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Abstract

We examine the welfare effects of forbidding price discrimination in intermediate goods markets when firms can bargain over terms of their nonlinear supply contracts. In particular, our focus is on secondary line injury to competition under three interpretations of what it means to forbid price discrimination. We find that in each case, forbidding discriminatory discounts renders retailer bargaining power useless in mitigating manufacturer market power. As a result, *all* retailers end up paying higher input prices, and all retail prices rise. We show by example that the welfare loss can be substantial.

*We thank three anonymous referees and the editor for their helpful comments. The views expressed herein are not purported to represent those of the U.S. Department of Justice. Please address all correspondence to Greg Shaffer, Department of Economics, University of Michigan, Ann Arbor, MI 48109-1220 or send electronic mail to *Greg.Shaffer@um.cc.umich.edu*.

I Introduction

An oft encountered question in antitrust is whether externalities caused by particular business practices harm competition or simply transfer rents. Nowhere are the issues more difficult than in intermediate goods markets where buyers of a product subsequently compete in its resale. Because downstream firms' demands are interdependent, each firm's profit depends not only on its own input price, but also on those of its rivals. If some buyers can use their bargaining leverage to extract discounts that rivals cannot secure, the rivals are disadvantaged and thereby injured. Injury to competitors, however, is not the same thing as injury to competition, and it is not obvious that competition is harmed in this case.

Nevertheless, in an effort to protect small business from alleged unfair purchasing practices of larger rivals, and thereby to ensure "equal competitive opportunity," Congress enacted the Robinson-Patman Act in 1936. It amends Section 2a of the original Clayton Act, and makes it unlawful for a seller "to discriminate in price between different purchasers of commodities of like grade and quality" where substantial injury to competition may result. As interpreted by the courts, price discrimination has often been found to be illegal upon a mere showing of injury to competitors. This interpretation has rightfully spawned an enormous amount of criticism when applied to primary line cases (alleged injury to rivals of the seller offering the discriminatory price), but surprisingly, there has been little criticism of its application to secondary line cases (alleged injury to rivals of the buyer receiving the discriminatory price).[1]

Indeed, a common view is that society is best served by ensuring "equal competitive opportu-

[1] Primary line cases used to turn on showing injury to competitors from alleged predatory conduct by the defendant. See *Moss v. FTC*, 148 F.2d 378, (2d Cir.), *cert. denied*, 326 U.S. 734 (1945), where the Court indicated that diversion of business away from rivals in itself was sufficient to violate the statute. In another example, which Bowman (1967) has called "the most anticompetitive antitrust decision of the decade" (*Utah Pie Co. v. Continental Baking Co.*, 386 U.S. 685 (1967)), the Supreme Court inferred injury to competition from evidence of a "drastically declining price structure." Since then, the burden of proof on plaintiffs claiming predation has grown substantially. Recently, in *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.* 113 U.S. 2578 (1993), the Supreme Court ruled that a claim of primary line injury under Robinson-Patman is of the same general character as a predatory pricing claim under Section 2 of the Sherman Act, thus making it much tougher to win a primary line case.

nity" among downstream rivals. According to one proponent, who is now a federal judge,

> Price discrimination impairs efficiency in the market in which the purchasers from the discriminating seller sell, by creating competitive cost disparities unrelated to differences in the relative efficiency of the competitors. The purchaser to whom the discriminating seller sells at a lower price may be no more efficient than the competing seller who is charged a higher price.[2]

An alternative view, expressed by Bork (1978), is that the welfare effect of forbidding price discrimination in secondary line cases is ambiguous at best. Borrowing from the literature on third degree price discrimination in final goods markets, he notes that price discrimination generally results in low (high) elasticity of demand buyers receiving a higher (lower) price than they would receive under uniform linear pricing. He concludes that the overall effect on welfare is likely to be positive if new markets are served at the lower price; otherwise, the change in welfare turns on the concavity of demand curves.

However, Katz (1987) (who came "to exhume Robinson-Patman, not to praise it") correctly points out that there are fundamental differences between final goods and intermediate goods markets. One difference is that in intermediate goods markets buyers have interdependent demands. Another is that buyers of intermediate goods can often integrate backward and supply the input themselves. Building on these insights, Katz shows in a model with linear pricing that "Under reasonable conditions, intermediate goods price discrimination leads to higher input prices being charged to *all* buyers." The implication is that, ceteris paribus, Robinson-Patman may be socially beneficial.

But intermediate goods markets differ from final goods markets in other ways as well, most notably in the propensity of suppliers to bargain with downstream firms and use nonlinear pricing.

[2]Posner (1976) at footnote 14.

The consequences of these practices for efficiency are substantially different under downstream rivalry than they are under downstream monopoly. In the latter case, the seller and single buyer each agree that the marginal payment should be chosen to induce the buyer to maximize joint profits; bargaining occurs only over the fixed payment. Under rivalry, however, each buyer has an incentive unilaterally to negotiate a lower marginal payment in an effort to gain a cost advantage over its rivals. Obviously, a cost advantage gives the buyer higher profits in the resale market. But since each buyer ignores the effect on its rivals' profits, it does not fully internalize the dissipation in joint profits. Since lower marginal payments subsequently translate into lower retail prices, consumers stand to gain, and on balance social welfare rises as well.[3] Intervening in this process by forbidding intermediate product price discrimination can have adverse consequences.

To illustrate this idea, section II presents a model of a single manufacturer who negotiates non-linear contracts with two retailers who subsequently compete in distribution. We solve for a "benchmark" equilibrium for the case of no government intervention.

Section III examines how alternative interpretations of the government's ban on price discrimination affect equilibrium pricing. While the precise meaning of secondary line price discrimination under Robinson-Patman is not given in the statute, the courts appear to have settled on the following. The Act is violated if 1) retailers are offered different payment schedules, or 2) retailers are offered the same payment schedule, but the discounts received by some retailers are not "functionally available" to all. Translating this interpretation into the implied restrictions on the set of bargaining instruments available in the model allows us to solve for the 'Robinson-Patman' equilibria. Our main finding is that forbidding intermediate goods price discrimination leads to *higher* marginal input prices for *all* buyers. In contrast to Katz, our model implies that, *ceteris paribus*,

[3]The failure to maximize joint profits in this case is due to a form of contractual incompleteness. The problem is that under bilateral bargaining, nonlinear contracts are insufficient to align incentives for bilateral opportunism with the goal of maximizing joint profits. Doing so requires retailers' payments to depend on their own and their rivals' actions (see O'Brien and Shaffer, 1992). There are many reasons why such contracts may not be feasible, ranging from the costs of enforcement to illegality under the antitrust statutes.

Robinson-Patman unambiguously reduces welfare. This finding is independent of both the degree of asymmetry among the downstream firms as well as their idiosyncratic bargaining powers.

Section IV illustrates these results in a linear demand example, which shows that the welfare loss caused by Robinson-Patman can be quite large. We also compare and contrast profits under alternative regimes. Not everyone loses under Robinson-Patman; this may account for some of the lobbying behavior observed when the Act was passed and whenever policy reforms are considered.

II Model

We consider an intermediate goods market in which a single manufacturer produces a product at constant marginal cost c and sells it to two competing retailers for subsequent distribution to final consumers. The upstream monopoly assumption is made partly for tractability and partly to rule out *apriori* any primary line issues. In particular, we will not be concerned with issues of predatory pricing, or whether price discrimination fosters cartel instability. Thus, our welfare conclusions ignore these traditional concerns. The assumption of constant marginal cost dismisses any possible Robinson-Patman defense on cost justification grounds.[4] The restriction to two retailers is purely for expositional convenience. Like the constant marginal cost assumption, it can be generalized without altering any qualitative results.

Retailers are differentiated in the sense that although the product they sell is homogeneous, customers have different store preferences. Let consumer demands for the products of retailers 1 and 2 be $D_i(P_1, P_2)$, $i = 1,2$. We assume that demands are downward sloping, that the goods are substitutes, and that a unit increase in both prices causes the demand for good i to fall.

We consider a three-stage model of pricing and distribution. In the initial stage, the manufacturer publicly announces supply terms for each retailer. Unfortunately for the manufacturer, he cannot commit to these terms in the absence of laws constraining his behavior. Thus, he may soon (stage two) find himself entering into private, bilateral negotiations with each retailer, as described in detail below. Stage one is actually redundant when negotiations are unconstrained in stage two, but it becomes important when bilateral renegotiation is disallowed by Robinson-Patman. We have in mind situations like what occurred in (*U.S. v. Borden Company*, 370 U.S. 460 (1962)), where suppliers of fluid milk used private letters to offer varying discounts to certain chain stores and independents.[5] Such discounts may be offered unilaterally by the manufacturer, or they may arise from bargaining pressure exerted by downstream firms.

Once contract terms are agreed upon, the retailers engage in Bertrand competition (stage three) to establish final goods prices. A key assumption is that the ith retailer's negotiated contract is private information between the manufacturer and retailer i. This assumption is natural when contracts are determined through bilateral bargaining, since firms would adhere to publicly announced first stage contracts only if it were in their bilateral interest to do so. An implication is that a (secret) adjustment in one buyer's marginal payment does not affect its rival's final goods pricing behavior. Thus, when the manufacturer and retailer i adjust only their contract, they take as given the retail price the rival plans to set.

We capture the essence of both fixed and marginal payments by assuming that retailer i's payment to the manufacturer is

$$\begin{array}{ll} 0 & \text{if } D_i = 0, \\ F_i + w_i D_i & \text{if } D_i > 0, \end{array}$$

where w_i is the marginal payment (wholesale price) and F_i is the fixed payment. The fixed payment can be either a fixed fee (if positive) or a discriminatory slotting allowance (if negative). Let the manufacturer's profit be $\pi_M = \sum_{i=1}^{2}(w_i - c)D_i(P_1, P_2) + F_i$, and let retailer i's profit be

[4] One of the traditional criticisms of the Robinson-Patman Act is that discrimination under the law is not the same thing as economic discrimination. In theory, the Act allows for price differentials "which make only due allowance for differences in the cost of manufacture, sale, or delivery." In practice, however, the cost justification defense is generally recognized as a mirage. The inherent difficulty in determining economic costs and arbitrariness in allocating them to individual products makes for a very difficult trial defense. This paper abstracts from these difficulties by ruling out cost differences from the start.

[5] See Breit and Elzinga (1989), p. 363.

$\pi_i = (P_i - w_i)D_i(P_1, P_2) - F_i$. We assume that if an equilibrium to the Bertrand pricing game exists in which both retailers are active, that equilibrium is unique.[6]

II.1 Solving the model in the absence of government intervention.

> "When a degree of non-transferability...sufficient to make [price] discrimination profitable is present, the relation between the monopolistic seller and each buyer is, strictly, one of bilateral monopoly. The terms of the contract that will emerge between them is, therefore,...subject to the play of that 'bargaining'..." (A.C. Pigou, 1932, 278).

Turning to the details of the contracting process, we assume that when Robinson-Patman is not enforced, the manufacturer bargains simultaneously with each retailer in stage two. A variety of assumptions have been made in the literature about the details of bargaining in vertical control models like ours. The most common assumption is that the manufacturer has all the bargaining power, and offers take-it or leave-it two-part tariffs that are observed by both retailers before choosing final prices (i.e., stage two would be the same as stage one in our set-up). Under this assumption it is well known that the unique subgame perfect equilibrium yields a wholesale price vector $\mathbf{w}^{\mathbf{I}}$ that induces retailers to charge the vertically integrated retail price vector $\mathbf{P}^{\mathbf{I}}$, and fixed fees that collect retailers' surplus.[7] A difficulty with using this approach to examine the effects of Robinson-Patman, however, is that it ignores incentives the manufacturer and each retailer may have to renegotiate *privately*.

We desire an equilibrium concept incorporating the idea that equilibrium contracts should be robust against private renegotiation by firms who contract with each other, at least in situations when bilateral renegotiation is legal. A fairly general way to capture this idea is to define a *bargaining equilibrium* as a set of contracts, and Bertrand final goods prices induced by those contracts,

[6] It suffices to assume that retailer i's profit under two-part tariffs is concave in P_i and obeys the dominant diagonal condition $|\partial^2\pi_i/\partial P_i^2| > \sum_{j\neq i}|\partial^2\pi_i/\partial P_i\partial P_j|$.

[7] See Dixit (1983) and Mathewson and Winter (1984).

that simultaneously solve asymmetric Nash bargaining solutions between the manufacturer and each retailer.[8] To ensure that each Nash bargaining problem is well defined under our assumption that contracts are private information, we assume that the manufacturer and each retailer bargain taking the rival retailer's contract and retail price as given.[9] We will be more precise about how this concept embodies the idea of robustness against private renegotiation as we proceed. We will also discuss its foundations from noncooperative bargaining theory in subsection II.2 below.

The Nash bargaining problem of the manufacturer and retailer i is described by their disagreement points, $(d_{M_i}, 0)$, and by the convex set of payoff pairs, $\Omega_i = \{(\pi_M, \pi_i) | \pi_M - d_{M_i}, \pi_i \geq 0\}$. We assume the disagreement point d_{M_i} corresponds to the profit the manufacturer expects to earn if negotiations with retailer i break down. In this event, the manufacturer and rival retailer negotiate as bilateral monopolists according to their respective bargaining strengths.[10]

A set of asymmetric Nash bargaining solutions is a vector of wholesale prices and fixed fees that maximize the Nash products $\phi_i = (\pi_M - d_{M_i})^{\alpha_i}(\pi_i)^{(1-\alpha_i)}$, $i = 1, 2$, where $\alpha_i \in (0, 1)$ is a measure of the manufacturer's bargaining power in negotiations with retailer i. Differentiating ϕ_i with respect to F_i gives the pair of first order conditions

$$\frac{\partial \phi_i}{\partial F_i} = \alpha_i\pi_i - (1-\alpha_i)(\pi_M - d_{M_i}) = 0, \quad i = 1, 2. \tag{1}$$

[8] The phrase "bargaining equilibrium" is due to Harsanyi (1977), who considers the general problem of simultaneous bargaining by two-player coalitions in N-player bargaining games. Our definition is actually closer to that of Horn and Wolinsky (1988), who examined incentives for horizontal mergers by upstream and downstream firms when input prices are negotiated. The main difference between our definition and theirs is that they considered observable linear contracts, whereas we consider non-linear contracts that are private information.

[9] We thank an anonymous referee for suggesting the need to clarify the assumptions defining the utility possibility frontier in each bilateral bargaining problem.

[10] Under this assumption the Nash bargaining solution between the manufacturer and each retailer corresponds to the equilibrium of an alternating offer non-cooperative bargaining game in which firms are motivated to reach agreement by fears that negotiations may break down. Our qualitative results hold equally well when the disagreement point corresponds to the profit stream the manufacturer earns from firm j while in a state of disagreement with firm i. See Binmore, Rubinstein, and Wolinsky (1986) for the theoretical connection between non-cooperative bargaining and these two interpretations of the disagreement point in the Nash bargaining solution. The assumption in the text is made only to simplify computations in deriving explicit solutions to the model.

Differentiating ϕ_i with respect to w_i, using (1), and simplifying, gives the first order conditions

$$D_i + (P_i - c)\frac{\partial D_i}{\partial P_i} + (w_i - c)\frac{\partial D_j}{\partial P_i} = 0, \quad i = 1,2, \quad j \neq i. \tag{2}$$

Optimal retailer pricing requires

$$D_i + (P_i - w_i)\frac{\partial D_i}{\partial P_i} = 0 \quad i = 1,2. \tag{3}$$

Conditions (1), (2), and (3) are necessary for $(w_1, w_2, F_1, F_2, P_1, P_2)$ to arise in a bargaining equilibrium. Surprisingly, they yield the following strong prediction.

Proposition 1 *When price discrimination is allowed, the bargaining equilibrium wholesale prices equal the manufacturer's marginal cost.*[11]

Proof: Substituting equation (3) into (2), we see that setting $w_1 = w_2 = c$ satisfies (2). Thus, $w_1 = w_2 = c$ is a solution to equations (2) and (3), and fixed fees can be chosen to satisfy (1). The appendix shows that marginal cost pricing is the only solution to 1-3. Q.E.D.

This conclusion is independent of α_i and holds for any amount of demand asymmetry. It is driven by the assumption that negotiations are done in private. Intuitively, because retailer 2 cannot observe retailer 1's actual supply terms, the manufacturer and retailer 1 know that an adjustment in w_1 will not affect either P_2 or F_2. Suppose $w_2 = c$, so that the manufacturer extracts a surplus of F_2 from retailer 2. Then in negotiations with retailer 1, it is as if retailer 2 does not exist. The manufacturer and retailer 1 simply act as if they are bilateral monopolists taking P_2 as given. In this case, it is well known that the Nash bargaining solution reduces to a two step procedure. The two parties first maximize joint surplus by choosing a marginal payment equal to marginal cost ($w_1 = c$), then they divide the surplus with a fixed fee determined according to their individual bargaining strengths. Now suppose $w_1 = c$. Then by the same reasoning, the

[11]O'Brien and Shaffer (1992) show that this result also holds under general non-linear contracts. What drives the result is that private negotiations take place over both marginal and fixed components of the payment schedule.

manufacturer and retailer 2 perceive themselves as bilateral monopolists and choose $w_2 = c$. Thus, the set of contracts with $w_1 = w_2 = c$ and F_1, F_2 chosen to reflect bargaining strengths are mutual (bilateral) best responses and therefore arise in a bargaining equilibrium.[12]

Note that in addition to characterizing the bargaining equilibrium wholesale prices, equation (2) is the first order condition for choosing a wholesale price w_i to maximize the bilateral profits $\pi_M + \pi_i$ of the manufacturer and retailer i. Since wholesale prices equal marginal cost in any bargaining equilibrium, it follows that if either wholesale price is different than marginal cost, the manufacturer and at least one retailer can negotiate a different wholesale price that will increase their joint surplus. This verifies our earlier assertion that the bargaining equilibrium concept embodies the idea of robustness against private renegotiation.[13]

Despite their best efforts, neither retailer in this model gains a marginal cost advantage over its rival in equilibrium.[14] They both end up negotiating wholesale prices equal to production marginal cost. This does not mean that the resulting retail prices are the same (since demands may be asymmetric), nor does it mean that the average prices paid for the manufacturer's product are the same. Each retailer's average price is determined by the quantity it buys in equilibrium and its fixed fee. The fixed fee, in turn, depends *inter alia* on relative bargaining powers. Suppose, for example, that retailer 2 is a large chain store and retailer 1 is a small independently owned concern.

[12]The intuition is precisely the same when downstream firms are Cournot competitors. Hart and Tirole (1990) and McAfee and Schwartz (1993) show that marginal cost input pricing arises in that case as well.

[13]One might argue that the need to develop a reputation might prevent the upstream firm from engaging in this type of opportunism. But reputation alone is not always enough, especially for young upstream firms. For example, retailers may believe that the upstream firm will not be around long enough to reap the benefits of building a reputation. Even for experienced firms, if downstream orders are infrequent, the short term gains from making private offers may outweigh the value of building a reputation. Another problem arises if retailers have difficulty distinguishing opportunism from exogenous fluctuations in market conditions. In this case a supplier may simply be unable to build a reputation. Finally, it is clear that reputation does not work in every case from the complex franchise contract law on disclosure and dealer termination.

[14]We have abstracted from several considerations that could give one buyer lower marginal prices. First, the manufacturer may have a lower marginal cost of selling to one buyer than another. If so, then each buyer would receive its good at the marginal cost of serving it. Second, retailers may differ in their degrees of risk aversion. For example, a retailer that is more risk averse may negotiate a lower fixed payment in exchange for a higher wholesale price. Third, some buyers may be compensated at the margin for performing tasks that are traditionally reserved for wholesalers. We leave these extensions for future research, but note here that as long as the engendered cost advantage is small enough, our qualitative results will continue to hold.

Then there are two factors that may tend to give the chain a lower average price. First, because of its size, the large chain can spread its fixed cost over a greater quantity than can its smaller rival. Second, the chain store is likely to have more bargaining power than the smaller store and hence may be able to negotiate a lower fixed fee.[15]

Notice that since $w_1 = w_2 = c$, bargaining equilibrium retail prices are the same as would be chosen by vertically integrated duopolists who each produce at marginal cost c. These prices generally fall well short of joint profit maximizing levels.[16] The bargaining equilibrium outcome is about as competitive as one could hope for. Proposition 1 implies that retail monopsony power suffices to block completely market power at the manufacturing stage from being passed on to consumers.

II.2 Noncooperative foundations of bargaining equilibria.

We close this section by briefly describing two noncooperative games that yield bargaining equilibria as solutions.[17] Consider first the simple bargaining game in which a single upstream firm makes private take-it or leave-it offers to multiple retailers who then compete by simultaneously choosing retail prices. As pointed out by several authors,[18] this game and its Cournot variant have multiple perfect Bayesian equilibria owing to the arbitrary nature of retailers' out-of-equilibrium beliefs about offers received by their rivals. Two approaches have been suggested to deal with this problem. One approach is to require equilibria to be immune not only from profitable deviations by individual players, but also from profitable contractual deviations by coalitions of players who contract with each other. Such equilibria were called "contract equilibria" by Cremer and Riordan (1987) in a somewhat different context.[19] O'Brien and Shaffer (1992) showed that a bargaining equilibrium is a contract equilibrium with a particular distribution of rents determined by α_i, $i = 1, 2$.

An alternative approach to the multiplicity problem is to place restrictions on retailers' out-of-equilibrium beliefs. The "market-by-market bargaining" restriction of Hart and Tirole (1990) and the "passive beliefs" restriction of McAfee and Schwartz (1993) require that retailers view unexpected offers by the manufacturer as unilateral deviations. Under this restriction, the unique perfect Bayesian equilibrium to the take-it or leave-it game yields a bargaining equilibrium in which the manufacturer receives all the rents. Intuitively, unilateral deviation beliefs force equilibria to be immune from profitable bilateral deviations by the manufacturer and each retailer.[20]

The take-it or leave-it game can be generalized to an infinite horizon bargaining game in which the manufacturer and each retailer alternate offers each period until reaching agreement or until negotiations break down. Briefly, suppose the manufacturer makes private offers to both retailers

[15] In general, the size of the discount a retailer can negotiate is increasing in its threat point, the inverse of its discount rate, and its cost of making bargaining concessions. Thus, a chain store may obtain a lower average price than a smaller independent store because it has better alternatives in the event negotiations break down, it has a higher discount rate, or it is more costly for it to accept a higher price.

[16] Joint profit maximization requires wholesale prices in excess of marginal cost in order to induce retailers to internalize the effects of their rivalry.

[17] This exercise is in the spirit of what has become known as "the Nash program," which refers to the idea whose origins can be traced to Nash (1953) that the choice of axioms in cooperative approaches to the bargaining problem should be guided by noncooperative games that explicitly model players' bargaining moves. Binmore (1985) has suggested that, "operationally, this means that cooperative solution concepts need to be firmly rooted in noncooperative theory in the sense that the concept should be realizable as the solution of at least one interesting and relevant noncooperative bargaining game (and preferably of many such bargaining games)."

[18] See Hart and Tirole (1990), O'Brien and Shaffer (1992) and McAfee and Schwartz (1993).

[19] A related idea is the "strong equilibrium" concept of Aumann (1959), which requires immunity from profitable deviations by *any* coalition of players. Weakening this to allow deviations only by individuals and coalitions of firms that contract with each other yields a contract equilibrium in our model.

[20] One might think that the manufacturer's offer to retailer i might signal the offer (or set of reasonable offers) it has made to retailer j. If so, this could reduce the set of "reasonable" equilibria. Unfortunately, the refinements in the literature that deal with the signalling problem under imperfect information (e.g., the "intuitive criterion" and others implied by "strategic stability" (Kohlberg and Mertens, 1986)), have little power in our model, even in the take-it or leave-it framework. The difficulty can be seen by observing that Kohlberg and Mertens' "never a weak best response" (NWBR) criterion for pruning inferior strategies with the hope of eliminating equilibria that are not part of stable sets does not prune many strategies at all in our model. For example, one type of equilibrium to the take-it or leave-it game has the manufacturer offer the wholesale price vector $\mathbf{w}^{\mathbf{I}}$ that induces retailers to set the vertically integrated price vector $\mathbf{P}^{\mathbf{I}}$, and a fixed fee vector $\mathbf{F}^{\mathbf{I}}$ that collects both retailers' surplus. This equilibrium can be supported by each retailer's strategy of charging P_i^I whenever offered the contract it expects and rejecting any other offer. The NWBR formulation of stability states that an equilibrium *outcome* must remain an equilibrium outcome when a strategy is deleted which is inferior (i.e., not a best reply) at every equilibrium with that outcome. Now if it were true that all offers to retailer j other than w_j^I were inferior at every equilibrium with the vertically integrated outcome, then one could eliminate those strategies and show that the manufacturer could gain by deviating, since in the new game retailer i would then effectively have unilateral deviation beliefs. However, there are equilibria that yield the vertically integrated outcome in which offering $\hat{w}_j \neq w_j^I$ is a weak best reply for the manufacturer to the retailers' equilibrium strategies. In one of these equilibria, retailer i rejects any offer that does not include w_i^I and charges P_i^I if it receives the offer it expects; retailer j rejects any offer that does not include w_j^I or $\hat{w}_j$ and charges P_j^I when offered either w_j^I or $\hat{w}_j$ along with a fixed fee that it expects will extract all its surplus. Similar arguments make it clear that stability does not significantly reduce the set of equilibria in this game.

in period 1 that the retailers simultaneously accept or reject. Each retailer who accepts its offer chooses a retail price. Each retailer who rejects its offer faces a small exogenous probability that its negotiations may break down before it can make a counteroffer. In that event any retailer who has reached agreement learns of it and renegotiates with the manufacturer by alternating offers as in Rubinstein (1982). If its negotiations do not break down, each retailer who rejects the offer comes back in period 2 with a counter offer (the offers are simultaneous if both retailers remain unsigned), which the manufacturer accepts or rejects. Retailers whose offers are accepted then choose retail prices. Bargaining continues in this way, with the manufacturer making offers to unsigned retailers in each odd period, with unsigned retailers making counteroffers to the manufacturer in each even period, and with a small exogenous probability that each retailer's negotiations may break down between periods, until both retailers have reached agreement or negotiations have broken down, at which time final sales are made. It can be shown that under the unilateral deviation beliefs restriction, this game has a unique perfect Bayesian equilibrium in which wholesale prices equal marginal cost and the equilibrium division of rents depends on firms' relative levels of impatience.[21] Different levels of impatience translate into different values of α_i, $i = 1, 2$, in the Nash bargaining approach we have adopted. The analysis of this game is similar to that of Jun (1989), who examines a similar alternating offer bargaining model of negotiations between an employer and two unions. The main difference is that Jun finds a unique subgame perfect equilibrium, whereas with unobservable nonlinear contracts, we require unilateral deviations beliefs to establish uniqueness.

III Forbidding Price Discrimination

A secondary line violation of the Robinson-Patman Act is established if there is a reasonable possibility that the seller's discriminatory prices may injure competition. Historically, the Supreme Court has inferred the requisite injury to competition from price differentials sufficient in amount to influence resale prices or impair profits.[22]

Translated into our model, we interpret the Supreme Court as requiring the marginal payment, i.e., the wholesale price, to be the same for both retailers. This requirement is independent of whether a firm receiving a lower wholesale price passes some of it through to consumers via a lower retail price. Obviously, any pass-through creates a retail price wedge over and above what would exist in the absence of any discrimination, and the firm paying the higher wholesale price has grounds to sue by virtue of the link between the additional wedge and its resulting loss in sales. But even if the favored retailer does not lower its retail price, the firm paying the higher wholesale price can still sue on the grounds that its profit was impaired relative to its rival.[23]

By the same reasoning, we interpret the Supreme Court as requiring any fixed payment to be the same for both retailers. However, whether or not fixed payments are even allowed depends on how the courts interpret a fixed payment schedule that is the same for all downstream buyers regardless of their size. The law is somewhat ambiguous regarding instances in which by virtue of the same fixed payment, a large retailer in effect receives a lower average price than a small retailer. But it appears that a finding of injury turns on the degree of asymmetry between buyers. If a lower average price were judged "functionally available" to all, then the manufacturer's payment schedule would not be deemed to have caused injury. On the other hand, if the lower average price were not "functionally available" to all, then the requisite injury would be found.[24]

[21] As when the manufacturer makes take-it or leave-it offers, unilateral deviations beliefs have the effect of forcing equilibria to be immune from profitable bilateral renegotiation. This yields wholesale prices equal to marginal cost, leaving only fixed fees to be determined by firms' levels of impatience in bargaining.

[22] See *FTC v. Morton Salt Co.*, 334 U.S. 37, (1948). In the Supreme Court's most recent statement on secondary line injury, *Falls City Industries, Inc. v. Vanco Beverage, Inc.*, 460 U.S. 428 (1983), it reaffirmed that an inference of injury can only be overcome by "evidence breaking the causal connection between a price differential and lost sales or profits."

[23] See *Foremost Dairies, Inc. v. FTC*, 348 F. 2d 674 (5th Cir.), *cert. denied*, 382 U.S. 959 (1965). According to the most recent ABA monograph on the Robinson-Patman Act (1980), the inference of injury rule "applies even if resale prices between favored and unfavored purchasers remain the same, since the latter may still be injured by impairment of their profits or their ability to provide services."

[24] For instance, one of the reasons the Court found against *Morton Salt*, was that "theoretically, these discounts are equally available to all, but functionally they are not," 334 U.S. 37, 42-43. According to Rowe (1962 p. 97,98), "no price discrimination arises if the same concessions are practically accessible to all customers" (he cites *National Lead Co.*, 49 FTC 791, (1953) and *Unites States Rubber Co.*, 28 FTC 1498, (1939)).

Based on this interpretation, we consider two cases. In the first case, the manufacturer must charge a common wholesale price and cannot specify a fixed fee. In the second case, the manufacturer is allowed to charge a common fixed fee in addition to a common wholesale price. The second case is permitted provided the degree of asymmetry among retailers is small enough. We also consider a third case which practically may arise because of information constraints. In some situations the courts may simply not be able to verify discriminatory fixed fees. Thus, in our third case, although the manufacturer must charge a common wholesale price, the fixed fees are determined through bargaining.

The timing in our model is the same as before. In the initial stage, the manufacturer publicly announces its supply terms. However, these terms are now subject to legal restrictions. Bargaining, if any, takes place in stage two, and retail prices are chosen in stage three. We assume that bargaining can arise only in case three, i.e., only when the courts cannot verify discriminatory fixed fees, and then only over the fixed payment. We do not allow bargaining over the wholesale price. Our justification for this assumption is the clause in section 2f of the Robinson-Patman Act which makes it illegal for a buyer "knowingly to induce or receive a discrimination in price." In other words, retailers in our model refrain from renegotiating the wholesale price because if they were successful, they would be held liable for inducing illegal price discrimination. The manufacturer obviously prefers that there be no bargaining over the wholesale price and has every incentive to remind retailers of their liability under section 2f.[25]

We begin by solving the retailers' pricing problem, the stage of the game that is common to each of the three cases. Each retailer chooses its price P_i, to maximize $\pi_i = (P_i - w)D_i(P_1, P_2)$,

[25]An alternative assumption, which we do not make, is that retailers can negotiate over the wholesale price, cognizant of the fact that if anyone is successful in obtaining a discount, the lower wholesale price is then granted to their rivals as well. The disadvantage of this alternative assumption is that it requires a more complete specification of the bargaining process, and would at best only mitigate the welfare problem we identify, without altering our qualitative conclusions. Intuitively, bargaining over the wholesale price loses much of its appeal to buyers who know that they cannot gain a marginal cost advantage. Adding to this is the fact that the manufacturer will be more reticent to grant wholesale price concessions precisely because he knows that they must be given to all buyers. Both of these factors lead to a higher wholesale price when discrimination is forbidden than when it is allowed.

$i = 1, 2$. The first order conditions are given as follows:

$$\frac{\partial \pi_1}{\partial P_1} = (P_1 - w)\frac{\partial D_1}{\partial P_1} + D_1 = 0, \qquad (4)$$
$$\frac{\partial \pi_2}{\partial P_2} = (P_2 - w)\frac{\partial D_2}{\partial P_2} + D_2 = 0.$$

Solving gives the final stage equilibrium retail prices $\mathbf{P}^* = (P_1^*(w), P_2^*(w))$.[26] We assume that retail prices are increasing in w. It suffices that reaction functions be upward sloping.

III.1 Common wholesale price, no fixed fee.

Consider first the strictest interpretation of the Robinson-Patman Act, i.e., that the manufacturer must charge a common wholesale price and cannot specify a fixed fee. Given the equilibrium retail prices derived above, the manufacturer's problem is to choose w to maximize

$$\pi_M^{NF} = (w - c)\sum_i D_i(\mathbf{P}^*),$$

where the superscript NF is a pneumonic aid for 'no fee'. Differentiating π_M^{NF} with respect to w gives the first order condition

$$\sum_{i=1}^{2} D_i(\mathbf{P}^*) + (w - c)\sum_{i=1}^{2}\sum_{j=1}^{2}\frac{\partial D_i}{\partial P_j}\frac{dP_j^*}{dw} = 0. \qquad (5)$$

Solving yields $w^{NF} > c$. Substituting into the final stage equilibrium retail prices gives $P_i^{NF} = P_i^*(w^{NF}) > P_i^*(c)$, for $i = 1, 2$.

Proposition 2 *When the Robinson-Patman Act requires a common wholesale price and no fixed fee, both retail prices are strictly greater than when price discrimination is allowed.*

Intuitively, since the manufacturer cannot extract surplus with a fixed fee, it has no alternative than to raise the wholesale price above its marginal cost. Retailers then add their own markup. In effect, the courts mandate a 'double markup' solution with consumers as the definitive losers.

[26]Equilibrium retail prices are a function of the common wholesale price, which is common knowledge to both retailers.

III.2 Common wholesale price, common fixed fee.

A looser interpretation of the Robinson-Patman Act is that a nonlinear pricing schedule is permitted as long as the discounts are "functionally available" to all. In other words, in equilibrium, sales of the two retailers must be "close enough." Assuming that $D_1(\mathbf{P}^*) \approx D_2(\mathbf{P}^*)$, in this subsection, we analyze the case in which the manufacturer is allowed to charge a common wholesale price and fixed fee. Assuming the manufacturer sells to both retailers, it will set its fixed fee to extract fully the surplus of the less profitable retailer. Let retailer 1 be this retailer. Then, given the final stage equilibrium retail prices, the manufacturer's problem is to choose w to maximize

$$\pi_M^{CF} = (w-c)\sum_{i=1}^{2} D_i(\mathbf{P}^*) + 2(P_1^* - w)D_1(\mathbf{P}^*),$$

where the superscript CF is a pneumonic aid for 'common fee'. Differentiating π_M^{CF} with respect to w, using (4), and simplifying gives the first order condition

$$(w-c)\sum_{i=1}^{2}\sum_{j=1}^{2}\frac{\partial D_i}{\partial P_j}\frac{dP_j^*}{dw} + (D_2(\mathbf{P}^*) - D_1(\mathbf{P}^*)) + 2(P_1^* - w)\frac{\partial D_1}{\partial P_2}\frac{dP_2^*}{dw} = 0. \tag{6}$$

Since $dP_2^*/dw > 0$, $\partial D_1/\partial P_2 > 0$, and $D_2(\mathbf{P}^*) - D_1(\mathbf{P}^*) \approx 0$, the left hand side of (6) is positive when evaluated at $w = c$.[27] Assuming the objective function is quasi-concave in w,[28] the wholesale price is higher when discrimination is forbidden than when it is allowed. Let w^{CF} denote the equilibrium wholesale price. Substituting into the final stage equilibrium retail prices gives $P_i^{CF} = P_i^*(w^{CF}) > P_i^*(c)$, for $i = 1, 2$.

Proposition 3 *When the Robinson-Patman Act requires a common wholesale price and fixed fee, and when the two-part tariff must be functionally available to all ($D_2(\mathbf{P}^*) - D_1(\mathbf{P}^*) \approx 0$), both retail prices are strictly greater than when price discrimination is allowed.*

[27]More formally, a sufficient condition for the left hand side of (6) to be positive, when evaluated at $w = c$, is that sales of the less profitable retailer be less than sales of the more profitable retailer. For $N > 2$ retailers, the generalization of the sufficient condition is that sales of the least profitable retailer be less than the average sales across all retailers.

[28]The objective is quasi-concave, e.g., under linear demand.

Intuitively, because the Robinson-Patman Act prohibits retailers from knowingly inducing discriminatory prices, the wholesale price is not bargained down to marginal cost. Instead, the manufacturer unilaterally sets its wholesale price above marginal cost in order to internalize downstream competition, and thereby drive retail prices closer to their joint profit maximizing levels.[29] Consumers are unambiguously worse off as a result.

III.3 Common wholesale price, discriminatory fixed fees.

The last scenario we consider is not so much a new interpretation of the Robinson-Patman Act as it is a recognition of an information constraint on the ability of the courts and retailers to ascertain price discrimination violations. One possibility is that the courts can verify wholesale prices, but not discriminatory fixed fees, which may take the form of under-the-table payments, rebates, or other allowances that are difficult to uncover. In this case, a disadvantaged retailer simply cannot prove a discriminatory fixed fee violation of Robinson-Patman. Another possibility is that the courts can verify fixed fees if called upon to do so, but the system is costly, and a retailer may not know for sure whether it has been disadvantaged. For example, suppose retailers can only infer discrimination when they observe "surprise" retail prices by their rivals. Any rival who receives discriminatory terms can hide this fact by setting its retail price equal to what it would set in the absence of any favoritism. By doing so, it avoids detection. In either case, the Robinson-Patman Act serves only to ensure stability in retail prices, not equity in surplus extraction.

We model this situation by assuming that the manufacturer must choose a common wholesale price, but that fixed fees are determined through secret bilateral bargaining.[30] This case differs from the previous two in that now the bargaining stage of the model matters. We proceed to

[29]If the two-part tariff is not required to be functionally available to all, the manufacturer has to balance its desire to internalize downstream competition with the possibility that sales of the less profitable retailer will be hurt more at the margin than sales of the more profitable retailer. This caveat arises because when the manufacturer is restricted to a common fixed fee, it cannot fully extract the surplus of the more profitable retailer.

[30]There is no loss of generality in assuming that the wholesale price is observable. As long as the recipient of the discriminatory contract sets its retail price equal to what it would set in the absence of any favoritism, bargaining over the wholesale price and bargaining over the fixed fee are equivalent.

solve backwards. Given the final stage Bertrand equilibrium retail prices, $(P_1^*(w), P_2^*(w))$, the manufacturer and each retailer negotiate in stage two over the fixed fees. Negotiations with retailer i yields a fixed fee that maximizes the Nash product $\phi_i = (\pi_M - d_{M_i})^{\alpha_i}(\pi_i)^{(1-\alpha_i)}$. Differentiating ϕ_i with respect to F_i gives the pair of first order conditions found in (1). Simultaneously solving the two equations for F_1 and F_2 as functions of w, and then substituting them into the manufacturer's profit yields

$$\pi_M^{DF} = \frac{\alpha_1\alpha_2\left(\sum_{i=1}^{2}(P_i^* - c)\,D_i\right) + \sum_{j\neq i}(1-\alpha_i)\alpha_j d_{M_i}}{\alpha_1 + \alpha_2 - \alpha_1\alpha_2}, \tag{7}$$

where the superscript DF is a pneumonic aid for 'discriminatory fee'.

Proceeding backwards, in the initial stage the manufacturer chooses w to maximize its profit, knowing how its decision will subsequently affect fixed fee negotiations in stage two and retail pricing decisions in stage three. Differentiating (7) with respect to w, using (4), and simplifying gives the first order condition

$$\alpha_1\alpha_2\left((w-c)\sum_{i=1}^{2}\sum_{j=1}^{2}\frac{\partial D_i}{\partial P_j}\frac{dP_j^*}{dw} + \sum_{i=1}^{2}\sum_{j\neq i}(P_i^* - w)\frac{\partial D_i}{\partial P_j}\frac{dP_j^*}{dw}\right) + \sum_{j\neq i}(1-\alpha_i)\alpha_j\frac{d(d_{M_i})}{dw} = 0. \tag{8}$$

Since $dP_j^*/dw > 0$ and $\partial D_i/\partial P_j > 0$, $j \neq i$, a sufficient condition for the left hand side of (8) to be positive when evaluated at $w = c$ is that the derivative of the manufacturer's disagreement point with respect to w be nonnegative. Under our interpretation of the disagreement point as the profit the manufacturer can expect to earn if negotiations with retailer i break down, the derivative is zero.[31] Hence, assuming the objective function is quasi-concave in w, the wholesale price will be higher when price discrimination is forbidden than when it is allowed. Let w^{DF} denote the equilibrium wholesale price. Substituting into the final stage equilibrium retail prices gives $P_i^{DF} = P_i^*(w^{DF}) > P_i^*(c)$ for $i = 1, 2$.

[31]The nonnegativity of the derivative of the disagreement point with respect to w is robust to the alternative interpretation that d_{M_i} corresponds to the profit stream that the manufacturer expects to earn from retailer j while he is in a state of disagreement with retailer i. In this case, $d_{M_i} = (w-c)\tilde{D}_j + \tilde{F}_j = \alpha_j(P_j - c)D_j + (w-c)\left[\tilde{D}_j - D_j\right] - (1-\alpha_j)(w-c)\left[D_i - \tilde{D}_i\right]$, where $\tilde{D}_j$ represents demand for j's product while retailer i is in a state of disagreement, $\tilde{D}_i$ represents demand for i's product while retailer j is in a state of disagreement, and $\tilde{F}_j$ represents retailer j's negotiated fixed fee as a function of w. Since $\tilde{D}_i > D_i$, $i = 1, 2$, it is straightforward to verify that $(\partial d_{M_i}/\partial w)|_{w=c} > 0$.

Proposition 4 *When the Robinson-Patman Act requires a common wholesale price but allows discriminatory fixed fees, both retail prices are strictly greater than when price discrimination is allowed.*

Intuitively, the manufacturer commits to a uniform wholesale price knowing that it will subsequently negotiate a given fraction of the profits derived from each good. Thus the manufacturer effectively chooses the wholesale price in stage one to maximize a weighted average of the profits earned by each good. This requires raising the wholesale price above marginal cost to at least partially internalize the externality from downstream competition. This case is similar to the common fee case in that the wholesale price is not needed for surplus extraction and can be used to internalize downstream competition, but note that the term $D_2(\mathbf{P}^*) - D_1(\mathbf{P}^*)$ is absent from the first order condition. Since discriminatory fixed fees are negotiated, the manufacturer does not need to balance the possibility that raising the wholesale price might reduce sales of the less profitable retailer by more than sales of the more profitable retailer.

An important implication of this model is that the Robinson-Patman Act has perverse effects even when it does not affect the type of discrimination that actually emerges in equilibrium. Both the benchmark case and the common wholesale price, discriminatory fee case yield a common wholesale price and discriminatory fee in equilibrium (except under symmetry, in which case both yield common fees). Nevertheless, the wholesale price is higher when a common wholesale price is required by law than when it is derived from private bilateral negotiations. The perverse effect of Robinson-Patman is to prevent such negotiations from driving down wholesale prices.

IV Profit and Welfare Comparisons

> "Wherever a little band of lawmakers are gathered together in the sacred name of legislation," said one observer, "you may be sure that they are ... thinking up things they can do to the chain stores." (J. Palamountain, 1955, 162)

We now turn to the policy implications of our model. In particular, we ask what the model implies about how the government can proceed to achieve its objectives. The discussion below is summarized by the flow chart in Figure 1.

The first thing to notice is that *all* firms (weakly) prefer some price discrimination policy over no policy at all.[32] Firms differ, however, in their preferences among Robinson-Patman regimes. The common fee case, if informationally feasible, is the worst for the small retailer, since the manufacturer commits to a fixed fee that extracts its entire surplus. Thus, if Congress intended the Robinson-Patman Act as a means of protecting the small businessman from the chain store "menace,"[33] its choice is between the no fee case and the discriminatory fee case. If the small retailer has little or no bargaining power, as was generally believed when Robinson-Patman was passed, then the no fee regime serves it best. This is because the rents associated with its mark-up in the no fee regime are not transferred to the manufacturer as they are in the other regimes. On the other hand, if the small retailer has substantial bargaining power, the discriminatory fixed fee regime serves it best. This is because the discriminatory fixed fee regime maximizes joint profits; if the small retailer has enough bargaining power, its share of maximized joint profits exceeds what it earns under the no fee regime.

[32] To see this, compare the discriminatory fixed fee case, which maximizes joint profits, to the benchmark case, which does not. Let Π be the joint profits of the manufacturer and both retailers. It is straightforward to show that in any bargaining equilibrium in which fixed fees are not constrained, the manufacturer earns $\pi_m = A\Pi + B$, where $A = \alpha_1\alpha_2/(\alpha_1 + \alpha_2 - \alpha_1\alpha_2)$ and $B = [\sum_{j\neq i}(1-\alpha_i)\alpha_j d_{M_i}]/(\alpha_1 + \alpha_2 - \alpha_1\alpha_2)$, and retailer i earns $\pi_i = C_i\Pi + D_i$, where $C_i = (1-\alpha_i)\alpha_j/(\alpha_1 + \alpha_2 - \alpha_1\alpha_2)$ and $D_i = (1-\alpha_i)(d_{M_i} - d_{M_j} - a_j d_{M_j})/(\alpha_1 + \alpha_2 - \alpha_1\alpha_2)$. Since each firm's profit is a affine function of joint profits under the two cases, and since the disagreement points do not depend on w, each firm is better off at $w^{DF} > c$.

[33] See the American Bar Association monograph 4 on Robinson-Patman (1980), pp. 14-19.

Although protecting the manufacturer and large retailer was never a stated goal of Robinson-Patman, it could be a secondary goal if the government values their profits or if they have political influence. In general, the preferences of these firms over the different Robinson-Patman regimes depends on their relative bargaining powers and the degree of substitution between retailers' products. However, their preferences may well conflict with that of the small retailer. For example, if retailers are close to being symmetric, the manufacturer earns close to the maximized joint profit in the common fee case. Retailers, however, do poorly. As another example of conflicting preferences, if the chain store has substantial bargaining power, it prefers the discriminatory fee regime, since that regime maximizes joint profits. But if at the same time, the small retailer has little bargaining power, it prefers the no fee regime, etc.

Like most of the antitrust statutes, the Robinson-Patman Act proscribes actions whose effect "may be substantially to lessen competition." If "competition" refers to a process tending to lower price toward marginal cost, then our results imply that Robinson-Patman itself lessens competition. Unlike the firms, consumers are best served when price discrimination is allowed, for in each Robinson-Patman regime prices are higher than in the benchmark case.

We can get an idea of how large the welfare (producer plus consumer surplus) loss from Robinson-Patman can be in a linear demand example. Assume that aggregate net utility is

$$U = \left(\frac{(1+\gamma)V_1 + \gamma V_2}{1+2\gamma}\right) q_1 + \left(\frac{(1+\gamma)V_2 + \gamma V_1}{1+2\gamma}\right) q_2 - \frac{1}{2}(q_1 + q_2)^2 - \frac{(q_1 - q_2)^2}{2(1+2\gamma)} - \sum_{i=1}^{2} P_i q_i,$$

where V_1, V_2, and γ are nonnegative constants and q_i is the quantity consumed of the ith good. Differentiating with respect to quantity and inverting gives the demand system

$$D_i(P_1, P_2) = \frac{1}{2}(V_i - (1+\gamma)P_i + \gamma P_j), \;\; i = 1, 2, \;\; j \neq i.$$

The parameter γ represents the degree of substitution between products. For a unit increase in P_i, retailer i loses $1+\gamma$ in sales, and of this, γ sales are diverted to retailer j. Thus $\gamma/(1+\gamma)$

represents the increase in j's sales as a fraction of the reduction in i's sales. When $\gamma = 0$, no sales are diverted; consumer demands are independent. As $\gamma \to \infty$, retailers become perfect substitutes in the eyes of consumers. Differences between the market size parameters V_1 and V_2 reflect the degree of asymmetry.

Figure 2 illustrates the percentage decrease in total welfare arising from the three Robinson-Patman regimes when $V_1 = 9$, $V_2 = 10$, and $c = 0$. Notice that as the retailers' products become closer substitutes (γ increasing), the welfare loss under the discriminatory and common fee cases increases, while the welfare loss decreases in the no fee case. At $\gamma = 0$, the welfare loss is 0%, 3.6%, and 41.5% respectively. At $\gamma = 5$, the welfare loss is 23.4%, 23.7%, and 31.2%. Intuitively, the discriminatory and common fee cases yield similar welfare results because the retailers are close to symmetric in the example. Nevertheless, the discriminatory fee case is always preferable to the common fee case and yields zero welfare loss at the polar extreme where the retailer's products are independent ($\gamma = 0$). By contrast, the double markup in the no fee case is exacerbated as retailers' products become less substitutable (γ decreasing). On the other hand, as retailers' products become more substitutable (γ increasing), all three cases converge in the limit to maximize joint profit (not shown). But the welfare loss associated with joint profit maximization (25%) is still substantial when compared to the competitive benchmark.

V Conclusion

The Robinson-Patman Act was enacted in 1936 to limit the purchasing power of large retail chain stores. Few have questioned its basic intent. Instead, most criticism deals with primary line issues of predatory pricing, barriers to entry, and cartel stability, as well as practical difficulties in enforcing the Act, such as the lack of an adequate cost justification defense (often deemed illusory), and the inevitable impediments to distributional efficiency engendered by preventing retailers integrated

into wholesaling from being compensated by the manufacturer for their services.[34]

So substantial was the early criticism that gradually a broad consensus emerged that intermediate goods price discrimination should not be proscribed. Reflecting this view, public enforcement was "slowly anesthetized" through the 1970's (Dixon, 1975).[35] But Robinson-Patman is no longer dormant. Encouraged by the courts' increasing sensitivity to economic analysis, the Federal Trade Commission's approach is now characterized as one of "cautious commitment."[36] Moreover, the Robinson-Patman Act's visibility was recently enhanced by the Supreme Court cases *Texaco, Inc. v. Hasbrouck*, 110 S. Ct. 2535 (1990) and *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 113 U.S. 2578 (1993).[37] In addition, private litigation continues unabated, (it has been estimated by Salop and White (1988) that 18.1 percent of all private federal antitrust suits filed between 1973 and 1983 involved Robinson-Patman claims), and the prospect of treble damages still causes manufacturers to assess carefully the consequences of their pricing decisions.

Despite the historical and renewed importance of secondary line protection under Robinson-Patman, the welfare effects of forbidding discriminatory discounts have only recently begun to be the subject of formal economic modeling.[38] However, this literature does not incorporate bargaining or nonlinear pricing, two practices that are pervasive in many intermediate goods markets. When they are included, the analysis of secondary line price discrimination is altered in a crucial way. For

[34] See Schwartz (1986) for an excellent summary of these issues.

[35] According to Scherer (1990), Federal Trade Commission complaints fell from an average of 74 per year during 1960-1965 to 5.6 per year during 1966-1970. And in the decade from 1975-1985, a *total* of only six complaints were filed.

[36] See the April 1991 address to the Robinson-Patman Act Committee of the American Bar Association, by Kevin Arquit, the director of the FTC's Bureau of Competition. He describes the recently settled *Boise Cascade Corp.* litigation (Dkt 91-33) as well as several ongoing internal investigations. The text of his remarks can be found in the CCH Trade Regulation Reports at ¶50,058.

[37] In *Texaco*, the Supreme Court affirmed the propriety of functional discounts. It held that discounts are allowable even though not explicitly permitted by the Robinson-Patman Act as long as the price differentials are reimbursement for legitimate marketing functions. The Court further indicated that suppliers do not have to satisfy the rigors of the cost justification defense in order to show the reasonableness of the discount. The *Brooke* case was discussed in footnote 1.

[38] Recent articles include DeGraba (1987) and (1990) in addition to Katz (1987). In contrast to our paper, each tends to find that secondary line price discrimination is welfare reducing. Price discrimination is harmful in DeGraba (1987) because it induces local firms to overly differentiate its product. It is harmful in DeGraba (1990) because it leads retailers to distort their choice of production technology in an inefficient way. Katz (1987) finds that price discrimination is welfare reducing unless it prevents inefficient backward integration.

instance, our model predicts that while firms (including small retailers) may benefit from Robinson-Patman, they always do so at the expense of consumers and total welfare. Put succinctly, forbidding intermediate goods price discrimination constrains the bargaining process by inhibiting buyers from seeking marginal price concessions that lower retail prices. This insight, along with the numerous primary line criticisms pointed out by others, and the practical difficulties of enforcement, raise serious concerns about the efficacy of the Robinson-Patman Act.

Appendix

Proof of Proposition 1: Equation 2 gives the necessary first order conditions for wholesale prices to arise in a bargaining equilibrium. Substituting in each retailer's first condition for optimal retail pricing gives

$$\sum_{j=1}^{2}(w_j - c)\frac{\partial D_j}{\partial P_i} = 0, \quad i = 1,2.$$

In matrix notation, this expression can be written as $(\mathbf{w} - \mathbf{c})\mathbf{D_P} = 0$, where $\mathbf{w} = (w_1, w_2)$, $\mathbf{c} = (c, c)$ and $\mathbf{D_P}$ is the 2-by-2 matrix of demand derivatives. By our assumptions on demand, $\mathbf{D_P}$ is invertible. Hence, the bargaining equilibrium wholesale prices are the same for each retailer and are given by $w = c$. That is wholesale prices are equal to the manufacturer's marginal cost. *Q.E.D.*

Calculations for the Linear Demand Example:

For the linear demand example introduced in Section IV, tedious but straightforward calculations yield the following retail prices as bargaining equilibria in the four regimes:

$$P_i^B = \frac{2(1+\gamma)V_i + \gamma V_j + (2 + 5\gamma + 3\gamma^2)c}{4 + 8\gamma + 3\gamma^2}, \quad i = 1,2, \ j \neq i,$$

$$P_i^{NF} = \frac{(10 + 13\gamma + 3\gamma^2)V_i + (2 + 9\gamma + 3\gamma^2)V_j + (4 + 10\gamma + 6\gamma^2)c}{16 + 32\gamma + 12\gamma^2}, \quad i = 1,2, \ j \neq i,$$

$$P_1^{CF} = \frac{V_1 + V_2 + 2c}{4}, \quad P_2^{CF} = \frac{(6 + 3\gamma)V_2 + (3\gamma - 2)V_1 + (4 + 6\gamma)c}{8 + 12\gamma},$$

$$P_i^{DF} = \frac{(4 + 3\gamma)V_i + 3\gamma V_j + (4 + 6\gamma)c}{8 + 12\gamma}, \quad i = 1,2, \ j \neq i.$$

To generate Figure 2, we used these prices to find equilibrium quantities and then substituted them into the social welfare function (utility plus joint profits). Finally, we constructed percentage change in welfare for each regime using the benchmark case as the base.

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Figure 1: Government Objectives in Intermediate Goods Price Discrimination

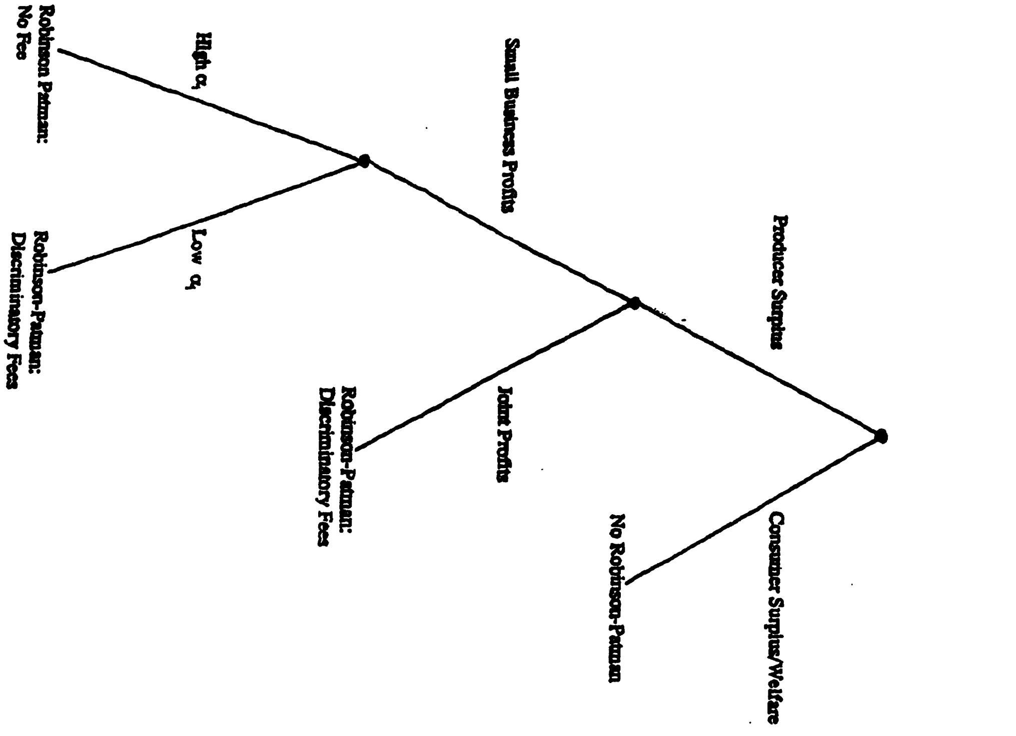

Figure 2: Welfare Loss Under Robinson—Patman

$V_1 = 9, V_2 = 10, c = 0$