

The Boycott Puzzle: Consumer Motivations for Purchase Sacrifice

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Abstract

A boycott is never far from a firm's exchanges with its customers. Researchers in marketing need to understand consumer protest behavior, both to aid NGOs who wish to organize boycotts and to assist managers who wish to develop appropriate strategic responses. Boycotts, like many other problems of collective action, are subject to free-rider and small-agent problems: there appears to be little or no motivation for an individual to participate. Yet they assuredly occur. We take an economic and psychological approach to the study of boycotts. Our approach is to develop a typology of motivations for consumer boycotts, to embed these motivations explicitly in a dynamic economic model, and thus to offer explanations for the extent of boycott participation.

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1 Introduction

The use of boycotts as a coercive marketplace tactic is widespread. A websearch yields calls for boycotts against Microsoft (for abuse of monopoly power), Amazon.com (for its attempts to patent ‘one-click shopping’), the Recording Industry Association of America (for prosecution of Napster), Monsanto (for production of genetically modified organisms), Nestlé (for promotion of infant formula in poor countries), Disney (for multiple reasons including glorification of pagan Earth-worship and the promotion of homosexuality), China (for human rights violations), Ben and Jerry’s (for support of a campaign to overturn a murder conviction), and numerous others. Boycotts are diverse and there is no completely reliable means of ascertaining how many serious boycotts are in effect. To get some sense of the numbers, we carried out a Google websearch for the string “Boycott <company/brand name>” for all the companies in the Fortune-50 and the top 50 brands identified by Interbrand. Seven companies (Intel, Exxon-Mobil, Wal-Mart, AT&T, Proctor & Gamble, K-mart, and Target) and fourteen brands all recorded over 100 hits; all but eight firms and all but four brands recorded at least one hit.¹ Not all occurrences of these phrases signal an organized boycott (any individual with a website can call for a boycott), but if we take 20 hits as an arbitrary (but fairly conservative) threshold of boycott significance, then 42 percent of top companies, and 54 percent of top brands, are facing calls for boycotts.

More systematic research also reveals the ubiquity of boycotts. From the mid-80’s to the mid-90’s, boycotts in the U.S. increased about fourfold (Putnam 1993); while Miller et al. (1992) found that as many as 18% of Americans, primarily those with high incomes and college degrees, participate in boycotts. Gelb (1995) predicted that boycotts will be an increasing force in U.S. marketing. Moreover, activist groups are becoming increasingly sophisticated: many NGOs no longer target consumers only, but also target corporate image through press releases and the staging of dramatic activities.

The precise impact of boycotts on firms is hard to assess. There are celebrated examples of corporate capitulation, such as Shell’s decision to dispose of the Brent Spar oil platform on land rather than at sea, but while groups that call boycotts are quick to claim success when their demands are met, companies typically downplay the impact of boycott activity on their sales, profitability, or decisions. Still, business leaders have been openly concerned about boycotts for several decades: in a 1977 survey, Sentry Insurance Co. found that 51% of senior business managers cited boycotts as their top choice of the “most effective techniques for the consumer movement to use” (Friedman 1999). And rightly so: Pruitt and Friedman (1986) and Davidson, Worrell, and El-Jelly (1995) both found that boycotts led to substantial falls in share prices; Davidson et al. also found that about one third of the 59 firms they studied changed their behavior. For example, after being boycotted for fishing policies that harmed dolphins, Heinz agreed to a dolphin protection plan.

Empirical research in marketing has investigated corporate image and corporate social responsibility (Brown and Dacin 1997; Sen and Bhattacharya 2001), but has largely neglected consumer boycotts (Garrett 1987 and Sen et al. 2001 are important exceptions). This dearth is surprising because boycotts fundamentally disrupt the relationship between the firm and its customers, which is a cornerstone of contemporary marketing theory and practice.² Furthermore, an understanding of individual protest behavior is essential both for NGOs organizing consumer protests and for managers who seek appropriate strategic responses. Our focus throughout is thus on the consumer who decides upon boycott participation, rather than on the group that initiates the protest or the firm that is being targeted.

Boycotts are usually conceptualized as *instrumental* – as a tactic to influence the behavior of a firm (or other institution) by withholding purchase of their products. For example, Friedman (1985) defines a boycott as “an attempt by one or more parties to achieve certain objectives by urging individual consumers to refrain from selected purchases in the marketplace”. Viewed in this light, the popularity and apparent success of boycotts is a serious

puzzle. Boycotts, like other problems of collective action, are subject to small-agent and free-rider problems that limit the incentive for participation. Because individual consumers are typically small relative to the market, their actions are likely to have a negligible impact on producers. And because an individual will reap the benefits of a successful boycott whether or not she participates, she has an incentive to free-ride upon the boycott actions of others. Yet boycotts assuredly occur. In this paper we consider why.

The fact that agents are small implies that boycotting is a costly act that can be rationally expected to yield no instrumental benefit. A similar anomaly has often been noted in the context of voting: why vote if your ballot is almost certain to have no influence on the outcome of an election? This rational choice approach to voting was set out by Downs (1957), and has since been widely discussed by political scientists (for a recent discussion, see Blais 2001). But the voting puzzle remains unresolved – and in many ways the mystery of why people boycott is far greater than the question of why they vote. Voting is an occasional act, and it is plausible that people may be motivated to go the polls every couple of years out of a sense of civic duty (Riker and Ordeshook 1968) or altruism (Knack 1992). Boycotts are typically ongoing, requiring individuals to forego a preferred product on a repeated basis.

It has likewise long been recognized that collective acts are subject to free-riding. The problem was famously articulated by Olson (1965) and Hardin (1968), and has been extensively analyzed in the fields of public and experimental economics, social psychology, and political science. People may choose not to free ride; researchers in all of these disciplines have certainly advanced our understanding of why individuals sometimes apparently act against their own self-interest (see Ostrom 1998 and Fehr and Schmidt 2001 for recent surveys). Still, the temptation to collect the benefit while others do the work is undoubtedly powerful.

Apparently, boycotters are either behaving irrationally or are obtaining some other benefit from participation in a boycott. But neither really constitutes an explanation of boycott

behavior: “irrationality” covers a multitude of sins, and the assumption of some other utility from boycotting begs the question of its source. In this paper, we attempt to give more substance to such explanations. Drawing on the insights of Smith (1990), Friedman (1991, 1999), and several strands of the social psychology literature, we consider the psychological bases for any utility gain or loss from boycott participation, noting that factors such as self-esteem and anger can play a role in the boycott decision. We refer to such motivations as *non-instrumental*. We also use insights from psychology to examine particular types of irrationality (that is, biases such as false consensus or perceived effectiveness) that might help explain boycott behavior. We incorporate these motivations and biases into dynamic economic models where individuals otherwise behave rationally.

2 Preliminaries

We assume that there is a unit mass of infinitely-lived individuals, indexed by $i \in [0, 1]$, each of whom makes a decision about whether to participate in a boycott. An individual agent has mass ε , where ε is typically small, so that the total number of agents equals $1/\varepsilon$. Individual i 's utility in period t has two additive components: the first (u_{it}) derives from consumption of goods and services in the familiar way, and the second (v_{it}) derives from other factors, about which we will be more specific below. The discount factor is β , and so lifetime utility is given by:

$$u_{i0} = \sum_{t=0}^{\infty} \beta^t (u_{it} + v_{it}). \quad (1)$$

Each individual receives a constant income each period, and saving and borrowing are not possible. We also assume that the price vector faced by the household is unchanging in all periods. Together, these assumptions (which can all be relaxed) imply the decision problem faced by each person does not change over time.

2.1 The Egregious Act

We think of the underlying cause of boycott activity as being some egregious behavior by a producer. We define a *boycott* as occurring when a number of people abstain from purchase of a product, at the same time, *as a result of the same egregious behavior*, but not necessarily for the same reasons.³ Following Smith (1990), we refer to a boycott as “effective” if there is non-zero participation, and “successful” if the boycott leads to the cessation of the egregious act. The egregious act is a source of disutility to individuals, either directly (for example, adverse health effects from a polluting firm) or vicariously (for example, the negative emotions that stem from envisioning a firm’s use of child labor). In general, all individuals may suffer this disutility: we thus assume that individual i incurs a cost of $\theta_i > 0$ in any period where the egregious act is ongoing. This cost varies across individuals but does not vary over time.

The egregious act might be committed by someone associated with the producer: Klein, Ettenson and Morris (1998) examine boycotts where a country’s policies lead to a boycott of all products from that country. Similarly, boycotts sometimes target retailers of products made by an offending firm. The assumption that all agents agree that the act is egregious is for ease of exposition, but our formal analysis is trivially extended to the case where $\theta_i \leq 0$ for some i . Note also that when different consumers have opposing views of the egregious act, we may observe a “buycott” – supporters attempt to offset the boycott by altering their purchasing habits in favor of the good (Friedman 1999, chapter 9).

2.2 The Cost of an Act of Boycott

Absent the egregious act, the boycotter would like to purchase a positive quantity of the good. Let u_i^* represent utility from the bundle of goods that individual i would choose if unconstrained, and let \hat{u}_i represent the utility she obtains if she chooses her bundle of goods subject to the restriction that consumption of the boycotted good is zero.⁴ By our earlier

assumptions, these choices do not depend upon t . Utility in any period where the individual boycotts, or does not boycott, respectively, is given by

$$u_i^b = \hat{u}_i - \theta_i; \tag{2}$$

$$u_i^n = u_i^* - \theta_i. \tag{3}$$

(If boycott activity were to affect equilibrium prices, there would be a difference between the utility of a nonparticipant when a boycott is occurring, and her utility in the absence of a boycott. Our analysis is easily amended to include this possibility.) Define $c_i = u_i^n - u_i^b = (u_i^* - \hat{u}_i) > 0$ as the direct utility cost to the consumer of participating in the boycott in any period. This cost will vary substantially from boycott to boycott and individual to individual. If close substitutes for the boycotted good exist, then the cost of participation is small; an example might be the boycott of Shell gasoline by consumers protesting Shell's environmental policies. Conversely, the cost of boycott is high for a consumer contemplating a change in vacation plans because of a country or state boycott.

2.3 The Boycotted Firm

Let the mass of agents who participate in the boycott in period t be denoted by $N_t \in [0, 1]$. (For ease of exposition, we treat N as continuous.) Suppose that, in period t , the firm will cease the egregious act with probability $\pi = \pi(N_t)$. We assume that $\pi(\cdot)$ is continuous and twice differentiable, and that $\pi'(N_t) > 0$: the more effective is the boycott, the more likely it is to be successful. A successful boycott means that individuals can return to their preferred consumption bundle and also no longer suffer the disutility from the egregious act. An individual changes this probability to $\pi(N_t + \varepsilon)$ by participating in the boycott. For small ε , the change in the probability ($\pi(N_t + \varepsilon) - \pi(N_t)$) approximately equals $\varepsilon\pi'(N_t)$. This specification is consistent with a firm that observes the level of participation with error and has a decision rule to cease the egregious behavior if boycott participation passes a certain

threshold. The distribution of the error would then determine the probability function $\pi(N_t)$.

3 The Small Agent Problem and the Free Rider Problem

We write the individual's problem as a dynamic program. At any date t when the egregious act occurs, the value function for agent i is

$$v_i(N_{t+s}) = \max\{v_i^b(N_{t+s}), v_i^n(N_{t+s})\}, \quad s = 0, 1, \dots$$

where $v_i^b(N_{t+s})$ is the value of participation in the boycott at time t , and $v_i^n(N_{t+s})$ is the value of non-participation. These values depend on both current and anticipated future participation. Unless specified otherwise, agents are assumed to form correct (rational) expectations of participation at all dates. The values of participation and non-participation are given by:

$$v_i^b(N_{t+s}) = u_i^b + \beta [(\pi(N_t + \varepsilon)) v_i^* + (1 - \pi(N_t + \varepsilon)) v_i(N_{t+1+s})] \quad (4)$$

$$v_i^n(N_{t+s}) = u_i^n + \beta [\pi(N_t) v_i^* + (1 - \pi(N_t)) v_i(N_{t+1+s})] \quad (5)$$

where v_i^* is the value of an agent if the firm ceases the egregious practice and the boycott comes to an end. The incentive to participate in a boycott comes from the fact that the agent influences the firm's decision, and thus helps bring the egregious act to an end.

We look for equilibria where agents forecast a constant level of participation until the egregious act ceases – that is, where $N_{t+s} = N \forall s \leq \tilde{T}$, where \tilde{T} is the (unknown) duration of the boycott, and $N_{t+s} = 0 \forall s > \tilde{T}$. For any individual, the problem therefore looks identical in each period (note that the expected duration of the boycott does not change over time).

Switching between decisions occurs only if the boycott is successful. It follows that

$$v_i^b(N) = u_i^b + \beta [(\pi(N + \varepsilon)) v_i^* + (1 - \pi(N + \varepsilon)) v_i^b]; \quad (6)$$

$$v_i^n(N) = u_i^n + \beta [\pi(N) v_i^* + (1 - \pi(N)) v_i^n]; \quad (7)$$

$$v_i^* = u_i^* + \beta v_i^*. \quad (8)$$

The steady-state value of v_i^* is immediate: $v_i^* = \frac{u_i^*}{1-\beta}$. Using this, together with (2) and (3), we obtain

$$v_i^b = \frac{u_i^*}{1-\beta} - \frac{(\theta_i + c_i)}{1-\beta(1-\pi(N+\varepsilon))}; \quad v_i^n = \frac{u_i^*}{1-\beta} - \frac{\theta_i}{1-\beta(1-\pi(N))}. \quad (9)$$

An individual will participate in the boycott if and only if $v_i^b > v_i^n$, which implies

$$\frac{c_i}{\theta_i} < \frac{\beta(\pi(N+\varepsilon) - \pi(N))}{1-\beta(1-\pi(N))} \simeq \frac{\beta\varepsilon\pi'(N)}{1-\beta(1-\pi(N))}, \quad (10)$$

where the approximation holds for small ε . The expression c_i/θ_i measures the cost-benefit ratio of boycotting: the numerator is the direct per-period cost of boycott activity, and the denominator is the per-period benefit obtained if the egregious act comes to a halt. Agent i 's participation in the boycott implies that the probability that the egregious practice will cease increases by an amount equal to $\pi(N + \varepsilon) - \pi(N)$. The benefit from this is that, after the egregious practice ceases, the agent will not have to suffer θ_i . This stream of benefits is discounted at the rate $\beta(1 - \pi(N))$. From (10) we see clearly the small-agent problem. When ε is very small, the potential gain from participation in an instrumental boycott is also small, and so is unlikely to outweigh the direct cost ($c_i > 0$) of boycott participation. A countervailing effect comes from the $\pi'(N)$ term: if agent i perceives that she is likely to be the marginal agent, then it is conceivable that $\pi'(N)$ will be large. (This is analogous to the increased incentive to participate in an election if the result is likely to be close.) Still, as $\varepsilon \rightarrow 0$, an individual agent's influence on the firm's decision becomes vanishingly small, and the gain from participation will be less than the cost for all agents.

The participation condition (10) also illustrates the free-rider problem. The more likely it is that the boycott will be successful anyway, the smaller is the incentive for individual participation. This effect is captured by the $\pi(N)$ in the denominator: an increase in $\pi(N)$ reduces the individual gain from participation in the boycott, because it is more likely that the boycott will come to an end even without the agent's efforts. Free-riding and small-agent problems are conceptually distinct, although both may often be present and both may serve as impediments to boycott participation.

3.1 The Equilibrium Level of Participation

Agents are distinguished by the direct cost of participation and by the disutility they receive from the egregious act. Without loss of generality, we can order the agents according to their value of c_i/θ_i . The resulting distribution has support $\left[\left(\frac{c_i}{\theta_i}\right)_{\min}, \left(\frac{c_i}{\theta_i}\right)_{\max}\right] \subset \mathbf{R}_+$; let the cumulative density function (cdf) of this distribution be given by $F(\cdot)$. The right-hand side of (10) defines a cutoff cost-benefit ratio, such that agents whose cost-benefit is less than this cutoff will choose to participate in the boycott. We can thus characterize an equilibrium level of participation in the boycott as a solution to

$$N = F\left(\frac{\varepsilon\beta\pi'(N)}{1 - \beta(1 - \pi(N))}\right). \quad (11)$$

Proposition 1 (*Existence of equilibrium*) (i) If $\left(\frac{c_i}{\theta_i}\right)_{\min} > \frac{\varepsilon\beta\pi'(0)}{1 - \beta(1 - \pi(0))}$, there is an equilibrium with zero participation ($N = 0$). (ii) If $\left(\frac{c_i}{\theta_i}\right)_{\max} < \frac{\varepsilon\beta\pi'(1)}{1 - \beta(1 - \pi(1))}$, there is an equilibrium with complete participation ($N = 1$). (iii) If $\left(\frac{c_i}{\theta_i}\right)_{\min} < \frac{\varepsilon\beta\pi'(0)}{1 - \beta(1 - \pi(0))}$ and $\left(\frac{c_i}{\theta_i}\right)_{\max} > \frac{\varepsilon\beta\pi'(1)}{1 - \beta(1 - \pi(1))}$, there is an equilibrium with partial participation ($N \in (0, 1)$).

Proof. If the condition in (i) holds, then when $N = 0$, even the lowest cost agent does not find it worthwhile to take part. If the condition in (ii) holds, then when $N = 1$, even the highest cost agent finds it worthwhile to take part. If the conditions in (iii) hold, then

$F\left(\frac{\varepsilon\beta\pi'(1)}{1-\beta(1-\pi(1))}\right) < 1$ and $F\left(\frac{\varepsilon\beta\pi'(0)}{1-\beta(1-\pi(0))}\right) > 0$, in which case there exists at least one N such that $F\left(\frac{\varepsilon\beta\pi'(N)}{1-\beta(1-\pi(N))}\right) \geq N$ and $F\left(\frac{\varepsilon\beta\pi'(N+\varepsilon)}{1-\beta(1-\pi(N+\varepsilon))}\right) < N + \varepsilon$. At this value of N , the gain from boycotting exceeds the cost for exactly N agents, and so it is an interior equilibrium. ■

An increase in perceived egregiousness increases the benefit from boycott activity and so will tend to increase equilibrium participation. An increase in the cost of boycotting will tend to reduce participation. Increased effectiveness of boycotting (an increase in $\pi'(N)$ in the relevant range) will increase participation, but an increased likelihood of success, through the free rider effect, will tend to decrease participation. These variables might change over the course of a boycott. As an example, the perceived egregiousness of Nestlé's actions involving the sale of infant formula in poor countries has probably decreased because the risk of mother-infant AIDS transmission has changed recommended best-practice in some regions. In our model, this could correspond to an unexpected decrease in θ_i . The direct effect of this change is that agents will then become less willing to boycott. There will also be an indirect effect resulting from the equilibrium change in participation.

3.2 Externalities

The participation condition reveals externalities from boycott participation. There are two channels through which agents' decisions to boycott (as reflected by an increase in N) affect the utility of others. First, if more individuals choose to take part in the boycott, then there is an external benefit because the boycott is likely to end sooner. This externality is imposed on boycotters and nonboycotters alike (although the effect will be larger on boycotters than on non-boycotters to the extent that there are variations in θ_i that affect participation). It is captured by the $\pi(N)$ and $\pi(N + \varepsilon)$ terms in the denominators of (9). Second, there is also an external effect that operates through the $\pi'(N)$ term that shows up in $v_i^b()$ only. If more people participate in the boycott, then this influences the value of boycotting but does

not affect nonboycotters. If, as seems plausible in the relevant range, $\pi''(N) > 0$, then this externality is also positive: increased participation by others raises the utility of those who are participating in the boycott, and it follows that there is then too little boycott activity from the perspective of consumers (if $\pi''(N) < 0$ then the net effect is ambiguous).⁵

These externalities bear on a current debate about the social control of business. Boycotts are a means by which consumers can influence business practices by refraining from purchase from firms that fail to behave in “socially responsible” ways (Smith 2001). But we have argued that there is likely to be less boycott activity than would be optimal from the perspective of consumers, and so this mechanism is likely to be unreliable. The presence of participation externalities indicates that governments cannot rely fully on consumers and the market mechanism and so abandon their role as regulators of business.

Because the extent of participation affects the utility of participants and non-participants, it also influences the individual incentive to participate. In the language of game theory, if an increase in N increases the individual incentive to take part, there is *strategic complementarity*; if it reduces this incentive, there is *strategic substitutability*. An increase in N raises the likelihood that the boycott will end sooner, and so decreases the incentive to participate: this is free-riding, and works in the direction of strategic substitutability. If $\pi''(N) > 0$, however, then the externality operating through $\pi'(N)$ gives rise to an offsetting effect: increased participation raises the incentive for an individual agent to take part. The overall impact of a change in N obviously depends upon the net effect of these two channels.

4 Instrumental Boycotts

4.1 Perceived Effectiveness and Illusion of Control

An individual's need for control over her environment can lead to perceptions of a stronger link between actions and outcomes than actually exists (see for example Fiske and Neuberg 1990). While individual consumers are small, they may not perceive themselves as such; they may have an exaggerated assessment of the importance of their actions. This could be because they exaggerate their direct impact on the firm (perceived effectiveness), or because they think that their actions will cause others to behave in a similar way (illusion of control), or simply because they are ignorant of the true relationship between their choices and the firm's behavior. Suppose the individual thinks that the probability of success is given by $\pi(N + \mu) \simeq \pi(N) + \mu\pi'(N)$, $\mu \gg \varepsilon$, if she participates. Here, $\mu\pi'(N)$ measures the extra influence that the individual *believes* that she has on the firm's behavior. Exactly analogous reasoning to that of Section 3 then reveals that an individual will participate in a boycott if $\frac{c_i}{\theta_i} < \frac{\beta\mu\pi'(N)}{1-\beta(1-\pi(N))}$. Because $\mu > 0$, it is possible that the equilibrium level of participation in the boycott will be greater than zero even if the agent is in fact vanishingly small. Equilibrium participation in this model is given by the solution (or solutions) to $N = F\left(\frac{\beta\mu\pi'(N)}{1-\beta(1-\pi(N))}\right)$.

4.2 Altruism

We noted earlier that the disutility from the egregious act might be engendered by the knowledge that the firm is harming others: for example, people may boycott in protest of dangerous working conditions in a firm's factories. Perhaps, then, people take part in instrumental boycotts because they also extend altruistic sentiments to other boycotters and nonboycotters. Suppose in particular that they choose their actions to internalize all the externalities that they impose. Individual i then obtains $u_i^b + W_i$ from participation and

$u_i^n + W_i$ from non-participation, where $W_i = \left(\frac{1-\varepsilon}{\varepsilon}\right) \left[\int_0^N u_j^b dj + \int_N^1 u_j^n dj\right]$, $j \neq i$. Here, W_i represents the total utility of all agents other than i , of which there are $\left(\frac{1-\varepsilon}{\varepsilon}\right)$. Each agent chooses her own action as if she were a social planner, maximizing a utilitarian social welfare function. Agents are assumed to be ordered, as before, in terms of their cost of boycotting. If the egregious behavior ceases, individual i obtains $u_i^* + W_i^*$; $W_i^* = \left(\frac{1-\varepsilon}{\varepsilon}\right) \left[\int_0^1 u_j^* dj\right]$, $j \neq i$. Analogous reasoning to before reveals that the condition for participation in this case is

$$c_i < \left(\frac{\beta(\pi(N+\varepsilon) - \pi(N))}{1 - \beta(1 - \pi(N))}\right) \left[\theta_i + \left(\frac{1-\varepsilon}{\varepsilon}\right) \left[\int_0^1 \theta_j dj + \int_0^N c_j dj\right]\right]; j \neq i \quad (12)$$

Agent i takes account not only of her own benefit from bringing the egregious practice to an end, but also of the benefit accruing to others. This benefit equals θ_j aggregated over all other agents, plus the benefit that other boycotters receive when they no longer incur their direct cost (c_j , aggregated over the mass N of agents who participate in the boycott).

As $\varepsilon \rightarrow 0$, the condition becomes $c_i < \frac{\beta\pi'(N)}{1-\beta(1-\pi(N))} \left[\int_0^1 \theta_j dj + \int_0^N c_j dj\right]$. As each individual becomes vanishingly small, the *number* of agents tends to infinity, so each individual still perceives that she has a positive effect on aggregate welfare. Altruism provides a possible explanation of instrumental boycotts, but only by defining away the collective-action problem. Note that altruism does not eliminate free-riding, which is still captured by the $\pi(N)$ in the denominator. The larger is the probability that the boycott will end anyway, the smaller is the incentive for agent i to participate, and this is unaffected by altruism. Even altruists may free-ride.

4.3 Thrill of Victory

Individuals may care about being part of a *successful* boycott. In this case the free rider and the small-agent problems disappear, because only those who take part in the boycott can experience the “thrill of victory”. To keep the analysis transparent, assume that $\varepsilon \simeq 0$, so agents do not anticipate that their actions will have any effect on the firm’s behavior.

Suppose that, for a boycott participant, there is an additional (one-time) benefit, equal to α_i , if the firm ends the egregious practice. Then

$$v_i^b = u_i^b + \beta (\pi(N)(v_i^* + \alpha_i) + (1 - \pi(N))v_i^b) = \frac{u_i^*}{1 - \beta} - \frac{c_i + \theta_i - \alpha_i\beta\pi(N)}{1 - \beta(1 - \pi(N))} \quad (13)$$

and the expression for v_i^n is unchanged. The condition for boycott is simply $c_i < \beta\alpha_i\pi(N)$. Because this is a one-time gain, there is no significant dynamic aspect to the choice: agents who participate in the boycott receive the gain α with probability $\pi(N)$.

Rewriting the expression as $c_i/\alpha_i < \beta\pi(N)$, and letting $\hat{F}()$ be the distribution of c_i/α_i , we obtain $N = \hat{F}(\beta\pi(N))$. The cutoff is increasing in N : the individual incentive to participate is higher when overall participation is higher, so we unambiguously have strategic complementarity. If participation in the boycott is expected to be high, then there is a bandwagon effect as individuals join the boycott to experience the thrill of victory.

5 Expressive, Punitive, and Clean Hands Boycotts

We now turn to non-instrumental motivations for boycott participation. We could incorporate these motivations in our earlier framework, but the analysis is more transparent if we assume that $\varepsilon \simeq 0$, and that there is no thrill of victory, no altruism, and no perceived effectiveness. Participation entails a direct utility cost, so any boycotter must either see an offsetting benefit, or must feel that purchasing the good would entail an even greater cost.

Participation in a boycott may simply be an expression of anger or outrage at the present or past acts of the producer. This in principle implies neither a desire to change the behavior of the producer, nor a wish that others participate. It is, at heart, an individual act. The literature often refers to such boycotts as “expressive”. (In the context of voting, Brennan and Lomasky (1993) similarly argue that voters make their decisions for expressive reasons, rather than instrumental reasons, and note that this may lead to inefficient outcomes.)

Further, boycott participation might allow the individual to maintain or enhance his self-concept (“I am the sort of person who cares about others”). Although individual self-esteem is generally relatively stable, it can fluctuate. As a consequence, people often engage in behaviors that allow them to increase their self-esteem (see for example Fein and Spencer 1997). Boycott participation and allied feelings of “doing the right thing” are one method of feeling good about oneself. Smith (1990) calls such motivations “clean hands”, which refers to the feelings of good conscience or moral superiority one can obtain from participating in a boycott. Punitive boycotts are very similar: individuals might satisfy a desire to punish the producer by withholding their purchases.

The flip side of a utility gain from boycotting is a utility cost associated with purchasing the good. An individual may not wish to purchase the good because such action would be felt as supporting the egregious act, and would therefore generate dissonance (Festinger 1957) with a positive view of the self. Some people might feel guilty about purchasing goods produced by child labor, or foodstuffs (such as veal) that they believe entail cruelty to animals. A holocaust survivor might not want to buy German products because it would cause discomfort to feel associated with Germany. All of these examples depict negative emotional reactions. We describe these as “dirty hands”, since they are the conceptual opposite of clean hands. Notice that not only are these motives non-instrumental, but also that the egregious act might even be unchangeable. Is there anything the German government could do to undo the damage inflicted upon the Holocaust survivor?

5.1 A Formalization

The expression of anger, the individual desire to punish, or the enhancement of self-esteem, suggest that there is a utility gain, denoted here by ζ_i , from not purchasing. By contrast,

guilt or dissonance suggest that an individual would experience disutility, δ_i , from purchase:

$$u_i^b = \hat{u}_i - \theta_i + \zeta_i; \quad u_i^n = u_i^* - \theta_i - \delta_i. \quad (14)$$

An agent's gain from boycotting or cost of not boycotting might vary with her perception of egregiousness: ζ_i and δ_i might be positively correlated with θ_i . Assuming that θ_i , ζ_i and δ_i do not vary over time, then the individual faces a series of identical static problems. (Recall that the dynamic linkage in our earlier analysis came from the influence of the agent's participation on the firm's behavior, assumed absent in this section.) Thus individual i will participate in the boycott if $u_i^b > u_i^n \Rightarrow \gamma_i - c_i > 0$, where $\gamma_i = \zeta_i + \delta_i$ represents the psychological gain from taking part in the boycott; and $c_i (= u_i^* - \hat{u}_i)$ is the direct cost. We assume that $\gamma_i - c_i$ has support $[(\gamma_i - c_i)_{\min}, (\gamma_i - c_i)_{\max}]$. Without loss of generality, we order individuals in increasing order of $\gamma_i - c_i$ and we let the cdf of the resulting distribution be denoted by $G(\cdot)$. All agents for whom $\gamma_i > c_i$ will choose to participate in the boycott, so equilibrium participation in the boycott is given by $N = 1 - G(0)$.

5.2 Social Influence

To take part in an organized boycott is to be part of a group. An individual's self-concept derives in part from the groups in which she interacts (Tajfel 1982), and a key part of group identity may be participation in group causes. Individuals may receive greater utility from being in a larger group, or may perceive a higher gain from punishing the firm when others are also doing so (perhaps because they infer something about the seriousness of the firm's behavior from the choices of others). We model such social gains from participation by assuming that $\zeta_i = \zeta_i(N)$; $\zeta_i'(N) > 0$. Participation bestows a positive externality on participants, but not on nonparticipants. Boycott participation in this case has some of the properties of a "club good" (Cornes and Sandler 1986; see also Olson 1965).

Ostrom (2000), summarizing work on collective action and social norms, suggests that

there are three types of agent in the world: rational economic agents; those who match others' cooperation; and those who punish non-cooperators. She posits modeling this by supposing that some agents "have an additional parameter that adds value to the objective payoffs when reciprocating trust with trustworthiness" (2000, p. 144). (In related work, Morris, Sim and Giroto (1998) argue that individuals both wish to match the previous cooperative choices of others and to avoid betraying the good faith of others.) Although the story is slightly different, Ostrom's analysis is consistent with our model of social gains from participation. In our setting, an agent who is willing to cooperate has $\zeta_i(\cdot) > 0$, and an agent who rewards cooperation with cooperation has $\zeta'_i(N) > 0$, indicating that she perceives a greater incentive to boycott when others are also participating. (For a summary of more complicated models of reciprocity see Fehr and Schmidt 2001.)

Another possibility is that participation imposes negative externalities on nonparticipants. The more people are taking part in the boycott, the worse individual nonparticipants might feel about their failure to be involved, particularly if those participating form part of the individual's social group. An animal rights activist might feel social pressure to boycott meat products, particularly if she often eats with like-minded friends. The publicness of consumption matters here: social pressure is stronger for goods consumed publicly. We model social pressure by assuming that $\delta_i = \delta_i(N)$, where $\delta'_i(N) > 0$. Because social gains from participation are associated with positive externalities for participants, and social pressure is associated with negative externalities for nonparticipants, they have distinct welfare implications, even though $\zeta_i(\cdot)$ and $\delta_i(\cdot)$ enter additively into the boycott decision.

It follows immediately that $\gamma_i = \gamma_i(N)$ and that $\gamma'_i(N) > 0$. Social influence gives rise to strategic complementarity, because an increase in total participation raises an individual's utility from boycotting and/or lowers her utility from not boycotting. While it is theoretically possible that the externalities could run in the other direction – greater participation might bestow a negative externality on participants or a positive externality on nonparticipants –

it is hard to come up with plausible stories for such effects. Thus, when we are considering non-instrumental boycotts, it is reasonable to expect strategic complementarities. Finally, the externality of Section 3 is still present: increased participation increases the likelihood that the egregious act will come to an end sooner, which is beneficial to all agents, but because agents are infinitesimally small, this has no effect on behavior.

5.3 Equilibrium Participation with Social Effects

For any \hat{N} , there is a distribution of (net) boycott gains, $\gamma_i(\hat{N}) - c_i$. Write the cdf of this distribution as $G_{\hat{N}}(\cdot)$, where $G_{\hat{N}}(\cdot)$ has support $\left[\left(\gamma_i(\hat{N}) - c_i \right)_{\min}, \left(\gamma_i(\hat{N}) - c_i \right)_{\max} \right]$. Social effects introduce a feedback into the model. The number of agents who are expected to take part in the boycott affects the net gain from participation, and hence the actual number who participate. Because $\gamma_i(N)$ is increasing in N for all N , distributions with lower values of N first-order stochastically dominate distributions with higher values of N . The fraction of agents who will participate in the boycott is given by the solution(s) to $N = 1 - G_N(0)$. Analogously to our earlier analysis, there is an equilibrium with zero participation if $(\gamma_i(0) - c_i)_{\max} < 0$; there is an equilibrium with full participation if $(\gamma_i(1) - c_i)_{\min} > 0$; and there is an equilibrium with partial participation if $(\gamma_i(1) - c_i)_{\min} < 0 < (\gamma_i(0) - c_i)_{\max}$. If the equilibrium is unique, then these conditions are sufficient as well as necessary. Multiple equilibria are possible, however, as illustrated by the following simple example.

Suppose that the cost of boycotting is constant for all individuals ($c_i = \bar{c} \forall i$), but that the psychological gain ($\gamma_i(N)$) is distributed uniformly on $[2N, N + 1]$, so $G_N(x) = \frac{x - 2N + \bar{c}}{1 - N}$. Now $(\gamma_i(0) - c_i)_{\max} = 1 - \bar{c}$ and $(\gamma_i(1) - c_i)_{\min} = 2 - \bar{c}$. Thus, if $\bar{c} > 1$, zero participation is an equilibrium, and if $\bar{c} < 2$, full participation is an equilibrium. If $\bar{c} \in (1, 2)$, then both zero and full participation are equilibria, and there is also an interior solution given by $N = 1 - \left(\frac{\bar{c} - 2N}{1 - N} \right) \Rightarrow N = (\bar{c} - 1)^{1/2}$. This example satisfies first-order stochastic dominance.

Greater participation by others raises the gain from individual participation; this strategic complementarity is the key to multiple equilibria (Cooper and John 1988).

Many boycotts are effective; many are not. One explanation is that both participation and non-participation are equilibrium outcomes, depending on people's expectations about the behavior of others. Social feedbacks imply that the incentive to take part depends not only on the objective costs and benefits of participation, but also on people's beliefs about what others will do: individuals may decide to boycott because others are. The effectiveness or otherwise of a boycott can be a self-fulfilling prophecy: which equilibrium occurs depends upon everybody's expectation of what others will do.

Any model that yields multiplicity is incomplete: it does not predict which equilibrium will ultimately occur. Such uncertainty is not a flaw of the model, but reflects the fact that outcomes in the real world can be driven by expectations and perceptions as well as by fundamentals. In the case of boycotts, there is often a pressure group that calls, organizes, and publicizes the boycott. This group seeks to manage expectations in order that, in equilibrium, boycott activity occurs. In the language of game theory, groups that organize boycotts may play a role in equilibrium selection. If boycotts can indeed be self-fulfilling, then we would expect to see NGOs publicizing boycott participation as heavily as possible, and managers downplaying the impact and the extent of the boycott – which of course is precisely what we usually observe in actual boycotts.

6 False Consensus

In the model of Section 5, people boycott because they perceive the psychological gains of boycott to outweigh the direct cost. We also noted that the social component to the psychological gain generates strategic complementarity: increased participation by others encourages individual participation. We now combine this with another psychological mechanism

– *false consensus* – and show that this increases the likelihood of observing some participation. False consensus exists when people’s own choices or beliefs bias their judgments of others’ beliefs, leading them to view their own views as relatively common and alternative views as relatively uncommon. For example, those who support a Democratic presidential candidate are more likely to believe that others prefer that candidate than do those who support the Republican candidate (for reviews, see Krueger 1998 and Kunda 1999). Perhaps people participate in boycotts because they overestimate the extent to which others will do so.

We present our argument in a simple setting, but the ideas are easily generalized. Suppose agent j expects N_j agents to participate. Were all agents to hold this belief, then the net gain for agent i would be $(\gamma_i(N_j) - c_i)$; as before, we assume the cdf of this distribution is given by $G_{N_j}(\cdot)$. We assume the distributions are continuous. Now suppose that, due to a false consensus bias, each agent believes the distribution of gains is shifted such that it is centred at her own gain. That is, agent j believes she is the median agent, and so thinks agent i ’s gain is given by $(\gamma_i(N_j) - c_i) + [(\gamma_j(N_j) - c_j) - (\gamma_i(N_j) - c_i)_{med}]$, where $(\gamma_i(N_j) - c_i)_{med}$ represents the true median value of the distribution of $(\gamma_i(N_j) - c_i)$, and $(\gamma_j(N_j) - c_j)$ is the true gain from participation in the boycott for agent j when N_j agents participate. (Such behavior need not in fact represent a bias; rather it may be an optimal estimate of the distribution based on agent i ’s observation of her own type. We could also imagine a less extreme version of this assumption, whereby agent i also samples the types of other agents that she knows, but where these types are correlated with agent i ’s own type.)

Previously, we imposed the (Nash) equilibrium condition that agents correctly forecast the degree of participation by others. Now, we instead require that each agent holds an *internally consistent conjecture* (icc). Define $g_j(N) \equiv 1 - G_N([(\gamma_i(N) - c_i)_{med} - (\gamma_j(N) - c_j)])$. This function tells us, for any N anticipated by agent j , how many people would take part in the boycott if that agent’s belief about the distribution were in fact correct. An icc satisfies

$N_j = g_j(N_j)$. Note that agent's j 's conjecture is correct if (i) she is truly at the median and (ii) all other agents also expect N_j agents to take part.⁶

Proposition 2 (i) If $(\gamma_i(1/2) - c_i)_{\max} < 0$, there exists an equilibrium with internally consistent conjectures for all agents in which there is zero participation. (ii) If $(\gamma_i(1/2) - c_i)_{\min} > 0$, there exists an equilibrium with internally consistent conjectures in which there is full participation. (iii) If $(\gamma_i(1/2) - c_i)_{\max} > 0 > (\gamma_i(1/2) - c_i)_{\min}$, there exists an equilibrium with internally consistent conjectures in which there is partial participation. (iv) If each agent has a unique icc, then the conditions in (i)-(iii) are necessary as well as sufficient.

Proof. The set of internally consistent conjectures for agent j is defined as $C_j = \{N \mid N = g_j(N)\}$. Since $N = g_j(N)$ describes a continuous mapping from $[0, 1]$ into itself, this set is non-empty. Further, if $g_j(1/2) < 1/2$, then $\exists N_j \in C_j$ such that $N_j \in [0, 1/2)$, and if $g_j(1/2) > 1/2$, then $\exists N_j \in C_j$ such that $N_j \in (1/2, 1]$. (i) $(\gamma_i(1/2) - c_i)_{\max} < 0 \Leftrightarrow g_k(1/2) < 1/2 \forall k \Rightarrow \exists N_k \in C_k$ such that $N_k \in [0, 1/2)$. Hence $\gamma_k(N_k) - c_k < 0 \forall k$, which implies that all agents choose not to participate. (ii) Analogous to (i). (iii) Consider the marginal agent (agent m) who is just indifferent about participation – that is, for whom $\gamma_m(1/2) - c_m = 0$. This agent, believing herself to be at the median, has the conjecture $N_m = 1/2$, which is an icc: $g_m(1/2) = 1/2$. For any agent k for whom $\gamma_k(1/2) - c_k > 0$, it follows that $g_k(1/2) > 1/2$ and therefore that $\exists N_k \in C_k$ such that $N_k \in (1/2, 1]$. Hence, a fortiori, $\gamma_k(N_k) - c_k > 0$, and this agent will participate. Similarly, any agent for whom $\gamma_k(1/2) - c_k < 0$ will not participate. (iv) Suppose agent j has a unique icc, N_j . Then $N_j \in [0, 1/2) \Rightarrow g_j(1/2) < 1/2$ and $N_j \in (1/2, 1] \Rightarrow g_j(1/2) > 1/2$. All the arguments in (i) - (iii) are then completely reversible. ■

While this proposition is complicated, the underlying intuition is simple. Consider in particular an agent who is just indifferent about participation in the boycott (part (iii) above). Because she (like all agents) thinks herself at the median, her consistent conjecture

is that exactly half of the population will take part. Agents who have less to gain from boycotting than does this agent conjecture that fewer than 50 percent will participate; this reduces their anticipated gain, and so they definitely will not take part in the boycott. Conversely, agents who have more to gain anticipate greater participation by others and so their incentive to participate increases.

False consensus thus makes some participation in the boycott more likely. Imagine that fully rational agents would perceive the gains from participation to be too low to justify participation. But the false consensus bias means that high-gain agents overestimate the gain of others, and so overestimate the possibility that others will participate. This increases the perceived benefit of boycotting for high-gain agents, and so makes it more likely that they will take part. More formally, suppose that, in the underlying model without false consensus, there are no multiple equilibria and that in the model with false consensus, each agent has a unique icc. From our analysis here and in Section 5, the conditions for equilibrium can be summarized as follows:

	Without false consensus	With false consensus
Zero participation iff	$(\gamma(0) - c)_{\max} < 0$	$(\gamma(1/2) - c)_{\max} < 0$
Complete participation iff	$(\gamma(1) - c)_{\min} > 0$	$(\gamma(1/2) - c)_{\min} > 0$
Partial participation iff	$(\gamma(0) - c)_{\max} > 0$ $> (\gamma(1) - c)_{\min}$	$(\gamma(1/2) - c)_{\max} > 0$ $> (\gamma(1/2) - c)_{\min}$

Zero participation and complete participation are less likely with false consensus; partial participation is more likely. As an illustration, consider a variant on our earlier example: suppose that the direct cost of boycotting is \bar{c} for all agents, and that the gain is distributed uniformly on $[2N, N+3]$. Without false consensus, there is partial participation for $\bar{c} \in (2, 3)$. Under false consensus, there is partial participation for $\bar{c} \in (1, 7/2)$.

7 Conclusions

The actions of a single consumer are generally imperceptible to a firm, and so it is improbable that an individual boycotter truly expects to influence the behavior of the firm she targets. Moreover, even if the consumer does believe her actions matter, she still has an incentive to free-ride on the boycott decisions of others. Yet boycotts are called on a regular basis, often have a large number of participants, and sometimes succeed in changing the behavior of firms. We offer a selection of explanations: individuals may be driven by psychological biases such as an exaggerated sense of their effectiveness; participation may be driven by individual motivations such as guilt, the maintenance of self-esteem, and the avoidance of dissonance; individuals may seek a “thrill of victory”; or behavior may be influenced by a false consensus bias. These explanations are not mutually exclusive: people may differ in their motivations and may possess more than one reason for taking part.

A common thread in our analyses is that participation by others will typically affect an individual’s incentive to participate in a boycott. In the case of instrumental motivations, this shows up most notably in the form of a free-rider effect: greater participation by others discourages individual participation. Conversely, non-instrumental motivations are frequently influenced by social pressure, so that greater participation by others encourages individual participation. As a consequence of such non-instrumental motivations, we may observe multiple equilibria: the effectiveness of a boycott might depend critically on the expectations of potential participants about the behavior of others. Individuals boycott if they think others will do so; individuals do not boycott if they think that others will not.

Boycotts are now a major tool for consumer protest groups, and are likely to become even more significant in the future; as such, they are already a serious managerial concern. Understanding consumers’ motivations for participation in such protests is a critical first step both for NGOs who wish to organize boycotts and for managers who find themselves

on the receiving end of boycott activity. Our results also bear upon pressing public policy issues concerning corporate governance. There is a current debate about the extent to which social control of business should be the responsibility of governments, through regulatory activity, of businesses themselves, through “socially responsible” practices, or of consumers, through their purchase decisions. Boycotts are a manifestation of the idea that consumers can influence business practices by refraining from purchase. But, as we have shown, externalities in the boycott decision suggest that governments should not think that they can abnegate their role as regulators of business practices.

We chose to approach the boycott puzzle using the tools of economics and psychology. There are of course other approaches. Moral philosophers might cite a Kantian view that behavior is guided by an inherent sense of right and wrong, and that actions may arise from a sense of duty, independent of self-interest (Hill 2000). However, abundant research from social psychology on helping behavior has been unable to conclusively disentangle pure altruism from egoistic motivations (for a review, see Dovidio et al 1991). Even people acting out of a sense of moral duty may enhance themselves through such actions – and if acting consistently with one’s moral principles is ego-enhancing (clean-hands), we can conceptualize such behavior as contributing to individual utility. Morris, Sim and Giroto (1998), meanwhile, suggest that cooperative behavior and reciprocity may derive from adaptive cognitive heuristics. Evolutionary biologists and evolutionary social psychologists argue that reciprocity bestows natural selection advantages (see Buss and Kenrick 1998 for a review of evolutionary social psychology). Again, we view such explanations as being broadly consistent with the approach that we adopt.

There are many possible theoretical motivations for boycott participation. Some we have identified; some remain topics for future work. Which of these are relevant in practice is an empirical matter, and in other ongoing research, we are conducting empirical studies of boycott motivations. Future research could analyze the boycott decision from the perspec-

tives of both NGOs and corporations: what are the strategies that will lead to a successful boycott?; and what are the best strategic responses to a boycott? Subsequent research could also develop a more sophisticated model of the behavior of the firm, in which abandoning the egregious act is a strategic decision. Firms might also want to develop a reputation for toughness in order to deter future boycotts. (Likewise, consumers might take part in a current boycott in order to warn firms about the possible consequences of future egregious actions.)

Finally, although we focus on boycotts, we recognize that much of our analysis could also be generalized to other instances of collective action, such as voting or voluntary military service. Collective action is being studied extensively in many different disciplines, including sociology, political science, and philosophy, and we obviously do not claim to have resolved the mystery of why agents often behave in ways that seem inconsistent with their own self interest. Nevertheless, fully-specified dynamic models of collective action are rare, and so the framework we develop here can perhaps be fruitfully applied in other areas.

8 Footnotes

¹ The most hits for a company (1130) occurred for the phrase “Boycott Intel”. Three brands (Disney, Intel, and Nike) had more than 1,000 hits; Disney had almost 1,840. Checking other likely boycott targets, the most hits we found was for the phrase “Boycott Amazon”, which yielded 1950. Searches for sites that contain both “boycott” and “<company name>”, but not necessarily together, tend to yield 10-20 times as many hits: a search for “boycott” and “Disney” obtained about 24,300 hits. For a few companies, we searched multiple versions of the name (ATT OR AT&T, for example); for others, we included only a part of the name (we searched for “Boycott State Farm”, not “Boycott State Farm Insurance Companies”, for example). The detailed searches reported here were carried out using January 2002.

² Earlier work in marketing on the subject of consumer boycotts (Miller and Sturdivant 1977; Petrof 1963) was primarily descriptive and did not directly address consumer motivations (but see Mahoney 1976 for an early attempt to identify psychological characteristics of boycott supporters). In the economics literature, there are some theoretical and empirical investigations of international boycotts and sanctions (Eaton and Engers 1992; Hines 1997, but little work on the microeconomics of boycotts. Rea (1974) is an exception; he analyzes how a group of consumers can exploit monopsony power through boycotts.

³ Association with the egregious act can be thought of as “negative product augmentation” (Smith 1990); that is, it can be thought of as a product attribute. This begs the question of why market mechanisms will not solve the problem. For example, if some consumers like a product to be red, and others like it to be blue, then firms have incentives to produce both red and blue versions. Of course, a boycotted firm cannot usually produce both an “egregious” and a “non-egregious” version of its product.

⁴ When the cost of boycott is potentially very large, individuals may reduce rather than eliminate, their consumption of a good. For example, advocates of a coffee boycott in 1976 called for people to cut their consumption by 50% (Friedman 1999). Our model does not require that consumption of the boycotted good must fall to zero, but we do treat the decision to boycott as dichotomous and we assume that $u(\hat{x}_i) > -\infty$.

⁵ Other externalities are possible. For example, the level of egregiousness, θ_i , may be a function of N : if more people are participating, any given individual may be more likely to think that the firm has committed an act that justifies punishment. Also, the cost of boycotting might also depend upon N . If many people participate in the boycott, the ensuing reduction in demand for the product could reduce its price and increase the price of substitute goods. In general, therefore, the distribution of $c_i(N)/\theta_i(N)$ may vary with N . But for any given N , we can – still without loss of generality – order the agents according

to their value of c_i/θ_i , denote the cdf by $F_N\left(\frac{c}{\theta}\right)$, and proceed as in Section 5 below.

⁶ This is a natural way of representing expectations if there is a false consensus bias – that is, if each agent truly believes she is typical. By contrast, if agents infer information about the true distribution from their type, and recognize that others are doing the same, then they will expect others to have different conjectures. Fully rational agents would then have to form a conjecture about the set of conjectures of all other agents, and, in equilibrium, we would require that these conjectures about conjectures are also correct.

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