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The Costs of Regulating Price Differences*

Price differences are regulated in a variety of situations in many countries. This essay considers some of the possible effects of such regulation on the behavior of a profit-maximizing firm. It is shown that the firm may profitably choose a technology or location that is not cost minimizing and that gold-plating, or purely wasteful expenditures, may even be profitable. A later section of the paper applies the theory more specifically to the most pervasive source of price difference regulation in the United States, the Robinson-Patman Act.

I. Introduction

In a variety of situations in many countries the prices that firms may charge their customers are regulated. In some cases this regulation is directed toward the price differences allowed when a firm sells its output to different types of customers. It is usually the stated purpose of this regulation to ensure equitable or nondiscriminatory pricing. The most obvious examples come in the form of price discrimination legislation, such as the Robinson-Patman Act in the United States, where the regulation of price differences is the sole concern.[1] In many other regulatory situations, however, regulators are concerned about price structures, and efforts to construct simple cost-based pricing rules are observed.

This paper studies some of the effects of cost-based pricing regulation on the behavior of profit-maximizing firms. I consider the case of a monopolist selling to two groups of consumers.

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1. See Grant (1981) for a description of similar legislation in Australia, West Germany, Ireland, and France.

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There are no joint costs of production, and unit costs of selling to group i, C_i, are assumed constant. With this simple model I show that certain pricing rules can induce firms to set Pareto-inefficient prices. This means that local moves in price space away from the chosen price vector can benefit everyone without side payments. In some circumstances, gold-plating (increasing expenditures with no benefit to consumers) can be a profitable strategy, and the firm can be encouraged to make the socially "wrong" choice of technology or location. This appears damaging to cost-based pricing regulation, particularly price discrimination legislation with no offsetting benefits.[2]

The next section of the paper describes the two basic cost-based pricing rules and examines the effects of applying these rules on the profit-maximizing firm. The third section applies the model more directly to the Robinson-Patman Act, suggesting who benefits from the act and which pricing rule they prefer. Some concluding remarks follow.

II. Cost-based Pricing Rules

With two customer types we can represent the general form of price-difference regulation with the function $P_2 = f(P_1, C_1, C_2)$, where P_i is the price charged to a customer of type i and C_i is the (assumed) constant cost of serving such a buyer.[3] The function indicates the permissible price to group 2 as a function of the price charged to group 1 and the costs of serving both types.

I shall study two obvious special cases of this general rule. Under the "difference rule" (D rule) the difference between price and unit cost $(P_i - C_i)$ must be equal for all customers, or

$$P_2 = f(P_1, C_1, C_2) = C_2 - C_1 + P_1. \tag{1}$$

Under the "markup rule" (M rule) the percentage markups must be equal, or

$$P_2 = f(P_1, C_1, C_2) = \frac{C_2}{C_1} \cdot P_1. \tag{2}$$

While economists may have a preference for percentages and, therefore, for the M rule (see Stigler 1966, p. 209; and Machlup 1952, p. 136), the legal profession and the Federal Trade Commission (FTC) seem to have taken a D-rule view of the Robinson-Patman Act in most cases.

2. In Sec. III other criticisms of the Robinson-Patman Act are mentioned.

3. There has been a discussion in the legal literature regarding whether marginal or average costs should be used to define discrimination in Robinson-Patman Act cases. I avoid this issue by choosing a cost function in which marginal and average costs are equal and defined as C_i for good i.

In this simple model these rules are easily seen to be lines in price space. They are graphed in figure 1 for an arbitrary case in which $C_2 > C_1$. The rules are linear constraints for this firm choosing prices to maximize profits. I assume that the firm's profit function, $\Pi(\mathbf{p})$, is strictly concave. This gives us one stationary point, $\mathbf{p}^* = (P_1^*, P_2^*)$, which is the global unconstrained profit-maximizing price vector. Each customer's demand is assumed to depend only on the price he faces and not on the prices charged to others.

In studying some of the effects of the regulation of price differences, we employ a very simple model of a profit-maximizing firm facing the D or the M rule as its only constraint. This might appear to be no more than a Robinson-Patman Act model, but it has broader application than that. There are many regulatory situations in which the regulated firms have some range in which to maximize profits even though they may be more constrained than we have them here. They may have their rate of return regulated, or benefit from regulatory lag, or the profit level regulation may simply have been ineffective.[4] Regardless of the number of other constraints the firm faces, we would expect the price difference regulation to be binding.[5] It may, therefore, be in the firm's interest to try to manipulate the constraint in the ways described below.[6]

Our firm will set prices to maximize profits subject to the constraint that it obey the relevant rule,

$$\max_{P_1, P_2} \Pi(\mathbf{p}) = (P_1 - C_1)X_1(P_1) + (P_2 - C_2)X_2(P_2) \tag{3}$$

subject to

$$P_2 = f(P_1, C_1, C_2),$$

where $X_i(P_i)$ is the demand function of group i for the firm's product.

The solution to this problem is most easily seen with the aid of figure 1. The point $\mathbf{p}^*$ is drawn, and around it are drawn a pair of isoprofit contours representing profit levels Π_1 and Π_0. The slope of an isoprofit contour at any point can be determined by totally differentiating the

4. There is a literature suggesting that this is true for electric utilities. See Stigler and Friedland (1962) and Jarrell (1978).

5. All I mean here is that, if the firm were allowed to maximize profit subject to all the constraints it faces except the price difference rule, we would not expect the resulting constrained maximum to give us prices that satisfied the D rule (or the M rule, as the case may be). That would be quite a coincidence. In general, then, we would expect the price rule to be binding. Whether it can always be profitably manipulated given the presence of all these other constraints is another matter that I do not take up here. Clearly, the answer will depend on the individual firm's circumstances.

6. Antidumping legislation in international trade is still another example of price difference regulation. I am grateful to Michael Mussa for bringing this example to my attention.

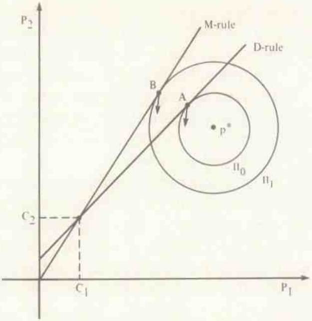

FIG. 1.—The D-rule and M-rule equilibria

profit function, giving

$$\frac{dP_2}{dP_1}\bigg|_{\bar{\Pi}} = -\frac{\dfrac{\partial \Pi}{\partial P_1}}{\dfrac{\partial \Pi}{\partial P_2}} = -\frac{(P_1 - C_1)\dfrac{dX_1}{dP_1} + X_1}{(P_2 - C_2)\dfrac{dX_2}{dP_2} + X_2}$$

or

$$\frac{dP_2}{dP_1}\bigg|_{\bar{\Pi}} = -\frac{X_1(1 - M_1\eta_1)}{X_2(1 - M_2\eta_2)}, \tag{4}$$

where $M_i = (P_i - C_i)/P_i$ is the percentage markup for good i and $\eta_i = -(dX_i/dP_i) \cdot P_i/X_i$ is the own-price elasticity of demand. When demands are independent, as we have assumed, it is easily seen that, at P_1^*, $M_1\eta_1 = 1$ and, at P_2^*, $M_2\eta_2 = 1$. Since $\Pi(\mathbf{p})$ is strictly concave, it will be the case that $M_i\eta_i > 1$ when $P_i > P_i^*$ and $M_i\eta_i < 1$ when $P_i < P_i^*$. This means that the isoprofit contours will have positive slopes when $P_1 > P_1^*$ and $P_2 < P_2^*$ and when $P_1 < P_1^*$ and $P_2 > P_2^*$. When both prices are above (and when both are below) their profit maximizing levels, the contours will have negative slopes. Finally, when $P_1 = P_1^*$, they are flat, and when $P_2 = P_2^*$, they are vertical. The contours drawn in figure 1 have all these properties.

In the figure the solutions for the D- and the M-rule constraints are illustrated as points A and B, respectively. Given the positive slopes of the lines, both A and B must be Pareto inefficient. That is, movements can be made away from these points (in the directions of the arrows) that would make everyone, including the firm, better off.[7] In fact, any binding price rule with a positive slope will induce Pareto-inefficient pricing. This result is not peculiar to the two rules studied here. The only vectors in price space that can be called Pareto efficient in this sense are those vectors lying to the southwest of $\mathbf{p}^*$, that is, with $P_1 \leq P_1^*$ and $P_2 \leq P_2^*$. In this region all the isoprofit contours have negative slopes.

This observation suggests immediately that regulators who can actually set prices should not be tied to D- or M-rule notions of equity in choosing those prices. Pareto-inefficient pricing may result. A notion of equity that would not suffer this fault would be the one employed in the calculation of Ramsey prices. There, prices are selected that maximize consumers' surplus subject to a profit constraint, with no regard for the distribution of surplus between the buyers. With independent demands, Ramsey prices obey the famous "inverse elasticity rule," under which $M_i = R/\eta_i$ with R (the "Ramsey number") varying between zero (for marginal cost pricing) and one (unconstrained profit maximization), depending on the level of profits in the constraint. Such prices are equitable in the sense that all consumers' surpluses enter the optimization problem with equal weight.

In the case illustrated in figure 1, both the firm and group 2 will prefer the D rule, while group 1 prefers the M rule, but these choices depend critically on the location of the vector $\mathbf{p}^*$ and on the relative costs of serving the two groups. Notice also that either rule will make one of the two groups of consumers (and the firm) worse off compared with the profit-maximizing vector $\mathbf{p}^*$. The following proposition summarizes what I have just demonstrated.

Proposition 1. Except for cases in which the vector $\mathbf{p}^*$ lies on the line defined by the constraint in question, both the D and the M rule make one group of consumers better off than at $\mathbf{p}^*$ and the other group and the firm worse off.

Gold-Plating or Pure Waste

Looking back at figure 1, it is clear that the firm would like to be able to shift the relevant linear constraint so that it passes right through $\mathbf{p}^*$. We rule out lying about costs by assumption, but might there be other means to manipulate these constraints profitably? One possibility is through purely wasteful expenditures, or gold-plating, that raise C_1 or C_2 and thereby shift the D-rule constraint and tilt the M-rule constraint. Can pure waste ever be profitable under either of these rules?

To examine this question, note that the first-order condition for the

7. The single (and obvious) exception possible in this model is when the line goes through the profit-maximizing price vector $\mathbf{p}^*$, in which case no move can make the firm better off.

seller's optimal choice of P_1, under the price rule $P_2 = f(P_1, C_1, C_2)$ (eq. [2]), is given by

$$\frac{\partial \Pi}{\partial P_1} = (P_1 - C_1)\frac{\partial X_1}{\partial P_1} + X_1 + [f(\cdot) - C_2]f_1\frac{\partial X_2}{\partial P_2} + X_2 f_1 = 0, \tag{5}$$

where $f_1 = \partial f/\partial P_1$ and $f_2 = \partial f/\partial C_1$. We wish to know whether, at this optimum, an increase in C_1 (or, symmetrically, C_2) can increase profits; that is, we wish to know whether

$$\begin{aligned} \frac{\partial \Pi}{\partial C_1} &= -X_1 + [f(\cdot) - C_2]f_2 \cdot \frac{\partial X_2}{\partial P_2} + X_2 f_2 \\ &= -X_1 + f_2\left\{X_2 + [f(\cdot) - C_2]\frac{\partial X_2}{\partial P_2}\right\} \end{aligned} \tag{6}$$

can ever be positive. For the D rule, no; for the M rule, sometimes. To see this, rewrite (5) as

$$-X_1 = (P_1 - C_1)\frac{\partial X_1}{\partial P_1} + f_1\left\{X_2 + [f(\cdot) - C_2]\frac{\partial X_2}{\partial P_2}\right\} \tag{5'}$$

and substitute this into (6) to get

$$\frac{\partial \Pi}{\partial C_1} = (P_1 - C_1)\frac{\partial X_1}{\partial P_1} + (f_1 + f_2)\left\{[f(\cdot) - C_2]\frac{\partial X_2}{\partial P_2} + X_2\right\}. \tag{7}$$

PROPOSITION 2. Pure waste will never be profitable for a firm constrained by the D rule.

Proof. Note that the firm never sells to either group at a price less than cost since it will lose money doing so. From (1) we see that, for the D rule, $f_1 = 1$ and $f_2 = -1$ so that $f_1 + f_2 = 0$. This means that

$$\frac{\partial \Pi}{\partial C_1} = (P_1 - C_1)\frac{\partial X_1}{\partial P_1},$$

which will always be negative. It will therefore never be profitable to inflate C_1 or (by the same argument) C_2 through purely wasteful expenditures.

PROPOSITION 3. Pure waste may be profitable for a firm constrained by the M rule.

Proof. Rewriting (5′) as

$$[f(\cdot) - C_2]\frac{\partial X_2}{\partial P_2} + X_2 = \left(\frac{-1}{f_1}\right)\left[X_1 + (P_1 - C_1)\frac{\partial X_1}{\partial P_1}\right], \tag{5''}$$

and substituting (5″) into (6), we obtain

$$\frac{\partial \Pi}{\partial C_1} = -X_1 - \left(\frac{f_2}{f_1}\right)\left[X_1 + (P_1 - C_1)\frac{\partial X_1}{\partial P_1}\right]. \tag{7'}$$

For the M rule, $f_1 = C_2/C_1$ and $f_2 = -C_2P_1/C_1^2$ and, therefore, $f_2/f_1 = -P_1/C_1$, implying that (7′) becomes

$$\frac{\partial \Pi}{\partial C_1} = \left(\frac{P_1}{C_1} - 1\right)X_1(1 - \eta_1). \tag{8}$$

The expression in (8) is positive if $\eta_1 < 1$ and negative if $\eta_1 > 1$. Normally, of course, an imperfect competitor would never set a price in the inelastic portion of his demand curve, but with the M rule in effect he may be forced to with one of the two prices. It is possible to find simple examples in which waste is profitable to some degree and in which it is still in the firm's interest to sell to both groups of consumers.[8]

The intuition behind these results is clear. When the seller must throw away one dollar (per unit) to raise the price one dollar (D rule), waste cannot be profitable. When he can raise price by more than a dollar with a dollar's waste (M rule), profit opportunities may present themselves.

These results suggest, however, that partially wasteful expenditures may be a more general problem. Even in cases in which pure gold-plating is not profitable, the firm may have an incentive to raise one product's marginal cost by improving its quality (or the quality of the services provided with it). Such an expenditure will move the price constraint as pure waste did, but it will also raise buyers' willingness to pay for the good. Thus the firm setting its quality levels will consider their effect on the price constraint as well as on consumers' preferences and costs.

Choice of Technology or Location

I turn now to examine formally the possibilities for partially wasteful behavior. To study the product quality problem I would need to model buyer preferences for quality, so I have chosen to focus instead on a simpler question. Could either rule provide an incentive for the firm to adopt a technology that is not cost minimizing for the outputs it produces? Alternative technologies are viewed here as nothing more than different feasible vectors of marginal costs.

Let the variable s represent the technology chosen by the firm, a point in the efficient set of feasible (C_1, C_2) combinations. A simple example is choosing a location between two markets. Suppose groups 1 and 2 are two geographically distinct markets. The firm must decide where to locate on the road between the two. This decision will then determine transportation costs to each market. The larger s is, the closer the firm is to the second market (hence a lower C_2), and the further it is from the first.

8. For example, the demand functions $P_1 = 12 - X_1$ and $P_2 = 8 - (X_2/2)$ will have these properties.

In general, then, we can write $C_1 = C_1(s)$ and $C_2 = C_2(s)$ with $\partial C_1/\partial s > 0$ and $\partial C_2/\partial s < 0$. The firm now chooses P_1, P_2, and s to maximize profit subject to $P_2 = f(P_1, C_1, C_2)$. With this simple extension to the model, the following proposition can be proved.

PROPOSITION 4. In general, a profit-maximizing firm subject to either the D or the M rule will not choose the technology that minimizes the cost of producing its output.

Proof. Let $C(\cdot)$ and $R(\cdot)$ represent total costs and total revenues, respectively. That is,

$$C(P_1, P_2, s) = C_1(s) \cdot X_1(P_1) + C_2(s) \cdot X_2(P_2)$$

and

$$R(P_1, P_2) = P_1 \cdot X_1(P_1) + P_2 \cdot X_2(P_2).$$

Then we can write the Lagrangean expression as

$$L = R(P_1, P_2) - C(P_1, P_2, s) + \lambda\{P_2 - f[P_1, C_1(s), C_2(s)]\},$$

and the first-order condition (for an interior solution) with respect to s will be

$$-\frac{\partial C}{\partial s} = \lambda\left(f_2 \cdot \frac{\partial C_1}{\partial s} + f_3 \cdot \frac{\partial C_2}{\partial s}\right),$$

where $f_2 = \partial f/\partial C_1$ and $f_3 = \partial f/\partial C_2$. An unconstrained firm would set $\partial C/\partial s = 0$ to minimize its costs. This will not be the case here. Since f_2 is negative and f_3 positive for both rules, the term in the parentheses will be strictly positive. Whether this means that s is too high or too low will depend on the sign of λ. This, in turn, depends on the direction the firm wants to push its constraint.

Therefore, in order to make its choice the firm will consider the cost efficiency of each technology and the set of legal price vectors for each technology. The results above show, not surprisingly perhaps, that the second consideration will, in general, be important enough that the most cost efficient technology for the outputs produced will not be adopted. Indeed, under the M rule pure waste may even be profitable.

III. The Robinson-Patman Act

The Robinson-Patman Act of 1936 prohibits price differences that cannot be cost justified if their effect may be injurious to competition. As mentioned earlier, lawyers and the FTC seem to have a D-rule view of Robinson-Patman. Legal scholars who appear to have the D rule in mind when they think about price discrimination include Rowe (1959), Murray (1960), and Medow (1970).[9] However, to my knowledge there

9. The D rule was clearly applied by the FTC in the Goodyear case of 1936 in determining the extent of Goodyear's discrimination against its own dealers and in favor of

has not yet been a case that has forced the commission or any court explicitly to choose between the D rule and the M rule.

To say that the act has its critics is to be guilty of gross understatement. "Opposition to the Act has come from government and bar association task forces, legal scholars, economists and businessmen, who have viewed the Act as inconsistent with basic competition policy, distributive efficiencies, and marketplace realities" (American Bar Association 1980, p. 1).

Given all the observed problems with the act, one might properly wonder how it got passed in the first place and why it has survived all previous attempts at reform. Legislative histories of the law make it clear that its principal purpose was to protect small retail, and some wholesale, businesses from competition from the larger (usually chain store) retail operations.[10] The small business lobby remains loyal to the act to this day: "All of the proposals for satisfactory change have come to naught, however, due to the unswerving support the Act has received from small businessmen, many of whom regard its continued existence as essential to their survival" (American Bar Association 1980, p. 1).

The situation depicted in figure 2, in which both rules result in a lower price to small business and a higher price to chains, may therefore be representative of many real-world cases. In fact, it is not difficult to show that, if $C_1 > C_2$ (so that small business is at some cost disadvantage) and $\eta_2 > \eta_1$ (i.e., the chains have greater bargaining power), then $\mathbf{p}^*$ will lie below both constraints, as drawn in the figure.[11] In such cases P_1 will be less than P_1^*, and P_2 will be greater than P_2^*, with either rule. Also notice that we can say something about which rule the firms prefer. In the case illustrated in figure 2, firm 1 will prefer the D rule, while firm 2 (the chain store) prefers the M rule. While the chain store in this situation need not always prefer the M rule, it is fairly easy to show that the small business will always prefer the D rule.

Proposition 5. If C_1 and C_2 are constant with $C_1 > C_2$, demands are independent, and $\eta_2 > \eta_1$, then firm 1 will prefer the D rule to the M rule (i.e., the D rule will result in a lower P_1).

Sears, Roebuck & Co. (Goodyear Tire & Rubber Co., 22 FTC 232 [1936]). On the other hand, the commission dismissed the complaint against Bird & Son, Inc., when it was shown that "costs differed by over 28 percent while the difference in price was less than 20 percent" (Bird & Son Inc., 25 FTC 548 [1937], p. 553). When the percentage cost differential equals the percentage price differential, the M rule is obeyed since $(P_1 - P_2)/P_2 = (C_1 - C_2)/C_2$ implies $P_1/C_1 = P_2/C_2$.

10. See, e.g., Palamountain (1955, chap. 7), Edwards (1959, chap. 2), Rowe (1962, chap. 1), or Ross (1984).

11. The first-order conditions tell us that, at $\mathbf{p}^*$, $M_i^*\eta_i = 1$, where $M_i^* = (P_i^* - C_i)/P_i^*$. This, combined with $\eta_2 > \eta_1$, gives us $M_1^* > M_2^*$ (i.e., $\mathbf{p}^*$ below the M-rule line). $M_1^* > M_2^*$, together with $C_1 > C_2$, then implies $P_1^* > P_2^*$ and, therefore, $P_1^* - C_1 > P_2^* - C_2$ (i.e., $\mathbf{p}^*$ below the D-rule line).

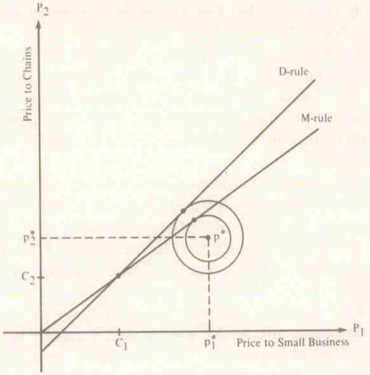

FIG. 2.—The small business bias

Proof. Consider figure 3, in which the M-rule optimum is labeled point M. We know that $\mathbf{p}^*$ will lie below both constraints, as drawn. At point M the slope of the isoprofit contour is

$$\frac{-\partial\Pi/\partial P_1}{\partial\Pi/\partial P_2}$$

with the derivatives evaluated at (P_1^M, P_2^M). Moving straight up to the D-rule line from M (to point $\bar{M}$), this slope must be getting flatter as $\partial\Pi/\partial P_2$ (a negative number) falls since $\Pi(\cdot)$ is assumed to be strictly concave in both prices. This means that the isoprofit contour through $\bar{M}$ crosses the D-rule line as shown. The D rule constrained optimum then, given the concavity of $\Pi(\cdot)$, must lie below $\bar{M}$, where P_1^D will be less than P_1^M. The tangency need not give us $P_2^D > P_2^M$, however. The fact that lawyers and the FTC have given the law a D-rule interpretation is therefore consistent with the goal of the original legislation, namely, helping small business.

In applying this model to the Robinson-Patman Act there is an important generalization to consider. We must recognize the obvious interdependence of demand of retailers. Back in the 1930s independent grocers were concerned about the discounts that A&P got from its suppliers because A&P would pass part of those savings on and undercut the independents' prices. Therefore, a manufacturer selling at a lower price to A&P can expect his independent customers to sell less of his product. Sales to the two groups are therefore substitutes, with

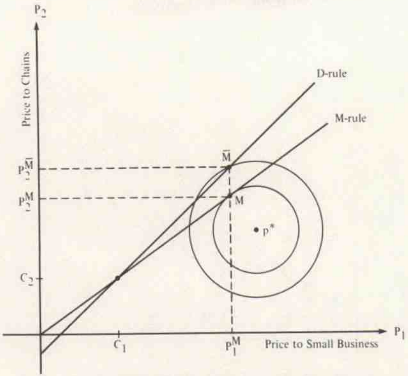

FIG. 3.—Small business preference for the D rule

demand from each group being a positive function of the price charged to the other group.

With this type of demand interdependence the roughly circular isoprofit contours in figures 1, 2, and 3 become elliptical with a major axis of positive slope as in figure 4. Now it is difficult to say what will happen to prices when either rule is imposed. The constrained optima will still clearly be Pareto inefficient. Under the M rule it is even possible for both prices to rise in this case. It is not difficult to show, however, that if (1) **p*** lies below both constraints (as in figure 4), (2) $\Pi(P_1, P_2)$ is strictly concave, and (3) direct-price effects on marginal profit rates are bigger than cross-price effects (i.e., $|\partial^2\Pi/\partial P_i^2| > \partial^2\Pi/\partial P_1\partial P_2$ for $i = 1, 2$), then the D-rule solution will involve a lower P_1 and a higher P_2 than the unconstrained solution, **p***. This last condition will hold, for example, when the demand functions are linear in both prices and when the own-price effects (i.e., $\partial X_i/\partial P_i$, $i = 1, 2$) are larger in absolute value than the cross-price effects, $\partial X_i/\partial P_j$ $(i \neq j)$.

The fact that both prices may be higher does not now mean that both firms are worse off. If the rule shrinks the difference between P_1 and P_2 (as both rules will in figure 4), then small business will likely benefit even though its price may have risen.

Although proving small business's preference for the D rule is more difficult in this case, it is possible to make a simple argument that carries much weight. If all that matters to small businesses is that $P_1 - P_2$ (their price disadvantage) be made as small as possible (and this will be roughly true if the retail market is very competitive), then they will

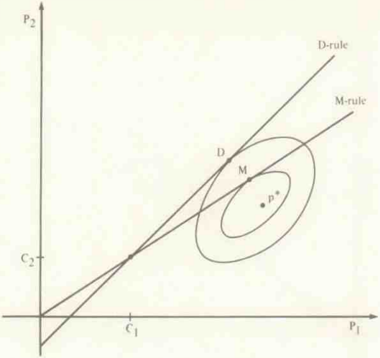

FIG. 4.—Interdependent demands

prefer the D rule. The D rule implies that (from its definition [1]) $P_1^D - P_2^D = C_1 - C_2$, while the M rule gives $P_1^M - P_2^M = (C_1 - C_2) \cdot P_2^M/C_2$, which will be greater than $(P_1^D - P_2^D)$ as long as $P_2^M > C_2$, which must be true if the seller has chosen to serve both types of customers.

The small business interested in minimizing its cost disadvantage will therefore prefer the D rule over the M rule. It is also straightforward to show that, if $\mathbf{p}^*$ is below both constraints (as in figure 3), and if $\partial^2\Pi/\partial P_1 \partial P_2 > 0$ (as befits substitutes), then the D rule will also give a lower P_1 than the M rule. In such cases small business wins both ways, with a lower price to itself and a smaller price disadvantage.

It seems, then, that we can view the Robinson-Patman Act as the sort of regulation that Peltzman (1971) described. Peltzman predicted that price-setting regulators would choose to subsidize the high-cost purchasers with higher margins charged to low-cost buyers. Thus prices would be more nearly equal than costs.

Evaluation of the welfare consequences of the adoption of either of these rules becomes much more difficult when we allow these buyers to be retailers. Now a full assessment of the benefits and costs of the act must allow for effects on three levels—those of the original seller, the retailers, and the final consumers. Even at the theoretical level this will be challenging; it will require adding a model of retail competition to the model of the seller's problem studied here.

IV. Conclusions

In this paper I have studied some of the costs associated with the application of cost-based pricing rules in situations in which firms have at least some incentive to maximize profits. The results indicate that, depending on the rule selected and the individual circumstances of the case, firms may be induced to choose inefficient technologies and, possibly, to incur purely wasteful expenditures in an effort to manipulate the constraint they face.

Although the results obtained here are more general, the model is most easily seen to apply to the study of price-discrimination legislation. Specifically, we have seen that it can explain the pattern of benefits from the application of the Robinson-Patman Act in the United States as well as the preferences of certain groups for the use of one rule rather than the other.

It is very difficult, then, to determine the value of these rules. On the one hand they may induce the inefficiencies described here and hurt the seller and some of his buyers, while on the other they may benefit many other buyers. The net welfare effect is ambiguous, so a once-and-for-all decision to use or to discard the rules will not be proper in every case.[12]

In general, the discussion here should make us more suspicious about the advisability of adopting cost-based pricing rules to regulate price differences. Such rules seem particularly inappropriate when regulators can actually set prices as they wish.

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12. Even the total effect on the equally weighted sum of consumers' plus producer's surplus is ambiguous. On this, see Schmalensee (1981).

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