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### **Explaining the Inexplicable: Measuring Housing Affordability in Melbourne, Australia**

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#### **Abstract**

Housing affordability is a major problem for Australia and New Zealand. One of the key issues is how best to measure it. The prevailing measure of housing affordability or stress in Australia and most other countries is some variation of a benchmark method whereby some percentage of housing costs is compared to household or personal income. In Australia it is normally taken as 30% of the 40th income quintile (the 30/40 rule). This paper reports on the application of the residual income or budget standard method as an alternative way of understanding a range of problems relating to housing affordability.

The method determines the amount of income left over for housing costs (hence the residual title) after a minimum standard of adequacy has been met by way of other expenditures. The paper outlines in preliminary form the method used in modelling the residual income for a range of household type and for both home purchase and private rental and then illustrates the usefulness of the concept via applications to the Melbourne housing market. While there is some fine-tuning of the method, early findings suggest that for some household types, the 30/40 rule overstates their lack of affordability and for others understates it. The findings also help explain how, despite high house prices in Melbourne (median of around A\$500,000), these dwellings are still affordable for many households, and why singles and childless couples are becoming large players in the home purchase market while many families are being trapped in private rental.

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# 1 Introduction

This paper grows out of an AHURI study looking at the implications of using a residual income method for understanding a range of housing problems. It outlines how a residual income model can be constructed for both ownership and rental and then exemplifies its use with reference to two household types and to a range of affordability and housing market issues.

## 1.1 Context

For many years there has been recognition in Australia that the gap between incomes and housing costs can leave households unable to meet their non-shelter needs at even a minimal level of adequacy. This was first articulated explicitly in the 1970s in the Henderson 'after housing poverty' measure and has since been discussed and utilised to some extent in recent studies (e.g. Burke and Ralston 2003; Gabriel et al. 2005; Waite and Henman 2006; Yates and Gabriel 2006, Tanton et al. 2008; Yates and Milligan 2007).

Despite the long-time recognition of the residual income method, the prevailing measure of housing affordability or stress in Australia and most other countries is a variation of a benchmark method whereby some percentage of housing costs is compared to household or personal income. In Australia this has been based upon the 30/40 rule, i.e. 30% of the income of the lowest 40% of income earners, which accepts as appropriate the ratio approach to housing affordability. Rent setting in social housing also uses a benchmark method and while it varies from jurisdiction to jurisdiction is 25% to 30% of income.

In part, such use has stemmed from lack of agreement as to an appropriate normative standard against which to assess residual incomes. In part, this derives from lack of clarity about how a residual income approach might be implemented, especially with regard to rent setting, but it also relates to the greater simplicity and familiarity of the ratio approach and, in the case of housing agencies, probably fears (in the absence of adequate research) as to the financial implications of moves away from existing rent-setting methods.

A number of developments in Australia justify a new and more detailed examination of the implications of the residual income logic for understanding the housing affordability problem and shaping policy and practice. Firstly, the problem has well and truly reached up the income distribution ladder such that it is no longer limited to the lowest incomes tiers or to renters. Second there is now a much greater diversity of household types with very disparate living costs participating in the housing market with little understood about their different capacities to afford housing. Third, the remaking of the social housing sector with a number of different models of provision raise questions about differential rent-setting practices across the sectors, with obvious implications for horizontal equity of affordability. Fourth, the existing benchmark model appears limited to explain what is actually happening in the housing market. For example, it would suggest house prices have reached a level of affordability where there could not be any further price growth, but in fact prices keep growing. Indicative of this disjuncture of findings is the work of Berry et al. (2010), which shows that, even in the worst trough of the global financial crisis, mortgage default in Australia was very small at the same time as benchmark measures were indicating widespread financial stress.

The US sub-prime crisis has raised questions about how best to assess housing risk, given all the evidence from the US – and there is some here – that banks themselves are no longer using a benchmark method but a non-transparent residual income model. Recent Australian affordability research (Yates 2007; Tanton et al. 2008; Hulse and Burke 2010) indicates a substantial number of renter purchasing households have housing costs well in excess of the 30% benchmark, while a simple plugging in of data to any financial institution's mortgage calculator will reveal that they have clearly departed from any semblance of a benchmark method, although since the global financial crisis they have tightened their lending criteria. The Commonwealth Bank calculator as of May 2010 would, for example, lend to a household with \$50,000 income and no other debt a mortgage with repayments of \$19,764, which

represents 39.5% of income. The basis for this is unclear, but one suspects some form of residual income model.

Such limitations with the benchmark method are not unique to Australia and this research is paralleled by not dissimilar research elsewhere (Stone 2006a; Heylen and Haffner 2010). However, this research is designed to take the method to a deeper level of analysis than has hitherto been the case.

Recognising the serious shortcomings of the familiar and widely used ratio approach, this paper outlines a residual income method that can differentiate potential affordability outcomes for various household types across a range of different incomes, both for home purchase and rental. We operationalise an ownership and rental model with the key features of:

- Different indicators for rental, purchase and outright ownership
- Multiple indicators of affordability for different uses
- Affordability measures for a broad range of incomes
- Affordability for four household types
- Affordability based upon two residual income non-housing standards
- User-set parameters to test market conditions as well as indexed over time.

## 2 The Home Purchase Model: Features

The home purchase and rental markets require separate models as they represent quite different sets of actors in terms of incomes, motivations and constraints, and to some extent also have different stock (much more multi-unit accommodation for rental) and locational attributes. Perhaps more important in terms of methodology is that the housing cost and income measures and assumptions that sit behind these tenures but which are required to build the model are different. For example, a renter's income may be boosted by Commonwealth rent assistance (CRA) compared to a purchaser, while on the other hand there are ongoing costs for owners (rates, repairs etc.) that renters do not have. So let's start with home purchase. For each of the five broad features of the model, the following outlines the specific elements.

1. **Multiple indicators of affordability:** In this case, six different applications of the model are developed and exemplified using Melbourne data. In most cases, the indicators will translate to Australia generally but in some cases they are limited to those states or territories that have Valuer Generals' property sales statistics in unit record format.
  - a. Maximum affordable total (mortgage plus non-mortgage) housing cost (per year, per month, per week)
  - b. Maximum affordable mortgage payment (per year, per month, per week)
  - c. Maximum affordable mortgage loan
  - d. Maximum affordable purchase price
  - e. Minimum savings required to purchase at maximum affordable purchase price
  - f. Share of houses sold in 2008 with affordable purchase prices.
2. **Affordability for a broad range of incomes:** The method allows for affordability for a very large income spectrum but in the case of home purchase the indicators only start at \$30,000 as it is assumed purchase is not affordable below this level.
  - a. \$1,000 intervals of gross annual household income
  - b. From \$30,000 to \$150,000.
3. **Affordability for four household types:** Necessarily the residual income model is household specific as that is one of its characteristic features, i.e. the ability to reveal that different household types have very different expenditures and therefore very different abilities to borrow. There are many different household types, once permutations of marital status and number of children are taken into account. For the purpose of most of

this study we concentrate on four indicative types although at some points we do look at more than these:

- a. Single adult, no children
- b. Couple without children
- c. Couple with two children
- d. Single adult with one child.

**4. Affordability based upon two residual income non-housing standards:** The development of a residual income model of housing affordability requires indicative budgets standards for different household types. Australia is fortunate to have the standards developed by the Social Policy Research Centre (SPRC) at the University of New South Wales (Saunders et al. 1998) and these come in two standards:

- a. Low Cost budget non-housing elements indexed for price changes
- b. Modest but Adequate Budget non-housing elements indexed for price changes.

It should be recognised that these budget standards are indicative and some elements have been questioned, notably childcare costs and housing costs (Department of Families and Community Services 2007). The housing estimates are not relevant for this study as they emerge as a residual from the other data, and the childcare methodological issues are not so great as to change the expenditure estimates in a way that could invalidate the findings here. There are also certain consumption items whose importance has change over time, e.g. mobile phones, and these will be factored into the final analysis along with a measure of debt.

**5. User-set parameters to test market conditions as well as index over time:** The budget standards were developed in the late 1990s and therefore the parameters of any measures or indicators based on this standard have to be adapted for current circumstances. These include:

- a. Month and year of affordability standard
- b. Appropriate CPI for selected month and year
- c. Non-mortgage recurring housing costs (rates, insurance, maintenance, repairs)
- d. Mortgage loan-to-value ratio (equal to 1 minus the deposit ratio)
- e. Mortgage loan term (years)
- f. Mortgage interest rates
- g. Mortgage establishment costs (legal etc.).

### **3 Operationalising A Home Purchase Residual Income Standard**

There are three major practical issues that have to be dealt with in translating the residual income logic into an operational affordability standard: how to specify the monetary level of a minimum standard of adequacy for non-shelter items other than taxes; how to scale this standard for various types of households; and how to deal with personal taxes.

The well-established budget standards concepts and methodology have provided an appropriate basis for establishing a normative standard for an after-tax standard for residual income. This takes into account the actual cost of a basic 'market basket' of necessities. By explicitly identifying and pricing the various elements in the basket, non-housing items can be extracted, so that their total cost is not an arbitrary percentage of the total budget.

The authors who have taken the budget standards approach in the US have utilised the non-shelter, non-tax components of Bureau of Labor Statistics 'Lower Budgets,' updated using corresponding components of the CPI (Stone 1993, Appendix A). For the UK, the non-shelter components of the Family Budget Unit 'Low Cost but Acceptable' budgets have been utilised (Stone 2006b). For Australia, the 'Low Cost' indicative budgets developed by the Social Policy Research Centre (SPRC) at the University of New South Wales (Saunders et al. 1998), which are conceptually and methodologically similar to the US and UK Low Cost budgets, have seen somewhat similar application in developing and applying a residual income affordability standard (Waite and Henman 2005; Yates and Gabriel 2006).

The SPRC has also developed a somewhat higher ‘Modest but Adequate’ budget, following similar assumptions and giving it the very same name as intermediate budgets developed much earlier in the US (Saunders et al. 1998).

The availability of the two SPRC budget standards has been essential for this project, making it possible to devise and apply operational residual income affordability scales based on both the very conservative standard of living defined by the Low Cost budget and the more ‘moderate’ standard defined by the Modest but Adequate budget.

The second practical issue involves translating a specified *qualitative* standard of adequacy for non-housing items into *quantitative* monetary amounts that differ by household size and type. For the US and UK, this has involved the use of equivalence scales because detailed standards budgets have been devised for only a few prototypical household types (Stone 1993, Appendix A; Stone 2006b). For Australia, this is not necessary, for the most part, because detailed Low Cost budgets have been derived for 20 different household types and Modest but Adequate budgets for 26 household types, the greater number for the latter reflecting a greater array of owner-occupier household types (Saunders et al. 1998).

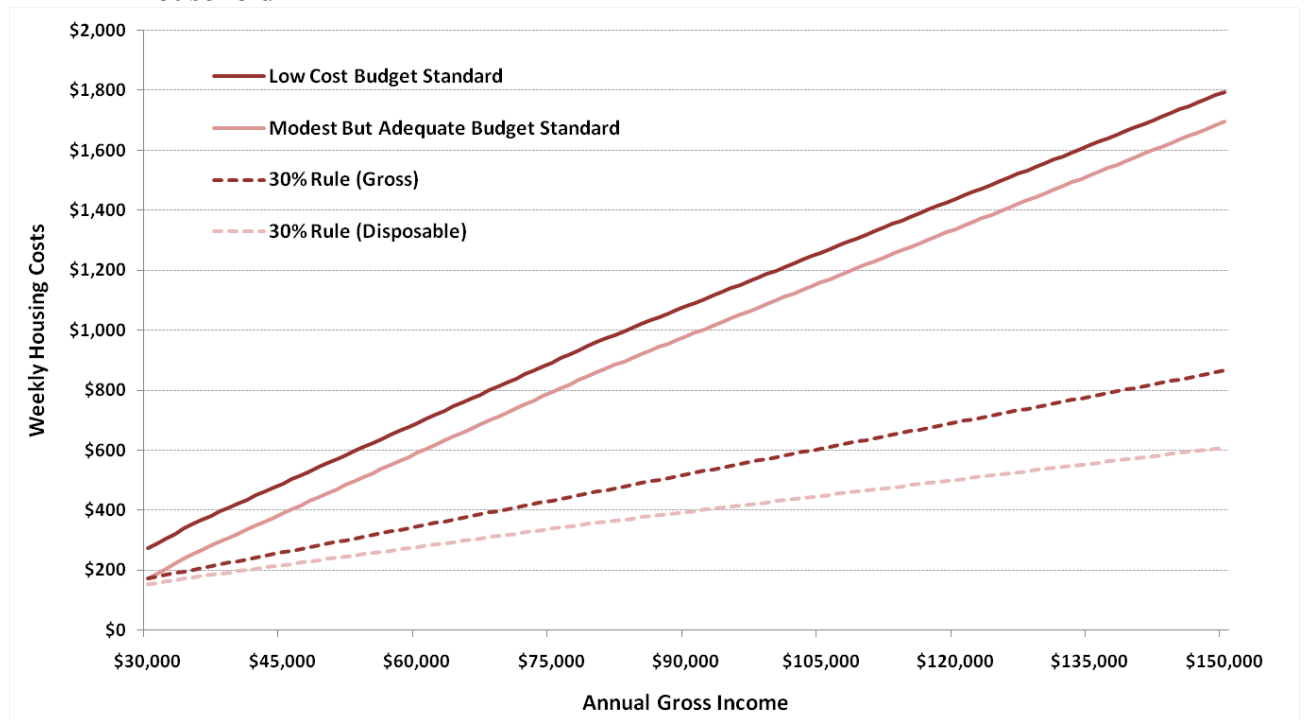
Finally, there is the matter of taxes. The ratio approach has always manifested a great deal of confusion and inconsistency as to whether the standard should be based upon gross household income or disposable income. By contrast, the residual income approach is unambiguous: because the non-housing standard provided by the indicative budgets is a consumption standard, it is a household’s *disposable* income that faces the tension between housing and non-housing necessities. This means that, to the extent that datasets and policy analysis are based upon gross household incomes, prototypical taxes and income-based government benefits need to be computed as a function of income as well as household type in order to determine disposable incomes and thus fully operationalise a residual income standard.

Appendix A outlines in detail the features of the model and its applications to two household types: a single person and a couple with two children. The following section examines some of the implications of the model using these two household types as case studies.

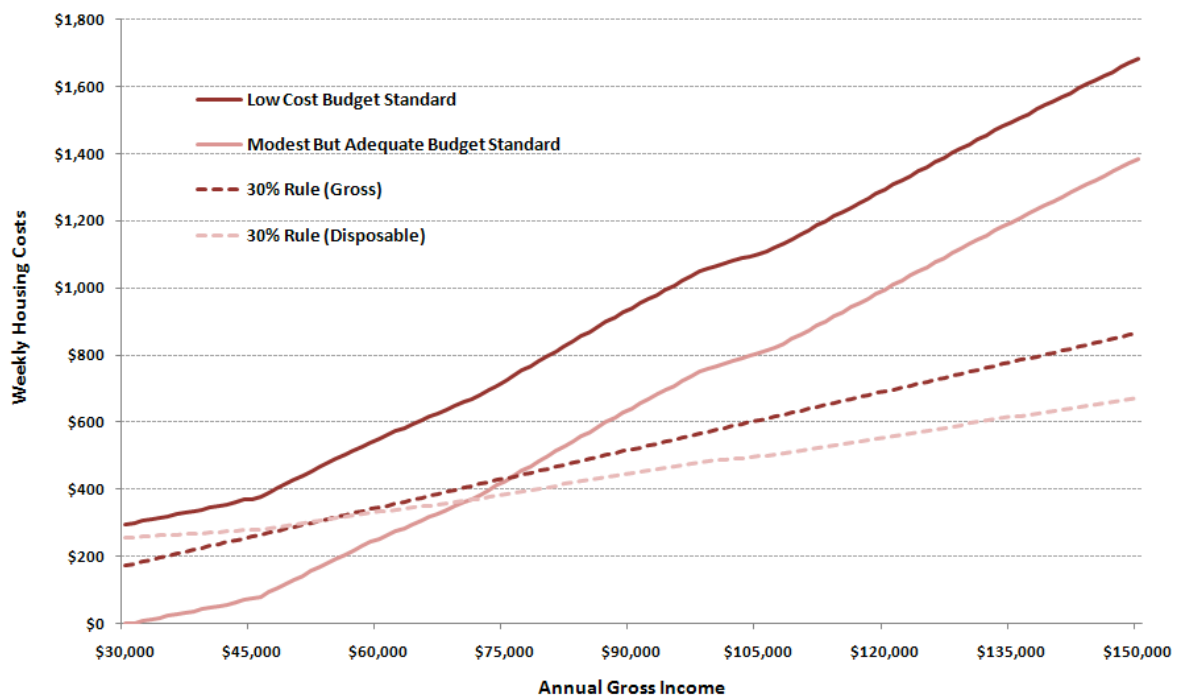
#### **4 Implications of the Home Purchase Model**

One of the paradoxes of recent housing affordability data is that posed by the question: *if the home purchase affordability problem is so bad, how can low-moderate income households still afford to buy?* Using the residual income method discussed above we were able to calculate the maximum weekly mortgage costs affordable for household incomes above \$30,000 p.a. Here we will illustrate the findings for a single person household (Figure 1) and a couple with two children (Figure 2). Each of these figures shows the weekly mortgage affordable for all incomes between \$30,000 and \$150,000; and for two versions of the budget standard (moderate and low); and two of the 30/40 (gross and disposable income) benchmar

**Figure 1: Maximum affordable mortgage repayments using two types of budget standard and two measures of housing affordability, single person household**



**Figure 2: Maximum affordable mortgage repayments using two types of budget standard and two measures of housing affordability, couple with two children**



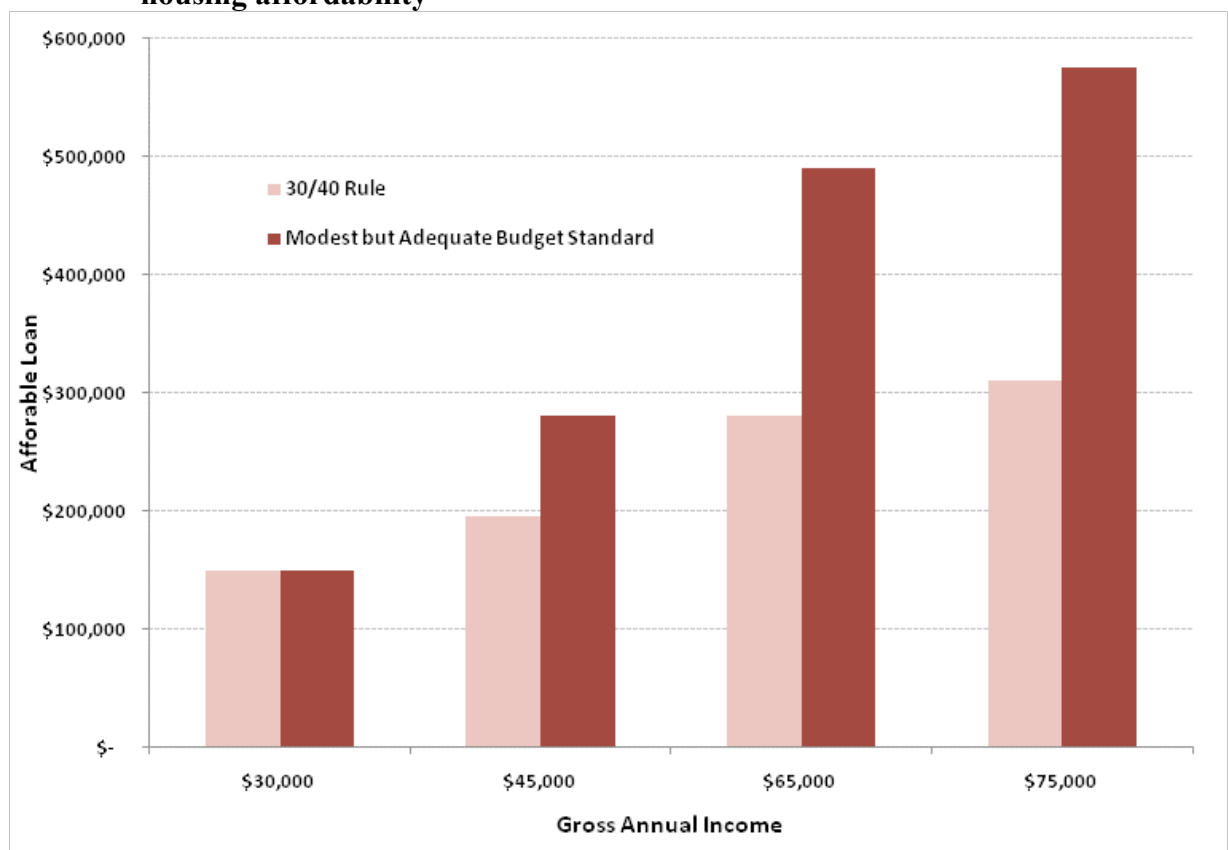
Note: Details of the methodology employed in Figures 1 and 2 are set out in Appendix A.

This analysis has three important implications. *Firstly*, there is a big difference in purchasing affordability for the two household types. A single person willing to live on the Modest but Adequate budget standard can afford to pay much more per week on housing expenditures than using a maximum of 30% of income benchmark, however measured. The situation is

very different for the couple with two children, however, due to their higher non-housing expenditures. Up to the 40th percentile of household income for purchasers, using the Modest but Adequate Budget Standard illustrates that they can afford to pay less than if the 30% of household income (however measured) was applied. When just using the residual method (which does not matter), the couple with two children on the same income as a single person, e.g. \$65,000, has much less mortgage capacity.

*Secondly*, many people have speculated on how some low-moderate income home buyers are able to afford the high prices of recent years, particularly first time purchasers who do not have more than a minimum deposit. The residual income method, based on budget standards, offers an explanation. For a single person, single income household, there is little difference between the amount that they could borrow using the two measures. However, on an income of \$65,000 p.a., a single person would only be able to borrow \$255,000 if they are not to exceed 30% of their income. Using the Modest but Adequate budget standard, they could afford to borrow up to \$455,000, as illustrated in Figure 3 (assumptions are: 10% deposit, mortgage repayable over 25 years, average interest rate 6%). The household might be living modestly to achieve the latter loan size but, provided that there were no other issues that affected their expenditures (e.g. maintenance payments), they could afford the repayments if this is how they set their priorities.

**Figure 3: Comparison of affordable loans for single person, single income households on different levels of income, comparing two measures of housing affordability**



Source: Amortisation data derived from MortgageX-mortgage information service, <<http://mortgage-x.com/calculators/amortization.htm>>

Note: The 30% is calculated on gross household income.

The situation is very different for the couple with two children. For the same household income of \$65,000 p.a., the household with two children cannot afford to devote more than 17% of their income to mortgage repayments and, using this measure, could only afford to borrow \$151,000 compared to \$277,000 using the 30% of household income ratio. The

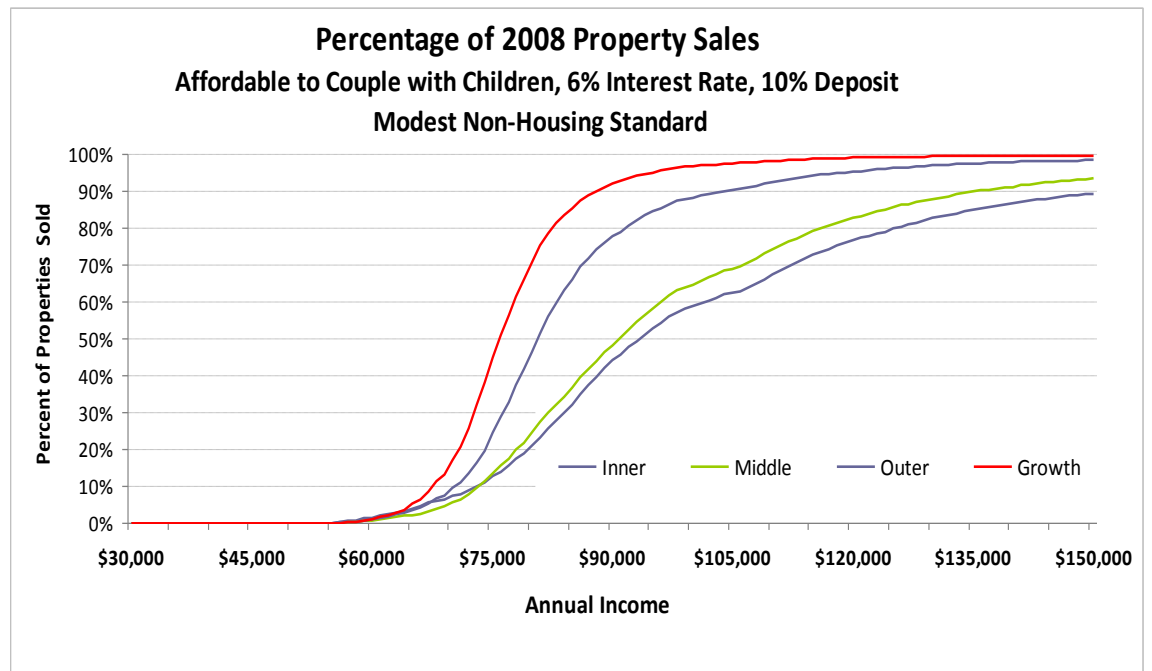
additional living expenses of households with children constrain their ability to borrow and therefore to afford housing even in lower price areas. This is consistent with the findings of Hulse et al. (2010, ch. 5) that there has been a sharp decline in the number of low-moderate income purchasers who are households with children and a very big increase in the proportion who are single person, single income households, with these changes being much greater than explainable by demographic change alone.

Many low-moderate purchasers have been able to afford the higher house prices of recent years so long as they are willing to forego a few luxuries and live to a Modest but Adequate budget standard. If they are willing to forego a little more and live on the Low Cost budget standard they can borrow even more.

*Thirdly*, the analysis suggests the notion of price points for affordable housing for low-moderate income purchasers. Using the example of the single person households in Figure 1, at \$30,000 annual income neither affordability measure indicates anything that would be affordable, while at \$45,000, particularly for singles, some apartments would be affordable. At \$65,000 very little is affordable using the 30/40 benchmark but the market opens quite widely using the Modest but Adequate budget standard, particularly if the person is happy with a unit/apartment. If we apply this to the couple with two dependent children, the price points for affordability are pushed out considerably if using the Modest but Adequate budget standard. However, if the Low Cost budget standard is used, this household type could afford a weekly mortgage cost of \$590 (as shown in Figure 2) and therefore have the borrowing ability to afford a dwelling up to around \$450,000. Such a household, unlike that of a single person, would most likely be looking for a 3-bedroom dwelling and therefore their choices would be much more limited, largely confined to the outer suburbs. They would also be living on a near poverty line income.

There is another reason why many low-moderate income households can afford to buy, and the explanation has relevance to the spatial polarisation of Australian cities. By taking the residual income and associated mortgage capacity for a given household type and applying that model to Valuer General's unit record sales data, it is possible to determine where households for any given income can purchase. Figure 4 shows the percentage of Melbourne properties affordable to a couple with two children with a 10% deposit and 6% interest rate and shows (a) the degree to which few properties are affordable anywhere below \$60,000 and (b) the differences between regions. The growth areas of Melbourne are almost universally affordable for this household type so long as they have around \$85,000 household income, while this income would get this household type a choice of less than 30% of the inner city. Such data enables a better understanding of what is happening in the market; low-moderate income households can still purchase, but only in very spatially constrained markets on the fringe of metropolitan Melbourne.

**Figure 4: Percentage of 2008 Melbourne properties affordable to couple with two children, using the Modest budget standard**



Source: Victorian Valuer General's Property Sales Statistics 2008, and residual income calculations as documented in Appendix A.

## 5 Renter Model

The construction of the renter model is broadly the same as for ownership but requires some rejigging in a number of aspects. Reviewing stages 1 to 12 of the ownership application of the model (see Appendix A), the ones that remain the same for rental are:

- 1 Non-housing consumption standards
- 2 Indexing using appropriate consumer price indexes
- 4 Income tax computations
- 5 Income-based benefits and credits.

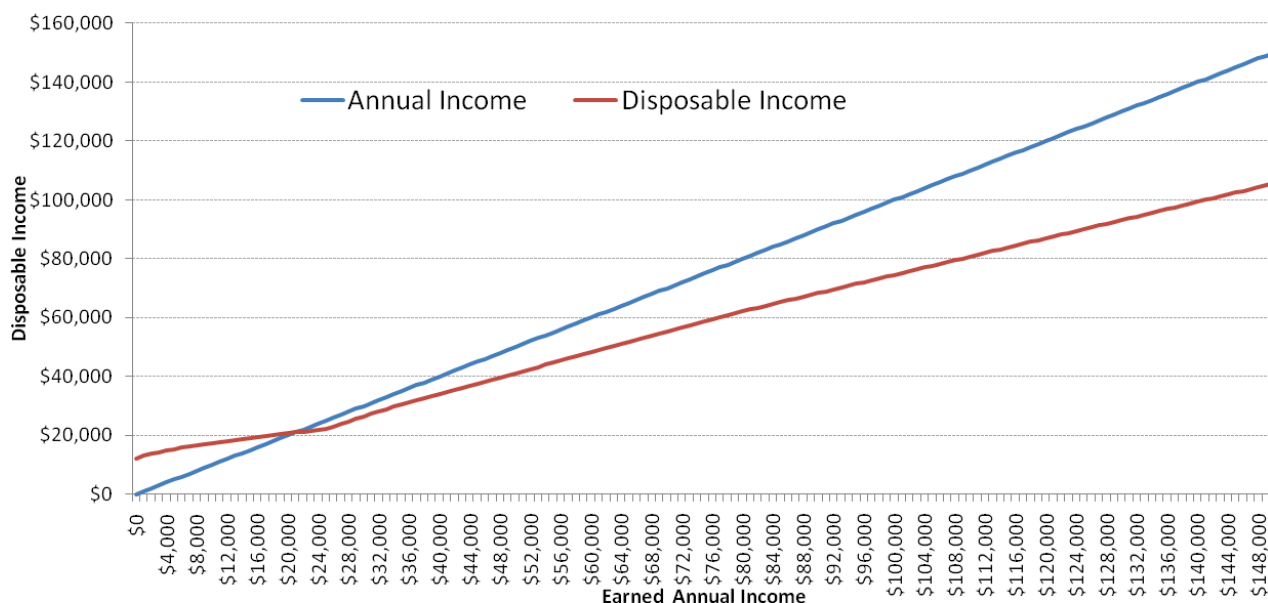
Areas that require change are as follows.

### Income assumptions:

Unlike home purchase, no minimum income for computations is assumed, as rental is the only option for low-income earners and therefore even the lowest income earners are assumed to be requiring accommodation in this sector. One of the issues in extending the income range down to zero is that Centrelink benefits and any credits become dominant in determining disposable income. Where most purchasers over \$30,000 have largely earned income with some credits such as family allowances, most renters under \$30,000 are dependent on some level of benefit.

This is simply illustrated in Figure 5, using the example of a single person household. It shows how annual earned income starts at zero but actual disposable income is higher, representing the pension or disability benefit and the fact that no tax is paid on such income. Above some point, in this case around \$21,000, the disposable income becomes less than earned income as the cut-in and application of marginal tax rates reduces actual income as income rises.

**Figure 5: Earned vs disposable income: single person**



## Rent assistance

Commonwealth rent assistance (CRA) is a non-taxable income supplement payment added on to the pension, allowance or benefit of eligible income support customers who rent in the private rental market and in eligible community housing. It is paid at the rate of 75 cents for every dollar of rent above the specified threshold until the maximum rate is reached. Maximum rates and thresholds vary according to household type and number of children.

Methodologically CRA can be treated in two ways. Firstly, it can be treated as an income payment and added to a household's income as calculated in the home ownership model, i.e. the Disposable Income equals Gross Household Adult Income from Employment minus taxes plus tax benefits, credits *and* CRA. Thus the 'Maximum Affordable Rent' equals Disposable Income minus the relevant budget standard.

Alternatively, it can be seen as a supplement to the rent, which means the disposable income remains that of Gross Household Adult Income from Employment minus taxes, but plus tax benefits and any credits. Thus the Maximum Affordable Rent equals disposable income minus the relevant budget standard *plus* CRA. In most cases the result will be same. For the purposes of this paper, the latter method is used, because the former does not easily allow for establishing the amount of CRA that would be available to a particular household type.

### 5.1 Rental Examples and Associated Issues

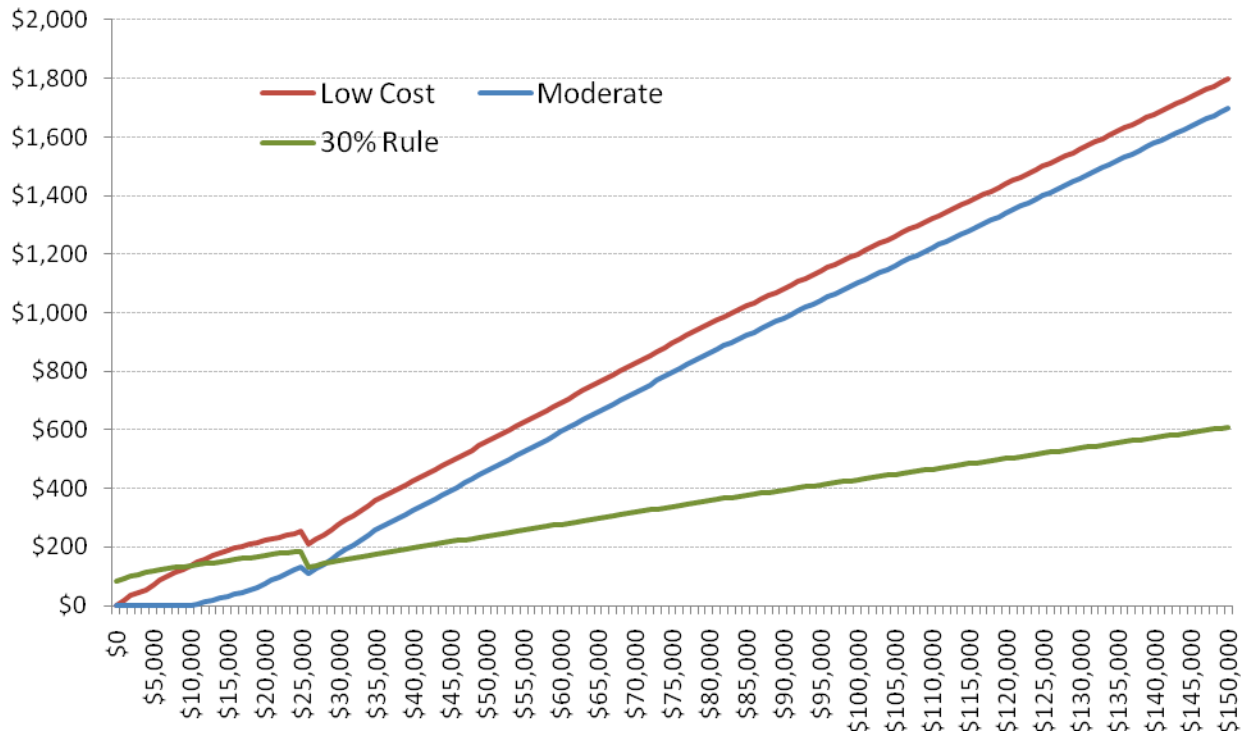
The rental application of the model is indicative only as work is still continuing on this stage.

Using the disposable income and the CRA added to the budget standard, Figure 6 shows both for the Low Cost and Moderate budget standards and for comparative purposes the 30% benchmark for what level of rent is affordable at each level of income.

As with the ownership data, this data clearly reveals differences between the benchmark model and the budget standard model. For single renters it would suggest that above some income level, i.e. \$25,000 to \$30,000 depending on which budget standard is used, they can afford more by way of rent than indicated by the budget standard, with the difference widening as incomes increase. By contrast, below some minimum level of income, the opposite holds true: the benchmark method overstates the degree of affordability. Secondly and related to these differences is that the budget standard method offers a better explanation of rental market dynamics. One of the puzzles of recent years has been how rents have been able to increase to the degree they have done, given the extent of income resistance that

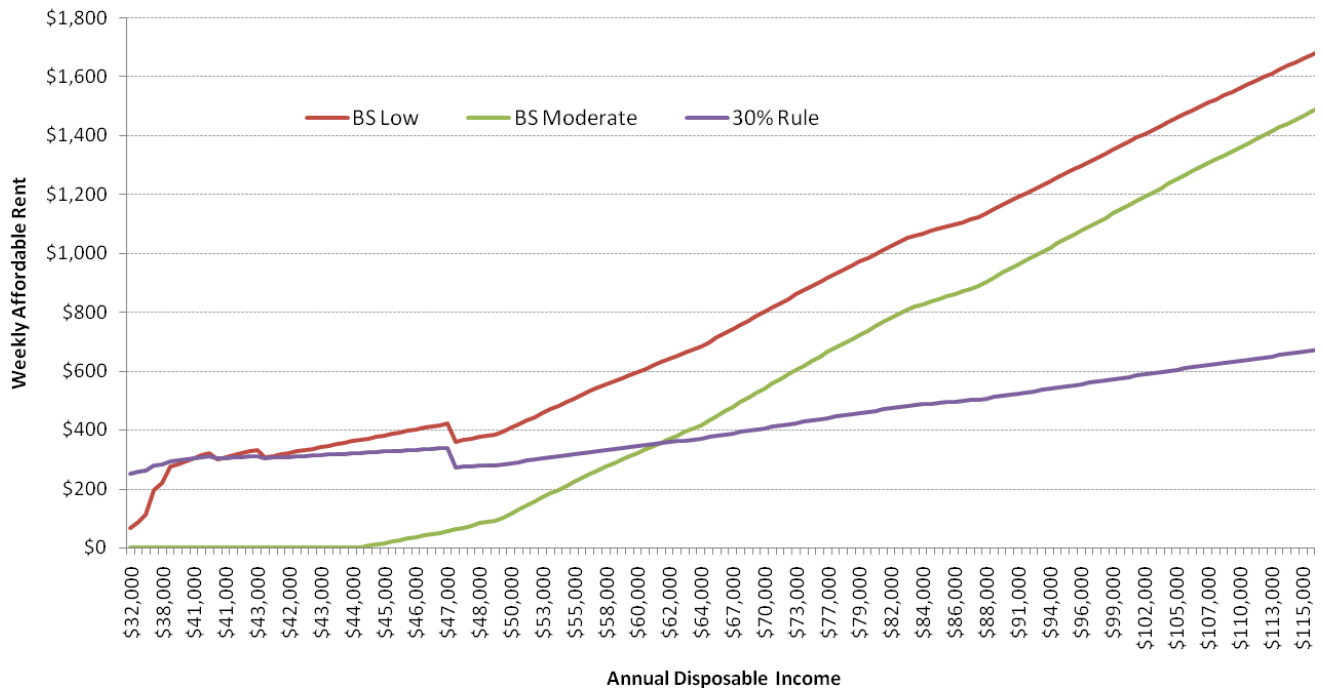
would be suggested by the benchmark method, i.e. lack of affordability of rents should have acted as a drag on the rental market. That this has not been the case is suggested by the budget standard method which indicated an ability of any single person household earning over \$30,000 to pay more than we previously thought affordable.

**Figure 6: Single person: rental affordability using different affordability measures**



Turning to a couple with two children (Figure 7), the story in broad terms is the same although much more visible. Note here that (a) the income level starts at \$32,000 as, factoring in all the benefits for a household of this type, that is the minimum income and (b) the annual disposable income between \$38,000 and \$43,000 is not linear as incomes actually drop back a bit when certain benefit tapers cut in. The affordable rent is much the same between \$38,000 and \$47,000 for the Low Cost budget standard and the 30% benchmark. After the \$47,000 income point, this household type's ability to pay more rents without experiencing an affordability problem is much greater under the Low Cost budget standard than the benchmark one. However, if the Moderate budget standard is used, we see a major problem. Such are the demands of other expenses for this household type that below \$45,000 no rent is affordable and any real capacity to afford rents is not achieved until the mid-\$50,000s.

**Figure 7: Couple with two children: rental affordability using different affordability measures**



Whether a rent is affordable is one housing issue. Whether there are any properties available to rent at an affordable level where a household wants to locate is another.

Victoria has a Residential Tenancies Bond Authority (RTBA) that holds all bonds for rental properties, including long-term caravans and rooming houses, houses and flats. The bonds are held in trust for landlords/agents and tenants, or owners and residents, giving all parties equal say on how bonds should be repaid when a rental agreement (also called a lease) ends. When a new lease is taken on, the landlord or agent provides the RTBA with the bond along with information including property type, number of bedrooms, rent and address. Confidentialised RTBA unit records thus enable us to calculate for each household type the percentage of appropriate dwelling units available for Melbourne using the Low Cost and Moderate budget standards and the 30/40 benchmark method. Table 1 looks at a single person household and applies the Canadian National Occupancy Standard, which has a single person occupying a 1-bedroom property. The table also shows boarding houses data, as this is potentially an option (but perhaps a worst outcome option) for this household type. The postcodes of the rental addresses have been amalgamated into inner, middle and outer areas of Melbourne.

The table shows the affordable rent for each income group and each method and the percentage of dwellings that were affordable and reveals a very different story when comparing residual income methods to the benchmark method. Taking a reasonably low income, e.g. \$35,000, and using the Moderate budget standard (our preferred standard), 30% of properties are affordable overall and in the middle ring 47% are affordable. By contrast for the same income, the 30/40 benchmark has only 3% of properties affordable overall and in the middle ring only 4%. This is a very different affordability story. The \$30,000 income level is a telling one as, if we use the Moderate budget standard, affordability drops away almost to the levels of the benchmark method and below \$20,000 there is no rental property affordable on the Low Cost budget standard. Even if we were to use the Low Cost budget standard (not illustrated), below \$20,000 there is nothing affordable. Thus, for households such as single age pensioners with no other income sources, no amount of adjustment of expenditures could find them an affordable dwelling.

**Table i: Single person: percentage of available 1-bedroom rental properties by inner, middle and outer Melbourne municipalities, 1 January 2010 to 1 June 2010**

Gross	Disposable	Modest					30/40 rules				
		Moderate	Inner	Middle	Outer	Total	30/40	Inner	Middle	Outer	Total
\$12,000	\$17,929	\$12	0%	0%	0%	0%	\$143	0%	3%	1%	22%
\$15,000	\$18,949	\$32	0%	0%	0%	0%	\$154	0%	2%	4%	1%
\$20,000	\$20,649	\$75	0%	0%	0%	0%	\$171	1%	4%	8%	3%
\$25,000	\$22,349	\$132	0%	1%	2%	1%	\$186	1%	6%	13%	5%
\$30,000	\$26,400	\$175	1%	5%	9%	3%	\$152	0%	2%	4%	1%
\$35,000	\$30,650	\$257	17%	47%	35%	30%	\$177	1%	5%	9%	3%
\$40,000	\$34,150	\$324	46%	72%	72%	59%	\$197	1%	10%	16%	6%
\$45,000	\$37,650	\$391	74%	85%	92%	80%	\$217	3%	21%	22%	12%
\$50,000	\$41,150	\$459	88%	91%	97%	90%	\$237	8%	34%	27%	20%
\$55,000	\$44,650	\$526	92%	94%	99%	94%	\$258	17%	47%	35%	30%
\$60,000	\$48,150	\$593	95%	96%	99%	96%	\$278	25%	56%	44%	39%
			7,713	5,404	2,061	15,178		7,713	5,404	2,061	15,178

Table 2 looks at the case study of a couple with two children, using the Canadian National Occupancy Standard for appropriate room allocations, which requires a 3-bedroom property for this household type. Here the story is a slightly different one. The Moderate budget standard method reveals less choice than the 30/40 benchmark. A couple with two children on \$50,000 has no available stock affordable on the Modest budget standard, while the benchmark method suggests that there is 26% affordable of which the bulk is in the urban fringe. Above \$75,000 the position is reversed, with the modest budget standard showing that 83% is affordable compared to 69% of the benchmark method. Both highlight that it is predominantly outer urban areas where there is any real choice for income below \$70,000 but, once \$80,000 is exceeded, choice in the inner area becomes much greater using the Modest budget standard than the 30% benchmark. The differences raise fundamental questions as to which is most appropriate for our understanding of (a) the affordability constraints in Melbourne or indeed in any other city where the method is applied and (b) the dynamics of the housing market.

**Table ii: Couple with two children: percentage of available 3-bedroom rental properties by inner, middle and outer Melbourne municipalities, 1 January 2010 to 1 June 2010**

Annual Income	Disposable Income	Modest Budget Standard					30/40% rules (Based on disposable income)				
		Rent Moderate	Inner	Middle	Outer	Total	30% rule	Inner	Middle	Outer	Total
\$32,000	\$45,193	\$15	0%	0%	0%	0%	\$327	3%	18%	70%	44%
\$40,000	\$47,274	\$55	0%	0%	0%	0%	\$339	3%	22%	77%	49%
\$45,000	\$48,647	\$87	0%	0%	0%	0%	\$281	2%	5%	34%	20%
\$50,000	\$51,297	\$143	0%	0%	0%	0%	\$296	2%	6%	44%	26%
\$55,000	\$54,550	\$210	1%	1%	1%	1%	\$315	2%	13%	61%	37%
\$60,000	\$57,652	\$275	2%	3%	27%	15%	\$333	3%	22%	76%	48%
\$65,000	\$60,455	\$334	3%	22%	76%	48%	\$349	3%	26%	82%	53%
\$70,000	\$63,258	\$393	6%	52%	96%	71%	\$365	4%	39%	91%	63%
\$75,000	\$66,656	\$463	16%	76%	99%	83%	\$385	5%	49%	95%	69%
\$80,000	\$70,456	\$541	31%	88%	100%	89%	\$406	8%	59%	97%	75%
\$85,000	\$74,256	\$619	51%	94%	100%	93%	\$428	10%	65%	98%	78%
\$90,000	\$77,906	\$694	69%	97%	100%	96%	\$449	12%	70%	98%	80%
Total Properties			1,736	8,248	10,854	20,838		1,736	8,248	10,854	20,838

## 6 Conclusion

This paper illustrates the residual income method for measuring housing affordability and suggests potential research and policy applications of the model including the ability to understand how the different expenditure patterns of different household types impact on their capacity to afford housing and related to this knowledge greater ability to understand what is happening in the housing market, i.e., the current 'unaffordable' prices of Australian cities are actually affordable to many household types above a certain income point.

The model illustrates (a) that the work requires a level of detail not hitherto undertaken in other equivalent studies in Australia or internationally and (b) the model's potential usefulness in providing a critical framework for thinking about affordability in a different way and about the policy implications.

Whether for ownership or rental, the examples demonstrate clearly the extreme sensitivity of affordability to a number of crucial factors. Changes to the assumptions or to the reality of figures in each of these domains will have make impacts on the finding and hence the importance of understanding the mechanics of the model. These domain areas are:

- Household income
- Household composition/household type
- Standard of adequacy for non-housing consumption
- Structure of the housing market, i.e. the locational constraints issue.

The paper is far from comprehensive in the applications the model can be put to, but it suggests the broad directions. Further AHURI work will enable a more robust and comprehensive model and associated analysis to emerge.

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## Appendix A

### 1 Methodology

#### 1 *Non-housing consumption standards:*

- a. SPRC Low Cost and Modest but Adequate budgets
- b. Total budget minus housing
- c. The budgets are national, not regional or local
- d. However, since housing is the expenditure that varies most by location, while the aggregate of other expenditures varies little by location, use of the national total budget minus housing is a reasonable approximation for Victoria.

#### 2 *Indexing using appropriate consumer price indexes:*

- a. Because SPRC budgets have separate components for housing and energy, but CPI 'Housing' includes utilities, it is necessary to ...
- b. Utilise CPI 'All Items minus Housing and Financial Services' to index the Budgets minus the Housing and Energy components and
- c. Utilise CPI 'Utilities' to index Budgets Energy component
- d. Because CPI 'All Items minus Housing and Financial Services' is available only for Australia as a whole, not for Victoria or Melbourne, it is necessary to use the national CPI elements
- e. As with the SPRC budgets, since housing is the expenditure that varies most by location, while the aggregate of other expenditures varies little by location, use of the national CPI 'All Items minus Housing and Financial Services' is reasonable
- f. Add results of 'b' and 'c' to produce indexed Normative Budget Standard (minimum adequate residual income) for Non-Housing Consumption including Utilities (home energy).

#### 3 *Income assumptions:*

- a. \$30,000 is the minimum income for computations as it is assumed ownership is not possible on a lower income unless subsidised. Any rental affordability measure, however, would have no lower income cut-off
- b. Because of the \$30,000 income cut-off, household income is predominantly from employment, although at lower income levels households are eligible for certain income benefits and allowances
- c. For two-adult households, 60% of total income is assumed to be from adult male employment and 40% from adult female employment. It is assumed no other family members' income is relevant for loan eligibility.

#### 4 *Income tax computations:*

- a. Income tax rates are based on personal tax rates for the 2009-10 financial year
- b. Tax rates are based on withholding rates for pay-as-you-go and do not include amounts credited or debited for taxation financial reconciliation such as the Medicare levy or low income tax offset. The computations also exclude tax deductions which are household specific, such as those for length of tax year, higher education payments and the private health insurance offset. However, there are a number of income-based tax credits and benefits that are not household specific and can be included in the computations (see 5).

#### 5 *Income-based tax benefits and credits:*

The value of the following benefits has been computed, with the specifics differing by household type as Table 3 shows and accompanying text explains further. Consistent with Australian government policy, Newstart is based on disposable income while Family Tax Benefits are based on annual gross income.

**Table iii: Relevant tax benefits and credits for sample household types**

Household Type	Newstart	Family Tax Benefit Part A	Family Tax Benefit Part B
Single person	√	X	X
Sole parent, 1 child	√	√	√
Couple, no children	√	X	X
Couple, 2 children	√	√	√

a. Sole person household:

Not eligible for Family Benefits, and the \$30,000 income cut-off means no single persons are eligible for Newstart as it ceases at a disposable income of \$853.34 per fortnight for singles. Lowering of the cut-off to, say, \$20,000 would require computation of Newstart for this household group.

b. Couple household:

Newstart allowance is paid up to an individual disposable income of \$779.17 per fortnight and reduces at a greater rate once one of the partners exceeds this amount. Once the combined incomes exceed \$45,000 the couple is no longer eligible for any Newstart allowance.

c. Sole parent household with child:

Minimum income level is too high to consider Newstart allowance, but Family Tax Benefit Payment of \$156.94 per fortnight is paid in full until income reaches \$44,165, thereafter decreasing on a sliding scale until the upper limit of \$99,000 is reached.

Family Tax Benefit Part B (FTBB) of \$93.10 per fortnight is paid up to primary earner's maximum annual income of \$150,000. Many sole parents will receive child support, but because this relates to individual circumstances it cannot be taken into account.

d. Couple household with two children:

This household type is eligible for Newstart up to \$45,000, above which the couple is no longer eligible for any Newstart allowance. Family Tax Benefit Part A of \$313.88 per fortnight is paid in full until combined income reaches \$44,165 and then decreases on a sliding scale until the upper limit of \$107,000.

Family Tax Benefit Part B (FTBB): The maximum payment of this benefit is \$93.10 per fortnight, and is based on the 'non-primary earner' if the primary earner's annual income is below \$150,000. As it is based on the income of the non-primary earner, FTBB is no longer paid once the couple's combined income reaches \$42,000.

6 *Computation of Maximum Affordable Housing Cost:*

- a. Disposable Income equals Gross Household Adult Income from Employment minus taxes plus tax benefits and credits
- b. Maximum Affordable Housing Cost equals Disposable Income minus indexed Normative Budget Standard (minimum adequate residual income) for Non-Housing Consumption including Utilities (home energy).

7 *Computation of Maximum Affordable Mortgage Payment:*

- a. Subtract assumed non-mortgage housing costs excluding utilities from Maximum Affordable Housing Cost.

8 *Computation of Maximum Affordable Mortgage:*

- a. Compute present value (PV) of stream of Maximum Affordable Mortgage Payments at assumed annual average interest rate over assumed term.

- 9 *Computation of Maximum Affordable Purchase Price:*
- a. Divide Maximum Affordable Purchase Price by assumed loan-to-value ratio (one minus deposit ratio).
- 10 *Computation of Minimum Necessary Savings to Purchase:*
- a. Necessary deposit equals assumed deposit ratio times Maximum Affordable Purchase Price
  - b. Compute stamp duty based on Maximum Affordable Purchase Price
  - c. Add non-variable fees (legal etc.) to results of 'a' plus 'b' to produce Minimum Necessary Savings.
- 11 *Computation of Number and Percentage of Sold Homes Actually Affordable:*
- a. Utilise Valuer General's sales price data for the most recent year, supplied by DPCD
  - b. Compute the number and percentage of homes sold for an amount less than or equal to the Maximum Affordable Purchase Price.
- 12 *Produce Graphs:*
- a. For each household type
  - b. For the full range of incomes
  - c. Based on Low Cost and Modest but Adequate Non-Housing Standards
  - d. Of results of computations in Steps 6-11 above.

## 2 **Illustrative Home Purchase Examples**

In order to demonstrate the utility of the Residual Income Home Purchaser Affordability Model, a few illustrative examples have been run. They are based upon the set of parameters specified in Table 4.

**Table iv**

**USER-SET PARAMETERS:**

<b>Month and Year</b>	<b>September 2009</b>
<b>Consumer Price Index for selected month and year:</b>	
<b>All Items excluding Housing and Financial &amp; Insurance Services (1)</b>	<b>169.7</b>
<b>Utilities (2)</b>	<b>221.2</b>
<b>Loan Term (years)</b>	<b>25</b>
<b>Interest Rate</b>	
<b>Additional Housing Costs Per Year</b>	<b>\$3,000</b>
<b>Deposit</b>	<b>10%</b>
<b>Legal Fees</b>	<b>\$1,000</b>

(1) CPI, TABLE 8, LINE 28

(2) CPI, TABLE 7, LINE 69

A comparison has been made with the mortgage interest rate changed to 9%, keeping all other parameters unchanged. This variation provides a basic sensitivity analysis of changing interest rates on home purchaser affordability.

For the illustrative examples, and indeed any cases for the same month and year, the non-housing consumption standards (minimum adequate residual income) would be unaltered by variations in the other parameters. The amounts of these standards for the four specified household types on the indexed SPRC Low Cost and Modest but Adequate budgets are as shown in Table 5.

**Table v**  
**INDEXED SPRC BUDGETS, NON-HOUSING CONSUMPTION STANDARD:**  
September 2009

	Single		Sole Parent One Child		Couple		Couple with 2 Children	
	Low Cost	Modest	Low Cost	Modest	Low Cost	Modest	Low Cost	Modest
Non-Housing Less Energy	\$ 221	\$ 320	\$ 283	\$ 492	\$ 337	\$ 524	\$ 533	\$ 829
Energy	\$ 13	\$ 15	\$ 13	\$ 21	\$ 18	\$ 21	\$ 24	\$ 28
<b>Total Non-Housing Consumption:</b>								
Per Week	\$235	\$335	\$297	\$513	\$355	\$545	\$558	\$857
Per Year	\$12,200	\$17,400	\$15,400	\$26,700	\$18,400	\$28,400	\$29,000	\$44,500

The numbers imply that a single person of a given disposable income living at the Modest standard for non-housing items could afford \$100 a week less for housing than if s/he were living at the Low Cost standard for non-housing items.

For a sole parent with one child, the differential in the standard of adequacy for non-housing costs is much greater, \$216 a week, due to the considerably higher standard, and hence greater costs, in the Modest budget associated with having a child. That is, for a given level of disposable income, at the Modest non-housing standard they could afford \$216 a week less for housing than at the Low Cost standard.

For a couple household, the differential is \$190 a week. For a couple with two children, it is \$300 a week.

The differential affordability implications of the Low Cost versus Modest non-housing standards only apply to a specific household type of a given *disposable* income. No comparisons are possible based on gross incomes without taking into account the differential effects of taxes and income-based government tax credits and benefits, which are essential parts of the following, more detailed summaries. The workings are only provided for a single person.

Note that, in the following examples, ‘gross income’ means total annual household income from adult employment.

### 1.2.1 Single Person

#### *Maximum Affordable Total Housing Cost and Mortgage Payment*

The maximum amount that a household of a given type and income can afford is independent of the loan characteristics, depending only upon the non-housing consumption standard and the magnitude of taxes and income-based government credits and benefits.

The maximum affordable housing cost rises steadily with income, not only in dollars as would be expected for any affordability standard, but also as percentage of income, revealing the folly of trying to set any single percentage of income or a few categorical percentages as an affordability standard. In this case, the percentage tends to level off at high incomes. The reason is that at higher incomes, for each additional dollar of gross income, approximately 40 cents goes for taxes with the remaining 60 cents potentially available for additional housing cost.

In terms of mortgage affordability, assuming quite low non-mortgage costs of about \$250 a month, a single person with:

Gross income of \$35,000 a year could afford a monthly mortgage payment of:

- a little under \$1,300 a month on the Low Cost standard
- about \$850 on the Modest standard.

Gross income of \$50,000 could afford a mortgage payment of:

- about \$2,160 a month on the Low Cost standard
- about \$1,730 on the Modest standard.

*Purchase Affordability with Mortgage Interest Rate of 6%*

To calculate the maximum affordable mortgage loan we assume: (a) maximum affordable mortgage payments, as just described; (b) mortgage term of 25 years; (c) average annual interest rate of 6%.

Gross income of \$35,000 a year could afford a loan of:

- \$200,000 on the Low Cost standard
- \$133,000 on the Modest standard.

Gross income of \$50,000 a year could afford a loan of:

- \$336,000 on the Low Cost standard
- \$268,000 on the Modest standard.

Gross income of \$35,000 could afford a price of:

- \$222,000 on the Low Cost standard
- \$147,000 on the Modest standard.

Gross income of \$50,000 could afford a price of:

- \$373,000 on the Low Cost standard;
- \$298,000 on the Modest standard.

Gross income of \$35,000 would need at least:

- \$30,700 on the Low Cost standard
- \$19,500 on the Modest standard.

Gross income of \$50,000 would need at least:

- \$53,300 on the Low Cost standard
- \$42,100 on the Modest standard.

The necessary minimum savings are lower on the Modest budget non-housing standard because the maximum affordable purchase price is less than on the Low Cost standard.

