

Misery loves company: social influence and the supply/pricing decision of popular night clubs*

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Abstract

This paper offers an explanation for why popular night clubs (restaurants) with excess demand (i.e., queues) do not raise prices or increase supply. Becker (1991) uses the social influence of a consumption externality or “bandwagon effect” to explain this puzzle. However, he admits that his explanation may be weak. In this essay, I present a formal analysis of Becker’s argument based on a *different* kind of social influence (i.e., misery loves company). I also offer an alternative explanation of why some night clubs (restaurants) are popular and others are not. While Becker (1991) includes market demand *and* the gap between market demand and supply as *separate* arguments in the customers’ demand function to explain why supply *and* price are not increased, I only include the gap between demand and supply in the customers’ utility function to explain both puzzles. Although the essay focuses on night clubs (restaurants), it should be seen as a contribution to the broader literature of why some markets apparently do not clear or why some goods are rationed.

Key words: cost of failure, excess demand, night clubs, social influence.

JEL Classification: D43, L13.

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1. Introduction

It is a common observation that two night clubs, located very close to each other, may experience different demands. One night club has long queues (excess demand) and the other night club has excess supply. However, the popular night club does not raise prices, although it has excess demand. It also does not increase supply (i.e., its capacity). Becker (1991) made a similar observation for popular restaurants. He offers an explanation for this puzzling phenomenon. He argues that this is due to the fact that a consumer's demand for some goods depends on the demands by other consumers. Becker (1991, p. 1110) writes “[s]uppose that the pleasure from a good is greater when many people want to consume it, perhaps because a person does not wish to be out of step with what is popular...” He shows that with this consumption externality, the demand curve for the popular restaurant may have an inverted-U shape. If the maximum price attained is at a demand level exceeding the restaurant's capacity, then it is not optimal to increase price although there is excess demand.¹

Becker's (1991) answer to why supply is not increased is the following “... aggregate demand depends not only on price and aggregate demand but also positively on the gap between demand and supply... [g]reater supply might not pay because that lowers the gap and, hence, the optimal price available to a producer.” Becker (1991, p. 1115) then notes that “... entering the gap into the demand function to explain why supply does not increase appears to be an ad hoc invention of a “good” to solve a puzzle. Therefore, I do not want to overemphasize the importance of the gap between demand and supply, although I do believe that it is sometimes relevant.”

¹In a model with two restaurants, Karni and Levin (1994) examine Becker's model. In particular, they provide micro foundations for the demand function used by Becker (1991).

In this paper, I use the psycho-sociological phenomenon of “misery loves company” to explain why a popular night club might not increase its price and/or supply in the face of excess demand. Unlike Becker (1991), I provide a formal and explicit micro analysis of why supply is not increased. Also, while Becker (1991) and Karni and Levin (1994) claim that a restaurant is popular because people believe or think that it will be popular, I provide an alternative explanation which argues that a night club (restaurant) is popular because it offers a bigger surplus. Finally, while Becker (1991) includes market demand *and* the gap between market demand and supply as *separate* arguments in the customer’s demand function to explain why supply *and* price are not increased, I only include the gap between demand and supply in the utility function to explain both puzzles.

It is important to note that although this paper focuses on the pricing behavior of night clubs, it should be seen as a contribution to the broader literature on why markets might not clear or why some goods are rationed.² Indeed, “night clubs” could be replaced with “restaurants” without affecting the substance of the analysis.³ The paper is also a contribution to recent literature which shows how psycho-sociological ideas can improve our understanding of puzzling economic behavior [see Akerlof (1982, 1984), Akerlof and Kranton (2000) and Rabin (1998)].

The paper could be viewed in two ways: (1) To explain why night clubs (restaurants) with excess demand do not increase price or supply, given that their patrons are subject to the social influence of “misery loves company” and/or (2) How would a

² Of course, the papers by Becker (1991) and Karni and Levin (1994) fall in this category.

³ However, I focus on night clubs because the application of “misery loves company” to the phenomenon of interest is probably more relevant to night-club patrons than restaurant patrons.

firm with excess demand adjust its price/supply *if* its customers are subject to the social influence of “misery loves company”? In what follows, I focus on (1) but the reader may choose to focus on (2) instead. The latter objective is less challenging.

The paper is organized as follows: the next section presents Becker’s analysis. Section 3 presents my model based on the psycho-sociological idea that a person who attempts to gain entry to a popular night club but is unable to do so incurs a psychic cost of failure which is decreasing in the number of other patrons (customers) who were also unable to go to the popular night club (i.e., misery loves company). An alternative social influence (with no “misery loves company”) is briefly examined in a sub-section. Section 4 concludes the paper.

2. Becker’s Analysis

Let Q be the aggregate demand for a good and $q_i(p, Q)$ be the demand of the i -th consumer, where p is price. Then $Q = \sum q_i(p, Q) = F(p, Q)$, where $F_p < 0$ and $F_Q > 0$. The idea that individual demand is increasing in the demand of others explains why $F_Q > 0$. Totally differentiating $Q = F(p, Q)$ gives $dQ = F_p dp + F_Q dQ$. Rearranging gives $dp/dQ = (1 - F_Q)/F_p$. If $F_Q > 1$, an increase in aggregate demand will increase the demand price. Hence the demand curve may have a positive slope. Indeed, if $F_Q > 1$ for all $Q < Q^*$, $F_Q = 1$ for $Q = Q^*$ and $F_Q < 1$ for $Q > Q^*$, then the demand curve has an inverted-U shape where the price hits its peak at $Q = Q^*$. Suppose aggregate supply is *fixed* at $S < Q^*$. Then the optimal price occurs at the peak where there is excess demand but the supplier has no incentive to increase the price because that is the maximum price that he could charge. A higher price will lead to a fall in demand.

To explain why supply is not increased, Becker (1991) re-specifies the demand function as $q_i = (p, Q, Q/S)$. That is, consumers do not only care about aggregate demand but they also care about the gap between aggregate demand and aggregate supply. He then argues, as stated in the previous section, that this may explain why supply is not increased. This is because if individual demand is increasing in the gap between supply and demand, then increasing supply will reduce each consumer's demand and hence aggregate demand resulting in a fall in the price that the supplier can set.

This paper presents a game-theoretic analysis of Becker's arguments based on a different social influence (misery loves company).

3. The model

Suppose there are $M+1$ night clubs. By assumption, one night club is popular and the M identical ones are unpopular. I shall return to this assumption.

Suppose B is the benefit to a patron (customer) when he goes to the popular night club. This, among other things, includes the material benefit of going to a night club (for example, dancing to music) and the benefit from the quality of service (i.e., the quality of the Disc Jockey, how spacious the dance floor is, etc). Let the entry price (hereafter price) at the unpopular night club be p and the cost of serving a patron be c . The surplus from going to this night club is $B - p$. I normalize the surplus from an unpopular night club to zero. Let E be the number of patrons that the popular night club will admit. This is the night club's supply.

A potential patron who made an attempt to enter the popular night club but failed incurs a cost of $D = \theta + g(N^f)$ where N^f is the number of patrons who were unable to

enter the popular night club; $g(N^f) < 0$ for $N^f > 0$ (i.e., excess demand) but $g(N^f) = 0$ for $N^f \leq 0$. I interpret $\theta \geq 0$ as an exogenous psychic cost of failing to gain entry to the popular night club; this may be due, among others, to feelings of disappointment.⁴ I assume that θ is commonly known to be distributed on $[\underline{\theta}, \bar{\theta}]$ with cumulative distribution function $F(\theta)$ and associated density $f(\theta) > 0$ for all $\theta \in [\underline{\theta}, \bar{\theta}]$; θ is a patron's type. My key assumption is that D (the cost of failure) to a patron is decreasing in the measure of patrons refused entry (i.e., $\partial D / \partial N^f = \partial g / \partial N^f < 0$). This reflects the idea that it is easier to deal with failure when the number of people who have also failed is higher. As Hoyle et. al (1999, p. 106) write “[b]y concluding that plenty of other people are just like them, people who believe they possess negative attributes can feel better about themselves.”⁵ Indeed, the saying that “misery loves company” captures this behavior. In a recent paper, Akerlof and Kranton (2000) show how one's sense of identity or self-esteem affects behavior and helps to explain many economic phenomena.

It is also important to note that there are other social influences in addition to the social influence identified in this paper. For example, no one likes to go to an empty night club nor to an over-crowded night club. This means that, within some limits, the benefit of going to a night club is increasing in the number of other night club-goers. This is the social influence that Becker (1991) considers. I discuss this social influence later. Indeed, since Veblen (1899) and Leibenstein (1950), it has been widely recognized that social influence plays a role in individual consumption decisions.

⁴ These patrons set themselves a task (i.e., go to the popular night club). They incur this cost because they have failed to accomplish the task they set themselves.

⁵ Indeed, since failure tends to have an adverse effect on one's self-esteem, using the failures of others to counteract this adverse effect is one of the many self-enhancement mechanisms discussed in Hoyle et. al (1999, chapter 6).

The negative relationship between the cost of failure and the number of (other) agents who have also failed is somewhat similar to the negative relationship between the cost of deviating from a social norm and the number of (other) agents who have also deviated from the norm in Akerlof (1980). Also Lindbeck, Nyberg, and Weibull (1999) assume that an agent's disutility of not working (due to "welfare stigma") is decreasing with the number of (other) unemployed agents in the economy [see also Besley and Coate (1992)].

Note that a disappointed patron does not have to personally know or socially interact with other disappointed patrons for this social effect to work. This social effect could work by only knowing the "number" (not necessarily the identity) of other disappointed patrons. This is similar to Becker (1991) for in his model it is an individual's knowledge of other consumers' demand which affects his demand; he does not have to know these other consumers. A similar interpretation is implicit in Besley and Coate (1992) and Lindbeck, Nyberg, and Weibull (1999). Hong, Kubik, and Stein (2001) examine a model with a much stronger social influence. They find that social households – defined as those who interact with their neighbors, or who attend church – are substantially more likely to invest in the stock market than non-social households, controlling for other factors like wealth, race, education, and risk tolerance. They argue that an investor may get pleasure from talking about the ups and downs of the market with friends who are also fellow participants. They suggest that participation in the stock market may be *partly* due to "misery loves company".

I assume that a patron who is unable to enter the popular night club can always gain entry to an unpopular night club and get a zero surplus. Since I focus on situations

where demand exceeds supply, there has to be some rationing. As in Becker (1991), I assume that if there is excess demand the method used to ration demand is costless (e.g., a lottery system). Let π be the probability of gaining entry into the popular night club and N be the measure of patrons who want to enter the popular night club. N is the demand for the popular night club. Therefore $N^f = N - E$ if $N > E$ and $N^f = 0$ if $N - E \leq 0$. The probability of entering the popular night club is $\pi = E/N$, if $N \geq E$; it is equal to 1 when $N < E$. I assume that there is a capacity constraint, \bar{K} . Therefore, $E \leq \bar{K}$. Since I normalize the total measure of potential patrons to 1, I require $\bar{K} < 1$ for this capacity constraint to possibly bind.⁶

If $p = B$, I assume that the night clubs split the market equally or each gets a share of $1/(M+1) < 1$. If $p < B$, there must be excess demand. Assume otherwise, or $B - p > 0$ and $N = E$. Then $\pi = 1$ and no patron is disappointed. But if the night club is popular because it offers a bigger surplus and all the patrons have the same valuation, B , for this night club then there is no reason why only $N = E$ patrons will show up. Consider an equilibrium where $N = E$ and $p < B$. A patron who is not participating in the lottery has to decide whether to show up at the popular night club or go to an unpopular night club which offers a smaller surplus. It is easy to argue that there will be patrons, with sufficiently low θ 's, who will rather go to the popular night club hoping that there is some probability of getting a bigger surplus compared to the certainty of getting a smaller surplus at an unpopular night club. The participation of these patrons will result in excess demand.

⁶ Carleton (1991), DeSerpa and Faith (1996) and Glibert and Klemperer (2000) also assume a capacity constraint. These papers explain why price does not increase but do not explain popularity or why supply does not increase.

Suppose the popular night club sets $p = B$. Then $N = E = 1/(M+1)$, since it splits the market with the other night clubs which are also offering a zero surplus. However, it does not make sense to do this because by setting a price marginally below B , it experiences excess demand and hence a discontinuous jump in the number of patrons that it can admit. I assume that it is not optimal for the popular night to set $B = p$, because M is sufficiently large such that $1/(M+1)$ is very small.

It is also not optimal for the night club to hold excess capacity. If it intends to admit E patrons, then it will install a capacity of E . Also, I require a capacity constraint because without that the model cannot possibly explain why supply is not increased. For any $c < p < B$, the night club can increase profit by increasing capacity to 1, admit $E = 1$ patrons with no patron incurring a cost of failure.

Suppose that the cost of failure as a result of being chosen in the lottery but failing to actually enter the popular night club is the *same* as the cost of failure as a result of not being chosen in the lottery. This means that the cost of failure, D , is actually the cost of failing to enter the popular night club, given that an effort was made to do so. How one failed does not affect this cost.⁷

A patron's payoff is $(0 - D)$ if he made an attempt to enter the popular night club but *failed* to do so. If he enters the popular night club, his payoff is $B - p$. His payoff if he goes to an unpopular night club *and* did not participate in the

⁷ This assumption is not crucial to the analysis. The analysis will still go through if the exogenous cost of failure as a result of being chosen in the lottery but failing to actually enter the popular night club is $\beta\theta$ for a patron of type θ , where $\beta < 1$ is a positive constant (i.e., this cost is smaller than the exogenous cost, θ , of *not* being chosen in the lottery).

lottery⁸ for entry into the popular night club is zero.

For now, I treat the price of the unpopular night club as exogenous. Consider the pricing decision of the popular night club. As in Becker (1991) and Karni and Levin (1994), I assume that the night club is restricted to charging a single price. I model the game as a three-stage game. The sequence of actions is as follows:

Stage 1: Night club announces E and p . The night club can commit to E and p .

Stage 2: Patrons decide whether or not to go to night club. Of those who decide to go, they join a lottery where E of them are randomly chosen.

Stage 3: A successful patron pays to go to the night club.

I solve the game backwards. Consider stage 3, where N , p and E are known. Let the marginal patron who pays to enter the popular night club be of type $\theta = \theta_L$. A *successful* patron's payoff when he goes to the club is $B - p$. If he does not, he incurs a cost of failure, $D(N, E, \theta) = \theta + g(N - E)$, where θ is his exogenous cost of failure. Hence he will pay to go to the night club if $B - p \geq 0 - [\theta + g(N - E)]$. The marginal patron, θ_L , who pays to go to the night club satisfies this with equality. So

$$\theta_L(N, p, E) = p - g(N - E) - B.$$

In stage 2, each patron knows p when deciding whether or not to participate in the lottery for entry into the night club. Given excess demand, the probability of winning the lottery is $\pi = E/N$. A patron of type, $\theta \geq \theta_L$, will join the lottery if

$$\pi(B - p) + (1 - \pi)[0 - D(N, E, \theta)] \geq 0. \quad (1)$$

⁸ I use the word "lottery" for the sake of exposition. What matters is that the method of rationing demand is costless. Indeed, the analysis still goes through if there is an exogenous fixed cost associated with the method of rationing demand. Also, by assuming a lottery I abstract from the problem of modeling the queuing process which determines entry into the night club. Indeed, the queuing process for night clubs *could* be described as a quasi-lottery because being first in the queue does not necessarily mean that one will be chosen before someone at the back of the queue is chosen.

The marginal patron, $\hat{\theta}$, satisfies (1) with equality. Hence we get

$$\hat{\theta}(N, p, E) = \frac{(B - p)E - (N - E)g(N - E)}{N - E} \quad (2)$$

Patrons with $\theta > \hat{\theta}$ will not join because their cost of failure is too high. Also patrons with $\theta < \theta_L$ will not join the lottery because such patrons will not be willing to pay p even if they won the lottery. For such patrons, $B - p < 0 - D$. Someone might argue that they will join just to fail and get $0 - D > B - p$.⁹ This argument crucially depends on whether these patrons can lie to themselves that they have failed, given that they had no intention of succeeding in the first place. Suppose they cannot lie to themselves. Then they cannot join the lottery to fail because they will not get $0 - D > B - p$. They will get 0. But if they get zero from failure and $B - p > 0$ from success, their expected payoff is greater than zero. So they will join the lottery. But then the reason why they are joining the lottery is to get $B - p > 0$. This means that they are now joining with the intention to succeed. But should they fail, they get $0 - D > B - p$. So they will now join to fail. These contradictions in their behavior imply that they cannot *credibly* join the lottery with the intention of getting $B - p > 0$ and if they joined with the intention of failing they cannot get $0 - D$ either. Therefore they will not join the lottery.

⁹ An implication is that $D < 0$ in equilibrium for $\theta < \theta_L$. Since $g(N - E) < 0$, $D < 0$ is possible if these patrons have sufficiently low θ 's. That is, a patron of type $\theta < \theta_L$ gets a net benefit (not cost) when he fails to enter the popular night club. An individual may use the failures of others to *ex post* rationalize his own failures. The net effect of such rationalization may differ for different people depending on their type (i.e., θ). Thus D may be positive for some people but negative for others. Think about the following related situation. People sometimes make statements like this: "If I pass the exam or if my team wins, I will be happy. But if I fail the exam or my team loses, I will also be happy because I shall go to the pub to drink my head off". Such people know that they have what it takes to be happy if they fail. My claim is that such people have very low θ 's. These could be patrons who show up at night clubs just to cause confusion and mischief. For the patron with $\theta = \theta_L$, $D < 0$ but $B - p = 0 - D$ in equilibrium.

Now suppose they can lie to themselves. They join the lottery without any intention of succeeding but can convince themselves that they failed and get $0 - D$. Since my model is one of complete information, everyone knows that these patrons will not go to the popular night club if they are chosen in the lottery. Hence serious patrons (i.e., those who join the lottery because they want to go to the popular night) *ignore* these patrons in their decision-making calculus. Thus any serious patron (i.e., a patron of type $\theta \in [\theta_L, \hat{\theta}]$) calculates his probability of success as E/N , where N does *not* include the patrons who join the lottery with no intention of going to the popular night club. If a serious patron is not chosen in the lottery, there is another random draw to fill all the spaces (if any) rejected by patrons with $\theta < \theta_L$. Then each serious patron has a probability, E/N , of entering the popular night club. Implicit in the above analysis is the assumption that the owner of the night club knows the measure of patrons who will join the lottery to fail but does not know their identity. Suppose instead the night club owner knows the identity of such patrons. Then when they join the lottery, he will not select them. So these patrons know that they will not be selected in the lottery. But they will join, get rejected, and get the payoff of $0 - D$.

It follows that only patrons with $\theta \in [\theta_L, \hat{\theta}]$ will join the lottery with the intention of entering the popular night club. Normalizing the total measure of potential patrons to 1, the measure of patrons who want to go to the popular night club is

$$N = \int_{\theta_L(N,p,E)}^{\hat{\theta}(N,p,E)} f(\theta)d\theta = F[\hat{\theta}(N,p,E)] - F[\theta_L(N,p,E)] \quad (3)^{10}$$

Since $\{F[\hat{\theta}] - F[\theta_L]\}$ is a continuous function of N mapping the unit interval $[0, 1]$ into itself, it follows that there is, at least, one solution (a fixed point) to (3). This gives

$$N^* = N^*(E, p) \quad (4)$$

The equilibrium measure N^* may not be unique and it may be less than E . For the sake of exposition, I assume that the equilibrium is unique and $N^* > E$. The latter assumption is probably not too strong. What I am interested in is the following: *given* excess demand why doesn't price and/or supply adjust? Later, I shall present an example which gives excess demand.

I shall now write the new functions $\hat{\theta}^*(E, p)$ and $\theta_L^*(E, p)$ using $N^*(E, p)$. In stage 1, the night club chooses p and E to maximize profit, $\Pi = (p - c)E$. To solve this problem, it is extremely helpful to investigate the properties of the night club's demand function $N^*(E, p)$. I can write (3) as

$$N^* = F[\hat{\theta}^*(E, p)] - F[\theta_L^*(E, p)] \quad (5)$$

Holding E fixed, we get

¹⁰ In Karni and Levin (1994) the demand for the popular restaurant (night club) is not a function of its capacity, because the customers do not consider the probability of entry to the popular restaurant (night club) when deciding which restaurant (night club) to patronize.

$$\frac{\partial N^*}{\partial p} = f(\hat{\theta}) \frac{\partial \hat{\theta}^*}{\partial p} - f(\theta_L) \frac{\partial \theta_L^*}{\partial p} \quad (6)$$

The derivative in (6) may be positive or negative. It is not surprising that it could be negative (i.e., downward-sloping demand). I shall explain why it could be positive (upward-sloping demand). Let's begin from a situation of excess demand for a given p and E . Suppose the night club increases its price. All things being equal some patrons with low θ 's will drop out of the lottery for entry into the popular night club. The measure of such patrons is $f(\theta_L)[\partial \theta_L^* / \partial p]$. This will cause N to fall. But a lower N implies that while the cost of failure has gone up, the probability of success has also gone up. If the increase in the probability of success is *sufficiently* high, then some patrons with high θ 's will now participate in the lottery. The measure of such patrons is $f(\hat{\theta})[\partial \hat{\theta}^* / \partial p]$. If $f(\hat{\theta})[\partial \hat{\theta}^* / \partial p] > f(\theta_L)[\partial \theta_L^* / \partial p]$, then demand will increase with the increase in the price.¹¹

This is exactly what equation (6) says. It is also possible that $f(\hat{\theta})[\partial \hat{\theta}^* / \partial p] < f(\theta_L)[\partial \theta_L^* / \partial p]$, in which case demand will fall. The main point of this analysis is the following: for a given E , the demand curve could have an upward-sloping segment. It could be an inverted U-shape over some price range as in Becker (1991) or it could be U-shaped. Suppose at the peak (i.e., p^*) of this demand curve, $N^* > E$. Then, as in Becker (1991), the optimal price occurs at the peak where there is excess demand but the supplier

¹¹ It is also possible that patrons with high θ 's will drop out and patrons with low θ 's will enter the lottery, if price increases. The issue boils down to a patron's expectations of demand. However, given $\theta_L = p - g(N - E) - B$ and noting that $\partial g(N-E)/\partial N < 0$, the only scenario consistent with an increase in p and N is an increase in θ_L . Thus some patrons with low θ 's drop out when a price increase results in an increase in demand.

has no incentive to increase the price because that is the maximum price he could charge. A higher price will lead to a fall in demand.

For example, using $D = \theta - \gamma(N-E)^\alpha$, $f(\theta) = 2\theta$ on $[0, 1]$, $B = 1$, $\gamma = 6$, $\alpha = 2$ and $E = 0.5$, I find that the demand curve is U-shaped within the price range $[0.75, 0.7692]$ with a corresponding excess demand ranging from 0.2 to 0.32.¹² Outside this price range, one or both of the restrictions (i.e., $\theta_L^* \geq 0$ and $\hat{\theta}^* \leq 1$) is/are violated. Thus, given the restrictions $\theta_L^* \geq 0$ and $\hat{\theta}^* \leq 1$, the peak of the demand curve occurs at $p = 0.7692$. This means that the optimal price is $p^* = 0.7692$ with excess demand of 0.32.

Having explained why price may not increase, I need to explain why supply may not increase? An increase in supply could reduce the price that the popular night club can charge. The intuition behind this result is as follows: the higher is the cost of failure, the higher the price that a patron is willing to pay to enter the popular night club. An increase in supply may increase demand.¹³ If the increase in demand outweighs the increase in supply, then the measure, $N^* - E$, of disappointed patrons increases. This reduces the cost of failure and hence reduces the maximum price that the popular night club can charge. Therefore the maximum price that the popular night club can charge may fall if it increases supply. In other words, when supply is increased the peak of the demand curve could fall. This may reduce its profit which explains why the night club may not increase supply. This is shown in figure 1. When the supply is E_1 , total revenue is the area

¹² My thanks are due to Gordon Myers for this example.

¹³ When supply increases and N^* is constant, there exists customers with $\theta > \hat{\theta}(N^*)$ who will now want to join the lottery, because the probability of success rises. However, should a customer fail, he would belong to a smaller group of disappointed customers (i.e., $N^* - E$ falls). This latter effect will cause some customers not to join and even cause some existing lottery participants to drop out. However, if the increase in probability is sufficiently strong, then this effect will dominate and there will be an increase in demand.

$OP_1^* AE_1$. When the supply is $E_2 > E_1$, total revenue is the area $OP_2^* DE_2$. Suppose the cost of increasing supply is zero. Then supply will not be increased from E_1 to E_2 if $OP_1^* AE_1 > OP_2^* DE_2$. I do not have a specific example of this result, though.

Note that the demand curve could take several shapes. Figure 1 is just an example. What matters is that the demand curve has an upward-sloping segment.

3.1 Endogenizing the price of the unpopular night club.

A limitation of my analysis is the treatment of an unpopular night club's price as exogenous. One can endogenous the price as follows. Since the choice of going to the popular night club is no longer available for a patron who has failed, an unpopular night club can charge all disappointed patrons a maximum price of B . For (p^*, B) to be an equilibrium price combination, we require that an unpopular night club cannot undercut the popular night club. That is, p^* is less than the marginal cost of an unpopular night club. This means that the popular night club has a smaller marginal cost. One can simply assume that the marginal cost of an unpopular night club is equal to B . So necessarily they set $p = B$ and offer a zero surplus.

3.2 Explaining popularity

I have assumed that one night club is popular and the others are not. However, implicit in the discussion so far is the idea that one night club is popular because it offers a bigger surplus (i.e., $B - p^* > 0$). At the risk of belaboring the point, let me present a formal argument. Call the popular night club G and, for the sake of exposition, suppose there is one unpopular night club J . Consider the Nash equilibrium in section 3.1 For the patron

of type $\theta = \theta_L^*$, $(B - p^*) = 0 - D(N^*, \theta_L^*)$. If $D(N^*, \theta_L^*) < 0$, then $(B - p^*) > 0$ or $p^* < B$.

This means that if the probability of success in the lottery to G were 1, then given the prices set by the night club, a patron would rather go to G than to J since his payoff is higher. But since everyone prefers to go to G, this leads to an excess demand for G resulting in its popularity and hence the equilibrium in this paper.

In my model, the unpopular night club will offer a bigger surplus if $D(N^*, \theta_L^*) > 0$. I ignore this case because I cannot justify, in my model, why a night club offering a smaller surplus will be popular. However, I can justify a popular night club offering a smaller surplus in a slightly different model, if I use an argument similar to Becker (1991) and Karni and Levin (1994). Let's ignore "misery loves company". Suppose $(B - p^*) < 0$. If, for some reason, people think that the night club offering the smaller surplus will be popular, then we could get $(B - p^* + D'(N^* - E^*)) \geq 0$, where $D'(N^* - E^*)$ is the social benefit of going to the popular night club. Hence if a patron thinks that other patrons will patronize the "popular" night club, then he will also patronize this club. This means that the "popular" night club was just lucky (i.e., chance). In this case, popularity (or the lack thereof) has to be explained as the result of a self-fulfilling expectation.¹⁴ Indeed, Becker (1991, p. 1114) writes "[I]f consumers... lose confidence that other consumers want the good, demand will drop..." Karni and Levin (1994) reach a similar conclusion in the case of restaurants. As they note in the abstract of their paper "[t]he essential aspect of this analysis is the presence of a consumption

¹⁴ I have used the social influence in Becker (1991) to illustrate the *general idea* that some kind of consumption externality could be used to explain a night club's (restaurant) popularity. However, I shall formally show, in the next section, that my model cannot accommodate the *specific* consumption externality in Becker (1991).

externality that makes popularity itself a factor in the determination of ... relative attractiveness....” In my model, the popularity of a night club is not what determines its relative attractiveness; a night club is popular because it offers a bigger surplus [i.e., $B - p^* > 0$].¹⁵ Indeed, in Karni and Levin (1994), an equilibrium where the popular restaurant charges a higher price and hence offers a lower surplus is possible. As they note on page 832 “... the equilibrium of the ... game ... does not restrict the relative prices in the two restaurants...”

It is important to note that, as in Becker (1991) and Karni and Levin (1994), the equilibrium in my model is also based on the expectations of patrons about the demand for the popular night club (or unpopular night club). However, I am inclined to argue that my model offers a justification for why these patrons will expect a night club to be popular in the first place (i.e., why such patrons will have such expectations). In spite of this, I am sympathetic to the explanation in Becker (1991) and Karni and Levin (1994) since chance or luck does play a role in the real world. Indeed, it is possible that the popular night club offers a smaller surplus currently, but it is still popular because it *used* to offer a bigger surplus (in the past). People then expect this night club to be popular today because it was popular in the past. Hence history (i.e., past glory) might influence today’s expectations about a night club’s popularity.

3.3 Becker’s social influence

In this section, I shall formally show that using Becker’s (1991) social influence does not permit an analysis of the kind in this paper. As in Becker (1991) suppose the

¹⁵ Note that the popular night club is able to offer a bigger surplus because it is more efficient (i.e., has a smaller marginal cost).

benefit of going to the popular night club is an increasing function of the gap between demand and supply, $N - E$. Suppose $D' = v(N - E) > 0$ is the social benefit of going to the popular night club and $\partial D' / \partial(N - E) = v > 0$. Assume that there is a common exogenous cost, $\Omega > 0$, of failing to enter the popular night club but there is no endogenous component (i.e., no misery loves company). Suppose that v is distributed on $[\underline{v}, \bar{v}]$ with positive density. In the lottery stage the marginal patron of type, \hat{v} , will satisfy $\pi(B - p + \hat{v}(N - E)) + (1 - \pi)[0 - \Omega] = 0$, where $\underline{v} < \hat{v} < \bar{v}$ such that *only* patrons of type $v \geq \hat{v}$ will participate in the lottery. Then, in the post-lottery stage, the marginal patron (i.e., the patron of type \hat{v}) at the popular night club must satisfy $(B - p + \hat{v}(N - E)) = (0 - \Omega)$, which gives $p = B + \Omega + \hat{v}(N - E)$. Putting this into $\pi(B - p + \hat{v}(N - E)) + (1 - \pi)[0 - \Omega] = 0$, in the lottery stage, gives $\pi(0 - \Omega) + (1 - \pi)[0 - \Omega] = 0$ which is true if $\Omega = 0$. But since this equation is independent of \hat{v} I am unable to pursue the analysis in the previous sections. Note that this conclusion this does not depend on social benefit being a linear function of the gap between demand and supply. Also, this conclusion does not imply that there is something wrong with Becker's social influence. It only means that my model cannot accommodate Becker's social influence.¹⁶

¹⁶ Note that when we use Becker's social influence, the marginal patron in the lottery stage is the *same* as the marginal patron in the post-lottery stage. It is as though we have two equations determining one unknown variable (i.e., the marginal patron in each stage). In contrast, when we use "misery loves company", the marginal patron in the lottery stage is *different* from the marginal patron in the post-lottery stage.

4. Conclusion

I have shown that when a popular night club or restaurant increases supply, this may reduce the price that it can charge. This was Becker's (1991) conjecture for why supply may not be increased. But as noted above, he admits he did not provide a good model which generates this conjecture. Using the psycho-sociological phenomenon of "misery loves company", this paper confirms Becker's (1991) conjecture by providing an *explicit* micro analysis of the behavior of the patrons and the night clubs (restaurants). The paper shows how increasing supply could reduce the night club's optimal price. I also provide an alternative justification for why a patron might care about the gap between demand and supply; the gap may affect the cost of failing to enter the popular night club.

This paper also provides an explanation as to how one night club becomes popular and the other unpopular; the popular night club offers a higher net surplus than the unpopular night club. This is an alternative to the explanation of Becker (1991) and Karni and Levin (1994) which is based on the idea that a night club is popular because people expect it to be popular.

Also, a contribution of this paper is that while Becker (1991) includes market demand *and* the gap between market demand and supply as *separate* arguments in the patron's demand function to explain why supply *and* price are not increased, I only include the gap between demand and supply in the utility function to explain both puzzles. Note that Karni and Levin (1994) do not consider why supply is not increased. In their model, the demand for the popular restaurant is not a function of its capacity because the customers do not consider the probability of entry when deciding which

restaurant to patronize. Finally, this paper has shown that psycho-sociological ideas can shed light on puzzling economic phenomena.

Karni and Levin (1994) assume that the restaurants (night clubs) are identical (i.e., have the same cost). I assume that the night clubs have different costs. However, I do not need a big difference in costs for my analysis to hold. The analysis will still go through if the difference in costs is very small.

It is not correct to argue that θ is analytically equivalent to an exogenous time cost of queuing. For time cost to lead to the same results in this paper, it must matter both in the queuing stage and in the post-queuing stage. However, in the post-queuing stage any time cost of queuing must be sunk and hence should not matter. If it matters, then the only way one can rationalize this is that the patrons care about sunk costs. But then one would have to appeal to some “psychological” behavior regarding sunk costs which will not be different from interpreting θ as some exogenous cost of failure. In other words, the model in this paper could be seen as one in which agents care about what economists usually refer to as sunk costs. Economists have long argued that sunk costs should not affect behavior but in reality it does (see Carmichael and MacLeod (2000) and Parayre (1995)). If people care about sunk costs, then a person’s valuation of a good is affected by the process through which the good is acquired. Hence when a person, for example, incurs a search cost he will not treat it as sunk when he has to decide whether or not to buy the good. It is also for the same reason that agents who have won the lottery for entry into the popular night club still take into account the cost of failure when determining whether or not to go into the club. It is this concern for sunk costs that the night club takes into account when setting its price. In equilibrium, they go to the night club though.

One can understand why some economists would not like the idea of sunk costs affecting behavior because it leads to some kind of endogenous or changing preferences. However, if sunk costs really matter to people, there is no compelling reason why they ought to be ignored.

A patron with high θ who failed in the lottery stage could bribe a patron with a lower θ who was successful. I do not consider this possibility because night clubs do not allow this. A patron who is allowed into the club cannot sell his right of entry to another patron. Night clubs always reserve the right to determine who enters the night club.

By identifying a different type of social influence, my model and Becker's (1991) suggest that social influence can explain why popular night clubs and restaurants, successful Broadway theaters, successful sporting events and other similar activities do not increase price and/or increase supply in the face of persistent excess demand. Indeed, Akerlof (1980) used some kind of social influence to explain why wages may not fall in the face of excess supply in labor markets (i.e., involuntary unemployment).^{17,18} Of course, one can think of other relevant social influences in my model. However, these social influences will not change the basic results of this paper; they will just be variations on a theme.

¹⁷ Of course, there are other explanations such as the behavior of unions and efficiency wages for the existence of non-market clearing wages in labor markets.

¹⁸ Social influence has also been used, among others, by Bernheim (1994) and Lazear and Kandel (1992) to examine issues like conformity and incentives in partnerships.

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Figure 1: A demand curve with an upward-sloping segment

