

Contesting Contestability and the Efficiency of Wages

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Abstract

The fundamental contribution of the paper is to contest the view that greater market contestability has non-negative effects on market performance. In a model where employees pose a threat of potential entry, we demonstrate that a reduction in barriers to entry causes no fall in industry price when incumbents are able to buy-off potential entry through higher wages. Over the longer term the analysis illustrates that increased market contestability can cause equilibrium industry price to be higher than that which would have occurred if entry barriers had persisted at their initial higher level. Correspondingly, the model indicates that investment in endogenous barriers to entry and wage ceilings on executive salaries may enhance market performance.

Key words: barriers to entry, market contestability, antitrust regulation, executive salaries

JEL Classification: L12, L13, K21, L41, L51

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1 Introduction

An increase in firm rivalry need not always result in greater economic welfare (see for example, Salop (1979) and Dasgupta and Stiglitz (1980)). However, the more familiar, and from a policy perspective, influential depictions of less than perfectly competitive markets demonstrate that an increase in firm rivalry can enhance both competitiveness and economic welfare. Within this framework, it is held that reductions in barriers to entry and exit to an industry cannot retard market performance. That is, an increase in market contestability is likely to result in a fall in the market price and at the very least have no effect. As we know, if a reduction in barriers to entry causes actual entry then it is pro-competitive. Furthermore, the insights on market contestability offered by Baumol *et al* (1982, 1983) and Baumol and Willig (1986) argue that potential entry can also exert a similar influence on market price.

While the generality of contestable market theory has been challenged (for example, see Schwartz and Reynolds (1983), Graham *et al* (1983), Fudenberg and Tirole (1984), Bailey *et al* (1985), and Moore (1986)) it is frequently referred to by industry regulators as a possible beneficial side effect of a policy initiative to increase market contestability when no subsequent entry actually occurs. In this context the notion of imperfect market contestability is often invoked (see Morrison and Winston (1987)). In general, regulation induced reductions in barriers to entry are often justified along the lines that if they cause actual entry then by definition, they increase competition, whereas if they do not incite actual entry incumbents may behave more competitively if they feel threatened by potential entry. In sum, a ‘rule of thumb’ for industry regulators arises which states that increasing market contestability cannot retard market performance and is likely to enhance it.

In this paper we argue that reductions in barriers to entry and exit may retard market performance in markets where increased firm rivalry enhances market performance. We,

therefore, advise against a ‘rule of thumb’ approach to the regulation of barriers to entry. In a model where an incumbent’s employees pose the only threat of entry, reductions in barriers to entry may result in increased salaries rather than an increase in actual entry. We show that in the short run increased market contestability may result in higher salaries and no entry. Over a longer time horizon reductions in barriers to entry may cause firms to limit the number of employees in the knowledge that increased contestability will translate into increased salaries. In this case increased market contestability causes higher prices and lower output. In other words, reductions in barriers to entry may retard market performance.

The basic intuition behind our result rests on the concept that production technology and entrepreneurial ideas are knowledge which may be disseminated through employment. Specifically, an incumbent’s employees often represent the most credible potential entrants having a detailed knowledge of production technology, and both output and factor markets. This may be particularly so for employees (most likely senior executives) who have sufficient entrepreneurial ability to credibly enter and compete with an incumbent.

In such circumstances it would be surprising if incumbents did not attempt to mitigate against potential entry by offering higher salaries or share options to such employees. Indeed, both of these practices are common and even in the case of small firms, share options to senior employees are not unusual. Thus, incumbents can affect the threat of entry if potential entrants are most usually its own employees. A form of rent seeking emerges where employees, who are also potential entrants, are offered a share of monopolistic profits in return for a decision not to enter the market. Therefore, when assessing the impact of market contestability on a firm’s labor hiring decision, one would expect a negative relationship between labor costs and barriers to entry and exit. Recognizing this, an incumbent may decide to curtail the number of employees (its scale of entry), hence reducing output. Thus low entry barriers may cause an inefficient initial labor hiring decision, resulting in higher

prices.

Finally, the analysis also contributes to research on endogenous barriers to entry. There investment in the creation of barriers to entry is attributed to a desire to create monopolistic power. In other words, it allows firms to charge monopolistic prices. In this paper we link barriers to entry to labor costs and thereby offer a further reason why firms might raise barriers to entry. Namely, to reduce labor costs. This incentive is increasing in the number of employees hired. To the extent that reductions in labor costs provide scope to enhance market performance, the model indicates some positive economic welfare features to what is usually a draconian depiction of endogenous barriers to entry.

The paper has two remaining parts. In the next section we outline the model and in the conclusion we discuss its wider ramifications.

2 A model of employee entry

Consider an incumbent monopolist who employs n employees who have the wherewithal, skill, resources, enthusiasm, foresight, etc., (e.g., senior executives) to potentially enter the market and compete with the incumbent. Generally, one might want to denote such attributes as entrepreneurial ability (for example, Evans and Jovanovic (1989)). Further suppose that these employees are the only source of potential entry to this market and that there are sunk cost barriers to entry of magnitude F . Thus, factors such as license fees, costs of incorporation, and an incumbent's reputation for quality and reliability of product supply (whether actual or perceived) may require entrants to incur costs to allow access to the market. In some cases it may be necessary for an incumbent to invest resources specifically for the purpose of raising entry costs (for example, excessive advertising) while in others specific

investment is not necessary when barriers to entry are a natural externality of production (for example, consumer goodwill).

We assume that each individual has a defined level of ability. Therefore, we let the incumbent's (I) and employees' (E) skills and abilities be summarized by differentiable cost functions $C_I(\cdot)$ and $C_E(\cdot)$ with $C_I(0) = C_E(0) = 0$ and $C'_I(q), C'_E(q) > 0$. Although allowing asymmetry among employees would be more realistic, it introduces many difficulties. This will be further discussed in the Section 2.3. Finally, if entry occurs, firms behave as homogeneous good Cournot competitors with inverse demand function $P(\cdot)$.

In the foregoing analysis we will examine two scenarios. Initially, we will assume that the incumbent does not have discretion over the level of barriers to entry and that these are determined by an industry (antitrust) regulator. For example, limiting advertising expenditure, or practices such as discount cards to loyal customers, aimed at increasing consumer switching costs. We will then discuss the implication of a more *laissez faire* environment where incumbents are free to invest in barriers to entry.

2.1 The short run

We assume that Cournot competition occurs if an employee chooses to enter the market. In this case the incumbent and the entrant would earn respective profits of:

$$\pi_I^c = P(q_I^c + (n-1)q_E^c + q_E^{c*})q_I^c - C_I(q_I^c) - (n-1)C_E(q_E^c) \quad (1)$$

$$\pi_E^{c*} = P(q_I^c + (n-1)q_E^c + q_E^{c*})q_E^{c*} - C_E(q_E^{c*}) - F \quad (2)$$

where q_I^c and q_E^c are the equilibrium profit maximizing outputs for the incumbent and her employees and q_E^{c*} is the entrant's equilibrium profit maximizing output.

On the other hand, the incumbent can always pay that employee π_e^{c*} to prevent entry.¹ In a Nash equilibrium, the incumbent cannot pay less than π_e^{c*} and prevent entry. To see this, suppose that in equilibrium, the incumbent paid $w < \pi_e^{c*}$ and no employees chose to enter. Any given employee would have an incentive to enter since as long as all other employees followed their equilibrium strategy of not entering, she could earn π_e^{c*} rather than the wage w , offered by the incumbent. Thus if the incumbent chooses to prevent any entry, her profits π_I^j are:

$$\pi_I^j = P(q_I^j + nq_E^j)(q_I^j + nq_E^j) - C_I(q_I^j) - nC_E(q_E^j) - n\pi_E^{c*} \quad (3)$$

Since monopoly profits are always greater than the Cournot duopoly profits, it will pay the incumbent to completely subsume entry as long as $\pi_I^j \geq \pi_I^c$. It is clear that π_I^j is falling in n and therefore, the likelihood that the incumbent completely subsumes entry falls as n increases.

Note that alterations in F change employee salaries which enter the incumbent's profit function as a constant. The greater the prospective rewards for an entrant, the more the incumbent must pay an employee in order to prevent entry. Thus, given some set of employees, when the incumbent completely subsumes entry, small changes in F will not affect the incumbent's profit maximization problem. Therefore reducing entry barriers do not necessarily put downward pressure on prices.

¹For simplicity, we assume that employees will never choose to enter the market as a coalition. This will be true as long as returns to scale are not strongly decreasing. To see this, note that although the duopoly profits of a coalition of employees is no less than the duopoly profits of a single employee, as long as the cost benefits of a coalition of employees is not too great (returns to scale are not decreasing too strongly), $\pi_E^{c*} > [P(\hat{q}_I^c + (n - \hat{n})\hat{q}_E^c + \hat{n}\hat{q}_E^{c*})\hat{n}\hat{q}_E^{c*} - \hat{n}C_E(q_E^{c*})]/\hat{n}$ for any coalition, $\hat{n} \geq 2$ and thus employees would always prefer to enter alone.

Proposition 1 *For a given number of employees, if employees represent the only threat of entry, it will be profitable to subsume potential entry as long as fixed entry costs, F , are sufficiently large or as long as n is not too large. If the incumbent does find it profitable to subsume entry, a small reduction in barriers to entry will have no effect on industry price and economic welfare.*

Thus the effectiveness of reductions in barriers to entry hinge closely on a relatively abundant supply of entrants, n . If entrepreneurs are scarce, attempts at increasing market contestability may have no effect on industry performance but merely cause an increase in executive salaries. For example, in a market where potential entrants sometimes face liquidity constraints (Evans and Jovanovic, 1989, Holtz-Eakin *et al*, 1994 and Black *et al*, 1996), the more ‘biting’ are liquidity constraints, the greater the proportion of employees who have insufficient financial capital to credibly threaten entry, the lower the number of employees the firm must pay a single entrant’s Cournot profits.

2.2 The long run

In the long run, lowered entry barriers could in fact result in higher prices. In particular, suppose a firm who is considering the option of establishing itself within a new market realizes that its employees will need to be paid a single entrant’s duopoly profits. Recognizing this, the firm would rationally restrict its initial scale of entry through the number and choice of employees. Using the above framework, define π_I^j as a function of the number of employees.

$$\begin{aligned} \pi_I^j(n) &= P(q_I^j(n) + nq_E^j(n))(q_I^j(n) + nq_E^j(n)) \\ &\quad - C_I(q_I^j(n)) - nC_E(q_E^j(n)) - n\pi_E^{c*}(n) \end{aligned} \tag{4}$$

The incumbent chooses n to maximize profits. Additional employees can give rise to cost savings but must be paid salary $\pi_E^{c^*}$.

2.2.1 Non-decreasing returns to scale

When returns to scale are either constant or increasing, the incumbent will clearly hire at most one employee. Furthermore, the incumbent will never hire an employee whose skills and abilities are inferior to her own. Hence when the employee is technically superior to the incumbent, the incumbent's problem is simply a comparison of $\pi_I^j(0)$ and $\pi_I^j(1)$. Thus if

$$P(q_I^j(1) + q_E^j(1))(q_I^j(1) + q_E^j(1)) - C_I(q_I^j(1)) - C_E(q_E^j(1)) - \pi_E^{c^*}(1) > \quad (5)$$

$$P(q_I^j(0))q_I^j(0) - C_I(q_I^j(0))$$

the incumbent will prefer to hire an employee rather than produce on her own. Since the employee is more able than the incumbent and there are non-decreasing returns to scale then $q_I^j(1) = 0$ and hence the above simplifies to

$$[P(q_E^j(1))q_E^j(1) - C_E(q_E^j(1))] - [P(q_I^c(1) + q_E^{c^*}(1))q_E^{c^*} - C_E(q_E^{c^*}(1)) - F] > \quad (6)$$

$$P(q_I^j(0))q_I^j(0) - C_I(q_I^j(0))$$

Since the employee is more cost efficient than the incumbent, it is clear that the first bracketed term on the left hand side is strictly larger than the term on the right hand side. Thus only if the second bracketed term on the left hand side is sufficiently small will the inequality hold. But the second bracketed term will be relatively small if the barriers to entry, F , are large. Thus, when deciding on her scale of entry, the incumbent will produce on her own, less efficiently, if F is too small. As a result, if F is reduced sufficiently, the price will actually

rise.

Proposition 2 *When returns to scale are non-decreasing, the incumbent will hire at most one employee. Furthermore, the incumbent will hire an employee only if the employee is more efficient than the incumbent and if entry barriers are sufficiently large.*

2.2.2 Decreasing returns to scale

For this discussion, assume for simplicity that $C_I(q) = C_E(q) \equiv C(q)$. For each $n = 0, 1, 2, \dots$ define $C_n(Q)$ to be the minimum cost of producing Q units of output when the incumbent has hired n employees. That is,

$$C_n(Q) = \min_{q_i} \left\{ \sum_{i=0}^n C(q_i) \right\} \quad (7)$$

subject to: $\sum_{i=0}^n q_i = Q$.

Since C is convex, it can be shown that

$$C_n(Q) = (n + 1)C(Q/(n + 1)) \quad (8)$$

It also follows from convexity that that $C_n(Q) > C_{n+1}(Q)$ and from (8) that $C'_n(Q) > C'_{n+1}(Q)$ for any n and any Q . That is, when there are decreasing returns to scale in incumbent and employee cost functions, the incumbent becomes more efficient as the number of employees increases.

The incumbent's equilibrium profits can now be written as:

$$\pi_I^j(n) = P(Q(n))(Q(n)) - C_n(Q(n)) -$$

$$n[P(Q^c(n) + q_E^{c*}(n))q_E^{c*}(n) - C(q_E^{c*}(n)) - F] \quad (9)$$

where $Q(n)$ is the incumbent's profit maximizing output when she has n employees. In order to be able to discuss comparative statics, assume that the profit maximizing number of employees n is unique. Now, in the limit as n becomes large, C_n approaches a cost function with constant marginal cost $C'(0)$. Thus the marginal cost savings of an additional employee approaches zero. Since the cost per employee is bounded below by $\lim_{n \rightarrow \infty} P(Q^c(n) + q_E^{c*}(n))q_E^{c*}(n) - C(q_E^{c*}(n)) - F$,² at a profit maximum, the incumbent will choose some finite n . Since the cost per employee is declining in F , a reduction in F will result in an increase in the cost per employee and hence lead to a decline in the number of employees hired. If the number of employees falls, marginal costs rise ($C'_n(Q) > C'_{n+1}(Q)$) and therefore output must fall and prices must rise.

Proposition 3 *When returns to scale are decreasing, the incumbent will hire fewer employees, be less efficient, produce less output and charge a higher price in response to a reduction in barriers to entry, F .*

The assumption of symmetry in costs keeps the problem tractable. To see the difficulty when there are asymmetries, note that not only will the incumbent have to choose the number of employees to hire but will have to choose among employees of different skills and abilities. It is not necessarily the case that the incumbent will choose to hire the most efficient employees for reasons similar to those discussed above. That is, efficient employees will command a higher salary and thus the incumbent may prefer to hire less efficient employees.

²As n becomes large, the incumbent becomes more efficient and thus the potential entrant's Cournot profits fall.

2.3 Endogenous Barriers to entry

In the previous section we assumed that from the firm's perspective barriers to entry were exogenously determined. We now drop this assumption and move to a laissez faire market where firms are free to set F . Under normal assumption, barriers to entry are introduced by incumbents because they facilitate monopolistic pricing. To this end they detract from market performance. We now show that when employees pose the main threat of entry, endogenous barriers to entry may also be stimulated by a desire to reduce production costs. We argue, therefore, that the implications of Propositions 1 to 3 are such that incumbent investment in barriers to entry do not necessarily retard market performance and may even enhance it.

Therefore, we now suppose that F is defined as $F = F(D)$ where $F'(D) > 0$ and D is investment aimed at raising barriers to entry. Further assume that $F''(D) < 0$ or that there are decreasing returns to investing in entry barriers. In the short run when n is fixed equation (3) becomes

$$\begin{aligned} \pi_I^j = & P(q_I^j + nq_E^j)(q_I^j + nq_E^j) - C_I(q_I^j) - nC_E(q_E^j) - \\ & n(P(q_I^c + (n-1)q_E^c + q_E^{c*})q_E^{c*} - C_E(q_E^{c*}) - F(D)) - D. \end{aligned} \quad (10)$$

Profit maximizing D must satisfy

$$\frac{\partial \pi_I^j}{\partial D} = nF'(D) - 1 = 0. \quad (11)$$

Since $F'(D)$ is a decreasing function, the larger is the number of employees, the greater is investment in entry barriers. Thus the extent to which the incumbent is willing to trade-off a reduction in wage costs with increased expenditure on barriers to entry is increasing in n

and decreasing in the the cost of raising barriers to entry. In fact, this is a re-statement of Proposition 1 in that decreases (increases) in F may raise (lower) employee wages without a corresponding effect on industry output or price. Thus, Proposition 1 implies that endogenous barriers to entry may be motivated by a desire to reduce labor costs and that in such circumstances a reduction in market contestability may have no effect on industry output and price. Only in cases at the margin where such investment prevents actual entry will it entail an increase in industry price. Otherwise it merely causes a reallocation of value added from employees to shareholders.

Correspondingly, Propositions 2 and 3 indicate that in the longer run (when n is variable) endogenous barriers to entry may enhance market performance if they encourage firms in new markets to hire more workers. In these cases the reduction wages (induced by investment in endogenous barriers to entry) cause firms to hire more workers, produce more output and lower market price. In sum, investment in endogenous barriers to entry may enhance market performance.

3 Conclusion

The fundamental purpose of the paper was to question the generic presumption that greater market contestability cannot have negative effects on market performance. With many commonly used models of imperfect competition, reductions in barriers to entry are perceived as having a non-negative effect on market performance. Actual entry causes firms to behave more competitively and potential entry may have similar effects. This viewpoint continues to be highly influential in the formulation and practice of competition policy. It has encouraged antitrust regulators to pursue a generic policy of ‘barrier to entry busting.’ In the paper we

demonstrated that barriers to entry may enhance market performance and therefore, suggest a more discerning regulatory approach towards market contestability.

In the paper we analyzed the effect of a reduction in barriers to entry and exit in a market where the supply of potential entrants is treated as an endogenous variable. In a model of Cournot competition where employees pose the only threat of potential entry we demonstrated that a reduction in barriers to entry (an increase in market contestability) caused no reduction in industry price when incumbents were able to buy-off potential entry through higher wages. Over the longer term the analysis demonstrated that increased market contestability could cause equilibrium industry price to be higher than that which would have occurred if entry barriers had been left at their initial higher level.

The analysis has a number of policy ramifications. Firstly, it implies that competition policy may have paradoxical effects when it seeks to increase competitiveness through measures designed to increase the ease of entry and exit to an industry. In the short-term it may have no effect in encouraging entry but merely stimulate an increased labor share of profits. Over the longer-term, it implies that new or innovating industries will be pushed onto higher equilibrium prices as firms hire less labor in order to avoid increased wages. In addition, productive efficiency may be reduced over the longer term as firms use welfare sub-optimal production technologies. Thus, cumulatively these findings imply that increased market contestability cannot be assumed to be pro-competitive and therefore, warn against the generic use of the concept of contestability as a ‘rule of thumb’ objective for competition policy.

Secondly, the results are pertinent to two areas of analysis which are on the threshold between industrial organization and labor economics. In the first instance they have relevance to the debate concerning the relationship between executive salaries and economic perfor-

mance. At present there has been conflicting evidence over the existence of a link between firm profits and executive salaries (for example, Cosh (1975), Jensen and Murphy (1990), and Rosen (1992)). This has sometimes been construed as support for the notion that high executive salaries are not economically justified. Recently, Main *et al* (1996) have argued that the correct correlation to examine is the total pay of the entire board of directors and not that of arbitrarily chosen ‘key’ executives. Main *et al* find that this measure of executive pay is positively correlated with firm profits. They then conclude that this provides evidence to support the economic justification for high executive salaries.

Under our analysis one would not quibble with the idea of using the total board of directors’ pay, as they are likely to represent a set of potential entrants. Our results would also predict a positive relationship between profits and the total executive wage bill. However, in contrast, we would conclude that evidence of such a correlation does not necessarily provide economic justification for high executive salaries as in our model these are derived through rent seeking; financed by monopolistic pricing. In our analysis executive salaries may retard market performance. In the short run higher executive salaries prevents entry and Cournot competition thereby suggesting enhanced market performance if a wage ceiling were placed on executive salaries. In the long run high executive salaries reduces the number of executives employed thereby retarding market performance. However, in this instance it is not clear that an executive wage ceiling would be beneficial because a very low ceiling restricts the ability of the incumbent to buy-off potential entry. This constraint may guarantee that executives will subsequently enter the market (in competition with the incumbent) when they have acquired the necessary entrepreneurial ability from the incumbent. In this case the incumbent will either not hire any employees or hire those who are less efficient and who are less likely to enter.

Finally, the paper has relevance for research concerned with the relationship between in-

dustry concentration and labor's share of value added (for example, Cowling and Waterson (1976) and Stewart (1990)). The analysis in this paper would argue that sunk costs may act to reduce employees bargaining power with the firm hence reducing labor's share of value added. Therefore, we would argue that the role of advertising expenditure in such studies, which was advocated by Kalecki (1938) and utilized by Conyon (1994), may be misleading. As an alternative to their arguments where advertising enhances revenue and hence reduces labor's share of value added, our analysis suggests it may affect this through an alternative channel. Namely, increased advertising might raise barriers to entry thereby reducing employees' wages. Thus ideally, firm revenue and wage equations should be estimated separately in order to untangle these two effects.

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