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On the value of incumbency Managerial reference points and loss aversion

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Abstract

In discussing market entry decisions and the strategic interaction between an incumbent firm and an entrant, the focus in the literature has been on the different asymmetries that exist between the two. In this paper, we claim that great importance should also be given to the fact that the incumbent firm is *in* the industry while the entrant is *outside* the industry. Therefore, even without any other asymmetries, we should expect different behavior from the two types of firms. Making use of the existing literature on decision making under uncertainty, the paper focuses on reference-dependent preferences and on loss aversion. The paper demonstrates that the firms' reference points and loss aversion affect a firm's entry/exit decision, the self-selection of entrants, and the market structure that emerges.

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1. Introduction

In discussing the market entry decision and the interaction between an incumbent firm and a potential entrant, the focus in the literature has been on

two aspects: (i) The strategic implications of having a first mover, and (ii) the different asymmetries that may be created by the incumbent, for example, cost asymmetries, capacity asymmetries, brand loyalty or any other factor that affects the firms' profit functions. The value of incumbency is derived, in such cases, from the value of these asymmetries or from having a first-mover (dis)advantage (see Gilbert, 1989; Sutton, 1991; Tirole, 1989; and Wilson, 1990).

In this paper, we claim that in evaluating the asymmetry between an incumbent firm and a potential entrant, the first and most simple difference is that the incumbent is *in* the industry while the entrant is *outside* the industry. Clearly, the inside/outside distinction is just a restatement of the incumbent/entrant market position, but the objective of this paper is to demonstrate that this difference, in itself, even when entry and exit are costless, may affect the firms' behavior, the entry/exit decisions, and, consequently, the resultant market structures.

Entry into new markets and exit from existing markets are important managerial decisions. Since decisions in corporations are always made by people, any positive theory attempting to understand the firm's entry/exit (as well as other) decisions must attend to them within the context of managerial decision making. This approach has, indeed, been recognized in the literature in which the principal-agent setting has been adopted as a standard framework for analyzing managerial decisions. The view of this paper, however, is that the literature ought to go one step further and recognize that managers, as human beings, are characterized by bounded cognitive ability. The different aspects of bounded cognition affect the way managers perceive and respond to different market conditions, including rivalry. Hence, cognitive boundedness should be an integral element of any positive industrial organization theory.

In this paper, we focus on thinking and decision making. That is, we assume that when facing seemingly similar decision problems, individuals might evaluate them differently and therefore might come to different conclusions. A simple example is that of individuals having different degrees of risk aversion. When analyzing the issue of market entry or exit, there is no a priori reason to assume that managers of one firm are as risk-averse than managers of another firm. In such a case, any asymmetry between the firms will be built into the model by assumptions regarding individuals' tendencies toward risk aversion. But when one firm is an incumbent while the other is a potential entrant, there is a natural asymmetry that may affect the way the managers of these two firms evaluate their options and their final decisions.

This paper focuses on two important features which seem characteristic of much decision making: reference dependence and loss aversion. Psychological

studies indicate that people perceive the outcome of a lottery as gains and losses from some given reference point (see Kahneman and Tversky, 1979; Tversky and Kahneman, 1991, 1992; and Kahneman et al., 1991). These studies also indicate that losses have greater impact on preferences than do gains of the same size. This asymmetry between gains and losses was labelled, in the above literature, as loss aversion. The economic literature, however, has yet to incorporate these two important psychological phenomena into mainstream analysis. There are, however, a few exceptions, such as Benartzi and Thaler (1992), Bowman et al. (1993) and Shefrin and Statman (1985). Note also that while in the strategic management literature somewhat more attention has been paid to behavioral approaches, the industrial organization literature tends to ignore them.

The interpretation of incumbency that we adopt in this paper relates to the firm's reference points. The managers of the incumbent firm evaluate decisions from the point of view of being within the industry while the management of the entrant holds the reference point of being outside the industry. The paper demonstrates that the difference in the reference points leads to different market decisions which then affect the market equilibrium.

To illustrate our claim, the paper considers two examples. In the first, we examine the existence of inertia forces in markets. In the second, we examine an entry game in which although the incumbent and the entrant are symmetric with respect to their payoff functions, their different reference points imply different decisions in the post-entry game and may consequently discourage entry.

2. Loss aversion and reference point

We start with a brief discussion on reference-dependence preferences and loss aversion. For a detailed study of such preferences see Kahneman and Tversky (1979, 1984) and Tversky and Kahneman (1992) for decision making under uncertainty, and Tversky and Kahneman (1991) for riskless choices. For experiments that illustrate these effects, see Kahneman et al. (1990, 1991).

Expected utility theory compares different lotteries by defining a utility value for any asset (wealth) position and then comparing the different expected values that each lottery implies. There is evidence, however, that people normally perceive the outcomes of lotteries as gains and losses rather than final states of wealth. Gains and losses, however, can only be defined relative to a reference point. Such preferences are coined in the literature as *reference-dependent*

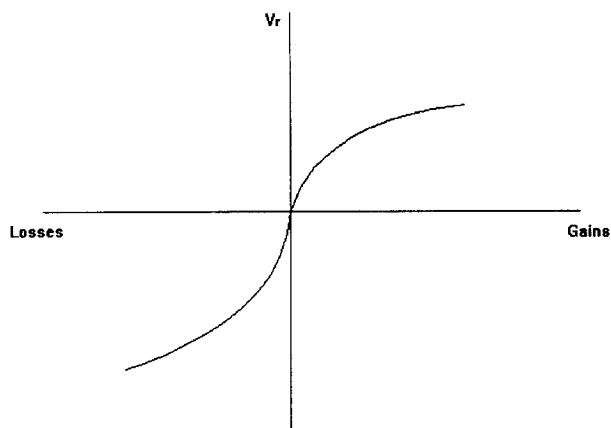


Fig. 1.

preferences. In such a case, the individual's preferences can be described as a collection of preference relationships such that $x >_r y$ is interpreted as 'x is preferred to y given the reference point r'. For any such reference point r, if the preferences are complete, transitive and continuous, one can define a value function V_r that measures the value of *deviation* from the reference point r. The outcome of a lottery can then be evaluated as the expected value of the function V_r .

People, however, tend to treat gains and losses asymmetrically. Using the language of Kahneman and Tversky: "The aggravation that one experiences in losing a sum of money appears to be greater than the pleasure associated with gaining the same amount". Such a phenomena is referred to as *loss aversion*. Note, however, that formalizing loss aversion does not necessarily mean a deviation from expected utility theory (see for example Bowman et al., 1993).

The above properties, together with the assumption of diminishing sensitivity, which implies that the marginal value of both gains and losses decreases with their size, imply an asymmetric S-shape value function, with the value zero at the reference point, which is steeper in the negative domain (see Fig. 1).

The following value function exhibits the above properties and will be used in the following discussion:

$$\begin{aligned} V_r(x) &= w(x - r), & \text{if } x \geq r \\ &= -kw(r - x), & \text{if } r > x \end{aligned} \quad (1)$$

where $w(\cdot)$ is a monotonically increasing concave function and $k > 1$ implies loss aversion.

It is important to note that the theory has little to say about how the reference points are determined and how they are adjusted over time. In our analysis, we assume that the reference point is simply the status quo (see also Samuelson and Zeckhauser, 1988, for a discussion on the status quo bias). Although such an assumption seems natural it is, however, incomplete as long as the rules for adjustment of the reference point are not fully specified. As indicated by Kahneman and Tversky (1979) and Tversky and Kahneman (1991), there is evidence of incomplete adaptation of the reference point to recent changes of the status quo; in particular, there are faster adaptations to recent gains than to recent losses. This missing piece of the theory limits the ability to use such preferences in economic applications.

3. Insiders versus outsiders

In the first example, we examine the relationship between a firm's scope of activities and its entry decision into a new market. Assume the following two types of decision scenarios concerning activity in market A. In the first, there is an incumbent firm that operates in the market, which we will refer to as the insider firm (or Firm I). In the second scenario, there is a potential entrant which we denote as the outsider firm (or Firm O).

We assume that the two firms are *completely identical* such that both get the same returns from participating in market A. Specifically, we assume that being in market A yields the following uncertain payoffs: with probability p , we have a good state of the world and the firm gains $m_+ > 0$; and with probability $1 - p$, we have a bad state of the world and the firm loses $m_- < 0$. Expected profits are positive, i.e., $pm_+ + (1 - p)m_- > 0$.

We assume that Firm I, which already operates in industry A, is operating in such a way that it automatically enters the new market. Alternatively, Firm I can be viewed as an incumbent firm that is already active in the new market. If Firm I wishes not to be in the new market, its managers ought to make a specific 'exit' decision. Firm O, on the other hand, needs to make an 'entry' decision in order to take advantage of the new market opportunity. We assume that both 'entry' and 'exit' decisions are *costless*. Hence, the decision problems the two types of firms face are completely identical: They both need to decide whether to take or not to take the lottery $(m_+, p; m_-, 1 - p)$.

The firms are not identical, however, in the way they analyze their decision problem. Firm I is in the industry and considers the possibility of getting out. Firm O is outside the industry and considers the possibility of getting in. The

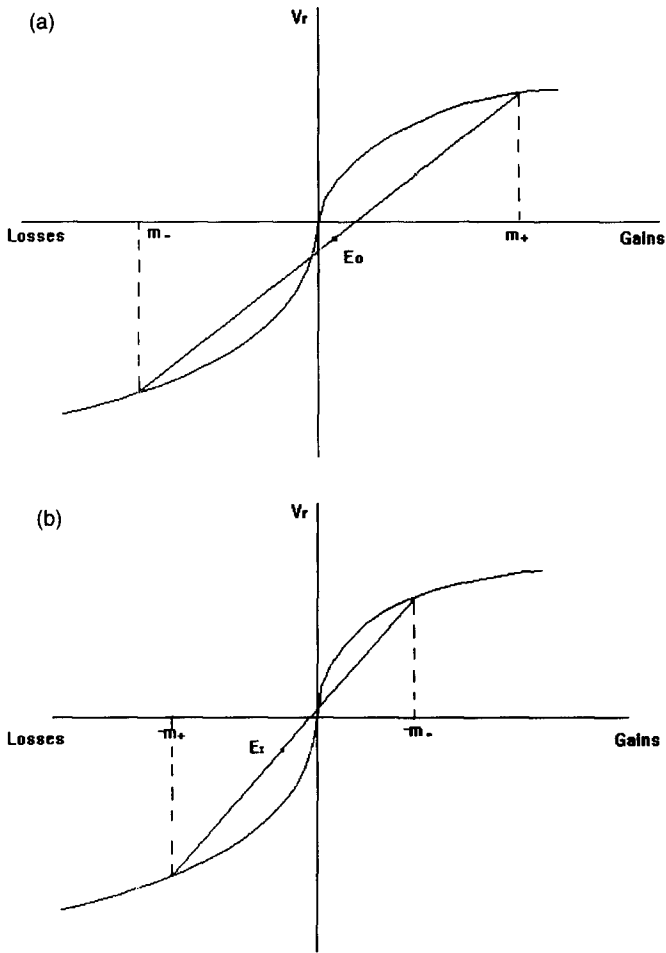


Fig. 2.

entry decision of Firm O implies getting the lottery $(m_+, p; m_-, 1 - p)$ while Firm I already owns the lottery associated with the new market. If Firm I decides to exit, then, if there is a realization of the good state of the world, Firm I will *not* get m_+ and thus it will view it as a loss. If there is a realization of the bad state of the world Firm I will avoid the loss of m_- and will thus view it as a gain.

In Fig. 2, we describe the decision problem for the two firms. In Fig. 2a we consider the entry decision problem of Firm O while Fig. 2b describes the exit

decision problem of Firm I. Note that without loss aversion, the entry/exit decisions of the two firms are equivalent.

Using the value function (1) implies that Firm O enters market A iff

$$pw(m_+) - (1 - p)kw(-m_-) > 0. \quad (2)$$

An insider firm will stay in the market only if it finds the exit option unattractive, that is,

$$(1 - p)w(-m_-) - kpw(m_+) < 0. \quad (3)$$

When $k = 1$, conditions (2) and (3) are identical; in such a case, either both firms will be in the market or both will be outside the market. When there is loss aversion, i.e., $k > 1$, condition (3) implies condition (2) and therefore, if Firm O finds entry attractive, Firm I finds it too. The reverse, however, does not hold. That is,

Result 1: (i) When firms are loss averse, a no-exit (or stay in) decision by the insider firm does not necessarily imply an entry decision by the outsider firm. (ii) Loss aversion and the different reference points of the insider and the outsider firms introduce an *inertia* effect such that firms within an industry are more likely to expand to new markets within the same industry than are firms out of the industry likely to come and take advantage of the new market opportunity.

Letting $W(m_+, m_-, p) = pw(m_+) - (1 - p)w(-m_-)$, conditions (2) and (3) can be written as follows:

Firm O enters if

$$W(m_+, m_-, p) - (k - 1)(1 - p)w(-m_-) > 0, \quad (4)$$

while Firm I does not exit if

$$W(m_+, m_-, p) + (k - 1)pw(m_+) > 0. \quad (5)$$

$W()$ can be interpreted as the expected value of the lottery when loss aversion is ignored. We can see from the above conditions that loss aversion (i.e., $k > 1$) implies that Firm O will not enter to all projects with $W() > 0$ as the firm puts a greater emphasis on the bad state of the world. Firm I, on the other hand, puts a larger emphasis on the good state of the world. Clearly, when loss aversion is sufficiently important and k is large, condition (5) may continue to hold while condition (4) ceases to hold. In such a case, Firm I stays in the market while Firm O does not enter the market. (This case is depicted in Fig. 2, in which we

let E_O and E_I be the firms' expected values of the gains and losses from entry and exit decisions, respectively.)

Note also that Eq. (5) implies that the incumbent's behavior should not be necessarily interpreted as an advantage. That is,

Result 2: Loss aversion implies that the incumbent firm may sometimes stay in a market even though the market yields negative expected returns.

An alternative way to think about the decision problem facing Firm I is by using regret theory (see for example Bell, 1982; and Loomes and Sugden, 1982). Regret is a psychological reaction to making the wrong decision. Or, in the language of Bell (1982) "desire by a decision maker to avoid consequences in which the individuals will appear, after the fact, to have made the wrong decision even if in advance, the decision appeared correct with the information available at the time". Thus if Firm I chooses to exit and the good state occurs, then Firm I regrets its exit decision and views it as a loss of m_+ . If the bad state is realized, staying out is a good decision and the firm views it as a gain of m_- . Thus, as analyzed above, such behavior implies that Firm I might choose to stay in a market, even when the expected returns are negative, in order not to be in the position of regretting its decision of exiting from the market.

4. The entry game

Our second example examines the strategic interaction between an incumbent and a potential entrant. Consider a homogenous good monopolistic market in which an entry is followed by a Cournot type duopolistic game. Demand is assumed to be stochastic such that with probability p there is a high demand, and with probability $1 - p$ there is a low demand. We assume that firms determine their output prior to observing the realization of demand. We let q_I and q_E be the outputs of the incumbent and the entrant, respectively, and $\pi_j^k(q_I, q_E)$, $j \in \{I, E\}$, $k \in \{h, l\}$ be the type j firm's post-entry profit in state k . By definition, we let $\pi_j^h(q_I, q_E) > \pi_j^l(q_I, q_E)$ for every (q_I, q_E) . Prior to an entry, the incumbent firm enjoys monopolistic profits; we let π^m denote the expected monopolistic profits. We further assume that $\pi_j^k(\cdot, \cdot)$ is concave with respect to q_j and monotonically decreasing with respect to q_i for every j, k and $i \neq j$, and that for every q_E (respectively q_I) the profit function π_I^h (respectively π_E^h) is maximized at a larger q_I (respectively q_E) than the function π_I^l (respectively π_E^l). To concentrate on the effect of the firms' different reference

points, we assume that the incumbent firm does *not* have any advantage in the post-entry game, i.e., the two firms have the same cost function, there are no captive customers or brand loyalty, etc., implying that $\pi_I^k(q_1, q_2) = \pi_E^k(q_2, q_1)$ for every q_1, q_2 . Having identical profit functions, however, does not necessarily imply that the firms have the same evaluation of the post-entry game. While the entrant's reference point is zero profits, the incumbent's reference point is its monopolistic profits, π^m , and all profits are compared with this reference level.¹ Thus, the incumbent evaluates the post-entry profits as a loss of $\pi^m - \pi_I^h$ with probability p and a loss of $\pi^m - \pi_I^l$ with probability $1 - p$.

We proceed by discussing the post-entry duopolistic game bearing in mind the firms' different reference points. We let $R_j(q_i, r_j)$ be firm j 's optimal response to the output q_i given its reference point r_j . A Nash equilibrium is a pair $(q_I^*(\pi^m, 0), q_E^*(\pi^m, 0))$ with the standard requirement that $q_I^* = R_I(q_E^*, \pi^m)$ and $q_E^* = R_E(q_I^*, 0)$.

Having the value function (1), the entrant's objective function is:

$$\text{Max } pw(\pi_E^h(q_I, q_E)) + (1 - p)w(\pi_E^l(q_I, q_E)), \quad (6)$$

while the incumbent's objective, on the other hand, is:

$$\begin{aligned} L(q_I, q_E, \pi^m) \equiv & -pkw(\pi^m - \pi_I^h(q_I, q_E)) \\ & - (1 - p)kw(\pi^m - \pi_I^l(q_I, q_E)). \end{aligned} \quad (7)$$

It is now evident from the different objective functions (6) and (7) that the post-entry game is not symmetric. The value of incumbency can thus be calculated as the difference between the incumbent's and the entrant's post-entry profits.

Using (6), the entrant's reaction function, $R_E(q_I, 0)$, is defined by:²

$$pw'(\pi_E^h(q_I, q_E)) \frac{\partial \pi_E^h}{\partial q_E} + (1 - p)w'(\pi_E^l(q_I, q_E)) \frac{\partial \pi_E^l}{\partial q_E} = 0. \quad (8)$$

The incumbent's objective function (7) is not necessarily concave. For the sake of simplicity, we assume that the profit function π_I^k is sufficiently more concave than the value function $w()$ so that the incumbent's objective function

¹ Note that while in the previous section the reference point was owning the lottery, in this section we assume that the reference point is having the expected profits.

² The second order condition is satisfied by the concavity of $w()$ and $\pi()$.

$L()$ is concave.³ Under such an assumption, the incumbent's best response, $R_I(q_E, \pi^m)$, is defined by:

$$pw'(\pi^m - \pi_I^h(q_I, q_E)) \frac{\partial \pi_I^h}{\partial q_I} + (1-p)w'(\pi^m - \pi_I^l(q_I, q_E)) \frac{\partial \pi_I^l}{\partial q_I} = 0. \quad (9)$$

To understand the equilibrium of the post-entry game, we now compare the response function (9) with $R_I(q_E, 0)$, given by:

$$pw'(\pi_I^h(q_I, q_E)) \frac{\partial \pi_I^h}{\partial q_I} + (1-p)w'(\pi_I^l(q_I, q_E)) \frac{\partial \pi_I^l}{\partial q_I} = 0. \quad (10)$$

Our assumptions about the profit functions imply that the optimal choice of q_I both for (9) and (10) is such that $\partial \pi_I^h / \partial q_I > 0$ while $\partial \pi_I^l / \partial q_I < 0$. Since for every (q_I, q_E) , $\pi_I^h > \pi_I^l$ and $w()$ is concave, we get $w'(\pi_I^l) > w'(\pi_I^h)$ but with $w'(\pi^m - \pi_I^h) > w'(\pi^m - \pi_I^l)$. Thus, comparing the reaction functions (9) and (10) yields that $R_I(q_E, \pi^m) > R_I(q_E, 0)$ for every q_E . Since both reaction functions are downward sloping and since the incumbent's reference point leads to a rightward shift of its reaction function, standard analysis (see for example Bulow et al., 1985) indicates that the post entry equilibrium is such that the incumbent produces a larger quantity than the entrant, i.e., $q_I^*(\pi^m, 0) > q_E^*(\pi^m, 0)$, and realizes larger payoffs. That is,

Result 3: (i) Under the above assumptions, reference-dependent preferences imply a *positive* value of incumbency. That is, the incumbent's post-entry equilibrium profits are larger than the entrant's profits.

(ii) (Entry Deterrence): In a model with a fixed entry fee, the entrant's disadvantage in the post-entry game may be large enough to discourage entry. In such a case even though the entrant and the incumbent are identical with respect to their profit functions, the incumbent's different reference point leads to entry deterrence.

³ Specifically, we impose the condition that $-w(a - \pi_I^k(q_I, q_E))$, where a is fixed and $a > \pi_I^k(q_I, q_E)$ for every (q_I, q_E) , is concave for $k = h, l$. The second derivative of this expression with respect to q_I is $-w''(a - \pi_I^k(q_I, q_E))(\pi')^2 + w'(a - \pi_I^k(q_I, q_E))\pi''$. Note, for example that when $w(\cdot)$ is linear this expression is negative. Thus it is sufficient to require that, at the relevant range of output, $\pi()$ is sufficiently more concave than $w()$.

An intuitive explanation of the above result is that the incumbent, having the reference point π^m , views the post-entry profits as losses relative to its monopolistic profits. Since the value function is convex in the loss region, the incumbent behaves like a risk-loving decision maker. Such behavior implies that the incumbent is expected to respond ‘aggressively’ in the post-entry period when by ‘aggressiveness’ we mean with larger quantities, i.e., $R_I(q_E, \pi^m) > R_I(q_E, 0)$. It is this (credible) ‘aggressive’ behavior which reflects the incumbent’s state of mind and creates the advantage in the post entry game. Note also that the results in this section are derived only from reference-dependent preferences and not from loss aversion.

5. Concluding remarks

In this paper we consider two examples in which reference-dependent preferences and loss aversion affect market behavior. The question is, however, to what degree managerial preferences are characterized by loss aversion and how should we adjust the industrial organization literature in order to take account of such preferences.

We do not have any direct evidence on the significance of managerial loss aversion. Casual observation, however, indicates that there is indeed some mystical aspect of ‘being in the red’ which is associated with losses and that there is a big psychological difference between being in a business that loses money and a business that does not, even though the losses might be marginal. It is also possible that loss aversion is related to managerial reputation. Managing a business that loses money may affect the managers’ reputation and their future career possibilities.

The fact that the managerial state of mind may affect decisions implies that optimal managerial incentives should take into account the interplay between incentives and the managerial state of mind. Shareholders should take into account the managers’ reference point when they design their compensation scheme and at the same time they should also consider the effect of compensation on that reference point. An important aspect of this problem is the issue of switching management. Replacing one manager by another, even with the same qualifications, may have an important effect as it introduces a manager with a different reference point. For example, following a recent loss, a manager might retain the reference point held prior to the loss as reference points are not necessarily adjusted immediately to recent losses. Replacing the manager may induce different managerial behavior simply because the new manager may refer

to the new status quo as his reference point. Clearly the benefit of such an action depends on the implication of the two different reference points on the managers' decision. Another interesting implication of loss aversion is the possible effect of sunk costs on a firm's behavior. From the normative point of view, a rational decision maker should ignore his past sunk costs in making his present decisions. The role of sunk costs in determining market structure has been extensively discussed in the literature (for a recent survey see Sutton, 1991). The main approach claims that if sunk costs do not introduce any asymmetry into the post-entry game, then it affects neither the entry decision nor the value of incumbency. But following the approach presented in this paper, one should take into account the effect of sunk costs on management's state of mind and, consequently, on its decisions.

An immediate concern in any discussion of reference-dependent preferences is the issue of dynamic consistency. That is, once a firm enters a market, it becomes an insider and thus should adopt the reference point of an insider firm (the same applies to an exit decision). Moreover, managers might anticipate such a change and thus should take it into account. But as we discussed before, the reference point is not necessarily the status quo and, more important, it does not change automatically with every change in the status quo. Thus an entry or an exit does not necessarily change the firm's reference point. Bearing this in mind, the rules that govern the changes of the reference points and their implications on the firms' behavior is, nevertheless, beyond the scope of this research.

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