ALL-UNITS DISCOUNTS: LEVERAGE AND PARTIAL FORECLOSURE IN SINGLE-PRODUCT MARKETS

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We present an exclusionary theory of all-units discounts schemes. These schemes offer a per-unit discount to all units purchased if the customer's purchase reaches a pre-specified quantity threshold. We demonstrate that when a dominant firm competes with a capacity-constrained rival, it is possible for the dominant firm to use all-units discounts to leverage its market power in the non-contestable portion to influence the contestable portion of the demand in single-product markets and to partially foreclose the small rival. Our theory suggests that pricing below cost is not necessary for all-units discounts schemes to be exclusionary and that a standard price-cost test may not be useful in assessing the exclusionary effects of all-units discounts. We advocate a rule of reason approach based on a comprehensive analysis of market structure, the nature of discount programs, exclusionary effects, efficiency, and the welfare consequences of these practices.

Nous présentons une théorie d'exclusion concernant les programmes d'escompte sur toutes les unités. Ces programmes offrent un escompte par unité à toutes les unités achetées si l'achat du client atteint un seuil de quantité déterminé d'avance. Nous démontrons que lorsqu'une société dominante livre concurrence à un rival à capacité limitée, il lui est possible d'utiliser les escomptes sur toutes les unités pour multiplier son pouvoir de marché dans la part non disputable pour influencer la part disputable de la demande sur les marchés à produit unique et pour éliminer partiellement le petit rival. Selon notre théorie, la fixation d'un prix inférieur au coût n'est pas nécessaire pour que les programmes d'escompte sur toutes les unités aient un effet tendant à exclure et un critère standard prix-coût n'est pas nécessairement utile pour l'évaluation des effets tendant à exclure des escomptes sur toutes les unités. Nous militons en faveur d'une approche raisonnée fondée sur une analyse exhaustive de la structure du marché, de la nature des programmes d'escompte, des effets tendant à exclure, de l'efficience et des conséquences sur le bien-être de ces pratiques.

1. INTRODUCTION

How to evaluate loyalty rebates (or discounts) programs is an unsettled topic in antitrust policy debate and enforcement. Conditional discounts and rebates can arise for many different reasons. Discounts based solely on the volume of purchase could help

enhance economic efficiency since they tend to reflect cost savings from high volumes, eliminate double marginalization, and mitigate double moral hazard problems wherein the non-contractible decisions by two parties affect both parties' payoffs.[1] On the other hand, when dominant suppliers adopt conditional-pricing practices, including all-units discounts (AUDs), a form of retroactive rebate schemes, antitrust authorities are often concerned about the possible abuse of dominance and the potential exclusionary effects of these practices. Motivated by some recent antitrust cases, in this article we examine the economic effects of loyalty rebate schemes on competition and consumers, focusing on AUDs in single-product markets.

There have been a number of recent antitrust cases that share a common feature: A dominant supplier implemented discounts/rebates program conditional on volumes and other instruments to its downstream customers. It was argued that such practices might have had an exclusionary effect and harmed competition and consumer welfare. Examples include *Canada Pipe* in Canada,[2] *Post Danmark II* and *Tomra* in Europe,[3] *Tetra Pak* in China,[4] and several cases such as *Intel* and *LePage's* in the U.S.[5]

On November 16, 2016, the State Administration of Industry and Commerce (SAIC) of China released its official decision regarding Tetra Pak, the world's largest manufacturer of liquid food packaging. According to the decision, between 2009-2013, the company abused its dominance in three relevant product markets in China, namely, the carton-based aseptic packaging equipment market, the equipment maintenance and service market, and the aseptic packaging material market. The SAIC found that Tetra Pak (i) tied the sales of packaging materials to the sales of equipment, without justifiable reasons, (ii) restricted its upstream supplier to exclusively deal with Tetra Pak, without justifiable reasons, and (iii) *excluded and limited competition through complex loyalty discounts policies* in the sales of packaging materials, violating the Article 17 (4), (5) and (7) of the Anti-Monopoly Law. The SAIC ordered the company to cease these illegal practices and imposed a fine equal to 7% of its sales revenues in the relevant markets in 2011. According to the decision by the SAIC, the discount policies used by Tetra Pak during the period were based on a complex grid of volume thresholds and discount percentages: For each of the major packaging product categories, once the purchase volume of a customer exceeds a pre-specified threshold, the per-unit price is discounted with the discount applying to all the previous orders of this product within a given year; there were also multiple

volume thresholds with corresponding discounts; moreover, there were additional retrospective discounts based on the aggregate volumes across different types of packaging products.

In *Post Danmark II*, judged by the European Court of Justice, there were two suppliers providing postal services in Denmark: Post Danmark, a dominant state-controlled company, and a small rival, Bring Citymail. For a period of time, Post Danmark implemented a rebate scheme in the market for delivering direct advertising mail, involving the following three major features: (i) the rebates were based on the customer's aggregate purchases over an annual reference period; (ii) the rebates were conditional on a volume threshold estimated at the beginning of the year and adjusted at the end of the year; (iii) the rebates were retroactive in the sense that the rebate rate applied to all volumes purchased during the year, not only to the volumes exceeding the threshold. The Danish Competition Council first decided against the company in 2009, and the company appealed twice. The Danish national court referred this case to the European Court of Justice (Second Chamber), requesting for a preliminary ruling concerning the interpretation of Article 82 EC applying to exclusionary abuses. On October 6, 2015, the European Court of Justice made a preliminary judgment and clarified a number of important issues on assessing the impacts of rebate programs, which we will discuss in Section 5 of this article.

In another recent case, *Tomra*, decided by the European Commission, Tomra was a dominant supplier of reverse vending machines used by supermarket retailers to collect empty returnable drink containers and return deposit amounts to final consumers. Tomra had more than an 80% market share in many national markets in Europe. According to the European Competition Commission in 2006, Tomra implemented "an exclusionary strategy in several national markets, involving exclusivity agreements, individualized quantity commitments and individualized retroactive rebates, thus foreclosing competition on the markets." The company appealed twice, with both appeals dismissed.

The three cases above—and several others—have raised interesting economic questions. What possible economic justifications for the adoption of various conditional discounts/rebates might there be? Are they mechanisms for price discrimination? Do they constitute a competitive strategy to increase profits and market share? Do they produce any

efficiency gains? What are the welfare implications for competition and consumers?

These cases also raised questions on legal approaches. In the U.S. antitrust community, there have been debates about treating conditional pricing practices as predatory pricing or as exclusive dealing. In the context of the Canadian *Competition Act*, there are questions about whether S. 77 on exclusive dealing and tied selling and market restriction, or S. 78-79 on abuse of dominant position might be most properly applied to cases involving loyalty rebate practices.

In our analysis of the economic justifications and consequences of rebate schemes, we focus on a simple form of retroactive rebate schemes called "all-units discounts" ("AUDs") in single-product markets. This scheme refers to a pricing practice that lowers a customer's per-unit price on every unit of the product purchased when the customer's purchase exceeds or is equal to a pre-specified volume threshold. In other words, a simple AUDs scheme consists of three numbers: a list price, a volume threshold, and a discount price. It captures the main features of the retroactive rebate schemes observed in several of the recent antitrust cases. We provide a leverage theory of AUDs in single-product markets and show that AUDs adopted by a dominant firm can leverage its market power in the non-contestable portion of the demand to contestable portion, partially exclude its small rival, in the sense that the rival's profits, sales volume, and market share are reduced as compared to the but-for environment in which the dominant firm could only use per-unit prices.

One key feature of the AUDs is that the total payment from the customer to the supplier drops sharply once the customer's purchase reaches the threshold, resulting in negative marginal prices for the units near the threshold. This feature often leads analysts to treat AUDs as a practice of predatory pricing.[6] As we shall illustrate in this article, the dominant firm's list price and discount price under AUDs can both be well above its marginal cost, but the AUDs scheme can partially exclude the small rival. In other words, our leverage theory of AUDs does *not* need any profit sacrifice in one period and recoupment in another period, as predatory pricing does. This also implies that AUDs are more profitable and thus more likely to occur and post greater risk to consumers than predatory pricing.

A natural but imperfect analogy of AUDs is exclusive dealing.[7] The economic analysis on exclusive dealing can be generally categorized into

two strands. One strand studies contracts as the rent-shifting mechanism originated from Aghion and Bolton (1987) [2], in which an incumbent firm can sign an exclusive contract with a customer before its rival enters the market.[8] Through the exclusive contract, which includes a liquidated damages clause, the incumbent and the customer can form a coalition to extract some efficiency gains from the potential rival. However, in many antitrust cases, the small rivals are already present in the market and can make counteroffers to the customer. From the customer's point of view, it is better to solicit two competing offers than to sign one without seeing the other. Our analysis allows both the dominant firm and its small rival to compete in pricing offers, and the customer does *not* commit to either party before seeing both offers. We find a partial foreclosure mechanism different from that in Aghion and Bolton (1987) [2].

The other strand of the economic analysis on exclusive dealing concerns multiple customers: Examples include Rasmussen, Ramseyer, and Wiley (1991) [11] and Segal and Whinston (2000) [13]. The exclusion mechanism considered requires economies of scale, e.g., the small rival needs to serve a sufficient number of customers in order to be viable. As a result, getting one customer to sign with the incumbent imposes a negative externality on other customers, and thus the incumbent can induce exclusive dealing for free by exploiting the lack of coordination among customers. By focusing only on one customer, we find that, even without externality or lack of coordination among customers, AUDs can still be used to partially exclude the small rival.

The rest of the article is structured as follows. In Section 2, we use an example to show that AUDs can be implemented to leverage the dominant firm's market power from its non-contestable demand to contestable demand,[9] partially foreclosing a small rival with identical costs. Section 3 explains the partial foreclosure mechanism as a leverage theory. Section 4 further shows that such leverage theory can work, even when the small rival is more efficient than the dominant firm. Section 5 discusses alternative legal approaches to assessing conditional pricing practices, such as AUDs. Section 6 provides concluding remarks.

2. A SIMPLE EXAMPLE[10]

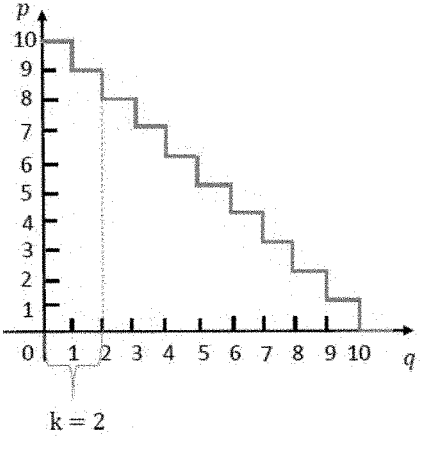
In this section, we use an example to illustrate how a dominant firm could use the AUDs to leverage its market power from its non-contestable portion to its contestable portion. Such leverage could yield higher profits for the dominant firm, partially exclude its small rival, and hurt

downstream customers, as compared to a benchmark case when AUDs are prohibited.

Consider the following stylized setting. A downstream customer demands at most 10 units, with stepwise willingness-to-pay (WTP): that is, the customer is willing to pay at most $10 for the first unit, $9 for the second unit, $8 for the third unit, and so on. The demand curve coming from these preferences is illustrated in Figure 1, where the horizontal axis represents units of quantity and the vertical axis represents WTP or price.

Suppose two firms producing identical products can serve the customer at constant marginal (per-unit) costs. For most of our discussion, we consider the two marginal costs as identical (i.e., the two firms are equally efficient) and, for simplicity, normalize them to be zero. Later on, we shall discuss the impacts of differential marginal costs on inefficient foreclosure using AUDs. Moreover, assume that Firm 1 (F1) can serve at least 10 units while Firm 2 (F2) can produce at most 2 units. In other words, F1 is not constrained in its ability to serve the customer, but F2 is capacity-constrained with capacity level k=2. The most efficient outcome for this market will involve producing output until the value that the customer places on the last unit no longer exceeds the marginal cost of producing it. Since marginal cost here is 0, this would involve producing 10 units generating total surplus value of 10+9+8+···+1=$55.

Figure 1: Stepwise demand and Firm 2's limited capacity k=2



We consider what is referred to as a sequential-move, complete information game with F1 offering its pricing scheme first and then F2 making its offer, followed by the customer's choices of where and how many units to purchase. Note that our timing is different from that of the seminal Aghion and Bolton (1987). That is, we allow the buyer to make her purchase decision *after seeing two competing offers*, instead of forcing the buyer to sign with F1 before F2 enters the market. Our modeling choice is intended to capture some of the main features of several recent antitrust cases discussed in the Introduction. Moreover, we focus on the case of complete information for the reason that we would like to isolate the strategic effect of AUDs from the second-degree price discrimination effect based on asymmetric information between the supplier and its customers.

Consider a benchmark in which F1 just offers a constant per-unit price (called linear pricing, LP) followed by F2 offering a per-unit price. Note that in this benchmark, F2 can always undercut F1's per-unit price and serve 2 units of the customer's demand. Anticipating this undercutting strategy, it is optimal for F1 to choose a monopoly per-unit price over the residual demand with WTPs, starting from 8 to 1. Simple calculations show that F1's optimal price is \$4.[11] Therefore, in equilibrium, F1 sells 5 units and earns a profit of \$20, while F2 sells 2 units and earns \$8. The customer receives a consumer surplus (difference between the value she placed on her purchases and what she actually had to pay) of \$21 and the total market surplus is \$49.

Now, suppose F1 uses a simple AUDs scheme, and then F2 offers a per-unit price, followed by the customer's choices. Consider the AUDs scheme with *a list price* p_0=\$10, *a volume threshold* Q=9 above which the discounted price p_1=\$36.5/9 *will be applied to all units.* Observing the AUDs scheme from F1 and p_2 from F2, the customer needs to choose between "meeting the threshold" and "not meeting the threshold." Meeting the threshold means that the customer purchases 9 units from F1, and possibly the last 1 unit from F2, which results in a surplus to the customer as

$$CS^{DS} = 55 - 36.5/9 \times 9 - p_2 = 18.5 - p_2$$

Not meeting the threshold implies that the customer has to rely on F2 only (since it is not worth buying at p_0=\$10 from F1), which yields a customer's surplus (from the purchase of only two units—F2's capacity)

$$CS^{SS} = (10+9) - 2p_2 = 19 - 2p_2$$

Here superscript DS is short for dual sourcing, and SS stands for single sourcing. Clearly, the customer will meet the volume threshold if and only if CS^{DS} is greater than CS^{SS} or

$$CS^{DS} = 18.5 - p_2 \geq 19 - 2p_2 = CS^{SS}$$

i.e., $p_2 \geq 0.5$. Thus, if F2 wants to sell at its full capacity $k = 2$, it has to undercut price below \$0.5. Thus, the maximal profit it can achieve when selling 2 units is $0.5\times2=\$1$. Nevertheless, if F2 sets $p_2=\$1$ it still can get $1\times1=\$1$, although it only sells 1 unit. The above logic implies that it is feasible for F1 to induce the customer to meet its quantity threshold.

It can be shown that in equilibrium, F1 will indeed use the above AUDs scheme and earn a profit of \$36.5, which exceeds what it could earn under LP in the benchmark, \$20. The best response that F2 can offer is to set its per-unit price $p_2^{AUD}=\$1$, in which case it will earn a profit of \$1, which is lower than what it could earn in the benchmark case, say \$8. However, the customer receives surplus \$17.5, which is lower than what she would receive in the benchmark case. Since all 10 units are supplied, the total surplus, \$55, remains intact.

This example illustrates that, as compared to LP, the AUDs scheme used by the dominant firm lowers the profits, sales volume and market share of its capacity-constrained rival, leading to partial foreclosure of competition in the market, reducing the surplus of the downstream customer.[12]

3. LEVERAGE AND PARTIAL FORECLOSURE MECHANISMS IN SINGLE-PRODUCT MARKETS

The insights from the above, simple example hold for a general downward-sloping demand curve, $D(p)$, and a rival with a relatively small capacity level, as formally shown in Chao, Tan and Wong (2016) [4]. Since the rival can compete with the dominant firm, up to its limited capacity level, the contestable portion of the demand is restricted to the size of the rival's capacity level while the remaining portion of the demand is considered to be non-contestable. The dominant firm is able to design AUDs in order to leverage its market power over the non-contestable demand and capture extra rents from the contestable demand.

First, note that the dominant firm F1 could have used two-part tariffs

to extract full surpluses from its non-contestable demand, see Chao and Tan (2014) [3]. However, the AUDs scheme enables F1 to go beyond its non-contestable demand, extracting an extra amount from the customer and shifting the rent from its rival. To prevent F2 from selling at its full capacity, F1 must induce the customer to purchase F2's product, only after buying a certain amount from F1, and commit to a minimum quantity requirement more than its non-contestable portion so that the residual demand for F2 is less than its capacity k. For such a quantity requirement to be accepted by the customer, *F1 must tie its contestable portion of the demand to its non-contestable portion and design its pricing scheme in such a way that the customer cannot afford to lose F1 as a supplier.*

There are two crucial features of the AUDs scheme: The first is its quantity threshold. Given that a customer has no choice but to purchase some, although not all, of her requirement from the dominant firm, the dominant firm can set its quantity threshold above its non-contestable portion and induce the customer to purchase a large chunk of its products and thus less of its rival's. Consequently, the capacity-constrained rival is forced to undersupply and earn lower profits than when the dominant firm could only use LP.

The second feature of the AUDs scheme is its quasi-fixed fee at the quantity threshold. Such a quasi-fixed fee (i.e., the list price multiplied by the quantity threshold), along with the quantity threshold, leads to two effects: quantity expansion effect and surplus extraction effect. First, since F1 can use a quasi-fixed fee to extract incremental surplus from the customer after deducting the one offered by F2, it has an incentive to push the equilibrium output towards a more efficient one than the one under the LP benchmark. Such a quantity expansion effect tends to increase the total surplus. Second, because of the featured quasi-fixed fee, F1 can extract a surplus from the customer more efficiently than using LP. Such a surplus extraction effect reduces the surplus of the customer. However, F1's surplus extraction is constrained by the competitive pressure from F2. When the rival's capacity level is relatively small, competition does not constrain F1 significantly and the quasi-fixed fee under the AUDs extracts most of the customer's surplus. On the balance, in such a circumstance, the surplus extraction effect dominates the quantity expansion effect, resulting in lower surplus to the customer, as compared to the LP benchmark.

As compared to the existing literature, our exclusionary mechanism

does *not* need: (i) asymmetric information, as in Kolay, Shaffer and Ordover (2004) [8], so that price discrimination cannot be a reason to offer AUDs; or (ii) a lack of buyer coordination in order for AUDs to be exclusionary as in Rasmusen, Ramseyer and Wiley (1991) [11] and Segal and Whinston (2000) [13], for there is only one buyer in our model; or (iii) the buyer to sign a contract with the dominant firm before the rival arrives, as in Aghion and Bolton (1987) [2] and Ide, Montero and Figueroa (2016) [5], because the customer in our model does not have to make any purchase commitment until seeing both competing offers. Moreover, in contrast to exclusive dealing, we find that the dominant firm prefers partial foreclosure to full foreclosure .

4. EXCLUSION OF MORE EFFICIENT BUT SMALL RIVALS

The above insights also apply when F2 has a lower marginal cost than F1, leading to an inefficient and partial foreclosure. To describe this finding more formally, suppose F2's marginal cost c_2 is no higher than F1's marginal cost c_1, i.e., $c_2 \leq c_1$. In addition, suppose $0< k < D(c_1)$, which means that F2 cannot serve the whole demand of the customer when F1 undercuts price to its marginal cost c_1. Denote F2's monopoly price as $p^m(c_2)$. Chao and Tan (2014) [3] have shown that in the same model as discussed in the last two sections, AUDs schemes lead to inefficient partial foreclosure, as long as the marginal cost differential is not too large, i.e., in formal terms when the following holds:

$$c_2 \leq c_1 < p^m(c_2) \text{ and } k + (c_1 - c_2) \cdot D'(c_1) > 0.$$

When facing a more efficient rival, up to its capacity limit, as long as the rival's cost advantage is within a certain range, the AUDs scheme is an effective instrument to shift rents from the rival, extract surplus from the customer, and improve the dominant firm's profit. As compared to LP, the AUDs adopted by the dominant firm may reduce total surpluses.

To illustrate the above findings, consider an example with a continuous, linear, and downward-sloping demand curve $D(p)=10-p$, and capacity $k=4$ for F2. Assume F2's marginal cost is zero and F1's is \$2. The model is the same as that in the last two sections: F1 offers its pricing scheme (LP or AUDs) first and then F2 makes its offer of LP, followed by the customer's choices of where and how many units to purchase.

Table 1 lists the equilibrium outcomes for both cases. Consistent with the example in Section 2, as compared with the LP benchmark, the

AUDs scheme improves the dominant firm's profits, reducing the profit, sales volume and market share of the capacity-constrained competitor, although the downstream customer's surplus is improved. However, due to the shift of sales from F2 to F1 under the AUDs, higher volumes are produced using F1's less efficient technology. This production inefficiency can dominate the quantity expansion effect of the AUDs, resulting in lower total surpluses, as shown in Table 1.[13]

Table 1: Linear Demand and Differential Costs

$c_1 = 2 > c_2 = 0$ and $k = 4$

	Price for F1	Price for F2	Quantity for F1	Quantity for F2	Profit for F1	Profit for F2	Consumer Surplus	Total Surplus
LP	$4	$4	2	4	$4	$16	$18	$38
AUDs	$3.97	$2.97	4.07	2.97	$8.03	$8.79	$20.64	$37.46
% Change	-0.7	-26	+103	-26	+101	-45	+15	-1

Our analysis suggests that in the short run, the AUDs scheme adopted by the dominant (incumbent) firm can harm the more efficient but capacity-constrained competitor (new entrant) and even reduce the total surplus, as compared to the benchmark case of LP. In the long run, the more efficient but smaller rival might be induced to exit, depending on the magnitude of fixed costs involved, and the dominant firm would monopolize the market, leading to lower customer's surplus as well as lower total surplus.

Returning to the issue of economic efficiency, recall that retroactive all-units discounts have a quantity-expansion effect. Although the competitor's sales may decrease, the dominant firm's sales are likely to increase, and the total sales often increase due to such a quantity expansion effect of the AUDs. The total surplus (the sum of the profits of the two suppliers and the downstream customer's surplus) depends on the three primitives of the setting: (i) the cost structures of the dominant firm and its rival, (ii) the size of the capacity of the rival firm, and (iii) the demand of the downstream customer. If the rival firm and the dominant firm are equally efficient, at least up to a certain capacity level, and if the

dominant firm's technology exhibits economies of scale after a certain quantity level, then the AUDs with the quantity-expansion effect can be efficiency-enhancing and such efficiency gains should be recognized in enforcement.

On the other hand, if the rival is more efficient up to a certain capacity level, AUDs shift production and sales from the rival to the less-efficient dominant (incumbent) firm, causing inefficiency. This efficiency loss should also be recognized in enforcement. The above example illustrates that the efficiency loss resulting from partial foreclosure can outweigh the efficiency gains due to the quantity-expansion effect. To quantify the net effect of the AUDs, it would be helpful to have information and evidence on the market structure, the cost structures of the suppliers and the demand of the downstream customers.

It should be noted that in our analysis, we have tried to keep our model simple in order to illustrate the incentives of the firms and the effects of AUDs in the context of asymmetric competition. When applying our theory to specific cases, we should pay attention to the facts of the cases and examine the extent to which the rival firm's ability to compete is harmed due to the adoption of the AUDs by the dominant, incumbent firm, not just simply look at the loss of sales of the rival firm.

5. LEGAL APPROACHES AND ENFORCEMENT

In assessing competitive effects of loyalty rebate programs, two main legal approaches have been advocated: one treating cases as potentially involving predatory pricing and the other treating them as potentially representing exclusive dealing. For a summary of the discussions on the two approaches and more recent debates,[14] see Klein and Lerner (2016) [6], Moore and Wright (2015) [9], and Salop (2016) [12]. Part of this debate is concerned with whether a price-cost test based on an equally efficient competitor is appropriate and useful in assessing anti-competitive effects of rebate programs used by dominant firms. Loosely speaking, such a test requires a comparison between an effective price by allocating relevant rebates/discounts to the contestable product/portion and some measure of per-unit cost of an equally efficient competitor. If the effective price by the dominant firm is found to be below the cost, it provides an indication that the dominant firm might have engaged in predatory conduct. On the other hand, if the effective price is above the cost, does this imply an antitrust safe harbor and that there is no exclusion associated with the rebate program under consideration?

Based on their analysis of the *ZF Meritor v. Eaton Corp.*, Klein and Lerner (2016) [6] state that "when price is 'the predominant incentive mechanism,' a price-cost test can be used to evaluate single product loyalty contracts." Salop (2016) [12] analyzes the two legal frameworks in the context of conditional pricing practices by dominant firms and concludes that the raising rivals costs (RRC) foreclosure paradigm is a better framework than the predation paradigm for assessing conditional pricing practices. Moore and Wright (2015) [9] argue that "price-cost tests applied to predatory pricing are not a good match for the economics of exclusion. A price below cost is neither necessary nor sufficient for exclusion. A firm with market power can raise rivals' costs without pricing its goods below cost." Their discussions also suggest that the RRC can be a good framework for assessing loyalty rebate programs.

In its preliminary judgment concerning the interpretation of Article 82 EC in the context of *Post Danmark II*, the European Court of Justice stated that "The application of the 'as-efficient-competitor' test does not constitute a necessary condition for a finding to the effect that a rebate scheme is abusive under Article 82 EC," and that "(i)n order to determine whether a rebate scheme ... implemented by a dominant undertaking is capable of having an exclusionary effect on the market ... it is necessary to examine all the circumstances of the case, in particular, the criteria and rules governing the grant of the rebates, the extent of the dominant position of the undertaking concerned and the particular conditions of competition prevailing on the relevant market." In this particular case, the Court of Justice concluded that the "as-efficient-competitor" test was of no relevance because the market structure with high barriers to entry made the mergence of an "as-efficient-competitor" almost impossible. The Court of Justice further noted that, in a market with high barriers to entry, a less-efficient competitor might contribute to intensifying competition.

We believe that price-cost tests motivated by predation theory are not appropriate for assessing the impacts of AUDs. Indeed, our theory suggests that AUDs can lead to partial foreclosure, yet prices are still above marginal costs . In other words, due to the leverage effect of AUDs, even if the competitor is willing to undercut prices, the customer may still find it optimal to purchase more units from the dominant firm at higher prices, and the capacity-constrained rival may be forced to under-supply at a low-profit margin. Hence, consistent with the ruling by the European

Court of Justice in *Post Danmark II*, our theory suggests that below-cost pricing is *not* necessary for AUDs to be exclusionary .

AUDs, according to our theory, can harm downstream customers' welfare and even reduce total surplus. Based on the evidence of a particular case, it might possibly be argued that the dominant supplier offers all-units discounts that partially foreclose a rival's ability to compete for customers, therefore forcing the rival to operate at higher costs (or reducing the rival's revenues), reducing the competitive constraint imposed by the rival, and allowing the dominant supplier to gain more market power in the contestable portion of the demand.

In the *Tetra Pak* case, while reviewing the competitive effects of the loyalty discounts adopted by Tetra Pak (TP), the SAIC's decision does not mention any applications of the "as-efficient-competitor" test, and does not discuss any predation argument either. Instead, the decision is based on the evidence that TP's discount policies have the effects of eliminating and restricting competition in the market of packaging materials. The SAIC identifies three types of discounts policies that TP adopted in the market of packaging materials between 2009 and 2013: (i) retroactively accumulative volume discount, (ii) customized volume target discount, and (iii) accumulative multi-products volume discount. The first two types are similar to the AUDs discussed in the previous sections of this paper.

The SAIC stresses the specific market conditions contributing to the case's outcome. One key aspect of the SAIC's analysis lies in the distinction between the contestable portion and non-contestable portion of the customer demand. Specifically, the SAIC finds that TP's discount policies have evident anticompetitive effects for the following reasons. First, TP offered a wide range of product categories and large-scale production capacity, leading to a "non-contestable portion of demand" for its products among certain customers, particularly those medium to large buyers. Second, TP tied certain volumes of packaging materials to the purchase of its machinery and technical services, and consequently, part of the contestable portion of demand was locked-in to become non-contestable. Third, the adoption of multiple types of discounts further enlarged the non-contestable portion through a loyalty-inducing effect, hence squeezed out the contestable spaces of rivaling packaging-materials suppliers. The logic behind the SAIC's analysis is consistent with the leverage theory discussed in this paper.

Based on the leverage theory, the SAIC further examines how TP's discount policies affected competition in the market of packaging materials, finding that in order to compete with TP, competitors had to overly match TP's discounted prices by providing bigger discounts. Such competitors' discounts not only had to be higher than the TP's for contestable portion of demand, but also had to compensate customers' loss of retroactive discounts for non-contestable portion of demand, due to their reduced purchase from TP. The SAIC claims that TP's discount policies made competitors more difficult to compete, and in the long run, market competition would be restricted or even eliminated. Therefore, the SAIC concludes that the discount policies constitute "other forms of abuse of dominant market position" as prohibited by the Article 17(1)(7) of China's Anti-Monopoly Law.

In the context of antitrust enforcement in Canada, there are two legal approaches to analyzing the loyalty rebate programs such as AUDs. Two provisions of the Competition Act are relevant. Section 77(2) states that "the practice is likely to (a) impede entry into or expansion of a firm in a market, (b) impede introduction of a product into or expansion of sales of a product in a market, or (c) have any other exclusionary effect." Section 79(1) (c) states that "the practice has had, is having or is likely to have the effect of preventing or lessening competition substantially in a market." Our theory suggests that the practice of AUDs is likely to have an exclusionary effect and possibly impede expansion of a small firm in a market, so that Section 77(2) can be applicable. Moreover, it can be argued that the practice of AUDs has had, is having or is likely to have the effect of preventing or lessening competition substantially, since our theory implies that the AUDs by the dominant firm reduces the small rival firm's profits and market share, restricts the growth of the competitor, and possibly reduces the welfare of the downstream customers. Thus, Section 79(1)(c) of the Competition Act may also be applied to assess the legality of the practice of loyalty rebate programs, such as all-units discounts.

Regarding enforcement, one may ask what types of evidence would support a finding that AUDs increase the dominant firm's market power and harm consumers, and what types of evidence would support a finding that AUDs increase efficiency and benefit consumers. These questions should be answered on a case-by-case basis. We suggest at least four types of information and evidence that we should be looking for: First, we should examine the nature of competition and dominance, which are

often induced by the nature of technological development in the industry and the timeline for entry. For instance, if we observe relative symmetry between competitors, loyalty programs are less likely to be exclusionary. If we observe extreme asymmetry between a dominant firm and its rivals, we then have to look at the case more carefully. The asymmetry here might be in terms of differences in capacity, product lines and distribution channels, and so on. Second, we should examine the nature of rebate programs—single-product volume threshold based discounts, market share based discounts, or multi-product bundled discounts, and so on. When we observe loyalty programs with extreme discounts and extreme conditions, but without obvious pro-competitive business justifications, it is worthy of further investigation. Extreme discounts with extreme conditions include those rebate and discount rates that are quite large, when the retroactive volumes thresholds are relatively large, and with relatively long contract periods. Third, based on the above information, along with information about downstream customers' demand, we might need to empirically identify whether there exists non-contestable demand/market and contestable demand/market and estimate the size of the dominant firm's products that customers must carry. Fourth, and equally important, economic theory could help us identify and organize the information and evidence necessary to apply relevant provisions of the antitrust laws.

6. CONCLUSION

In this paper, we present an exclusionary theory of all-units discounts (AUDs), in the context of a dominant firm competing with a capacity-constrained rival in a single-product market. Our theory demonstrates that it can be profitable for the dominant firm to use all-units discounts to extend its market power in its non-contestable portion of the single-product market to the contestable portion, thus reducing the rival's revenues (or raising the rival's costs), relaxing the competitive constraint imposed by the rival, and allowing the dominant firm to further gain market power in the relevant market. We also demonstrate that pricing below cost is not necessary for all-units discounts to be exclusionary and that all-units discounts can have an exclusionary effect, even though the prices might be above marginal costs. In our view, a price-cost test is not useful in many cases when assessing possible exclusionary effects of loyalty rebate programs, and instead we advocate a rule of reason approach based on a comprehensive analysis of market structure, the

nature of rebate programs, exclusionary effects of rebates, and overall efficiency.

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Endnotes

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[1] See Sreya Kolay, Greg Shaffer & Janusz Ordover, "All-Units Discounts in Retail Contracts" (2004) 13:3 J Econ & Mgmt Strat 429; Bruce H Kobayashi, "The Economics of Loyalty Discounts and Antitrust Law in the United States" (2005) 1 Comp Pol'y Intl 115; David Spector, "Loyalty Rebates: An assessment of Competition Concerns and a Proposed Rule of Reason" (2005) 1:2 Comp Pol'y Intl 89; Daniel P O'Brien,"All-units Discounts and Double Moral Hazard" (2014) Federal Trade Commission Working Paper No 316; and references therein.

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[8] Enrique Ide, Juan-Pablo Montero & Nicolás Figueroa, "Discounts as a Barrier to Entry" (2016) 106:7 Am Econ Rev 1849; revisited Aghion and Bolton's model and show that "*unlike exclusive dealing provisions, rebates do not contractually commit retailers to exclusivity when signing the contract.*" Philippe Aghion & Patrick Bolton, "Contracts as a Barrier to Entry" (1987) 77:3 Am Econ Rev 388.

[9] According to European Commission's DG *Competition Discussion Paper on the Application of Article 82 of the Treaty to Exclusionary Abuses* (Brussels: EC, 2005) at para 152, "The rebate enables the dominant supplier to use the inelastic or 'non contestable' portion of demand of each buyer, i.e. the amount

that would anyhow be purchased by the buyer, as leverage to decrease the price for the elastic or 'contestable' portion of demand, i.e. the amount for which the buyer may prefer and be able to find substitutes." As we will see, in our example, the contestable demand versus non-contestable demand are determined by the rival firm's capacity size relative to the total demand size of the buyer.

[10] The continuous demand version of the example can be found in Section 3 in Yong Chao, Guofu Tan & Adam Chi Leung Wong, "All-Units Discounts as a Partial Foreclosure Device" (2017), online: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2842600>.

[11] In this example of a stepwise demand profile, there are two equilibria in the benchmark case in which F1 is indifferent between choosing $4 or $5. However, such multiplicity is a knife-edge result and it disappears when the demand is downward-sloping with continuous quantity, as shown in Chao, Yong, Guofu Tan & Adam Chi Leung Wong, *supra* note 10.

[12] It is easy to see that full foreclosure is not optimal for the dominant firm in the short run: To fully exclude F2, F1 has to offer the customer a surplus at least 10+9=19, which is the least that the customer would get if capacity-constrained F2 is forced to price at its cost level 0; since the maximum total surplus is 55, the most F1 can earn under full foreclosure will be 55-19=36, which is less than 36.5 under partial foreclosure. Yong Chao & Guofu Tan, "All-units discounts as a partial foreclosure device" (2014) USC Dornsife Working Paper No 14-01; shows that for a more general downward-sloping demand F1 can use two-part tariffs to extract full surplus from its non-contestable demand and eliminates any profits in the contestable portion of the demand, resulting in full foreclosure. Nevertheless, F1 can achieve higher profits by using AUDs at the expenses of the customer.

[13] It is interesting to note that in this example, F1's dominance is generated by a combination of its larger capacity level and its adoption of AUDs, given that F1 moves before F2 does in the game.

[14] On June 23, 2014, the U.S. Federal Trade Commission and Department of Justice Antitrust Division held a workshop focusing on "conditional pricing practices" including loyalty discounts, bundled discounts and related pricing schemes.