Considerations in Contract Pricing of Utility Services in Alaska

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CONSIDERATIONS IN CONTRACT PRICING OF UTILITY SERVICES IN ALASKA

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Introduction

In the past public utility regulation was relatively straightforward. Providers were considered natural monopolies and regulation took the form of determining the allowable costs for service provision and the appropriate rate of return on investment. The price under this regulation was a form of averaged cost.

Today the presence of competition in many markets once controlled by public utility monopolies has made the simple regulatory model obsolete. Public utility commissions must redefine the role and form of regulation in this new environment. This transition is complicated by, among other things, the difference between how price allocates resources in a regulated market compared to a competitive market. Typically in the former, price is based upon historical cost and distributive fairness is important. In a competitive market, price is determined by the interplay of cost and willingness to pay. The criterion of equity does not enter into the allocation of resources.

This paper addresses one important question which arises in the context of regulation of a public utility when competition is present. What is the appropriate contribution to common cost which should be included in the rate charged by the public utility to customers in competitive markets? Should the commission allow the market to determine price and thereby in some instances contribute little if anything to the common costs of the utility? Or are there public policy considerations which justify restraint on the operation of the market in this situation?

This question has arisen in the context of a proposal by Alascom to enter into a special contract with Markair for the provision of a variety of telephone services for a period of 3 years at a bundled price considerably below the tariffed rates for the individual services. Among the reasons put forward for the contract is the assertion that Alascom is in competition for the provision of these services to Markair. Alascom also asserts that at the prices reflected in the contract they would retain Markair as a customer and the

prices, being above the cost of the direct provision of the services, would make some contribution to the common costs of the utility. Although the benefits and costs of the prices proposed under this special contract are important, the question goes beyond this one contract since its disposition by the commission may set a precedent which could affect the pricing of a large volume and share of telecommunications services regulated by the commission. For this reason the question of the appropriate sharing of common costs must consider the telecommunications market as a whole.

The Potential Gains from Market Competition

In perfectly competitive markets in which there are large numbers of buyers and sellers, the resources of the economy are efficiently allocated toward the production of the goods and services most valued by consumers. This allocation is accomplished when the unplanned operation of the market (via the "invisible hand") establishes product prices at the marginal cost of production. Deviations from this efficient allocation of resources are quickly corrected by the presence of many sellers and many buyers.

Three important conditions are satisfied when price equates to marginal cost because this is the point at which the amount that consumers are willing to pay exactly matches the cost of production.

> First, production is at the most economically efficient level. If price were above marginal cost, production would be too small since some consumers, willing to pay the marginal cost, would not be served. If price were below marginal cost, the cost of production would exceed the amount that some consumers would be willing to pay and production would be too large.
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> Second, consumption is at the most economically efficient level. The value of the services to consumers, as reflected in the price they are willing to pay, just matches the cost of production. At a price above marginal cost, some consumers willing to pay the amount required to produce the service would be unable to purchase it. At a price below marginal cost, some consumers who valued the service less than its cost to produce would purchase it.
>
> Finally, production occurs using the most efficient combination of resources since each producer has an incentive to minimize his cost of production in the pursuit of profit, but none can influence the price of his output.

In addition, competition stimulates the search for new products, innovation, and cost cutting. Firms are willing to take the risks associated with the introduction of

these changes because of the potential for profits they may generate. When these activities generate profits beyond the normal return on investment they provide a signal to other firms to enter the market, and the entry of these other firms will eventually dissipate any excess profits.

Perfect competition is not a necessary condition for the presence of economic efficiency as defined above. Economic efficiency may be present in a market that has a limited number of competitors if the market is, in the terminology of economists, "contestable". In a contestable market the threat of entry produces the discipline to price at marginal cost because if a firm were to raise its price above marginal cost competitors would enter the market and competition would immediately drive the price down to marginal cost. The threat of entry in a contestable market requires that the cost of entry into the market be low. This can be either because the fixed costs are low or because the fixed costs are transferable between producers. Airline service for a particular link is an example of a contestable market. In telecommunications private line long distance service is a contestable market because the fixed costs are transferable through resale.

When there is more than one competitor in a regulated market, economic efficiency requires that those competitors with the lowest marginal cost serve the market. In addition if price is set at marginal cost this will result in the most economically efficient allocation of resources both in production and consumption. Consumers will purchase the service up to the point where their willingness to pay exactly matches the marginal cost of production.

Although setting price equal to marginal cost in the market with competition may enhance economic efficiency in that market, the customers in the competitive market will not be making any contribution to the common costs of the utility. Common costs are those costs shared by all customers which cannot be specifically assigned to one customer or one class of customers. If these common costs are not recovered from its customers, the utility will not be financially viable. If the customers in the market with competition are not contributing to the common costs, these costs must be recovered from the other customers of the utility in markets with less competition. This has three implications. First, the customers paying the common costs will be paying a price above marginal cost, which is not economically efficient. Second, they may be paying a higher price for the same service as customers in the market with competition even though their cost of service may be identical to those customers with access to competition. Third, by shifting all the common costs to customers in markets without competition, equity across customers may be undermined.

This situation would clearly be to the advantage of the customers in the more competitive market because they would directly enjoy the savings from the price at marginal cost rather than at some higher level. If the customers in the competitive market were making an appropriate contribution to common costs, it could also be beneficial to the customers in the markets with less competition. Although these customers in the

market with less competition would be paying a price for service above the marginal cost of its provision, which is not economically efficient, they would not be paying more than the value they placed on the service they received (If the value of the service were less than the price, they would not buy the service.), and they would be paying less than would be the case if the utility were not serving the customers in the competitive market. If those customers left the utility the remaining customers would be required to pay the entire amount of the common cost.

If price in a regulated market with competition is set above marginal cost it is possible for the situation known as "uneconomic bypass" to occur. This happens when a customer is lost to a competitor with a higher marginal cost of production because the competitor is able to offer service to the customer at a price below the regulated rate but higher than the marginal cost of the regulated utility. This is not an economically efficient situation since production has shifted from a producer with a lower marginal cost to a producer with a higher marginal cost. The loss of a customer is not automatically a situation of uneconomic bypass however if the competitor does truly have a lower marginal cost of production. In this case it would be economically efficient for the customer to leave the system and switch to the provider with the lower marginal cost. In either case the loss of the customer does result in the loss of the sharing of common costs that the customer provided. However, there would be an opportunity for the lost customer to pay a share of the common costs of the other provider and this would be beneficial to the other customers of the that provider.

If price in a regulated market with competition is set above marginal cost the practice of "cream skimming" may occur. This is the capture of market share by competitors with a lower marginal cost for serving portions of the market. This is basically the market working to allocate production in an economically efficient manner in the form of the capture of market share by the most efficient producers. If regulation were to prevent this, the market share of inefficient firms would be protected at the expense of economic efficiency in production. On the other hand detrimental cream skimming could occur if the price set in the more regulated market were an average of costs and competitors picked off markets where their marginal cost were less than this average and yet above the marginal cost of the regulated producer.

The Potential Negative Effects of Marginal Cost Pricing

Allowing the price to be competitively determined in a market may result in economic efficiency in that market. The economic efficiency benefits include the efficient use of resources to produce the desired level of output at a minimum cost as well as responsiveness to changing conditions of demand, cost, and technology. However because customers in different markets may be linked by the existence of common costs, competitive pricing may give rise to a number of possible negative effects. These are as

follows:

1. PRICE BELOW MARGINAL COST--Although for the purpose of maximizing economic efficiency the appropriate floor for the pricing of utility services is short run marginal cost, it is very difficult to determine short run marginal cost with accuracy in practice and it may exhibit considerable variation over time. Consequently there is a possibility of error when setting price to reflect marginal cost. Furthermore, although no firm operating solely in a perfectly competitive market would rationally price below marginal cost or survive for long if it did, this constraint does not hold in a regulated market where competition is limited or where an opportunity for cross-subsidization exists. There are three reasons why this may be the case.

First, the firm may engage in predatory pricing. Predatory pricing occurs when a firm consciously first sets price below marginal cost in an attempt to drive a competitor out of a market and then raises price above marginal cost to recoup its losses.

Second, a firm may be willing to offer service at a price below marginal cost for the purpose of expanding its market share and potentially its rate base, if the loss from pricing below marginal cost in one market can be recovered from the prices charged customers in other markets. This is cross-subsidization because the customers in these other markets are paying some of the costs directly attributable to the customers who are paying less than the marginal cost of provision of their services.

Third, competition may lead to the practice of detrimental cream skimming where the price offered by one firm is below the true marginal cost of the service provided because there is an "externality". For example, one firm could offer telephone service at a low price that did not cover the cost of adequate backup capacity which was provided at no cost to those consumers through the presence of another supplier in the same market. The customers of this other supplier would be unfairly burdened with the cost of providing backup capacity to the customers of the firm doing the "cream skimming". At the same time the customers of the "cream skimming" firm would not be paying the full marginal cost of the services they were receiving.

If a price were set below marginal cost it could have the following effects:

a. Some customers would be receiving services at a price below the marginal cost of providing those services. This would be economically inefficient since these customers would not be paying all the costs directly attributable to providing them with service. Some other customers would be subsidizing their consumption. Consequently they would be consuming more than the economically efficient amount.

b. Other customers could be paying not only the costs directly attributable to their consumption (marginal cost) and the common costs of the producer, but also some of the costs directly attributable to serve the subsidized customers (marginal costs). This

cross-subsidization is economically inefficient since it increases the price these customers must pay for their service further above marginal cost than it would otherwise be and further reduces their consumption below the economically efficient amount (which for them is also the amount they would consume if price were equal to marginal cost).

c. Incorrect estimation of short run marginal cost could result in a diversion of business away from a firm with a short run marginal cost which is--over time and on average--lower. If done consciously this could be considered a form of predatory pricing.

d. A price induced expansion of demand (subsidized price) could lead to an expansion of capacity in excess of the economically efficient amount.

e. Insufficient return on investment (if the cross-subsidization were paid by the shareholders rather than other customers) could result in deterioration in the quality of service and impede new investment by the firm in the long run.

2. BURDEN ON CORE CUSTOMERS--Pricing at or near marginal cost in selected markets through special contract shifts common costs into the tariffs in regulated markets. This moves these markets away from their economically efficient level of output and could put an unfair burden on "core" consumers who have no alternatives (these effects are independent of the possibility of cross-subsidization discussed above):

a. Since any price higher than marginal cost can prevent some consumers willing to pay the marginal cost from obtaining service, which is economically inefficient, the shifting of all common costs into the tariffs in regulated markets can reduce economic efficiency in those markets.

b. If the higher tariffs force customers to forego service this may undercut a goal of universal service. Forcing customers to forego service would further shift the common costs onto a smaller base of customers.

c. Higher tariffs might force customers in the tariffed markets to bear all the burden of paying off past investments that should have, because of the pace of technological change, been depreciated much more rapidly. (This would be the case if the economic life of these investments was shorter than had been anticipated when the depreciation schedules were established.)

d. Shifting common costs to core customers could reduce or eliminate any incentive for cost savings in serving those customers.

e. Charging different rates to different customers that have the same cost of service might be viewed as undue discrimination even though the customers differ in their access to alternative suppliers or in their ability to self supply (and thus may have different price elasticities of demand--price sensitivities).

3. UNECONOMIC COMPETITION--Because of the small size of many markets in Alaska combined with the lumpiness of investment in public utility facilities, it may be economically efficient in many instances for only one supplier to serve an entire market. Competition, combined with the ability to cross-subsidize, could lead to duplication of facilities and consequently added costs to consumers.

4. UNDUE DISCRIMINATION--If price reflecting marginal cost is "locked in" a special contract covering a term of several years, undue discrimination may result. This would happen if during the term of the contract the short run marginal cost increased because an increase in demand resulted in the need to add capacity to the system. In that case the "locked in" customer would be exempt from the requirement to pay the higher marginal cost while all other customers who were not under special contract would pay a higher price based on the now higher marginal cost. Since the marginal cost is now higher for all, there can be no basis for shielding one customer based simply on the existence of a contract. To allow one customer to continue to pay a price less than the marginal cost would also not be economically efficient.

5. DISTORTION OF SECONDARY MARKETS--If competition between utilities allowed some customers but not others to benefit from low prices that were not due to some natural advantage such as the ability to self supply, distortions would be introduced into secondary markets. An example would be an advantage that Markair might enjoy over Alaska Airlines if the former but not the later received service under a special contract when the cost of serving the two competitors was not significantly different.

6. ANTICOMPETITIVE BEHAVIOR--When there is a dominant firm in a regulated market, and competing firms desire entry, one method for encouraging competition is via the purchase of wholesale services. If the wholesale prices are on average an accurate reflection of marginal cost then the pricing of services consistently below wholesale could restrict entry by competitors.

Comparing the Benefits and Costs of Marginal Cost Pricing

The appropriateness of pricing utility services at or near marginal cost, compared to a price including a share of common costs, depends upon a comparison of the benefits to be gained from such a policy with its costs. The primary potential benefit of allowing firms to price at or near marginal cost is economic efficiency in the allocation of resources in that particular market. Pricing at or near marginal cost in one market however, undermines economic efficiency in the other markets served by the utility. The retention of customers and consequent sharing of common costs among a larger number of customers is another potential benefit. Alternatively the primary potential benefit of pricing at average cost with sharing of common costs is fairness in the distribution of

common costs among customers. In addition this alternative may prevent some misallocation of economic resources. In comparing these policies account must be taken of the relative importance of these different effects.

If we consider first the potential economic efficiency benefits to result from allowing special contracts at a price close to marginal cost we must ask the extent to which production at the least marginal cost will be enhanced, the extent to which pricing above marginal cost would restrict consumption, and the extent to which competition which enhances innovation and cost reduction would be fostered.

In the proposal for a special contract between Alascom and Markair presently before the commission there is no evidence either that reducing the price of service to the level proposed in the contract will allocate production to the lowest cost producer, or that keeping the price at the tariffed rate will result in uneconomic bypass--a diversion from the more cost efficient to a less cost efficient producer. Therefore it is impossible to estimate any economic benefit from a more efficient provision of services if the contract were approved.

Second, there is no evidence regarding the price sensitivity (price elasticity) of the proposed services. If the services provided under the contract are not price sensitive (Markair and other customers do not purchase significantly more or less when the price falls or rises) then consumers are not prevented from consuming the economically efficient amount by a price above marginal cost. Customers would be purchasing about the right amount of services at the tariffed rate even though they would be paying more than the marginal cost because a lower price would not prompt increased purchases.

It is important to recognize that competition in a market can arise for a number of reasons. For example it could be that one competitor is an inefficient dinosaur, it could be that competitors have become particularly dynamic, it could be the result of sweeping technological changes. In any event the competing firms could be very similar in their technologies and cost structure. In this case the advantages to be gained for competition compared to the provision of service by a single firm, particularly if the demand for the service by customers is not price sensitive (compared to the price sensitivity to a particular supplier) are modest.

The extent of potential loss of customers to the Alascom system is unknown in this case but it is entirely possible that Markair would switch to a competitor if the special contract were not approved. This would mean that the entire contribution to common cost currently paid by Markair would need to be paid by the remaining Alascom customers. On the other hand the addition of Markair to a competitor's system would provide the opportunity for Markair to contribute to the common costs of that system which would be a benefit to the other customers on that system. There is no information available to make a judgement regarding the relative equity merits of the sharing of common costs with the remaining customers of Alascom or the customers of a

competitor.

Against these potential gains must be weighed the costs of allowing the special contract at a price close to marginal cost.

First, the proposed prices may be below true marginal cost. This could be because the utility is able to price in the less competitive market to cross-subsidize customers in the more competitive market. It could also be because the marginal cost calculations might not adequately account for the potential of demand to run up against capacity constraints in some markets in the foreseeable future. When capacity additions are lumpy, the short run marginal cost may be low except at those output levels where capacity additions become necessary. When that occurs the short run marginal cost becomes much higher. The marginal cost calculations must take into account the likelihood that capacity constraints will be reached in the provision of services by some averaging of short run marginal costs under conditions of both no constraints and capacity constraints. A low price which just covers short run marginal cost might benefit the consumer in the short run but could lead to a deterioration of the quality of service in the longer run, and could be misleading to a consumer making an investment based upon one price only to find later that the price has increased dramatically due to a capacity constraint caused by other consumers entering the market. However if there is little evidence in this case that a price above marginal cost significantly reduces economic efficiency, by extension the loss of economic efficiency from pricing below marginal cost would be limited.

Of more significance is the fact that the prices proposed in the special contract clearly shift the payment of common costs onto the other customers. The resulting increase in prices to these consumers may be considered a negative impact either if it undermines an objective of universal service or if it is deemed to be unfair by some other standard such as unfair burden of payoff of former investments. In addition the further increase in price above marginal cost which this shift of common costs would entail would further restrict customers in those markets from consuming the economically efficient amount.

Third, a special contract covering a period of several years "locks in" the customer to the prices based on marginal cost at the time that the contract is executed. This may be viewed as undue discrimination by the conferring on this customer of a preferential status in terms of immunity from changes in price based on changes in marginal cost over the life of the contract. For example, marginal cost in many of the markets served under the contract might currently be very low because of more capacity than necessary. Growth in demand could require an expansion of capacity in some of these markets during the life of the contract and this would mean an increase in marginal cost to reflect the purchase of additional capacity. There is no reason why any particular customer should be shielded from paying the higher subsequent marginal cost just because they happened to sign a long term contract at prices which did not take into account the

subsequent capacity constraint.

Fourth, price discrimination could extend into the secondary market. This would be the case if the special contract gave Markair an advantage over its competitors which was not based on any real economic advantage such as differences in the cost of economic resources.

Finally, it is important to consider the precedent which approval of this special contract would establish and the implications of that precedent for the pattern of cost shifting in the future. It is not clear what volume of customers would become eligible for the prices proposed in this contract or the extent to which other customers would be able to negotiate special contracts at similar rates if this contract is approved. However in the interest of reducing the potential for undue discrimination among customers with similar costs of service provision, it is likely that the number of customers eligible for special contract status would be large.

Although the proposed special contract between Alascom and Markair represents only a small portion of the total revenues of Alascom, the number of customers in the intrastate market who may be eligible for pricing close to marginal cost under special contract is potentially large. If a large share of those customers were to negotiate special contracts at prices similar to those in the Alascom-Markair special contract, the impact on price to customers in the markets with less access to competition would be substantial. The aggregate result would be a significant shift in the allocation of paying the common costs of the utility onto the "core" customers with a significantly larger likelihood of a reduction in demand among those customers.

To illustrate, if the monthly special contract price for a private line were on average $2,000 below the tariffed rate and 200 private lines paid this price under special contract, the savings to the private line customers would be $4.8 million per year. The utilities would recoup this loss of contribution to common costs by increasing (or failing to decrease) prices in their other markets by $4.8 million per year. If the total revenues collected from these other markets were about $73 million, pricing by special contract in the competitive market would increase prices for the remaining customers by 6.6%.

Furthermore there are an unknown but potentially larger number of customers presently in the interstate market who might choose to transfer to the intrastate market if special contract pricing becomes generally available in the intrastate market. Although prices in the interstate market are generally less than in the intrastate market there could still be an advantage to a customer from the lower special contract price compared to the interstate tariff.

If an interstate customer transfers to the intrastate market and pays a price for service under a special contract that exceeds marginal cost that customer would be making a contribution to common cost. However, in the shift from the interstate to the

intrastate market that customer would bring with them an allocation of common cost based on fully distributed costs in the interstate market due to application of jurisdictional separation procedures. If the common cost allocation exceeded the common cost contribution, the amount of common cost that each customer in the less competitive markets would be required to pay would increase with each customer who shifts to the intrastate market. If the number of customers who shifted into the intrastate market were large, the increase in price to the "core" customers from this phenomenon could be significant.

For these reasons in the case of the special contract between Alascom and Markair, there is little evidence of significant real economic benefits from a price reduction close to marginal cost and there is evidence of potential shifting of costs and undue discrimination. Taken together these factors suggest that the societal cost of setting a price close to marginal cost is higher than the societal cost of setting a price close to the tariffed rate.

The Appropriate Markup Above Marginal Cost in Competitive Markets

Because of the large number of considerations identified and discussed above, there is no general formula which will be applicable in all cases for determining the appropriate markup of price over marginal cost for different types of consumers and consequently how much each consumer should contribute to the common costs of the utility. Other things being equal, competition should be recognized where it is viable and regulation should be appropriately reduced. However the value of competition is in its results rather than its existence and there will be instances where competition may be harmful to the goal of economic efficiency. For example it may result in cross-subsidization or lead to too much capacity or a deterioration in the quality of service. Furthermore price set close to marginal cost may be discriminatory and negatively impact "core" customers. Finally the cumulative negative effect on "core" customers of marginal cost pricing in competitive markets could be significant. Since it is not possible to have both economic efficiency and equity, some compromise is necessary.

One alternative for determining prices and the appropriate allocation of common costs is to establish markups above marginal cost for different markets. Economic efficiency considerations dictate that common costs be allocated among consumers by a formula which results in prices that are at least as high as the marginal cost of service but are no higher than the stand alone cost of providing the service. A price below marginal cost results in cross-subsidization while a price above the stand alone cost encourages entry by inefficient competitors. The practical problem is that between these two points there is a wide range of prices and consequently this economic efficiency criterion still allows for the use of any number of allocation formulas.

A fixed markup over marginal cost would be an easy standard to apply, but there is neither an industry consensus nor a universally accepted theoretical basis in economics for the appropriate percentage standard. However there are a number of guidelines that derive from the general analysis of costs and benefits of pricing at marginal cost presented in the previous sections.

First, given that 1.) a firm which can cross-subsidize has an incentive to set price at less than marginal cost, 2.) marginal cost is difficult to accurately estimate and may display considerable variation over time, and 3.) capacity constraints may not be adequately reflected in short run marginal cost, price should never be allowed to fall to the level of short run marginal cost. Since there is a range around which the actual value of marginal cost will fluctuate over time, the upper bound of this range should be built into the markup as the floor. This will reduce the possibility of price being consistently below marginal cost.

In the case of the proposed special contract between Alascom and Markair, there is a difference of opinion between Alascom and the commission staff as to the marginal cost of service to be provided. The difference is significant, with the staff estimate about double the estimate of Alascom. If this variation were taken as an estimate of the potential range of fluctuation in actual marginal cost, it would suggest a minimum markup above marginal cost as defined by the utility of about 100% to prevent the potential for cross-subsidization, to account for fluctuations, and to guard against the potential of underestimating capacity constraints.

Second, a small markup may be appropriate, and a small contribution to common cost, if pricing close to marginal cost clearly and significantly contributes to an improvement in economic efficiency. The most direct evidence of this would be that with marginal cost pricing service provision would shift from a high marginal cost to a low marginal cost producer. In this case a greater portion of the common costs are borne by the customers in the less competitive markets regardless of whether the customer leaves the system or not.

Third, a large markup may be appropriate, and a large contribution to common cost, if considerations of equity are the most important. Among these considerations might be the burden of price increase on the "core" customers, the appropriate distribution of the costs of equipment that is technologically obsolete but not yet depreciated, or the perception of discrimination among customers who have equal marginal costs to serve but are distinguishable by the level of competition in their markets. Here the common costs would be shifted to the customers in the less competitive markets only if by going off the system the special contract customer self supplied or otherwise obtained his supply from a totally unregulated source.

Fourth, a large markup may be appropriate, and a large contribution to common cost, if the size of the markup sets a precedent for a potentially large volume of sales

which could shift a significant share of the common costs onto other customers.

Finally, a markup which is a compromise between large and small may be appropriate when considerations of economic efficiency and equity are both important and both are significantly influenced by the price chosen.

Any markup above marginal cost is conceptually equivalent to some discount off the tariff rate calculated as a percentage of the difference between the tariff rate and the marginal cost. It is useful to think of any markup also in terms of a discount from the tariff rate for two reasons. First since the determination of the marginal cost may be difficult, basing a markup entirely on marginal cost as a base raises the possibility of compounding any error made in the calculation of marginal cost. Second, by comparing the price based on the markup to the tariff rate, it is possible to get a good idea of the size of the benefit which would accrue to the customer under the special contract and the size of the common cost contribution that other customers would be required to bear.

Based on the analysis and discussion of the potential benefits and costs of pricing close to marginal cost with a small contribution to common cost as reflected in the special contract between Alascom and Markair, a significant markup above marginal cost is appropriate. A discount of 25% of the difference between the tariffed rate and the marginal cost would be the midpoint of an appropriate range in which to set the price. This takes account not only of the fact that there is no evidence of a marked improvement in the allocation of resources from a small markup, but also that the precedent this special contract would establish may have far reaching consequences on the customers of Alascom who do not have access to competitive markets.

An alternative to a fixed markup above marginal cost or a fixed discount from the tariff rate would allocate common costs among customer classes and thus establish prices based on each customer class share of the total cost savings from the utility serving all customers together compared to the sum of the stand alone costs of serving each class of customers separately. With some knowledge of what these stand alone costs are, the proportion of common cost allocated to each class of customer would be less than or equal to the proportion of total savings attributable to that class from combined production compared with stand alone production. When added to the marginal cost of serving each class of customer, this would establish price ceilings for each class of customer. Prices in competitive markets could be market determined while prices in the less competitive markets could not exceed the ceiling. This would prevent any allocation of costs from the more competitive to the less competitive markets in the presence of marginal cost pricing in the competitive markets.

In the proposed special contract between Alascom and Markair, an allocation of common cost on the basis of savings over stand alone cost would result in equal proportional allocations of common cost to the contract and non contract markets since the only difference between these markets is the alleged competition in one but not the

other. There is no evidence of any difference in the stand alone cost of service between the two types of customers. Consequently strict application of this allocation rule would mean that any price discount below the tariff rate under the special contract would be borne by shareholders rather than ratepayers of the other services.

In other words, the application of this rule would limit the amount of common cost that could be allocated to the customers in the less competitive markets even if the utility were allowed to price close to marginal cost in the competitive market. The primary usefulness of this approach however, is not in its use for pricing on a case-by-case basis, but rather as a check over a period of time to ensure that major service categories are contributing their appropriate share of common costs.

Appendix:Setting the Price for a regulated natural monopoly

A natural monopoly exists if the average cost of production declines with increasing levels of production so that a single firm can supply the entire market at the lowest cost. This condition of falling average cost could be static--due to economies of scale arising from technical indivisibilities in supply or it could be dynamic--due to technological change over time. Since a monopolist who is unable to price discriminate maximize profit by charging a price above the marginal cost of production and produce less than the amount for which customers are willing to pay the marginal production cost, regulation of natural monopolies has been instituted to promote the efficient allocation of resources.

The efficient allocation of resources requires that the monopoly price at marginal cost just as firms in competitive markets do. However because the average cost for the monopolist is falling, the marginal cost is below the average cost and marginal cost pricing will not, in the long run, allow the monopolist to recover all the fixed costs associated with production. The theoretically correct economic solution to this problem which retains economic efficiency is the institution of a head tax on all consumers. Practically speaking revenues to make up the deficiency must be collected from the customers in the form of prices above marginal cost.

By pricing above marginal cost to meet the budget constraint there is a loss of economic efficiency because some customers who are willing to pay the marginal cost of the service offered will not consume the service at the higher price.

Economists have offered a number of suggestions for how to set the price in this situation so that the budget constraint is satisfied and the loss of economic efficiency is minimized. Obviously if all customers are identical the only solution is to set price at average cost. But it would be better if output could be increased beyond this point since average cost would be lower so different pricing schemes that result in higher demand, and consequently higher output are preferable even though they may appear to be price discrimination.

If it is possible to identify different classes of customers then it is possible to price discriminate and obtain a solution which is preferable because it minimizes the loss of economic efficiency. Price discrimination in this sense is the practice of charging different rates to customers in different circumstances for the purpose of more closely approximating the efficient level of production and consequently lowest possible average cost of production. This is equivalent to identifying the marginal customer since it is the marginal customer who should, within this framework, be charged a price closest to marginal cost.

Price discrimination is alternatively defined either as charging a different price to two customers when both have the same costs, or the same price when their costs are different (as in lifeline rates). This practice should be minimized because it results in cross-subsidization but it is unavoidable in practice because any method of grouping customers and averaging of rates will result in some discrimination.

One suggestion is Ramsey pricing which allocates common costs to customers based on their price sensitivity (price elasticity). More price sensitive customers are charged a price close to, but always above, marginal cost. Less price sensitive customers are charged a price further above marginal cost. The rationale for this pricing scheme is that price sensitivity is a measure of the value of the service to customers and prices should be set so the majority of the contribution to common costs should come from customers who both value the service highly (as reflected by their lack of price sensitivity) and who will not cut back on their consumption rates much if price is above marginal cost. Conversely little of the contribution to common costs should come from customers who will cut back on their consumption if the price is above marginal cost.

A second is to raise prices above marginal cost (reduce prices below average cost) for the price sensitive customers until the benefits to the non-price sensitive customers have been maximized, that is until the point where the benefits of the higher rate of production (lower average cost) are surpassed by the costs in the form of a higher contribution to common costs.

These methods of pricing do not result in cross-subsidization as long as no customer is being charged a price which is below the marginal cost. If one class of customers is receiving services at a price less than the marginal cost of providing the service then the other customers will be subsidizing those favored customers through the prices they are paying. At the other extreme the price charged the price inelastic customers cannot exceed the "stand alone" cost of serving them alone. It did exceed this level, those customers could be served at a lower price separately from the other customers. When a monopoly is regulated and different prices are set for different classes of customers subject to a budget constraint, there is no guarantee than cross-subsidization does not occur. This is possible because the monopoly has an incentive to expand its rate base to maximize profit by expanding service and one way to expand service to price as low as possible to price sensitive customers. In addition there is no guarantee than a "stand alone" producer would be allowed into the regulated market.

These pricing suggestions have at least three major problems. The first is how to identify the price elastic customers and quantify the extent of this sensitivity. The second is that as reasonable as these suggestions are from the perspective of economic efficiency, they do not seem fair to many people since price is based on the value of the service rather than on the cost of service provision. The third is that it is extremely difficult to determine marginal cost.

In light of these practical difficulties some economists argue for an equal percentage markup above marginal cost. This makes sense and is consistent with Ramsey pricing if all customers have approximately equal sensitivity to price.

The starting point for any attempt to price according to value of service is to determine the marginal cost which is the cost associated with serving one additional customer.

It is important to distinguish the marginal cost from marginal customer. If a passenger plane is about to take off and one additional passenger wants to get on, the marginal cost is the cost to provide service to that additional passenger--very low if there is excess capacity on the plane but very high if the plane is full. This last person to desire service is not however necessarily the marginal passenger. The marginal passenger is the one who places the least value on the services the plane is offering. If there is excess capacity that marginal value is immaterial. If the plane is at capacity it becomes important since those passengers who value the service the most should get it. This is determined by a type of auction where passengers are offered an incentive not to take the flight. The incentive is increased until the marginal passenger, the one who is willing to postpone his journey for the least incentive, is found.

It is clear from this example that the short run marginal cost can vary from instant to instant with the level of demand, and that it can vary dramatically if the capital investment is "lumpy" (as it is in the case of 747's). If the value to the marginal passenger (as well as to all the other passengers) exceeds the cost of adding an additional plane to accommodate him the marginal cost becomes the cost of adding the additional plane. Otherwise the marginal cost is essentially zero. (How should price be determined in the case when marginal cost is non-zero?)

The short run marginal cost is defined at each instant of time as the cost of serving one additional customer. In this instant of time all capital costs are fixed, they cannot be changed but operating costs can be varied. Marginal cost is determined by the identification of causal responsibility.

In contrast long run marginal cost is defined as the cost of serving one additional customer using the least cost combination of facilities given that the size of all facilities can be varied. This involves the choice of the optimal plant size in the long run--that plant that has the lowest average cost for the output expected over the life of the plant. From this it is possible to calculate a long run marginal cost curve as you move from smaller to larger capacity facilities, and in the range of decreasing average cost there is an area of decreasing long run marginal costs.

Because of the lumpiness of investment and the fact that utilities generally operate with a significant amount of excess capacity in anticipation of growth or because output is available on demand, short run marginal cost is often very low or even zero in some

cases. This is particularly the case if the assumption is made that the capacity of the existing facilities will never be reached. In this case short run marginal cost will tend to be below long run marginal cost, but this need not always be the case. For example if a firm is operating near capacity with an aged facility the short run marginal cost of serving an additional customer might be high relative to the long run marginal cost calculated as the cost of serving that additional customer with modern equipment properly sized for the actual level of demand.

Short run marginal cost is the ideal price to charge at each instant to assure the best allocation of resources over time, but there are practical limitations on application of this rule because of technological change over time, shifting demand, and the cost to calculate short run marginal cost at every instant of time. First, there are numerous margins associated with any service, such as adding another call to a line vs. adding another customer vs. extending the length of time for a call. Second, the marginal cost is constantly changing with changes in the level of demand. Not only is it costly to calculate since the utility commission staff would need to duplicate the entire accounting department of each utility to do the job thoroughly, but the utilities and their consumers would prefer some stability. Some compromise with the ideal is necessary.

This means that if changes in short run marginal cost can be predicted, they should be somehow included in rate structures so when it can be anticipated that capacity constraints will be reached in the future, customers must be forewarned that they may have to pay the costs of additional capacity in the future. Here there is clearly a tradeoff between stability of rates and marginal cost pricing.

One such compromise is to use average variable cost plus a markup as a proxy for short run marginal cost.

Because pricing at short run marginal cost is unlikely to yield sufficient revenues to cover the revenue requirement of the utility, long run incremental cost for an incremental block of sales rather than a tiny increase is a typical practical solution. This "long run incremental cost" which could also be referred to as "long run marginal cost" will be based on the average incremental variable cost of the added sales plus the estimated additional capital cost per unit, for the additional capacity that would have to be constructed if sales at that price are expected to continue over time or to grow. Both components would be estimated as averages over some period of time extending into the future. The increment to output is allocated a share of common cost only if there is an alternative use of the capacity or if new capacity would need to be built to serve that output.

Traditional rate making has not relied much on the concept of marginal cost which is prospective. Rather rates have been determined by historical costs, or at best by the cost of reproduction of existing facilities. Since prices developed from these costs do not reflect the opportunity cost of the use of resources to provide the services, they are not

efficient.

The traditional two part tariff is one means of approaching an incremental pricing scheme. The demand charge covers the fixed costs of service delivery and is allocated on the basis of the portion of demand at the peak, and the energy charge covers variable costs.

The fixed costs may or may not be common costs or costs that are shared by all users. In the absence of a clearly defined peak there is there is no way to allocate these costs from an economic perspective.