The psychology of residential developers: lessons from behavioral economics and additional explanations for satisficing

Rayman Mohamed, Wayne State University
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Lessons from Behavioral Economics and Additional Explanations for Satisficing

Rayman Mohamed

Abstract
Researchers have repeatedly observed satisficing by residential developers. The phenomenon has been attributed to their bounded rationality. In response, policy makers have designed policies that reduce risks to assist developers in overcoming bounds on their rationality. However, after decades of such policies, there is little evidence that developers have stopped satisficing. This article argues that bounded rationality is an insufficient explanation for satisficing by small developers. Lessons from behavioral economics suggest additional reasons for satisficing by developers. Satisficing is common because developers bracket projects one at a time, bracket each investment decision in isolation of others, create nonfungible investment accounts, establish self-imposed liquidity constraints, and temporally space projects. Policies that group risks to developers are likely to be the most effective. However, additional land-market-specific research is required to design policies that address these psychological traits. Academicians also need to design better survey instruments to investigate developer decision making.

Keywords: developers; sprawl; satisficing; prospect theory; behavioral economics; mental accounting; narrow bracketing

1. Introduction

The phenomenon of satisficing—the setting of suboptimal targets to which people aspire (Simon 1979)—has been widely observed among residential developers (Baerwald 1981; Hepner 1983; Leung 1987).1 Drawing on behavioral theories of the firm proposed by Cyert and March (1963) and earlier writings by Simon (1957), Kenney (1972) attributed satisficing by developers to their bounded rationality.

Because efficient land use requires developers to take advantage of all profit opportunities, suboptimal decisions by developers contribute to inefficient land use (Lucy and Phillips 2000, 27).2 In particular, as efficient land use requires the full utilization of existing services and infrastructure, their underutilization by satisficing developers contributes to sprawl in the form of low-density and leapfrogging development (Nelson and Duncan 1995, 5).3

In response, government policy makers have designed policies aimed at reducing risks to developers. Reducing risks is intended to help developers overcome the bounds on their rationality so that they will make decisions that result in more efficient land use. Early enunciations of this approach can be found in Kenney (1972, 220), and contemporary statements to this effect can be found in Berke, Godschalk, and Kaiser (2006, 200). Risk reduction policies include clear rules about zoning and allowable uses; fixed rather than negotiated exactions; transparent capital improvement programs; and predictable, streamlined approvals processes.

Despite decades of experience, however, there is little evidence that developers have stopped satisficing. This article argues that bounded rationality is an insufficient explanation for satisficing by small developers. Lessons from behavioral economics suggest additional reasons for satisficing by developers. Satisficing is common because developers bracket projects one at a time, bracket each investment decision in isolation of others, create nonfungible investment accounts, establish self-imposed liquidity constraints, and temporally space projects. Policies that group risks to developers are likely to be the most effective. However, additional land-market-specific research is required to design policies that address these psychological traits. Academicians also need to design better survey instruments to investigate developer decision making.

I address this question by drawing from the literature in behavioral economics, a field that studies the role of human psychology in economic decision making. Although this literature originally rested on the foundations of bounded rationality articulated by Simon (1957), it has blossomed since the 1970s to provide other psychological theories to explain economic decision making.4 In this article, I argue that
lessons from behavioral economics can provide additional explanations for satisficing by small developers that have been overlooked until now.

The remainder of the article is as follows: Section 2 summarizes the literature on developers’ tendencies to satisfice and the responses of policy makers; Section 3 distills pertinent lessons from behavioral economics that are applicable to developer decision making; Section 4 proposes a generalized framework for decision-making by developers in the context of these lessons; and Section 5 presents conclusions and suggestions for further research.

2. Bounded Rationality, the Development Industry, and Satisficing

Nearly a half century ago, Simon (1957, 198) articulated the concept of bounded rationality. He argued that people are limitedly rational, that bounds on their knowledge and limits on their cognitive abilities prevent them from finding optimal solutions to problems they face. As a result, people aspire to the first satisfactory solution they can find by utilizing simple decision rules. The less capable the person or the more obscure the solution, the more he or she relies on decision rules rather than the maximization of expected utilities or profits.

The concept of bounded rationality has, in turn, led to behavioral theories of the firm (Cyert and March 1963) that underpin our contemporary understanding of how developers set objectives, manage expectations, and make decisions. In an insightful study of developers in Atlanta, Kenney (1972) found that developers avoid risks, use simple decision rules, are reluctant to change those rules, search for solutions among a small subset of options, and use recent choices as a benchmark against which to evaluate alternatives. For developers, the most important rule is to choose locations that meet a minimum profit criterion—a rule that results in satisficing. Kenney attributed his findings to the bounded rationality of developers.

Other researchers have observed satisficing by developers and have also attributed the phenomenon to bounded rationality (Baerwald 1981; Hepner 1983; Leung 1987). The main consequence of satisficing is that developers prefer projects on greenfield sites that take a shorter time to build and sell (Daniels 1999, 55). The empirical basis for attributing satisficing to bounded rationality, however, is at best weak. In the literature cited above, bounded rationality was asserted because it was seen as the only possible explanation for this phenomenon.

For policy makers, the vast majority of whom are trained in the tradition of the rational land use model, the policy response is obvious: devise ways to reduce risks so that developers stop satisficing and instead make the optimal choices that are necessary for efficient land use. This response is found in numerous policies and regulations that aim to identify for developers which locations carry higher profits and to make the process of development more predictable.

Like all land use policies that get reflected in land prices (Nelson 1997), risk-reduction regulations send unambiguous price signals to developers about which locations are preferred by policy makers. For example, regulations can reduce risks by clearly identifying which land is appropriate for subdivision development and which land is not (Nelson 1992a). Even in cases where regulations can increase costs, as in the case of impact fees, developers prefer that fees be mandated rather than negotiated because mandated fees add predictability to the approvals process (Porter 1988; Nelson, Frank, and Nicholas 1992; Wiewel, Persky, and Sendzik 1999).

“Planners can provide developers with valuable information about community growth trends to help them make better decisions on the need for, and timing of, their projects...” (Berke, Godschalk, and Kaiser 2006, 200). Similarly, streamlined approvals processes and fewer discretionary standards can remove uncertainties associated with obtaining approvals and thus reduce the cost of this aspect of subdivision development (Peiser 1990; Nelson 1992b). Collectively, these policies are rooted in the belief that developers will stop satisficing and, instead, will optimize profits because risks have been reduced to a manageable level.

However, after decades of local governments designing a wide variety of policies that attempt to overcome the bounded rationality of developers, there is little evidence that developers have stopped satisficing. Indeed, despite all the advantages conferred to promoted locations through various policies, developers’ persistent preferences for areas not promoted by policy makers suggest the opposite. The lack of response by developers to incentives intended to guide them to locations promoted by policy makers casts doubt on whether bounded rationality is the only reason developers make suboptimal choices.


Advances in the field of behavioral economics since the 1970s suggest additional explanations beyond bounded rationality for why developers satisfice. Detailed accounts of behavioral economics can be found in Hogarth (1987), Plous (1993), and Rabin (1998). This section focuses on fundamental lessons from behavioral economics that are applicable to the behavior of developers. In Section 4, I will weave these lessons into a framework for of developer decision making and risk management strategies.
Taking their cue from psychologists, behavioral economists argue that absolute levels of wealth are not as important as changes in those levels relative to some reference point. According to this concept, called prospect theory (Kahneman and Tversky 1979), changes in wealth translate into value for the holder of the wealth. Thus, prospect theory uses a value function that maps gains and losses from a reference point (see Figure 1) as opposed to a utility function that maps net wealth.

The basic characteristics of prospect theory can be summarized as follows:

- Decisions are evaluated on the basis of a reference point. People are sensitive to changes in gains and losses from this point rather than to the absolute value of final assets.
- There is diminishing sensitivity to additional gains or losses. Thus, a gain (or loss) between $10 and $20 is valued more highly than a gain (or loss) between $1,000 and $1,010.
- The curve is steeper in the area of losses than the area of gains. Thus, people are more sensitive to losses than they are to gains of the same size (Kahneman and Tversky 1984).

Together, these characteristics have led to three parallel areas of research that are crucial to proposing additional explanations for satisficing by developers: the endowment effect and loss aversion, mental accounting, and narrow bracketing.

3.1. The Endowment Effect and Loss Aversion

The endowment effect predicts that after acquiring a certain wealth, a person values it more than when it was not possessed. For example, in an experiment where wealth effects were controlled for and transactions costs were minimal, a group of students at Cornell who were given free coffee mugs required more money to part with them than students who were not given any mugs were willing to pay the first group of students to acquire one (Kahneman, Knetsch, and Thaler 1990). The first set of students appeared to treat the free mugs as endowments that they now possessed.

The aversion to losing endowments follows from the shape of prospect theory’s value function shown in Figure 1. Once in possession of an endowment, the value lost in having to give it up is greater than the value that would be gained by someone else who wishes to acquire it. Loss aversion and the endowment effect have been noted in research that found that during housing busts, sellers hold on to property longer than they should because they are reluctant to sell at a loss (Genesove and Mayer 1997, 2001). Another planning implication is related to contingent valuation studies that elicit citizens’ willingness to pay for environmental amenities. Citizens are often willing to pay less for the acquisition of environmental amenities than the amount they are willing to accept to give them up. This phenomenon can be explained by an aversion to losing amenities that citizens consider community endowments.

Samuelson and Zeckhauser (1988) found a phenomenon resembling the endowment effect that they describe as the status quo bias. They found that new employees at Harvard University were more likely to choose a newly offered medical plan than those who were employed there before the plan became available.

The endowment effect and status quo bias have a profound implication. As Kahneman, Knetsch, and Thaler (1991, 203) note, it implies that “people treat opportunity costs differently than ‘out-of-pocket’ costs. Forgone gains [for example, those which could have been gained from selling the coffee mugs or exchanging community endowments] are less painful than perceived losses.”

3.2. Mental Accounting

The concept of mental accounting pioneered by Thaler (1980, 1985) adds further insights into the endowment effect and loss aversion. Mental accounting rules are “cognitive operations used by households and individuals to organize, evaluate, and keep track of financial activities” (Thaler 1999, 183). Among these rules are conventions on how to treat gains and losses.

Using the value function in Figure 1, Thaler (1985) explored this issue by considering two cases: simple gains and simple losses. He argues that people prefer to segregate gains so that each gain is associated with its own value because

\[ v(x_1) + v(x_2) + \ldots + v(x_n) > v \left( \sum_{i=1}^{n} x_i \right), \]  

(1)
where $v$ is value and $x_1, \ldots, x_n$ are discrete gains. The left side represents the segregation of gains and the right side represents the integration of gains. Segregation results in higher total value.

On the other hand, people prefer to integrate losses because

$$v \left( \sum_{i=1}^{n} x_i \right) < v(-x_1) + v(-x_2) + \ldots + v(-x_n),$$

where $-x_1, \ldots, -x_n$ are discrete losses. The left side represents the integration of losses and the right side represents the segregation of losses. Integration minimizes the pain associated with losses.

From equations (1) and (2), people should prefer their gains to occur one at a time, whereas they should prefer their losses to come all at once. Indeed, Thaler and Johnson (1990) found that the segregation of gains is easier to accomplish if they are temporally spaced. An example of the desire to temporally segregate gains is the irrational choice by many university professors (when allowed) to accept their salary over a twelve-month period instead of over the nine-month academic year. From equation (1), the cumulative value of more paychecks (the left side) makes them feel better about their income.

Mental accounting also encourages people to set up non-fungible accounts as self-control mechanisms to regulate their spending (Thaler 1999). For example, assets may be allocated to current and future accounts and expenditures may be allocated to food, housing, and entertainment budgets (Thaler 1990, 1999). In this portfolio of asset allocation, an inheritance expected in the future will be placed in the future asset account and only very reluctantly spent today (Thaler 1999). This is in sharp contrast to the widely used life-cycle theory of savings, based on rational behavior, which predicts that additional income, whether an unexpected bonus today or an expected future windfall, will produce the same change in spending habits today (Thaler 1990, 1999). The reluctance to shift assets from one account to another, however, can create artificial liquidity constraints (Thaler 1990, 1999) and prevent people from taking advantage of existing investment opportunities.

3.3. Narrow Bracketing

An increasingly acknowledged effect of mental accounting is narrow bracketing, where decisions are evaluated independent of choices that should be grouped either temporally or across different activities (see Read, Loewenstein, and Rabin 1999, for a review of the phenomenon). Narrow bracketing manifests itself in the consideration of events “one at a time.” The segregation of gains is itself an example of narrow bracketing, where each gain is bracketed as a separate event to be savored on its own.

Camerer et al. (1997) observed narrow bracketing by New York City cabdrivers, who appeared to set short planning horizons by establishing daily income targets. These cabdrivers stopped working sooner on lucrative days than on slow days (partially explaining why it is difficult to get a taxi in the city when it rains). The reason for quitting earlier on more lucrative days cannot be related to bounded rationality; computing anticipated income on days when business is good should surely be easier than on days when business is poor.

There are two plausible explanations for this behavior. First, having reached the income target, cabdrivers consider their incomes to be endowments that they are averse to losing through accident or robbery, even though the chances of these adverse events occurring are no different before or after reaching the target. Second, the target is a reference point on the value function, after which the marginal value of additional income falls sharply (Camerer et al. 1997; Rizzo and Zeckhauser 2003).

Evidence for reducing inputs after reaching income targets is not anecdotal. The phenomenon has been observed among physicians (Rizzo and Zeckhauser 2003), sole proprietors (Wales 1973), and farmers (Berg 1961). Camerer et al. (1997) speculate that entrepreneurs who set their own hours and work for variable wages routinely reduce inputs after achieving income targets.

Cabdrivers would not decide to stop working early on good days if they set their income targets over a longer period, for example, a week or month. In the language of Thaler (1999), cabdrivers “balance” their accounts and “reset” their reference points too often, and the end of the day seems like a natural point at which to perform these operations. Rizzo and Zeckhauser (2003) note that physicians appear to perform their mental accounting annually.

Benartzi and Thaler (1999) refer to the phenomenon of frequent evaluations as myopic loss aversion to indicate that short-term planning horizons prevent the adoption of more beneficial longer-term strategies. This happens because the volatility of short-term trends leads people to be more risk-averse than they would be if they considered longer-term trends where volatility is less apparent. For example, Benartzi and Thaler (1999) found that in an experiment, university employees chose bonds with lower returns over stocks when they viewed one-year rates of return but chose stocks over bonds when they viewed thirty-year rates of return.

Investors can also be myopically loss-averse when considering a single option at a point in time. Thaler (1999) reports that twenty-five corporate executives were asked if each was willing to accept a project with a 50 percent chance of earning $2 million and a 50 percent chance of losing $1 million. With each executive narrowly bracketing a single project, only three accepted the option. The CEO, who was in the room, was willing to accept the entire portfolio of options; the CEO was planning over a wider horizon than the individual.
executives. According to Thaler, these examples (and others that he describes) show that “the antidote to excessive risk aversion is aggregation” (p. 201) whether temporally or across different projects.

It is not completely understood why people bracket decisions narrowly. In addition to limited cognitive capacity, Read, Loewenstein, and Rabin (1999) argue that limited attention spans, short memories, cognitive inertia, preexisting heuristics, and motivated bracketing all contribute. Motivated bracketing refers to situations where narrow bracketing can be used as a self-control mechanism and therefore might not be a bad thing. For example, setting an entertainment budget of $70 per week can create the temptation to splurge at the beginning of the week. However, a budget of $10 per day is easier to sustain (Read, Loewenstein, and Rabin 1999). The decision by academicians to spread their pay checks over twelve months can also be explained as a self-control mechanism to regulate spending. As a mental accounting technique, however, motivated bracketing can lead to self-imposed liquidity constraints.

4. Psychological Influences on Developer Decision Making

Lessons from behavioral economics can provide a richer and more realistic description of developer behavior than that attributed only to bounded rationality. This section discusses how fundamental lessons from behavioral economics combine to encourage developers to make satisficing decisions. The developers considered here are sole proprietors who work for variable profits that depend on investments that they choose to make. I assume that profits and losses to developers translate into an S-shaped value function of the type shown in Figure 1.

4.1. Developers Set Profit Targets and Bracket Projects One at a Time

To developers, the most important reference point on the value function is the profit target for each project (Kenney 1972; Baerwald 1981; Somerville 1999). Thus, developers narrowly bracket their decisions one project at a time. A better strategy would be to consider a sequence of projects into the future as a means to aggregate risks (as mentioned earlier). However, even with the alleviation of some risks because of increased predictability in the approvals process, developers will still have to accurately forecast profits on future projects years in advance—in particular, profits from infrastructure improvements and the selling price of finished lots.

Bracketing projects one at a time may therefore not be a bad thing, as it is unrealistic to expect developers to consider current and future projects as part of the same portfolio. However, the ambiguity of future profits is a compelling reason for developers to exhaust all profit possibilities from current projects. Bounded rationality cannot explain why this is not the case, because the passage of time and the effects of government policies should encourage developers to overcome the bounds on their rationality.

The setting of profit targets appears to be related to a combination of cognitive inertia, preexisting heuristics, and a preference for the status quo. Support for these explanations can be found in the literature on developers. For example, Daniels (1999) observes that satisficing leads developers to repeat the same types of projects. This repetition covers the full collection of choices that developers make, including neighborhood location, lot layout, and the provision of infrastructure, and involves copying both themselves and other developers. Peiser (1990, 498) refers to this phenomenon as “GMOTLLT” (give me one that looks like that), although he attributes it at least partially to conservative bankers. Change in the development industry comes slowly.

4.2. Developers Create Nonfungible Mental Investment Accounts and Bracket Discrete Subdivision Features in Isolation of Others

In making investment decisions, I posit that developers construct two nonfungible mental accounts that I call primary and secondary investments. Primary investments allow developers to achieve their profit targets. For many of the early sprawling developments across the United States, and some of the current ones, primary investments consist of the elementary constituents of a subdivision constructed in a pattern that follows simple design guidelines. Secondary investments do not contribute to reaching profit targets but are profit opportunities that exist after the target has been met. Requirements for secondary investments vary by location within the same jurisdiction and across neighboring jurisdictions as a function of zoning and subdivision regulations.

Developers only reluctantly make secondary investments. The reluctance of developers to make secondary investments is related to three issues. First, as with people who create different asset accounts (Thaler 1999), the construction of nonfungible investment accounts is a self-control mechanism to guard against the temptation to make marginally important investments when profit targets can be met by spending from the primary account only.

Second, after profit targets have been achieved, developers appear to view them as endowments. Loss aversion suggests that spending these endowments carries a loss in value that is greater than the potential gain in value from profits associated with secondary investments. This is an instance of the observation by Kahneman, Knetsch, and Thaler (1991, 203) that
“forgone gains” (additional profits) are less painful than “perceived losses” (spending from endowments). The value of forgone gain is itself small because, as in other situations where satisficing has been observed, the marginal value of additional profits falls sharply after targets are met (Camerer et al. 1997; Rizzo and Zeckhauser 2003). The bounded rationality argument does not make this claim but instead argues that beyond the point of satisficing there are profit opportunities which developers have an interest in exploiting.

Finally, since each investment decision in a subdivision must be justified to a financial backer, each investment must unambiguously pay for itself. The effect is that each investment is narrowly bracketed in isolation of other investments. This means that there is no opportunity to aggregate the risks of secondary investments with the risks of primary investments. As Thaler (1999) observed, the isolated evaluation of investments results in excessive reluctance to take risks.

Nonfungible investment accounts imply that developers do not compare total profits between potential projects; rather, they consider which project would allow them to reach their profit target by drawing from their primary investment account only. Thus, locations that require spending from the primary account only are preferred to locations that also require spending from the secondary account. This helps to explain why developers avoid projects in promoted locations in preference for greenfield sites; the latter require spending from the primary account only. Developers compare profits between projects only when they involve spending from the same mental account, such as a choice between two greenfield sites.11

While acknowledging that developers consider controlling costs to be more important than maximizing profits (Goldberg and Ulinder 1976; Hepner 1983; Barnard and Butcher 1989), the bounded rationality literature has given short shrift to the implications of this finding for decision making by developers. Moreover, the literature does not address whether developers are more averse to one type of cost than another. From the perspective of the bounded rationality literature, one type of cost is interchangeable with another as long as the developer is able to reach his profit target. However, assuming that costs are interchangeable is a serious shortcoming from a policy perspective because it ignores the literature’s own findings that developers copy each other (Peiser 1990; Daniels 1999, 55), which clearly indicates that developers do not easily change investment patterns; that is, they do not easily swap money between primary and secondary accounts.

The preference for locations that require spending from the primary account only may result in perverse land markets where prices are partially determined by the types of investments that are required, rather than the profit margins of the investments. Locations that require expenditures from the secondary account will be discounted (holding other factors constant) even if the investments are profitable. In general, the fewer secondary investments required on a given parcel, the higher the premium will be for that parcel.

4.3. Developers Establish Self-Imposed Liquidity Constraints

Because investment money is nonfungible, developers establish self-imposed liquidity constraints. Liquidity constraints in capital markets are not a major reason why developers make suboptimal levels of investments.

The literature on developers suggests that when liquidity constraints exist, they mostly affect small developers (Dowall 1984, 141; Leung 1987; Chan 1999). While it is generally true that larger developers have more access to resources, most developers get their financing from outside sources, including thrift institutions, commercial banks, life insurance companies, credit companies, mortgage bankers, or pension funds (Bookout 1990, 118-26). It is also common to form limited liability corporations with better endowed developers or with subcontractors who can then be repaid with lots after the project is completed.12

To be sure, a convincing case has to be made to secure financing, but this only ensures that the financial backer can be repaid for each investment that is made in the subdivision. For example, the financier would like to know that an investment made in sidewalks can be repaid by the premium that sidewalks carry on finished lots. If, however, a developer chooses a location where sidewalks are not required by the subdivision regulations (and the developer chooses not to install them), financial backers will not recommend an alternative parcel where they are required even though greater profits may result by choosing the alternative location.

In short, financial backers are not in the business of choosing locations. The sites chosen by developers already account for the investments they would like to make and, in turn, the profit targets they would like to achieve. Indeed, the norm in the development industry is that developers formulate a concept they wish to build, search for a site with the necessary features to support the concept, and then seek financing for the project (Bookout 1990, 32).

The self-imposed liquidity constraints that result from not making secondary investments is perhaps the main reason why developers constantly move outward from regulated locations to locations that do not require expenditures from secondary accounts. While it is true that developers are likely to move to exurban areas in response to increasing regulatory costs (Dowall 1984, 141; Byun and Esparza 2005), the reason is not because the absolute level of costs in exurban areas is lower but, rather, that those locations tend to require expenditures from the primary investment account only. Secondary investments that may be avoided in exurban areas include
high road standards, innovative subdivision designs, sidewalks, curbs, landscaping, sewer lines, retention ponds, signage, etc. In regulated areas, each of these features could be associated with a discrete profit, but satisfying developers forego these profits by choosing locations that do not require them.\(^{13}\)

### 4.4. Developers Temporally Space Their Projects

Psychology-based accounts of decision making can also help explain why developers prefer to build and quickly move to the next project (Daniels 1999, 55). From equation (1), developers prefer to move sequentially from one project to another because segregating gains from different projects carries a higher cumulative value than if all the gains were to come at the same point in time from a single project.

This mental accounting is facilitated by the very nature of subdivision development and the narrow bracketing of projects. While it is not possible to temporally segregate gains from different subdivision features (all are sold at the same time when a lot is sold), it is possible to segregate gains from different projects by spacing them into the future. As in the case of other entrepreneurs who have control over the level and timing of inputs, developers have considerable control over the timing of their investments.

A psychology-based explanation for why developers prefer to move from one project to another has a perverse implication: making the approvals process more predictable reinforces this innate psychological trait. It also reinforces the one-project-at-a-time mentality. Instead of maximizing profits on one project, a developer only needs to reach the profit target and then move on to the next project if approvals for the subsequent project are assured. This tendency is amplified in strong land markets. On the other hand, in a market with low demand for housing, developers might be more willing to make secondary investments on current projects. Returning to the earlier discussion on the role of liquidity constraints in satisfying, if developers were liquidity constrained, they would rather use their limited capital to invest in sequential projects than exhaust assured profits from a single project.

Besides the segregation of gains, temporally spacing projects can act as a self-control mechanism to help developers plan for their futures. Since the developer industry consists mostly of small sole-proprietor firms, spacing projects may be a way of ensuring continued employment.\(^{14}\) This desire to space projects into the future might better explain the prevalence of smaller subdivisions over more profitable larger subdivisions than arguments that the former require less capital (Peiser 1984).

\> **5. Conclusions and Directions for Future Research**

Although behavioral economics is having a profound impact in other fields, it has yet to make an impact on the field of planning. This article is an attempt to use lessons from behavioral economics to better understand how developers make decisions. These lessons suggest that bounded rationality can only partially explain satisficing by developers and that other inherent psychological traits also cause developers to satisfice. These psychological traits do not imply that developers are irrational. Rather, like arguments being made by others in the field of economics (Rabin 1998), it is developers’ systematic departures from rationality that are of interest and that require further study.

Psychological explanations for suboptimal decisions by developers question whether the rational land use model, even in its adaptive, consensual form, is complete. In particular, they challenge one of the model’s fundamental assumptions that derived from Cyert and March’s (1963) behavioral theory of the firm: as long as we create policies to reduce risks, developers will overcome bounds on their rationality and make profit maximizing decisions that will lead to more efficient land use. Rather, it would appear that the reduction of risks has a perverse effect because it reinforces the psychological tendency of developers to satisfice on one project and then move quickly to another. This raises an interesting question: do local governments unwittingly promote sprawl when they introduce policies to make the development process more predictable? The answer appears to be tentatively yes.

A policy response of obfuscating the approvals process to make it more difficult for developers to jump from one project to another hardly seems appropriate. Such an approach will only encourage developers to seek jurisdictions with less onerous approvals processes. This conundrum, however, highlights the difficulty of designing policies that reduce risks while at the same time discouraging developers from engaging in serial projects to meet demand that could be met with fewer, but larger, projects.

Within a given jurisdiction, a land use strategy that includes spatially focused risk reduction policies would appear to be useful. Thus, for instance, expedited subdivision approvals might be restricted to preferred areas only, rather than applied across an entire jurisdiction.\(^{15}\) In the end, however, specific policies to address the psychological tendencies of developers will have to wait until more research is conducted on the behavior of developers.

Policy interventions that are likely to have the greatest impacts will be those that devise ways for developers to group the risks of different subdivision features into a single portfolio of risks, since research shows that grouping risks routinely results in lower levels of risk aversion (Thaler 1999). However, policy makers will have to present a very strong case...
for developers to do so, because encouraging this behavior would involve overcoming long-established mental accounting protocols about primary and secondary investments and the bracketing of each investment as a separate venture. Importantly, it means that planners should possess detailed knowledge (as opposed to a mere intuitive understanding) of the profit margins associated with investments that are designed to attract developers to promoted locations.

However, academicians have some way to go before we understand developer decision making. In general, additional research is needed to determine how developers set profit targets, create mental accounts, determine what are primary and secondary investments, and respond to differently framed regulations.

Addressing the questions raised above will require a different line of inquiry into developer decision making than has previously been employed. Past attempts to understand developers utilized surveys that concentrated on questions intended to elicit reactions to specific land use policies or that inquired about the decision-making process employed for making land purchases. However, questions designed to elicit underlying preferences are likely to result in more useful insights into the behavior of developers.

An example of a question that could capture the influences of the value function (Figure 1) and mental accounting on developer decision making would be one that is based on Savage (1954), Thaler (1980), and Tversky and Kahneman (1981). Consider the following question, where the numbers outside the brackets are presented to one group of developers and the numbers inside the brackets are presented to another group of developers:

Imagine that you are about to close the deal on a parcel of land for a subdivision. Because of subdivision regulations, you are required to make investment A that costs $105,500 [$4,500] and investment B that costs $4,500 [$105,500]. As you are about to close the deal, the seller tells you that she owns the adjacent parcel and is willing to sell you that parcel but that investment B would now cost $3,500 [$104,500]. The costs of investment A remain the same. However, it would take an additional day to complete the transaction on the adjacent parcel. Would you wait the additional day? Assume that you have dealt with the seller for a long time and you completely trust her. Further, assume that the figures given above are accurate and that the two parcels are identical in every respect (after all, they are located next to each other), except for a slight difference in topography that makes investment B cheaper on the second parcel.

Behavioral theorists will predict that the majority of developers presented with the numbers outside the brackets would choose to wait for a day, but that the majority of developers presented with the numbers inside the brackets would choose not to wait.

The reasons for this prediction are twofold. The first reason is related to the shape of the value function in the area of losses. For the group faced with the numbers outside the brackets, the loss in value of $1,000 ($4,500-$3,500) is greater than the loss in value of $1,000 ($105,500-$104,500) for the group faced with the numbers inside the brackets.

The second reason is related to mental accounting. The costs of investment B on the two parcels will be compared to each other without any connection to the costs of investment A. If the costs of investments A and B are combined, then the choice facing both groups of developers would be the difference between spending $110,000 and $109,000 ($1,000), so both groups of developers should respond in the same way. However, developers who choose to wait to save that $1,000 would be comparing $4,500 to $3,500, while developers who choose not to wait would be comparing $105,500 to $104,500.

By applying similar behavioral tests to developers, academicians can improve our understanding of them and local governments can design better policies that take their psychological traits into consideration.

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Notes

1. From here on, the word developers refers to residential developers.
2. A reviewer of this article pointed out that households and political decision makers also satisfice, which can lead to additional land use inefficiencies.
3. This article uses the definition of sprawl provided by Nelson and Duncan (1995, 1): “unplanned, uncontrolled, and uncoordinated single-use development . . . which variously appears as low density, ribbon or strip, scattered, leapfrog, or isolated development.”
4. An indication of the maturity of behavioral economics, the 2003 Nobel Prize in economics was awarded to a psychologist, Daniel Kahneman (who in turn recognized his deceased collaborator, Amos Tversky). In addition, between 1987 and 2001, Richard Thaler edited a section called “Anomalies” in the Journal of Economic Perspectives that questioned many of the assumptions and predictions of neoclassical economics.
5. To be sure, there are other models of land use planning, but as Sager (1999) notes, the rational land use model is by far the most prominent. Furthermore, the rational land use model incorporates other models of planning such as consensual planning (Susskind and Cruikshank 1987), critical theory (Forester 1988), and strategic planning (Bryson and Einsweiler 1988).
6. See, for instance, Nelson and Duncan (1995) for additional tools available to policy makers to reduce sprawl.
7. Reducing risks to developers continues to be a major consideration in contemporary discussions of smart growth (Mohamed 2006). For example, Gyurko and Rybczynski (2000) argue that the risks of new urbanist projects need to be understood before such projects can attract developers. Similarly, Starkie and Yosick (1996) believe that more needs to be done to educate lenders and developers about the risks inherent in new urbanism.
8. There are other explanations for the discrepancy in prices between willingness to pay and willingness to accept. According to Cropper and Oates (1992), it may represent strategic behavior
on the part of citizens; whereas according to Courvis, Hovis, and Schulze (1987), it could be that people are not as familiar with the value of an item when they are selling it as when they are buying it.

9. Contrary to the predictions of Thaler (1985), Thaler and Johnson (1990) found that people also preferred to temporarily space losses. Thaler (1999) suggests that people may prefer to feel losses one by one because prior losses may make them more sensitive to subsequent losses.

10. Mathematically: \( v(x_{n} + \ldots + x_{m}) < v(x_{n} + \ldots + x_{m} + \text{additional investments}) \) where: \( v \) is the value to the developer; \( x_{n} \ldots x_{m} \) are marginal profits from discrete primary investments; \( x_{n} \ldots x_{m} \) are marginal profits from discrete secondary investments; and “\&” represents the cognitive combination of profits (Thaler 1999).

11. Profit opportunities can also vary on a given site. For instance, developers could choose the more capital intensive and more profitable option of building roads around a scenic area (the increase in value of the lots would be sufficient to cover the additional costs), or in the absence of environmental ordinances, they could choose the less capital intensive and less profitable option of building roads through the scenic area. However, spatial variation in investment requirements has a much larger impact on developer decision-making than choices on a given parcel.

12. Limited liability corporations with other developers have become more popular since the enactment of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) that requires developers to show more collateral when obtaining loans.

13. Over time, some secondary investments shift to primary investments. For example, in many land markets public water would be considered part of the primary investment account.

14. The vast majority of residential developers in the U.S. are small developers. According to the 2002 Economic Census, 75 percent of the firms involved in land subdivision employ one to four employees and 88 percent of the firms involved in land subdivision employ one to nine employees (U.S. Census Bureau 2002). On average, each of the 88 percent of these firms performed approximately $850,000 worth of construction during 2002, well below the six million threshold used by the Small Business Administration to define a small firm involved in land subdivision (U.S. Small Business Administration 2004). Whether the arguments made in this article are applicable to large institutional developers or Real Estate Investment Trusts (REITs) is worth investigating.

15. Regional land markets is a more appropriate scale over which to apply spatially focused risk reduction strategies, but this, of course, raises issues related to regional land use coordination.

References
