BEHAVIOURAL ECONOMICS AND HOUSING

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Abstract

Economic analyses of housing conventionally identify the opportunity costs associated with owning versus renting housing as key drivers of housing demand, assuming a risk-free world of complete information and perfectly rational agents. In the real world however, uncertainty, financing constraints, speculative forces and institutional constraints weaken the link between housing demand and the opportunity costs associated with owning or renting housing, generating destabilising and volatile patterns in housing demand. Compounding these instabilities, analyses from behavioural economics explore how cognitive constraints, behavioural biases and social influences are additional sources of complexity in imperfect housing markets. This chapter explores some of these behavioural drivers of housing demand, their impacts in magnifying housing market instability and their socio-economic consequences in contributing to persistent inequalities in the distribution of housing costs and housing wealth.

Key words: behavioural economics, social influences, herding, peer pressure, social networks, property investment, user cost of housing, housing demand, financial instability, inequality, owner occupation, mortgage finance, cognitive bias, heuristics, bounded rationality, housing market complexity, opportunity cost

1. Introduction

In a perfectly competitive world populated by homogenous and rational agents, housing decisions will be determined by objective factors and housing market instability will be propelled only by exogenous shocks. House-buyers are assumed to respond to the objective factors driving their housing investment / consumption decisions methodically and independently, discounting the benefits of future housing consumption relative to current housing investment and consumption. They will focus on expected future consumption streams generated from current ownership of housing. Partly house buyers will use owner occupation as a hedge again rent rises and the consumption component of housing decisions will be a function of the discounted stream of imputed rents, affected by expectations of capital gains and losses in housing assets and interactions between the discount rate and the real interest rate. Models assuming these types of relationships have been analysed empirically e.g., by Meen (2002), Pain and Westaway (1997) and Sinai and Souleles (2005), but these analyses abstract from many of the factors that contribute to the inherently unstable characteristics of housing markets.

Some sources of complexity are implicit in the housing assets themselves and, to some extent, can be embedded into the perfect competition model outlined above. Houses are heterogeneous reflecting a mixture of old and new properties; some renovated, some not – and to capture this hedonic pricing methods are needed. Housing assets are lumpy and indivisible. Inelastic supply will amplify the impact on house prices of shifts in demand. Transactions costs add to complexity too - the fact that buyers face large and lumpy transactions costs, e.g., legal fees, survey / property search costs, property taxes and credit searches, generates threshold effects – whereby decisions to buy are affected only when a buyer's consumer surplus is significantly greater than zero. This exacerbates housing market instability, particularly if owner-occupiers economise on transactions costs by limiting the frequency of housing transactions. Housing activity will take place in bursts when conditions are favourable in terms of house prices, taxes and other transactions costs and/or fiscal incentives. This all means that housing decisions cannot be captured as a smooth, continuous function of the opportunity costs of owning housing assets, even if perfect rationality is assumed. Uncertainty adds to this complexity and partly this can be understood in terms of inefficient financial markets (for example, see Shiller 2003).

Minsky's analysis of financial fragility also captures the systemic instability seen in housing markets: financing constraints, speculative forces and institutional changes will generate destabilizing and volatile patterns in housing demand (Earl *et al.* 2007, Baddeley 2005, Minsky 1978). Buyers and sellers will have incentives to wait for more information about the state of the market before deciding to buy housing assets. Similarly, in times of instability, first time buyers will have raised incentives to 'wait-and-see' before making a decision exacerbating the jumpiness and discontinuity in housing decisions, contributing to falls in the volume of housing transactions. The asset market effects of general uncertainty may be compounded by asymmetric information, agency problems and risk shifting behaviours (Allen and Gale, 2000). Buyers and sellers have limited information about the real intentions of transacting parties; the probabilities of reneging and gazumping (particularly at peaks and troughs of the housing cycle) increase the riskiness of housing decisions. These risks, for both buyer and seller, are particularly high in England and Wales because of the long lags between decisions to buy/sell a house and the signing of a legally binding agreement. Instability may reflect interactions between gearing and interest rates, with gearing inflating expected returns in rising markets and generating housing bubbles (Muellbauer and Murphy 1997, Cameron *et al.* 2006). Further limits emerge because sellers and mortgage lenders have limited information about the financial background of potential buyers / borrowers. Housing bubbles are difficult to capture using standard econometric tools. Garino and Sarno (2004) develop an econometric model based around

Markov switching but, as Cameron *et al.* 2006 observe, it does not connect deeply with economic theory.

Whilst all these sources of instability and uncertainty are crucial, this paper focuses on the behavioural microeconomic factors that feed instability. Housing decisions will be made in different ways in different contexts and bounded rationality will also change buyers' and sellers' observed behaviours (e.g., see Gayer *et al.* 2007 on rule-based versus case-based housing decisions). Impacts of uncertainty and instability will be magnified in a world in which decisions are made, not independently, but by references to others' decisions. In this way, housing market trends will be affected by behavioural biases and social influences. This can be captured using a behavioural housing model constructed to extend standard models to embed social and behavioural factors – capturing the fact that the housing decisions of owner-occupiers are the outcome of interactions between objective analysis and subjective behavioural factors. The relative importance of these will be affected by individuals' predispositions and susceptibilities, which in turn will be determined by individual differences, including demographic characteristics and personality traits.

In exploring these themes, in section 2 some key themes are outlined in the context of a conventional model of housing demand. Using principles from the non-behavioural housing literature, in section 3 sources of housing market complexity and imperfections are analysed. Section 4 addresses the additional complexity reflecting the impacts of cognitive constraints, behavioural biases and social influences in exacerbating housing market instability. Conclusions and policy implications are outlined in section 5.

2. A baseline housing model

In conventional analyses of housing demand, the user cost of housing is identified as a key variable determining individuals' decisions to own housing assets. User cost is a simple measure of the relative cost of housing assets, expressed in terms of real interest rates, imputed rents and capital appreciation/ depreciation. These analyses assume a risk-free world of complete information, and homogenous, atomistic agents. In the real world, however – uncertainty, financing constraints, speculative forces and institutional changes will modify the influence of the user cost of housing on agents' decision making, generating destabilizing and volatile patterns in housing demand.

Housing assets are simultaneously consumption goods and investment assets. In mainstream analysis, rational and atomistic agents operating in a risk-free world of perfect information and reversible decisions respond to the objective factors affecting their housing investment/consumption decisions

in a methodical way. In a static world, they respond to the affordability of housing as measured by the income to price ratio. By contrast, forward looking agents will take account of the future implications of current decisions by discounting the benefits of future housing consumption relative to current housing consumption. Extending standard models of fixed asset investment to housing investments, households will maximise the net present value (NPV) of the utility gained from owning houses (Ut), where Ut is the stream of consumption and investment gains from the ownership of housing assets. Given the expected future consumption stream enabled by current ownership of housing, owner occupation will be used as a hedge again rent risk (Sinai and Souleles 2005). Thus, the consumption component of housing can be represented as a discounted stream of imputed rents. The forward-looking investment aspects of housing decisions will also be affected by expectations of capital gains and losses in housing assets. Both components will be affected by the interaction between the discount rate and the real interest rate, relationships – as analysed e.g., by Meen (2002) and Pain and Westaway (1997). Overall, the NPV will be represented as the integral of discounted net utility U, over an infinite time horizon. Assuming that the time rate of discount is constant:

$$\text{NPV} = \int e\text{-}rtU(t)dt \qquad (1)$$

$$U(t) = f(C, I) \qquad (2)$$

where C represents the consumption gains from home-ownership – the discounted stream of net imputed rents, and I represents investment gains from house price appreciation. The marginal utility from the ownership of housing assets can be represented as:

$$\frac{\partial U}{\partial H} = \mu + \rho - \Delta p_h \qquad (3)$$

where Δp_h is the expected capital gain in terms of real house price inflation, μ is the net imputed rent and ρ is the real mortgage interest cost. Then the user cost of housing investments will decrease as housing assets appreciate, will decrease as the cost of alternatives (i.e., renting) increase and will increase as mortgage costs increase. Simplifying to abstract from complexities around depreciation, property taxes and transaction costs associated with property transactions, this can be summarized as:

$$c_h = \mu - \Delta p_h - \rho \qquad (4)$$

where c_h is the user cost of housing,

3. Housing Market Complexity: Market imperfections

The above model is strictly limited because it abstracts from many factors contributing to the inherently unstable characteristics of housing markets – for example sources of macroeconomic and microeconomic complexity including financing constraints and gearing; heterogeneity and supply constraints; transactions costs, uncertainty and asymmetric information; and political / institutional change. Also, insights from behavioural economics have demonstrated that behavioural biases and social influences will magnify the instabilities created by market imperfections. These forces are not distinct. They may be interrelated and in different ways will lead to the generation of behavioural complexity. Overall, these complexities in housing markets reflects that fact that housing is a heterogeneous asset, representing a mixture of old and new properties and properties of different qualities.

By definition, the stock of old housing represents housing investment flows from the past and so the supply of old housing is also highly inelastic. This inelasticity of supply will mean that pure economic rent can be earned in the same way that it is earned on land, at least in the short-term. Also, flows of new housing into the existing housing stock are a component of total fixed investment and, as is true for any fixed asset investment, these flows will be affected by long and complex supply lags – especially complex in the case of new housing because of the long lags involved with housing construction and constraints on the supply of land, including land hoarding by developers.

For business capital, depreciation and obsolescence will deplete the existing stock over time in a relatively stable way; but for housing capital, the relationship between value and age is also complex and non-linear. Whilst the quality of the fabric of a house may deteriorate, its scarcity value may increase and home-owners' responses to this deterioration are unpredictable, and dictated by personal preferences. Some buyers will consider a new house more desirable than a not particularly unusual house built 40 years ago with old plumbing. Yet, the same person might consider it less desirable than a house built 400 years ago with non-existent plumbing. This, combined with the fact that the stock of 400-year-old houses (for example) will necessarily diminish over time just as its desirability is increasing, will make market trends unpredictable. Further instability is created by transactions costs and concomitant threshold effects, contributing to 'jumpiness' and discontinuities in the frequency and volume of housing transactions (Muellbauer and Murphy 1997). These transactions costs become more significant in a world of uncertainty.

Recognizing the importance of timing in residential house-buying parallels Dixit and Pindyck's (1992) analysis of the importance of timing in real options theory of business fixed investment. Real options theorists make a distinction between idiosyncratic uncertainty, affecting individual decisions at a microeconomic level, and aggregate uncertainty, reflecting uncertainty about macroeconomic conditions and therefore affecting all rational agents equally (Pindyck, 1993). Timing and its relationship with irreversibility will mean that both idiosyncratic uncertainty and aggregate uncertainty have crucial impacts on the housing market. In a world where uncertainty is endemic but decisions are completely, quickly and costlessly reversible, uncertainty is unimportant because people can change their minds. When decisions are irreversible in a world in which the future is known, rational agents will make the right decisions first time around and so the irreversibility will not matter. When uncertainty and irreversibility coincide, however, investors risk large losses when their expectations of future rewards are not realised and they are unable to recover sunk costs.

The corollary for owner-occupiers in residential housing markets is that home-buyers purchasing houses in bubbly markets may have unrealistically rosy expectations about the future value of their houses and can lose a great deal – or insufficient positive equity after the transaction cost of a move are taken into account - if these expectations turn out to be misplaced. The more that home-buyers (and their mortgage lenders) commit to a purchase during the height of a housing bubble, the larger will be the costs of irreversibility and uncertainty in terms of rising sunk costs – including not the various transactions costs associated with house purchases but the financial costs for home-owners with low equity and high loan to value ratios. In these circumstances, increased uncertainty about the course of house prices in the future means that house buyers will have an incentive to wait for more information about the state of the market before deciding to purchase housing assets, and if they are able to wait – another corollary is that people will spend more time renting. Exercising an option to invest is costly not only because of user cost but also because of the opportunity costs (associated with risk and incomplete information) that emerge in abandoning the wait for clearer signals. In times of uncertainty, further information becomes proportionately more valuable and house-buyers (especially first-time buyers) will have greater incentives to wait before making purchases.

4. Behavioural complexity in housing markets

The complexities associated with housing markets and related institutions outlined above have both structural and institutional origins. How do these institutional instabilities interact with people's behaviours on a microeconomic scale? Disaggregating down to each individual person making a housing decision, behavioural economics explores how these *market complexities* are magnified by the microeconomic *behavioural complexities* associated with cognitive constraints, behavioural

biases and social influences. In a world of boundedly rational agents, market instability and complexity will be magnified not just by aggregate uncertainty but also by more complex forms of idiosyncratic uncertainty: Dixit and Pindyck's conception of idiosyncratic uncertainty can be expanded to include what behavioural economists describe as 'internalities': deviations from optimal choices created not by forces external to the individual, but from influences emerging from within the individual. In the context of housing choices, this means that all the sources of instability, complexity and uncertainty outlined above will be compounded by behavioural and socio-psychological influences. Sources of instability, such as frenzy effects, may arise from the boundedly rational decisions of atomistic representative agents in response to incomplete / asymmetric information and/or transactions costs. Additional sources of complexity may emerge because of endogenous or behavioural instability emerging because it is not possible to operate as an atomistic agent in real-world housing markets, particularly when uncertainty limits strictly rational behaviour. House-buyers' decisions may interact via social processes – first, by assessing the role of cognitive constraints on housing decisions and second, by analysing housing herding behaviour. If individual house-buyers' decisions are heterogeneous and/or socially motivated, then at a microeconomic level, herding and cognitive constraints will generate non-linearities. At a macroeconomic level, the consequent interactions between house-buyers will mean that instability is magnified.

4.1 Cognitive Constraints and behavioural bias

As outlined above, the standard economic approach is to explain the fundamental value of a house in terms of a buyer's expectations of utility, which in the context of housing assets, include the stream of imputed rents and also the expected increments to wealth that emerge with expected house price appreciation. Adding in behavioural factors, these expectations will reflect the balancing of private and social information about long-run fundamental value and subjective influences.

Cognitive biases will also play a role; homeowners' satisfaction may increase in the short-run just because their home's value is increasing even though the owner has no intention to sell. In this case house price appreciation is generating intangible *perceptions* of value rather than tangible value, and these perceptions will be driven by others' willingness to pay. This may generate something like a speculative bubble: as more and more buyers buy houses during a housing boom, the impact on buyers' choices of objective, non-social information will diminish, and late joiners to the herd will over-weight others' willingness to pay in their own judgement of a property's value. Sources of cognitive constraints on economic decisions and the implications in terms of the use of heuristics are outlined in Kahneman and Tversky (1979), Tversky and Kahneman (1974, 1982), Shiller (2000, p. 136) and Baddeley (2019).

These can be applied to the housing market by focusing on two important sources of cognitive bias relevant to housing: the anchoring effect and loss aversion. Anchoring occurs when beliefs are anchored to prior experiences; a homeowner will anchor their judgments of a house's value to press reports and anecdotal evidence (Kahneman, Ritov & Schkade (1999). From analyses of financial markets by Odean (1998) and Shefrin and Statman (1995), it follows that financial investors anchor their expectations of capital gains to prior peaks, meaning that they will be reluctant to realize their losses and/or will hold onto losing assets for too long. Experimental evidence from Northcraft and Neale (1987) similarly shows that house buyers will anchor their willingness to pay to list prices and will adjust their willingness to pay in response to changes in these list prices.

Genesove and Mayer (2001) link these anchoring effects to loss aversion in housing markets. They note anomalous positive correlations between house prices and sales volumes across many OECD housing markets, with the effects being particularly pronounced in local markets. They also note the volatility in prices and the persistence of large housing inventories. They argue that the explanation lies in loss aversion; people assess gains and losses relative to a reference point (linking to the anchoring effects outlined above - another example of anchoring) and they worry more about losses than gains. Following Tversky and Kahneman (1991) they argue that the housing value function is non-linear being steeper for losses than gains with the marginal value of gains and losses diminishing with the size of gains and with the size of the loss. Using data on the downtown Boston housing market 1990-7, they estimate reservation house prices as a function of potential loss and find that loss aversion has a statistically significant impact on seller behaviour. They separate out the responses of owner-occupiers versus 'pure' investors and find that behaviour differs across these groups – with a larger loss response amongst owner-occupiers. They also find that liquidity constraints affect house prices and the length of time properties remain on the market unsold. They also note that the impact of liquidity seems to affect the pure investors more – with low equity having a larger impact on their asking prices. For British housing markets, Disney, Henley and Jevons (2003) confirm similar asymmetric responses to house price rises versus house price falls. This evidence ties in with the assertions about the destabilising impacts of gearing, as outlined in Section 2.

4.2 Herding and Social Networks

An additional source of complexity in housing markets reflects the fact that housing decisions are not made by people acting independently of each other. People interact in all sorts of ways – reflecting socio-psychological factors as well as economically rational incentives. Some of these influences are picked up in the microeconomic literature on herding.

Social learning

In microeconomic theory, herding is explained as the outcome of Bayes rational decision-making. People learn from others' actions – often because information about others' behaviour is valuable information in a world of imperfect information. The impact of informational influence on economic decision-making has been captured in Bayesian herding models (e.g., see Banerjee 1992, Bikhchandani et al 1992, 1998, and Chamley 2004 for a survey). Whilst herding can be justified as a rational phenomenon in these models, it is nonetheless associated with market failures because, as Banerjee (1992) notes, it leads to "herding externalities" – reflecting an inefficient use of information, though Alevy et al. (2007), in the context of financial markets more generally, show that there are significant differences in behaviour for professional versus amateur traders. Also, Avery and Zemsky (1998) show that herding behaviour in asset markets under conditions of uncertainty, is associated with traders following trends in past trades, and this can lead to significant mispricing of assets. If people are following others, their potentially valuable private information will be lost. These insights about rational herding as the product of a systematic Bayesian updating process assume that – even though optimising behaviour is constrained – nonetheless rational agents process information in systematic and logical ways and often copy others as a social form of learning: a decision-maker will follow the herd because they assume that the herd knows more than they do.

In microeconomic theory, herding is explained as the outcome of Bayes rational decision-making. Also, when herding emerges because of informational influences then these will affect expectations of house price appreciation if owner occupiers look to others in deciding whether or not their house purchase will generate capital appreciation. An information cascade unfolds if enough decision-makers discount their own private information in favour of social information about the decisions of their predecessors. This can generate speculative bubbles. Applied to housing, as more and more buyers buy houses during a housing boom, weights on non-social information will diminish. This sort of extreme may have implications for the tail end of speculative bubbles when the last person to join a herd bases his/her decisions entirely upon the decisions of other buyers. But in more usual times, there will be a balancing of social information about the decisions of others against private signals.

Experimental evidence consistent with Bayesian herding is analysed by Anderson and Holt (1996, 1997) and many others. Similar experimental approaches applied to experimental participants' willingness to pay for housing suggest that social influences have a significant impact on people's willingness to pay for housing, and personality traits will determine a buyer's susceptibility to these social influences, specifically higher levels of cognitive reflexivity [is this defined above?] will lower the impact of social influences on buyers' decisions (Baddeley 2011).

Social pressure

Herding may also be the product of psychological motivations and limitations, for example as the consequence of social pressures and forces. There is evidence that people will follow the majority opinion in spite of their own individual and accurate judgments about a situation (Asch, 1952, 1958). This may reflect the influence of social conventions (Levine and Resnick 1993; Shiller 1995, 2000, 2003). Alternatively, herding may be the outcome of social pressure and therefore must be distinguished from the social learning models based on Bayes rational behaviour outlined in the preceding sections. Shiller (1995) argues, however, that social response explanations are linked to rational herding and social learning, citing evidence from Deutsch and Gerard (1955) that herding operates even without face-to-face encounters. Whatever the origins of social pressure, Festinger et al (1950) and Gibler and Nelson (2003) explore the distinct impacts of social pressure on real-estate and housing decisions (Gibler and Nelson 2003, p.71).

This may reflect the fact that intra-group pressure generates social effects, inducing an unwillingness to disagree amongst conformists, though Shiller (1995) argues that conformity could also be explained as a rational comparison of the probabilities of different possibilities. It is not irrational to infer that it is very unlikely that a large group of other people are all wrong about a simple decision; experimental participants were rationally discounting their personal perceptions when favouring information from group signals (Shiller 1995). The extent to which individuals are affected by the judgements of others can reflect their personality. Individuals' perceptions about the value of reputation and social status will depend on personality traits associated with docility and sociability (Simon 1990), and this will affect susceptibility to herding externalities (Baddeley 2010, Baddeley *et al.* 2010). Socio- psychological influences have also been analysed in the context of housing markets – see Festinger *et al.* (1950) for an early analysis of social pressures in the context of housing decisions. Gibler and Nelson (2003) and Salzman and Zwinkels (2017) and advocate for incorporating consumer behaviour principles into analyses of real estate decision-making, arguing that behavioural influences, including social pressure, have distinct impacts on real estate decisions. These are not captured in the predominant neoclassical analyses of real estate decision-making, which embed strict rationality assumptions and thus preclude a role for socio-psychological factors.

Reputation

Reputation also plays a role in herding. As observed by Keynes 'When reputation matters, it is better to be conventionally wrong than unconventionally right - 'worldly wisdom teaches us that it is better for reputation to fail conventionally than to succeed unconventionally' (Keynes 1936). In other words, decisions in line with conventions and consensus opinions are less risky because to fail when many others are failing does little harm to one's reputation: it is easier to hide from failure when failures are shared. Failing when no-one else is failing is much more noticeable and so the downside risks associated with unconventional decision-making are disproportionately large. Drawing on Keynes's insights, Scharfstein and Stein (1990) develop modern models of reputational herding within a conventional economic framework. The influence of reputation can also be explained in terms of the impacts of social norms, and individuals' perception of attitudes and responses of others. Bernheim (1994) argues that approaches focusing on rational herding as social learning give only a limited explanation and neglect other important social influences. Social factors such as status and reputation can be embedded into individuals' preferences, and it is also rational to follow others if your social group penalises deviations from what is accepted.

Also, the social world is affected by interactions between people and this generates a normative influence – each individual's actions will be affected by social norms and others' perceptions and also by the social capital and social value that the individual's own actions generate, e.g., via purchasing Veblen goods (Veblen 1899) and/or via demonstration effects (Friedman 1957) – both of which will be relevant in the context of housing. Becker and Murphy (2000) analyse social multipliers capturing complementarities between social capital and willingness to pay in the context of fads, fashions and information cascades. In the context of housing decisions, people's housing decisions will be affected by the desire for prestige and social status, and also the rewards from owning houses if others in their social networks do too.

Social networks

Herding tendencies can be linked into concepts of small world networks – the analysis of which was pioneered in mathematics, see – for example –Rosenblat and Mobius (2004), Watts (2004*a*,2004*b*) and Watts and Strogatz (1998) – see also Goyal (2007) for economic applications. In the models of Bayes rational herding / informational cascades outlined above, once-off decisions are taken sequentially. By contrast, in small world networks, decisions may be made simultaneously and repeatedly (Choi, Gale and Kariv 2005). Small world networks develop when different members of a network herd and copy each other generating social networks characterized by clustering and small characteristic path lengths. In a small world network, the shorter characteristic path lengths mean that

changes will spread easily and quickly because of the existence of short cuts (Watts and Strogatz 1998, p. 442).

In an urban housing context, these social influences can contribute to spatial asymmetries, compounding spatial misallocation problems, as identified – for example, by Hsieh and Moretti (2019). Network effects will operate at neighbourhood levels. In a world of uncertainty, a neighbour may be better informed than a given individual about the relative prospects of the local housing market and so an incentive for informational herding will exist. In social networks people can only observe the actions of those with whom they are connected so they will herd with their immediate neighbours. But information from non-adjacent neighbours will nonetheless spread through the network via indirect effects (Gale and Kariv 2003). As each household making a housing transaction looks to its neighbours in making its decision, so its neighbours will look to their neighbours. So, neighbours once removed will have an indirect influence on a household's housing decisions but the neighbourhood herding effects will diminish as distance and degrees of separation increase. This diminishing impact occurs not only because the information becomes once removed but also because the sources of information from other neighbours creates noise within the herding signals. If each of your neighbours is doing something different, then the signals will be less clear. In addition, there will be feedback effects – just as your neighbour may copy you, you may copy your neighbour.

Given a world in which herding takes place as a social learning device, social networks will develop as neighbours follow each other. These ideas were extended in the preceding section to show how housing herding can lead to the evolution of small world housing networks, with the extent of neighbours' influence decreasing with distance. When households follow their closest neighbours in their housing choices, housing herding will generate a network of neighbours copying each other in the belief that others around them may have more information about the relative merits of house purchases. Developing the small area social network analysis outlined above, as one neighbour copies another, so their neighbours will copy them with the extent of contagion being determined by the degree and the influence of activity in other markets will decline with spatial distance. UK evidence from neighbourhood housing statistics has verified that housing activity in neighbouring wards will have more influence than housing activity in neighbouring local authorities, but housing activity in neighbouring local authorities will have more influence than housing activity in neighbouring regions (Baddeley 2005).

5. Conclusion

The institutional sources of housing market instability, as explored in section 3, can be brought together with the behavioural and social drivers of housing market instability, as explored in section 4, to build an encompassing model embedding both sets of drivers within a microeconomic analysis

of housing demand. As explored in section 2, the fundamental value of a house reflects a combination of rents (actual or imputed depending on whether the owner is an occupier or an investor) with returns increasing as house price appreciation generates capital gains. Expectations of house price appreciation will have two components. In a standard model of rational forward-looking agents, this is driven by market expectations. But when socio-psychological factors highlighted in behavioural economics are allowed in, then owner occupiers' satisfaction from their homes may be increasing in the short-run even if they get no objective, physical utility from the increase in its value. House price appreciation generates intangible mis*perceptions* about value – i.e., changes in value that are not real in a tangible sense. Many owner-occupiers (unless they are moving to a new area or downsizing) are either not selling at all or selling in the same markets in which they subsequently have to buy (what they gain in the sale they subsequently lose in their purchase). Nonetheless, they derive hedonic satisfaction in interpreting a rising price as a signal that their home is becoming more desirable.

Herding behaviours – reflecting social learning and other social influences – will impede equilibration in housing markets, generating persistent divergences in house prices and housing demand, magnifying inequalities between those owning housing assets versus those not owning housing assets, with particular implications for spatial economic divergence, especially in population dense urban areas where social influences are more likely to be more salient.

But home owners' and buyers' information about value of housing assets is imperfect – and, especially for those new to the market, social learning will occur as they infer the value of houses from the information available to them, where their information set includes the prices paid for similar houses by others. In this context social influences are relevant in two ways: informational influence (owner occupiers learn about the market value of their homes by observing prices paid by others) versus normative influence (higher prices paid by other owner occupiers will increase the social rewards accruing to the home-owner e.g., because reputation and/or status are increasing and rising house prices raise the intangible aspects of the utility stream from owning houses). In judging the fundamental value of a house, expected utility will reflect the balancing of private information and social information about long-run fundamental value and subjective influences.

This chapter has explored some of the objective determinants of housing demand, as grounded in mainstream economic theory but has also identified a range of subjective drivers that will distort decision-making in housing markets away from behaviours consistent with assumptions of rational optimising behaviour. The empirical evidence, including experimental evidence, suggests that behavioural biases, social influences and individual differences will distort willingness to pay for owner occupied housing and applied the insights to an experimental analysis of housing decisions. In terms of implications for housing policy, if behavioural biases and social influences are distorting decision-making, then it is likely that these distortions will be magnified in urban areas where

population density co-exists alongside segregation. Some of the social aspects of segregation and housing markets have been explored in the context of wellbeing (see, for example, Massey *et al.* 1987; Krysan and Crowder 2017). The connections between this literature and current behavioural economic analyses of housing decisions are not yet well-developed and further analyses drawing on new insights from behavioural economics around the role of socio-psychological factors on housing decision-making is a potentially rich theme for future research. This will have implications for spatial divergences in creating pockets of high versus low housing costs, entrenching spatial patterns of poverty and inequality. Different institutional arrangements and relationships between property owners and developers will have significantly different impacts in terms of land value betterment (Wang and Baddeley 2015). These are likely to be pronounced in an urban context reflecting uneven patterns of agglomeration of key infrastructures, especially in large cities. These social influences will magnify impacts from local infrastructure, exacerbating land value capture by home-owners in key areas. One implication for land use policy would be to prioritise areas with lower levels of infrastructure for new infrastructure investments, to even out potential sources of spatial divergence, and the patterns of inequality that emerge as a consequence.

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