

## Bill and Keep as the Efficient Interconnection Regime?: A Reply

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### Abstract

In a critique of my paper outlining the Central Office Bill and Keep (COBAK) proposal, Wright (2001) offers two sets of conditions under which a COBAK interconnection regime would not lead to optimal utilization. While there could be conditions under which some interconnection regime other than COBAK would lead to higher social surplus measures in very simple models of telecommunications, the critique provides no evidence that these conditions would be empirically significant. This, along with the other considerations explained in the proposal and not considered in the analysis, continue to suggest that COBAK is an appropriate policy recommendation.

### 1 Introduction

The Telecommunications Act of 1996 was designed to reduce regulatory intervention in the provision of telecommunications services in the United States, and afford the marketplace a greater role in providing and pricing telecommunications services. The transition from monopoly to competition necessitated the development of, among other things, a consistent set of rules governing inter-network calls. The purpose of my COBAK proposal<sup>1</sup> was to present an implementable set of rules that could be applied consistently across all forms of interconnection.<sup>2</sup>

A major goal of the COBAK proposal is to show that efficient pricing could be attained under an interconnection regime that acknowledges communication is a shared service from which both the calling and the called party benefit, and accordingly requires the parties to share the cost of calls.<sup>3</sup>

It also identifies a number of “practical” areas in which COBAK would improve upon the existing interconnection regime independent of any externalities that exist between the calling and called party, including eliminating many existing regulatory arbitrage opportunities, reducing the need for regulators to monitor and determine the

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<sup>1</sup> DeGraba (2000b), henceforth “COBAK paper”.

<sup>2</sup> The FCC recently issued an NPRM seeking comment on the implementability of bill-and-keep interconnection regimes as proposed in the COBAK paper and in another FCC working paper, Atkinson and Barnekov (2000).

<sup>3</sup> The bulk of prior analysis has assumed that the caller derives all of the benefits from a call and, therefore, properly assumes the entire cost of interconnection.

incremental cost of individual networks for the purpose of setting cost-based interconnection rates for each network, and reducing the need to update such findings as the technologies of these networks evolve. COBAK will also eliminate the expense networks currently incur in determining how many minutes pass from one network to another.

Thus, COBAK offers an interconnection regime that can both generate efficient prices and solve many of the practical problems facing the industry.

## 2 Response to the criticisms

The critique by Wright (2001) focuses on the results of COBAK that depend on how the benefits of telecommunications are divided between calling and called party. Such a critique of policy recommendations can both advance the pure theory by focusing in greater detail on specific aspects of the proposal, and may result in additional policy recommendations.

To begin, I disagree with Wright's claim that the COBAK paper argues that COBAK is efficient *per se*. Paragraph 4 of my paper states that COBAK is appropriate when a number of assumptions hold, one of which is that both the calling and called parties typically share in the benefits of a call.<sup>4</sup> More generally, determining appropriate interconnection rates is an empirical matter. The interconnection regime will affect a vast number of decisions, including usage levels by customers, subscription levels of customers, choices by carriers of which technologies to adopt, attempts by carriers to engage in regulatory arbitrage, and decisions made by regulators. An appropriate policy must balance the costs and benefits among all of these decisions.

At a more specific level, Wright states that "Two fundamental problems with the COBAK approach that are not addressed by DeGraba are its failure to internalize network externalities between the calling and the called party and its failure to apply Ramsey principles to the recovery of joint costs" (see section 4 of his critique).

### 2.1 Accounting for the call externality

I address these in reverse order. To illustrate his second point, Wright argues that there are some calls for which the calling party receives most of the benefit. He then argues that a bill-and-keep interconnection regime would under-allocate the cost of the call to the calling party. He states, "In fact the assumption that the called party has no willingness to pay may be closer to reality in many situations than DeGraba's implicit assumption that the willingness to pay of the calling and the called parties is always equal."

This problem can be viewed as a Lindahl problem, in which the cost of a public good (a minute of calling) is divided between consuming parties (called and calling parties). In the Lindahl problem, parties should contribute to the cost of a public good in proportion to the incremental benefit they derive. If the benefits of all minutes of callings are shared equally, then users should share the costs equally.

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<sup>4</sup> See also footnote 53 of the COBAK paper.

The COBAK analysis does not require that for *every* minute of calling the called and calling parties share the benefits equally.<sup>5</sup> It is consistent with the weaker assumption that there is some distribution over the division of the benefits across calls, and that the distribution is centered on a roughly even division of the benefits. DeGraba (2000a) does show that when customers share equally in the benefit of each call and competing carriers have access to the same technology, a bill-and-keep regime that equally divides the costs results in first best utilization.<sup>6</sup> DeGraba (2000a) also shows that, with a symmetric distribution over the division of benefits between the calling and called parties, a bill-and-keep interconnection regime represents the most efficient cost allocation system.

For distributions that are weighted towards the calling party receiving more of the benefit, the calling party should pay more than half the cost of the call. COBAK actually imposes more of the cost of the call on the calling party, since the calling party pays for originating switching and all transport, while the called party pays only for terminating switching.<sup>7</sup>

## 2.2 Accounting for the subscription externality

I found Wright's first example more interesting. He argues that there should be a positive termination charge paid by wireline networks to wireless networks when wireline customers call wireless customers. The reason is that customers on the wireline network receive a benefit when more customers join the wireless network. When such a termination charge exists (and no termination charge is paid by calling parties on the wireless network to other parties on the wireline network), the wireless carrier will lower its subscription rates, which will increase the number of customers subscribing to the wireless network. Wright then argues that the additional subscription resulting from the lower prices benefits society. Since all wireless customers presumably also subscribe to the wireline network, the benefit comes in the form of increased accessibility provided by mobile phones.

The analysis assumes an asymmetry between wireline and wireless subscription. That is, raising the price of service to wireline customers causes little reduction in wireline network subscription and usage, but decreasing the rate to wireless customers causes a significant increase in new wireless subscriptions. If the interconnection charge is viewed as a tax, then his analysis can be viewed as saying that taxing an inelastically demanded service (which in this case is assumed to be subscription to the wireline network) to subsidize a service that is both elastically demanded and under-demanded by the market (wireless subscription) can be welfare-improving.

Thus, for example, making the extreme assumptions that customers inelastically subscribe to the wireline network and that all local service is flat-rated, implies that an increase in termination charges imposed on the wireline network would result in an

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5 Even if such an assumption were made, the statement that there are some calls for which the calling party receives no benefit by itself is not a valid criticism of COBAK or any other interconnection regime. Clearly, if different calls have different distributions of benefit, then there is no single interconnection rate that will ensure a first best allocation for each call. Thus, by Wright's logic, the fact that there are some calls for which both the calling and the called parties share the benefits equally, would imply that a calling party pays interconnection regime would not be efficient.

6 On the other hand, it is relatively simple to show that if the calling party receives the entire benefit of every call, then a "calling party pays" interconnection will lead to efficient utilization.

7 This of course applies to interconnecting networks with similar technology and therefore costs.

increase in the flat local rate. This does not effect wireline network subscription or usage. The increase in termination revenue in the wireless network causes wireless carriers to lower subscription rates, thus increasing the number of subscribers, and therefore welfare.

However, if the termination rates are passed through to wireline customers in the form of per-minute usage charges, usage from wireline customers to wireless customers would fall, which lowers welfare. This welfare reduction would have to be weighed against the welfare increase from additional wireless subscription. The welfare increase does not necessarily outweigh the welfare reduction. In addition if there were some price sensitivity in wireline subscription, then increasing the usage rate would presumably cause some marginal customers to drop off the wireline network, which would further reduce welfare. Thus, it is possible that (wireline to wireless) termination charges can increase welfare, but, as a matter of theory this is not always the case. This analysis by Wright does however provide a useful insight that helps to illuminate a specific aspect of the theory of markets for network goods.

This assertion that there *may* be a welfare gain from imposing a positive termination charge from wireline to wireless networks is not by itself enough to imply that regulators should impose such a charge. If local rates were flat-rated, one would first want to be assured that the elasticity of subscription for wireline service was significantly lower than the elasticity for wireless service. For example, the demand for second lines is likely to be more price-sensitive than the demand for first lines. Thus, an interconnection charge imposed on wireline calling in a market that has flat-rated local service will raise the price of second lines (as well as for first lines), which will reduce the quantity of second lines demanded, thus reducing the accessibility of customers over the wireline network while increasing their accessibility over the wireless network.

A second complicating factor is that customers may view wireless and wireline subscriptions as substitutes (i.e., they may cancel their wireline subscription in favor of relying on wireless service to handle both calls at home and mobile calls). A subsidy from wireline to wireless networks would increase the rate of customers' substitution from wireline to wireless. To the extent that wireless mobile technology is more expensive than wireline technology, such a substitution would move many calls off the less expensive wireline network and onto the more expensive wireless network, thus reducing welfare.

Even if it were determined that such a subsidy could increase overall welfare, a series of problems (outlined in the COBAK analysis) would be encountered that might make implementation expensive enough or imprecise enough to negate much or all of the potential benefit. Briefly these include (i) the fact that it would be difficult for regulators to obtain the necessary cost and demand elasticity data to set appropriate rates,<sup>8</sup> (ii) differential termination rates create incentives for carriers to engage in regulatory arbitrage,<sup>9</sup> and (iii) the termination rate may lead to carriers choosing an inefficient technology.

Finally, while COBAK prevents one network from demanding termination payments from another network that delivers a call to the called party's central office, it

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<sup>8</sup> There is a sizeable literature dedicated to discussing those mechanisms regulators can use to persuade firms to reveal their true costs.

<sup>9</sup> For example if there were no termination charges between wireless carriers a wireline carrier that also owned a wireless carrier could "launder" calls originating on its wireline network through its wireless network and avoid termination charges.

does not prevent carriers from charging customers on other networks directly.<sup>10</sup> Thus, in the United States for instance, COBAK does not prevent the use of 800 or 900 services. Such retail solutions could yield different equilibria than those arising from government mandated interconnection regimes. One difference between allowing a carrier to bill calling parties directly and allowing termination charges is that customers must agree to purchase the service where the carrier charges the calling party directly. Thus, rather than imposing termination charges on all customers, allowing for a market solution allows each individual customer a choice of whether or not to charge people who call him or her.

### 3 Conclusions

The COBAK proposal presents an interconnection regime in which there need be no termination charges for calls that cross networks. The FCC has recently initiated a proceeding to seek comments on implementing such a regime. Julian Wright has presented a number of empirical conditions under which COBAK might not lead to efficient utilization of the network. The FCC proceeding will present an opportunity to determine if these or other criticisms of COBAK are enough to prevent the U.S. telecommunications industry from adopting some form of bill and keep interconnection.

### 4 References

Atkinson, J. and C. Barnekov (2000) “A competitively neutral approach to network interconnection”, Federal Communications Commission, OPP Working Paper #34.

DeGraba, P., (2000a) “Efficient interconnection for competing networks”, Working Paper.

DeGraba, P. (2000b) “Bill and keep at the central office as the efficient interconnection regime”, Federal Communications Commission, OPP Working Paper #33 (2000b).

Wright, J. (2002) “Bill and keep as the efficient interconnection regime?”, *Review of Network Economics*, 1, 54-60.

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<sup>10</sup> Note that the carrier would not need to physically render a bill to such a party, but rather pay the party's carrier to bill the customer with that customer's local phone bill, much as wireline carriers currently provide billing services for long distance carriers in the U.S.