Can the market be tamed? A thought experiment on the value(s) of planning

Abstract

In many contexts across the globe the scope and remit of planning is being limited. Much of the academic literature identifies this tendency as arising from a tension between planning as a state-regulatory activity and the tenets of neoliberalism – particularly free market competition. In this essay we seek to explore the degree to which this perceived incompatibility between planning and the neoliberal order is genuinely real by running a thought experiment. We hope to show that thinking about the development process in this way points to alternative ways of imagining the scope and remit of planning – and how the normative principles at the core of the activity might be reconciled, or even extended, within the context of a neoliberal polity.

Introduction

In many contexts across the globe the scope and remit of urban and environmental planning is being limited (Gunder, 2016; Gunn and Hillier, 2012; Hrelja, 2011; Holman, Mossa and Pani, 2017; Mäntysalo and Saglie, 2010; MacCullum and Hopkins, 2011). As an activity that has statutory regulation at its core it often grates against the now more or less fixed neoliberal orthodoxy that posits the market as locomotive of progress against bureaucracy as a brake on development (Brenner and Theodore, 2005; Fisher and Gilbert, 2013; Jones, 2012). Although the specific anatomy of the neoliberal order varies from nation to nation some core similarities
have been catalogued and planning’s corresponding incompatibility with these principles identified (for example, Lovering, 2009).

For some academics interested in making the case in favor of planning, corresponding attempts to diminish the professional activity to make way for the market have been understood as an ‘attack’ (Lord and Tewdwr-Jones, 2014). Others have highlighted the continuing public interest justification that spawned planning in the first place (Campbell, 2012). In some cases (Campbell and Fainstein, 2012) the defence of planning, quite correctly, points out that the environment (widely construed) is a very complex asset that is not well captured by those analyses of planning that categorise it as a restrictive drag on economic growth (Cheshire and Sheppard, 2005; Nathan and Overman, 2011). This point has been extended by research that has sought to investigate much more fully planning’s specific ‘added value’ (Adams and Watkins, 2014; Adams and Tiesdell, 2010). The net result of work in this vein has been to challenge the logic that real estate markets would respond effectively to market signals if it was not for the planning system. Correspondingly, the argument has emerged that there may be value in thinking of planning as a ‘market maker’ (Lord and O’Brien, 2017) and that planning may be conceived as an important foil to the neoliberal hegemony rather than explicitly incompatible with it.

But what would this type of planning look like? Could we imagine ways in which a modernised planning might combine these ‘market making’ aspects with its normative ends and professional ethics: the public interest, social inclusion, environmental sustainability, balanced development?

An important strain in the literature would suggest not. A sustained body of work has emerged on the incompatibility of planning’s social and environmental goals with the core attributes of neoliberal capitalism. The result is that an earlier proposed ‘sustainability fix’ (While, Jonas and Gibbs, 2004) has, following thoroughgoing empirical investigation, given way to scepticism that...
a balance can be struck (Bina, 2013; Georgeson, Caprotti and Bailey, 2014; Gibbs and O’Neil, 2014; Krueger and Gibbs, 2007; O’Neil and Gibbs, 2016). For an area of public policy which is charged with precisely this task of taming the market, this question is particularly germane to planning. Although rarely confronted explicitly in the planning literature some, such as Campbell, Tait and Watkins’ (2014), have posed the question directly: “Is there space for better planning in a neoliberal world?” (see also, Legacy, Lowe and Cole-Hawthorne, 2016). At one remove Holman, Mossa and Pani’s (2017) work has made a significant contribution through an exploration of the empirics of this question by looking at planning reform in England to explore the points of convergence and divergence between planning’s economic and ethical value(s).

In this paper we hope to further this debate by exploring from first principles the relationship between how planning systems function at a human level and the outcomes they might entail. In this respect our aim is to advance the literature on planning’s capacity to effect meaningful change in business decision making by exploring the intersection of “how real estate developers think” (Brown, 2015) and how they might act and, correspondingly, any influence planning might have in this regard. In this respect our contribution is to the nascent work that seeks to develop a ‘behavioral insights’ take on planning (Bond et al., 2016; Ferrari et al., 2011; Jackson and Watkins, 2008; Lord, 2009, 2012).

The development process: rationality, belief and human behaviour

There is now a huge corpus of research on the development process, much of it inspired by various branches of economics. Perhaps the best example of this crossover comes in the shape of transaction cost approaches that seek to understand the development process through the
lens provided by the New Institutional Economics (Alexander, 1992, 2001; Lai, Ngar Ng and Yung, 2008; Webster, 2005). For adherents this framework provides a persuasive way of reading off outcomes from the governance arrangements and the interaction of the prevailing set of institutions (widely construed to include formal codes and informal norms of practice) that exist in a particular context. However, its post-hoc vantage point and the primacy accorded to the rules and institutional players of the game - as opposed to the interpretation of those rules that result in the human behaviors of those who people the institutions (or act individually) – have meant that not all are convinced. Fischer's (1977:322) early unease remains relevant: “Transaction costs have a well-deserved bad name as a theoretical device, because solutions to problems involving transaction costs are often sensitive to the assumed form of the costs, and because there is a suspicion that almost anything can be rationalized by invoking suitably specified transaction costs.”

In response some researchers have turned to game theory. Perhaps the fundamental motivating factor encouraging the infusion of this school of economic thought into planning research is the recognition that the markets that planning regulates are really quite peculiar. The development process, irrespective of contextual setting, is overlaid with specific qualitative features that speak very closely to the questions with which game theory (and behavioral economics) deal: the decision making process pits hypothetical development against unpriced public goods, usually environmental assets; buyers and sellers may take a very long time to negotiate a mutually agreeable settlement; the decision to develop is (almost always) irreversible and creates landscape altering externalities that cast a decades-long shadow; and the issue of local democratic control is a relevant consideration in many settings. These observations alone point to the limitations of econometric estimations of planning’s costs devoid of any corrective for the effect the activity

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has on the quality of market conditions or the things it achieves that lie outside the parameters of any given model.

In those cases where game theory has been applied to planning-orientated questions the focus has usually been on the specific microeconomics of urban transformation, particularly questions of land readjustment and compensation policy (Samsura, van der Krabben and van Deemen, 2010, 2015). At one remove, others have shown the utility of using concepts from game theory to think about the dissemination of information and how this affects the strategies employed by all those who have any conceivable role in the development process (Kaza and Hopkins, 2009). The shared underlying logic of research in this vein suggests a fundamentally altered way of thinking about the economics of land-use planning more widely.

Alternative approaches to thinking about the development process have encompassed the use of ‘big data’ and econometric methods to simulate (aspects of) the production of the built environment (Brotchie, Sharpe and Toakley, 1973; Gómez-Antonio and Hortas-Rico, 2016; Jiang, Deng and Seto, 2013; Reades, 2014), systems- and complexity theory-inspired approaches (Chadwick, 1978; Hillier, de Roo and van Wezemael, 2016) and others that single out variations in agential power and the chronology of the process as holding explanatory power (Farías and Bender, 2010; Gar-On Yeh and Wu, 1996; Landis, 1995; Yigitcanlar and Teriman, 2015). At the intersection of these contributions sits an array or research which combines insights from consonant approaches - such as agent-based modelling (ABM), which seeks to marry the impulse to simulate with an appreciation of human agency (Batty, 2005). The promise of this approach is yet to be fully realized as the application of agent-based modelling to the development process is in its infancy (Baptista et al., 2016; Levy, Martens and van der Heijden, 2016).
There are exciting developments in, and at the confluence of, all these approaches. However, although the various ways of thinking about the development process sketched out above offer rich insights into the specifics of the development process from place to place we lack a thoroughgoing epistemological framework that would allow us to make part-whole connections across the, often, case-based empirical literature. Indeed, perhaps the single most important overriding message that emerges from the literature as a whole is that it makes little sense to talk of the development process when there are such huge variations between contexts: for example, the discretionary system of the UK, US zoning arrangements and Chinese statutory orchestration are systemically very distinct with huge variations in both legal framework and norms of practice. This point is well made in the classic statements of planning as a context-specific activity comprising multi-agent negotiations (and other communicative acts) (Forester, 1999; Healey, 1997). Therefore, to develop any kind of theoretically nuanced understanding of the development process that prevails in any particular context means engaging with the human psychology of decision making.

This presents a very specific challenge in two respects. Firstly, in theoretical terms we have to be able to accommodate an understanding that participants in the development process may be acting on the basis of their beliefs about one another. By extension these beliefs alone may have a significant bearing on individual (and collective) action and the outcomes that might result. Secondly, we need to be able to translate this understanding into empirical investigation. This would allow us to develop behavioral insights into the specifics of the ‘planning game’ that plays out in any particular context.

In this paper we hope to address the first question: how could we theorise counterparty interaction in the development process to elucidate the importance of the beliefs that each forms
about the other(s)? In so doing we hope to make the case that market intervention in the form
of urban and environmental planning could have an effect on how developers think that in turn
shapes how they act. We argue that this vision of planning as a market actor that regulates
beliefs opens the door to imagining the sorts of planning system that could have a meaningful
impact on business decision making. To do this we use the medium of a simplified thought
experiment. This approach has become the principal way of thinking about the underlying
philosophical question — what we can know of other minds — and can be seen in classic examples
such as the ‘brain in a jar’ (see also, Avramides, 2001; Ryle, 1949). The thought experiment
allows us to explore from first principles under what circumstances we might come to have true,
justified beliefs about cognition, behavior and language in others. The specific nature of the
thought experiment is a scenario — not always one that must closely mirror reality (as with the
‘brain in a jar’) — that provides a framing device to explore a specific question often pertaining to
a fundamental principle of epistemology, metaphysics, logic or ethics. Thought experiments
often take a greatly simplified or superficially contrived format to allow us to test the limits of
some imagined state, for example, Hardin’s original iteration of the Tragedy of the Commons (and
developments thereupon) serve perfectly to illustrate this point (Hardin, 1968; Cole, Epstein and

The medium of the thought experiment is well-aligned to our objectives in this paper as we seek
to explore from first principles the effects of belief on the development process, how beliefs
might affect outcomes and how beliefs might be shaped through regulation. As established in
the foregoing discussion there cannot be said to be any singular real world with respect to the
development process: there are myriad approaches taken that vary wildly from place to place.

So, our aim is explicitly not to give a fine-grained rendering of how affecting beliefs might alter
157 how the development process might work out in any specific location. We fully acknowledge
158 that behaviors and the beliefs that motivate them are to some extent a reflection of the rules of
159 the game established in a particular context. Instead our aim is to consider the problem in the
160 abstract through a simplified thought experiment that removes the issue of empirical context.
161
162 In what follows we run a thought experiment that follows the well known folk game “Going to
163 the Party” and in structural terms begins by mirroring the traditional rendering (for example see
164 165 Pereira, 2012). The purpose of the thought experiment is to explore how, even in a simplified
166 scenario involving just two participants, a range of possible outcomes can be imagined dependent
167 upon what each participant believes regarding the other. Each outcome is rational and reasonable: a set of
168 potential ‘states of the world’ (Rasmussen, 2006). Which set of outcomes is preferable is wholly
169 normative and would require prescription - an answer to the separate but not unrelated question
170 of what should be the underpinning goals of a system designed to mediate competing ends vis à vis
171 how our environment is governed. It is our contention in this paper that it is the value - and in
172 the values - of a planning system to appreciate that a range of potential outcomes are possible, that
173 they are belief-driven and that planning has the agency to seek to manage the beliefs that shape
174 the process towards one of these end states.

175 Although we have explicitly and deliberately not sought to develop a thought experiment that
176 exactly mirrors a specific case from the material world we have started, as with all thought
177 experiments, from some principles that we are interested in exploring. Firstly, we seek to
178 investigate how decision makers engaged in the development process might order their
179 preferences over a range of potential sites; secondly we seek to investigate how these preferences
180 are affected by beliefs. More specifically, we hope to uncover how, what has long been argued to
181 be a core, foundational feature of neoliberalism – competition (Wigger and Buch-Hansen, 2012,
2013) - might affect decision making. In this thought experiment we set out to identify how the
desire to gain an advantage by diminishing competition, a central principle of business strategy
(Porter, 1979; Gunther McGrath, 2013), might play out in the development process where
aversion to competitive rivalry has a clearly spatial dynamic (Bulan, Mayer, Tsuriel Somerville,
2009; Xu and Yeh, 2005). Building from this we begin with three uncontroversial propositions
that frame the thought experiment:

1. Developers prefer some sites to others.

2. Developers prefer to limit competition within the context of their spatial preferences
(defined under 1);

3. Developers will formulate beliefs about one another’s spatial preferences that
ultimately affect 1 and 2.

The thought experiment

Imagine a city that has four vacant sites for redevelopment: A, B, C and D. A is a ‘prime’
location; B and C incrementally less desirable and D, a deprived inner city neighbourhood, is
deemed to have the least development potential as a profitable location. There are two main real
estate developers in our city run, respectively, by Mark and Cecilia. Mark has a well-defined set
of preferences with respect to the development opportunities in the city: he favours Site A to
Site B; B to C and C to D; however the situation he dislikes most is when Cecilia competes with him for a site.

Mark’s preferences can be set out in tabular form:

**TABLE ONE ABOUT HERE**

The table above simply sets out Mark’s position with respect to how he ranks the desirability of acquiring each development opportunity; he derives most satisfaction from the acquisition of Site A and then transitively ranks the following three sites in descending order. However, a coincidental choice by Cecilia is the outcome he likes least: when Cecilia chooses to compete with him the desirability of that site diminishes to zero for Mark.

This ranked order of preferences (4,3,2,1,0) - utilities in the language of economics - represents Mark’s satisfaction with any of the possible outcomes of site acquisition; the full range of ‘states of the world’ that might prevail.

All other things being equal it is clear that Mark’s preferred option is Site A. This is the best choice for Mark so long as he believes that Cecilia will make any choice other than Site A. If Mark believes that Cecilia has similar tastes to himself, and that she will likely pursue Site A too, the choice of Site B would be rational as the absence of spatial competition means this will yield a better outcome (expected utility, 3) compared to one where both Mark and Cecilia make the same choice for Site A (expected utility, 0).

How about Site C? If Mark believes that Cecilia will choose Site A clearly the only rational choice for Mark is Site B. But what if he believes Cecilia has a preference for one of the other sites? The strict ordering of the utilities would mean that Mark should go with his strongest preference, Site A, the one that yields him the greatest utility (4).
Is it the case, therefore, that there are no circumstances under which Sites C or D could be a rational choice for Mark?

To this point we have worked solely on the basis that Mark is certain in his belief about what Cecilia might do. However, beliefs rarely function in this way. Instead we might believe to a certain extent that we can forecast what, for example, a competing property developer might do.

For example, on reflection, Mark might arrive at the belief that he has a 60% expectation that Cecilia will choose Site A and a 40% probability that she will choose Site B. If Mark holds this belief about Cecilia’s actions his expected utility can be summarized as a 60% chance that following his own strict preferences will result in he and Cecilia competing for the same site (Site A) the outcome of which would be totally unsatisfactory to Mark (utility, 0) and a 40% chance that Mark will succeed in obtaining Site A without having to compete with Cecilia (because she will have gone for Site B) thus realising his most preferred outcome and a utility of 4. This field of possibilities produced by Mark’s beliefs could be summarized as:

Site A: (0.6) 0 + (0.4) 4 = 1.6

By extension if Mark chooses Site B he expects with probability 0.6 to have avoided competition with Cecilia and, therefore, to enjoy a utility of 3. Similarly he anticipates a 40% chance that they will have both opted for Site B, the presence of competition resulting in an expected utility of 0. Again, this could be summarized as:
Site B: 0.6 (3) + 0.4 (0) = 1.8

If Mark opts for Site C he expects with certainty that he will not be competing with Cecilia as he expects with equivalent certainty that she will only be interested in Sites A and B. Looking again at Table 1 we see that the expected utility to Mark of choosing Site C is 2: greater than the expected utility resulting from his beliefs about Cecilia’s preferences with respect to either Site B (1.8) or Site A (1.6). Site D is still the least preferred of Mark’s non-competing options with an expected utility of 1. In summary, Mark now prefers C to B to A to D: a very different ranking to the one he started with before we formulated his beliefs as probabilistic expected utilities. We note that to make the point, we have intentionally kept the analysis as simple as possible. One may, however, argue that Mark’s belief have been arbitrarily specified without respecting the strategic interaction between the two players, Mark and Cecilia, and the consistency between beliefs and actions. To address this point, we demonstrate in the appendix to this paper that Mark’s belief is consistent with Cecilia’s strategy and is part of a Bayesian Nash equilibrium in a game where Mark is uncertain about Cecilia’s preference regarding the four development sites.

Interpretation

This thought experiment illustrates how, even under the terms of a simplified game, rational choices made by market participants under competition are a function of their beliefs about others. It also illustrates how this may result in patterns of behavior that run contra to what one might expect when beliefs are not considered: in the thought experiment it is Mark’s beliefs about Cecilia that result in his optimal choice being what would otherwise be his third most preferred site.
So what should we make of this more widely? We can probably imagine scenarios where it may
be in our collective societal interests that developers arrive at the conclusion that their less-
preferred sites are the ones that they should pursue. This may be achieved by encouraging the
necessary belief set on the part of competing developers to allow that conclusion to follow
rationally. For regulatory planning this would mean helping to install within developers a belief
profile consistent with the conclusion that investing in what would otherwise be their least
preferred sites, often inner city neighbourhoods which have been neglected, would be the logical
thing to do. This would mean a greater, not lesser, role for planning. Moreover it would mean a
more economically active position for planning (Adams and Tiesdell, 2010): enhancing the
desirability of C- and D-type sites by creating the perception that the right to develop might be
more readily achieved over sites which, on first principles, would be more desirable to the
developer but where development is less viable, because of competition and/or a diminished
probability of consent. Alternatively we could potentially conceive of more fundamental ways of
achieving progressive outcomes through planning working with/harnessing neoliberalism’s
competitive impulses. For example, bundling sites at either end of the spectrum could be
arranged in such a way that the right to develop Site A was accompanied with the obligation to
develop Site D. Such a strategy would be unequivocally behavioral-economic. Its outcomes
might also be considered to give more socially preferable outcomes. Similar observations may be
made with respect to environmentally more, over less, sustainable locations.

In the example in this paper we have simply introduced two competing players, Mark and
Cecilia, without any planning agency to mediate or coordinate their activities. Such an agency, a
‘market maker’ for land and property, would occupy a strategically vital role. It would be able to
animate markets, shape their conditions and potentially, depending upon its power, reach and the
skills of those who people it, affect the beliefs and, therefore, the decision making of developers.

For example, in this thought experiment we have not considered what might be entailed if Mark
and Cecilia seek to cooperate and coordinate their actions in some way. A planning agency that
had the power to diminish the likelihood of this outcome and maintain competitive market
conditions or manipulate them, perhaps through encouraging competition for sites A and B
while diminishing the likelihood of competition for sites C and D, would have a hugely
significant bearing on the perceived desirability of sites. The corresponding effect such an
agency might have on limiting developers’ choice sets and, critically, developers’ beliefs about
one another’s preferences would also have profound effects on market conditions. Depending
upon the ethical criteria by which such a system is held to account it could potentially privilege
‘better’ outcomes in a neoliberal world in which competition is reified (Campbell, Tait and

So powerful are beliefs as a determinant of how markets function in practice that the importance
of this role of market making intermediary in creating or installing beliefs can barely be
overstated. If we change the utility profile of Mark’s preferences to make Sites A and B more
strongly favoured than Sites C and D, but leave all other aspects of the thought experiment
unaltered, the implied logical course of action for Mark becomes quite different:

### TABLE TWO ABOUT HERE

Now, although the strict ranking remains the same, Mark favours Site A quite a bit more strongly
than any other. Under this revised set of preferences Site C can no longer be an optimal choice
for Mark. He prefers Site A sufficiently more strongly that, with the same field of beliefs as before about Cecilia, his expected utilities become:

\[
\text{Site A: } (0.6) \times 0 + (0.4) \times 7 = 2.8
\]

\[
\text{Site B: } (0.6) \times 4 + (0.4) \times 0 = 2.4
\]

The strength of Mark’s preference for Site A now means that despite his belief that Cecilia also favours this site and his very strong aversion to competition with Cecilia he will favour the pursuit of this site to the others.

Extension and Conclusions

Although this is only a simplified thought experiment it serves to reveal some significant points regarding the importance of beliefs in shaping outcomes. Evidence from behavioral economics shows that if a belief is widely held and with sufficient conviction we may identify the emergence of a normalising form of behavior which results in ‘herding’. This formation of a commonly held belief extends far beyond the terms of the traditional neoclassical understanding of a wholly and perennially self-interested economic decision maker. For example, a connection may be explicitly traced between social pressures and expert opinion in creating and reinforcing the instinct to herd (Baddeley, 2013); highly relevant considerations with respect to real estate transactions where social invocations to ‘get on the property ladder’ and mutually reinforcing expert opinions abound. Under conditions such as these the establishment of herding has been understood as a collective psychological precursor to the irrational escalation of commitment common to many bubble markets where a premium is assigned to some asset(s) as a function of the prevailing belief that it is universally understood to be highly-prized (see, for example, Roberts and Henneberry, 2007 on developers’ potentially irrational preference for capital cities).
This creation of a socially normalized, limited ‘worldview’ (juxtaposed with the game theory understanding of multiple possible states of the world) seems to be a tendency common to humankind (Ostrom, 2014).

More widely it is far from clear that the politically most popular neoclassical analyses of how real estate markets function can be translated into realisable policy ends. For example, the view that building more residential units in areas of extreme demand, such as the New York/tri-state area or London/South East England will stabilise or lower house prices through reconciling the mismatch between undersupply and excess(ive) demand is a potentially greatly oversimplified conclusion (see Marom and Carmon, 2015 for a review of housing policy in these two specific areas). The focus on the bricks and mortar of under supply at the expense of the behavioral psychology of demand in an over-heating market is in keeping with the ceteris paribus assumption common to neoclassical economics. But all things are not equal. Omitting the psychology of human economic decision makers produces very partial analyses that explain little of the irrationality of some real estate market outcomes. Building many more new houses in locations where demand is strongest may do very little to lower or stabilise prices (assuming this is the true objective): not if the 'Site A' logic for, say, Greater London is sufficiently strong as a prevailing set of beliefs. We may simply build a great many very expensive new homes, probably to rather low standards - “rabbit hutches on postage stamps” (Evans, 1991) - in areas of environmental jeopardy (in this English context particularly in relation to flood risk) that remain out of reach for many/most. From this perspective the answer to resolving the affordable housing situation may require a fuller engagement with the beliefs and expectations of those who play the ‘planning game’ (Lord, 2012).
To carry this conclusion through to an alternative policy prescription we can return to the point at which this paper opened: the status of a planning system. Although now seemingly friendless in political circles, planning is perhaps the only viable way of animating real estate markets in such a way as to challenge or subvert the belief structures that have given rise to one of the most pressing social problem in many developed countries: urban centres of population where housing is too expensive for all but the most wealthy. To illustrate, if we could remake planning so that its enactment is cognisant of effects on real estate markets we might imagine Mark and Cecilia playing a different game, one in which planning controls created a ‘state of the world’ such as this:

**TABLE THREE ABOUT HERE**

To run the thought experiment through to its conclusion if Mark believes that Cecilia has a 50% probability of choosing Site A, a 30% preference for Site B and favours Site C to a degree of 20%, under this new set of preferences, every possible site becomes a potentially rational choice for Mark, including the otherwise least-preferred option, Site D. His expected utilities become:

- Site A: \((0.5) \times 10 = 5\)
- Site B: \((0.7) \times 9 = 6.3\)
- Site C: \((0.8) \times 8 = 6.4\)
- Site D: \((1) \times 7 = 7\)
The order that Mark began with has been symmetrically reversed. His optimal choice is to go for the site he initially favoured least, Site D, because the fear of spatial competition with Cecilia is now greater relative to a less strongly ordered set of preferences. Surely this would be the end goal for any planning system: harnessing the competitive impulses of a neoliberal world to encourage better outcomes for areas that would otherwise be disadvantaged? Of course in practice Mark’s beliefs may moderate over time. We may need to use Bayesian methods to understand how he updates his beliefs in light of information he gleans from Cecilia, for example, if commitment to a course of action is escalated as a result (Gilroy and Hantula, 2016).

Equally Cecilia may use signalling and screening strategies in an attempt to affect Mark’s beliefs about her. She may bluff, or double bluff; she may obfuscate; she may dissimulate and prevaricate. And so may Mark (see, Benz, Jäger and van Rooij, 2016; Polnaszek and Stephens, 2013). We invite others to extend and develop the thought experiment such as we have done here and in the Appendix to this paper.

With so many moving parts, even in this greatly simplified thought experiment, there may be value in having a referee. An objective and impartial third party who can set and enforce the rules of the game explicitly to engineer behavioral outcomes may turn out to be a very important market participant. This would be particularly true if we are ever to make the Site Ds of the world – deprived neighbourhoods, complex but environmentally sustainable sites - locations where developers might rationally choose to invest. Conceiving of planning in this way suggests an alternative form of urban and environmental regulation that will entail a fuller dialogue with behavioral economics and ‘mechanism design’ (for example, Börgers, 2015). These schools of thought have had a profound effect on other aspects of public policy (for example, Halpern, 2015; Loewenstein, 2015; Madrian, 2014). Taking a cue from this literature and thinking again
about beliefs, values and the epistemic underpinnings of how we animate the markets that produce the built environment may help us arrive at a clearer view regarding the role and value of planning in these markets.

Appendix

Consider a game of incomplete information where Mark and Cecilia independently and simultaneously choose a development site from the set \{A, B, C, D\}. If their choices coincide, they both obtain a payoff of 0. It is known to both players that Mark’s payoffs when choosing A, B, C, D alone are 4, 3, 2, and 1, respectively. However, \textit{ex ante} there are two possibilities for Cecilia’s payoffs. With probability 0.6, Cecilia has the same payoffs as Mark’s. With probability 0.4, Cecilia’s payoffs when choosing A, B, C, D alone are 3, 4, 2, and 1, respectively. Note that Cecilia prefers site B the most in this case. Note also that Cecilia’s payoffs, or in game theoretical terms types, are Cecilia’s private information while Mark only knows the prior distribution of Cecilia’s types. The following figure summarizes the game. Intuitively, Cecilia knows which bimatrix is being played while Mark only knows that the left (type 1 of Cecilia) is being played with probability 0.6 and the right (type 2 of Cecilia) 0.4.
Figure 1: The first payoff in each cell is for Mark and the second is for Cecilia.

414 We now claim that the strategy profile \{C, \{A,B\}\} constitutes a Bayesian Nash equilibrium in this game in which Mark chooses C, and type 1 of Cecilia chooses A and type 2 chooses B. To see this, note that given Mark’s strategy of choosing C, type 1 of Cecilia indeed maximises her payoff by selecting A which yields her the highest payoff of 4. On the other hand, type 2 of Cecilia obtains the highest payoff of 4 by selecting B.

419 We now show that given Cecilia’s strategy which specifies A and B for type 1 and 2 respectively played where according to Cecilia’s strategy A is chosen, and with probability 0.4 the right bi-matrix is being played where Cecilia selects B. In expected terms, choosing A yields Mark 0.6*0 + 0.4*4 = 1.6. Similarly, choosing B yields 0.6*3 + 0.4*0 = 1.8. Finally, selecting C yields 0.6*2 + 0.4*1 = 2 and selecting D yields 0.6*1 + 0.4*1 = 1. Thus, Mark indeed maximizes his expected payoff by selecting C given Cecilia’s equilibrium strategy.

426 In conclusion, Mark’s belief of Cecilia choosing A with probability 0.6 and B with probability 0.4 is consistent with Cecilia’s best response to Mark’s choice of C. And Mark choosing C is rational given his belief about Cecilia’s type.
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<th>Site C</th>
<th>Site D</th>
<th>Same site as Cecilia</th>
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<td>4</td>
<td>3</td>
<td>2</td>
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Table 1: Mark’s preference set

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<td>7</td>
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Table 2: Mark’s adjusted preference set

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<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3: Mark’s final preference set