An Exploration of Affordable Housing Policies in Auckland

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Cover: Building houses Long Bay Auckland. Photograph by Jay Farnworth

Executive summary

Housing affordability is at the top of policy discussions in New Zealand. To counteract unaffordability, central and local governments have acted together to streamline land supply or to remove land use regulations that hinder new houses entering the market.

The purpose of this discussion paper is to evaluate a set of affordable housing policies through a matching simulation model that assesses the compatibility between the housing prices distribution and households' incomes. The policies explored are as follows: the targeting of affordable houses to target population groups (to mimic inclusionary zoning or the retention of housing for affordable purposes), shared ownership schemes (SO), and the cascading (or release) of the retained affordable houses into the broader market after an initial 'embargo' period when they are only available to target population groups. The rationale is to mimic (and to preserve) the competitive nature of the housing market ensuring that developers remain profitable (and therefore willing to supply houses).

Results show that affordability policies can increase the number of house sales, thereby improving the market outcome with a housing mix that includes affordable houses.

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1.0 Introduction

Housing affordability is at the top of policy debates in New Zealand. Housing prices in Auckland increased on average by 45 per cent between 2014 and 2017 (CoreLogic 2018) making the region one of the most unaffordable housing markets in the world by some measures, with a median housing price nine times larger than the median household income (Cox and Pavletich, 2018).

To counteract housing unaffordability, central and local governments have acted together to streamline land supply or to remove land use regulations that hinder new houses entering the market (e.g. the Special Housing Areas programme –SHAs, or the National Policy Statement on Urban Development Capacity – NPSUDC). While the central government has focused on the need to release more land for residential development, the Auckland Council, through the Auckland Unitary Plan (AUP), relies more on urban intensification and changes in residential land use to enable growth and development (Murphy, 2016; Auckland Council, 2017; Fernandez, Sanchez and Bucaram, 2019). Additionally, the KiwiBuild programme seeks to provide incentives to get developers build more affordable houses. The potentially differing policy views imply that Auckland requires a range of affordable housing policies to meet the needs of a growing and diverse population (Wildish, 2015).

The NPSUDC and the SHAs have an explicit policy rationale entailing that increases on land supply should imply increases on house supply and, consequently, better affordability conditions for first homebuyers. However, the SHAs were ineffective on delivering affordable housing (Fernandez, Sanchez, & Bucaram, 2019), and the NPSUDC, though it may have some value on promoting finer-grained approaches to planning for urban development, it may generate affordable conditions only for households with incomes twice the median of Auckland income (about $190,000) (Fernandez, 2019; McEwan, 2018). Additionally, the KiwiBuild programme is made up of houses in Auckland priced at $650,000 (or below) that may be bought only by households whose income is less than $180,000. It appears to follow the Australian experience of targeting particular population groups in order to increase homeownership (Martel, Whitzman and Sheko, 2019). Nonetheless, it is uncertain whether its effects on affordability will be significant or whether it will gain momentum at all.

About potential housing supply entering the market, the AUP estimates that 400,000 houses are feasible to be built in Auckland (Auckland Council, 2017), while the Special Housing Areas set an initial three-year target of 39,000 houses and sections to be delivered (Government of New Zealand, 2013b, 2013a). However, it is still an open question how the estimated housing supply can be converted into viable

options for low or moderate-income households (Fingleton, Fuerst and Szumilo, 2019). Therefore, examining how (a combination of) housing policies may improve affordability is relevant, particularly when the goals of the policy maker may vary, or where goals are not clear, or are potentially contradictory (Guest, 2005; Johnson, 2007; Preval *et al.*, 2016; Hu and Qian, 2017). The purpose of this discussion paper is then to evaluate a package of affordable housing policies through a matching simulation model developed in Fernandez (2019).

Affordability is an easy concept to grasp but it can be challenging to pin down in practice (Sliogeris *et al.*, 2012). Gan and Hill (2009) indicate that affordability refers to the ability of households to obtain sufficient borrowed funds to buy a house, while repayment affordability refers to the possibility of households to meet the financial obligations imposed by the payment of a mortgage. Affordability is then a reflection of the conditions that a potential buyer may face: mortgage rates, prices, rent, income thresholds and other requirements of lenders. Affordable housing policies should then take into account the residual income of the households, once the expenses caused by the housing have been paid, and if these comply with a socially acceptable standard (Stone, 2006; Taltavull and Juárez, 2012). Affordability issues become even more complex as they may be cyclical and change with prices and economic circumstances, for low-income households affordability takes a permanent nature for which solutions may not exist in the absence of support policies (Taltavull and Juárez, 2012). The contribution of this discussion paper then relies on developing information input for policies design.

The paper is structured as follows: Section 2 is a literature review on affordable housing policies. Section 3 describes the methods used. Section 4 presents the results. Section 5 concludes.

Auckland Council's Research and Evaluation Unit discussion papers are intended to generate and contribute to discussion on topical issues related to Auckland. They represent the views of the author and not necessarily those of Auckland Council.

2.0 Background on affordable housing policies

This section is a non-comprehensive literature review about economic approaches on affordable housing policies in New Zealand and abroad. This section serves as a background for the methods described in Section 3 and the simulation results presented in Section 4.

2.1 Inclusionary zoning (IZ)

IZ consists on requesting or encouraging developers to retain a certain percentage of the units within market-rate residential developments at prices or rents that are affordable to specified income groups (Schuetz, Meltzer and Been, 2011). IZ is considered a ground-breaking scheme because it may produce affordable housing through focused and flexible local policy framework rather than through distant and rigid national prescription (Calavita and Grimes, 1998), and without resorting to public subsidies or by producing the affordable units in segregated, stigmatised and geographically dispersed areas (Schuetz, Meltzer and Been, 2009, 2011; Kontokosta, 2014).

The IZ programmes may be broadly categorised either as mandatory IZ (for their clear and enforced mandate for affordability purposes), or voluntary IZ (for their incentive-based schemes to motivate development of affordable housing).

Evidence on the effectiveness of mandatory IZ on affordability is mixed. Gurran *et al.* (2007) mentions that mandatory IZ programmes applied to over 30 sites in Vancouver, Canada, and since the late 1980s, created 2670 affordable housing units. In Toronto, a density bonus scheme, in place jointly with the IZ since the early 1980s, resulted on about 6000 houses and $19 million for an affordable housing fund raised through cash-in lieu contributions. The “grow home” mechanism in Montreal resulted in the development of over 6000 houses, contributing both to affordable housing and to urban containment. Gurran and Bramley (2017) claim that planning mechanisms and IZ in the UK contribute to securing land for affordable housing in high value sites, and to enforcing the provision of affordable units within market developments. In 2005 more than 18000 affordable houses were delivered across the country (Monk, Crook and Lister, 2005). Sliogeris *et al.*, (2012) assert that in Ireland, IZ legislation prescribes that development plans of local governments must include housing strategies that detail how future housing demand will be met, including the need for affordable housing. Requirements consist of 20 per cent of residential land to be used for affordable housing, and it is a condition for planning approvals. By 2006 this mechanism resulted in 962 affordable houses (Gurran *et al.*, 2007).

However, IZ programmes also impose additional costs because of price-controlled housing (Schuetz, Meltzer and Been, 2011), leading to size decreases of stand-alone houses. Developers may attempt to subsidise the affordable units by raising the prices of units allocated to high-income households, resulting on a decline in construction activity of both market-rate and affordable housing (Clapp, 1981; Powell and Stringham, 2004; Tombari, 2005). Schuetz, Meltzer and Been (2011), using data from the San Francisco metropolitan area and suburban Boston, find that IZ contributed to further increasing housing prices and lowering rates of construction during periods of regional house price appreciation. Bento *et al.* (2009) examine the impact of IZ on the production and prices of housing in northern California. They find that the impact differs across the distribution of prices, and that IZ actually lowers the price for houses below the median price and raises prices for houses above the median. Finally, IZ may also result on density and stigma effects that decrease demand for market rate units (Hughen and Read, 2014).

Nonetheless, there is research suggesting that even though, because of the IZ, the production of affordable housing lags initially, it increases over time (Crook and Whitehead, 2002; Monk, Crook and Lister, 2005; Norris and Shiels, 2007). If coupled with cost offsetting mechanisms for developers (e.g. density bonuses, zoning standards, tax exemptions, impact fee waivers or deferrals, and alternatives to developing affordable units onsite), (mandatory) IZ becomes an important component of a comprehensive housing strategy (Calavita and Grimes, 1998; Mallach and Calavita, 2010; Mukhija *et al.*, 2010). However, Kontokosta (2014) finds that affordable houses tend to concentrate in low-income and minority neighbourhoods, which implies that communities oppose new affordable development and lead to not-in-my-backyard (NIMBY) attitudes toward low-income housing.

Research on voluntary IZ programmes is scarce (Schuetz, Meltzer and Been, 2009; Stabrowski, 2015). Mukhija *et al.* (2010) claim that, in the Los Angeles and Orange Counties, IZ has not been effective in delivering affordable housing, though they have not produced any adverse effect on housing supply either.

The SHAs programme in New Zealand fits the definition of a voluntary IZ. Under the SHAs, any project above 14 dwellings had to allocate at least 10 per cent of affordable housing (Auckland Council, 2013). The SHAs had to meet either of two criteria: Criteria A, prices could not exceed 75 per cent of the Auckland region median house price; or, Criteria B, houses were sold or rented to households earning up to 120 per cent of the median household income for Auckland, or below a price such that the household spends no more than 30 per cent of its gross household income on rent or mortgage repayments (Auckland Council, 2013; Government of New Zealand, 2013a). The initial three-year target of the programme amounted

39,000 housing units, but reviews of the programme reported on the speed of the consenting process and the volume of consents issued (Ministry of Business Innovation and Employment, 2017), and little attention was given to the volume of affordable housing generated (Murphy, 2016). Fernandez, Sanchez and Bucaram (2019) carry out a causality analysis (based on a difference-on-difference approach) and find that the SHAs in Auckland caused, within their designated areas, an average price increase of 5.7%. The SHAs also increased by 6% the probability for transactions of costly houses to occur and had no effect on increasing the probability of transactions of affordable houses. Therefore, the contribution of SHAs to improved affordability is questionable or negligible.

2.2 Planning and rezoning for residential purposes

2.2.1 The Auckland Unitary Plan

To enable growth and development, while protecting people and communities, the AUP prescribes major rezoning and changes in residential land use, which would enable about one million houses in currently zoned residential areas (Auckland Council, 2017). The AUP sets rules for what, where and how buildings can be built in the city, where its main priorities are to meet economic and housing needs. The AUP also seeks to promote housing affordability by encouraging increased housing supply through relaxing a variety of land use regulations in targeted areas of the region.

However, the AUP caused other economic effects. Fernandez and Martin (2019) find that despite the AUP creates a redevelopment price premium (because of the greater flexibility on the development options of land), at the same time much of the price premium from special character areas is lost (because of demolition of houses that provide aesthetic and streetscape values). Similarly, Greenaway-McGrevy, Pacheco and Sorenson (2018) argue that rezoning (because of the AUP) significantly inflated the value of underdeveloped properties by 15.2% per annum, while properties with no land value appreciated by 3.7% per annum. In turn, rezoning deflated the value of already intensely developed parcels located in high density zones because of disamenities from density or anticipated supply effects from future construction of high density housing.

2.2.2 The National Policy Statement on Urban Development Capacity

The NPSUDC was introduced in late 2016 and was designed as a mechanism to streamline housing supply. The NPSUDC prescribes that local governments must ensure there is sufficient development capacity to meet demand; and, should imbalances occur, then a greater number of commercially feasible opportunities for

development should be provided in order to produce a more competitive housing market (Government of New Zealand, 2016). The rationale of the NPSUDC relies on developing capacity to accommodate additional houses and improve affordability (Fernandez, 2019). Additional capacity may take the form of land releases or rezoning for residential purposes, further intensification of the city or redevelopment of existing residential sites (IHP, 2015)

Nonetheless, Fernandez (2019) explores the capability of households to buy new houses entering the market (induced by the NPSUDC) under scenarios representing competitive and affordable markets. Out of 6000 new houses deemed as physically feasible, under the baseline competitive market conditions only 29% would be bought (and actually built) because of the high prices. That rate of take-up in turn increases to 70% under more affordable conditions where prices are on average 30% lower. However, the modelled buyers correspond to households with incomes on average twice the median household income in the Auckland region (about $96,000 in 2017). Therefore, it is uncertain whether the NPSUDC may result on improved affordability (Metcalf, 2018).

2.3 Other approaches

Shared ownership (SO) schemes entail a third party (e.g. a financial institution, housing association, or government) contributing a fixed proportion of the housing price, the household pays for the rest. The SO then reduces the mortgage required by the household (Guest, 2005) and widens the access to housing on an affordable basis to low or moderate-income households who face difficulty in arranging for an initial deposit or the required equity in the private market (Nanda and Parker, 2015). In the UK these schemes have succeeded in helping households into home ownership, particularly at a time when affordability pressures and a range of other factors have contributed to decreases in the level of national homeownership (Heywood, 2016). By 2015, SO formed around 0.4% of the English housing stock; 1.3% of all mortgages, and around 0.7% of the total value of mortgages held (Williams and Whitehead, 2015). Several community housing providers in New Zealand offer SO as part of their suite of assisted home ownership products (Auckland Council, 2018), and it is argued that the KiwiBuild programme needs to be complemented with similar but larger-scale SO initiatives for it to be effective on delivering affordable housing (Johnson, 2018)

Similar to the SO schemes, community land trusts (CLTs) are non-profit organisations holding title to land in perpetuity, conveying the land to a resident body via a ground lease. The lease between the CLT and the property holder sets out the affordability criteria and the permissible uses of the properties, and carries a monthly

fee charged to the resident. Davis and Demetrowitz (2003) explore the Burlington Community Land Trust (state of Vermont, USA) and find that the trust developed about 366 housing units between 1988 and 2002. This implied that homeownership expanded for residents earning less than the regional median income, and actual wealth was created, with homeowners experiencing an annual rate of return of 17 per cent.

Other mechanisms usually discussed to improve affordability are home grants for first homebuyers. Variants of these policies are in operation in New Zealand. For example, the HomeStart programme provides a grant of up to $10,000 (for an existing house) or $20,000 (for a new house), conditional to the length of time the households have been enrolled in a KiwiSaver scheme. HomeStart grants supplemented mortgages to 75 per cent of first-home buyers in the 2017/18. Also, the Welcome Home Loan is a mortgage guarantee provided via a risk-sharing partnership between the Government and participating banks, to first homebuyers that are unable to come up with a 20 per cent deposit (Auckland Council, 2018).

3.0 Method

This section describes the matching model used to assess a set of affordable housing policies. It is worth mentioning that modelling housing decisions is complex. Choosing a house (and paying for it) is determined by factors such as the location of labour markets, households' incomes, time horizons, the variety and mix of incentives available to developers. The interactions between those factors result in trade-offs of housing attributes and alternatives (e.g. renting or buying) (Guest, 2005; Lawson, Milligan and others, 2007; Barrios and Rodríguez, 2008; Sliogeris *et al.*, 2012; Barrios, Colom and Molés, 2013; Wildish, 2015; Fernandez and Bucaram, 2019). This section then summarises the complexities of the housing market through a mathematical representation of the matching between first homebuyers and new houses entering the market.

3.1 The Matching Model

This section relies on Fernandez (2019).

The model in this paper resembles a housing allocation problem (HAP). The HAP consists of the ordering households, starting with the one with the largest willingness to pay (WTP) who buys the house of her preference within their budget constraint. Once the purchase is complete, both the household and the house leave the market. This process is repeated for the remaining households and houses. In the model, the ordering is determined by the interaction between housing prices and income, other location and preference- variables are captured through the market segments identified through hedonic modelling as in Auckland Council (2017).

A basic setup of the model consists on a set of households (current renters), $A = \{1, \dots, n\}$, willing to buy a new house from a set $H = \{1, \dots., m\}$. A purchase is viable if the WTP is greater or equal to the house price (or mortgage payments if in annualised terms). A simple example of a matching model is displayed in Table 1. There are three households (J1, J2 and J3) and two new houses entering the market (H1 and H2). Case 1 implies that household J1 outbids the others and buys house H2. House H1 remains unsold because J2 and J3 cannot afford it and decide to remain as renters. Case 2 shows that household J1 buys H2 and J2 buys H1, and J3 is outbid and remains as renter. Case 3 shows that all WTPs are lower than prices so that no household will buy a house.

The outcome of the model is a matching, where a house is assigned or bought by a particular household, resulting in a competitive equilibrium where each house has a price and each household buys the best house (i.e. highest priced) that can afford

(Sönmez and Ünver, 2011). Holding other things constant, a higher house price is associated with a better-quality and well-located house that renders higher utility to the household (Alonso, 1960).

Table 1: Basic Representation of the Matching Model

	Demand		Supply		Matching
	Households	WTP	New Houses	Prices	Who Buys What?
Case 1					
	J1	100	H1	120	J1:H2
	J2	90	H2	99	
	J3	80			
Case 2					
	J1	100	H1	89	J1:H2
	J2	90	H2	99	J2:H1
	J3	80			
Case 3					
	J1	100	H1	120	
	J2	90	H2	110	
	J3	80			

Note: adapted from Fernandez (2019)

The matching model is implemented through a mathematical programme as follows.

Indices and sets:

$i = 1,2, \dots, n$ number of households in the sample

$hb = 1, \dots, m$ number of new houses entering the market

$z = 1, \dots, 13$ number of sections in Auckland created from the aggregation of 40 housing submarkets

Data

$Cost_{hb,z}$ Annualised cost to buy and relocate into the new house

$Bid_{i,z}$ Bid (willingness to pay) of household i that buys a house at section z

$MortgagePayment_{hb,z}$ Mortgage payments

$Income_{i,z}$ household income

$StressFactorBuyer$ maximum share of income to be allocated on mortgage payments

$Deposit_{i,hb}$ housing deposit

$Minimum$ share of housing price to be paid upfront as deposit

Decision Variables

$BUYHOUSE_{i,hb,z}$ dichotomic variable that in the optimal solution takes the value of 1 if a house is bought, and 0 otherwise

Model

maximize $Welfare = \sum_{i,z,hb}(Bid_{i,z} - Cost_{hb,z}) * BUYHOUSE_{i,z,hb}$ (1)

subject to

$MortgagePayment_{hb,z} * BUYHOUSE_{i,hb,z} \leq Income_{i,z} * StressFactorBuyer,$ (2)
$\forall$ i, hb, z

$Deposit_{i,hb} \geq Minimum * Price_{hb,z} * BUYHOUSE_{i,hb,z},$ $\forall$z (3)

$\sum_{hb} BUYHOUSE_{i,hb,z} \leq 1,$ $\forall$i, z (4)

$\sum_{i} BUYHOUSE_{i,hb,z} \leq 1,$ $\forall hb, z$ (5)

$BUYHOUSE_{i,hb,z} = \{0,1\},$ $\forall i, \forall hb, \forall z$ (6)

The objective function (Equation 1) maximises the difference between WTP and price. Constraint (2) limits mortgage payments to 50% of the household income; this limit is set by a stress factor, which is simply the share of income that can be spent on mortgage. Mortgage payments embed the development costs and profit margin for the developer, estimated at a time-horizon of 25 years and 5% discount rate. Constraint (3) indicates that the deposit should be at least 20% of the price. Constraints (4) and (5) ensure that a household will purchase one house only and that a house is purchased only by one household. Every house is occupied by the highest bidder, but the model does not require that the market clears. That is, that every household need not buy a house and every additional house need not be sold in the market (Miron, 2017).

3.2 Model setup

This section is a brief description of the setup and assumptions of the matching model. More details are found in Fernandez (2019).

3.2.1 Demand

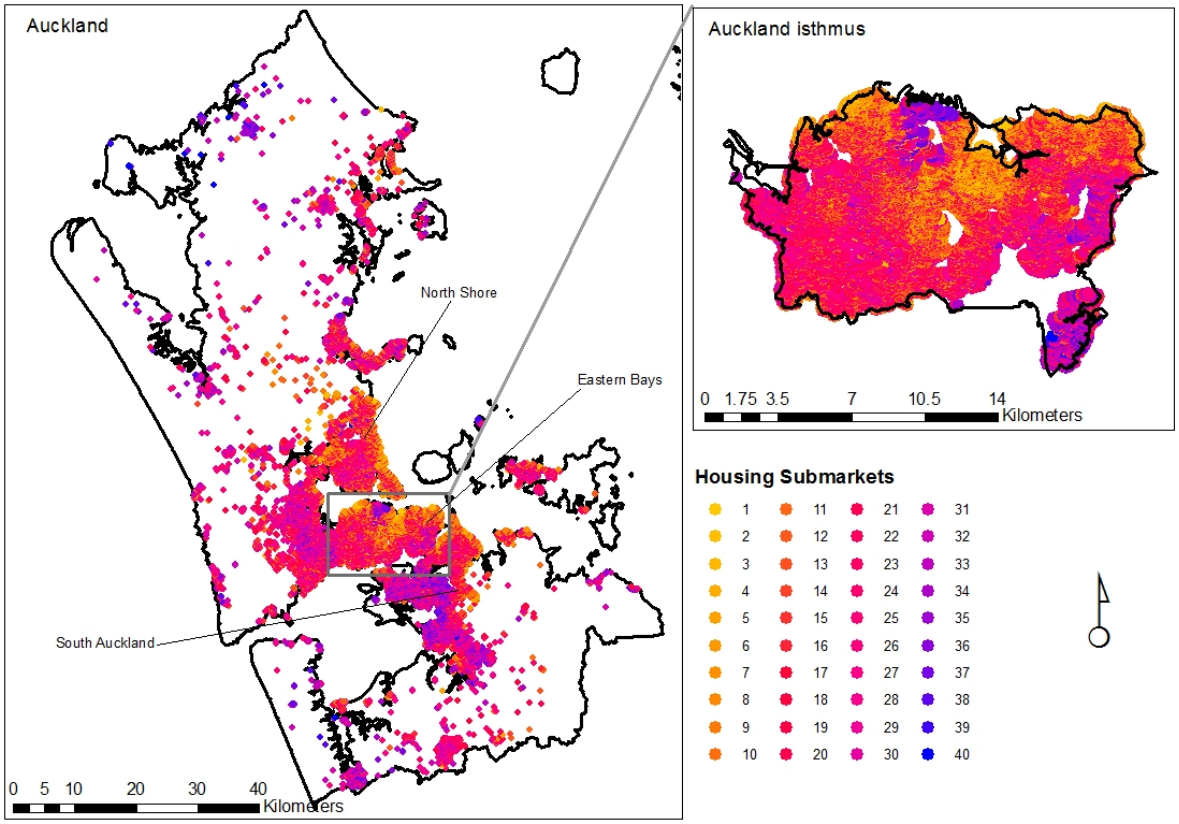
Households are created based on 2013 Census data by Area Unit (AU) where imputation of income and rent figures is based on a regression of rent in terms of

income, household type (single person, couple without children, couple with children, and single-parent households) and AU fixed effects. AU figures are assumed to apply to meshblocks inside each AU. A total of 100 synthetic households are created per AU.

Housing submarkets, identified through hedonic modelling (Auckland Council 2017), are intersected with meshblocks to mimic relocation alternatives of households across Auckland. From each intersection those households with the 10 highest incomes are selected and are assumed as those with the greatest likelihood to buy a house, resulting in 9017 households. For tractability and to prevent for extreme reallocations (e.g. a household relocating from a wealthy area to a poor one), submarkets are aggregated into 13 sections, that is, submarkets 1,2 and 3 (wealthy areas) are aggregated into Section 1, submarkets 4, 5 and 6 are aggregated into Section 2, and so on. Any household may relocate only within one section.

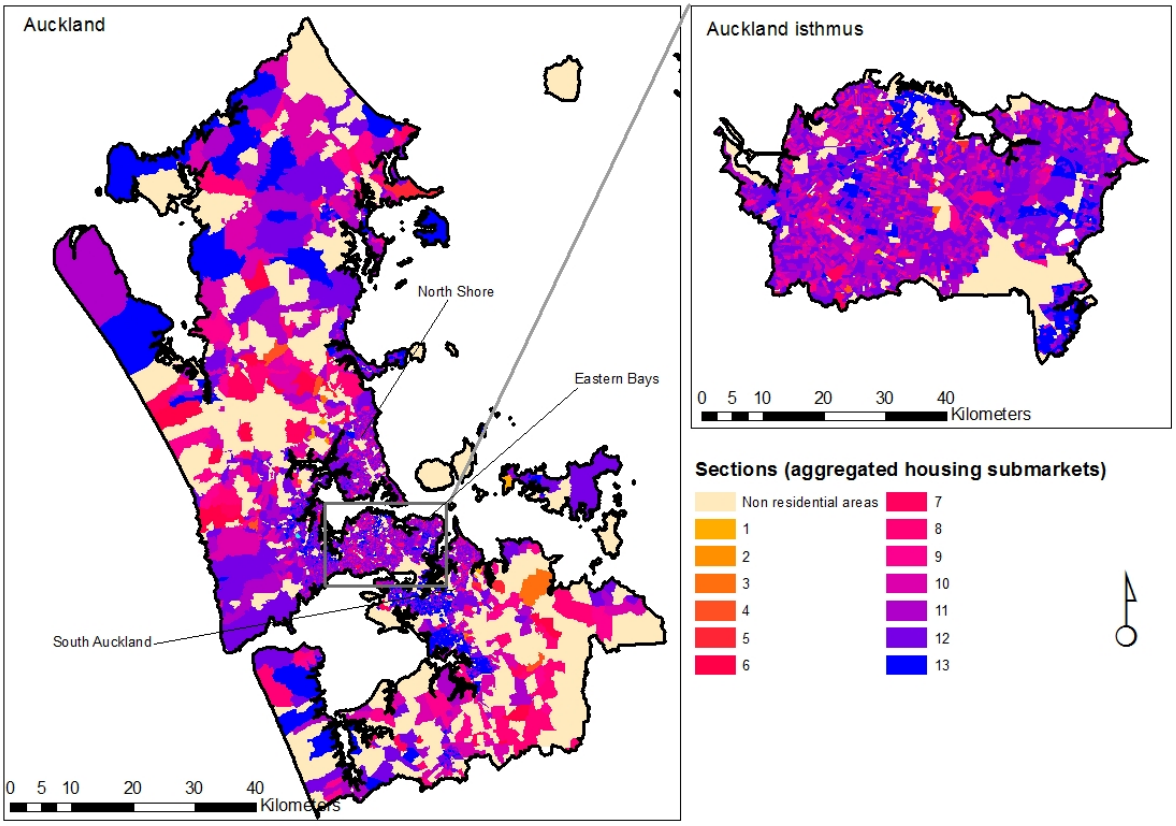
Figure 1 shows the submarkets identified through the hedonic models in Auckland Council (2017). Figure 2 shows the aggregation of the submarkets into the 13 Sections.

Figure 1: Housing submarkets – Auckland and Auckland Isthmus



Note: adapted from Auckland Council (2017) and Fernandez (2019)

Figure 2: Housing submarkets and sections – Auckland and Auckland Isthmus



Note: adapted from Auckland Council (2017) and Fernandez (2019)

3.2.2 Supply

Supply (in the form of additional housing capacity) is extracted from simulation runs of the Auckland Council Development Capacity (ACDC) model (IHP, 2015). The model simulates profit-maximising developers buying land and selecting development alternatives at parcel-level (standalone houses, terraces, apartments), where those alternatives are conditional on the zoning constraints. The model calculates the development costs for that parcel and built form typology and dwelling size (e.g. how many houses are possible on the parcel).

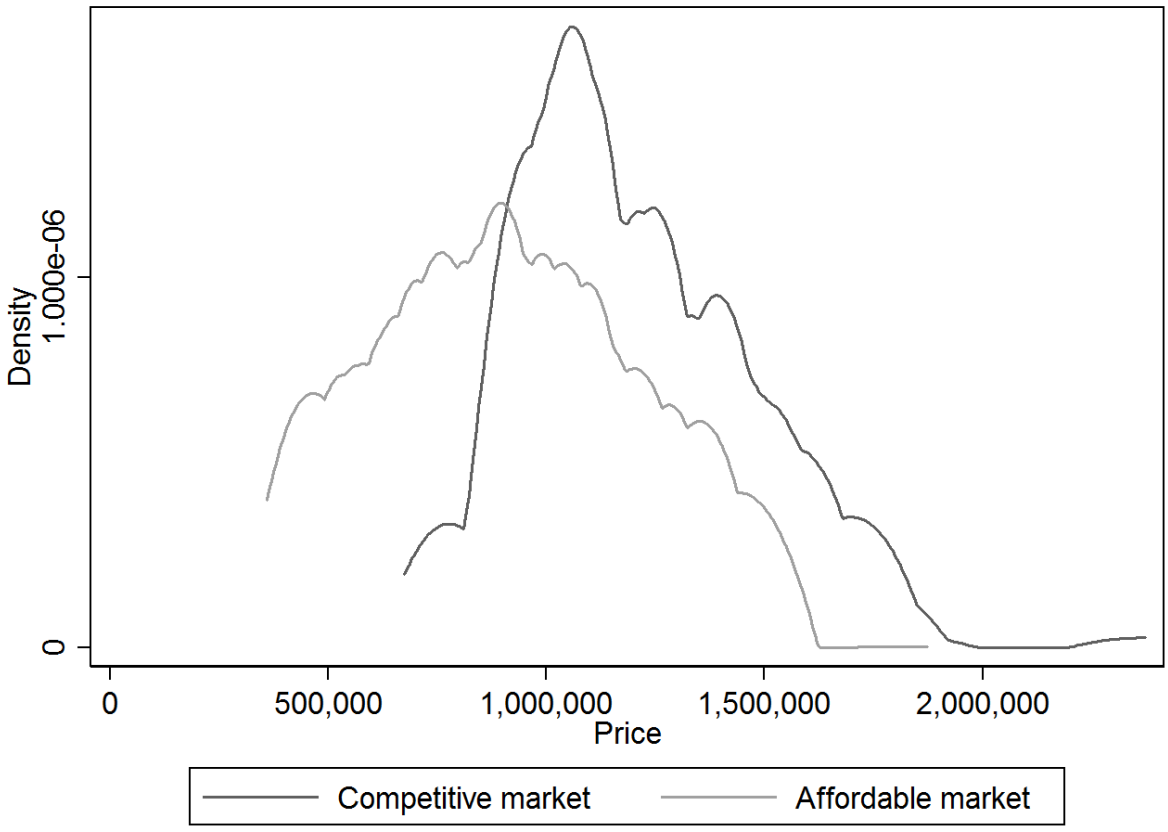
Two supply scenarios are developed:

1. The (baseline) competitive market scenario where profit-maximising developers select development options with the highest percentage returns. For example, if there are two possible feasible developments, returning 25% and 22% gross return on (land and development) costs, the developer will choose the 25% return option. This scenario consists mainly of large and expensive houses with a median price of 1.1 million.

2. The affordable market scenario where developers select the option whose price per dwelling is the lowest. For example, if two development options are available where house prices are $800,000 and $900,000, the developer will choose the lowest price. This scenario (with a median price of $940,000) entails the shift toward a price distribution with a more affordable nature because of the participation of community housing providers, but preserving the competitive nature of the market so that the developer is willing to deliver the affordable houses.

Both scenarios deliver 6000 new houses, but with different prices distributions (Figure 3). The competitive market scenario does not deliver any house priced below $650,000; but the affordable market could in turn deliver 1200 which are labelled as the affordable houses hereafter. One of the core assumptions of the model is that the additional housing capacity does not alter overall market prices. All households are fully informed about the prices and spatial distributions of houses entering the market, and both developers and households may anticipate the future (forward looking behaviour). Therefore, this is an ex-ante approach to assess the compatibility between housing prices distribution and the capability of households to absorb the additional supply, conditional on the availability of affordable housing policies.

Figure 3: Prices distributions of supply scenarios



3.2.3 Affordable housing policies and scenarios

The policies are interacted with the affordable market scenario for supply. The policies entail the following:

1. The targeting of affordable houses (those priced below $650,000) to specific population groups, which are defined by two income thresholds: $180,000 (similar to the KiwiBuild programme) and $96,000 (the median household income in the Auckland region). The targeting mimics inclusionary zoning or the retention of housing for affordable purposes,
2. A simple SO scheme that takes the form of a price discount of 30% on the affordable houses[1], and
3. The cascading (or release) of the retained affordable houses into the broader market after an initial 'embargo' period when they are only available to target population groups. It is assumed that the affordable price remains fixed despite the house being traded in the broader market.

Table 2 summarises the 10 simulation scenarios that will explore whether the outcomes of an affordable market may be improved with the introduction of affordable housing policies.

Table 2: Simulation Scenarios – Matching Model: Target price: 650,000

	Income Threshold	
	96,000	180,000
Competitive market		
Affordable market		
Affordable market + Income threshold + Target price	X	X
Affordable market + Income threshold + Target price + Shared ownership	X	X
Affordable market + Income threshold + Target price + Cascading	X	X
Affordable market + Income threshold + Target price + Shared ownership + Cascading	X	X

[1] SO schemes are not really a discount but this is how it functions in the model because it's irrelevant who pays the other 30% as long as someone does.

4.0 Results

Results show that under a (baseline) competitive market scenario, out of 6000 feasible houses, only 1844 houses are actually built and sold, none of them below the $650,000 target price. Prices are too high to allow most of renters to become homeowners. In turn, under an affordable market scenario (without affordability policies), there is a higher rate of take-up where 4397 houses are built and sold. These results are similar to Fernandez (2019). The arising research question is whether it is possible to improve the number of sales of the affordable market scenario through a set of policies coming into force. In particular, it is of interest to identify, for example, whether households earning the median income of Auckland (about $96,000) can become homeowners when affordability policies are introduced.

Panel a of Figure 4 shows that an affordable market with an income threshold of $96,000 results in 424 affordable houses being sold. Though the threshold allows moderate-income households to become owners, about two thirds of the 1200 affordable houses remain unsold. Thus, developers may be reluctant to deliver them because of the risk of unprofitability. In turn, if the threshold is set at 180,000, about 93% of the affordable houses are sold. Arguably, those affordable houses are bought by households earning about $180,000. A potential conflict between policy goals arise: either to maximise the sales of affordable houses, or to assist moderate-income households to become homeowners.

If SO becomes available for households earning up to $96,000, sales increase to 438. It may be a small increase, but the SO may play a role on mitigating housing stress (the ratio between mortgage repayments and income). Nonetheless, it is left for future research to explore the potential for the SO scheme to be scaled up in order to produce a massive increase in sales. Also, results do not differ when SO is applied under an income threshold amounting $180,000. That is, high-income households would buy a house even without the SO.

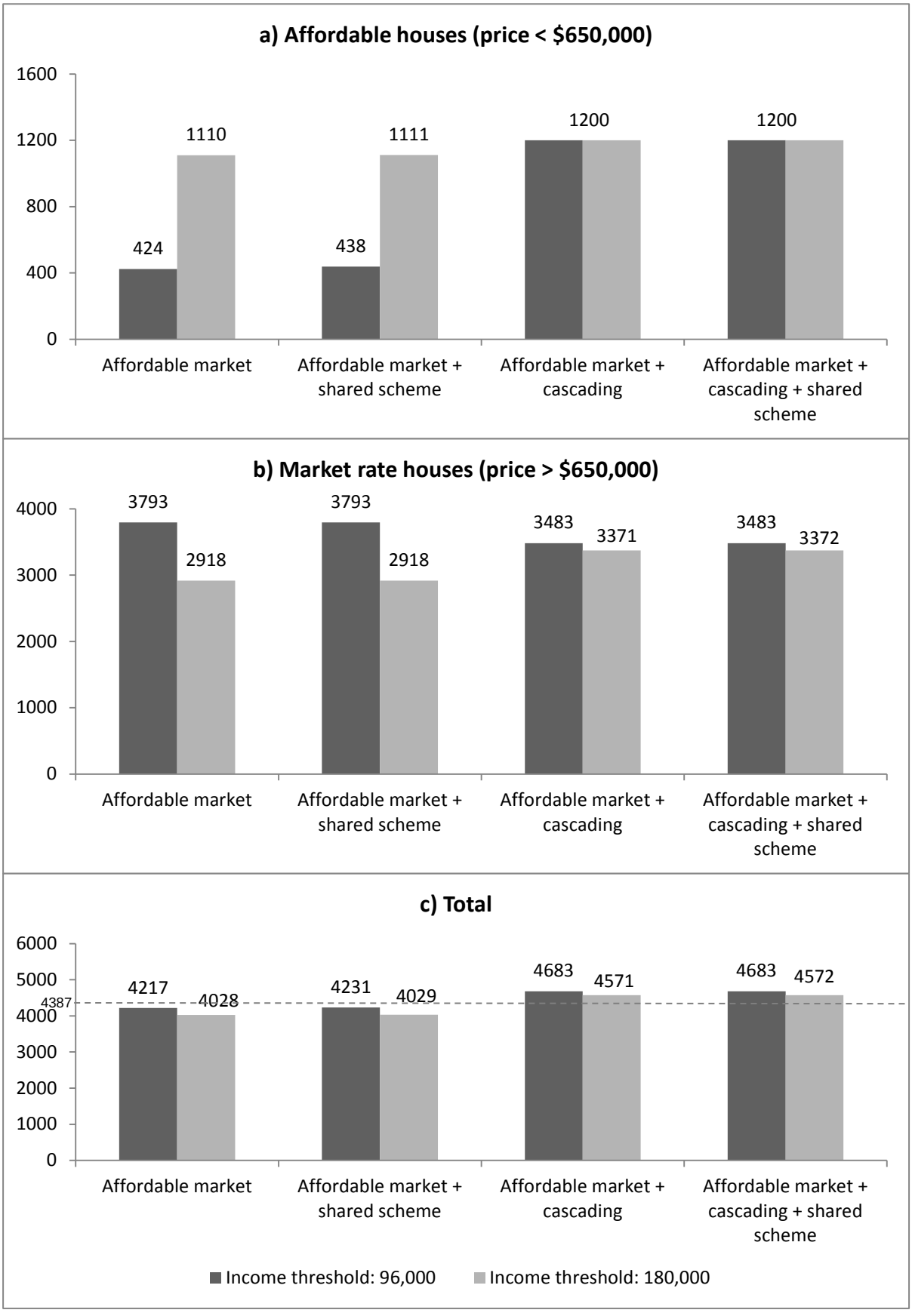
Most importantly, when cascading is introduced high-income households are allowed to buy the affordable houses not bought by the target population. Hence, setting targeting policies imply that lower-income households will not have to bid or compete with high-income households for the same house, and then the targeting mitigates the bidding pressure of the housing market. Additionally, cascading may improve the profitability prospects for developers, and motivate the delivery of affordable houses.

Panel b of Figure 4 shows that policies in the affordable market segment also affect market rate houses (those priced above $650,000). Under the affordable market and a threshold of $96,000, sales of market rate houses peak at 3793, and then

decreases to 2918 at a threshold of $180,000. This decrease occurs as wealthier households enter the pool of the target population group and are allowed to buy affordable houses, which crowd-out market rate houses. When cascading is introduced, the difference of sales between income thresholds is 112 houses. Hence, as the increase of the threshold expands the share of wealthier households in the target groups, fewer houses are left to cascade, resulting in the increase of sales of market rate houses (from 2918 to 3371).

Panel c of Figure 4 shows that affordable housing policies can improve the number of sales in an affordable market scenario. These improvements occur because of the staged process of the targeting policies, households earning $96,000 manage to enter the market and buy about one third of the affordable houses, otherwise they would have stayed as renters. Thus, 776 affordable houses are cascaded into the broader market, which allows non-target population groups to buy houses priced lower than the market-rate ones. Under the affordable market scenario (without policies), the affordable houses would have been bought by households earning $180,000, then outbidding lower-income households and substituting away from market-units.

Figure 4: Number of house sales: a) affordable houses, b) rest of the market, c) total



5.0 Discussion

The future for Auckland is challenging, as rising prices and rent burdens may reduce its economic potential (Gabriel and Painter, 2018). Affordable housing has become one of the most debated policy problems in New Zealand and the rest of the developed world. It is agreed that lack of affordable housing can result in adverse metropolitan-wide externalities, distributional and job access concerns, and erosion of the competitive structure and economic base of a city (Ben-Shahar, Gabriel and Golan, 2018; Gabriel and Painter, 2018).

Two of the most prominent housing policies implemented in New Zealand in the last decade rely on land and housing supply as the main (or even the sole) mechanism to bring prices down and increase homeownership. The Special Housing Areas programme and the National Policy Statement on Urban development Capacity were explicit on that premise (Auckland Council, 2013; Government of New Zealand, 2013a, 2016; Murphy, 2016). However, if the increase in the housing supply is accompanied by expansion of employment, there might be a feedback effect on demand, because of the reciprocal relationships between city size, productivity and income (Glaeser, Gyourko and Saks, 2006; Fingleton, 2008; Gyourko, Mayer and Sinai, 2013; Austin, Gurran and Whitehead, 2014; Szumilo, Laszkiewicz and Fuerst, 2017; Fingleton, Fuerst and Szumilo, 2019). This and other general equilibrium effects counteract the affordability purposes of policies relying solely on the supply-side (Aura and Davidoff, 2008). Fernandez (2016), for example, finds for Auckland that for a 10 per cent decrease in housing prices to occur, land supply (and the subsequent housing supply) would need to increase by 17 per cent (equivalent to 78,000 additional houses). That is, increasingly large changes on land supply are needed to achieve price decreases.

This paper has reviewed a set of affordable housing policies that act on the demand-side of the housing market. It also simulates the potential of a set of policies to improve the outcomes of an affordable market scenario.

However, to carry out assessments of housing policies is complex. Lifecycle models have been employed to simulate household behaviour facing affordable housing policies. Guest (2005) explores how grants, SO and deposit loans improve affordability for first homebuyers in Australia. Those policies affect the timing of the first home purchase, and the amount of housing and non-housing consumption in each period, which imply a cycle timing effect on housing demand and prices. Johnson (2007) evaluates affordable housing policies using a multi-objective programming to deal with investment priorities among a variety of affordable housing programmes (as well as choosing locations and configurations for affordable housing

initiatives). He finds that there is potential for those policies to fill housing gaps, and address social benefits and fairness concerns concurrently. Johnson (2003, 2006) uses multi-objective programming to inform the transition from a model of high-rise public housing developments toward tenant-based housing subsidies for market-rate rental units. Their analyses indicate that model solutions are approximations to potentially welfare-enhancing allocations of houses to potential buyers, which improves policy advice.

Overall, in the context of complex interaction effects of demand and supply, it is not straightforward to quantify the impact of new (land or housing) supply on prices and affordability. The overall impact will depend on many factors including household income, income elasticity of demand, or market segmentation (Fingleton, 2008; Fingleton, Fuerst and Szumilo, 2019). The results of the simulation model in this paper reveal that a balanced view of policy goals and outcomes is needed. Affordable houses can be sold and the affordable housing submarket may exist while developers stay profitable. However, the heavy assumption behind is the set of incentives that may induce developers to switch toward a prices distribution with a more affordable profile. Other factors that play an important role on the size of that submarket are the shared equity schemes, and variations in the income threshold or target prices to define that affordability segment. As housing costs tend to be inflexible and make the first claim on after-tax income for most households (Stone, 2006), a key issue for designing housing policies is whether there is a large enough group of households that may become the affordable submarket, and whether it will continue to be present as market conditions change through economic cycles (Bramley and Dunmore, 1996).

The contribution of this paper relies on providing indications on the potential effects of affordable housing policies. It opens the avenue to exploring schemes such as the shared ownership, which has demonstrated success in helping households into affordable house ownership. However, there may be unexploited potential to expand the tenure, particularly at a time when affordability pressures and a range of other factors have contributed to a situation where the level of homeownership in New Zealand has been falling (Heywood, 2016). Though a salient research gap is pending about the policies needed to switch from a purely competitive market to an affordable one where prices are lower (on average), the policies simulated in this paper show that efficient market outcomes may be achieved but with the added feature of having desirable features in terms of affordability improvements.

6.0 References

Alonso, W. (1960) ‘A theory of the urban land market’, *Papers and Proceedings Regional Science Association*, pp. 149-157. doi: 10.1080/01944367908977002.

Auckland Council (2013) ‘Auckland Housing Accord’. Available at: https://www.hud.govt.nz/residential-housing/housing-affordability/housing-accord/auckland-housing-accord/.

Auckland Council (2017) *National Policy Statement on Urban Development Capacity 2016: Housing and business development capacity assessment for Auckland*. Available at: http://www.knowledgeauckland.org.nz/assets/publications/NPS-UDC-Housing-and-business-development-capacity-assessment-for-Auckland-Dec2017.pdf.

Auckland Council (2018) *Affordable housing in Auckland*. Available at: http://www.knowledgeauckland.org.nz/publication/?mid=2716.

Aura, S. and Davidoff, T. (2008) ‘Supply Constraints and Housing Prices’, *Economics Letters*, 99, pp. 275-277. doi: 10.1016/j.econlet.2007.07.019.

Austin, P. M., Gurran, N. and Whitehead, C. M. E. (2014) ‘Planning and affordable housing in Australia, New Zealand and England: common culture; different mechanisms’, *Journal of Housing and the Built Environment*. Springer Netherlands, 29(3), pp. 455-472. doi: 10.1007/s10901-013-9356-3.

Barrios, J. A. and Rodríguez, J. E. (2008) ‘Housing demand in Spain according to dwelling type: Microeconometric evidence’, *Regional Science and Urban Economics*, 38(4), pp. 363-377. doi: 10.1016/j.regsciurbeco.2008.02.002.

Barrios, V. E., Colom, M. C. and Molés, M. C. (2013) ‘Life cycle and housing decisions: a comparison by age cohorts’, *Applied Economics*. Routledge, 45(32), pp. 4556-4568. doi: 10.1080/00036846.2013.795276.

Ben-Shahar, D., Gabriel, S. and Golan, R. (2018) ‘Can’t get there from here: Affordability distance to a superstar city’, *Regional Science and Urban Economics*. North-Holland. doi: 10.1016/J.REGSCIURBECO.2018.04.006.

Bento, A. *et al.* (2009) ‘Housing Market Effects of Inclusionary Zoning’, *Cityscape: A Journal of Policy Development and Research*, 11(2), pp. 7-26.

Bramley, G. and Dunmore, K. (1996) ‘Shared ownership: Short-term expedient or long-term major tenure?’, *Housing Studies*, 11(1), pp. 105-131. doi: 10.1080/02673039608720848.

Calavita, N. and Grimes, K. (1998) ‘Inclusionary housing in california: The experience of two decades’, *Journal of the American Planning Association*, 64(2), pp. 150-169. doi: 10.1080/01944369808975973.

Clapp, J. M. (1981) ‘The Impact of Inclusionary Zoning on the Location and Type of Construction Activity’, *Real Estate Economics*, 9(4), pp. 436-456. doi: 10.1111/1540-6229.00253.

Cox, W. and Pavletich, H. (2018) *15th Annual Demographia International Housing Affordability Survey: 2019*. Available at: http://www.demographia.com/dhi.pdf.

Crook, A. D. H. and Whitehead, C. M. E. (2002) ‘Social housing and planning gain: Is this an appropriate way of providing affordable housing?’, *Environment and Planning A*, 34(7), pp. 1259-1279. doi: 10.1068/a34135.

Davis, J. E. and Demetrowitz, A. (2003) ‘Permanently Affordable Homeownership’, *Burlington Community Landtrust, May*.

Fernandez, M. A. (2016) ‘Land Supply Constraints and Housing Prices in New Zealand’. Auckland Council Technical Report 2016/38.

Fernandez, M. A. (2019) ‘A matching simulation to assess additional housing capacity in Auckland’, *New Zealand Economic Papers*. Routledge, pp. 1-22. doi: 10.1080/00779954.2019.1585386.

Fernandez, M. A. and Bucaram, S. (2019) ‘The changing face of environmental amenities: Heterogeneity across housing submarkets and time’, *Land Use Policy*, 83, pp. 449-460. doi: 10.1016/j.landusepol.2019.02.024.

Fernandez, M. A., Sanchez, G. and Bucaram, S. (2019) ‘Price Effects of the Special Housing Areas in Auckland’, *New Zealand Economic Papers*. Available at: https://doi.org/10.1080/00779954.2019.1588916.

Fernandez, M. and Martin, S. (2019) ‘What’s so special about character?’ Manuscript in Preparation.

Fingleton, B. (2008) ‘Housing Supply, Housing Demand, and Affordability’, *Urban Studies*. SAGE PublicationsSage UK: London, England, 45(8), pp. 1545-1563. doi: 10.1177/0042098008091490.

Fingleton, B., Fuerst, F. and Szumilo, N. (2019) ‘Housing affordability: Is new local supply the key?’, *Environment and Planning A: Economy and Space*. SAGE PublicationsSage UK: London, England, 51(1), pp. 25-50. doi: 10.1177/0308518X18798372.

Gabriel, S. and Painter, G. (2018) ‘Why affordability matters’, *Regional Science and Urban Economics*. North-Holland. doi: 10.1016/J.REGSCIURBECO.2018.07.001.

Gan, Q. and Hill, R. J. (2009) ‘Measuring housing affordability: Looking beyond the median’, *Journal of Housing Economics*, 18(2), pp. 115-125. doi: 10.1016/j.jhe.2009.04.003.

Glaeser, E. L., Gyourko, J. and Saks, R. E. (2006) ‘Urban growth and housing supply’, *Journal of Economic Geography*, 6(1), pp. 71-89. doi: 10.1093/jeg/lbi003.

Government of New Zealand (2013a) *Housing Accords and Special Housing Areas (Auckland) Order 2013*.

Government of New Zealand (2013b) ‘Housing Accords and Special Housing Areas Act 2013’.

Government of New Zealand (2016) ‘National Policy Statement on Urban Development Capacity: Guide on Evidence and Monitoring’. Wellington. Available at: http://www.mbie.govt.nz/info-services/housing-property/national-policy-statement-urban-development.

Greenaway-McGrevy, R., Pacheco, G. and Sorenson, K. (2018) ‘Land Use Regulation, the Redevelopment Premium and House Prices’, *AUT School of Economics - Working Paper Series*, 2018(2).

Guest, R. S. (2005) ‘A life cycle analysis of housing affordability options for first home owner-occupiers in Australia’, *Economic Record*. John Wiley & Sons, Ltd, 81(254), pp. 237-248. doi: 10.1111/j.1475-4932.2005.00258.x.

Gurran, N. *et al.* (2007) ‘International practice in planning for affordable housing: lessons for Australia’, *Australian housing and urban research institute positioning paper series*. Australian Housing and Urban Research Institute.

Gurran, N. and Bramley, G. (2017) *Urban planning and the housing market: International perspectives for policy and practice*, *Urban Planning and the Housing Market: International Perspectives for Policy and Practice*. doi: 10.1057/978-1-137-46403-3.

Gyourko, J., Mayer, C. and Sinai, T. (2013) ‘Superstar cities’, *American Economic Journal: Economic Policy*, 5(4), pp. 167-199. doi: 10.1257/pol.5.4.167.

Heywood, A. (2016) ‘From the Margins to the Mainstream: A Study of the Prospects for Shared Home Ownership in the North West’. London: The Smith Institute.

Hu, F. Z. Y. and Qian, J. (2017) ‘Land-based finance, fiscal autonomy and land supply for affordable housing in urban China: A prefecture-level analysis’, *Land Use Policy*, 69, pp. 454-460. doi: 10.1016/j.landusepol.2017.09.050.

Hughen, W. K. and Read, D. C. (2014) ‘Inclusionary Housing Policies, Stigma Effects and Strategic Production Decisions’, *Journal of Real Estate Finance and Economics*, 48(4), pp. 589-610. doi: 10.1007/s11146-013-9402-7.

IHP, A. U. P. (2015) ‘Expert Group (2015) Residential developable capacity for Auckland’. A report on the.

Johnson, A. (2018) *Beyond Renting: Responding to the decline in private rental housing*. Auckland.

Johnson, M. P. (2003) ‘Single-Period Location Models for Subsidized Housing: Tenant-Based Subsidies’, *Annals of Operations Research*. Kluwer Academic Publishers, 123(1/4), pp. 105-124. doi: 10.1023/A:1026119128524.

Johnson, M. P. (2006) ‘Single-period location models for subsidized housing: Project-based subsidies’, *Socio-Economic Planning Sciences*, 40(4), pp. 249-274. doi: 10.1016/j.seps.2004.11.001.

Johnson, M. P. (2007) ‘Planning models for the provision of affordable housing’, *Environment and Planning B: Urban Analytics and City Science*, 34(3), pp. 501-523. doi: 10.1068/b31165.

Kontokosta, C. E. (2014) ‘Mixed-income housing and neighborhood integration: Evidence from inclusionary zoning programs’, *Journal of Urban Affairs*, 36(4), pp. 716-741. doi: 10.1111/juaf.12068.

Lawson, J., Milligan, V. and others (2007) *International trends in housing and policy responses*. AHURi.

Mallach, A. and Calavita, N. (2010) ‘Inclusionary Housing in International Perspective: Affordable Housing, Social Inclusion and Land Value Recapture’, in *United States: From radical intervention to mainstream housing policy*, pp. 15-77.

Martel, A., Whitzman, C. and Sheko, A. (2019) 'Private Developers and the Public Good: Can a Socially Constructed Market Deliver Quality Affordable Housing for Australian Cities?', *Urban Policy and Research*, pp. 1-15. doi: 10.1080/08111146.2018.1557042.

Metcalf, G. (2018) 'Sand Castles Before the Tide? Affordable Housing in Expensive Cities', *Journal of Economic Perspectives—Volume*, 32(1—Winter), pp. 59-80. doi: 10.1257/jep.32.1.59.

Ministry of Business Innovation and Employment (2017) 'Auckland Housing Accord - Third Quarterly Report for the Fourth Accord Year'. Available at: http://www.mbie.govt.nz/info-services/housing-property/housing-affordability/document-image-library/auckland-housing-accord-monitoring-report-06-2017.pdf.

Miron, J. R. (2017) 'The Herbert-Stevens Model', in *The Organization of Cities*. Cham: Springer International Publishing, pp. 397-410. doi: 10.1007/978-3-319-50100-0_18.

Monk, S., Crook, T. and Lister, D. (2005) 'Land and finance for affordable housing: the complementary roles of Social Housing Grant and the provision of affordable housing through the planning system'. Working paper, Centre for Housing and Planning Research, Department of Land Economy, University of Cambridge.

Mukhija, V. *et al.* (2010) 'Can inclusionary zoning be an effective and efficient housing policy? Evidence from Los Angeles and Orange counties', *Journal of Urban Affairs*, 32(2), pp. 229-252. doi: 10.1111/j.1467-9906.2010.00495.x.

Murphy, L. (2016) 'The politics of land supply and affordable housing: Auckland's Housing Accord and Special Housing Areas', *Urban Studies*, 53(12), pp. 2530-2547. doi: 10.1177/0042098015594574.

Nanda, A. and Parker, G. (2015) 'Shared Ownership and Affordable Housing: A Political Solution in Search of a Planning Justification?', *Planning Practice & Research*. Routledge, 30(1), pp. 101-113. doi: 10.1080/02697459.2015.1008801.

Norris, M. and Shiels, P. (2007) 'Housing Affordability in the Republic of Ireland: Is Planning Part of the Problem or Part of the Solution?', *Housing Studies*. Taylor & Francis Group , 22(1), pp. 45-62. doi: 10.1080/02673030601024598.

Powell, B. and Stringham, E. (2004) 'Housing Supply and Affordability: Do Affordable Housing Mandates Work?', *Policy Study No. 318*. Los Angeles, CA: Reason Foundation.

Preval, N. *et al.* (2016) 'Streamlining urban housing development: Are there environmental sustainability impacts?', *Cities*, 55, pp. 101-112. doi: 10.1016/j.cities.2016.04.003.

Schuetz, J., Meltzer, R. and Been, V. (2009) '31 flavors of inclusionary zoning: Comparing policies from San Francisco, Washington, DC, and suburban Boston', *Journal of the American Planning Association*, 75(4), pp. 441-456. doi: 10.1080/01944360903146806.

Schuetz, J., Meltzer, R. and Been, V. (2011) 'Silver Bullet or Trojan Horse? The Effects of Inclusionary Zoning on Local Housing Markets in the United States', *Urban Studies*, 48(2), pp. 297-329. doi: 10.1177/0042098009360683.

Sliogeris, E. *et al.* (2012) ‘Housing Affordability Literature Review and Affordable Housing Program Audit List of Acronyms’, *Housing Affordability Literature Review and Affordable Housing Program Audit* , pp. 32-38. Available at: http://www.uws.edu.au/__data/assets/pdf_file/0004/164623/landcom_report_2008-07-21.pdf.

Sönmez, T. and Ünver, M. U. (2011) ‘Matching, allocation, and exchange of discrete resources’, in *Handbook of social Economics*. Elsevier, pp. 781-852.

Stabrowski, F. (2015) ‘Inclusionary Zoning and Exclusionary Development: The Politics of “Affordable Housing” in North Brooklyn’, *International Journal of Urban and Regional Research*, 39(6), pp. 1120-1136. doi: 10.1111/1468-2427.12297.

Stone, M. E. (2006) ‘What is housing affordability? The case for the residual income approach’, *Housing Policy Debate*, 17(1), pp. 151-184. doi: 10.1080/10511482.2006.9521564.

Szumilo, N., Laszkiewicz, E. and Fuerst, F. (2017) ‘The spatial impact of employment centres on housing markets’, *Spatial Economic Analysis*. Routledge, 12(4), pp. 472-491. doi: 10.1080/17421772.2017.1339119.

Taltavull, P. and Juárez, F. (2012) ‘La accesibilidad residencial. una revisión de la literatura’, *Revista Galega de Economía*, 21(2), pp. 1-24.

Tombari, E. (2005) ‘Smart Growth, Smart Choices Series: The Builder’s Perspective on Inclusionary Zoning’. ashington, DC: National Association of Home Builders.

Wildish, B. (2015) *Housing choice and preference: a review of the literature*.

Williams, P. and Whitehead, C. (2015) ‘Financing affordable social housing in the UK; building on success?’, *Housing Finance International*, pp. 14-19. Available at: https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=103699988&site=ehost-live.

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