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Drive till you Qualify: An Alternative View of Housing Affordability

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Abstract: *Choice of residential location and the transport options which flow from those choices may have significant impacts on family budgets as the combined share of expenditure on housing and transport increases. Thus the perception that housing is cheaper on the urban fringe of Australian cities may not be borne out by reality for income constrained households which are forced to spend a large share of their disposable income on transport to work. This paper builds on previous work reported elsewhere in respect of 2006 data, by examining evidence from Adelaide over two census periods, 2006 and 2011. Using census data and vehicle purchase and running cost data, a model is developed which analyses the proportion of household income devoted to housing and transport for specific locations within the metropolitan areas of both cities. Specifically we aim to address two questions. Firstly, are there affordability advantages for households on low incomes to live in the outer suburbs in the fringe metropolitan areas of Adelaide? Secondly, has there been any change in the affordability of housing, defined by its location and taking transportation costs into account, between the two census periods? The analysis aims both to inform potential housing purchasers of the likely implications for their household budgets of their choice of location and to assist planners in making zoning decisions in respect of urban fringe land and new transport infrastructure.*

Introduction

In the last decade or so there has been growing concern at the spatial extent of Australian cities, the implications of their physical size for commuting patterns, the high environmental costs of such development patterns and the decreasing affordability of housing. In this paper we seek to examine the relationship between these characteristics of the Australian city, using Adelaide as a case study example. In particular we are concerned with the possible effects on household budgets of the choice to locate on the periphery of the city, a decision which consumers of housing often justify as being driven by financial necessity. We seek to discover whether, when commuting costs are factored into the equation, living on the edge of the Australian city represents a rational choice or whether in fact it more expensive than choosing to live in the inner areas where public transport is more accessible.

Consumer perceptions of housing affordability generally focus on up front purchase or rental costs with decisions to rent or purchase being made primarily on the ratio of these costs set against household income. A considerable literature on housing affordability seeks to establish the threshold of housing stress which can then be used to establish a benchmark for affordability of housing in any given economy or city (Beer, 2007; Hulchanski, 1995; Burke & Ralston, 2004; Gabriel et al, 2005; Gan & Hill, 2009). Nepal et al, (2010) suggest housing costs should account for no more than 30% of disposable household income before becoming unaffordable. Where the policy focus is on low- and middle-income households, the Australian government uses the 30 per cent of disposable household income as a benchmark of affordability (COAG 2012:8) refined to focus only on households in the bottom 40 per cent of the (equivalised) income spectrum (ie the bottom two quintiles) (Henman and Jones, 2012). Rental affordability policy for social housing also uses a ratio approach, with rents often set at a maximum ratio of total household income, such as 25 per cent, to ease the costs for those who qualify for social housing (Henman and Jones, 2012).

Many factors affect the capital value and consequent sale or rental price of housing. Amongst these proximity to the city centre may be viewed as a key explanatory variable which tends to add to value. In Australian cities, which are characterised by their relatively low housing density, extensive suburbs and high car dependency, the suburbs immediately surrounding the CBD tend to be some of the most highly priced and therefore least affordable, in the urban area. In Adelaide in particular many of the inner suburbs consist of detached dwellings on large blocks (700-900 m²). Residential land value in the Adelaide metropolitan area decays with distance from the CBD. The eastern suburbs

within a 6k travel distance of the CBD represent a concentration of high value (over \$340K) sites and the inner northern and southern suburbs similarly represent high land values as does a thin coastal strip to the west. However the majority of western suburbs even close to the CBD display lower land values mostly between \$260- 300K. Beyond a notional 8k ring in all directions apart from east, which is constrained by the Adelaide Hills, residential land values are in the \$240-280k range.

Gusdorf and Hallegatte (2007) suggest that households choose their housing location and consumption bundle to maximize their utility. In this regard, insufficient public transport, unfavourable accessibility and long commuting distances may be traded off by households in exchange for other advantages such as a quiet location, low purchase price of land and housing or a pleasant neighbourhood (Scheiner 2006). Where there is a lack of affordable housing, there is evidence of trading of transport cost for housing cost, for example, as households seek more distant but lower cost locations for their residential location. Hanson, Schnier *et al.* (2012) define the “drive-'til-you-qualify” (DTQ) condition as follows: ‘the credit constrained household locates as far out as it must to afford the quantity of housing closest to what would be its unconstrained demand, balanced against the incremental commuting costs’.

Here we test this assumption. In choosing to live on the periphery might households end up spending a larger proportion of their income than if they had chosen to live closer to the city centre or to their place of work, when transport and housing costs are bundled together? There are a number of reasons why this assertion is worth investigating further. Firstly it may be possible that this locational decision may place some households in housing stress. Secondly, by allowing such unconstrained market driven choice, are mortgage lenders creating problems for the future? Gusdorf and Hallegatte (2007) argue that, over medium term timescales, dispersed cities are more vulnerable than compact cities when confronted with an abrupt increase in their transportation costs. Dodson and Sipe, (2008) support this argument. Path dependency in transport infrastructure provision may limit any future adaptation strategies to low energy availability and climate change (Seto and Shepherd 2009). Zoning provisions that currently support larger allotment sizes on the periphery than in the core may encourage first time house buyers, who cannot afford the price of second hand property in the core, to choose new dwellings on the periphery. Policy encouraging smaller dwellings located with public transport access as a priority may improve affordability and reduce housing stress.

Research in the USA has sought to extend the argument about what constitutes the true cost of housing by linking up front purchase or rental to travel to work costs. Two studies by the Center for Housing Policy examine the combined cost of housing and transportation across 28 metropolitan study areas in the USA. US families that dispose of more than half their total household expenditure on housing, put 7.5 percent of their expenditure toward transportation. This contrasts with working families who spend 30 percent or less of their total budget on housing. Their expenditure shares for transportation are more than three times higher, or nearly 24 percent of their household budget income (Center for Housing Policy, 2005). Whilst the share of income spent on these two factors varies from place to place, the combined total is remarkably constant at 57% of income (Center for Housing Policy, 2006). This picture contrasts with the Australian data which suggests that across all income brackets the average expenditure on housing is 18% of gross income and 16% on transport (ABS, 2011) giving a total of 34% for the average household. This figure represents a slight increase of 2% over the previous survey (ABS, 2006). Lower income Australian households with a mortgage in 2011 spent on average, 26% of their household income on housing and 14% on transport or 40% in total (ABS, 2006, ABS, 2011). Housing, transport and food account for the three greatest demands on household expenditure.

The Urban Land Institute (2009) has demonstrated through an analysis of the Bay Area of San Francisco that the combined “cost of place”, the combination of housing costs (defined as mortgage or rent) and average annual transport costs, amounts to 59% of average annual income (Urban Land Institute (2009). Typically a Bay Area household spends 39% of its income on housing and a further 20% on transport. These statistics significantly exceed the 30% of household expenditure standard suggested above as a measure of housing affordability and combined with often below average household incomes, imply a considerable degree of housing stress. For the majority of households in the Bay Area the choice is between renting in the City of San Francisco or “driving till they qualify” for a suburban block in more distant Bay Area neighbourhoods. Here we address this

issue in respect of Adelaide and ask whether it displays similar traits to the US cities discussed above.

Research method

The initial study used 2006 census data for the Statistical Division of Adelaide. In the 2006 census Adelaide was made up of 2040 Collection Districts (CD) (ABS, 2006). The analysis was repeated using 2011 Census data at which point the data collection units had changed to 3018 SA1s which replaced CDs. In both cases these represent the smallest units of data analysis which are publically available. CD boundaries were in many case adjusted when converted to SA1 format so a direct comparison between 2006 and 2011 data is not possible. However SA1s continue to represent small areas (around 200 households) and there is considerable overlap between the 2006 and 2011 units, so the overall pattern of results for the Statistical Division of Adelaide may be viewed as comparable between the two census periods. A spreadsheet based model was developed, populated with data derived from a variety of sources, notably the 2006 and 2011 Australian census (ABS, 2006; ABS, 2011), vehicle data from the RAA for typical costs of vehicle purchase and operation in South Australia and public transport cost data obtained from the public transit agency, Adelaide Metro.

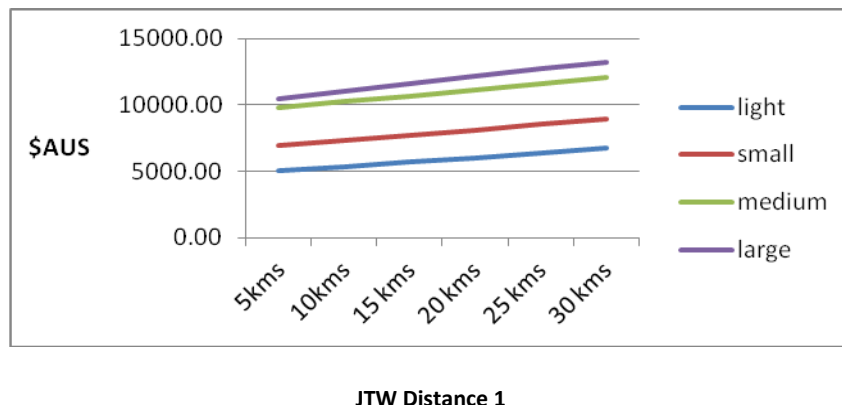
Each row of the spreadsheet represents a census area, which represents a discreet location consisting of around 200 households. The model was constructed as series of scenarios represented by columns. Each scenario assumes a different pattern of vehicle ownership and use. So each column represents a household with a different size or number of vehicles which they may use in different combinations with or without public transport for the JTW. Census data was used to determine the mean journey to work distance for each census area. Therefore the model is based on an aggregate of real home and work locations and journey distances. It does not assume all jobs are located in the Adelaide CBD. Alternative scenarios include travel to work by public transport, different vehicle sizes and numbers of vehicles per household in different combinations. In total some 60+ scenarios were initially modelled. Each scenario represents the percentage of household income which is taken up by the combination of housing costs (either mortgage or rent) and transport to work. Thus we broadly replicate the analysis carried out by the US studies mentioned above using actual 2006 and 2011 census data. A full description of the method and data sources used is set out in Kellett et al (2012).

Results

Graphing the full range of 60 scenarios for buyers and renters demonstrates a number of key patterns. The proportion of household income spent on the combination of rent or mortgage and transport displays a similar profile across different locations for similar transport scenarios. Whilst the actual amounts and percentages of expenditure vary with location, since the length of the typical journey to work may vary, the relative positions of the different transport scenarios form a consistent pattern. So for example, whether renting or buying, a household with a small car always spends a lesser proportion of its income on the combination of housing and transport than a household which owns a large car or a household which owns two cars regardless of its location within the metropolitan area.

For any given location rental costs are generally lower than mortgage costs. Second the lowest cost scenario for both renters and buyers is not to own a vehicle and rely on public transport for the daily journey to work. However, once a household has purchased a vehicle it may be more economical to use it for JTW than to use public transport. The critical factor is the distance of the JTW. The ownership costs of a vehicle (purchase, maintenance and legal costs) considerably outweigh the running costs of fuel, oil and tyres for most metropolitan journeys to work. Expressing this finding another way suggests that public transport costs will be higher than the cost of fuel and tyres to the private car owner for shorter metropolitan JTW. Nevertheless, the RAA vehicle data suggests that overall, ownership costs have a greater impact on household expenditure than do fuel costs. Figure 1 presents a summary of private transport cost analysis for Adelaide, showing the stronger influence on total household expenditure of vehicle capital cost and size over commute distance.

Figure 1: Relative costs of different vehicle ownership and use



Households with two or more vehicles spend a proportionally greater proportion of household income on transport. The difference between owning and operating one small car and two cars, say an SUV along with another large vehicle, can be as much as 30% of household income for both renting and mortgaging households.

The starting point for the analysis was identification of all CDs where household income was at or below the median for Adelaide. In 2006 this accounted for 31% of all CDs distributed fairly evenly across the metropolitan area, although as expected, the incidence was reduced in the wealthier inner eastern suburbs. Of this 31%, 165 CDs (8%) spent more than 30% on rent or mortgage, so could be viewed as suffering housing stress. This 8% of households tend to be less spatially widespread and are largely confined to the core of the metropolitan area, reflecting the higher land and housing costs of the inner metropolitan zone. By 2011 however conventionally housing households stressed are distributed widely across the entire metropolitan area.

The following analysis relates only to census areas where household income is at or below the median for South Australia in the relevant census year. In 2006 the overall number of CDs where households are spending more than 50% of household income on housing and transport increases as the size and number of motor vehicles owned increases. Using the lowest cost scenario of households which own and use one light vehicle for the journey to work, the results shows that in 2006 such stressed households account for 9% of CDs for mortgagers. If they own a similar sized car but use public transport for the JTW the proportion is similar suggesting that the costs of running a light car for a typical JTW are similar to the cost of public transport. However, if they do not own a vehicle and use public transport for the JTW then only 1% of all CDs spend more than 50% of household income on housing and transport. Renters in 2006, if they choose either not to own a car or own only a light car, overwhelmingly spend less than 50% of household income on housing and transport as Table 1 below demonstrates.

Table 1: Proportion of Adelaide household income spent on combination of rent/mortgage and travel for JTW for households at median income or less by census area (2006 = CD, 2011 = SA1).

Scenario	% of household income	CD 2006 n = 633				SL1 2011 n = 1101			
		Renting		Buying		Renting		Buying	
		n	%	n	%	n	%	n	%
No Car. Travel to work by public transport	<50%	0		602	95	1004	91	844	77
	50-59%	0		9	1	13	1	66	6
	60-69%	0		1		2		62	6
	70-79%	0				1		16	1
	80+%	0		1		0		19	2
One light car. One household member travels to work by public transport	<50%	607	96	554	88	762	69	248	23
	50-59%	5	1	40	6	215	20	303	28
	60-69%	2		13	2	16	1	307	28
	70-79%	0		5	1	11	1	84	8
	80+%	0		1		4		65	6
One light car. One household member travels to work by car	<50%	607	96	559	88	893	81	502	46
	50-59%	5	1	40	6	89	8	272	25
	60-69%	2		10	2	21	2	84	8
	70-79%	0		4	1	1		85	8
	80+%	0		1		4		64	6
One large car. One household member travels to work by public transport	<50%	462	73	294	46	114	10	28	3
	50-59%	124	20	188	30	532	48	109	10
	60-69%	20	3	101	16	226	20	404	37
	70-79%	7	1	20	3	114	10	273	24
	80+%	1		11	2	22	2	193	18
One large car. One household member travels to work by car.	<50%	460	73	293	46	152	14	33	3
	50-59%	126	20	198	31	543	49	107	10
	60-69%	24	4	93	15	204	19	407	37
	70-79%	2		20	3	88	8	275	25
	80+%	2		10	2	21	2	185	17

NB in the total data set there are a small number of cases where income data = 0. These are excluded from analysis in the table. (2006 = 19; 2011 = 94) so % may not total 100.

Table 1 selects five typical scenarios for buyers and five for renters for 2006 and 2011. Whilst numerous multiple car household scenarios were modelled, these are excluded from the discussion since they invariably result in a budget expenditure greater than 50%, which is taken as an indicator of stress since it considerably exceeds the norm of 40% for lower income Australian households cited above. The analysis in Table 1 demonstrates that occupiers who choose not to own a vehicle and travel to work by public transport almost universally spend less than 50% of their household income on a combination of housing and transport. This observation remains valid for both 2006 and 2011. However, it is unusual for households other than those resident and working in the CBD to be able to make this choice. Only 9% of households in Greater Adelaide do not own a motor vehicle (ABS, 2011 Quickstats) and outside of the inner metropolitan core surrounding the CBD less than 10% of journeys to work are made by public transport. Once vehicle ownership is factored into household expenditure we begin to see a changing situation. Whilst renting households appear to be able to support the purchase and operation of one light vehicle in 2006 without spending more than 50% of their budget on housing and transport, five years later in 2011, 10% of SA1's are spending more than 50% of the household budget on housing and transport. For households purchasing their property with a

mortgage expenditure is immediately greater than for renters. So ownership of a light car pushes renters in 7% of CDs over the 50% threshold in 2006 but this proportion increases to 70% 5 years later. This is a dramatic rise which is reflected in all of the comparisons of similar vehicle ownership and use scenarios between 2006 and 2011 for households who are buying as opposed to renting. Whilst vehicle purchase and running costs increase over the inter-censal period, it is the house purchase costs that appear to be responsible for the increased levels of combined expenditure. The census data reveals that average mortgage repayment costs in Adelaide rose by 30% between 2006 and 2011, whilst median incomes rose by 14%, or less than half as much (ABS, Quickstats, 2015).

Table 2 presents scenario results for those households selected from the total dataset for Adelaide, where income was below the median level and mortgage housing costs represented a percentage of total income above 30%.

Table 2: Percentage of census areas showing stress various measures

	2006		2011	
	n	%	n	%
Total census areas	2040	100	3018	100
Census areas below median household income	633	31%	1101	36%
Census areas in conventional housing stress as a proportion of all areas	165	8%	770	25%
Census areas in conventional housing stress as a proportion of low income household census areas	165	26%	770	69%

In 2006 31% of all CDs had a median income at or less than the state median income level (\$AUS 49,608). This proportion rose to 36% in 2011. The conventional measure of housing stress suggests that in 2006 8% of all CDs represented households which fell into this category. This rose substantially to 25% of SA1's in 2011. Taking only those CDs where household income in 2006 was below the median level we observe that 26% of CDs had housing costs greater than 30% of total income, that is they were in conventional housing stress. However the situation five years later contrasts starkly. In 2011 36% of all SA1's were below median household income level (\$57,512) and for those SA1's we observe the proportion in conventional housing stress rising to 69%.

When transport options are input, the stress of housing and transport costs combined increases the overall stress levels as soon as a household purchases a vehicle. Even a light vehicle impacts on expenditure levels for mortgaging households and the proportion of census areas identified as spending below 50% drops from 88% in 2006 to just 23% in 2011. Once households purchase a large car or multiple vehicles then for mortgaging households the unstressed proportion of census areas drops from 46% in 2006 to just 3% in 2011. In a number of cases the proportion of income spent on the combination of household and transport exceeds 80% of household income leaving very little or nothing for other items of household expenditure such as food, clothing, utility bills, education or entertainment. Even in those cases where the total expenditure on housing and transport is less than 100% of income, there are a number of scenarios where the proportion spent on these aspects takes up more than 70% of income which, when compared to the Australian Family Expenditure Survey data, suggests that these households would be in a position of stress as a result of having insufficient funds to cover other household expenses. In respect of spatial distribution then in 2006 we observe that most CDs which spend more than 50% on housing and transport are located in the core of the metropolitan area. This observation holds for households with one light car. CDs exhibiting stress as result of ownership of larger cars or multiple vehicles are widespread across the metro area. Once we move to 2011 there is no discernible pattern of distribution, with SA1's spending 50% or more spread widely across the entire metro area. This observation suggests that up until 2006 the outer suburbs may well have been more affordable for low income households, even when they factored in their travel costs. The vast majority of households in fringe and outer locations in 2006 spent less than 50% of their household income on housing and transport regardless of their income levels. But by 2011 this was no longer the case. Drive till you qualify may have operated with judicious choice of vehicle costs until recently, but this analysis suggests it no longer holds good.

Discussion

The analysis undertaken here uses actual rental and mortgage costs in all locations but models the transport costs. Whilst these are based either on the real cost of public transport or ownership costs of particular vehicle types, we cannot be certain how specific households behave in reality. However, since public transport accessibility is undoubtedly better within the inner metropolitan area it is reasonable to suggest that households living in this region have greater opportunity to utilise public transport for the JTW, thus reducing their need to own multiple vehicles and thereby expend relatively more on housing than on transport. As in the US studies the family expenditure survey data suggest that while the total proportion of expenditure spent on housing and transport is remarkably constant, the relative proportions vary according to income, so households in the lowest income quintile spend 20% on housing and only 12% on transport whilst households in the highest quintile spend 15% on housing and 17% on transport (ABS, 2011). The widespread distribution across the metropolitan area of households which are spending more than 50% of household budget on housing and transport set against the Australian average of around 34% of household budget being spent on these two aspects, suggests that households on median income level or below which spend more than 50% of their household budget on housing and transport may be considered to be under stress.

Whilst much of the data used in the above analysis may be considered highly reliable, the assumptions made in the modelling may be more questionable. In reality households are likely to discriminate in respect of the age, size and consequent price of vehicles which they purchase and use for the JTW in order to better manage overall household budget. Thus it is possible that the motoring costs used in this study are inflated as they represent the RAA's vehicle cost estimates which assume purchase on new vehicles with regular servicing etc. This approach to reducing vehicle and transport costs goes some way to explaining the varying proportions of income spent on housing and transport in the US studies, which demonstrated a remarkable consistency of overall spend on housing, as broadly defined, in all locations whilst the relative proportions spent on mortgage/rent and transport varied with location. It is beyond the scope of the current research to examine these aspects in detail in respect of Adelaide. However, the findings of the present study do suggest that many households are choosing to live on the fringe as this helps them maintain housing affordability whilst allowing them to invest in the type of housing and housing environment that they prefer. The mapped analysis does not indicate a spatial concentration of unaffordability in any particular location beyond perhaps the core metropolitan area in 2006. Whilst it does show that the combination of housing and car ownership package becomes increasingly unaffordable as the number and size of vehicles increases, it does not suggest that unaffordability is any worse in fringe areas than in the inner suburbs. The *drive till you qualify* concept appears to be borne out by consumer behaviour in metropolitan Adelaide until quite recently and may have represented a rational choice for many households. However, by 2011 it appears that the housing/ transport package has become unaffordable for many households wherever they are located.

Nevertheless, trade-offs other than the classic "drive till you qualify" may be possible. Firstly, households could choose to rent or buy accommodation closer to the CBD where land and property prices are relatively higher but reap the benefits of more frequent and accessible public transport links for the JTW in order to reduce their private car dependence. This choice may also involve compromising on property size in order to reduce mortgage or rental costs. Secondly, those households whose earners do not work in the CBD could choose housing locations which are sufficiently close to their workplace as to not require a car trip. Walking, cycling or public transit if available could substitute for the car and therefore reduce overall costs. We acknowledge however that for households with multiple wage earners such convenient access to all relevant workplaces may prove difficult. Nevertheless, if one wage earner can access the work place without recourse to a private car, overall household costs are likely to be reduced.

Conclusion

The data shows that housing affordability as assessed in conventional terms has worsened significantly in Adelaide in the period 2006-2011. Prior to this period it appears that the *drive till you qualify* notion may have represented a successful strategy for many low income households who may have optimised their choice of housing by living on the fringe, paying less for housing but more in transport costs than residents in the core. Since 2011 the analysis above suggests that there is not a correlation between distance from the Adelaide CBD and the proportion of household income spent on housing when this proportion is defined to include both the cost of mortgage or rent plus the cost of transport for the JTW. Rather the incidence of SA1s in 2011 is so widely distributed that, as in the case of the US Bay Area study, a high proportion of households on median incomes or below are spending more than 50% of their household budget on the combination of housing and transport regardless of their location. Despite a decay in land values as distance from the CBD increases, recent increases in housing prices along with the cost of investment, maintenance and operation of multiple private vehicles, which is necessitated by living and working in often widely separated and transit inaccessible locations, means that poorer households can no longer gain by *driving till they qualify*. Out on the fringe recent purchasers below median income are now as likely to spend as high a proportion of their household budget on this combination of housing costs as poorer households located within the metropolitan core. This finding is at odds with the family expenditure survey data which suggests a relatively constant 32% of expenditure on the combination of housing and transport across all household income levels. Adelaide households on the urban fringe are choosing to spend less on housing and more on transport compared to their counterparts in the inner suburbs in order to secure housing of a size and quality which they desire but the result places stress on household budgets. Only those rare households who can live without a vehicle are immune from such stress and outside of the city centre this scenario is largely untenable.

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