

**Asymmetric Regulation, Asymmetric Information and Competition in  
Multimedia Markets**

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## **1. INTRODUCTION**

### **1.1 Summary and Conclusions**

This paper utilizes a novel analytical framework to assess competition issues in multimedia markets and to provide general recommendations for the design of regulation.

Much of the existing regulation of multimedia, telecommunications and broadcasting markets is a hold-over from the era when there was a one-to-one correspondence between a service and a delivery system. In the 1970's, telephones could only provide analogue voice point-to-point communications and cable television distribution systems could only provide broadcast (rather than interactive) television programming. Delivery systems technically could not deliver competing services and services could not be provided by competing delivery systems<sup>3</sup>.

The last decade has seen the emergence of a vast number of technological innovations which have ended this one-to-one correspondence between a delivery system and services. Telephony can now

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<sup>3</sup> Cable TV did always face competition from over-the-air broadcasting.

be provided by wired, wireless, and soon by satellite technologies, and video delivery can be provided by cable TV, copper wire pairs (ADSL) and soon by wireless<sup>1</sup>. The number of services that can be offered over these delivery systems is expanding rapidly.

The existing regulatory restrictions were designed in a world when telephony and broadcasting were technologically distinct and these restrictions are not likely to be appropriate now that technologies and services overlap. Many of the key regulatory rules are *asymmetric*, in that they either exclusively or differentially apply to one provider or one group of providers. Two general forms of asymmetric regulations exist. Line-of-business restrictions (LOB) prevent a delivery system from providing a particular service (such as telephone systems prevented from providing video-on-demand (VOD)). A second, more indirect form of asymmetric rules are those that impose on one group of providers (deemed 'dominant') the requirement to post tariffs, to provide evidence that new services are priced at or above cost, and other restrictive rules, while other providers not deemed dominant are not subjected to such requirements.

In this paper we begin with a definition of *symmetric regulation* as a regulatory regime that does not preclude the low cost firm from being the low price provider<sup>1</sup>. We then ask the natural question of how the market's performance under asymmetric rules compares to the performance of an unregulated, or symmetrically regulated, market. There are two general types of efficiency losses which may emerge in decentralized markets. The first of these - allocative efficiency losses - is associated with the exercise of market power through increasing prices to consumers. The second potential social cost is productive inefficiency - that the incentives to innovate and invest are reduced below their social optimum and thus that a socially correct amount of cost reducing

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<sup>1</sup> The Low Earth Orbit (LEO) systems of Iridium Teledesic and others is designed to provide telephony, but not necessarily to substitute for wired infrastructure in developed countries.

innovation does not occur. Allocative efficiency is considered in this (and many other) papers to be of less of a consequence than productive inefficiency since the latter affects the future path of the industry. We emphasise productive efficiency as the key objective in designing regulatory rules in the dynamic multimedia sector. Asymmetric regulations can effect incentives to invest and innovate and thus can be costly for society because they may lower long term productive efficiency. We also stress the availability of alternative symmetric regulatory instruments that address key policy concerns while doing less harm in terms of productive efficiency – in particular, the implementation of appropriate access and interconnection rules and prices.

Asymmetric line-of-business restrictions, for example the restriction in the UK on BT's offering of television programming services, but the right of cable operators to offer telephone services, *de jure* foreclose certain forms of entry. The logic of these restrictions is based on a view of the world where the incumbent in delivery system A has market power, that this market power can be enhanced by horizontal control over delivery system x or vertical control over service/content J. For example, Veljanovski 1996 argues that this market power exists but without any supporting evidence. In much of this literature (but see OFTEL 1996 for the opposite view) the presumption is made, always without proof, that incumbent delivery system A does not have advantages or economies of scope in providing service x.

Any such regulatory induced foreclosure involves social costs, but these are seldom mentioned in both the academic and policy literature. These costs are the potential for productive efficiency losses in the dynamic sense in several dimensions. Which firms will supply any given technology or service in the future is unknown. The literature describes the breathtaking array of possible innovations in new delivery systems (such as fixed wireless), in new services (such as direct meter reading) or

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<sup>1</sup> See also Sibley and Waterman 1996

content (VOD). Yet, the perception appears to be that asymmetries in provision (restriction on who can do what) are needed to foster such innovation.

We utilize a simple game theoretic framework that allows us to examine the potential social costs and benefits of imposing asymmetric restrictions, *relative* to the performance of the market operating without such restrictions. The key element driving the model is the degree of cost asymmetry between firms. This is crucial since the technological revolution in multimedia means that competitors have different costs of innovation. We show that as the degree of cost asymmetry increases - i.e., as the spread of cost differences between potential entrants rises - the performance of the unregulated market improves in the sense that it is more likely to generate efficient entry outcomes, while the potential inefficiency of asymmetric regulation increases. The central reason is that all asymmetric regulation involves the regulator in trying to pick 'winners', i.e., low cost entrants. But as the asymmetry of firms in terms of their innovation costs increase, it is unlikely that the regulator's ability to pick the low cost providers rises correspondingly. This *information asymmetry* lies at the heart of the problem, and it gets worse in markets where there is substantial *cost asymmetry* among potential entrants. This is precisely the context with the dynamic multimedia markets. Thus, we conclude that LOB and other asymmetric restrictions should be re-examined, their potential costs considered and alternative instruments assessed.

## **2. WHY IS TECHNOLOGY IMPORTANT? MULTIMEDIA MARKET DEFINITION AND TECHNOLOGY MATRIX**

Our starting point in analysis is the distinction between *delivery systems, services and content*. A *delivery system* can be considered as analogous to a distribution system, the downstream component of traditional analyses of vertical relationships among firms. Both *services* and *content*

are upstream from delivery. Services are, in our analysis, analogous to production (packaging) and content is akin to discovery or R&D. A cable TV system, the wires, is the distribution of services and content to subscribers. The services are the various channels and the content, the material sent over the channels. Of course each stage involves technological innovation. The issues are the degree to which horizontal integration (one delivery system takes over another delivery system) and vertical integration (a delivery system integrates upstream into services or content) lead to anti-competitive abuses and thus require some degree of regulatory involvement.

An issue that appears to be different in multimedia markets is that market power is alleged to reside downstream whereas in most traditional analyses of multi-market relationships, market power is traditionally considered as more likely to exist upstream. When local monopolies, for example, are given to a cable franchise, that downstream delivery system may have market power. The degree of market power is a function of the extent of horizontal competition at the distribution (delivery system) level as well as the degree of competition at the service level. Many of the recent technological advances are at the delivery system level and have two effects - they potentially lower the market power of incumbents while at the same time raising the possibility of high cost incumbents attempting to retain market power by horizontal acquisitions.

One must be most careful in examining alleged anti-competitive ties to distinguish horizontal from vertical relationships. A tie (merger, acquisition or exclusive contract) between a delivery system and a service or content provider is not horizontal but vertical and must be analyzed thoroughly to see if anti-competitive concerns appear. There is thus a need to define markets in an economically sensible way. Both geographic and product markets are important. The role of innovation and the continued emergence of new supply (technology systems) and demand (new services and content) implies

viewing market boundaries flexibly. Rigid boundaries in a regulatory context may limit the emergence of new services.

Vertical service regulatory asymmetries result from the view that the incumbent delivery system (telephone, cable) has greater bargaining power in the purchase of services and content and thus the ex ante incentives for innovation are reduced. (Tirole and others). But the first question to be addressed, is whether there is market power in delivery systems? And if there is the second question to ask is what policy considerations follow? Generally there are two solutions to handle this downstream market power: first, interconnection rules, the preference now in telecommunications and second, bans on integration, the existing panoply of LOB restrictions and cross-ownership rules across multimedia markets. However, these two policy sets are not equivalent. A ban removes any potential for innovation by the incumbent which is foreclosed by the LOB restriction. The ban also biases both the selection of entrants and the incentive to enter. Interconnection rules need not, and in our view, should not, be asymmetric but they do incur regulatory costs.

The terms 'multimedia' and convergence mean that the fundamental mapping between delivery systems and services is fading. Multimedia services can be delivered by several technologies. Today, even telephone calls do not need to originate from fixed phones using traditional phone lines. Phone calls are increasingly originated from mobile phones (both analog and digital). Low earth orbit satellites systems will soon provide phone services. And there is increasing ability by cable TV companies to upgrade their coaxial networks to provide phone services. In the television arena, television signals are now provided by traditional over-the-air broadcast, cable and satellites (DTH). Technologies appear to allow near video on demand (NVOD) over traditional phone lines. In terms

of our analysis, several points are crucial. First, technological change and innovation are prevalent. Second, this innovation is increasingly creating new mediums of supply and new services. The potential for several technologies to deliver multimedia services implies that competition is increasing in those markets. Traditional monopolies are being faced with competition from providers that bypass the traditional network and provide services through new technologies. There is therefore a substantial heterogeneity of possible costs among potential suppliers which cannot practically be known by the regulator. Thus this is an opportune time to reconsider the continued usefulness of asymmetric LOB restrictions.

## **2.1 Delivery Systems**

But competition between delivery technologies is not the whole story. In order to assess the extent of competition, it is important to know how many providers would likely enter the market using the available technologies. Telecom technologies often have large fixed and sunk costs, which may limit the number of competitors. For instance, local phone networks have often been seen as natural monopolies, but the pervasive holding of the price of access below costs has meant that alternative suppliers are constrained because of the below cost prices.<sup>1</sup> Yet entry for POTS is occurring in a variety of forms. And the telephone delivery system is being altered to provide other services, many of which they could not offer because of regulatory bans, for example, fiber-to-the-home. Most probably, switching to a fiber-intensive network will occur in gradual fashion. Fiber networks to serve the household market will probably be built by expanding fiber in telephone networks and cable television networks. Copper-based networks can be gradually expanded into FTTC and FTTH networks. Cable television networks could be upgraded into hybrid fiber coax networks, and then to SDV networks. For the household sectors, it is likely that in the near to medium term,

fiber-based networks will be provided mostly by the local cable and telephone companies. ADSL is viewed as a gap filling technology that may be installed in the mean time by phone companies, before full fiber networks are developed. All these are alternative delivery systems.

Because wireless networks are more recent and do not require as much physical investment, competition is more open. Wireless communication companies are in the process of acquiring frequencies (in the U.S., most bands have been auctioned) and are filling out the supporting infrastructure. It is likely that not all companies that enter the market will survive in the long-term, but it is well possible that five or more providers remain in the wireless market in each geographic area.

*Overall, there is likely to be a significant number of potential delivery systems for multimedia service, as long as competition is allowed to develop using the available technologies.*

## **2.2 Services**

When a service is provided under a given delivery system, it is clear that competition from another delivery system imposes constraints on the price of that service provided by the first delivery system. What is less obvious is that under multiproduct technologies, the pricing of all the products will be constrained. For instance, consider the competition between telecopy and messenger service for the rapid delivery of documents. For some documents, messenger service and telecopy are close substitutes. For other documents, for instance those that require a signature, or that are too long to be sent by telecopy, messenger service has a clear superiority. But if messenger companies cannot

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<sup>1</sup> See Crandall and Waverman 1996.

discriminate between the two products and have to gain a certain market of both types of documents to be profitable, then pricing of messenger delivery will be constrained to some extent by the availability and pricing of telecopies.

It is therefore necessary to examine demand substitutability between services in order to assess whether specific delivery systems have significant market power in a given market. Because of multiproduct technologies, it is difficult to differentiate between markets. Market definition depends on demand conditions (the elasticity of demand for a given product and the elasticity of demand substitution between two multimedia products), as well as supply conditions (the cross-elasticity of supply). For instance, a provider of TV home shopping will be constrained by the elasticity of demand for home-shopping (which, most likely, depends on the substitution with real shopping), the cross-elasticity of demand substitution with other home-shopping outlets (e.g. Internet shopping) and supply conditions (the price constraints from other home shopping delivery networks).

It is undeniable that comparative costs will guide the expansion of specific technologies and services. True competition will really occur between two technologies only if their costs are comparable. Nevertheless, it would be a mistake to rely too heavily on current comparative costs to decide where competition is likely to develop, and this for several reasons. First, costs are changing very rapidly in light of technological breakthroughs, so that current costs may have little predictive power for future costs. More importantly, costs are endogenous. R&D money will flow to technologies that have a potential for market acceptance and also depend on regulatory restrictions on pricing (on the latter see Paul Groul). Our central concern is that asymmetric regulations that preclude a given technology from providing a given service may prevent the development of cost-effective ways to provide such service, making it more likely that the costs will never be competitive with other

technologies. For instance, the high prices and low quality of local cable systems in the U.S. has fostered the development of satellite DBS technologies, with dramatic reduction in costs.

Some services, like television, phone, Internet access, are already provided through several delivery systems. Wireless technologies promise to provide access to many services in the coming years. And in the longer term, satellite communication could revolutionize mobile telephony as well as related services such as long-distance data transmission.

Admittedly, the existence of several technologies for a given service does not guarantee perfect competition. New technologies initially may be introduced to serve specific niches. For instance, the big advantage of wireless phone is that the consumer can make calls at any time from any place, even if traveling. However, as costs decline and the number of mobile phones grows, wireless phone displaces calls that would have been made from stationary phones. The number of mobile phone subscribers in the U.S. has grown from 3.5 million in 1989 to more than 20 million in 1994, while fixed connections have only grown from 133 million to 155 million over the same period. If the trend continues, mobile phone rates might well become competitive with land-based phone rates for a majority of calls.

Similarly, VSAT technology is currently used by companies with many locations (such as gas stations, discount chains) to transmit voice and data. As such, VSAT is replacing phone and Internet connection for those companies. VSAT will not replace phone for the majority of users, but might well become competitive with phone for a larger market if costs continue to decrease.

## 2.3 Existing Regulations

The regulations in place neither recognize the diversity of delivery systems discussed above nor do they recognize market boundaries appropriately. In the US, until the Telecommunications Act of 1996, telephone delivery systems could offer telephone service but not cable TV delivery service unless built and operated over a separate broadband system. Also in the US, cable television delivery systems companies could not offer telephone services or POTS for many years, and their ownership over content was controlled. Telephone delivery systems in the UK cannot offer cable TV service or content; since 1995, telephone delivery systems can offer near video-on-demand services (NVOD) but not content.

Cawley 1997<sup>1</sup> shows the liberalization dates for EU member countries, the restrictions on telecom operators providing television distribution and programming services, cable TV penetration and the ownership of cable (to what extent owned by the incumbent TO). In the UK (BT only), Austria, Holland, Italy, Greece, Belgium and Spain<sup>1</sup>, restrictions apply on Telecom Operators who wish to provide cable TV transmission. In the UK, Italy, Spain, Greece, Denmark and Belgium there are restrictions on Telecom Operators providing content. There are various restrictions on cable operators providing content and these restrictions are of various sorts. Thus, across Europe the restrictions across horizontal and vertical ties among distribution, services and content vary so much (see Table 1) that one point is clear - there is no central unifying theme or vision of regulating multimedia. The issues which are driving these various and varying restrictions are not based on a governing economic underpinning.

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<sup>1</sup> Interestingly, the “European Parliament raised the questions of ‘symmetrical treatment’ between telecommunications networks and cable TV networks “... The question was raised as to why telecommunications operators not be permitted to offer broadcasting services.” Cawley, 1997 p. 6

Implicit in these rules is the assumption that there are no social benefits of such cross-ownership, thus by banning it we need only consider the benefits of the ban, not the costs.<sup>2</sup> This is an incorrect way of proceeding in any analysis. It may be true the certain cross-ownership bans are socially beneficial but one must begin with the general case and examine both benefits and costs. Since it is vital to preserve the incentives for innovation in technology (delivery system), content and services.

It is obvious that the three elements of multimedia - delivery, service and content are in a state of enormous flux with new developments announced almost daily, It is precisely in these kind of markets that improper entry can have high social costs. The trade-off between the potential gains in welfare from LOB restrictions must be weighed against losses in socially inefficient entry, forestalled innovation, and improper incentives. *We demonstrate in this paper, that the greater the asymmetry in the sunk cost of entry, the lower the potential gain from asymmetric regulation. Thus, in technologically dynamic markets such as multimedia, regulators must take care since the potential costs of asymmetric regulation are higher (negative selection) and the potential benefits (preventing duplication and delay) are lower, as compared to a decentralized market outcome.*<sup>3</sup>

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<sup>1</sup> A Spanish court ordered Telefonica to close its new cable TV services, and draft legislation will prevent such entry until two years after a private cable TV operator is licensed. (See Cawley, 1997, p.18).

<sup>2</sup> Frank Fisher, 1989 discussed theories which he characterizes as “exemplifying,” a theory which portrays an example of what could (not would) occur by ruling out one crucial effect. The prevailing view of the necessity for line-of-business restrictions and cross deliver/service/content ownership bans in multimedia strikes us as examples of “exemplifying” facts.

<sup>3</sup> Waterman and Weiss argue “... it is difficult to predict which technologies will prove to have the upper hand in delivering video services. If, as we recommend, non-discriminatory access provisions were applied equally to program suppliers which are integrated with cable systems and those which are not, then the objective of equal application to non-cable distributors would be substantially achieved”.

### **3. A THEORETICAL FRAMEWORK FOR ANALYZING THE GAINS AND LOSSES OF ASYMMETRIC REGULATION**

In a related paper we utilize a simple game theory model to analyze the potential costs and benefits of asymmetric rules that affect the entry decisions of new firms. Here we describe the model and highlight its important findings.

In order to evaluate alternative regimes, we begin with the case for symmetric regulation. *We define symmetric regulation as rules which do not preclude the low cost firm from being the low price provider.*<sup>1</sup> This appears to us to be the only economically sensible reference point because asymmetry, as a general proposition, is ill-defined. There are many asymmetric configurations and it is impossible to construct a comparison of their effects on economic welfare without some well-defined regulatory reference point. This point is perhaps best illustrated by the example of free trade: we know that free trade is not the best regime (in terms of welfare) in all cases, yet analyses begin with a free trade equilibrium as a starting point and the analytic burden of proof lies with those who demonstrate, first, that free trade has socially undesirable consequences and second, that these cannot be addressed in less costly ways, in efficiency terms, than trade restrictions.

Symmetric rules are similar to free trade: they form the natural starting point for analysis, and it should be incumbent on proponents of asymmetric regulation to demonstrate that the ban they propose is the least costly method of achieving a socially desirable outcome.

We model the entry decision in a stylized non-cooperative dynamic game involving two firms with heterogeneous costs, one with high cost (H) and one with low cost (L). Cost heterogeneity is important in our analysis because we wish to examine the effects of asymmetric regulation as

heterogeneity rises. That is, as firms increasingly differ in terms of their sunk costs to enter, are the benefits of asymmetric regulation likely to increase or not? Since we, and others, view the various aspects of multimedia markets as extremely heterogeneous, the analysis with the help of this model is central.

In the first stage of the game, each firm invests a certain amount of 'effort' (e.g., gathering information, developing corporate strategy for the new market etc.) that determines the probability that it will enter. This effort has a cost which must be paid whether or not the firm actually enters. If the firm does enter, it must invest an additional sunk cost. In the context of emerging telecommunications markets, sunk cost is best thought of as R&D costs associated with new delivery system technologies, services or content. But the sunk cost may also include the cost of production facilities. In the second stage of the game, firms compete. If both enter they each earn duopoly profits; if only one enters it earns monopoly profits. Heterogeneity in supply costs is analogous to heterogeneity in innovation since the main underlying focus of these multimedia markets is the extent and uncertainty of innovation. Uncertainty as to future developments implies not only the need to view market boundaries with caution, but also the desire to have regulatory rules on entry and pricing that do not foreclose the most efficient entrant(s).

The entry game begins by modeling the profits for two delivery systems providers. While the lower cost firm is more likely to enter in equilibrium, in general both the high and low cost firms have some positive entry probabilities-  $e_L, e_H$ , where  $e_L$  is the probability of entry for the low cost firm, and  $e_H$  the probability of entry of the high cost firm.<sup>2</sup> As noted, the central question we are interested in is

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<sup>1</sup> See also Sibley and Weisman, 1996.

<sup>2</sup> If firms compete in prices, (Bertrand) greater product differentiation (lower cross-price elasticities) makes  $\Delta\pi$  smaller. This raises both  $e_L$  and  $e_H$ , essentially because it increases ex post returns under duopoly and thus the incentives of each firm to enter.

how the equilibrium probabilities of entry for both firms depend on the *degree of cost asymmetry*. These probabilities determine the costs and benefits of regulation as compared to the ‘market’.

We examine the impact of increasing the degree of cost asymmetry. Other things equal, increasing cost asymmetry raises the probability of entry for the low cost firm (raises  $e_L$ ) and reduces the probability of entry for the high cost firm (lowers  $e_H$ ). Consider the costs and benefits of regulation via a LOB restriction versus no regulation. Under the assumptions of the model, the socially efficient outcome is entry by the low cost firm and no entry by the high cost firm. There are three potential sources of inefficiency:

1. Duplicative entry: This occurs with some positive probability  $e_L \cdot e_H$  and imposes excess cost on society, the costs of the additional firm.
2. Negative selection (single entry by the high cost firm): This occurs with probability  $(1 - e_L) e_H$  and imposes excess social cost of the difference between the costs of the low cost firm and the higher cost firm which entered instead.
3. No entry (delay): This occurs with probability  $(1 - e_L)(1 - e_H)$  and imposes costs in terms of the foregone social surplus from provision of the service.<sup>1</sup>

Since an increase in cost asymmetry changes the entry probabilities, it also affects the expected net social cost of a policy of asymmetric entry restrictions. The question is how. We analyze each source of inefficiency in turn.

We model cost asymmetry as a ‘mean preserving spread’, the mean cost stays the same, but the distribution widens. Thus, greater asymmetry in costs in our model means a greater range of

possible costs, but with mean costs staying the same. We then ask what happens to the three potential inefficiencies as this cost asymmetry increases.

First, the probability of duplicative entry is  $e_L \cdot e_H$ . As cost asymmetry increases,  $e_L$  rises and  $e_H$  falls, the probability of entry by the high cost firm decreases, while the probability of entry by the low cost firm increases. We show that  $d(e_L \cdot e_H) \leq 0$  as cost asymmetry increases. Thus, the market outcome of the 'correct' firm entering and the higher cost firm not entering is strengthened as cost dispersion increases.

How about no entry (delay)? We show that delay occurs when rivals fear that the other is lower cost; the more equal the firms feel they are, the lower are  $e_L$  and  $e_H$  and the higher the probability of delay. When firms can be very different in costs and firm L knows it is low cost, then it can be facing a very high cost rival and  $e_L$  increases. Thus, the probability of delay falls as cost asymmetry increases.

The problem of negative selection is the potential that the high cost firm enters instead of the low cost firm. Since increasing cost asymmetry increases the probability of entry of the low cost firm ( $e_L$ ) and decreases the probability of entry by the high cost firm, it is immediately obvious that the potential for negative selection decreases as cost asymmetry increases.

These three major points are directly related to the potential benefits and costs of asymmetric regulation (AR). When firm H cannot enter, because of a regulation bias, L enters. The benefits of AR are then the elimination of delay and duplication. The costs are choosing wrong - negative selection (H is chosen instead of L, or the LOB restriction is on L) But we show that an unregulated

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<sup>1</sup> In a multiperiod entry game this would take the form of delayed, rather than entirely foregone, entry and surplus.

market produces 'better' outcomes as cost asymmetry increases - the probabilities of delay and duplication fall and the probability of negative selection also falls. *Thus the greater the heterogeneity of costs, the greater is the probability that the market will achieve the correct outcome. But the benefits of regulation fall and its potential costs rise as cost asymmetry increase - the opposite of market performance.* We now demonstrate this important finding. The potential benefits of regulation (delay, duplication) fall as the potential costs (negative selection) rise. The costs rise because the costs of negative selection, which the market reduces by increasing the relative probability of entry by the low cost firm, are increased for a regulator, unless the information available to the regulator of the relative costs of the firms increases as cost asymmetry increases. If the probability that the regulator will pick the wrong firm does not fall as cost asymmetry increases, the costs of the incorrect regulatory decision rise with increasing cost asymmetry since a mistake is more costly.

Consider the effects of regulation in settings with different cost asymmetries. For simplicity only, firms are assumed to know their own and other firms' costs. Regulators/government, however, have no information as to which firm is lower or higher cost. If the government forecloses entry, then duplication cannot occur, and only one firm will enter (there will be no delay). However, the potential social cost is the probability of negative selection - the government backs the 'loser' (high cost firm), not the winner (low cost firm). Where the two firms are more similar in their sunk costs - the social costs of the government choosing the higher cost firm are lower, while the benefits of regulation, the foregone costs of duplication and delay, avoided by the grant of a franchise to one firm (the foreclosure of the other) are higher.

We feel that the probability of negative selection by regulators or via asymmetric regulation of regulations is a real danger for two reasons. First, technologically advanced industries are largely

uncertain as to the realized costs of entrants. Thus, it is precisely where cost asymmetries are large that regulators do worst. Second, asymmetric regulations such as LOB restrictions are an unwieldy tool, unlikely to change as industry circumstances change. Say there is a rule established in 1950 that delivery system X cannot offer service i and that there is little cost asymmetry - it is easy to determine who is a low cost supplier of local loops when the only technology is copper wire pairs in the ground. Forty- five years later, technology has advanced so that enormous innovations are possible and cost asymmetry is large. Now regulation has to change so that the LOB restriction on delivery system X should be liberalized. However, the ability to alter and reverse LOB restrictions is clearly difficult. A regulatory asymmetry generates winners and losers and its status quo is difficult to alter.

But as cost asymmetries increase then the potential costs of regulation increase while the potential benefits decrease provided the government's ability to choose the low cost firm instead of the high cost firm does not increase as rapidly as cost asymmetries do. As cost asymmetries increase, the probabilities of delay and duplication decrease, as shown above. Thus the potential benefits of the government acting fall. But with greater cost asymmetry the costs of the government choosing incorrectly, rise - thus as cost asymmetry increases, there is less of a case for government restrictions which foreclose entry - LOB restrictions and asymmetric rules generally (tariffing, unbundling only for 'dominant' firms, etc.).

We have assumed, plausibly, that as the spread of possible costs increases, the government gets no better at choosing a low cost versus a high cost firm. If we were examining the costs of producing say, pencils, then the government may indeed be able to distinguish higher cost from lower cost firms. However, we are dealing with innovation, multimedia and content markets where entrants are

largely unknown, technologies are new (e.g. Iridium and Teledesic), potential cost asymmetries huge, and there is no basis at all, and no track record, to believe that governments can outperform the market in selecting amongst heterogeneous suppliers. Thus, we are confident in our assumption that governments are no better at picking winners when cost asymmetries rise.

It is not only direct foreclosure such as LOB restrictions which should be re-examined. Any asymmetric rule of which there are a vast array such as - tariffing requirements, notice of tariff changes, unbundling, equal access provisions, implemented only on incumbents - change the post-entry profits of all firms and thus affect the probabilities of entry. LOB restrictions represent the extreme form of how rules affect entry decisions. But all rules affect entry decisions. Take as an example, asymmetric tariffing requirements - the larger firm must post tariffs, and the smaller firm need not. These rules clearly affect the post entry competition<sup>1</sup> and thus change the incentives of the large firm and the small firm. Is this change in incentives consistent with society's drive to minimize productive inefficiency? In some cases these restrictions may well do so. However, the restrictions must always be considered in three parts. First, what problem is the restriction designed to solve? Second, how does the restriction affect the decisions to invest and innovate of all firms? Third, is there an alternative regulatory instrument which will solve the problem but at a lower social cost? We do not consider that these three questions are explicitly asked or answered in much of the literature.

#### **4. AN ANALYSIS OF ASYMMETRIC REGULATION**

As we have noted the multimedia industry is separated into three vertical production levels: ownership and operation of the delivery system, provision of services, and production of content.

We investigate the potential competitive concerns related to vertical integration, i.e. when one company (or several related companies) operate within at least two of the three production levels (delivery system ownership, service delivery, and content production).

The analysis will follow a typology of possible situations:

- A network operator's expansion into another network. For instance, what if a traditional phone company seeks to own and operate a cable television network?
- A network operator's expansion into a service that uses the operator's network.
- A company providing network, service delivery and content on an integrated basis.

#### **4.1 Network into Network**

Entry by one delivery system into a competing delivery system, raises the possibilities of foreclosure and is the dominant issue mentioned in the literature (see Velijanovsky). Our model says little directly about the possibility of horizontal foreclosure. We do consider however, that the foreclosure motivation for asymmetric regulation needs to be carefully re-considered. The anti-competitive foreclosure story is as follows. The telecom delivery system purchases or builds a cable television delivery system to reduce competition in both telephony services and cable television services. This ability to reduce competition in telephony however assumes that no alternative delivery systems exist for telephony but cable TV and copper wire pairs, and that interconnection rules cannot prevent competitive abuses. Where cable is the most likely and immediate alternative technology to copper wire pairs, then this foreclosure would be of private benefit to the telephone company if, as a result, prices could be raised or would be higher than without the horizontal merger.

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<sup>1</sup> We do not explicitly model the type of post entry competition in this paper.

If telecom prices are regulated, at least via a price cap, then the potential benefits to the telecom operator are limited. Our discussion in section 2 on emerging technologies and services showed that a number of competing delivery systems exist or are likely to exist for telephony. With the emergence of technologies other than cable that can substitute for copper wire pairs, the ability of the telecom operator to benefit from foreclosing just one technology is clearly limited. The horizontal foreclosure story then must assume that other technologies such as wireless will not effectively constrain the ability of a telecom/cable dominant operator to raise prices.

While there are some scope economies between telephony and cable (trenches, poles, ducts) these are possible to control through mandatory pole attachment and structure rules (as in the USA and Canada and unlike for example in the UK). Therefore, the social costs in the short-term of delaying infrastructure development by preventing a telecom operator from providing cable television may not be high. Velijanovsky shows that there is no correlation in the roll-out of cable TV facilities or their take-up relative to ownership by the PTO.

However, asymmetric regulation (a LOB restriction on a telecom operator not to provide cable television services) is mandatory foreclosure and the important issue, to us, is whether or not alternative regulatory instruments exist which are less potentially costly to society than asymmetric regulation. Velijanovsky downplays the ability of interconnection regimes to solve any potential problems. We consider this incorrect. As the literature demonstrates, a delivery system which delivers no services is of little use to the incumbent. An incumbent telecom operator can use a cable TV delivery system to make himself better off only by preventing services from using the two networks. Thus, if the telecom operator has to interconnect i.e., provide transmission to service providers at non-discriminatory rates then there would be no ability to utilize control over two

networks rather than one network to prevent service competition. These interconnection rules would be for telephone services as well as for video services. If the telecom operator could not utilize the two networks for anti-competitive purposes (could not limit supply), the horizontal integration would occur only for efficiency reasons. The comparison should then be between the benefit-cost ratios of LOB restrictions and the benefit-cost-ratio of an interconnection regime.

Interconnection rules when they are used in actual circumstances are however likely to be asymmetric themselves. Thus, the world is divided into dominant and non-dominant players and asymmetric treatment of the two groups is prevalent. These asymmetries do affect the profits, the probabilities of entry and thus, competition and must be carefully considered to determine if the asymmetry is socially beneficial. For example, requiring a 'dominant' provider to post tariffs, but not entrants, creates price umbrellas and likely increases in prices.<sup>1</sup> LOB restrictions are the limiting case of asymmetric regulations in general.

What we show for LOB restrictions holds in general for other asymmetric rules and regulations which constrain one firm's ability to compete. These other regulations would have less of an impact than LOB restrictions, but the direction of this impact would be similar if they affect profits and expected profits directionally the same. Therefore, symmetric inter-connection rules as to operational floor and ceilings on prices are likely to prove superior in innovative markets such as multimedia.

## **4.2 Network Supplier Integrates Into Services**

Second, is the case of preventing a delivery system, say telecom, from providing a service, such as NVOD, while allowing competing delivery systems to provide telephone service. Variants of such

an asymmetric rule would be requiring a telecom operator to use a separate subsidiary, post tariffs but not requiring the same of the competing delivery system.

This case of delivery systems providing alternative services appears to us to involve potentially large cost asymmetries. For telecom operators, for example, to provide NVOD requires innovation. Preventing such innovative activity through a LOB restriction redirects societies resources towards having videos delivered via cable TV, DTH etc. While it is possible that the delivery of broadband signals such as video will be lower cost, and their quality superior. on current broadband technologies such as co-axial cable, than over copper wire pairs, we simply don't know. Besides, if copper wire pair telephony is such a poor candidate for NVOD, why worry that the telecom operator will pre-empt videos? Either telecom operators are better at NVOD or not, why prevent innovation and experimentation? The 1996 US Telecommunications Act does allow these operators to provide video services through an 'Open Video Service' system. This move is long overdue. Basically, open access and interconnection regimes now substitute for previous entry prohibitions on telephone companies providing video services (see De Fontenay and Pupillo for a discussion). Surprisingly, these new telecom entrants, must make two-thirds of their capacity available to other service providers, whereas incumbent cable TV operators must make only 15% of their capacity so available. Partially off-setting this asymmetry are other asymmetries relieving OVS telecom operators from other restrictions present on cable operators. The effect, in total, of all these asymmetries has not been attempted.

The basic question is as follows: How can a specific telephone operator X use entry into video services for anti-competitive purposes? If that operator prices VOD services predatorily, then other competing suppliers and society are worse off. When would firm X be able to predate in this way?

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<sup>1</sup>MacAvoy 1997

If X was regulated under rate-of-return regulation then entry into VOD at a price below marginal cost would be feasible and perhaps sensible. However, if telephony is regulated under price caps, then losses in the video market could not be recaptured in other markets. If company X wanted to earn a reputation as an aggressive competitor, then predating in the video market could be feasible. However, as we have emphasized, the video market is constrained by both other technologies (DTH satellite for one) and other services (VCR's, movies) and the ability of telecom operator X to earn long run rents in foreclosing service j (video) seems farfetched

Again alternatives to LOB restrictions are present. An interconnection regime is feasible. The issue is the price of access, when the service is not a single telephone call but a single channel. We do not address these issues in this paper.

### **4.3 Delivery Systems, Services and Content:**

Finally, we turn to the area of content and issues of vertical integration between delivery systems, service providers and content providers.

Here, we, and all, see content provision as being essentially innovation with huge cost asymmetries. There is simply no a priori way of judging, who will be an efficient content provider.

Asymmetric regulation is prevalent and is likely to expand. As we have shown, in the US differential rules apply to integrated (delivery plus content) versus non-integrated content providers (access is mandated only from integrated suppliers to non-integrated) differential rules apply also to telecom versus cable, and to cable versus DTH; regulation is not a symmetric proposition.

There are a variety of concerns in content provision, most of which we consider as unfounded or based on incorrect premises. First, is the fear that a delivery system will buy up all the 'good'

content, leaving no room for alternative content. But Cave and Cowie and Cowie & Williams demonstrate that the incentives for the downstream delivery system provider and the upstream content provider are, as in many areas of vertical relationships, inconsistent. The delivery system wishes to maximize the use of its system, i.e. to have low prices at retail for viewing content, while the content provider wishes to maximize the return to content. If each were a monopoly, the familiar double marginalization problem would occur. Vertical integration does, in the case where both delivery system and content have some market power, make consumers better off.

A monopoly delivery system facing a competitive content providing industry would set the monopoly price for delivery and would not gain extra profits from vertical integration except if owning content would increase the ability to price discriminate. This we view as unlikely since the delivery system already bills individuals and presumably can price discriminate without owning content. In essence the delivery system can use its monopoly over termination and its individual billings to price discriminate. Note that content providers who do not bill cannot price discriminate. Thus, a monopoly content provider facing competitive delivery networks would integrate downstream in order to engage in price discrimination which he may not be able to accomplish without control over termination. This is the traditional vertical integration concern where the manufacturer (content) utilizes vertical integration (services, delivery) to increase profits. Therefore, the existence of market power at the content level and competition at the delivery system level is the case that would appear to warrant examination.

A second concern is discrimination. Existing delivery systems practice second degree price discrimination since standard packages of menus of channels are available to customers. Prices are

not customized to individuals. Of substantial interest in the literature is the discrimination which occurs in the pricing of unique events, say Wimbledon.

Does control over unique events such as Wimbledon lead to competition policy and regulatory concerns and can a delivery system use its control over “events” to foreclose entry into either competing distribution systems or into competing content?

One must carefully disentangle the division of rents from the ability to extract monopoly profits or foreclose rivals. It appears to us that much of the existing analysis is confused over this central point.<sup>1</sup> First, if there is market power in content provision, and if that market power can be bundled with a delivery system to forestall entry, then surely symmetric rules preventing any bundling are necessary preventing bundling between content and a specific delivery system is inefficient. Thus, the existence, if any, of market power in content does not lead to the need for an asymmetric regulatory regime, indeed it suggests symmetry, i.e., a ban on all such bundling whatever the delivery system. Second, there is a crucial distinction between, on one hand the division of the value of Wimbledon among copyright holder, service provider and delivery system and, on the other hand, the ability of a delivery system to use Wimbledon to forestall entry. Wimbledon is unique and thus earns rents over and above those of the Canadian Tennis Open. There is no doubt that Wimbledon can earn those rents. Now say that delivery system X purchases the rights to Wimbledon, what are the competitive concerns? Clearly other delivery systems will not be able to offer Wimbledon but since they can bid for its rights, any benefits of bundling Wimbledon with other events will be captured by Wimbledon. Surely if there is only one delivery system, then there is a problem of monopsony power (see Cowie and Williams) and Wimbledon will not earn as much than if competing delivery systems existed. Thus the distribution of rents shifts from content provider to

delivery system. If content provision involves more innovation resources than delivery systems, or if content provides more value to consumers, then shifting rents via asymmetric regulation to delivery systems lowers the social surplus (Grossman and Hart 1986). This is, to us, an essential concern with asymmetric regulation in a world of multimedia. By focusing on the short-term prices to consumers and therefore imposing LOB restrictions on a delivery system, and preventing a particular service from being offered on a particular system, the incentives to offer services may well be reduced creating long-term social losses. What if a present monopoly delivery system purchases Wimbledon (or the MGM library of films.)? Potential entrants into alternative delivery systems are then foreclosed from owning that same asset. But the question returns to whether the provision of content is competitive or not. If it is competitive then alternative content will be provided. If it is not competitive, then content has market power and will earn rents. And the content provider can earn more rents by integrating into delivery systems if the ability to engage in price discrimination is enhanced.

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<sup>1</sup>Note Cowie and Williams.

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