terms of AWE, a measure which is currently used by several State housing authorities when setting their

eligibility criteria? If a measure using the poverty line is to be used, there would need to be a stable relationship between AWE and disposable income before AWE could be used as the updating mechanism.

d. How simple does the measure have to be? Should it be simple enough to be easily understood and therefore to be used fairly widely? Should the method chosen be able to be incorporated into State housing authorities' eligibility rules?

e. Which unit of analysis is the most appropriate? Should we go for household because of ease of use with other measures, and ease of use by administrators, or should we go for income units as being analytically more appropriate? What is the effect of changing the poverty lines from an income unit basis to a household basis? Is this valid? These issues need further examination.

f. All the measures assume that we know housing costs. In many instances this will not be the case, and we will only know rent or mortgage payments. Adjustments need to be made to allow for this.

g. Poverty line based measures/parameters will have to be adjusted to allow for tax. The best way of approaching this is to estimate tax at the individual level before applying the poverty lines.

h. Should the age groupings for children in the estimated poverty lines be formed around the ABS 5 year age groups or kept to the original poverty line specifications?

i. None of the measures take into account that non-housing costs may also change with location. Should, and can, we allow for this?

j. How can we account for availability of adequate housing?

9. Appendix

The algebraic description of several of the possible measures of financial housing stress is given below.

Combined estimated poverty line and Canadian method

In this approach, once income is above the after-housing poverty line, the maximum allowable housing costs increase linearly with a percentage of income.

Algebraically we have

N_{pi} = norm rent income for household needing house of size p in area i

Z_j = estimated after-housing poverty line for household type j

X_{ij} = estimated before-housing poverty line for household type j in region i

Y_{ij} = allowed housing costs for units on the before-housing poverty line for household type j in region i

then

$Z_j = X_{ij} - Y_{ij}$ (this is independent of the region i)

and a household k, of type j needing a house size p in area i, with income x_{ijk} and housing costs y_{ijk} is in financial housing stress if:

$x_{ijk} \leq N_{pi}$

and

$y_{ijk} \geq 0$ if $x_{ijk} \leq Z_j$

or

$(y_{ijk}/x_{ijk})*100 \geq 25* (x_{ijk} - Z_j)/(N_{pi} - Z_j)\%$ if $x_{ijk} > Z_j$

that is, if income is at or below the norm rent income, and

per cent of income spent on housing ≥ 25{income in excess of the after-housing poverty line/income in excess of the after-housing poverty line for households with income equal to the norm rent income }

Maximum allowable housing costs increase linearly with income

In this approach the maximum allowable housing costs increase linearly with income (rather than increasing linearly as a percentage of income) from \$0.00 to $\$0.25*N_{pi}$, as income increases from the after-housing poverty line income, Z_j, to the norm rent income, N_{pi}, giving:

a household is in financial stress if

$x_{ijk} \leq N_{pi}$

and

$y_{ijk} \geq 0$ if $x_{ijk} \leq Z_j$

or

$y_{ijk} \geq (0.25*N_{pi})* (x_{ijk} - Z_j)/(N_{pi} - Z_j)$ if $x_{ijk} > Z_j$

Housing costs must not put the household into after-housing poverty

This approach is very similar to the full poverty line approach in section 3, except that the low cut-off is the norm rent income rather than the before-housing poverty line. Thus a household is in financial housing stress if

$$x_{ijk} \leq N_{pi}$$

and

$$y_{ijk} \geq (x_{ijk} - Z_j)$$

This assumes that it is acceptable to put all income above the after-housing poverty line into housing.

The NHS affordability measure

Letting S be the fortieth percentile of the income distribution of income units, then under the NHS 25% affordability rule a unit is in housing stress if

$$x_{ijk} \leq S$$

and

$$y_{ijk} \geq 0.25 * x_{ijk}$$

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