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Triple Play Time

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Abstract: Digital convergence thrusts telephony, television and the internet into the so-called 'triple play' offerings, creating new forms of rivalry between cable operators and telephone companies. Markets participants feel compelled to enter new industries to survive, even though their core competencies are limited to their primary market. The outcome of triple play competition is likely to depend on the speed of the development of new technologies and the adaptation of the regulatory environment. In the short run, telephone companies will enjoy an advantage attributable to switching costs. However, this advantage will erode as younger subscribers switch to telephony on the internet.

Key words: triple play, bundling, digital convergence, broadband access, television and telephone

Even though it remains true that pictures, sounds and written data eventually reach our brain through airwaves and electromagnetic radiation, all this information is now processed, stored and transmitted as digits. This digital homogeneity has recently facilitated important changes in the structure of the Information, Communication and Entertainment (ICE) industries, as well as in the R&D and marketing strategies of the firms in this sector.

New forms of rivalry have emerged between hardware producers who would not have competed in the past. Mobile telephone producers have entered new fields: some have integrated personal digital assistants into the handset (for example, the Sony Ericsson P900), music players (for example, the Sony Ericsson W800), credit cards (for example, the DoCoMo Mobile Wallet). Most handsets now have an integrated camera. Similarly, personal digital assistants now come with a built-in phone (for example, Treo), gaming consoles can be used for voice calls (for example, the Nokia's N-Gage), and

messaging devices can include the telephone as a secondary component (for example, the BlackBerry) ¹.

Alongside this mutation in hardware, there has been an important change in "content." Digital products are now commonly tied to each other. The seller supplies a basket of communication services that includes telecommunications (voice and instant messages), television and access to the internet. The incumbent operators of fixed-telephone networks such as Verizon, SBC and BellSouth in America, BT, France Telecom and Deutsche Telekom in Europe already deliver TV programmes, as well as voice-over-internet-protocol (VoIP) via high-speed DSL telephone lines or fibre-optic networks. This is only the beginning. In South Korea, TU Media is testing mobile TV services; while Nokia is doing the same in Europe and America.

The convergence between media (mainly TV), telephone, and broadband is apparent to all: it has been dubbed "triple-play" ². This convergence is a challenging topic for the economist because it raises unexplored issues with regard to strategic behavior and an additional slew of antitrust issues. To see why, we only need to consider the following: 1) lack of transparency resulting from bundling; 2) the exclusive access to an essential technology by dominant actors; 3) cross subsidization that accompanies competition between "triple players" and "single-service providers" and 4) bundling of services regulated by different agencies with different traditions and rules.

This paper explores the effects of digital convergence between telephony, television and internet into the "triple play adventure." In the first section, we set out the main features of the convergence between electronic services. The second section recalls the economic principles of tying, focusing on efficiency and the antitrust implications of bundling by a dominant player. The following section extends the analysis to a competitive environment that more closely matches the rivalry between the players engaged in the developing war in ICE industries. This is followed by a few examples of recent cases involving bundling of digital services and some conclusions.

¹ Most stylized facts quoted in this paper are from *The Economist*: "TV on your phone" (January 13th 2005), "The device that ate everything?" (March 12th 2005), "The war of the wires" (July 30th 2005), "The meaning of free speech" (September 17th 2005), "The teachings of the Virgin" (January 21st 2006), "Old mogul, new media" (January 21st 2006).

² An offering is referred to as "quadruple-play" when mobile phone is added to the bundle.

■ Bundling ICE services

The convergence of the supply of Information, Communication and Entertainment (ICE) has sparked a battle between telecoms-firms, cable-operators and internet-providers for the market in fixed-line telephone services. The traditional suppliers of telephony are facing tremendous competitive pressure from players like Skype that offer voice over the internet network (VoIP) at rock bottom prices. Concurrently, the telephone companies are entering the entertainment market. In the USA, for example, the second largest Baby Bell, SBC, has launched IPTV – a television channel that supplies content via upgraded broadband connections. Cable firms such as Comcast, Cablevision and others offer subscriptions to triple-play bundles. France Telecom, the dominant player in French telephony, now offers its 'MaLigne tv' product -a DSL line - to 100 cities, and reaches over 20 million households³. Its closest competitor – Free – currently has 159,000 subscribers to TV-over-DSL services.

Traditional telecoms firms try to meet the challenge by taking over VoIP carriers and switching from the technology of circuit-switched networks to internet-based networks. This, however, appears inadequate as a means of stopping the invasion of their markets by players using other digital technologies. It seems increasingly obvious that they all will have to enter the entertainment and internet worlds and will bundle all services.

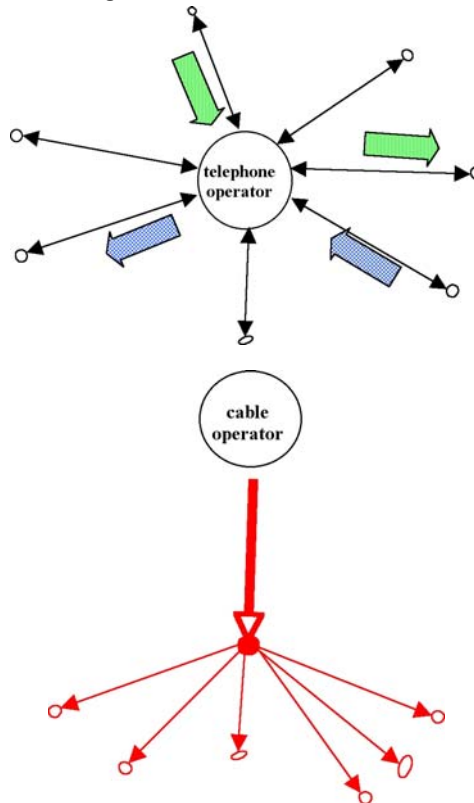
Traditional telecoms firms face a double challenge. The investments required in fibre-optic lines and upgrades of standard copper wires into high-speed DSL lines are massive⁴. The firms also have to install a 'residential gateway' in each house to connect the telephone, the computer and the TV set. To conquer the broadband universe, they must also invest in software including: compression formats, transfer protocols, compatibility standards, etc.

³ The customers of the 'MaLigne tv' service purchase tickets that can then be debited for on-demand movies and programmes. France Telecom expects to have 180,000 IPTV subscribers by the end of 2005, thus tripling its subscriber base in one year.

⁴ A temporary way of entering the TV business is to form an alliance with a satellite-TV operator (at the moment, satellite cannot offer triple-play), but this hardly solves the problem in the long run because it involves maintaining and developing two distinct heterogeneous transmission infrastructures. In France, Wanadoo (France Telecom) offers its broadband subscribers a discount on contracts with the two French satellite operators (TPS and Canalsat).

The second challenge is to adapt the telephone culture to the entertainment world. As shown by figure 1, the telephone operator is essentially a passive hub of a star network that connects consumers who produce content. Each telephone call is a specific two-way service with endogenous content and duration. The telephone company provides the platform, that is, it plays a mere technical role. By contrast, the cable firm controls a one-way mass service. It is responsible for technical quality, but also has to deal with content producers and to some extent determines content ⁵.

Figure 1 - Two business models



⁵ In North America, there is essentially vertical disintegration and the cable distributor plays a minor role in supplying content. There are firms which supply the channels to a cable distributor who arranges for the bundling of channels and pricing. The firms that sell the channels to cable distributors generally acquire the content that they put in the channel from independent content suppliers. These firms are often paid by the cable distributors on a per subscriber basis. The suppliers of channels may also produce some of the content that they put in the channel themselves.

The selection and marketing of content (CRAMPES & HOLLANDER, 2005) requires skills that have little in common with expertise in the management and pricing of voice. Moreover, fixed-line operators do not have an established relationship with content providers, which can be detrimental for entering TV market. The major competitive asset of the telephone companies is a penetration rate of almost 100%. The penetration rate of internet and pay-TV is for now significantly lower ⁶.

The next section considers the role played by bundling in the competitive struggle driven by convergence. It examines both the pro-competitive and anti-competitive features of bundling.

■ Tying and bundling: pro or anti-competitive?

Tying generally refers to an action whereby the sale of a product – for example toner cartridges – is made conditional to the purchase of another product from the seller – a printer. It is achieved via contract or technical compatibility. Pure bundling denotes the practice whereby the seller combines a fixed number of units of one product with a fixed number of units of one or more other products in a single package and limits the choice of buyers to purchase of the package or nothing at all (for example, the week-end newspaper bundled with a magazine). By contrast, a mixed bundling regime allows consumers to choose between the aforementioned bundle and the purchase of the individual components of the bundle (European Commission, 2005, p. 54).

Tying creates long-run dependency of consumers. Bundling makes it possible to increase short-run revenues by imposing the sale of goods with low utility. These methods should therefore be clearly distinguished like they are in legal cases. Nevertheless, the strategic differences are less important than their common characteristics. To keep things as simple as possible, we will regard bundling and tying as synonymous in this paper ⁷.

⁶ In the OECD countries, the broadband penetration rate reached 11.8 subscribers per 100 inhabitants in June 2005. Korea is the world leader with 25.5 subscribers per 100 inhabitants. In the US, the rate is 14.5% and in France 12.8%. The breakdown of broadband technologies is as follows: DSL: 61.2%, cable modem: 32.0%, other technologies: 6.8%, (e.g. fibre optics, LAN, satellite and fixed wireless). Source www.oecd.org/statsportal.

⁷ For a comprehensive overview on bundling, see section 7 of STOLE (2003). For the antitrust aspects, see MOTTA (2004).

During the last two decades, bundling has become a hot topic for Industrial Organization economists, mainly as a result of legal actions against Microsoft⁸. Historically the theoretical literature on bundling and tying has primarily considered two cases: 1) the case of a monopolist who is not threatened by entry and uses these techniques as a substitute to discrimination allowing greater extraction of consumer surplus (BAKOS & BRYNJOLFSSON, 1999); 2) the case of an incumbent monopolist threatened by an outsider for whom the strategy serves as a means to foreclose entry (REY & TIROLE, 2005). In the latter case, the basic economic model depicts a monopoly tying one exclusive product to some other product also sold by active competitors. To capture the economics of triple play, one must look at more recent work that models bundling by several firms already active in separate markets and competing in the bundle extended market. We will revisit this point later in the paper.

Bundling allows several direct gains. One possible gain derives from economies of scope over high-speed phone lines and economies of scale in billing and marketing. Bundling also expands players' strategy space. For instance, bundling together TV, broadband and phone increases customer loyalty since it makes it harder to switch from one provider to another. The economists have long viewed bundling as potentially dangerous behaviour for competition – the so-called "leverage theory" – ... except that the only theoretical works available, most of them from the University of Chicago, tended to prove its harmlessness (POSNER, 1976). The leverage theory of bundling holds that a firm with monopoly power in market A can restrict competitors' sales in market B. The objection by Chicago economists was that in a competitive market for good B, monopoly A could attract consumers only by fixing a price below marginal cost, which is not profitable. Therefore, they considered that bundling should not be suspected of having an exclusionary purpose. WHINSTON (1990) has shown that if one relaxes the assumption that market B is competitive and that production takes place under constant returns to scale, the monopoly in A can benefit from the exclusion of competitors in market B. Nevertheless, this does not mean that

⁸ Many economists consider that bundling has been the main driver for the development of Microsoft, long before the Explorer and Media Player cases. For example, NALEBUFF (2000) writes: "... a firm that creates or simply aggregates a bundle of complementary software applications would have a substantial pricing advantage over its rivals and thereby achieve a leadership position in the market. This is especially true as the bundle grows in scale. Thus, Microsoft's taking the lead in creating a software application bundle – putting together word-processing, spreadsheet, presentation, HTML editing, and email applications – may help explain the stunning market success of the Microsoft Office suite".

there can never be an efficiency gain from tying, and from the triple play offer in particular. We examine the efficiency gains in the following subsection. We then discuss the profit incentive for bundling and its anticompetitive consequences.

The social gains from bundling

When the goods within the bundle encompass economies of scope and/or when they are always consumed jointly by the buyers, it can be welfare increasing to have one single producer and seller. Bundling may allow a saving in production, selling and administration costs (on the supply side) and transaction costs (on the demand side). It may also give the buyer the assurance that the different products in the bundle meet a certain quality standard. This may be of great importance when the components of the bundle work together as a system⁹. With regard to transaction costs, it is true that buying from different suppliers may be time consuming, for example because the consumer needs to find technical information about compatibility. Consequently, bundling two goods or services may give consumers a higher net utility than if they have to buy them separately, either because the gross utility of joint consumption is higher than the sum of the separated gross utilities, or because the bundle is produced at a lower cost than if the elements were produced separately so that the price is lower.

In the triple play case, one can discard the argument of utility super-additivity. In fact, telephone, broadband access and TV are available from a variety of suppliers and there is little evidence that a bundle would decrease subscribers' costs. In other words, even if the services were complements for the consumer, there is no reason to purchase from a single supplier. Moreover, due to the digital nature of the products, one may assume that the transaction cost argument is not essential, even though it can be decisive at the margin, for example, because households prefer to receive a single bill and to always call the same hotline when they have a problem with one of the services. Obviously, this type of consumer gain is claimed by bundlers, although there is a lack of evidence to support this point.

⁹ However, efficiency gains from joint consumption can also arise from the products supplied by competitors. In particular, when the bundle is made up of complementary goods or services, it does not necessarily follow that buyers would enjoy lower utility by buying the component parts from independent sellers. However, the bundle is better if the exclusive producer of one of the goods has made it incompatible with the other goods when they are produced by a competitor -- for example when toner cartridges sold by firm A exclusively work with the printers of firm A.

The strongest efficiency argument in favor of triple play is based on the existence of economies of scope in supply. On the transmission side, digitalization has made sounds, pictures and data perfect substitutes that can be injected into the "electronic pipes". Therefore, ownership of the physical network that can carry any audio and video signals argues against specialization. This "common pipe" argument means that the operators of all types of e-nets have good reason to make their pipes accessible to all content providers. Even though digitalization has opened the doors to both vertical bundling (access to the pipe + supply of content) and horizontal bundling (several types of contents), economies of scope do not necessarily apply to vertical bundling. In fact, things are more complex for service production and consumption outside of the telephone or cable network, both upstream and downstream. At the downstream level, consumers still need distinct electronic appliances to receive and process the digits. Using a non-adapted receiver, chances are that the pink elephant sent by the TV operator will look like a green donkey on the phone's screen if not like a boring list of 0s and 1s on the computer's screen. Nevertheless, given the past trend, one can rationally expect quick technological progress in this field so that, in the near future, households will have at their disposal standardized "compuTV sets" that will allow them to switch from one service to another by touching the screen or the keyboard.

The main efficiency argument against triple play is upstream, at the stage of content production. The failure of Time Warner-AOL and Vivendi-Universal clearly illustrates that the skills required to succeed in each of the three activities are very different. As indicated in the first section, consumers provide the content in the case of telephone. Like in a marketplace,¹⁰ the operator's roles are strictly technical: to ease the search of the person with whom the caller wants to speak and allow a high quality of secured connection without interfering in content between the agents who want to exchange voice or text.

The internet services are quite different. Except for chat-rooms and blogs, there is a clear separation between the providers of services (news, financial data, travels, real estate, as well as video-on-demand and music-on-demand) and the consumers of services. Moreover, there is no complementarity of skills between the publication of weather forecasts and the supply of music catalogues. As for TV programme broadcasting, this is a

¹⁰ The similarity between operating a telephone network and operating a market place explains Ebay's recent takeover of Skype, the leader in VoIP, for some EUR 3 billion.

product with mass appeal where viewers can pick and choose. It is neither the consumption of a two-way service as for telephony, nor an individual choice among millions of products as for the internet. It is the supply of differentiated programmes from which each of the thousands of viewers select the programme s/he prefers. Therefore the safety, quality and regulatory requirements are not the same for telephony, internet services and TV programmes and the business models are quite different for each service.

Budget-balancing can be an argument in favor of bundling ICE services. In spite of its apparently anticompetitive effects, customer loyalty can be necessary for operators to break even. In fact, infrastructure costs and media production costs are very high; conversely, variable cost per head is lower and keeps decreasing. It might well be that competition prevents telecom and cable firms from recouping their fixed costs when consumers only subscribe to one or two services. In that case, if a consumer with the gateway box of operator A in his basement, only pays A for the web connection and subscribes to operators B and/or C for TV and telephone, the revenue of A may be too low to compensate its cost. One strategy for A could be to use its gateway technology to blockade or to damage the services provided by its competitors, so that consumers have no other choice than to subscribe to A's bundle, with the effect of balancing the infrastructure budget. If quality is not observable, A can allege that the low quality of the competitors' service is due to exogenous reasons (virus, incompatibility, etc.). This problem is no different to that of long distance telephone operators asking for access to the local loop (see REY & TIROLE, 2005).

To sum up, there is little evidence of an increase in efficiency due to triple play. More specifically, the economies of scope achieved in the joint supply of TV, telephone and internet are rather low. The argument that tying is necessary to raise revenues enough to recoup infrastructure costs is dubious because 1) the three services have been developed in the past without being bundled and 2) revenues can be raised by the infrastructure's owner opening access to his essential facility. On pure efficiency grounds, the main social benefit of triple play could derive from enhanced competition. However, as shown in the next section, the main driver of bundling is to limit competition and to conquer adjacent markets.

Private gains from bundling

The alternative argument for bundling is that it allows sellers to capture greater monopoly rents at the expense of consumers by engaging in price discrimination and by blocking access to entrants who only supply one product¹¹. We first consider the case of a firm which is a monopolist both in markets A and B. Then we suppose that the monopolist in A faces competitors in B.

Price discrimination

When a firm faces very heterogeneous consumers, it would like to propose them very different prices in order to appropriate their surplus. But price discrimination may be prohibited by law or be contingent to the availability of information about consumers' willingness to pay, that is too costly to acquire. If the only feasible solution is uniform pricing, the seller abandons some surplus to the consumers with the highest willingness-to-pay and, additionally, does not supply all consumers with a reservation value higher than marginal cost. Bundling is an alternative way to price discriminate as the following elementary example shows.

A monopoly sells two goods A and B to two consumers i and j . The willingness-to-pay of consumer i is EUR 1 for good A and EUR 2 for good B. The willingness-to-pay of consumer j is EUR 2 for good A and EUR 1 for good B. Each consumer buys at most one unit of each good. If discrimination is banned, (or impossible because the firm cannot identify who is i and who is j), the monopoly can at best earn a total profit of EUR 4 by fixing for each good either a uniform price of EUR 1 and selling one unit of each good to both consumers – who enjoy a positive net surplus – or a uniform price of EUR 2 and selling each good only to one consumer – one unit of B to i and one unit of A to j . However, assuming that the reservation price for the package AB is exactly equal to the sum of the reservation price for each good, the monopoly can easily increase its profit by tying A and B and selling the package at the unit price EUR 3. At this price, the two consumers will buy the bundle and the monopoly's profits will be EUR 6. Bundling increases the monopolist's profit by reducing the heterogeneity of

¹¹ In Europe, bundling cases are treated under Article 82(d) of the EC Treaty. Abuse by a dominant firm may consist in "making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts".

consumers' valuations: i and j are different in terms of preferences for A and B but their willingness to pay for the bundle is the same. This reduction of consumer heterogeneity and the existence of economies of scope are the main reasons why there are generalist newspapers, although readers display a great disparity in preferences for politics, arts, sports and other topics.

When preferences are not perfectly negatively correlated like in the former example, pure bundling does not make it possible to extract all the consumers' surplus. A better solution is mixed bundling where the firm sells separately good A at high price p_A , good B at high price p_B and simultaneously offers the package AB at a price $p_{AB} < p_A + p_B$ ¹². This form of second-order price discrimination allows the sorting of consumers: those with a strong preference for A (respectively B) buy A (respectively B), and the others with middle-range evaluations either buy the bundle or do not buy at all.

Foreclosure¹³

We now consider the case where the monopolist in market A faces competition in market B. To analyze the risk of leverage through bundling, it is necessary to assess the technical conditions of production and commercialization in the tied markets. In particular, one essential feature is the credible ability of the dominant firm to commit to a bundle. In the absence of any competitor in market A, the producer will fix the monopoly price, denoted by p_A . Suppose that the firm simultaneously proposes good A alone at the monopoly price p_A and a bundle made of good A and good B at a price p_{AB} . It is clear that consumers will buy the bundle only if the implicit price of good B, $p_{AB} - p_A$, is not larger than the price of good B sold

¹² For a deeper exploration of this topic, see MATHEWSON & WINTER, 1997; BAKOS & BRYNJOLFSSON, 1999.

¹³ "By foreclosure is meant that actual or potential competitors are completely or partially denied profitable access to a market. Foreclosure may discourage entry or expansion of rivals or encourage their exit. Foreclosure thus can be found even if the foreclosed rivals are not forced to exit the market: it is sufficient that the rivals are disadvantaged and consequently led to compete less aggressively" (European Commission, 2005, p.18).

by competitors. This inability to inoculate some market power from market A into the competitive market B has been stressed by the Chicago School ¹⁴.

However, this is no longer true in a sequential setting where the monopoly can commit itself to producing only the bundle, for example by creating technical links or specific design: "You cannot use my VoIP service if you do not buy my internet connection because I use proprietary protocols." The exclusive sale of bundles makes the monopolist in market A more aggressive in market B. The argument is as follows: if the monopoly has committed to bundle, it must sell B to extract rents from A, which means the obligation to cut the implicit price of good B. The resulting lower equilibrium price of good B will hurt the firms that only produce good B and decrease their operating profits. If the resulting profit is lower than their fixed cost of entry, in the sub-game perfect equilibrium potential competitors stay out of market B when they observe that the incumbent sells a bundle ¹⁵.

Note that this policy is also costly for the monopoly when it faces competitors already in the market. Bundling is profitable only when it attracts a sufficient number of consumers of B to compensate for the loss in revenue on A. When all consumers are the same, the monopolist in A will tie A and B only if it drives competitors out of the market. When the consumers of good A have heterogeneous preferences, a commitment to bundling does not necessarily result in foreclosure. To sum up, it is clear that "the reason for concern about tying by a dominant firm is that tying serves more to hurt and eliminate rivals from the tied market than to enhance efficiency..." (TIROLE, 2005, p. 3). Is that true in the triple-play game where bundling is multilateral?

¹⁴ "If the price of the tied product is higher than the purchaser will have to pay on the open market, the difference will represent an increase in the price of the final product or service to him, and he will demand less of the tying product". (POSNER, 1976, p. 173).

¹⁵ When technology does not make it possible to exclude competitors from the secondary market, the incumbent in the primary market can try to obtain legal exclusion from the secondary market, for example through a patent. But antitrust authorities can view it as a presumption of abuse of market power. In the Independent Ink vs. Trident case, Independent Ink alleged that Trident had engaged in illegal tying by conditioning the lease of Trident's patented inkjet technology on the additional sale of Trident ink products. The U.S. District Court for the Central District of California ruled in 2002 against Independent Ink's claim that Trident violated Sections 1 and 2 of the Sherman Act, stating that Independent Ink "failed to produce any evidence of market power over the tying product" (i.e., the print-head). But on January 25th, 2005, the United States Court of Appeals for the Federal Circuit concluded that a patent "presumptively defines the relevant market for the patented product itself, and creates a presumption of power within this market. Once the plaintiff establishes a patent tying agreement, it is the defendant's burden to rebut the presumption of market power and consequent illegality that arises from patent tying". See HAYDEN, 2005.

■ The multi-play game

The preceding section dealt with bundling in markets where one firm could tie its products, but its rivals could not. By contrast, in the triple-play game several firms are attempting to capture market share by bundling. To explore such competition, it is best to distinguish between the following cases: 1) no asymmetry between rivals, and 2) initial asymmetry between rivals.

Symmetrical bundle competition

The analysis of competition between firms that offer bundles is examined in the framework of the so-called "mix and match" models (see MATUTES & REGIBEAU, 1988, 1992)¹⁶. Their model has been revisited by several authors, in particular REISINGER (2004) who shows that the consequences of commodity bundling are less predictable in the duopoly case than in the monopoly case. As pointed out earlier, bundling is particularly profitable for the monopoly if the preferences of consumers are negatively correlated because it makes consumers more homogeneous (the "sorting effect") thereby facilitating the extraction of rents. However, in the duopoly framework, making consumers more homogeneous intensifies competition because it is less likely that sellers will focus on specific segments of consumers; (this additional effect is named the "business-stealing" effect.) This would intensify price competition and lower profits. Actually, as shown below, the possibility of tying creates a prisoner's dilemma situation.

REISINGER (2004) provides an extension of the Vickrey-Salop model of differentiation whereby consumers are uniformly located along two circles in order to represent their relative preferences for two goods. Each circle represents one market. Two firms are active at exogenously given locations in both markets. They simultaneously choose their bundling and pricing strategy. They incur identical linear independent costs because there is no complementarity on the supply side. Every consumer has a unit demand for both goods and purchases at most one unit of each good independently of the other good: there is no complementarity on the demand side.

¹⁶ Actually, in MATUTES & REGIBEAU the problem is whether to make two products compatible. But their model, where consumers must choose between buying the products separately (when compatible) or from the same seller, can be easily interpreted in terms of bundle competition.

The analysis focuses on the role of correlation between the preferences for the two goods. Consumer prices for the two goods depend on their location on the circles. Therefore, the joint distribution function of reservation prices for the two products sold by each firm can be inferred from the joint distribution function of consumer locations. Moreover, from the joint distribution of reservation prices one can compute the correlation between the reservation prices. For example, if every consumer has the same location on both circles, then the reservation price correlation is equal to 1. The Reisinger's model assumes that the distance between the location on one circle and the location on the other circle is the same for all consumers. Specifically, the consumer with address x in the first market has address $x+k$ in the second market, the consumer with address y in the first market has address $y+k$ in the second market, and so on. This means that the larger the distance, the smaller the correlation of preferences for the two goods. When k is 0, the correlation coefficient is 1.

Consider first the case of consumer homogeneity. Homogeneity means that many consumers have a strong preference for both goods being sold by the same firm. Consequently, the firms can behave as local monopolists and can extract more consumer rent with bundling. There are not many consumers who are almost indifferently disposed to the two bundles and firms do not compete to attract them. There is some business-stealing, but it is unimportant compared to the sorting effect. The implication is that bundling increases profits. Assume instead that consumer preferences are heterogeneous, i.e. consumers have negatively correlated willingness-to-pay. Now bundling creates a strong 'business-stealing' effect that most likely dominates the sorting effect and makes bundling unprofitable.

To gain intuition, assume that the two firms can sell their goods only in a bundle (pure bundling). The bundles are almost perfect substitutes and each firm can gain many new customers by lowering the price of its own bundle, that is by "stealing" them from the other firm. This results in harsh price competition and a decrease in profits. When the firms can implement mixed bundling, the same is true because the price war on the bundles influences the unbundled prices which are also driven down. The result is that profits are low and consumer rents are high.

We observe that in the case of heterogeneous preferences, the dupolists are in a prisoner's dilemma situation. They both would be better off if they could commit not to bundle. But if one does, the competitor has no choice

but to do the same ¹⁷. In this case, the firms would benefit from the legal interdiction of tying products.

The model also shows that welfare is lower when the firms bundle because of distributive inefficiency. Since the bundle is priced below the sum of the two independent prices, some consumers buy the bundle. An increase in consumer heterogeneity increases equilibrium prices for the products sold alone and it induces some consumers to switch to one of the bundles. This results in distributive inefficiency because some of these consumers have preferences for the products coming from different firms. So bundling reduces social welfare since its only effect is to oblige some consumers to buy the wrong good.

The model can also be used to analyze what happens when firms choose their location and thereby influence the correlation of reservation prices. The firms may choose minimal differentiation in one product and forego profits from that product and still differentiate themselves from their rival in regard of the other product. This averts price competition on the bundle. In the USA, telephone companies that sell long distance service and internet access in one package engage in such hybrid differentiation. For instance, the long distance service offers included in the bundle of AT&T, Birch telecom, and Verizon are very similar but each firm tries to differentiate itself with respect to their internet offerings. Each offers different rates and different installation incentives:

"AT&T offers only 20 hours per month but gives a free installation kit and free live support. By contrast, Birch telecom offers unlimited access but gives only standard support and no gifts. Verizon also offers unlimited access and free live support but it offers no installation kit. In addition, consumers can choose at Verizon if they want to buy DSL or wireless where wireless is a bit more expensive." (REISINGER, 2004, p. 25).

Asymmetrical bundle competition

The symmetric model cannot answer all of the questions raised by the triple-play game. The model pays no heed to the role of an installed base. The latter plays an important role by reducing the responsiveness of consumers to small price gaps. This remains true today, even though

¹⁷ Vodaphone is the only large telephone company sticking to a mobile-only strategy.

switching costs have declined in ICE. Moreover, in the absence of perfect compatibility, network externalities give a strong advantage to incumbents since each of their subscribers benefit from the fact that there are many other subscribers to the same company. The marginal subscriber does not switch from one provider to another in response to a small price differential. The resulting viscosity creates a hysteresis effect. More pointedly, there are strong advantages to incumbency in a market because the number of customers today echoes the number of customers yesterday. So, to convey the essence of the triple play problem, the model must be adapted to the case where each firm has a relative advantage in one market (which cannot be the case in the circle model) before opening the game for entry in the other market.

The way past outcomes impinge on actual competition in digital markets may differ from one firm to the other. Cable operators already have the expertise to programme TV content. Adding VoIP to their supply of services is not a difficult task when broadband access is already available. Yet they face two handicaps:

- Firstly they are late entrants in the telephone industry and suffer from the positive network externalities of their competitors. The fact is that they have a small number of subscribers as compared to telephone companies, and the connection protocols are not perfectly compatible. Consequently they must offer price discounts to poach clients for VoIP from telephone companies.
- Secondly, contrary to traditional fixed telephony, VoIP requires the home connection box to be permanently on, which is costly in energy for households.

By contrast, telephone companies are newcomers to the entertainment industry and they will have to invest heavily to keep up with the cable firms in the supply of movies and football games, either by contracting with content producers or becoming producers.

It is hard to identify which entry cost is higher because this depends on the behavior of consumers, as well as on the development of hardware and software techniques. For older consumers, the incumbent telephone companies may well retain a competitive advantage because these consumers are less likely to switch to new and unfamiliar providers. However younger consumers, already familiar with mobile telephony and the internet are probably easier to capture by cable operators. This means that the traditional telephone companies allied with satellite operators are likely to

ultimately lose their advantage as their loyal customers grow older. Nevertheless, if it takes cable operators too much time to install and control the electronic box that connects the home with the external world, they will lose the war on financial grounds because the population of youngsters will not be large (and rich) enough to compensate for the richer clients of telecom firms.

■ Examples of recent cases involving bundling of digital services

The business process reengineering initiated by triple play will call for changes in regulation. The adaptations concern the competition authorities and the sectoral regulators. Some examples of recent cases are provided below.

Bundling residential telephone and internet

In 2000 British Telecom (BT) announced a new tariff package that bundled standard residential telephone service to unmetered off-peak internet access.¹⁸ The dominant telco launched the package in response to an offer of free internet access by the ISP provider Freeserve. The offer made it possible for subscribers to access the internet for the cost of a local phone call. The introduction of the new package by BT led to the initiation of an investigation by Oftel, the regulator of telecommunications. Oftel's concern was that the bundle would be instrumental in extending BT's position of dominance from retail voice calls to internet services. A second concern related to distortion of competition in the wholesale termination of internet calls.

To assess the intentions of the dominant firm, the regulator examined whether the marginal price charged by BT for internet access was higher than the long run incremental cost it incurred by offering this service. In its report, the regulator concluded that the available information could not support a conclusion that BT was offering internet access below cost. It also found that the structure of competition in wholesale call termination markets did not warrant a concern for anti-competitive effects. It therefore concluded that the launch of the bundle did not infringe the Competition Act.

¹⁸ Our summary of this case is based on NALEBUFF & MAJERUS (2003).

VoIP and price regulation

The French regulator of telecoms has recently determined that VoIP must be included into the market of fixed communications. It also established that competition is strong enough to justify forbearance from tariff control (ARCEP, 2005). On the latter, the competitors of France Telecom and the French competition authority strongly disagree with ARCEP (see Conseil de la concurrence, 2005).

Triple-play via merger

On December 30th, 2005 the UK's Office of Fair Trading cleared the proposed acquisition of Easynet by BSKyB. The merger allows BSKyB to offer triple-play services. The merger had raised concerns about Sky using its power as a seller of premium content and a buyer of non-premium content to block the supply of pay-TV content to DSL rivals. The OFT found that Sky already had the potential to do this in the absence of a merger, and the merger did not materially alter its incentives to block.¹⁹

Triple play to foster competition in telephony

Ten years after losing its monopoly, Telmex remains in control of over 90% of the Mexican voice telephone market. Mexico has about 220 cable companies. On July 10th, 2006, the Federal Competition Commission²⁰ issued a non binding document recommending to the Communications Ministry to allow cable operators to sell telephone services as soon as possible, and to bar telephone companies from offering television until they provided interconnection and number portability services to cable operators. The competition authority is clearly promoting an active industrial policy in order to adapt the new industry to its view on what competition should be and to limit the advantages of the incumbent.

Triple play and the merger of regulatory bodies

Convergence at the technological and market levels has led to integration at the regulatory level. In the UK, Communications Act of 2003²¹ gave Ofcom²² the authority to regulate communications. Ofcom combines powers

¹⁹ See: <http://www.ofcom.gov.uk/News/Press+releases/2005/235-05.htm>.

²⁰ See: <http://www.cfc.gob.mx/>.

²¹ See: <http://www.opsi.gov.uk/acts/acts2003/20030021.htm>.

²² See: <http://www.ofcom.org.uk/>.

previously held by five regulators²³. The old regulators have been disbanded and many members of their staff have been transferred to Ofcom.

■ Conclusions

Bundling strategies are risky and likely to profit firms, not consumers. Will the same hold true in the communication, information and entertainment industry where modern bundling takes the form of triple play?

On efficiency grounds, most of the arguments that motivate bundling in a monopoly framework are negative: at best, it is a way of discriminating in markets where a firm already exerts some monopoly power, at worst it allows a firm with monopoly power in one market to leverage this power to conquer a second market. This explains why courts should not take a positive view of a regional telephone company unilaterally tying local phone services and DSL. Nevertheless, triple play and quadruple play open up new perspectives. They are a reciprocal attempt to cross invade neighboring markets by firms that are well installed in their native market. In other words, triple-play looks like the unavoidable extension of competition due to the digitalization of pictures, sounds and data. It is unavoidable because the ICE firms face a prisoner's dilemma. For these firms, limiting their business activities to their incumbency sector is not an equilibrium strategy: when the bundling strategy is adopted by one of the firms in a market, the others have no choice but to follow. Moreover, to benefit from network externalities, the firms must install a large base of clients, which gives them the incentive to play first, thereby accelerating the transition.

Due to the lack of relevant economic modeling of the phenomenon, it is hard to predict whether there is a risk of natural monopolization. Is there room for one single national champion or, on the contrary, is it time for real competition at last? Indications are that control of the gateway box will become essential to remain in the ICE markets. Based on the economic pattern of telecommunications established in most developed countries, one can expect that open access to the gateway box will be a key element of the new regulatory framework in the ICE industry.

²³ Specifically the Independent Television Commission, the Broadcasting Standards Commission, the Radio Authority, the Radio communications Agency and OfTel.

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