

Smarten up! Applying market design theory to greyfields housing supply.
Background paper
Housing Melbourne: Innovation for good design, urban renewal and affordable supply
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Introduction

This paper examines whether recent innovation in market design can address persistent problems of housing choice and affordability in the inner and middle suburbs of Australian cities. Australia's ageing middle suburbs are the result of a low density and highly car-dependent garden city greenfield approach to planning that failed to consider possible future resource or environmental constraints on urban development (Newton et al., 2011). Described as 'greyfield' sites in contrast to greenfield (signalling the change from rural to urban land use) and 'brownfield' (being the transformation of former industrial use to mixed use, including housing), intensification of development in such areas is expected to deliver positive social, economic and environmental outcomes (Trubka et al., 2008; Gurrán et al., 2006; Newton et al., 2011; Goodman et al., 2010). Yet despite broad policy consensus progress remains elusive (Major Cities Unit, 2010). In this paper we argue that the application of market design theory, specifically through the internet-based coordination of market information, offers a new policy approach and practical measures to address these problems.

New market design approaches such as smart markets and matching markets have enabled stunning improvements in resource allocation for a wide range of goods and services. However, to this point, their application to the housing sector has been limited. In this paper, we outline the theoretical and practical dimensions of market design theory, and discuss how its application to housing markets can challenge prevailing market structures, assist with greyfields redevelopment, and boost housing choice and affordability.

The paper begins by discussing housing supply in Australia, with particular reference to the problems of securing multi-unit housing through existing market structures. We then make a case for diversification in housing procurement by introducing Housing Development Cooperatives (HDC) as a new sector particularly suited to delivering multi-unit housing. We argue that the viability of HDCs can be greatly enhanced by the application of market design theory, which is outlined in the section that follows. Here we focus on new market types – matching markets and smart markets – that are facilitated by increased computing power and the internet. Market theory is then applied to two housing sub-markets: private multi-unit residential development, and the affordable housing sector. In the former, the contribution of market design to aggregation and the central role of a smart market manager is explored. In the latter, the discussion focuses on the role of market design in unlocking new sources of land equity, specifically under-utilised land assets of not-for-profit agencies (NFP) and local government authorities. The paper concludes with a discussion of land trust mechanisms which could facilitate such land being part of the much

needed innovation in affordable housing supply.

Background to multi-unit residential housing development in Australia

There is a serious mismatch between new housing supply and demand in Australian cities. The National Housing Supply Council has forecast a substantial and growing gap in supply and demand of dwellings over the next few decades (NHSC, 2010). This mismatch includes location, type and affordability of dwellings. The 'greyfields' or middle ring suburbs in major Australian cities are identified in recent policy statements and critical analysis as the prime locus for solutions to this problem (Trubka et. al 2008; Gurran et al. 2006; Adams 2009; Newton et.al 2011; Goodman et.al 2010).

Greyfield residential precincts are defined here as under-utilised property assets located in the middle suburbs of large Australian cities, where residential building stock is failing (physically, technologically and environmentally) and energy, water and communications infrastructure is in need of regeneration. Greyfields are usually occupied and privately owned sites typical of urban development undertaken from the 1950s to the 1970s (Newton et al. 2011:1-2).

The Australian residential development market is characterised by high rise apartments in and near the central business district; and tract development of low density, usually detached dwellings on the urban fringe (Berry, 1999; Alves and London, 2012). Research by Phan et al. (2008) and Ruming (2010) suggests residential development in the middle, greyfield suburbs is dominated by 'opportunistic' small scale multi-unit housing. These developers tend to build between three and five, one or two story attached dwellings on sites that formerly contained a single detached house. They are generally unconcerned with 'good' design and sustainability. Newton suggests this 'informal' development is undertaken by very small scale building firms and individuals, much of which is speculative (2011: 21). Notably, 'the uncoordinated nature of this redevelopment limits choice in dwelling design, performance and quality. Without strategic oversight, there are no corresponding improvements in infrastructure, servicing or amenity' (Newton et al. 2011: 21). There are also development firms building 'higher-density apartment typologies in response to strategic development policies' (Newton et al. 2011: 21). These developers have a corporate structure and fund projects through debt finance (Chandler, 2009). These apartments too are often criticised for poor design, material quality and sustainability. Affordability, to the extent that it can be claimed, results from reducing floor space, ceiling height, reliance on borrowed light and sub-optimal ventilation. The norm is one or two bedrooms with an increasing number of studio apartments (that is, bedsits) being offered. New product is often priced above comparable detached stock, necessitating borrowing for those wishing to downsize.

Despite the corporate residential development sector delivering a largely undifferentiated offering, this sector has both the size and technical capacity to embrace innovation, and has the potential to increase output. Accordingly, it is corporate residential developers with whom we are concerned rather than owner builders. However, as will be discussed shortly, there are also opportunities for new entities to engage in multi-unit development which we see as important for increasing the supply of affordable housing.

Increasing dwelling density within the existing urban form is a key policy objective to improve the sustainability and efficiency of Australian cities; however a significant increase in the number of housing units has not been realised (Major Cities Unit, 2010). Planning regulation is cited as a key barrier resulting in considerable contestation about the nature of reform required. The other widely acknowledged hurdle, residential development finance (RDF), is the subject of limited research and policy debate. RDF is a critical consideration in the development process, a fact which became increasingly apparent following the recent global financial crisis (GFC). Renewed attention to risk meant that RDF became harder to obtain in Australia after the GFC. The cost of money and liquidity are highly influenced by global markets. However the cost of money also reflects development risks, which are generally local. These include land cost, consumer demand and

capacity to pay, cost of materials, labour and, of course, planning and building regulations. These variables have historically justified the argument that multi-unit residential development is high risk requiring a high rate of return. The consequence is a partially speculative industry, offset by financier's requirements for pre-sales as discussed in the following section.

The loan application process for development finance is far from transparent. The lending policies of financiers and the key approval criteria are rarely explicit. Applications are assessed on a case by case basis by multiple levels of credit management hierarchy. Prospective borrowers are faced with lengthy negotiation periods following extensive information exchange about every detail of the project and the borrowers themselves. This complex credit assessment process can be compressed into the 'Five Cs' of credit assessment as indicated in Table 1.

Table 1: The 'Five Cs' of Credit Assessment

Five 'Cs'	Description	Includes
Character	Appraisal of the borrower's integrity	Character Competence identification Social and financial stability Honesty and reliability
Capital	Appraisal of the borrower's financial strength	Assets and liability statement Title searches Gearing
Capacity	Analysis of the borrower's capacity to repay	Cashflow Confirmation of income/project revenue
Conditions	Analysis of key external and internal factors	Loan conditions and covenants Market and economic conditions
Collateral	Appraisal of security available to support the borrowing	Mortgage Guarantee Lien Multipartite agreements Fixed/floating charges

Source: Adapted from Weaver and Kingsley (2001) and Weerasooria (1998).

Even where credit worthiness can be established, project funding hinges on the most critical part of the development process: pre-sales (Bryant, 2012; PCA, 2012).

The presale role in lending criteria is two-fold. Firstly, it confirms the design and pricing of the product is acceptable to the housing market (Conditions). Secondly, settlement of presale contracts form the future cashflow/revenue for the project and therefore confirm the Capacity of the project to repay its debts (Bryant, 2010: 390)

Providers of RDF (primarily banks) require a nominated percentage of pre-sales prior to the extension of monies required to commence construction. The need to obtain pre-sales within a limited timeframe, in turn stifles innovative product development with a resulting loss of quality (Chandler, 2009). This may reflect the impact of 'cottage' investors purchasing apartments for future rental income (up to 60% of apartments¹) or the high proportion of cottage investment may simply reflect what is being built. Chandler (2009) argues reliance on cottage investors has inhibited long overdue reform to the housing development sector. In this context owner-occupiers are hard pressed to influence the apartment product coming onto the market. Furthermore, cottage

¹ Chandler 2009: Landlords in Australia typically own less than three properties (Hulse et al.. 2012). Unlike the US there is currently no large scale equity investment into long term private rental housing.

investors, particularly those who have borrowed to purchase, are able to deduct the interest accruing on their loans against their other taxable income as a result of Australia's idiosyncratic negative gearing provisions. More recently investors can claim a tax rebate of around \$10,000pa for period of ten years if they accept a tenant eligible for the National Rental Affordability Scheme (NRAS). This scheme requires a rental discount of 20% of market rents over the period. Both these schemes are ostensibly aimed at increasing the provision of rental housing. This is not the place to discuss the merits and efficacy of these schemes but it highlights the disadvantage of owner-occupiers within the apartment market.

Pre-sale involves the purchaser 'buying off the plan', or signing a contract with the developer prior to the property being completed and having its own certificate of title. In some instances this will may occur even before the development is approved by the local planning authority. The purchaser pays a deposit which is held in a trust account. When the property is completed, the balance owing is paid and the property title transferred. A significant advantage for purchasers in some Australian states is that they avoid paying stamp duty on the transfer of the title. At the time of signing the contract the purchaser will typically see architect's drawings, a floor plan, a schedule of finishes and other disclosure documentation but will have little recourse if there are design changes. In addition they have no control over who builds the development and have no guarantee of a completion date. It is possible that the development may not eventuate. For the developers and financiers there is a risk of default at settlement and the subsequent legal process to enforce the contract an issue in 2008/2009 when purchasers were unable to obtain finance (Bryant, 2010). Bryant (2010) found a change arising from the GFC is that the pre-sale marketing costs are now covered by the developer's own equity contribution to the project rather than being funded by borrowings. This requires developers to prioritise projects to the most profitable only, further reducing the supply of affordable housing.

For all of the importance of pre-sales, procurement appears to have altered little over past decades. Real estate agents are engaged to handle sales and inquiries, including operating display units. This typically costs around 2% of the dwelling sale price and up to 6% where investment marketing techniques are employed. Actual marketing costs are in addition to this and can include newspaper, magazine, internet, television and radio advertising, home show displays and even international trade delegations. Elaborate display suites are constructed and fitted out and glossy brochures produced all in the effort to entice a buyer to commit sometimes years in advance of any product being delivered. In short a lot of effort and money goes into finding buyers. The search problem is very considerable.

Dolin et al. (1992) identified that a gap in the market existed for consumer initiated apartments. They recognised that while an individual could purchase an existing house or apartment, or could initiate the construction of a detached dwelling they were unable to initiate the construction of an apartment. Their response was to call for development cooperatives whose specific aim was to build multi-unit housing. They called this proposal 'Sector 4 Housing'². Although the authors formed a cooperative in the early 1990s and built an apartment block in Perth, Western Australia, and established significant cost savings could be achieved their recommendations for establishing an 'Institute' to facilitate this form of development was not taken up by the Western Australian government or elsewhere in Australia. Forty years on people buying apartments remain with little choice other than developer initiated products.

Since then some German state governments have facilitated 'terminating housing cooperatives' (THC) which operate along the line envisaged by Dolin et al. (1992). A cooperative is formed to undertake the development and then terminated when the development is finished, at which point strata titles are created. These cooperatives are an established development model in Germany delivering significant cost reductions, and greater consumer satisfaction and housing performance

2 Housing consumers can purchase an existing house or apartment, or can initiate the construction of a house but they cannot initiate the construction of a apartment. These other options are the other 3 sectors within the Sector 4 typology.

(Alves and London, 2012). As the Office of the Victorian Government Architect (OVGA) notes it is 'rare for individual households to initiate multi-unit housing development in which they intend to own and/or occupy a unit...In effect, the housing development co-operative takes the place of the developer in a multi-unit development. By removing speculation from the development process, the households involved stand to make substantial cost savings, while also having far greater control over the outcome than if they were buying a unit 'off the plan''(OVGA 2012). Economic theory also suggests that the entry of HDCs into the market would place competitive pressure on corporate developers to lower prices and focus more on consumer preferences.

Both the corporate (speculative) model and the cooperative (deliberative) development model rely on the timely engagement of the individual owner/investor to attract RDF to allow construction. This is where innovation in market design can be of immense value.

Market design: smart markets and matching markets

In setting out to apply market design theory it is important to appreciate the extent to which housing as a commodity deviates significantly from the ideal market. Smith suggests housing market behaviours require explanation(s) that are as unique as the asset class itself (Smith, 2011a). In classical economic theory the following features set housing apart from other types of assets:

- * Durability: houses are expensive and have long lives;
- * Fixity: houses are fixed in time and space; locality is an important aspect of desirability. This can result in disequilibrium in particular submarkets as a result of changes in demand;
- * Uniqueness and heterogeneity: each house is different because it is built in an exclusive space and the durability means there may be significant alterations over time;
- * Infrequency of trades; barriers exist to selling and buying housing; consumers have imperfect knowledge; search costs are high; purchase often involves some form of bidding;
- * Housing is more than a house: consumers purchase a bundle of attributes;
- * Supply (construction) time is lengthy, as are title transfers;
- * Housing is increasingly an investment as well as consumption.

As Marsh and Gibb (2011) note a purchaser's decision to buy is heavily influenced by market intermediaries acting as gatekeepers reflecting the impact of such market imperfections. Within the context of such an imperfect market, understanding consumer preferences is an important issue for public policy and for supply-side investment. Yet as housing and planning debates in Melbourne show (see Birrell et al. 2012; Kelly et al. 2011) these market imperfections have serious and long lasting ramifications.

Market design is a relatively new branch of economics that has developed from the convergence of game theory and experimental economics (Roth, 2007). Roth describes market design as 'a new branch of economics...[that] can create markets where there were none or fix them when they go wrong' (Roth, 2007: 1). This new capacity has been enabled by the vast increases in computing power and the internet. Two variants have emerged from the practical application of market design theory. These are two-sided *matching* markets, and *smart* markets. Matching markets and smart markets facilitate transactions amongst a pool of participants rather than bilaterally between one buyer and one seller. Each aggregates and coordinates information, reducing transaction costs and minimising negative externalities (Stoneham and Thomas, 2011).

Much of the success of matching and smart markets is owed to their ability to aggregate a critical number of potential buyers and sellers so that market participants can achieve a satisfactory transaction. In the language of market design, aggregation produces market *thickness*. Roth also identifies two other necessities. First, the market must be *safe* for the market participants. That is, participants must have the confidence and incentive to reveal the information they hold. Second, sometimes market processes can become victims of their own success: thickness can create *congestion* so market design must ensure transactions are conducted quickly and satisfactorily.

In matching markets, market-like allocation occurs but price is not the mechanism that clears the market. In addition, the agents – the buyers and sellers – have specific requirements or conditions that must be met. One of the most celebrated matching markets is for kidney donation. A large proportion of people in need of a kidney transplant die each year because live donors (those willing to donate) are not compatible with the person they wish to donate to. Roth et al. (2007) modelled the potential for a paired donation process. They examined the possibility of exchanges between a pair of patient and willing but incompatible donor (typically a family member) and other such pairs. Transplants involving swaps between two pairs proved unfeasible. However when there was enough thickness in the market, that is, when there were sufficient numbers of pairs in a scheme, simultaneous swaps (transplants) could occur involving as a little as three pairs. Other examples of matching markets in the US are the hiring of new doctors (interns) and choice of school programs (Roth, 2007). Matching markets in effect have become 21st century clearinghouses.

The principle of the matching markets is evident in choice-based letting (CBL) (Pawson and Hulse, 2011; Hulse and Burke, 2007). CBL is a method of social housing allocation.

A Choice Based Lettings (CBL) scheme gives applicants the opportunity to bid for properties which are most appropriate for their needs. A CBL scheme works by Local Authorities and Registered Social Landlords (RSLs) advertising housing to potential applicants via local newspapers, newsletters or on a website. The system then identifies the successful bidder, which is the applicant who has the highest priority. In this case priority is based on the applicant who has the most critical needs (Pavier nd: 1).

Traditionally public housing aggregates eligible applicants by placing them on waiting lists. In the Australian context, waiting lists are segmented and housing is allocated according to priority. There are virtually no search costs. A tenant is called and given a small amount of time to accept an offer and there is significant disincentive to refuse.

Choice-based letting has led to considerable improvement in the allocation process, greater tenant satisfaction and cost savings. CBL is possible because of the internet. In market design terms CBL is a two-sided matching market. The term 'matching' is used to denote that price is not the mechanism that clears the market and that the 'agents' - the tenant and landlords in this case - have specific criteria that both want met. On the social housing side it is eligibility criteria; and for the tenants the specific housing on offer needs to conform to their needs and desires. With CBL a pool of social housing providers exists on one side and a pool of tenants exists on the other. A platform – an internet marketplace – enables their mutual preferences to be sorted and matched efficiently and quickly.

In smart markets price plays its traditional role in clearing the market. Smart markets operate in a range of settings including the wholesale electricity and gas markets (Oren, 2004; Pekec and Rothkopf, 2003), mobile phone spectrum rights and airport take-off and landing slots. The latter two markets are characterised by the need for purchasers to buy a suite of rights; for phone users, the ability to call is dependent on the receiver's ability to take that call. Similarly, airlines need destinations as well as points of origin. The selling of such rights is typically through combinatorial, on line auctions. Smart markets are in development or have been proposed for traffic congestion (Markose et al. 2007) and water pricing (Raffensperger, 2009). In Victoria, the Department of Sustainability and Environment (DSE) has established a smart market for vegetation offset (DSE, 2012) and Victorian Treasury officials have proposed smart markets for planning issues including car-parking requirements, developer contributions and planning objections (Stoneham and Thomas 2011).

The application of market design theory to housing is under-developed. Albrecht et al. (2006) have applied the theory of matching markets to the buying and selling of existing house stock. This exploratory analysis highlights the extent to which housing deviates from the economic ideal, which

in part explains why there are persistent market inefficiencies.

Nevertheless smart market pioneer Charles Plott created a smart market to sell apartments in the US (Intellimarket, n.d). Plott noted that auctions of apartments (where all apartments go to auction at once) meant buyers who failed to gain their first preference were not in a position to bid for their second preference. This meant sub-optimal prices for vendors. The smart market enabled purchasers to simultaneously lodge bids on multiple dwellings but remain liable for only a single purchase. As all the bids are lodged at the same time, the sale prices remained higher than it would have otherwise been.

If we look at the German experience of THCs, the state has supported the formation of aggregators or seller/agents in the terminology of market design. These aggregators are predominately architect-led. In effect a two sided matching market has been brought into existence to overcome the failure of the market to match supply and demand. Current aggregation for THCs however is small scale.

Aggregation is the key to efficient allocation of social housing and the formation of THCs. Theoretically, aggregation could occur for the sale and purchase of existing private housing in Australia. However, in the following section we explore how the application of aggregation and market design theory could work in improving the supply of new multi-unit housing in existing urban areas where policy-makers are seeking housing intensification. Specifically we consider the cost impact on corporate residential development.

A leap forward: aggregation of housing consumers

The Australian housing system is with one major exception (social housing) characterised by bi-lateral trades – that is, sales are between a single seller and single buyers. The creation of a pool of potential buyers on one side, and a pool of developers/development opportunities on the other offers the potential to reduce the search costs associated with obtaining pre-sales. Aggregation enables potential purchasers to be pre-identified and their preferences assessed, and allows for communication with developers prior to major decisions being made. It not only telescopes the campaign for pre-sales but opens the way for a far more collaborative approach to development. The onus is on developers to consider their brand and product offer. As a key risk can be substantially avoided development need not be speculative. Indeed, with buyers literally on the ground at project conception, especially owner-occupiers, community hostility to increasing density may also be mitigated.

Large scale aggregation of buyers is not something an individual developer would be likely to undertake, but it is the ideal function for a third party who could provide it as a service to both buyers and sellers. The aggregator could be the market manager. For our purposes, if you have a Smart Housing Market (SHM) there needs to be a Smart Housing Market Manager (SHMM).

For its users the SHM is an interactive website where they can manage their profiles, browse, and learn (there is a substantial opportunity for on-line education tools relating to all aspects of purchasing, selling, renting and maintaining housing). Vendors (in this case corporate residential developers) can promote their previous developments, not just the current project. They can innovate to provide not just high quality virtual tours but housing avatars to assist buyers make decisions. Potential buyers can be invited to meetings or tours of existing properties.

In order to appreciate the extent of innovation we can compare the SHM to websites that advertise real estate, such as domain.com.au and realestateview.com.au. These websites are advertising sites with limited functionality or interactivity. Potential purchasers browse the advertisements which direct them to vendors, usually real estate agents. Buyers can register on these websites but can only access a limited dashboard of search tools. The website manager has very limited knowledge of what the consumer wants. So long as they get hits, advertisers seem happy. However, the popularity of these websites suggests at least some level of acceptance of internet-

based transactions by housing consumers.

The SHMM on the other hand actively recruits potential buyers, obtains their preferences and capacities and matches them to opportunities (that is, segments them). Developers then have the opportunity to shape their offering to actual consumer preferences. They then have the opportunity to seek a level of commitment prior to purchasing land and/or seeking RDF.

A SHM is a communication tool. For THCs, or as we prefer to call them Housing Development Cooperatives (HDCs), aggregation of member/purchasers is as critical to their project finance as it is for corporate developers. HDC members need to commit early in their project. But real life gets in the way of good intentions, and people will pull out, potentially jeopardising projects. Large scale aggregation and segmentation provides the answer. A HDC may form to build a 20 dwelling apartment block, but having people drop out is a risk. Knowing that there are another 30 would-be buyers on a waiting list, of whom 20 could literally step into the breach substantially reduces the risks for everyone. The SHM is the mechanism by which HDC members can find each other, and find a development opportunity. In a sense the SMH works as a kind of crowd sourcing.

One of a SHM's desirable features is its capacity to service a range of markets concurrently. The larger the scale the more efficient it is. Large scale aggregation permits robust segmentation into specific housing tenure or options. For example the SHM can also aggregate private rental tenants enhancing the efficiency of the NRAS by permitting developers to avoid the 'double search' problem (finding purchasers of the apartments and attracting tenants who must be assessed according to eligibility criteria). Aggregation of tenants would benefit equity investment into long-term private rental, as proposed by Landcom (2010). As the reference to NRAS tenants suggests, a SHM can overcome some 'market failures' for community housing organisations. In the next section we will outline how a SHM can support innovation in the affordable housing sector.

Affordable Housing - NFP sector

The affordable housing sector is largely comprised of not-for-profit organisations that in the majority of cases provide subsidised rental housing to people eligible for public housing. These organisations have in recent times been required to register as housing associations or providers in order to capture capital grants from government. There are not-for-profit organisations that have opted not to seek registration and their funds are derived from private sources. Historically, such organisations have supplied housing to client groups via a variety of arrangements. Land and/or dwellings were sometimes donated or bequeathed by private individuals, families or communities in exchange for life tenure of a specific person in need, or to address a more general need. Ground lease arrangements were quite common. In the case of independent living units (ILUS), the federal government provided funding for construction where local government or communities could supply land (McNelis, 2007). Service organisations such as Rotary, Lions and the RSL remain substantial providers of ILU accommodation for older people (McNelis and Sharam, 2011). ILUs can be rented or a licence to occupy purchased. Purchase options are far less common for other affordable housing types. Shared equity schemes have been mooted but these have remained mostly within the province of governments.

Capital for housing associations and providers is subject to the periodic funding derived from the National Affordable Housing Agreement (NAHA), although the National Economic Stimulus Plan (NESP) separately funded over 19,000 dwellings and the Victorian Government provided an additional \$510m over four years in the 2007/08 budget (VCOSS, 2009). A consequence of the NESP, coinciding as it did with a sharp decline in housing affordability, was interest from NFP organisations with land equity but who had not previously provided affordable housing. However, as the purpose of the NESP was to quickly generate economic activity these NFPs were poorly positioned to take advantage of the funds. They nevertheless remain interested in housing provision and have land but lack a source of capital for construction. At present there is only anecdotal evidence as to the scale of available land held by NFPs that could be utilised for affordable housing, and no simple methodology for calculating it.

However, there is every reason to believe that significant land or airspace may be available (McShane, 2006; Mian, 2008). Consistent with the historical growth patterns of NFPs and membership organisations, a proportion of these assets are located in greyfields areas (Barraket, 2008; Leigh, 2010; Lewi and Nichols, 2010; Lyons, 2001). Ageing assets and declining membership pose organisational dilemmas for managing buildings. Sale onto the open market is often the easiest solution, although, as the sale of the inner-Melbourne Ascot Vale Bowls Club in 2001 demonstrated, such a move can be highly contentious. In this case the local community had purchased land in the early twentieth century to establish a lawn bowling club (bowling being a sport). In the 1990s, faced with declining membership and revenue, a core membership group changed the club's constitution (which specified long-term retention of the asset in community hands) to permit sale of the now highly sought-after site, with the sale proceeds distributed to the members. The prospect of such windfall gains from sale in the private market can induce opportunistic behaviour and permanent loss of a community asset. Many NFP organisations, of course, are likely to be deeply troubled by the ethics of such actions, but nonetheless face real revenue pressures. Anecdotal evidence suggests many NFPs are open to development alternatives that deliver affordable housing. Research currently being undertaken by Sharam and McShane seeks to understand what land resources may be available, and the constraints on NFP re-purposing such land for housing.

As the current NAHA winds down and negotiation commences for the next agreement, little capital is available for constructing affordable housing (noting that NRAS sits outside the NAHA). In short the affordable housing sector has access to a source of land but limited public funding for construction. In addition to this however is the problem of a growing group of households which have been priced out of homeownership and face a lifetime in private rental, with immense implications for their retirement. This cohort however is mostly comprised of people who are not poor. Sharam (2011) has proposed equity land trusts (ELTs) to capture this latent equity for construction of affordable housing units for older single women.

This 'Smart Homes' proposal separates the ownership of the land from the ownership of the dwelling using a 'land trust' agreement. The corporate structure for a land trust is generally a company limited by guarantee with charitable objectives to provide housing to those that are unable to purchase on the open market. The owner of the dwelling has a strata title to the dwelling and the Trust either owns the land (it may be gifted to the Trust or purchased by the Trust) or the Trust leases it at a peppercorn rate from a benefactor. Where freehold title is transferred to the land trust, the land trust holds the land in perpetuity and the value of the land is excluded from any of the costs an owner is expected to pay on purchase. In this way the end cost to the owner of a dwelling is reduced. The Trust and the donors determine who would be eligible to purchase a Smart Home. This way Smart Homes can provide perpetually affordable homes. An owner can bequeath or sell to another eligible person otherwise the Trust must re-purchase the dwelling. The re-sale price is determined at entry into the scheme - usually the price will reflect the original purchase price plus inflation. Purchasers can also rent out their home but there would be restrictions to prevent profiteering.

Purchasers pay for the dwelling in the same way as they would any house in the market using savings and/or getting a mortgage. Construction is undertaken by a not-for-profit developer such as a Housing Association, or using the Housing Development Cooperative model in which the future owners take the role of developer thereby reducing the costs. By reducing the cost of the land to practically zero and reducing the cost of construction, housing purchasers can buy for as much as half they would pay in the existing market.

If leasing occurs a ground lease can be used to protect everyone's interests and determine future use on the site. Ground leases are commonly used in the UK and are typically long term (e.g. some leases are up to 999 years) leases. The leasehold owner, as commonly referred to, pays a capital sum at the commencement of the lease and a nominal sum (e.g. 10 pounds) throughout the

term to the freehold owner termed a 'ground rent'. The rights a leasehold owner has under a ground rent are akin to that of a freehold owner. The leasehold owner is able to develop the premises as it so wishes and is responsible for all payments relating to the premises whilst the landlord/freehold owner is responsible for the structure of the building (where the dwelling is an apartment) or the land. Ground leases are commonly used by local governments for a range of social purposes. They are particularly attractive to local government and not-for-profit organisations that wish to use their land assets strategically to deliver their mission. Councils for example often have car parks where the airspace is un-developed. Such organisations may want to develop or use the ground level for a community purpose, and add value by building apartments above. The land trust and ground lease preserve the donor's ownership of the land and controls future use on the site.

Smart Homes provides the purchaser with a subsidy so eligibility rules need to be devised to reflect the public interest in providing that subsidy. Land donors consult with their members or community regarding who they would like to target for a Smart Home. Each donor community will have a different priority.

The 'land trust' is managed by an independent board and is charged with managing the physical assets (which can also include commercial, community or retail space) and the process for buying and selling Smart Homes, as well as building new homes. Each land trust is supported by a shared services company to keep costs down.

Land trusts, where dwelling property rights are separated from the land property right (retained by the NFP but 'donated' to the dwelling occupier), offer a new basis for affordable housing construction if supported by new mortgage products. Smith has noted both the dearth of attention to private housing finance and the lack of innovation in the fundamentals of mortgage finance (Smith, 2011b). Smart Homes would require mortgage product innovation by a conservative industry. However, the history of strata title provides a lesson, both in terms of market design fundamentals driving reform and the role of mortgage finance in supporting reform. Strata title provides for individual ownership of a dwelling within a multi-unit residential property and common ownership and responsibility of the associated common property. Common property may include driveways, stairwells, lifts, roofs, and gardens (Everton-Moore et al. 2006). Strata title was introduced in Victoria until the early 1960s. Prior to that time individual flats could be rented but not purchased. 'Cooperative' flats (as strata title was initially called) were already common in Sydney by then and were financed through credit cooperatives providing mortgages supported by government guarantees. In Melbourne insurance companies (who were significant providers of mortgages) would not initially lend for strata title properties (The Australian Women's Weekly, 1969).

Equity land trusts (ELT) are analogous to strata title properties. What is 'common ownership' under strata title becomes 'community ownership' under the ELT. Yet a shift in mortgage lending practices is required. Fifty years ago the lending industry looked to the fundamentals: a legal, enforceable property right and securitisation. ELTs also provide these. The history of strata title, however, contains a bigger lesson. Law reform and innovation in financing created a new market and promoted a new, affordable housing supply.

The SHM can provide the infrastructure for recruiting ELT purchasers. It can work with NFPs to bring land onto the 'market' and facilitate development finance and mortgage finance for buyers. The SHM would be the home for later sale or rental of ELT homes. If run as a NFP itself, the SHM could use the profit from its private clients to support NFPs, land donors and ELTs, including the possibility of purchasing land. At scale a SHM would have a very considerable turnover.

We imagine that many ELTs would contract housing associations to construct and manage their properties providing a new revenue source to these organisations. Similarly housing associations would be well positioned to undertake project management and construction on behalf of HDCs.

For those housing associations providing housing to moderate income households, the search costs for eligible tenants would be dramatically reduced if the SHM acted as aggregator.

We also imagine that some NFPs would see residential property development as a viable investment vehicle. A SHM means reduced development risks, and property development may be viewed as a better performer than other investment classes such as shares. So in addition to HDCs bringing competition into the private residential development sector, a new breed of NFPs with land assets could bring powerful branding and further competition into the market. Housing associations should be significant beneficiaries of these innovations.

Conclusion

Computational power and the internet has revolutionised markets and brought a new focus on the significance of market design. Inefficient allocation problems are being overcome by matching markets and smart markets through the aggregation of buyers and sellers. This innovation can be applied to housing to overcome some intractable problems of housing supply in the greyfield areas of Australian cities. By bringing housing consumers forward in the supply chain, development costs and risk can be reduced. The construction of apartments would be far less speculative and more responsive to consumer preferences, enhancing choice and affordability. A smart housing market would facilitate the identification of new sources of land for affordable housing; herald the rise of equity land trusts; foster innovation in mortgage products; give life to housing development cooperatives; strengthen housing associations; promote competition and reform in the private sector; promote good urban design; and hold the potential to reduce neighbourhood conflict around planning issues.

The growing use of mechanisms such as land trusts can be seen in the context of wider international interest in ownership models, social enterprise and cooperative or community-based resource management. The stability of new community-based institutions in the areas of housing and finance was amply demonstrated during the recent global financial crisis (Kelly, 2011). The design of new corporate structures and market instruments to produce what Kelly refers to as generative rather than extractive economic benefits is an evolving area of policy and practice that holds the potential to positively contribute to many intractable issues such as housing affordability and sustainable urban growth.

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