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Two-Sided Telecom Markets and the Unintended Consequences of Business Strategy

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A two-sided market is one where two different parties are connected to each other through a third-party platform. Examples are many: nightclubs and dating clubs are platforms that bring together people wishing to meet other people; newspapers are platforms providing advertising and content to readers. In this brief paper, I examine the two-sided nature of telecommunications. It is clear that a traditional telecom is a platform allowing a calling party (C) to connect to a receiving party (R). However, it is, in a sense, too easy to label economic activity as two-sided. Without clear limits, most activities appear to be of a two-sided nature. Therefore, I begin by examining whether telecoms does meet the conditions of two-sidedness as defined by Tirole and Rochet in their 2007 paper.[1]

I then turn to examining briefly the history of pricing in fixed-line and mobile telecoms. The pricing structure we see today in many markets is a result of historical business models. In most countries, the calling party pays all the costs of the call, while caller and called pay for access to the network. I show how the pricing structures first developed in fixed-line telecoms had unintended consequences on subsequent developments in new mobile telephony. Since pricing structures and not just the level of prices are important in two-sided markets, these unintended consequences need to be recognized, and dealt with, if possible. I then turn to the brave new world—telecom operators providing content and being the platform for IP services and applications.

1 J.-C. Rochet & J. Tirole, *Two-Sided Markets: A Progress Report*, RAND J. Econ. (Autumn 2006).

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There is a danger that the original pricing model developed when telecoms was a circuit switched voice call will be carried over to the new IP world. When the platform connects multiple parties and provides more than a conversation between the caller and the receiver, the pricing model need not be that the calling party pays. In the world of free over-the-air (FOTA) broadcasting, advertisers pay for content and for the costs of building and running the platform. In the IP-based telecom world, cost contributions could come from content providers, advertisers, and users, as well as service and application providers. The burgeoning literature on two-sided markets indicates that simple cost allocation rules no longer need to dictate. That is, because of the existence of positive externalities in a market on another side of the platform, prices can be below attributable costs.

I. Is Telecoms Two-Sided?

For a market to be two-sided, Tirole and Rochet cite two conditions that hold; consider telecommunications where C is the calling party, and *R* the receiving party to a call:

(a) The structure of prices matters:

Consider usage prices (z_1C, z_2R).

- Definition: market is two-sided if volume *V* depends on the structure and not only on the level of aggregate price z; $z = z_1C + z_2R$, Otherwise, the market is one-sided.

(b) For a market to be two-sided, the Coase theorem must not apply

- Definition: Coase theorem: If C and *R* bargain efficiently, then they (1) maximize the size of the pie (which depends only on $z_1C + z_2R$) and (2) share it.

Consider a voice call between two people C and *R*. Condition (b) above clearly holds, with millions of possible connections, the caller and called parties cannot negotiate each time a call is attempted. Is it obvious that condition (a) holds: that the structure of the division of the price of the call—z—will affect the volume of calls? Both parties usually benefit from the voice call. C should always benefit—otherwise why originate the call? *R* will usually benefit but not if the call is an unwanted sales call, spam, etc. Let us assume that *R* always benefits; then having C bear all the costs of the call is sub-optimal as C is subsidizing *R*'s benefit. The sub optimality would be C undertaking too few calls. Similarly, having *R* bear all the costs is sub-optimal—and *R* will want to receive fewer calls than if C contributed to the costs. Normally, if society wanted to force one party to bear all the costs/price—z—we consider it superior that C pays all incremental costs since as the initiating party, C knows the purpose of the call. However, having C bear all costs is inefficient, and there are no measures that I know of to quantify the magnitude of the social loss imposed by this pricing scheme.

Empirical evidence would require lab experiments or natural experiments where the same people faced price—z—but under different sharing rules. I know of no such data. The data used to suggest that telecoms is a two-sided market is the very different levels of cell phone ownership and penetration in the United States and in Europe. In the United States, both *R* and C pay part of the call costs while in Europe only C pays. Hence it is conjectured that receiving parties kept their phones turned off in the United States, diminishing the externality value of cell phones, hence limiting adoption. Thus in the early days of mobile calling, a far lower percentage of the population had mobile phones in the United States than in Europe. This is shown in Table 1 where mobile subscribers per one hundred inhabitants are given for the United States, Canada, the European Community (EC) 15 and the EC 25. Until 1999, a greater percentage of people subscribed to cell phones in the United States than in Europe (and until 1997 in Canada). But beginning in 1999, far more people have mobile phone subscriptions in Europe than in North America.

Table 1

Mobile phone subscribers per 100 inhabitants

Year	USA	Canada	EU15	EU25
1995	12.69	8.81	5.77	5.42
1996	16.35	11.77	9.00	8.57
1997	20.29	13.99	14.09	13.68
1998	25.09	17.68	23.85	23.35
1999	30.84	22.66	40.69	40.15
2000	38.90	28.35	63.24	59.09
2001	45.03	34.20	74.02	69.95
2002	48.88	37.73	79.20	76.08
2003	54.58	41.65	84.82	81.83
2004	62.11	46.72	92.12	89.86

Source: ITU World Telecommunications Indicators, 2006.

These data however cannot be used to support the conjecture that the sharing of costs of calling in the United States and Canada lowered the desirability of owning a mobile phone, as many circumstances differed between the United States and Europe. In the United States, mobile numbers were similar to landline phone numbers—an area code and 7 digits. In Europe, mobile phones were given a distinct national numbering plan with 8 digits, unrelated to the city or area.

Thus in the United States, it is not obvious that the phone number that one is calling is a mobile number while in Europe it is obvious. Hence, making C pay all costs in the United States was thought to be unfair, since only after the call was made and the bill received would C know that he/she called a mobile phone. In Europe the caller knows it is a mobile phone that is being called. Other important distinctions exist as well. In most jurisdictions in the United States, a local call is free (I discuss this below), hence if mobile was to compete with free local calling, then C could not be asked to pay all of the z costs. In addition, in the United States there are a number of competing technologies available to mobile subscribers—analogue (AMPS), two kinds of Time Division, GSM (the European standard), and CDMA. Few papers examine this technological difference between the United States and Europe and its impact on diffusion and calling.[2]

II. Pricing in Telecoms

Does it matter if we ignore the two-sidedness of voice calls? In fixed-line calling, the charging model has always been that the calling party pays all costs (i.e., z). I ignore free local calls here. When the call was national or international long distance, the calling party paid. In some cases the receiving party countries levied huge taxes on incoming international calls. These taxes caused the U.S. regulator, the Federal Communications Commission, to unilaterally limit the termination fee charged by outside countries to U.S. callers. Clearly if the receiving party paid for termination, then taxing callers by raising termination fees is not possible.

There are other examples of pricing systems that shed light on the two-sided nature of telephone calls. In much of the United States and Canada local calls are free (i.e., the price of a local call is zero). This pricing system dates to the beginning of last century when the Bell system was engaged in fighting for dominance of telephony against independent competitors. The Bell system's strategic advantage was its ownership of long distance lines and by refusing to interconnect with independent telecoms and by pricing local calls at zero while charging (tolling) for long distance calls, it was able to achieve dominance.[3] Even when the Bell system became a regulated monopoly, the practice of free local calls (i.e., bundled with the access subscription) was maintained. This, however, impacted mobile networks. Because of the charging model for fixed lines, using a mobile for a local call was costly compared to free fixed-line calls. And when mobile receiving parties share part of the costs of call, mobile subscription lagged in the United States and Canada (as seen in Table 1). To overcome this lag in adoption, AT&T Wireless introduced bundles—a monthly

2 N. Gandal et al., *Standardization versus Coverage in Wireless Telephone Networks*, CoRR: Computers & Soc'y (2001).

3 If we consider local and long distance calls as two sides of a market, then two-sided pricing could have been used for foreclosure purposes.

fixed-fee option to pay for access, as well as for all calls incoming and outgoing, local and national. This bundle effectively priced incoming terminating and outgoing local calls (as well as outgoing national calls) at zero within the bundle, effectively matching the zero price for fixed-line outgoing local calls, and for all incoming fixed-line calls. Other mobile operators quickly matched AT&T Wireless. As a consequence, revenues per minute in mobile systems are now lower in the United States than in Europe.

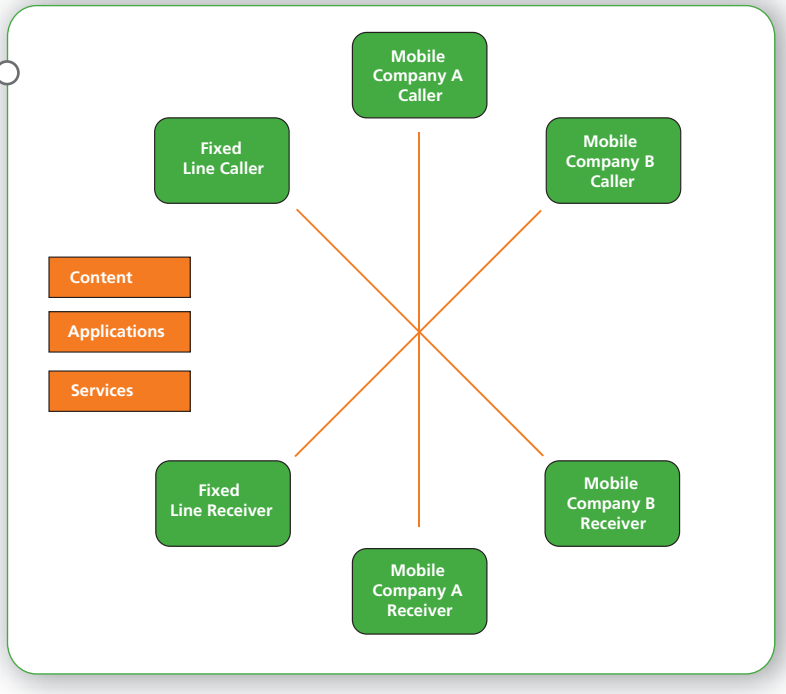
DECISIONS ON HOW TO SPLIT THE COST OF A TRANSACTION BETWEEN TWO PARTIES MAKING A VOICE CALL OVER A FIXED LINE HAVE HAD UNINTENDED CONSEQUENCES ON COMPLEMENTARY PRODUCTS AND ON SUBSEQUENT DIFFUSION.

Hence, decisions on how to split the cost of a transaction (a call) between two parties making a voice call over a fixed line (the calling party and the receiving party) have had unintended consequences on complementary products and on subsequent diffusion.

III. Mobile Markets

A fixed-line call can involve up to two parties (where both sides are using fixed-line telecoms). A mobile phone call can involve up to four potential parties if both the caller and receiver are using mobile networks and the networks are competing (see Figure 1).

Figure 1



Also included in Figure 1 are three boxes labeled content, entertainment, and services. Content can be data or information; entertainment can include movies, blogs, videos, games, etc.; and services can be dating or employment agencies, restaurants, GPS (positioning), etc. The network providers are then platforms and the market is multi-sided.

Traditional telecoms have a lot to learn about pricing in multi-sided markets. Some six years ago, wireless application protocol (WAP) was touted as the means of offering services to the mobile phone customer. Network operators in most countries did not recognize that it was necessary to get both sides on board in order for the WAP market to form. The operators thought since they "owned" the customers, that WAP service and application providers needed to pay operators (or receive very little revenue) in order to access the operators' customers. The inevitable happened—WAP failed. Similarly, poor recognition of the multi-sidedness of markets also enveloped much of the 3G service rollout in Europe. But the early rollout and acceptance of 3G in Japan (primarily by DoCoMo) showed a workable two-sided market model.

Unlike WAP and 3G in Europe, DoCoMo's approach allowed easy entry to its large accepted list of service application providers. To be accepted meant submitting basic financial data and plans, and having acceptable material. DoCoMo took 9 percent of application service revenues as its share and let consumer choice dictate providers' location on menu selections. That is, DoCoMo did not choose or sell the right to be first on the menu of, say, ring tone providers. Instead such providers competed to be first on the list. The list ranked providers according to popularity.

DoCoMo also understood two other aspects of business models for emerging two-sided markets. As customers could not foresee how much calling time or data charges they would use in accessing new services, DoCoMo initiated three significant controls that had never been used elsewhere (although now, many years later, they are becoming commonplace). First, DoCoMo limited the price that service providers could charge end users. Second, customers could see their bill on their phone in real time, with details of spending since their last bill, the last day, the last hour. Third, DoCoMo implemented controls on applications that could use a lot of network time. For example: four or five years ago, a fishing game became fashionable among company executives where the phone could be used to catch fish. This turned out to be fairly addictive and DoCoMo insisted that the game developer have the fishermen fall asleep after an hour. These controls by DoCoMo showed an understanding of the pricing and usage requirements to ensure that markets formed and were used optimally.

Many European 3G providers did not learn from the Japanese experience. They selected services and content they thought their customers would want (i.e., walled gardens). The pricing to customers is not simple to understand, nor can costs of accessing content be calculated as it is based on megabits of down-

loads. The price charged to content owners is not known, but given that access to the menu is tightly controlled, operators likely attempt to acquire significant revenue shares. As a result, provider ranking on menu selections is dictated by the telecom operator, not by customers. Third, most mobile telecoms have not introduced real-time bill information accessible on the device. Thus the business models for 3G services of a number of European telecom operators do not recognize the two-sided nature of service markets.

IV. Content

All telecoms, fixed and wireless, see the provision of content as new revenue sources—new multi-sided businesses. Different pricing models co-exist in these markets. For example, competing content platforms—newspapers, magazines, and broadcast television—have third-party advertisers that elect to pay part of the costs of the content and platform.

Take as an example, FOTA broadcasting. Since its inception in the 1950's, viewers pay to acquire their own devices (e.g., TV receivers) and advertisers pay for the provision of content and the platform over which the content is delivered (e.g., the costs of the broadcasters). Thus, the costs of both the content and of the platform are paid for by advertisers. Broadcasting has shifted its business model so that there is now both advertiser-supported content and programming (i.e., free to the viewer), as well as subscriber-paid content. The subscriber-pay model is via both a fixed monthly fee and pay-per-view. The subscriber-pay models include charges for the platform.

IT IS REASONABLE TO PROJECT THAT NEW CHARGING MODELS WILL EVOLVE IN TELECOMMUNICATIONS AS THE BUSINESS CONVERGES. HENCE IT IS REASONABLE TO EXPECT THE CURRENT TELECOM PRICING MODEL WILL ALSO EVOLVE.

As telecoms move into platform provision of content, more sides than the traditional calling parties of a voice call are added to the business model. Telecoms have high fixed and sunk costs. Other platforms are eroding the once fortress-like hold that telecoms had over the voice market. One such platform is IP-based, peer-to-peer file sharing platforms such as Skype or voice over IP (VoIP). As of November 2006, VoIP accounted for 20 percent of all voice traffic in France. Another platform threat to traditional telecoms is Wi-Fi and WiMAX. Google is experimenting by offering free Wi-Fi in San Francisco, California. These so-called free calling services such as VoIP or Wi-Fi generate revenues in ways other than charging the calling or the called party. Google is an advertising-based model. Hence, its free Wi-Fi experiment is one whereby the cost of calling (i.e., the platform) is paid for, all or in part, by advertisers.

The FOTA broadcasting model has evolved into a situation today where there are multiple price charging mechanisms for ensuring that all sides are on board.

It is reasonable to project that new charging models will evolve in telecommunications as the business converges from offering a voice channel platform to two parties to a business platform providing access to communications and content services. Hence it is reasonable to expect the current telecom pricing model will also evolve.

There is a current debate in the United States as to whether communications carriers can discriminate among content services. This net neutrality debate is not one of whether the Internet is free, but about who will pay for the high fixed and sunk costs of Internet communications networks. It is inefficient and incorrect to regulate that future multi-sided communications markets should charge according to the model established accidentally by the fixed-line Bell system a century ago (i.e., calling party pays). Forcing all costs of next-generation networks and fiber upgrades on subscribers is inefficient. Broadcasting has moved from FOTA broadcasting to multi-charging business models. Communications firms need the ability to allocate costs across all sides in a manner that maximizes network effects for all. Thus, pricing in telecoms may migrate from calling party pays to receiving party pays to FOTA to perhaps FOTP, or free-over-the-platform, where free really means that other sides to the market pay.

Hence it is time to understand the multi-sided nature of communications markets and the platform role of infrastructure providers. All parts of the ecosystem—telecoms, content and application providers, and service providers as well as politicians and regulators—need to account for two-sidedness in their policies and in their pricing decisions. ◀