Universal Service in the Brazilian Model of Telecommunications Reform

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RESUMO

Um dos objetivos mais importantes da reforma das telecomunicações no Brasil refere-se à universalização do serviço para todos os cidadãos, independente de renda e localização. A universalização do serviço de telecomunicações é uma política social que constitui um traço comum na experiência internacional. Neste artigo introduzimos as principais justificativas teóricas relativas a este tipo de política, suas principais características nos EUA e Reino Unido e as críticas da literatura econômica corrente de forma a embasar uma avaliação da implementação da universalização na reforma das telecomunicações no Brasil. Em particular, a discussão teórica e a experiência daqueles países no que tange ao financiamento da política de universalização, suas distorções e trade-offs com outros objetivos da reforma, como a introdução da competição, serão enfatizadas ao longo deste trabalho.

PALAVRAS-CHAVE

serviço universal, telecomunicações, regulação, privatização

ABSTRACT

One of the most relevant targets of the reform of telecommunications in Brazil refers to expand, as much as possible, the access of citizens to this service, regardless of income and location. The Universal service of telecommunications is a social policy which is a common element within international experience. This article introduces the main theoretical justifications regarding this type of policy, the characteristics encountered in the US and UK and the critiques of current economic literature which we will be addressing in the implementation of universal service in the reform of telecommunications in Brazil. Furthermore, this work will stress theoretical discussions and experiences of countries which are related to the funding of universal service, its distortions and trade-offs with other goals of reform, such as the introduction of competition.

KEY WORDS

universal service, telecommunications, regulation, privatization

JEL Classification

L12, L22, L42

INTRODUCTION

Universal service is a social policy which aims to spread the use of telecommunications service to the largest number of people as possible, in order to redistribute income from the richest to the poorest, from urban to rural telephone subscribers and/or, more generally, locations where the cost of provision are very high (mainly rural areas), when compared to demand. The significance of the telecommunications sector for this purpose comes from the sense that access to this service has become a necessary condition to avoid social exclusion in modern societies.[1,2] More recently, many countries have sought to include in the scope of universal service policies specific measures for the disabled, health institutions, schools, libraries, availability of emergency services and so on.

Brazilian regulators have considered universal service as one of the core issues of the Brazilian Model of Telecommunications Reform (BMTR). Actually, the main governmental document which brings the foundations of the BMTR entitled "General Guidelines to the Openness of the Telecommunications Sector in Brazil"(1997-GGTB from now on), stresses that the main targets of the reform are twofold: 1) Search for universal access to the basic telecommunications service; 2) Introduction of competition in the sector.

In this paper, we aim to present the universal service policy in the BMTR, comparing it to other international experiences, supplying a survey of economic literature and discussing policy alternatives. The next section

1 According to a report from OFTEL (1999, p. 6) on universal service policy: "*Most people would probably consider having a telephone to be essential. It provides a means of staying in touch with friends, relatives and work. It enable calls to business and services, local government, social security, the doctor and a range of other vital contacts. And of course, it gives access to the emergency services. For some people, such as those in rural communities, single parents, the elderly and people who have long-term sickness or disability, the telephone can be a lifeline.*"

2 This contrasts with the original meaning of this concept from the early 20'th century when the Bell system competed against other companies without interconnection enforcement. According to MUELLER (1997, p. 3) "*at that time, universal service did not mean a telephone in every home or rate subsidies to residential users, but the unification of the telephone system so that all users could call all others. In other words, the original universal service debate was about interconnection.*"

addresses the complementarities and trade-offs of universal service policies with the other two instruments of the reform, which are, privatization and the introduction of competition. Section II provides the theoretical rationale behind universal service and its criticisms. We address the main universal service policies designed in the UK and in the US in Section III. Section IV addresses the Brazilian policy of universal service, evaluating theoretically the trade-off between universal service and competition specific to the way that policy was implemented in the country. Section V assesses one of the most conventional policies related to universal service, that is, geographic price averaging regardless of cost and demand conditions. The distortions brought by this common practice are commented.

The most important issue related to universal service worldwide is about funding. Countries have usually relied on cross-subsidisation mechanisms to fund universal service. The advent of competition challenges the basis of this system, requiring a design of new mechanisms to fund such policy. This is what we analyse in Section VI, evaluating the choices made by the Brazilian regulators in light of the current theoretical discussion and practice. Section VII presents the current debate on alternative approaches towards universal service, mainly on auctioning of subsidies (which is the current approach adopted by Brazilian regulators). Last Section concludes.

I. UNIVERSAL SERVICE, COMPETITION AND PRIVATIZATION

A crucial point of telecom reform throughout the world is the relationship between universal service, competition and privatization.

The lack of public funds to cover investment expenditures in telecommunications in the past[3] and the recurrent temptation to use public tariffs as

3 For a discussion of the past evolution of the telecommunications investments in Brazil, see FERREIRA & MALLIAGROS (1999, p. 15).

a means to curb inflation[4] provides the main links between privatization and for the purpose of increasing service supply.[5] The idea is that the private sector would be more able to provide financial resources for investment rather than the government. Privatization could increase the flow of investment towards the sector without jeopardising fiscal balance. Moreover, privatization could enhance the current and future fiscal situation through the use of privatization revenues to reduce public debt and also through the shrinkage of the future flow of interest payments related to this debt, besides the expenditures that the government releases to spend for state-owned company deficits and investments in the future.[6]

The combination of privatization and competition can also increase the service supply through an increased efficiency, at least in the most profitable areas and services, which follows the same direction of the universal service targets. Looking at these forces in isolation, there is no trade-off between privatization, competition and universal service. So, not only are the two targets (competition and universal service) convergent in profitable areas and services, but also achieving competition will ensure universal service as well, without requiring state intervention.

However, the main problem is that privatization and competition policies will **not** fulfill universal targeting in **every** area and/or service in a country. Actually, the fact that private ownership and market forces were not considered enough to fulfill universal service targeting can be taken as one of the rationales for the long period of state-owned monopoly in

4 See FERREIRA & MALLIAGROS (1999, p. 8) for measurement and discussion of the infrastructure tariff lagging behind inflation, including telecommunications, along the time in Brazil. See also ALMEIDA & CROSSETTI (1995) and FIUZA & NERI (1998, p. 6). According to these last authors, while the local pulse price fall 90% in real terms between 1975 and 1994, productivity had increased by only 50%, resulting in a substantial lag.

5 Note that privatisation is **not** a necessary condition to raise private funds for investment. The government could only relax borrowing constraints of the state-owned companies. However, there is a crucial difference coming from the structure of incentives for efficiency, according to VICKERS & YARROW (1991 p. 158), since "*the borrowings of a private sector company are not backed by government guarantee.*" This factor is usually called as the problem of the "soft budget" of the state-owned company, which undermines its cost efficiency.

6 See an analysis on the relationship between privatization and fiscal accounts with an assessment of the numbers for Brazil in more detail in PINHEIRO & GIAMBIAGI (1994, p. 743-748).

several countries before the liberalising reforms, including Brazil. The idea was that the private investor would supply service only in the most profitable areas and services, leaving the others unattended, which was regarded as a socially undesirable outcome. In these cases, state ownership was taken as crucial.

We can go even further and state that privatization and competition are often regarded as not compatible with universal service. Mueller (1997, p. 2) states that the problem can be so deep that "*reconciling universal service goals with the new market paradigms is one of the central problems of contemporary telecommunications policy*", since the traditional way of funding universal service was cross-subsidisation, a mechanism that can be dampened by entrant cream-skimmers in a competitive environment.

II. UNIVERSAL SERVICE IN THEORY

There are two economic rationales behind universal service. First, universal service can be considered a means of **regional planning**. According to Laffont and Tirole (2000, p. 219), offering good conditions to rural people, in general, attempts "*to encourage a more harmonious distribution of residents away from large congested metropolitan areas. This rationale is based on the existence of externalities: non-internalised congestion externalities in large cities; social benefits from maintaining a rural habitat*."

The conventional criticism to this kind of policy relates to the fact that every targeted consumer (in rural areas) could be better off earning an equivalent direct monetary compensation in view of those externalities. Instead of facing a lower price for telecommunications services or even vouchers to buy telephone lines or for making calls, the consumers would be better-off (or not worse-off) by having the choice of which basket of goods he/she prefers.[7] The same amount of subsidy that would be spent

7 CRANDALL & WAVERMAN (2000, p. 36, Table 2-7) shows, for instance, that in the group of lowest-income French households in 1995, more of them preferred to have a TV or a refrigerator rather than a telephone. In the US, for every income level, households spend more on entertainment than with telephone (p. 39). In Brazil, this does not seem different given the statistics collected by FIUZA & NERI (1998, p. 17). The proportion of unphoned in total population was greater than the quantity of people without refrigerators, radios, water filters, TVs and wash machines in 1995.

in telecom universal service policy could be spent on a broader social policy involving monetary transfers to low-income and/or rural population with net gains in welfare and thus a potential Pareto improvement. Such direct monetary compensation would be a redistributive mechanism much more transparent to society than universal service.[8]

Secondly, universal service policy can help to deal with a problem of **consumer network externalities**, typical of this sector. According to OFTEL (2000, p. 20), "*the externality occurs because all customers receive benefits when others join the network. Because these benefits cannot be reflected directly in individual transactions or met on strict commercial terms, there is a role for Government in ensuring that the network is as extensive as is feasible at appropriate prices.*" Accordingly, the lower the coverage of the current telecommunications network the more relevant this argument is. Meanwhile, in the case of the most developed countries, where coverage for telecommunications service is very high, this argument seems to be weak, as it is stronger for less developed countries, where coverage is relatively lower.[9]

On the other hand, the existence of an externality is not a sufficient condition for the conclusion that state intervention is required. Crandall and Waverman (2000, p. 25-26) question the externality argument to justify state intervention through subsidies on the telecommunications sector in the US. According to them, it would only make sense to intervene for "*those individuals whose private benefits do not exceed the costs of serving them, but who generate sufficient external benefits to make up the difference.*" Based on this rationale and given the fact that telephone bills represent a small

8 In Brazil, an example of this mechanics is under a long debate in Congress based on the "minimum income subsidy" bill proposed by Senator Eduardo Suplicy.

9 CRANDALL & WAVERMAN (2000, p. 27-28, Table 2-1) present interesting cross country data showing that in a group of 22 selected high-income countries, the number of telephone lines per 100 inhabitants (called telephone density) ranged from 36,5% to 83,5% in 1995. On the other hand, in Brazil, according to PASTE 2000 (Plan of Recovery and Widening of the Telecommunications and Postal Services, p. 64), the percentage of fixed telephone lines reached in the end of 1999, was 16,8% of the population (against 8,6% in 1994). Furthermore, waiting lists in the developed countries are practically zero while they averaged 15% of existing lines in upper-middle countries (where Brazil is included) and 47% in low income countries (see p. 30, Table 2-2 of the authors).

share of the household budget, the set of eligible beneficiaries should be quite strict.[10]

Thus, the two main theoretical rationales for universal service policies can be challenged by powerful economic rationales and so they cannot be taken as a compulsory element of telecom policy in every country. The economists have taken universal service targets as unavoidable to satisfy political motivation. So, the debate of whether any universal service policy should be undertaken or not, tends to be kept aside with the economist's goal, that is, how to design the less distortionary policy to fulfil these purposes.

III. UNIVERSAL SERVICE IN THE INTERNATIONAL PRACTICE

In the US, Section 254(b) of the Telecommunications Act of 1996 contains the main principles on universal service, which are affordable rates for quality services, including rural and high cost areas and access to advanced telecom services everywhere in the country. Universal service phylosophy usually brings the idea of "social and economic inclusion", stressing the failure of market forces to achieve this purpose as remarked in OFTEL (1999, p. 4 and 7*) "If the market were left entirely to itself, operators might decide that certain areas of the country were not worth serving. Telephones in rural areas or inner cities might become rare commodities.Universal service is about finding ways of meeting the needs of those remaining few whom the unregulated market might choose not to serve."*

The principles behind universal service are basically the same worldwide, with minimal conceptual differences among the countries. In the US, the main current programs on universal service described by Crandall and Waverman (2000, p. 9-11) are[11]: i) the **Lifeline** program that aims to

10 Moreover, CRANDALL & WAVERMAN (2000, p. 39) state that given the pattern of consumer expenditures in the US that the provision of below-cost rates may be seen as regressive, since high-income households are much more likely to have second lines or additional local services, among other findings.

11 See LAFFONT & TIROLE (2000, p. 231-232).

reduce the monthly subscription rate for low-income households; ii) the **Link-Up** program designed to subsidise the installation charge for low income households[12]; iii) the **High-Cost Area Assistance** program funded from long distance carriers through an Universal Service Fund. This program is based on subsidies for local companies in high-cost areas; iv) the **Long Term Support** program to high-cost companies funded by local companies; v) the **High-Switching Cost** program for companies with high switching costs funded by long distance companies. These subsidy programs avoid the distortions brought by cross-subsidisation, besides making the financial cost of universal service policies more explicit. Furthermore, the Lifeline and Link-up Programs, being based on direct support to the targeted public (poor and rural areas inhabitants), avoid at least part of the distortions that occur when the subsidy goes directly to the companies.

In the UK, the main universal service policies, according to OFTEL (2000, p. 7-8) are 1) The **Light User Scheme (LUS)** that provides *"the option of a more restricted service package at low cost."*[13] The social appeal of this alternative rests on the fact that poor people are often not able to pay the variable part of their bills brought by their outgoing calls and/or to control their monthly telephone expenditures. The state intervention in this case would be undertaken to correct the information asymmetry of the customer *vis-à-vis* the operator due to the complexity of the tariff rules. The design of these programs is also consistent with the idea that the main problem to be addressed in universal service policy is to guarantee **some** possibility of telephone contact even if only through incoming calls

12 GARBACZ & THOMPSON (1997) found a positive effect of Lifeline and Linkup programs on telephone penetration in the US, but with very small elasticity, suggesting its low efficiency. These programs would tend more to redistribute income rather than to increase telephone penetration. In a later work (2001), the same authors state that "*from 95 to 100 percent of all households receiving lifeline subsidies would have been at the network without any subsidy.*" CRANDALL & WAVERMAN (2000, p. 104) found a modest support of Lifeline for increasing telephone penetration and a surprisingly negative relationship between the Link-Up Program and telephone penetration. The authors conclude for a net positive welfare impact by abandoning universal service policy.

13 There are two schemes currently offered: 1) the "*In Contact*" that allows incoming calls only, with outgoing calls barred except to emergency services and 2) the "*In Contact Plus*" that uses a pre-paid card linked to the "*In Contact*" scheme.

and emergency services. The balance of this program in terms of the number of customers that adhered to it was considered "disappointing" by OFTEL (1999, p.12), realizing less than 10% of the previous estimates. These poor results show that such constrained access policy designed by regulators is not on the UK public's preference[14]; 2) **Option for all consumers of "*an outgoing calls barred service, together with a repayment plan, as an alternative to disconnection for non-payment*."** OFTEL thinks that there is a high number of telephone disconnections for non-payment that can be reduced through the provision of more means to control bills and a more flexible debt management offered by service providers. While attempts to improve self control seems as a good policy, the enforcement of special schemes of easing debt payment can enhance adverse selection problems to operators; 3) "***Reasonable geographic access to public call boxes across the UK***."

An important difference between universal service in the US and the UK is concerned with the scope of this policy. Should it encompass a broader range of technological intensive services such as the Internet or be restricted to conventional telephony? The US opted for a more encompassing concept, including advanced services. On the other hand, the view of OFTEL (1999 and 2000) in the UK is that the coverage of universal service should not be widened to include higher bandwidth information age services, since the funding requirements would increase excessively.[15]

Indeed, the estimates made by Crandall and Waverman (2000, p. 150-159) for the funding required for broadening universal services in the US, reached substantial amounts.[16] Moreover, according to the authors,

14 The market itself in the UK (as in Brazil) seems to be solving this problem on its own through the increasing use of pre-paid mobile telephony. Curiously, despite OFTEL has reckoned strongly with LUS program as one of the pillars of the universal service policy, this regulatory body recognised that "*the development of pre-paid mobile has demonstrated that markets are, in the long run, a better instrument for meeting the needs of customers than schemes invented by regulators or government.*"

15 However, neither the UK nor the EU disregard the future incorporation of these technologically advanced services under universal service policies if this starts to represent a necessary condition for "social inclusion".

16 Only subsidised subscription to internet would cost US$ 5,4 billion a year in the US.

"*since households with computers and modems tend to have above-average incomes, such subsidies would obviously be regressive.*"[17]

The US Telecommunications Act of 1996 also included subsidies for schools, libraries and certain rural health service facilities to access the Internet. The total amount of financial support was capped at US$ 2.65 billion a year, but according to Crandall and Waverman (2000, p. 160), "*not surprisingly, the demand for funding quickly exceeded the cap.*" Despite this, the authors agree that "*computers in school may be vital to educating everyone*" and "*internet access... a valuable component of educational policy..., it would be reasonable to conclude that the optimal mix of teachers, buildings, books and internet connections is best determined by those making education policy decisions*", being "*unwise to have uniform subsidies for such a narrow component of the education-input package.*" The authors add that "*equally important, taxing a narrow group of products with fairly price-elastic demand-such as telephone calls- to subsidise broad policy goals is highly inefficient.*" In sum, according to the authors, those programs would be more properly carried out by government authorities than by being undertaken by the telecom regulator and financed through the general budget.

IV. UNIVERSAL SERVICE IN BRAZIL

The most important characteristic of the practical implementation of universal service in Brazil, especifically during the transitional period after the reform, is its focus in minimum quantities across country locations, which has been a crucial difference of implementation compared to the US and UK.

17 The authors also address the merits of increasing the scope of universal service policies based on network externalities arguments. The conclusion is that many of the existent externalities have already been internalised by the market and there is no need for further state intervention. Furthermore, OFTEL (1999, p. 23) introduces another interesting argument normally used in the literature of standards against the US universal service policy: "*the imposition at this early stage of a universal service obligation delivered by a particular technology might reinforce the adoption of that technology even though it may not be the most efficient for providing services in the longer term.*"

In Brazil, the GLT defines universal service as a right for telephone access to any citizen, regardless of location and social/economic status. The main regulation regarding practical implementation of the universal service in Brazil, at least in the short-run, is the Universal Service Plan, which established objective targets for this policy. There are targets for minimum amounts of supply of individual and collective wire terminals by state and toward locations with small population. As an example of one of these targets is the duty to install until year 2001, 49 thousand individual telephone access and 1.8 public telephones for each thousand inhabitants in the state of Roraima. Every Brazilian state have their own targets, including even the most profitable state in the country, São Paulo. Each regional company must introduce individual access until 2001, 2003 and 2005 in every city within the respective granted area with less than 1 thousand, 6 hundred and 3 hundred inhabitants, in this order. There are also targets for disabled persons, hospitals and school attendance.

Thus, the current universal service policy in Brazil is based on an enforcement of minimum quantities to be supplied by the new private owners of the privatized regional companies. Until 2001, the universal service targets hired with the companies envisages the provision of a further 11.4 million individual terminals and 372 thousand public telephones across the country.[18,19]

A striking feature of the Brazilian universal service policy is that only the incumbent privatized companies have to fulfil universal service targeting, while the first wave of entrants[20] remained free from this obligation. The main idea behind the differential treatment in terms of universal

18 See HERRERA (1998) for a more detailed description of the universal service estimates.

19 In the case of EMBRATEL, the concession contract establishes universal service quantitative targets to the long distance fibre optic cables. EMBRATEL is obliged to link all State capitals through fibre optic cables around the country until 2004 and has to ask for ANATEL's permission in the case of any shrinkage of its network.

20 Brazil adopted a duopoly (temporary) policy like in the UK, granting only two concessions in each regional area. The first wave of entrants (the second duopolistic that did not entered the privatization bidding) were called the "mirror companies". See MATTOS (2001), PIRES (1999) and HERRERA (1998) for more details.

service duties is a deliberate government strategy to provide a temporary "cream-skimming" for the entrant. In this respect, the entrant will choose freely where it will concentrate its business in the conceded area, enjoying more flexible business choices than the incumbent. In the UK, the universal service duties still falls (more than 15 years after privatization) almost exclusively on British Telecom, the previous incumbent before privatization in 1984.[21]

We consider the mechanism of universal service policy through minimum quantities designed in the transition of the BMTR as basically flawed. In the case of individual access, the definition of minimum levels does not differentiate either rich or poor or either profitable or unprofitable areas, while bringing potential negative side effects to competition.

In fact, when the government selects minimum quantities in every area, it supplies a "commitment variable" to the incumbent in the competitive game against the entrant. If the service provided by the incumbent (1) and the entrant (2) are strategic substitutes everywhere,[22] we will have that $\partial q_2/\partial q_1 \leq 0$ for all q_2 and q_1. Thus, if we exogenously establish lower bounds to q_1, it is intuitive that the values of q_2 will be non-increasing on these lower bounds, which means a more restricted space for the entrants to grow.

It is possible that the maximising behaviour of the incumbent facing the possibility of entry of the mirror company, would be one of accommodated entry,[23] without the need to fulfil minimum quantity requirements. Alternatively, the minimum quantity supply requirements may be such that the entrant cannot profitably enter (blockaded entry).

21 On the other hand, entrants in Brazil were not completely free from minimum quantities obligations, they are not considered as encompassed by the universal service duties. The difference refers to the fact that in the case of the incumbents, minimum quantities were imposed by the government before the privatisation, while the owners of the mirror companies committed to a certain amount of minimal quantity supply in their bid at the mirror grant auction.

22 In the sense given by BULOW, GEANAKOPLOS & KLEMPERER (1995).

23 See TIROLE (1988, p. 315-323) and GILBERT (1989, p. 482-485) on this concept.

As surveyed by Tirole (1988, p 315), the most important characteristic of the first-mover advantage is that the incumbent can act strategically through variables like "*capacity*", "*ex-ante production for learning by doing*" or "*lower ex-ante prices to attract a clientele that become loyal to the incumbent brand.*" Tirole (1988, p. 317) did not use quantities as used in Stackelberg's original model, since the use of quantities leaves unanswered an important question: why would quantity have a "commitment value"? Dixit and Spence introduced two-stage models where the firms choose capacity in the first period and quantity in the second. The role of capacities in the analysis shows that this variable has a "commitment value", given its characteristic of sunk cost. Quantities would not bring a "commitment value" in normal market circumstances. However, when the regulatory authority defines a minimum quantity requirement for the incumbent in each service/area, the defined quantity starts to have a "commitment value". In this case, we do not need a two-stage (capacity/quantity) model to introduce "commitment".

To see this, suppose that two firms play a cournot game. Their profit functions are:

$$\Pi_i = p(q_i, q_j)q_i - C_i(q_i) \qquad (1)$$

Suppose that the Cournot equilibrium is given by the vector $q^* = (q_i^*, q_j^*)$. Assume that the regulator imposes a minimum quantity duty on player i, given by q_{iu}. If $q_i^* \geq q_{iu}$, then the constraint is not binding and the equilibrium remains at q^*. If $q_i^* < q_{iu}$, then the equilibrium will have to change. Assume that the regulatory authority is able to enforce this minimum quantity standard, for instance, by imposing on player i a penalty larger than the extra-profit achieved for deviating to any quantity value lower than q_{iu}. So, the new equilibrium value of q_i is $q_i^{**} \geq q_{iu} > q_i^*$. The question is what occurs to profits and quantities of players j compared to the previous Cournot equilibrium?

Firstly, we check what happens if q_i^{**} is greater, but very close to q_i^*. At this point, the profit of j, by using the envelope theorem, will change by:

$$\frac{d\prod_j}{dq_i} = \frac{\partial p(q_i^*, q_j^*)}{\partial q_i} q_j^* \leq 0 \qquad (2)$$

So, for a small change of the new equilibrium quantity of *i*, the profits of the remaining firm will fall. As long as the new quantity equilibrium remains as a Nash (but not Cournot) one, the inequality above still holds for further increases on q_i far from q_i^*. So, for any $q_i^{**} \geq q_{iu} > q_i^*$, then $\prod_j^{**} \leq \prod_j^*$, the profits of player *j* always falls.

The slope of the reaction function defines whether both quantities are strategic or complementary substitutes. In the first case of strategic substitutes, this slope is negative and the quantity of *j* will also fall as long as a larger quantity is imposed on *i*. The expression for this slope is given by:

$$R`_j(q_i) = -\frac{\frac{\partial P}{\partial Q} + q_j \frac{\partial^2 P}{\partial Q^2}}{2\frac{\partial P}{\partial Q} + q_j \frac{\partial^2 P}{\partial Q^2} - \frac{\partial^2 C}{\partial Q^2}} \qquad (3)$$

A sufficient condition for the above expression to be negative is that the second derivative of the cost function should be positive and the demand function concave.[24] If both quantities are strategic substitutes in the range between q_i^* and q_i^{**}, then the imposition of the universal service duty will unambiguously represent a fall in *j*'s quantity. When we join this hypothesis with the conclusion that *j*'s profit always falls, then the imposition of the universal service duty on *i* reduces the profits **and** quantities of *j*, reducing the vigour of competition. Moreover, when the variable profits of *j* falls sufficiently, it can become lower than firm's *j* fixed costs.

24 See TIROLE (1988, p. 207 and p. 219).

In the case that a firm j is the entrant, it can prefer not to enter and so the entry is blockaded. This problem tends to be more acute when the entrant is less efficient than the incumbent, since he gives up from entering for a relatively lower q_{iu}.

Note that, regarding the cost function, these conclusions are for the specific case of telecommunications, where there are relevant economies of density, being $C'(q_i)<0$, but at decreasing rates ($C''q_i)>0$). Even if economies of density occur at increasing rates ($C''q_i)>0$), it is still possible that both quantities are strategic substitutes in two cases: i) the demand function is convex enough (the second derivative of the demand function is positive enough to make both, numerator and denominator positive in the expression above, implying a negative expression) or the demand function is concave enough and the second derivative of the cost function is just slightly positive. Industrial organization theorists consider that quantities are often strategic substitutes.

It is also important to note that, there is potentially a range for which the imposition of the universal service duties on the incumbent would increase its profits, if the quantities are strategic substitutes. This means that there are cases in which the profit of the incumbent increases at the entrant's expense, when the minimum quantity obligation is imposed on the former entrant. In these cases, it would not be difficult to find incumbents lobbying the regulator to increase its quantity obligation at least until some level. This may occur until the point where the entrant is just kept out of the market. From this point on, the imposition of minimum quantities will not be profitable to incumbents and can even force them to quit.

Thus, the policy of minimum quantities can dampen the efforts of the regulators to foster competition. We think that the replacement of this policy by programs which are more focused on lower income groups, like the Lifeline and Link-up from the US, could achieve better results. Note that compared to the US, relatively there is a larger number of poor people without conditions to install and keep individual access in Brazil, so the social relevance of this kind of policy may be greater. Furthermore,

the enforcement of outgoing calls barred service controlled by the customer and the requirement of a minimum term for pre-notification of disconnection, brought from the UK experience, seems as an interesting provisions.

In the case of public telephones, the definition of minimum global levels for locations is associated, in the BMTR, with other standards such as minimum distances between two public boxes in every town which can guarantee provision to the poor neighbourhoods. The social impact of public telephones is clearly greater than individual access, since they can be used by a larger number of people, especially the poor. Thus, we do not disagree with a minimum quantity approach to public telephone boxes, especially in Brazil where coverage rates of individual access are low.

However, minimum public telephone levels in **every** location, including profitable ones, also brings the problem of jeopardising competition where it is feasible to emerge, besides increasing excessively the funding requirement of the policy. A pre-selection of locations eligible for universal service would be crucial.

Of course a pre-selection of states, municipalities and neighbourhoods can suffer from more problems of information asymmetry and capture, than those associated with the current framework. Note that even the definition of profitable and non-profitable areas can be misleading, since it can depend on the minimum quantity requirement designated to each area by the regulator. To see this, assume a minimum quantity target in a given area and/or service of q_{im}. Assume that it exists at least one positive quantity q_{i1} such that $q_{i1}<q_{im}$ and $\prod(q_{i1})>0$. Suppose also that a value of q^* exists such that for all $q_i \geq q^*$, $\prod(q_i)<0$. Then, if $q_{im} \geq q^*$, it does not mean that the area and/or service is intrinsically unprofitable. It becomes unprofitable since the minimum quantity requirement of the universal service targeting was defined at a value equal or higher than q^*. If q_{im} was settled such as that $q_i^* \geq q_{im}$, the area and or service would become profitable. Notice also that the universal target requirement q_{imin} can be a binding constraint, even if profitable ($\prod(q_{im})>0$). If the value of q_{iM} is such that $\prod(q_{iM})$ is a global maximum, then a value of q_{im} such that $q_{im}>q_{iM}$

implies that it is a binding constraint. Of course there are some areas and/or services where there is no $q_i>0$ such that $\prod(q_i)>0$ and thus they can be considered as intrinsically unprofitable. However, in the services and/or areas where exists at least one value of $q_i>0$ such that $\prod(q_i)>0$, the definition of profitable and unprofitable will be linked to the minimum quantity required by the regulator. In other words, the regulator is the one who makes the area profitable or not.

However, even with those difficulties, some cut-off parameter such as income per inhabitant in a given location (state, municipality and neighbourhood) or the relative number of "unphoned" by area as shown in Fiuza and Neri (1998, Annex 2) from PNAD[25] data, could exclude the most profitable locations from the minimum quantity requirements and also from future subsidies. This would allow a better focus of the policy. Moreover, in telecommunications, given that the marginal cost of an additional connection is small, the fact that the area is profitable or not may not depend on variations on the quantity selected by the regulator, since it is greater than zero.

Finally, as we saw in this section, there are also universal service provisions in the BMTR towards schools, health institutions and disabled. Furthermore, there are attempts to foster the increasing use of new communication technologies for a greater number of people. In Brazil, ANATEL launched two programs aiming to widen the scope of universal service to foster internet and other advanced information services.

V. GEOGRAPHIC AVERAGE PRICING AND UNIVERSAL SERVICE

There is an important common element usually found in every universal service policy around the world: the principle of geographically average

25 National Research on Household Samples made by the Brazilian Statistics Institute, IBGE.

pricing, constraining the ability of the service provider to price-discriminate among regions and services even to reflect differences in costs. This is an implicit form of cross-subsidisation, given the possible cost differentials among regions and locations.

While in the US and in the UK, this is explicitly part of the universal service policy, in Brazil, geographical price averaging is indirect through the price caps rules. Specific price caps were not defined on a geographical basis, but on the basis of distance, times and days of the week on a typical peak-load pricing methodology. Geographical differentiated prices can occur below the caps in areas where the price regulatory constraint is not binding. This is clearly a more flexible (and less distortionary) form of geographical price averaging.

In the US and the UK, the adoption of geographical price averaging is an implicit acceptance of cross-subsidisation as a means of funding universal service, despite the official statements stating the opposite. OFTEL (1999,p.15) justifies the policy on the basis that "*It has the benefit of ensuring that the benefits of competition in areas of the country where BT face strong competition are extended throughout the country*." However, OFTEL also recognises that "*it is not without negative effects on the market and, at the margin, it might force BT to price higher in areas of low cost than they might otherwise do.*"

OFTEL introduced an important safeguard in cases where a line installation is excessively expensive. This is the "100 man-hour rule" according to which BT is allowed to charge the full cost of any line installation that involves the use of more than 100 man-hours. This safeguard can reduce the distortions brought by geographical price averaging by incorporating cost concerns and could also be used in Brazil.

Armstrong and Vickers (1993) had already shown that banning price discrimination quite often increases entry. This happens because the price in the competitive markets will have to be greater than otherwise, in order to avoid excessive price cuts in its captive market. The problem of geographically average pricing is the "type" of entry that is fostered and

the financial sustainability of the economic activity in the non-profitable area. As stressed by Armstrong (2000, p. 9), higher (lower) prices in the most (least) attractive areas can induce (avoid) inefficient (efficient) entry. The explanation is very simple. Assume that the incumbent serves areas A (low cost) and B (high cost) with constant marginal costs equal to C_A and C_B, respectively. Assume that $C_A<P<C_B$, being P the geographical uniform price imposed by the regulator. It is easy to see that entrants less (more) efficient than the incumbent in the low (high) cost area such as $c_A>C_A$ ($c_B<C_B$), but with $P>c_A>C_A$ ($P<c_B<C_B$) will (will not) enter. In the most profitable market A, there is an inefficient cream-skimming, while in the less profitable market B, there is an inefficient lack of entry of a more efficient player. Furthermore, any cream-skimming (inefficient or efficient) erodes the funding of universal service.

We can enrich this analysis by introducing fixed costs that have a central role in telecommunications. While they alleviate the problem of inefficient cream-skimming, they also enhance the problem of lack of efficient entry. Assuming that F_1 is required to enter market A and F_2 to enter market B, and that when entering, the entrant takes half of the whole market, we note that:

- even if $P>c_A$, we can have

$$\frac{(P-c_A)Q(P)}{2}<F_1$$

- even if $P<c_B$, we can have

$$\frac{(P-c_B)Q(P)}{2}<F_2$$

If both conditions apply, then the potential entrant will never enter. This is good for the sake of avoiding inefficient entries, but bad for the purpose of stimulating efficient entries.

In the BMTR, cream-skimming was partially constrained through the entry constraints designed in the transitory duopoly policy. However, there are two important remarks. First, the possibility of efficient extra entry (beyond the first entrant) was also (transitorily) constrained: the side effect can be as bad as the prevention of inefficient cream-skimming.

Additionally, the second duopolist in the BMTR was allowed and even encouraged to cream-skim the incumbent as part of the policy of assisting entry. This weakens the financing of universal service through cross-subsidisation. Next, we address more directly the question of universal service funding.

VI. UNIVERSAL SERVICE FUNDING: THEORY AND POLICY

The most sensitive aspect of the universal service policy is its funding. When telecommunication companies were state-owned, the main mechanism to fund universal service was cross-subsidization i) from urban to rural customers; ii) from business to residential customers; and iii) from long distance to local services. According to Laffont and Tirole (2000, p. 217-218), "*this system of subsidies typically operated through "distortions" in the relative prices of the incumbent monopoly. The monopoly was compensated for its losses on subsidised services (or more generally, from a Ramsey perspective, for insufficient cost recovery on these services) by unusually high mark-ups on specific, unsubsidised offerings. That is, cross-subsidies were internal to the firm and were part of the regulatory contract between the firm and the regulator*."

Faulhauber (1975) provides a theoretical definition about what should be a subsidy-free price structure, which basically means "no cross-subsidisation". Skipping the technical details of this definition, in the words of the author (p. 966-967), "*if the provision of any commodity (or group of commodities) by a multicommodity enterprise subject to a profit constraint leads to prices for the other commodities no higher than they would pay by themselves, then the price structure is subsidy-free.*" An important

finding of Faulhaber (p. 973) about subsidy-free prices is that they are neither a necessary nor a sufficient condition for welfare maximisation. But if this is true, what is the problem with cross-subsidisation to keep financing universal service? As stressed by the author (p. 972), if there is free-entry and the regulated firm faces non-subsidy free prices, market forces will lead the company to bankrupcy. That is why cross-subsidisation is usually considered as not sustainable when competition is allowed.

In the US, the regulated rate structure settled by Federal and State regulators still contains substantive subsidies from long distance to the local service as shown by Crandall and Waverman (2000, p. 46-47). This was not different in Brazil before privatization, according to the GGBT (1997), since 43% and 57% of revenues, respectively, came from the local service and the long distance service, while 81% of the costs came from the local service and 19% from the long distance service. The GGTB (1997), in view of these figures, pointed to the urgent need for tariff rebalancing in Brazil, since it was unsustainable within the new competitive regime.

Cross-subsidisation can be criticised even in the context of a state-owned monopolist. According to Laffont and Tirole (2000, p. 219) "*It is not a priori clear that the needy and the high-cost area customers are best helped through distortions in the price systems of network industries.*" The GGTB in Brazil also recognises this point.

A more theoretical argument against the cross-subsidisation mechanisms comes from the classical result due to Atkinson and Stiglitz (1976) on taxation theory. Laffont and Tirole (2000, p. 220) translated this result to the context of the price-distorting scheme of cross-subsidisation to finance the universal service: "*The Atkinson-Stiglitz theorem indicates simply that the best way to redistribute income may be the direct way, through the taxation of income, and that (indirect) manipulation of the relative prices of goods and services may be an inefficient policy.*" This statement holds for a competitive private market as well as for a state-owned monopolist. However, in the privatized scenario associated with high-powered incentive mechanisms provided by price cap rules, the question of financing

unprofitable services and/or areas holds at the same time the use of cross-subsidisation which becomes more distortionary and sub-optimal than ever.

The Telecommunications Act of 1996 in the US, according to Crandall and Waverman (2000, p. 129-130), replaced the previous programs by one funded by a tax on long distance services. The authors show that one of the main problems of the US funding universal service, is that it should be accompanied by a price rebalancing between local and long distance services, urban/rural and residential/business[26] to avoid an excessive burden of this tax. This tax rebalancing should be done by allowing increases on local rates and not only by decreasing long distance rates. Otherwise, the authors´ estimate (p. 131-139) of those taxes would be prohibitively high.[27]

The GGBT disregards the use of cross-subsidization as a way to finance universal service. The GGBT criticizes cross-subsidisation as unsustainable in a competitive environment and as a stimulus to bypass the incumbent network, distorting the market. Cross-subsidization in Brazil, like in other countries, worked through lower price/average cost proportions in local calls, rural areas and residential customers financed by large price/average costs ratios in the long distance service (intercity and international), urban areas and business customers. In the case of the rural/urban cross-subsidies, the policy was undertaken by requiring geographic averaging across areas regardless of cost.

Despite the official statements against cross-subsidies, the GLT is still consistent with them, mainly in the short run. Firstly, external funding will not be supplied to companies to fulfil the targets already committed

26 And most of this rebalancing depend from state regulators rather than from FCC, which remains a problem in the US as addressed by BROCK (1994) and KATZ (1997, p. 682-683).

27 SAPPINGTON & WEISMAN (1996, p. 47-48) provide a general idea about the numbers involved in the US. While the basic residential local distance revenues were averaging about $10 per month, its estimated incremental cost amounted to $25 per month. Access charges suffered most of the burden of this policy being that in some US jurisdictions, they amounted to 14 times the marginal cost of access.

by the companies in their respective grant contracts. Thus, given that there are some regions where the revenues brought from the fulfilment of minimum quantities will not cover the costs, it is implicit that there will be cross-subsidisation to make it feasible. There are also temporary provisions that are explicit exceptions to the stated general rule of "no cross-subsidisation".

It is not clear if at least part of the universal service in the future will also be financed through cross-subsidisation. It is possible that there is still some regional cross-subsidisation, given geographical averaging of prices implicit on the price cap rules. It is also possible that there is some cross-subsidisation from the long distance to the local rates. The two rounds of price adjustments that have already occurred in the middle of 1999 and 2000 revealed a mixed pattern. A report prepared by Filippo (2000) assessed the price evolution of the average prices of Telefonica, Telemar and Embratel as shown in the table below.

TABLE 1 - AVERAGE PRICE INCREASES IN THE TWO ROUNDS OF PRICE ADJUSTMENTS AFTER PRIVATIZATION IN BRAZIL (IN PERCENTAGE)

	Local Basket (Average)	Long Distance (Average)	Monthly Subscription
Telefonica			
1999	2,52	5,45	17,7
2000	18,61	12,91	23
Total	***21,6***	***19,1***	***44,7***
Telemar			
1999	0,73	10,89	17,7
2000	18,94	15,85	23
Total	***19,8***	***28,5***	***44,7***
Embratel			
1999	-	5,45	-
2000	-	19,85	-
Total	-	***26,4***	**-**

Source: FILIPPO (2000)-UNICAMP.

For Telefonica and Telemar, the long distance charges increased more than the average local basket charges in 1999, while the reverse occurred in 2000. For Telefonica, the accumulated increase on the local basket serv-

ice charge (21,6%) was slightly greater than the increase on the long distance service charge (19,1%). For Telemar, the opposite occurred with the average long distance increases larger than the local basket does by a significant amount. The long distance increases of EMBRATEL's rates were slightly lower, but closer to TELEMAR's increase.

These numbers can be interpreted as signalling that tariff rebalancing between long distance and local service by the time of privatization was complete. However, the author of this preliminary report calls the attention for an important aspect. Habilitation charges and public telephone rates dropped substantively for Telefonica and Telemar in the first round of reviews in 1999. The monthly subscription for both regional companies, Telefonica and Telemar, raised by 44,7%, far from the rate increases of the long distance service. This shows that there was still some required rate rebalancing after the privatization.

The permanent provisions regarding the funding of the universal service in the GLT are partly based on resources coming from the fiscal budget and partly from the companies. The law 9998/2000 created the universal service fund (FUST). The main source of revenues for the FUST is an 1% tax over gross revenue of the telecommunications companies. It does not bring distortions on relative prices as cross-subsidisation. Local services are not exempted from the tax as in the US, which seems a better approach to avoid distortions on the relative returns of both services.

There are potential distortions arising from this way of funding the universal service. If there are transactions between non-integrated companies, there is an implicit incentive to merge and become a single firm to avoid taxation. However, since this tax will not be applied to transactions between telecommunications companies, it became a Value Added Tax (VAT). The characteristics of broadness and non-cumulativeness of the tax base, incorporating local revenues and exempting revenues from transactions between telecom operators are harmonised with the EU Directives (2000, Annex IV, p. 34) "*a sharing mechanism based on a Fund should respect the principles of transparency, least market distortion, non-discrimination and proportionality. Least market distortion means that the contribution*

*burden should be **spread as wide as possible**, subject to proportionality.Member states undertaking cost recovery via a Fund should give due consideration to collecting contributions via a VAT mechanism....*"

On the other hand, every tax that is not based on lump-sum schemes brings at least some distortion. Moreover, this distortion can be even greater than that brought by cross-subsidisation. This happens, for instance, when at least one of the strong assumptions behind the Atkinson/ Stiglitz theorem is broken. Laffont and Tirole (2000, p. 225-230) explore the relaxation of some of these assumptions and the possibility that the funding of universal service through distortions on relative prices become a superior policy.[28] Gasmi, Laffont and Sharkey (2000) also show that cross-subsidisation through the establishment of regional monopolies can be a superior policy to external public funding with competition. The relative attractiveness of public funding compared to cross-subsidisation will depend upon the cost of raising public funds relative to the distortions brought about by cross-subsidies. The authors show that even for very small costs of the public funds, cross-subsidisation is preferable to public funding. This is particularly true for developing countries, where the social cost of public funds are higher, on average, than in the developed countries due to the relatively higher distortions in the whole tax system. In fact, according to the authors, the cost of public funds in developing countries are much above the minimum level required to make cross-subsidisation an inferior alternative to public financing. The authors conclude that cross-subsidisation can still be regarded as an important means of funding universal service at least in developing countries.

Baumol (1999) argues that cross-subsidies to finance universal service, competition and efficiency can be made compatible through a suitable regulated access price rule. Consistent with his previous work, the author shows that, by using the Efficient Component Pricing Rule (ECPR)

28 The main role of the theorem in the cross-subsidisation context would remain showing that cross-subsidisation could not be taken for granted as the best policy.

for access pricing in every market, the benefits from competition can be obtained in all of them without undermining universal service funding. By this rule, the bottleneck owner should be allowed to vary the access price charged to its competitors according to the price of the final good or service that the former would be charging. Moreover, the **variation** charge of the regulated access should cost **precisely** the same amount that the final product price charged by the bottleneck owner. Given these characteristics, the ECPR rule would provide a "competitive neutral" formula for access pricing, eliminating any incentive for cream-skimming, while maintaining cross-subsidies.

In the UK, OFTEL (1999, p. 9-10) decided not to establish a universal service fund. Instead, the UK decided to impose the whole burden of universal service upon BT on a permanent basis. This choice implies cross-subsidisation. In the US, the choice of a constant updating of the coverage of universal service implied the grant of specific powers to FCC to increase the sources of funding. The Telecommunications Act of 1996 allowed the FCC to extend the set of companies that have to contribute to the universal service fund. Moreover, the FCC was also entitled to exempt telecommunications operators if their contribution is considered small enough to fall below administrative cost of collecting them. This is clearly a huge discretionary power conceded to FCC and does not seem a wise policy to follow.

VII. ALTERNATIVE APPROACHES FOR THE UNIVERSAL SERVICE POLICY

Laffont and Tirole (2000, p. 232) addressed alternative approaches for universal service policies that should contain two main characteristics, i) break the link between the subsidy obtained by operators and the actual cost incurred by the carrier to provide adequate incentives for efficiency and; ii) avoid "picking the winner" carrier of the subsidy (normally the incumbent), a policy that harms efficiency and competition. The authors (2000, p. 235-236) present two sets of alternatives.

First, a "proxy model" where the subsidy *s* should equal a forward looking cost of connecting a line minus a national benchmark price, being offered to any company that requires it. The two main benefits of this method would be the incentives to reduce costs by eliminating the cost plus nature of subsidies and the competitive neutrality of the scheme by allowing any company to make use of it.

There are two main problems with this method as discussed by the authors (p. 236-243). Firstly, the greater the number of universal service suppliers, the greater is the amount of cream-skimming in the context where there is less than perfect information about where there is a need for state sponsorship in a given area. Thus, "*carriers that provide universal service can no longer count on low cost consumers to complement the universal service subsidy to compensate their losses on high-cost consumers*", and the higher will be the volume of total subsidy and its cost to the State.[29]

Secondly, market mechanisms play no role in the determination of subsidies, which can generate all the distortions caused by not perfectly informed decisions taken by the regulators. That is why several proposals started to appear based on the idea of **auctioning** universal service subsidies. The Directives of the European Parliament on universal service (2000, p. 20) incorporates explicitly this alternative as a means of allocating universal service subsidies efficiently.

Sorana (2000) surveys most of the recent literature on auctioning universal service subsidies. This author compares competitive bidding to be a "Carrier of Last Resort" (COLR) with an ex-post uniform subsidy scheme and shows that "*COLR auctions can lead to lower subsidies and, more generally, higher welfare levels in a wide range of circumstances.*" The COLR auction tends to be better, the most inaccurate are the cost estimates of the proxy model above.

29 See the cream-skimming model presented by LAFFONT & TIROLE (2000, Box 6.3, p. 240-241). Other important source of increased subsidy due to "in-market competition" comes from technology progress as shown by LAFFONT & TIROLE (2000, p. 251-252).

There are proposals for auctioning a subsidised monopoly or more than one subsidised franchise. While in the first case, there is only competition "for the market" (in the sense of the seminal article of Demsetz, 1969), but not "in the market" (conventional competition), the second contemplates both competitive mechanisms. An example of a blend of these cases is the GTE proposal elaborated by Paul Milgrom. There is a single-round, sealed-bid auction of minimum subsidies accepted by bidders to provide universal service. The award rule, as compiled from Laffont and Tirole (2000, p. 244-245), is:

> "*1. If at least one bid does not exceed the lowest bid by more that 15% of the sum of the lowest bid and the basic service price, then all bids within that range will be accepted.*
>
> *2. If no competing bids is within the range described in (1), but one is within 25%, then the two lowest bids will be accepted.*
>
> *3. If no bid is within the range described in (2), then only the lowest bid is accepted.*"

The main virtue of this proposal is that it reconciles the "*trade-off between in-the-market competition (which may increase, presumably at a decreasing rate, with the number of selected firms) and the cost inefficiency associated with not allocating the market to the most efficient bidder.*" This holds, since under the GTE rule, "*cost inefficiency can be tolerated only if the cost differential between the lowest bid and the other winners is low.*"

There is also another problem for allowing "in-market competition" after a competitive bidding as shown by Sorana (2000, p. 49-55): The prospect of "in-market competition" **after** the competitive bidding increases the incentive of the bidders to collude **ex-ante** in the bidding in cases of per-subscriber subsidies by making the ex-post threat of punishment for defection more credible. This points to the possibility that in high-cost areas where an universal service subsidy mechanism is used, a constrained entry policy should be followed.

Another important concern about universal service subsidies auction rules is the impact of geographic price averaging regulation over the incentives faced by "outside" and "inside"[30] bidders. Anton, Weide and Vettas (2000) provide an interesting analysis introducing an element of strategic pricing by insiders that result in different bidding strategies of these players relatively to outsiders. This happens because the price in the profitable market (urban sector, for instance), where universal service is not required, defines the ceiling of the price in the non-profitable market (rural sector, for instance), given the regulatory requirement of geographic price averaging. According to the authors (p. 4), this creates a strategic link between the rural and urban market and "*a firm that supplies both markets would like to set a rural price in excess of the oligopolistically determined urban price and, as a result,…that makes this firm a "softer" competitor in the urban market.…Thus, a firm supplying both markets is at a strategic disadvantage relative to an urban market competitor.*" This strategic disadvantage is reflected in a higher equilibrium bidding (a higher required subsidy) for the universal service subsidies in the rural area by the inside bidder. By permitting the participation of outsiders in the auction, it reduces this sort of problem, since the player does not care if the cross-effects of geographical price averaging and equilibrium prices and bidding subsidies tend to be lower.

The problem is that these mechanisms can lead to a less efficient outsider winning the auction to serve the rural market. This shows one further negative side effect of geographical price averaging that appears when competitive bidding for universal service subsidy is introduced.

Another alternative is that, instead of targeting "areas", the system of universal service subsidies could be oriented towards "individuals". This could decrease the overall amount of subsidies required for universal service since a system that benefits the whole area does not separate non-needy individuals and besides favours entry. The focus on targeting "areas" rather than "individuals" was one of the main critiques of Katz (1997,

30 "Inside" defined as bidders who already operate in the country.

p. 686) towards the universal service provisions of the US Telecommunications Act of 1996: "*This choice is likely to have at least two negative effects. First, because many people receive subsidies even though there is no danger of their dropping off the telephone network, it increases overall subsidy needs and the concomitant distortions from raising the subsidy funds. Second, this approach may in practice limit eligibility for universal service subsidies to incumbent local exchange providers, because other carriers are unlikely to be able to displace them to serve entire areas.*"

Finally, in the Brazilian model of universal service funding, the Brazilian authority collects the fee revenues from the companies and makes financial transfers to companies to invest in areas/services where investments would be unprofitable. The mechanics of this transfer of resources was designed in the Regulation to Implement the Application of Resources of the FUST (2001). The incumbents owning the privatized companies are not eligible for these resources, since they are already committed to undertake universal service with their own resources. The basic mechanism is public procurement, being the award granted to the smaller bid in terms of funds to fulfil targets defined ex-ante in the "edital". On the other hand, there are cases where a procurement can be avoided and ANATEL will choose the operator.

The auction procedure seems an adequate approach, allowing for the choice of the most efficient operator and avoiding the problems of information of the regulator. In the future, more complex bidding rules such as the GTE proposal should also be considered, which requires careful attention to the ongoing experience of other countries in implementing these mechanisms.

CONCLUSIONS

The usefulness of universal service policies currently used worldwide as a means to promote social objectives is usually challenged by economists. In general, the objectives and the instruments used in universal service

policy lack a solid theoretical justification and economists tend to feel uncomfortable about that. On the other hand, the irresistible attraction that these policies exert upon politicians and regulators requires economists to search for less distortionary interventions. Moreover, there are, potential social impacts of specific policies that should not be neglected.

The distortionary effects of cross-subsidisation have become common sense among regulators everywhere, but it survives notably in the US as shown in the study of Crandall and Waverman (2000). On the other hand, raising funds from other public sources can be even more distortionary as shown by Gasmi, Laffont and Sharkey.

The mechanism of the FUST designed in Brazil with a broader tax base, including local revenues and exempting interconnection revenues, is superior to the narrower tax base of the US fund, and the self-financing of the incumbents in the UK.

The merits of universal service in countries like Brazil are also greater than in the case of the US and UK. In the most developed countries, the coverage of the telephone service is very high and spread over the whole territory, reaching in several cases over 90% of households. In the UK, for instance, according to the OFTEL (2000), **95%** of households already own a fixed line. Moreover, in the remaining 5% of "unphoned", about **60%** already own a mobile telephone and thus spreading individual access should not be a big issue.

The scenario in Brazil is quite different. Besides the low coverage, deep social and regional income imbalances also point to a greater concern for universal service. The impact of universal service duties in suburban poor areas and distant regions can be substantial for social inclusion, access to emergency services, and development of economic activities.[31] The benefits brought by the existence of at least one public telephone in a given

31 See FIUZA & NERI (1998, Annex 2) for a mapping of the regional imbalances of telephone access in Brazil).

urban location or a distant region can be significant. Furthermore, geopolitical objectives for the integration of a huge territory like Brazil can also justify minimum provision of at least public telephones in more distant locations in the North and Northeast.

However, we firmly disagree with the "minimum individual access quantities" approach adopted in the BMTR. The analysis in section IV shows the problems that can be generated in competition on a very simple theoretical setting. On the other hand, minimum provision of public telephone boxes in poor and more distant areas with free-access for emergency services seems to be more appealing.

The mechanism of selecting subsidised operating companies through a competitive bidding procedure seems adequate, but it is important to pay attention on the international experience to address the convenience of beefing up the auction mechanics such as in the case of the GTE proposal. Finally, programs more focused on the targeted groups should be considered to save public resources and improve the efficiency of the policy.

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