

# Mobile telephone service in Brazil: High Dissemination, Low Use

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Abstract - Brazil was successful in introducing competition and in disseminating the access to (mobile) telecommunications services. But there is room for improvement, especially with respect to taxation.

## Introduction

Much of gap between Brazil and the more developed countries is due to problems with its infrastructure. The positive impact of investment and adequate provision of infrastructure services on the levels and rates of growth of per capita income, as well as the indicators of inequality, is well known and documented. Specifically, there is solid evidence in relation to telecommunications and the Internet: mobile telephone service (GRUBER & KOUTROUMPIS, 2011), including broadband mobile (THOMPSON JR & GARBACZ, 2011).

The positive impacts are manifested through different channels: from increased productivity in companies, including increased household income (mainly for the self-employed) and the welfare of consumers, to the economic effect of the investments needed to sustain the provision of these services. Furthermore, since they represent network infrastructure, that is, because the benefits increase when a larger number of users are connected, these gains tend to be seen only after a certain level of the dissemination of the services is reached.

Unlike other types of infrastructure, telecommunications is not a mature sector. Technology has evolved at an astounding rate, a fact that continues to create difficulties for attempts at regulation. Or deregulation, to the extent that some segments are potentially competitive.

It should be noted that with regard to infrastructure in general and transportation (roads, railways, ports and airports) indicators, Brazil's performance is below average for middle-income countries and similar (and sometimes lower) than that of poor countries. On the other hand, Brazil's lack of infrastructure appears to be relatively less with respect to communications, since Brazil displays a higher than average performance than the middle-income countries. In the specific case of mobile telephone service,

Brazil is fairly close to the average for the rich countries.

In Brazil, telecommunications is probably the sector in which the liberalizing reforms of the 1990s were the most complete and most successful. The mobile telephone service segment is emblematic: all the relevant companies are private, competition was established, access to services has increased significantly and investment remained high.

The process of introduction of mobile services in Brazil started in the late 1980s. In 1988, a precedent was set for the private operation of such service without, however, preventing the state-run telecom carriers from doing so. In 1997, ANATEL's jurisdiction was established for publishing the regulations for this service. With the breakup of the Telebras System, the country was divided into ten areas, with two frequency bands for each area assigned, called band A and band B. Band A was reserved for the former Telebras System companies and band B was specified for the new carriers. After the tender for band B bandwidth usage, whose contracts were signed between June 1997 and April 1998, the privatization process of the former Telebras System carriers (band A) was initiated.

With the start of the auctions of new frequency bands, and the mergers and acquisitions between the companies, the mobile phone market gradually migrated to its current configuration. Today, there are four mobile phone companies with national coverage and a reasonably balanced market: Vivo (Telefónica), TIM (Telecom Italia), Claro (América Móvil) and Oi (Portugal Telecom and Brazilian partners). Moreover, there is a fifth company specialized in mobile services (SME or trunking), which also operates throughout Brazil (Nextel, of the Nextel NII group).

Between 2003 and 2014, the number of households with a telephone went from just over 30 million to approximately 63 million (Figure 1). This trend is even more striking when measured as a proportion of total house-

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holds: 61% in 2003 and 93% in 2014. Moreover, much of this progress can be attributed to an increase in the penetration of cell phone service. In most Brazilian households, the cell phone is the only means of access to telephone service services. This trend is more pronounced among low-income households. The massification of telecommunications in Brazil is largely a result of the expansion of mobile services, especially in the pre-paid mode.

The comparison of the spread of mobile telephone service in Brazil with other groups of countries only confirms these results. In recent years, the penetration of mobile phones in Brazil neared the average of the rich countries much faster than the average of the other middle-income countries.

However, there is one thing that can counteract the diagnosis of success of the spread of mobile telephone service in Brazil. On one hand, there was a significant increase in access. On the other, although it has increased in recent years, the use of the mobile services is still relatively low in Brazil, even after adjusting for differences in income between the countries.

This is probably related to the pricing of mobile services: in many international comparisons, with different methodologies, Brazil always appears among the countries where mobile services are more expensive (see, for example, BARRANTES & GALPERIN, 2008). By way of illustration, in 2012 the average rate (in dollars adjusted for purchasing power parity) for calls made from prepaid cell phones in Brazil was the 140th highest in the world (out of 144 countries) (WORLD ECONOMIC FORUM & INSEAD, 2014). In 2011 the cost of a typical basket of mobile services in Brazil (also measured in dollars adjusted for purchasing power parity) was the 157th in the world (out of 161 countries) (ITU, 2012). From this point of view, the success of mobile telephone service in Brazil should at least be subject to qualification.

In summary, the limited use of mobile services by Brazilians apparently is not explained by elements of demand, but rather by supply: typically, its prices are higher in Brazil than in the rest of the world. This being the case, what are the causes of such high prices?

### Competition

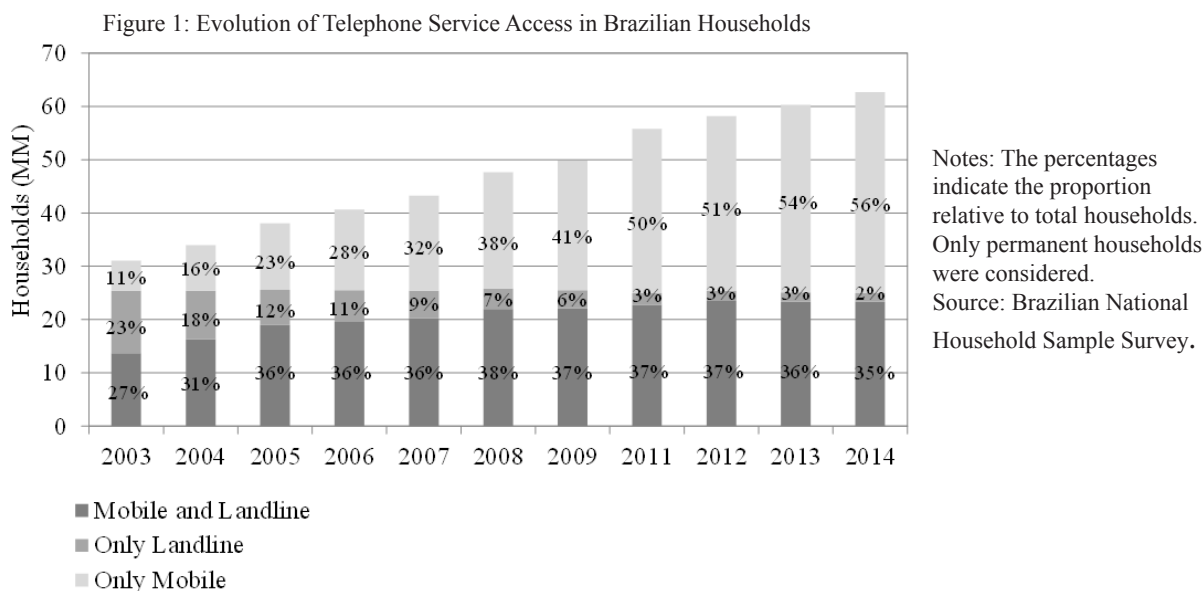
The most obvious explanation would be the absence of competition. However, Brazil has five major companies providing mobile services on a national scale and the observation of the indices of industry concentration indicates that apparently there is competition in Brazil. But, despite the low concentration of the market, companies - tacitly or explicitly - could be acting in a coordinated manner to raise prices. Again, this does not seem to be the case. The profitability of Brazilian companies in the sector is among the lowest in the world, making this explanation implausible.

### Tax Burden

Thus, all that remains to investigate are the costs incurred in the provision of mobile services in Brazil. Are they higher than in other countries? In this regard, the first thing that comes to attention is the tax burden on telecommunications services. Typically, tax burden is around 43% on telecommunication services in Brazil, one of the highest in the world (DELOITTE & GSMA, 2011).

There is considerable debate in the United States on the need and gains involving the reduction of taxation on these services (see, for example, HAUSMAN, 2000). If this debate is relevant in the American context - where income is higher and the tax burden (around 17%) is significantly lower compared with Brazil - surely it is also important in the Brazilian context.

It is possible to calculate the impact of reducing the tax



burden on mobile services in Brazil to the prevailing average level in the United States. The producer surplus would increase by R\$ 2.9 billion a year, the consumer surplus to R\$ 10.6 billion and the collection of taxes would decrease by R\$ 8.8 billion. In net terms, that is, discounting the purely distributive effects, in which the gain of one agent is simply a loss for another, it represents an increase of R\$ 4.7 billion per year. It should be emphasized that these estimates refer only to mobile voice services and do not include data services such as mobile broadband.

It is clear that reducing taxes on mobile services would generate not insignificant gains in welfare. However, in the Brazilian case it is a difficult policy to put into practice. For many states, the revenues from these taxes account for much of the overall tax revenue; and even for the federal government there is currently little room for the reduction of tax burdens.

### Remuneration for Networks

Another possible explanation for the high price of mobile services could be the remuneration model of the mobile carriers' networks. Whenever a (mobile or fixed-line) call is made, the company originating the call must pay the receiving company for the use of its network. In Brazil, although it has come down in recent years, the amount of such remuneration for mobile networks (called VU-M in Brazil) is still high by international standards.

Indeed, in principle it would be expected that the incentives are such that companies would negotiate an amount close to the marginal cost of the termination of the call, at least in the case where the traffic between companies is reasonably balanced (payments would cancel each other out). But this is not what happens in practice, not only in Brazil, but in most countries. In this instance, we need to separate two distinct cases.

The first refers to calls that originate from fixed-line telephones and terminate with mobile phones (F2M). In this case, the mobile phone companies have the capacity and the incentive to charge values higher than the marginal cost of call termination. Intuitively, by charging amounts above cost, the mobile phone companies could use the profits to reduce the charges to subscribers and attract more consumers, especially if the competition is vigorous, as seems to be the case in Brazil. That is, competition acts in the direction of increasing the termination rate, not reducing it. In this case, the literature predicts that a reduction in the termination rate of the mobile networks results in: (i) lower prices for users of fixed-line services; (ii) a reduction in the profitability of mobile carriers; (iii) a reduction of the diffusion of mobile phones (GENAKOS & VALLETTI, 2012).

Item (iii) is known as the waterbed effect. Since there are positive network externalities, mobile companies have incentives to compete aggressively for new customers by reducing subscriptions. The revenue loss with this strategy is compensated by higher incoming call traffic. Thus, the higher the termination rate, the more aggressive can be the strategy. Therefore, although the reduction in the termination rate tends to reduce the price paid per minute for calls (mobile and fixed-line), it generates an offsetting increase in the value of the subscription and, thus, a decrease in the penetration of the mobile services (BAIGORRI & MALDONADO, 2014).

The second case deals with calls between mobile phones of distinct companies (M2M). In this situation there is a tendency towards a better balance between traffic that enters and leaves each network. Precisely because of this interdependence, termination rates can be used as an instrument of tacit collusion. In this case, under certain conditions (limited externalities and preponderance of competition in linear prices), a reduction in termination rates can generate lower prices for mobile calls without significant effects on the diffusion of that service (GENAKOS & VALLETTI, 2012).

If mobile services are relatively less important than fixed-line services, the trend is that the dominant effect is that of fixed-to-mobile calls. This probably was the case when much of the regulatory framework of the sector was initially defined. In practice, because the regulators commonly require that termination rates are the same for calls originating from fixed-line or mobile networks, what is observed is that they are concerned about very high rates, and not very low rates. Not coincidentally, various regulators, especially in Europe, have moved to regulate them, usually by setting values that are close to some measurement of costs.

In Brazil, there has always been concern about reducing the mobile termination rates. The main argument is that they help subsidize the pre-paid mobile phones. In short, it is feared that the reduction in mobile termination rates could trigger the waterbed effect and reduce the spread of these services, especially among the low-income consumers who are more sensitive to increases in the price of the subscription rate. Some authors reported that, in the Brazilian case, this possibility actually exists (see BAIGORRI & MALDONADO, 2014, for example). However, these are studies that use older data, in periods when mobile telephone service had lower relative importance (and, therefore, the waterbed effect had greater relevance).

The empirical literature with international data also follows this pattern. In earlier periods, the waterbed

effect is shown to be quite relevant. However, in the recent literature this effect usually tends to disappear (see KONGAUT & BOHLIN, 2014 for references). Because of this, after small initial reductions, ANATEL recently decided to reduce the maximum reference value for the mobile termination rates more consistently. By 2019, this amount should fall to something close to the incremental long-term cost. If the empirical literature is correct, and if one observes what happened in other countries that have adopted this strategy, a reduction in the price of mobile services is expected without a significant impact on its dissemination (or on the profitability of the companies).

### Final Considerations

The importance of communications infrastructure in the development of countries and increasing productivity is widely documented. And, in this regard Brazil's relative backwardness in communications compared with other sectors, is smaller. This partly reflects the success of the sector's regulatory model, especially the positive results in terms of introducing competition (especially in mobile services). Obviously, this should not be taken to mean there is no room for improvement.

There are major opportunities to progress with respect to taxation of services and equipment. In the case of services, Brazil's tax regime is one of the highest in the world. For equipment, although there are public policies for tax reductions, the protection the industry enjoys in the domestic market ends up making their prices very expensive compared to other countries.

In the case of network remuneration, Brazil chose to follow the experience of other countries and reduced the termination rates for mobile services. It is expected that in the coming years the price of services will be reduced.

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