working paper
department
of economics

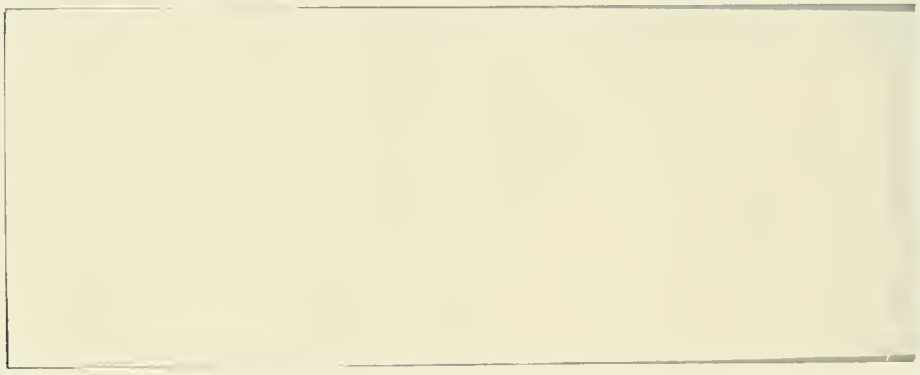
Owner Consumers and Efficiency

Joseph Farrell

Number 380 May 1985

massachusetts
institute of
technology

50 memorial drive
cambridge, mass. 02139



Owner Consumers and Efficiency

Joseph Farrell

Number 380 May 1985

Owner-Consumers and Efficiency.

by

Joseph Farrell

GTE Laboratories

40 Sylvan Rd

Waltham, MA 02254

and MIT

May, 1985.

Forthcoming, Economics Letters.

Abstract

Owner-Consumers and Efficiency

Joseph Farrell

GTE Laboratories

If each household owns the same fraction of a firm as its share of consumption, shareholders unanimously want marginal-cost pricing. Otherwise, profits are overemphasised relative to consumer surplus.

Introduction.

Traditional theories of the firm emphasise that shareholders want the firm to make profits. This is natural if the firm is closely held. However, many firms are held widely on a stock market, and so shareholders of a given firm have other interests too. Rotemberg (1984) has pointed out that the usual theory of stock-market equilibrium implies that shareholders of a given firm will (unanimously) wish to maximize industry rather than firm profits, because they are also shareholders in the other firms in the industry. In this note, I explore the implications of the fact that shareholders are also consumers.

Shareholders' consumer surplus from their firm's good is usually assumed away: see for instance Grossman and Stiglitz (1976). This is natural if we wish to show that, under conditions otherwise favorable to competition, firms will indeed maximize profits. However, in exploring the implications of monopoly or other market imperfections, we should expect shareholders to consume the firm's product, and to derive surplus from doing so.

A shareholder's objective for the firm will be close to profit maximization, if his consumption value is small compared to his stake in profits. But finance theory implies that each investor's stake in the profits of a particular firm will be small, so there is no clear reason to expect a shareholder to be "smaller" as a consumer than as an owner. This suggests that shareholder-consumers will want significantly different things from their firm than would shareholders who do not consume the firm's product. In Section 2, I consider a "benchmark" case in which ownership and consumption are proportional across the population: it is natural to think of this as arising from both being proportional to wealth.

In that case, shareholders unanimously vote to maximize social welfare.

I consider a monopoly firm choosing a price, taking as given prices charged by other firms. If ownership shares are equal to consumption shares (at marginal cost pricing), then all shareholders will vote for marginal cost pricing. If not, unanimity fails. Then, in a simple model of voting power, I show that random concentration of stock ownership, or concentration among the rich in excess of the concentration of consumption, will make the firm raise price above marginal cost. So we can view this monopoly distortion as due to an improper pattern of ownership, not to the monopoly itself.

Formally, the model can be extended to cover externalities, but its assumptions are then (even) less persuasive than with pricing, since there is no reason to expect ownership shares to be proportional to marginal rates of damage (or benefit) from the externality at the optimum.

In Section 3, I argue that the consumption-proportional pattern of ownership is not stable in a stock-market economy, because of takeovers.

2. The Basic Model.

Household h (h = 1,...,H) owns a fraction t_h of firm 1, whose pricing decision we consider. Firm 1, taking other prices as given, has a demand curve $X = X(p)$, where

$$X(p) = \Sigma_h \, x_h(p) \qquad (1)$$

The total cost of producing X is c(X). We write $s_h(p)$ for h's consumer surplus from good 1 at price p, and S(p) for $\Sigma_h \; s_h(p)$. Social welfare is

$$W(p) = pX(p) - c(X(p)) + S(p) \qquad (2)$$

and we write p* for the price that maximizes (2): we have

$$p^* = c'(X(p^*)) \qquad (3)$$

If household h chose p, it would maximize the sum of h's share of profits and h's surplus. Thus p_h, h's preferred price, maximizes

$$t_h(pX(p) - c(X(p))) + s_h(p) \qquad (4)$$

We also have

$$s_h'(p) = - x_h(p) \qquad (5)$$

We assume that ownership shares are equal to consumption shares

$$t_h = x_h(p^*)/X(p^*) \qquad (6)$$

Substituting (6) and (5) in the first-order condition for maximizing (4), we see that p* maximizes (4): $p_h = p^*$. Intuitively, household h has internalized just as much of the profit as of the consumer surplus, and therefore makes the socially correct tradeoff. This gives us

Proposition 1: If ownership is proportional to consumption, then shareholders will unanimously vote for the socially efficient price p*.

Next, we ask about the direction of bias if (6) does not hold. Thus, some shareholders own more than their consumption share, while others own less. Evidently, those who own more will weigh profits more heavily than consumer surplus, and so vote for a higher price, while those who own less

will do the opposite. There is a fundamental asymmetry: the large shareholders have more voting power in the firm. Thus we should expect that deviations from (6) will lead systematically to raising prices.

To formalise this, we consider the voting on a shareholder proposal to raise p a little above p*. If each household had a number of votes equal to its stake, the derivative of (4), then the proposal would be rejected unanimously. But voting power is proportional to t_h.

It is not necessarily the case that a majority of the shares will be held by households who own more than their consumption share. For example, suppose there are just two households, and household 1 owns 2/3 of the firm and consumes 3/4 of the output. Then simple voting by share will actually lead to a lowering of the price below p*.

However, if household h's influence is proportional both to t_h and to the derivative of (4), its stake in the matter, and if in addition excess ownership is not negatively correlated with consumption share

$$\Sigma_h \ (t_h - x_h(p^*)/X(p^*))\ x_h(p^*) \ \geq \ 0 \qquad (7)$$

then the weighted incentive to increase p from p* is positive:

Proposition 2: If (7) holds, then $\Sigma_h \ t_h \ ds_h/dp \ (p^*) \ \geq \ 0$, with equality if and only if (4) holds.

Proof: First, $ds_h(p^*)/dp = t_h \ X(p^*) - x_h(p^*)$, using (3) and (5). Now write

$$t_h \ = \ x_h(p^*)/X(p^*) \ + \ z_h,$$

so that $\Sigma_h \ z_h = 0.$

Then $\Sigma_h \ t_h \ ds_h/dp \ (p^*) \ = \ \Sigma_h \ t_h \ (t_h X(p^*) - x_h(p^*))$

$$= \Sigma_h \ (x_h/X + z_h)\ z_h$$

$$= \Sigma_h \ (x_h/X)\ z_h \ + \ z_h^2 \ \geq \ 0.$$

We interpret (7) in two ways. First, if (7) holds with equality, the ownership pattern departs from (6) in a non-systematic way. Then Proposition 2 tells us that random concentration of ownership will induce higher prices. This is the relevant interpretation if we believe that ownership will be proportional to consumption across wealth classes, perhaps because both are proportional to wealth, but that transactions costs limit diversification in such a way that each wealth class's ownership of firm 1 is held by some fixed fraction (less than one) of the members of that wealth class.

Secondly, (7) will hold strictly if the rich are disproportionately large stockholders (as is the case), or if the good is bought disproportionately by the poor. Then there are different class interests, and, by Proposition 2, price will exceed marginal cost as a result.

3. Stability of the Allocation.

Suppose that we begin with an allocation as described above, in which a firm is widely held and ownership is proportional to consumption. Is this stable? I argue that, unfortunately, it is not.

The price of the firm's shares must reflect only the level of profits achieved by maximizing welfare, which by assumption is less than maximum profit. This leaves the firm vulnerable to a takeover by someone who is

willing to sacrifice part of his own consumer surplus in return for the entire difference in profits between welfare-maximizing and profit-maximizing operation. With many consumers, this profit difference will dwarf an individual's consumer surplus.

Will shareholders sell for such a purpose? If they made a group decision on the matter, they would not, since the proposal to move to an inefficient allocation and also to enrich one individual will not appeal to the rest of society. However, a familiar argument suggests that, in a large economy, each person will see the success or failure of the takeover bid as exogenous to his own decision, and will therefore be willing to accept a small premium over the previous market price.

Conclusion.

The fact that shareholders are consumers as well as investors has important implications for the theory of the firm. Not all households can own a much larger fraction of the firm than they consume of its output, as the unanimity theory requires if all households are investors. Deviations from proportionality of ownership shares and consumption shares have a systematic tendency to make profits more important than consumer welfare in the objectives of the firm. Even if such a proportionality holds, the firm is vulnerable to a takeover that will turn it into a profit-oriented firm.

If ownership is proportional to consumption, but not in general otherwise, then shareholders unanimously correctly internalize the interests of society. To the extent that proportionality fails, society delegates to an agent with different preferences (see Holmstrom, 1984 or Farrell, 1985) when it leaves the choice of price up to the firm.

We have seen why, given proportional ownership, shareholders would not want to maximize the firm's profits. We then saw why such shareholders would be inclined to sell out, so that in equilibrium the firm will be more closely held than the distribution of consumption. For that reason, profit- maximizing will after all be (at least approximately) shareholders' goal.

References.

Farrell, J., "Allocating and Abrogating Rights: How Should Conflicts be Resolved under Incomplete Information?", mimeo, GTE Labs, 1985.

Grossman, S., and J. Stiglitz, "Stockholder Unanimity in Making Financial and Production Decisions," IMSSS, Stanford, November 1976.

Holmstrom, B., "On the Theory of Delegation", in Bayesian Models in Economic Theory, M. Boyer and R. Kihlstrom, eds, Elsevier, 1984.

Rotemberg, J., "Financial Transactions Costs and Industrial Performance," mimeo., Sloan School of Management, MIT, April 1984.

2-5-90