

# Universal Service And The Telecommunications Industry

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*With liberalisation of the telecommunications industry has come a host of complex issues regarding efficiency and competition. Richard Doyle focuses on the question of universal service and suggests that it need not suffer in the wake of liberalisation.*

## **Introduction**

In countries all around the world, telecommunications markets are being liberalised. Economists view liberalisation as a good thing. It enhances efficiency, thereby lowering costs, which in turn reduces prices. New services are developed and the quality of service is improved. Society experiences a general rise in welfare due to liberalisation. In the overall context of telecommunications liberalisation, there is no obvious reason to expect anything different. However, within one specific area of telecommunications, universal service, the effects of liberalisation are not so clear.

The aim of this paper is to investigate how liberalisation affects the achievement of universal service. First of all is a discussion of the background to universal service. The concept is examined and then the economics underlying universal service, showing how it constitutes a market failure, are examined. The pre-liberalisation situation, that of monopoly provision of universal service, is also analysed. This serves as a benchmark for a comparison to various broad regulatory scenarios in a liberalised environment. These are no regulation, regulatory oversight and prescriptive regulation. Reference is made to countries that have liberalised and the findings of the section are then discussed. Finally, the paper is summarised and concluded.

The scope of the paper is narrower than would be wished. Therefore, the analysis is simplified and employs implicit assumptions. This is entirely due to a desire to cover the necessary background and thereby offer a complete analysis. It should also be noted that the aim of the paper is not to offer any definitive recommendation; rather, its purpose is to discuss the issue in an informed manner.

## **The Background to Universal Service**

### ***What is Universal Service?***

Universal service is the concept that every individual, in a given country, is entitled to some basic level of telecommunication service at an affordable price. Though there are more precise and technical definitions, the advantage of this one is its simplicity and clarity. Universal service is a dynamic concept. Its meaning is changing over time, though the definition remains the same. For example, what is considered to be a 'basic level of telecommunication service' today may be voice telephony, whereas in ten years it may include Internet service. Similarly, given the general rise in income, the meaning of an 'affordable price' may also change in the future.

### ***Economics of Universal Service***

The economic rationale for universal service obligations is that without them, the market would not provide telecommunications services efficiently. This is due to the existence of positive externalities; without universal service obligations, the socially optimal amount of telecommunications services would not be provided. There are two types of externalities in telecommunications. Call externalities occur because

subscribers receiving incoming telephone calls benefit therefrom (because it adds to their utility), yet pay no cost. Network externalities result from the benefits that new network subscribers confer upon existing network subscribers, without the existing subscribers paying any cost. The existing subscribers benefit because they are now able to call, and receive calls from, one more subscriber. As subscribers' valuation of their utility from network access includes the full value of call externalities, we can concentrate upon network externalities. Network externalities can be illustrated as in the following diagram.

**Diagram 1**

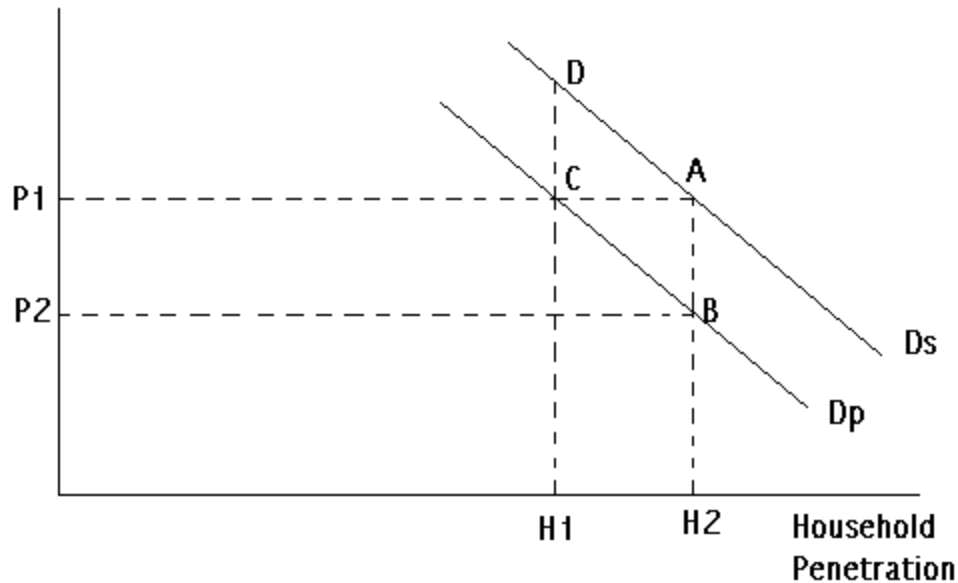


Diagram 1 shows two demand curves in price \ household penetration space. One demand curve reflects private benefits only ( $D_p$ ), while the other represents both private and social benefits ( $D_s$ ). They differ because of the existence of network (or access) externalities. At price  $P_1$ , the actual household penetration rate is  $H_1$ , though the social optimum is  $H_2$ . In conflict with the earlier definition, all individuals are not connected at an affordable price. This means that there is inefficiency, represented by area ABCD, due to the presence of network externalities. This inefficiency occurs because subscribers (both existing and potential) do not take account of the social benefits that accrue from a marginal subscriber joining the network and therefore 'social' demand diverges from 'private' demand.

### **Universal Service in a Non-Liberalised Environment**

In a non-liberalised environment, telecommunications services are provided by a monopoly and the telecommunications sector is regulated. Universal service is achieved in this situation. That is, the socially optimal amount of telecommunication service is provided and the household penetration rate approaches 100%. This occurs because the monopolist and the regulatory authority reach an agreement on the provision of universal service. This has been termed a 'social contract' in the context of Europe. The idea is that in exchange for the privilege of being a monopolist, the sole operator undertakes to provide universal service. This is done by internal cross-subsidy: the losses that the monopolist incurs from the provision of universal service are offset by the supernormal profits that it makes in other areas. Without universal service obligations, not all households would be connected. In particular, households in sparsely populated areas and low-usage ones would not be connected.

This explains why monopoly and universal service are associated together and, further, why people fear the impact of liberalisation on the achievement of universal service.

Following Cave et al, the case of a country that has not liberalised can be broadly represented by Diagram 1. Consider the imposition, by the monopoly regulator, of an access price of  $P_2$ , where  $P_2$  is less than the cost of supplying access, say  $P_1$ . At  $P_2$ , the socially optimal household penetration rate,  $H_2$ , is demanded. Assuming that the monopolist is able to cover the consequent loss with its profits elsewhere, it agrees to price at  $P_2$  and universal service is attained. Cave et al show that the net cost of doing this is given by the area, ABC. It is therefore clear that universal service represents a loss; if an operator is obliged to connect more households than  $H_1$ , it loses money.

## Telecommunications Liberalisation and Universal Service

### *General Effects of Liberalisation*

A number of regulatory scenarios could be implemented in a liberalised environment. However, before discussing these it is instructive to briefly mention the general effects of liberalisation. First, prices adjust to reflect costs. This is called tariff rebalancing and usually entails the prices of trunk and international calls falling while those of local calls and connection rise. Second, there is a strong incentive for operators to ignore certain groups of customers. These are the aforementioned uneconomic customers. Finally, new telecommunications services are introduced, typically in urban areas. In addition, costs will generally fall, due to the greater emphasis on efficiency.

### *Measurement of Universal Service*

To allow comparison between the various regulatory scenarios, one requires a measure of universal service. Unfortunately, there is no index of universal service achievement, though there are some alternatives. The best of these measures is the number of residential mainlines per 100 households. It corresponds most closely to the household penetration rate in Diagram 2A. Regrettably, the data for this measure are limited. The alternative is the number of mainlines per 100 inhabitants, known as the penetration rate. Table I presents data on the penetration rates for a number of countries. The first three countries in the table liberalised their telecommunications markets over ten years ago, while the latter two have just liberalised.

In interpreting the table, some comments are apposite. First, what is most relevant is the performance *after* liberalisation; that is, how the penetration rate changes after liberalisation. Second, what is the significance of the upward trend in the figures? Is it due to liberalisation itself or do all the regulatory scenarios encourage universal service, independent of liberalisation? Reference will be made to the data throughout the rest of the essay.

**Table I**

Country	Mainlines per 100 Inhabitants (1985-1997)					
	1985	1990	1993	1994	1995	1997

New Zealand	38.5	43.8	44.0	45.1	46.4	48.6
UK	37.0	44.2	47.0	48.6	50.2	54.0
USA	49.6	54.6	57.6	59.8	62.7	64.3
Ireland	19.9	28.1	32.8	34.7	36.7	41.2
Netherlands	40.2	46.4	49.9	50.9	51.8	56.4
<i>Sources: OECD (1997a) and International Telecommunications Union (1998)</i>						

## Regulatory Scenarios

### *No Regulation*

The case of liberalisation with no regulation is the first scenario. Earlier, it was shown that without intervention, universal service would not be achieved. However, this only happens if the 'no regulation' scenario coincides with the beginning of telecommunications provision. The much more realistic case is where telecommunications has been provided by a monopoly for a number of years. There is a crucial difference, because in the latter case, universal service will probably have been achieved. The question then becomes: will universal service be maintained after liberalisation?

In New Zealand, there is no industry specific regulatory framework. Furthermore, when liberalisation occurred in 1989, it was immediate and full. There are universal service obligations in the licence of the former incumbent, Telecom New Zealand, but these are not onerous. Disputes are resolved through the courts. Since liberalisation, the penetration rate has risen from 43.8 in 1990 to 48.6 in 1997. Though this is indeed a rise, it does not compare favourably to other countries, both those that have liberalised and those that have not. For example, the performance of Ireland over the same seven years is superior. Similarly, New Zealand does not compare well with the Netherlands. It will be shown that countries liberalising under different regulatory scenarios also performed more favourably.

### *Regulatory Oversight*

A step away from the 'no regulation' scenario is that of regulatory oversight. In this scenario, the regulatory body gives broad guidelines as to the provision and funding of universal service. There is regulation, but it is not prescriptive. The UK is a good example of this regulatory environment.

Liberalisation in the UK occurred in 1984 with the establishment of the British Telecom / Mercury duopoly. British Telecom, the former incumbent, is required to provide voice telephony services to all those requesting it. The requirement does not specify detailed requirements. An important feature of the UK case is that universal service is partially funded by cross-subsidy from industry operators. In contrast to New Zealand, the UK has performed well since liberalisation. Over the period 1985-1997 it outperformed all countries but Ireland in the absolute rise in its

penetration rate, which increased from 37.0 to 54.0. Accordingly, its performance compared to New Zealand's was superior.

### *Prescriptive Regulation*

Prescriptive regulation is the most interventionist of the three regulatory scenarios. As the term suggests, regulation is usually in detailed terms. The obligations of those providing universal service are made explicit. Moreover, these guidelines are monitored closely and enforced.

The USA corresponds to this type of telecommunications regulation. In 1982, AT&T was split up and the process of liberalisation begun. Regulation occurs at both federal and state level. Universal service goals in the USA are certainly explicit; telecommunications service must be provided to primary and secondary schools, libraries and rural and non-profit hospitals. In addition, funding by cross-subsidy is fully unbundled. The system of subsidising particular groups of subscribers is recognised as being complex.

Measured over the post-liberalisation period, 1985-1990, the performance of the USA in achieving universal service goals is nearly as impressive as the UK. There has been a large rise in the penetration rate from 49.6 to 64.3. As with the UK, the performance of the US is superior to all (particularly New Zealand) but Ireland.

### **Discussion**

Given the findings of above, two hypotheses may be proposed. Though these hypotheses are distinct, the evidence the above can support each.

#### *Liberalisation Positive; Regulatory Environment Unimportant*

The first is that liberalisation, and the length of time since liberalisation, is what matters. This could be so for two reasons. One is that liberalisation causes costs to fall which in turn means that universal service ceases to represent a loss. This means that monopoly provision must have been inefficient. Monopoly inefficiency would explain why the penetration rates in the liberalised countries are not static. Furthermore, it required the threat of liberalisation to ensure that universal service was being achieved in the liberalising countries.

An alternative is that universal service is not a cost and never was. That is, it is a myth that universal service is a cost; universal service is a victim of regulatory capture. The positive effect of liberalisation is to expose the myth and demonstrate that liberalisation is not 'bad' for universal service. If this is so, then it is a fallacy to suggest that universal service and monopoly are inextricably linked.

Mueller advocates this view, that liberalisation is good for universal service, and gives an example of universal service being achieved in a competitive environment. For both the explanations above, the regulatory environment is irrelevant. The fact that the penetration rates are increasing in all three liberalised countries can be construed as evidence in favour of this argument.

#### *Liberalisation Neutral; Regulation Environment Important*

The second hypothesis is that universal service is a cost and the regulatory environment does matter. The differences between the 'no regulation' scenario and the two scenarios with regulation are significant; the presence of a regulatory body does have an impact on the achievement of universal service. The superior performance of the USA and the UK over New Zealand is evidence that regulation, whether prescriptive or by oversight, is preferable to no regulation at all. This means that there is no incentive for telecommunications operators to pursue universal service if there is no regulatory framework. Therefore, if this hypothesis is accepted,

then some form of regulation should accompany liberalisation.

## Summary and Conclusion

This paper has examined the achievement of universal service in a liberalised environment. The background to universal service in telecommunications was examined. This entailed analysing the economics of universal service and its monopoly provision in a non-liberalised environment.

Three main regulatory scenarios were discussed in the context of telecommunications liberalisation and universal service. These were no regulation, regulatory oversight and prescriptive regulation. Two hypotheses emerged from this discussion. The first was that liberalisation itself has a positive effect on universal service and that the regulatory environment was not important. This positive effect can be explained in two ways. One is that universal service becomes profitable, while the other is that the myth of universal service being a cost is exposed. The second was that the regulatory environment does matter and that some regulation is preferable to no regulation.

Caution must be expressed for a number of reasons. The absence of a true indicator of universal service is a major disadvantage. More generally, the scope of the paper is limited. Nonetheless, if this paper contains a message, it is that liberalisation does not appear to be detrimental for universal service. In fact, it may even be good. However, the effects of the various regulatory scenarios are unclear. More detailed research is required to reach a definitive conclusion on the matter.

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