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Quantity-Discount Contracts as a Barrier to Entry

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Abstract: This POLICY PAPER presents an economic model showing how incumbent local exchange carriers may deter efficient facilities-based entry for high capacity loop facilities through the use of quantity-discount contracts for Special Access services. Since efficient entry is deterred, these contracts are socially inefficient. The theoretical model also shows that the entry-detering effects of the contracts are eliminated if high-capacity circuits are made available at prices based on economic costs (e.g., TELRIC) and made available without use restrictions historically applied to such access. To foster efficient facilities-based entry, federal policies must address the entry-detering components of Special Access contracts and make high-capacity facilities available on an unbundled basis at cost-based prices.

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I. Introduction

Some believe that the largest corporate users of telecommunications services – the Enterprise market – have numerous facilities-based alternatives from which to buy telecommunications services because of their large expenditures on telecommunications services. Yet, market evidence reveals that the incumbent local exchange carriers (“ILECs”) continue to provide about 95% of the telecommunications facilities used to serve this sector.¹ Given the apparent richness of this market for facilities-based entry, an important question is why is there so little competition in the Enterprise sector?

There are, of course, many possible explanations for the lack of facilities-based entry. On the one hand, there are significant exogenous entry costs² inherent to the telecoms business. That is, the fact that Enterprise telecommunications expenditures may be large, and their demand may be concentrated, does not *a fortiori* mean that the Enterprise market is *economically suited* for facilities-based entry. As explained in more detail in Section II.A *infra*, even the FCC concedes that the structural characteristics inherent to the Enterprise market make entry difficult at best. While market density should improve the prospects for entry, density is not the only economic factor that limits the profitability of entry in telecommunications markets.

On the other hand, and as demonstrated herein, the incumbents have successfully stymied competitive facilities-based entry into the Enterprise sector by creating significant endogenous entry costs³ through a form of exclusionary

¹ For example, various public filings reveal that:

- Over 98% of AT&T’s local services for business customers of DS-1 level or higher are provided over ILEC special access services. *AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates For Interstate Special Access Services*, FCC Docket RM 10593 at 17; and
- Sprint reported that for just its long-distance segment (not including wireless) it “continues to rely upon the ILECs for approximately 93% of its total special access needs despite aggressive attempt to self-supply and to switch to CLEC-provided facilities wherever feasible.” *Comments of Sprint Corporation*, FCC Docket RM 10593 at 3.

² Exogenous entry barriers are fundamental characteristics of a market that attenuate entry (*e.g.*, sunk costs or scale economies) but are not influenced by the behavior of the incumbent(s).

³ Endogenous entry costs, alternately, are entry barriers that are created by the incumbent firm(s), and may include the enhancement of the exogenous barriers (*e.g.*, increasing advertising expenditures to increase the importance of scale economies). Level playing field laws are an

(Footnote Continued. . .)

pricing structures incorporated into long-term contracts for high-capacity facilities in an effort to protect their monopoly power and rents. Properly designed, these contracts attenuate otherwise profitable entry as well as prevent competitive carriers from using more economically-priced Unbundled Network Elements (“UNEs”) for their high capacity access needs.⁴ Not surprisingly, several potential entrants and purchasers of high capacity facilities have complained that contracts for Special Access services have the effect of deterring entry, and we review some of these claims in Section II.B *infra*.

In light of these concerns, an important yet unanswered public policy question is whether or not contracts for Special Access services are designed to deter *efficient* entry, and thereby reduce social welfare. To address this question, we present an economic model in Section III *infra* that reveals how incumbent firms deter *efficient* facilities-based entry through the use of quantity-discount contracts. In the model, we show that both the incumbent and buyer of the Special Access service willingly sign the contract even though it deters efficient entry – that is, all firms behave rationally.⁵ Yet, *despite the fact that these contracts are entered into voluntarily, they reduce social welfare by deterring efficient entry.* Accordingly, the model’s finding that quantity discounts deter not only entry, but *efficient* entry, is extremely important to determine correct telecoms policy. The applicability of the model’s primary conclusion – *i.e.*, quantity-based discounts in contracts can be used to deter efficient entry – extends beyond

example of endogenous entry barriers. See Thomas W. Hazlett & George S. Ford, *The Fallacy of Regulatory Symmetry: An Economic Analysis of the ‘Level Playing Field’ in Cable TV Franchising Statutes*, 3 BUSINESS AND POLITICS 1 (2001) (available at: http://www.manhattan-institute.org/hazlett/the_fallacy_of_regulatory_symm.pdf).

⁴ Given the unattractive possibilities of stranding sunk costs, despite their protestations to the contrary, facilities-based entry is completely inapposite to the Bells’ self-interests. George S. Ford, *A Fox in the Hen House: An Evaluation of Bell Company Proposals to Eliminate their Monopoly Position in Local Telecommunications Markets*, PHOENIX CENTER POLICY PAPER NO. 15 (September 2002) (<http://www.phoenix-center.org/pcpp/PCPP15%20Final.pdf>).

⁵ *C.f.*, Oliver Williamson, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* (The Free Press 1985) at 30 (“Transaction cost economics assumes that human agents are subject to bounded rationality, whence behavior is ‘*intendedly* rational, but only *limitedly* so’ and are given to opportunism, which is a condition of self-interest seeking with guile.”) (Emphasis in original and citations omitted.)

telecommunications, shedding new light on a component of exclusionary pricing behavior by incumbent firms.⁶

Solutions to the entry-detering nature of the Special Access contracts include, obviously, regulations restricting the terms of such contracts most conducive to entry deterrence. The most pernicious term of such contracts is quantity-based discounts linked to large penalties, either a direct payment or higher average prices, for the failure to meet the specified quantity due to a migration to a competitive vendor or to unbundled network elements. However, the administrative costs of an effort to regulate the specific terms and conditions of Special Access contracts may be high, and care must be taken not to rob buyers of price discounts applied to what appears to be monopoly prices for Special Access services.

The theoretical model suggests an alternative and perhaps more effective and efficient solution: Specifically, *the entry-detering efficacy of the contracts can be eliminated if high-capacity circuits are made available on a wholesale basis at cost-based prices (e.g., TELRIC) without use restrictions historically applied to such access.* A cost-based price for wholesale high-capacity circuits encourages efficient entry, and nullifies the potential entry-detering effects of long-term quantity-discount contracts. As such, the model demonstrates that a pro-entry public policy would not only seek to reduce anticompetitive contractual provisions, but also ensure that high-capacity circuits are made available on a wholesale basis at cost-based rates, the latter perhaps being a more effective and lower risk solution than the former. Importantly, for cost-based access to be an effective solution, buyers must be unconstrained either by contract or regulation in the conversion of Special Access circuits to unbundled elements (which are functionally equivalent but priced differently).⁷ Unbundled elements (or actual competitive alternatives)

⁶ See, e.g., John Temple Lang and Robert O'Donoghue, *Defining Legitimate Competition: How To Clarify Pricing Abuses Under Article 82 EC*, 26 *FORDHAM INT'L L.J.* 83 (November 2002); Russell A. Klingaman, *Predatory Pricing And Other Exclusionary Conduct In The Airline Industry: Is Antitrust Law The Solution?* 4 *DEPAUL BUS. L.J.* 281 (1992); Thomas A. Lambert, *Evaluating Bundled Discounts*, Unpublished Manuscript, Contracting and Organizations Research Institute - University of Missouri, Columbia (3 September 2004) (available at <http://cori.missouri.edu/pages/seminars/Lambert.pdf>) and citations therein.

⁷ The ILEC Special Access contracts can also limit the ability of a buyer to substitute unbundled elements for Special Access services. As noted by AT&T: "[E]ven if more broadly available alternatives [to Special Access] were to become available - e.g., if the Commission were to eliminate use restrictions on EELs or if broad-based facilities-based alternative were somehow to emerge - AT&T could not take advantage of them in many cases, because virtually all of these

(Footnote Continued. . . .)

must be available ubiquitously and without use limitations to eliminate the entry-detering nature of the Special Access contract.

The POLICY PAPER proceeds as follows: In the next section, a brief history of the issue is presented, including a description of two key entry barriers in the market for high-capacity circuits including contracts. Section III presents our theoretical model illustrating how quantity discount contracts can deter efficient entry. Conclusions and Policy Recommendations are provided in Section IV.

II. Entry Barriers for High-Capacity Circuits

As noted above, many believe that the largest corporate users of telecommunications services – members of the Enterprise market – have numerous facilities-based alternatives from which to buy telecommunications services. However, as the Commission itself conceded when it found national impairment for high-capacity loops in its *TRO*, entry barriers into this sector are extremely high and, as a result, the incumbents remain dominant providers of high-capacity telecommunications facilities.

As the Commission observed, the lack of entry in this market stems from two sources: (1) the inherent demand- and supply-side economics of the market and (2) strategic entry deterrence by incumbent firms.

A. Demand and Supply-Side Entry Barriers

From a demand perspective, for example, Enterprise market customers demand reliable services that include customized products, significant customer care, and enhanced security features. Moreover, they prefer a single provider capable of meeting all their needs at each of their business locations, which may be in multiple locations in different parts of the city, state or country. As a result, the economics of serving a particular enterprise customer at each of its business' facilities may be very different depending on the location of the facility.⁸

While the revenue commitment relative to the best-case cost of constructing a high-capacity loop facility may result in a positive profit margin for a particular

[Special Access Pricing] plans impose substantial penalties for early withdrawal, which would negate any savings. *AT&T Petition, supra* n. 1 at p. 22.

⁸ *TRO* at ¶ 302.

customer location, there are other obstacles that must be overcome before such competitive entry can effectively occur. These other barriers include the inability to obtain reasonable and timely access to the customer's premises both in laying the fiber to the location and getting it into the building thereafter, as well as convincing customers to accept the delays and uncertainty associated with deployment of alternative loop facilities.⁹ Constructing local loops in the best of circumstances generally takes between 6-9 months, yet delays nonetheless occur with great frequency and can impose significant additional costs. In some cases, construction can be delayed via protracted battles with municipal officials over the cost and right to dig up streets or other public rights-of-way to lay fiber. Similarly, obtaining building and zoning permits adds further delay as local authorities often conduct extensive inquiries into the planned construction activity of the competitive carrier. In some cases, local jurisdictions often impose construction moratoriums preventing the grant of a franchise agreement to construct new fiber facilities in public rights-of way to appease political pressure regarding traffic delays.¹⁰

There also is the thorny issue of building access to multi-unit premises. As the Commission noted in its *TRO*:

Although multi-unit premises could present substantial economic opportunities for competitors, if the entity or individual controlling access to the premises does not allow a competitor to reach its customer residing therein (or places unreasonable burdens on the competitive LEC as a condition of entry), the competitive LEC may be unable to serve its customer via its own facilities, even where a competitive carrier may be ready, willing, and otherwise able to self-deploy the loop.¹¹

⁹ *TRO* at ¶ 303; see also T. Randolph Beard, George S. Ford and Lawrence J. Spiwak, *Why ADCo? Why Now? An Economic Exploration into the Future Industry Structure for the "Last Mile" in Local Telecommunications Markets*, PHOENIX CENTER POLICY PAPER NO. 12 (November 2001) (<http://www.phoenix-center.org/pcpp/PCPP12.pdf>) and citations therein; reprinted in 54 FED. COM. L. J. 421 (May 2002) (<http://www.law.indiana.edu/fclj/pubs/v54/no3/spiwak.pdf>)

¹⁰ *TRO* at ¶ 304; PHOENIX CENTER POLICY PAPER NO. 12, *supra* n. 9, and citations therein *passim*.

¹¹ *TRO* at ¶ 305. *But c.f.*, *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, FCC 04-248, ___ FCC Rcd ___, Order on Reconsideration (rel. 18 October 2004) at ¶ 13, where the FCC denied unbundled access for Fiber to the Curb ("FTTC")

(Footnote Continued. . . .)

So, while entry may very well be feasible from a best-case financial perspective, the inability to access the customer premise due to third-party intervention precludes entry altogether.

We have by no means exhausted the demand- and supply-side economic conditions that limit the prospects for facilities-based entry. However, these conditions are not the focus of this POLICY PAPER. Rather, our intent is to evaluate the influence of contracts on efficient entry, and we turn to that issue now.

B. *Contracts as Barriers to Entry*

Exacerbating the significant and inherent barriers to entry has been the incumbents' insistence on including exclusionary pricing structures into long-term contracts for high-capacity circuits. That is to say, in order to get relief from paying the incumbent what otherwise would be the monopoly price for Special Access services,¹² purchasers of Special Access service are typically required to accept significant long-term volume discount provisions and term requirements (usually 3-5 years).¹³ And, of course, these contracts also usually contain onerous penalties for failing to meet the contract's volume and term commitments.¹⁴ As the Commission observed in its *Special Access Pricing Flexibility Order*:

facilities serving multiple dwelling units on the ground that this policy would encourage the Bells to "further deploy fiber architectures necessary to deploy broadband services to the mass market, and the benefits of such deployment outweigh the limited impairment that competitive carriers face." (Emphasis supplied.)

¹² George Ford and Lawrence J. Spiwak, *Set It and Forget It? Market Power and the Consequences of Premature Deregulation in Telecommunications Markets*, PHOENIX CENTER POLICY PAPER NO. 18 (July 2003)(<http://www.phoenix-center.org/pcpp/PCPP18.pdf>); to be reprinted in NYU JOURNAL OF LAW AND BUSINESS (forthcoming Spring 2005).

¹³ These discounts on the monopoly portion of the customers demand are often conditioned on choices for the competitive sensitive portion of demand (e.g., discounts on the customer's entire demand that require the customer to maintain fixed levels of spending with the ILEC; alternatively, discounts on the customer's entire demand that require the customer to transfer business from the competitive supplier. As a result, competitors arguably cannot compete for a portion of the customer's business, because it would have to give an enormous discount on this portion to offset the higher cost incurred by the customer on the balance of its business, which must surrender the discount. For a detailed presentation of the types of exclusionary pricing structures under discussion here, see *MCI Ex Parte*, RM No. 10593 (June 30, 2003) at 3, 4.

¹⁴ *Id.*

[a]n incumbent can forestall entry of potential customers by “locking up” large customers To the extent the incumbent can lock in the larger ... customers whose traffic would economically justify the constructions of new facilities, the incumbents can foreclose competition for the smaller customer as well.¹⁵

The purpose of these contracts is obvious to all parties. From the seller’s perspective, as Verizon’s Vice-Chairman and President Larry Babbio recently remarked on an investors’ call: “Our goal is to encourage carriers to use our networks, rather than build their own” because special access service to other “carriers generate about \$5.5 billion of high margin business for us.”¹⁶

¹⁵ *In re Access Charge Reform*, Fifth Report and Order and Further Notice of Proposed Rulemaking, ___ FCC Rcd ___, FCC 99-206 (rel. 27 Aug. 1999) at ¶79.

¹⁶ Thomson Street Events, Final Transcript, Q3 2004 Earnings Conference Call (28 October 2004) at 11 (emphasis supplied). Significantly, this same type of pattern emerged on the mass market side. For example, immediately after the D.C. Circuit eviscerated the FCC’s unbundling rules in *USTA II*, the FCC sought to have the various parties “engage in a period of good faith negotiations to arrive at commercially acceptable arrangements for the availability of unbundled network elements” such as switching immediately after the *USTA II* decision came down. http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-245631A1.pdf. Yet, rather than embrace various offers from CLECs who wanted to move away from UNE-P towards facilities-based competition, the Bells rejected these offers out of hand. See, e.g., *AT&T Proposes Limiting Phone Network Leasing*, REUTERS (29 April 2004). In contrast to the naïve expectations of FCC Commissioners and some in the Bush Administration, press reports revealed that the Bells never wanted the CLECs to deploy their own facilities, and, in fact, tried to force the CLECs to use the Bells’ embedded facilities exclusively. Indeed, both SBC and Verizon are requiring that CLECs use their networks for nearly all of the CLECs’ phone traffic, discouraging the CLECs from installing their own equipment and preventing them from leasing from other providers. As a result, the press reported that many talks with these incumbents died. James S. Granelli, *Bells Now Aim for Rivals to Use Gear*, LOS ANGELES TIMES (7 May 2004). For example, the WALL STREET JOURNAL reported that under the terms of SBC’s proposal to Talk America (a small company in Reston, Va., that sells bundled local and long-distance services), SBC would require Talk America to send 90% or more of its phone traffic to SBC’s network instead of using its own equipment and not enter similar agreements with rival phone networks. Anne Marie Squeo, *SBC Dispute Undermines Move Toward Local Phone Competition*, WALL STREET JOURNAL (6 May 2004). In the end, it seems the Bells preferred to keep CLECs’ captive because they earn more on UNE-P than they would on UNE-L and, therefore, according to some Wall Street analysts, “appear firm in their opposition to any UNE-L strategy” LEGG MASON WASHINGTON TELECOM & MEDIA INSIDER, *FCC Phase Out of UNE-P Not so Simple* (14 June 2004). See also, *A Fox in the Hen House*, *supra* n. 4.

From the buyer's end, AT&T Wireless ("AWS") – which used high-capacity circuits to connect its cell towers – argued to the Commission that in the absence of unbundled high-capacity loops at TELRIC:

[T]he only ability AWS has to mitigate special access costs is by entering into long-term volume commitments with the ILECs in order to obtain pricing discounts. By locking AWS into long-term commitments, the ILECs greatly constrict AWS's ability to avail itself of alternatives that may arise, and *create a disincentive to deploy alternatives facilities even where otherwise economically feasible*. AWS must constantly weigh the costs of the termination liability when assessing the feasibility of alternatives to ILEC facilities.¹⁷

Likewise, Sprint advised the Commission that:

The BOCs are the only providers that can offer that geographic and service scope. In an effort to get any discount on interstate special access services, the IXCs must sign up for these broad contracts. To meet the discount terms, the IXCs must leave most if not all of their services with the BOCs. The IXCs are thus obligated to the BOC [sic] services and cannot switch to a competitor, even in the unlikely event that one exists. *With the large IXCs locked into the BOC, and competitors locked out, there is no economic reason for a competitor to attempt to build facilities that would provide a competitive alternative to the BOC.*¹⁸

And, as MCI Communications observed:

[d]iscounts on the monopoly portion of a customer's demand are conditioned on choices for the competitive sensitive portion of demand. *CLEC[s] cannot compete for a portion of the customer's business, because it would have to give an enormous discount to offset the higher cost incurred by the customer, which must surrender the [] discount.*¹⁹

¹⁷ *Comments of AT&T Wireless Services, Inc.*, RM No. 10593 (December 2, 2002) at 6 (emphasis supplied).

¹⁸ *See Sprint Comments, supra* n. 1 at 5 (emphasis supplied).

¹⁹ *See MCI Comments, supra* n. 13 (emphasis supplied).

Clearly, the buyers of the high-capacity circuits believe that Special Access contracts are deterring facilities-based entry.

From a theoretical perspective there are a number of unanswered questions regarding these apparent exclusionary pricing provisions in the Enterprise market. First, can these contracts deter efficient entry and, consequently, reduce social welfare? And, second, what remedies are available to attenuate the ILECs' exclusionary pricing strategies? In the next Section, we construct an analytical model to shed light on these important questions.

III. The Model

Our model is an extension of the one found in Aghion and Bolton's 1987 paper entitled *Contracts as a Barrier to Entry*, published in the *AMERICAN ECONOMIC REVIEW*.²⁰ In that paper, Aghion and Bolton present a formal theoretical model showing that "an incumbent seller who faces a threat of entry into his or her market will sign long-term contracts that prevent the entry of some lower-cost producers (at 388)." In this POLICY PAPER, we generalize the Aghion-Bolton model to include stylized "quantity discounts." As we show, the solution is related to that of Aghion and Bolton, in that we find that a quantity discount contract between the buyer and seller can deter efficient entry and such contracts are, consequently, socially inefficient. The result obtains even under the conditions that all participants are rational and none are fooled by strategic behavior or false signals. Like Aghion-Bolton, we find that the entry deterring contracts are privately profitable but socially inefficient even if all entry is not deterred.

In our model there are three primary participants: (1) the incumbent seller (*S*; the ILEC); (2) the buyer (*B*; the CLEC or enterprise end-user); and (3) the potential facilities-based entrant (*E*). In order to provide end-user services, *B* must purchase one unit of output from *S* or, if available, one unit from *E*. We have a two-period model, where in the first period a buyer and seller sign a contract or not, and a potential entrant enters or not. In the second period, Bertrand price competition occurs if there is entry.

²⁰ P. Aghion and P. Bolton, *Contracts as a Barrier to Entry*, 77 *AMERICAN ECONOMIC REVIEW* 388-401 (1987).

In order to evaluate the effects of quantity discounts on entry, we consider the case where B has demand for 2 units of the input, with value \$1 each. It is assumed that the buyer can extract all surpluses from its customers. The seller S is able to supply all the inputs needed by B and can produce 0, 1, or 2 units at \$0.50 each. For simplicity, we assume that there are no other costs. The entrant E knows its costs, c_e , before its entry decision; the other participants do not know c_e , but do know that c_e is uniformly distributed on the interval $[0, 1]$. The entrant E can only provide 1 of the 2 units needed by B , so one unit is provided as a monopoly by S .²¹

If there is no contract and no entry, then S sells 2 units to B for \$1 each for a profit of \$1 [= $1 + 1 - 1/2 - 1/2$]. The profits for both B and E are zero. If there is entry, then the price for the contested unit is $P = \max\{1/2, c_e\}$ and the price for the monopoly unit is \$1. If E is more efficient than S ($c_e < 1/2$), then the profit for S is $1/2$, the profit for B is $1/2$, and the profit for E is $1/2 - c_e$. Alternately, if E is less efficient than S ($c_e > 1/2$), then profit for S is c_e , profit for B is $(1 - c_e)$, and profit for E is zero.

If there is some positive level of sunk-entry costs, then E enters only if the expected profit is positive ($\pi'_E > 0$). If there is no contract, entry occurs only if $c_e < 1/2$, and the probability of entry is given by

$$\phi = Pr(c_e < 1/2) = 1/2. \quad (1)$$

From the discussion above, it follows that without a contract, the expected profit for S is

$$\pi'_S = (1 - \phi) \cdot 1 + \phi \cdot 1/2 = 3/4, \quad (2)$$

and the expected profit for B is

$$\pi'_B = (1 - \phi) \cdot 0 + \phi \cdot 1/2 = 1/4. \quad (3)$$

²¹ The entry deterring effects of BellSouth's "Fast Packet Option," where large discounts on high-capacity circuits are linked to purchases of BellSouth's frame relay services, can be illustrated using a similar model to that presented here.

Importantly, the buyer will not sign a contract that renders a profit less than $\frac{1}{4}$, since the expected profit without a contract is $\frac{1}{4}$. Similarly, the seller will not sign a contract that will reduce its profit below $\frac{3}{4}$. The task, then, is to show that the seller and the buyer will voluntarily sign a quantity discount contract that prevents entry, and they will do so only if their expected profits are at least as large as those computed in Eqs. (2) and (3).

Now, consider a simple quantity discount contract $t = (P_1, P_2)$, where P_1 is B 's payment to S for one unit and P_2 is B 's payment to S for two units. So, the marginal price of the second unit is $P_2 - P_1$. The buyer will purchase the second unit from E only if the entrant's price is less than the marginal price of the second unit from S . Call this price \tilde{P} , which must obey the constraint $\tilde{P} \leq P_2 - P_1$.²²

In the presence of this contract, the entrant enters with probability

$$\phi' = \max\{0, P_2 - P_1\}. \quad (4)$$

The buyer will sign the contract t only if $P_2 \leq \frac{7}{4}$ (so that B 's profit is at least $\frac{1}{4}$). The optimal contract solves

$$\phi' = (P_1 - \frac{1}{2}) + (1 - \phi')(P_2 - 1) \quad \text{s.t. } P_2 \leq \frac{7}{4}. \quad (5)$$

The solution to the optimal contract is $(P_2^* = \frac{7}{4}, P_1^* = \frac{6}{4})$, where the marginal price of the second unit, \tilde{P} , is only $\frac{1}{4}$. Note that the price for one unit under the contract substantially exceeds the price without the contract. This price difference $(\frac{7}{4} - 1)$ represents a penalty on B for defecting to the entrant.

Under the contract, the expected profit to the seller is

$$\pi_S^t = \frac{3}{4} + \frac{1}{16}, \quad (7)$$

which is a higher expected profit than without the contract. The expected profit to the buyer with the contract is

$$\pi_B' = \frac{1}{4}. \quad (8)$$

²² If the entrant's price does not satisfy this constraint, then B 's profit would be less than $\frac{1}{4}$.

So, the buyer will also sign the contract since its expected profit is unchanged.

What is the effect of the quantity discount contract t between the buyer and seller? With a marginal price of the second unit being $\frac{1}{4}$ under the contract, the entrant will not enter unless $c_e < \frac{1}{4}$, which occurs with probability $\frac{1}{4}$. Without the contract, the probability of entry was $\frac{1}{2}$. Thus, the contract reduces the probability of entry. Importantly, quantity discount contract deters *efficient* entry (entrants with cost, $\frac{1}{4} < c_e < \frac{1}{2}$), and therefore reduces social welfare.

Now, consider a scenario where the incumbent is required to offer its output at a cost-based rate of $\frac{1}{2}$ per unit (*i.e.*, cost-based pricing of unbundled elements). Is there a contract that both the seller and buyer will sign that will deter efficient entry? The answer is *no*. With cost-based pricing, there is no entry-detering contract that the seller is willing to sign (that is, it is profitable). Thus, an unbundling regime with cost-based prices eliminates the ability of the seller to use a contract to deter efficient entry.

IV. Conclusions and Policy Implications

A number of important policy conclusions can be drawn from the preceding analysis. First, the quantity-discount contract reduces entry even though the entrant may be more efficient than the incumbent. Since the contract keeps out more efficient entrants, the contract is *socially inefficient*, even though the contract is privately beneficial to both firms. In essence, the contract is an agreement between the seller and buyer to expropriate some gains that might accrue to the customers of the buyer (*i.e.*, end users) due to entry by a more efficient entrant. It is this expropriation of potential gains to end users that make the mutually beneficial contract possible.

A second and very important policy implication of the model relates to wholesale access to high capacity facilities. It is clear from the model that requiring the ILECs to sell high-capacity circuits on a wholesale basis at economic cost can eliminate the entry deterring effects of the contract by making entry-detering contracts unprofitable. With cost-based access, entry occurs if and only if it is efficient, and efficient entry is not deterred. Thus, in the context of high capacity circuits, the theory indicates that circuits should be made available to CLECs at cost-based rates (*e.g.*, TELRIC).

The analysis also suggests that for cost-based access to provide an effective solution to entry deterrence effectuated through Special Access quantity-discount contracts, the cost-based access must be without use restrictions historically applied to the facilities.²³ These anticompetitive use restrictions – which relate primarily to the mix of traffic carried over the circuit – have rendered the wholesale, cost-based access a worthless alternative to Special Access services. For example, the competitive carrier PaeTec observed:

[T]he co-mingling and use restrictions applicable to conversion of special access circuits to UNE combinations render that cost based alternative for leasing the same facilities as economically and operationally impractical.²⁴

To ensure efficient entry is not deterred but encouraged, when the Commission mandates unbundling it should ensure that the facilities should be unbundled and made available at cost without regard to the use of the facility, including the mix of traffic carried over that facility. Use restrictions are unnecessarily regulatory and encourage inefficient entry decisions. The Commission now appears to recognize the inefficiency of use restrictions and, with the one narrow (though potentially dangerous) exception of limiting an ILEC's unbundling obligation to a total of two DS3s per requesting carrier to any single customer location, made high-capacity circuits available without use restrictions in the *TRO*.²⁵

As the Commission prepares to issue its next version of its unbundling rules, the Special Access case study presented herein serves as a “canary in the coal mine” regarding the design of effective pro-entry competition policy. Indeed, if there is no entry in a sector comprised exclusively of the largest carriers and customers in America, then there is a serious market failure present and, by extension, a failure of the Commission to establish effective pro-entry policies.

²³ The *TRO* eliminated such use restrictions, but as the D.C. Circuit eviscerated the FCC's unbundling rules *in toto* in *USTA II, United States Telecom Association v. FCC*, 359 F.3rd 554 (D.C. Cir. 2004), how the Commission will approach this issue when it issues its next set of unbundling rules is unclear.

²⁴ *Comments of PaeTec Communications, Inc.*, RM No. 10593 (November 27, 2002) at 3.

²⁵ See *TRO* at ¶ 324.

As our theoretical model shows, even if firms can get over the significant sunk cost issue (a fundamental component of the impairment analysis requires under Section 251 of the Telecom Act²⁶), the Bells – through the use of quantity-discount contracts – still very much have the incentive and ability to stymie efficient entry. As a result, a pro-competition policy agenda must include unbundled network access to high capacity circuits and/or tighter regulatory control of Special Access pricing and contractual terms.

²⁶ George S. Ford, PHOENIX CENTER PERSPECTIVES NO. 04-05: *You're Not Impaired Because You Are Impaired* (10 November 2004) (<http://www.phoenix-center.org/perspectives/Perspective04-05Final.pdf>).