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## Option Value Analysis and Telephone Access Charges

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*Abstract* - This paper explores the policy implications of the recent options value analysis for telecommunications. It shows that application requires very great care because otherwise, the actions taken, while they appear to follow the analysis, can actually go in the opposite direction. This is demonstrated by access fees for interexchange carriers' use of the local loop. Because options analysis shows that the true cost of an investment, including future opportunity cost, is greater than it appears to be, the access charges should apparently be raised accordingly to discourage excessive investment in facilities. But here, raising access fees, rather than discouraging investment, is likely to increase it. Increasing the cost of entry through the use of currently extant facilities will lead to increased facilities-based entry. This will thereby exacerbate any excessive investment rather than reduce it.

### 1. THE ISSUE

The very illuminating new analysis stemming from the work of Dixit and Pindyck has profound implications for both theory and practice. The theory is deep and may sometimes entail complex and subtle reasoning. In contrast, its practical consequences may seem straightforward and even easy. This paper, however, employs a very current and urgent issue to show that, even by using the new analysis to deal with applications, matters are not always as straightforward as they can appear to be.

In short, one can characterize the pertinent part of the new analysis as follows. It tells us that investment decisions typically have a cost component that has usually been overlooked, so that the total costs of such decisions (and, hence, their appropriate price) is normally underestimated. The overlooked cost component is the narrowing of future choices that a current investment commitment entails. By making such a commitment, the decisionmakers forego some of their future op-

tions. The decisions preclude choices the decisionmakers *may* prefer to change as the passage of time increases the information available to them. But such changes are no longer open to them because of their investment commitment.

Dixit and Pindyck note that this is obviously a real cost that can be avoided only by postponing the investment decision. They also demonstrate that using the net present values of the expected future revenues and costs as the decision criterion to choose between immediate investment and the postponement of the decision can lead to erroneous choices. Neglecting the value of the foregone options biases the decision in favor of current investment over decision postponement. The error cannot be cured without including the value of the foregone options as part of the cost of an immediate or early commitment. Thus, the true total costs of the investment are higher than they usually are calculated to be.

Moreover, the true *marginal* cost of increased investment can also be expected to be higher than it is usually estimated to be. So it seems plausible that there should be a concomitant enhancement of the efficient price of access to the resulting facility as well as that of any product using the facility as input. From the point of view of economic welfare, the role of such a price enhancement is the prevention of inefficient overinvestment by the market. That is, by reducing the quantities demanded, the enhanced prices will prevent the expansion of current investment commitments beyond the point called for by expected revenues and true costs, including foregone option costs.

This, in considerably oversimplified form, is the basic story, and it is, of course, fundamentally valid. However, the use of this reasoning for practical application, without careful consideration of the pertinent relationships, can lead to indefensible and inefficient decisions. This is demonstrated by relating the analysis to a hotly debated current issue – the appropriate level of the access fees that the local exchange carriers (LECs) should charge the interexchange carriers (IXCs) for access to the former's local-loop facilities.

## **2. APPEARANCE AND REALITY OF OPTION VALUE COSTS IN ACCESS CHARGES**

The obvious interpretation of the options value scenario to the LECs' access fees seems straightforward enough. The appearance of the matter, which is very different from the reality, is the following. In order to enter the local telecommunications market, the IXCs desire to rent access to the LECs' facilities because it is likely to be less expensive for the IXCs than building duplicative facilities of their

own. The resulting increase in demand for the facilities may therefore require the LECs to enlarge the capacity of those facilities – an investment commitment that entails foregone future choices for the LECs. Everyone seems to agree that the appropriate access fees should be based on costs (even though there is heated dispute over which costs these should be). The apparent conclusion is that the access charges should be higher than they would be if the foregone option value were ignored in the calculation.

However, this all-too-easy conclusion ignores two vital considerations. First, the grant to the IXCs of access to the LECs' facilities is likely to require little, if any, expanded investment commitment. Second, an increase in access charges is likely to speed up and increase IXCs' commitment to facilities-based entry into the local markets. That is, it will provide an incentive for investment commitments *by the IXCs*, which themselves have a cost in terms of foregone option value. Indeed, it is plausible that this is the type of investment most in danger of being driven to excessive levels in terms of economic efficiency. Below, these two contentions are discussed in turn.

First, if IXC entry into the local telecommunications markets is successful, it will mean that the LECs will lose some of their local business to the new entrants (presumably made up for by LEC entry into the interexchange arena). In terms of local traffic, the transfer of some traffic from the LECs to the IXCs will reduce the LECs' use of their own facilities, leaving unused capacity available for rental to the IXCs. Thus, the entry should result in little, if any, need to expand capacity and investment. More than that – in the debates over the proper access charges before the many regulatory agencies involved in the process, *the LECs have repeatedly contended that entry will leave them with substantial stranded assets*. But this is tantamount to saying that, far from having to *expand* capacity, the LECs expect to have considerable excess capacity left on their hands. They patently cannot have it both ways – they cannot legitimately claim at the same time that entry will force them to make substantial new investment commitments with high option-value costs, and that entry will leave them with a significant burden of excess capacity.

Second, entry can lead not just to one but to two different types of investment decisions, either of which is in danger of being carried to levels that are excessive in terms of economic efficiency. And here it must be emphasized once more that efficiency in investment decisions is the central point of the new options value analysis. It has just been demonstrated that access prices that disregard the cost of foreclosed choices can conceivably lead to overinvestment by the LECs, although it was shown to be unlikely. *But the level of access charges can also result in overinvestment by the IXCs*. If those charges are too high but entry into the local

telecommunications market promises to be profitable, the IXCs may feel compelled to build duplicative facilities, even in cases where substantial excess capacity already exists on the LEC's local loop. It is at least plausible that this sort of overinvestment – the natural extension of uneconomic bypass – is the more likely possibility. And it can indeed occur when some of the option values most likely to be relevant are overlooked.

This, then, is the important point: foregone option value is a very real cost of a current commitment to invest. The failure to recognize and incorporate this fact into pricing decisions can, indeed, lead to an inefficient overallocation of resources to investment. But the implication for pricing is not always as straightforward as it may appear, which has been demonstrated here for telecommunications access charges because they should be set to avoid the inefficient overcommitment of resources by the IXCs and not only by the LECs. Thus, quite plausibly, option value analysis may well call for an access price that is *lower* than the one that would otherwise be adopted, rather than the higher price that a superficial consideration of the matter would recommend.