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## Working Paper

# An examination of numerical portability in mobile communication in Uruguay

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# An Examination of Numerical Portability in Mobile Communication in Uruguay

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January 2025



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## Abstract<sup>1</sup>

This paper examines the effects of the introduction of mobile number portability (MNP) using data from Uruguay. MNP allows customers to switch mobile providers while retaining their phone number, thereby reducing switching costs and potentially enhancing competition. Our analysis reveals that firms responded by increasing the share of postpaid contracts, partially countering the exogenous reduction in switching costs with new endogenous barriers. We find that while market concentration increased in terms of subscriber share, it decreased for data traffic, reflecting differing customer behaviors and firms' commercial strategies. Additionally, we observed reductions in mobile data prices and an increase in new mobile subscribers, suggesting that MNP contributed overall market growth. Using a world panel of data prices for the internet we find that MNP is associated with lower prices in the range of 42-50 percent.

**JEL classifications:** L96, L51, D43

**Keywords:** Mobile number portability, Telecommunications, Competition, Switching costs, Uruguay

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## 1. Introduction

In any economy, the regulatory framework has a crucial role in fostering competitive market dynamics, incentivizing innovation, sustaining productivity advancements, facilitating market expansion, and ultimately augmenting consumer well-being through reduced pricing, increased product diversity, and elevated product quality. This paper aims to examine the impact of a recent regulatory change in the telecommunication market that implemented mobile number portability (MNP).

MNP means that the owners of the mobile number are the clients (and not the provider company) and they can change the company with which they operate while maintaining their number. In this way, switching costs are significantly reduced and telephone companies largely lose the ability to have captive customers. Regulators promote MNP intending to increase competition among providers, empowering consumers to choose plans that suit their needs, encouraging innovation, and introducing new service offerings in the mobile market.

Uruguay presents a particularly interesting case for studying the implementation of MNP due to its unique combination of market dynamics, regulatory framework, and high levels of mobile phone penetration. As one of Latin America's most digitally connected countries, Uruguay stands out as a high-income nation according to the World Bank classification, despite being located in a region generally considered to have relatively lower development levels. The Uruguayan telecommunications market is characterized by high concentration and significant state involvement, with the state-owned operator ANTEL dominating the market alongside two private competitors, Movistar and Claro. Furthermore, regulation concerning number portability was significantly delayed and faced strong opposition from labor unions and political stakeholders. This combination of economic advancement, market structure, and regulatory challenges makes Uruguay a compelling case for examining the interplay between regulation, competition, and resistance in the telecommunications sector, offering valuable lessons for other economies seeking to enhance consumer choice and market efficiency.

The Ley de Urgente Consideración (LUC) of 2020 was a very comprehensive law with multiple considerations used by the incoming government to establish an agenda of changes that ranged from aspects of security, education, environment, agriculture, labor relations, fiscal rules, and more. One of its provisions allowed MNP.

The regulation change had the explicit aim of creating a more competitive environment that could generate efficiency gains and benefit consumers. As expected, these regulatory changes were welcomed by some but resisted by others. Unions formally challenged 135 articles of the 476 of the LUC, including MNP. After a one-year period of collecting signatures, the unions achieved the legally necessary support to force the government to call a national referendum. By the end of March 2022, the national referendum rejected the unions initiative, and the LUC remained unchanged. Even before that, in January 2022 MNP was implemented and the first customers were allowed to switch providers.

In this paper we consider the short-term effects of the policy change. We find that while the implementation of Mobile Number Portability (MNP) reduced switching costs, firms responded by increasingly promoting post-paid contracts, which, in the absence of regulations on early termination fees, introduced new barriers to switching. Additionally, we observed that the market share of the largest and state-owned company, measured by subscribers, increased, leading to a rise in the Herfindahl concentration index based on subscriber numbers. However, the Herfindahl index for data traffic decreased, suggesting a differences in the use of voice and data services between the customers of the state-owned company, which dominates the market, and the customers of the private competitors. This is likely due to network externalities primarily benefiting the largest operator. We also document a rightward shift in the supply curve (in terms of price and data traffic offered) for all three competitors following the introduction of MNP. This is consistent with aggregate evidence of decreasing Internet prices, continuing a trend that began prior to the regulatory change. Finally, we conclude that the concerns of those opposed to the LUC were not realized regarding number portability, as the state company remains the dominant player in the telecommunications market. This suggests that pro-competitive changes are not necessarily negative for incumbent firms, while market expansion and better conditions for consumers are aligned with improvements in general well-being.

The paper proceeds as follows. Section 2 presents the relevant literature and the expected effects of MNP. Section 3 presents the data, and Section 4 the results. Section 5 concludes.

## **2. Background and Related Literature**

In mobile telecommunication markets, two key features shape the market competition and set the pace of its dynamics, namely, switching costs and network effects. Theoretical and empirical

studies suggest profitability in these markets depends heavily on having a large, stable customer base. This is driven mainly by network effects and switching costs (Farrell and Klemperer, 2007). These factors allow market leaders to sustain large market shares and exert market power. In this context, policymakers often try to promote competition to benefit consumers by reducing switching costs. Thus, MNP aims to reduce customer inconveniences when changing providers (Lee et al., 2006). Nonetheless, it is critical to consider that MNP takes place in an industry with network effects. If the latter are strong enough, and if firms are able to endogenously generate switching barriers, the reduction in the switching cost of MNP might not generate the expected impact.

Farrell and Klemperer (2007) argue that switching costs and network effects both arise from consumers' need for compatibility, but in different ways. With switching costs, compatibility is longitudinal—consumers seek consistency over time to preserve prior investments, such as knowledge or accessories tied to a specific product. In contrast, with network effects, compatibility is horizontal—the value of a product increases as more people uses it, like in social networks, where each new user enhances the value for others.

Network effects increase willingness to pay as consumers find more utility for products compatible with large networks. Meanwhile, switching costs represent a tradeoff as customers accept higher prices to avoid losing past investments if they switch providers.

Number portability is far from being a regulatory innovation. The first country to adopt number portability was Singapore in 1997 and, after that, the list of countries adopting portability has been continuously growing.<sup>2</sup> It is noteworthy that South America is among the furthest behind in its adoption, Brazil being the first in the region to introduce portability in 2009. Table 1 presents the portability status of Latin American countries.

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<sup>2</sup> This is also due to the development of the technologies necessary to support number portability.



**Table 1. MNP Status in Latin America**

	<u>MNPs</u>	<u>Since</u>
Argentina	Yes	2010
Bolivia	Yes	2018
Brazil	Yes	2009
Chile	Yes	2012
Colombia	Yes	2011
Costa Rica	Yes	2013
Cuba	No	-
Dominican Republic	Yes	2009
Ecuador	Yes	2009
El Salvador	Yes	2015
Guatemala	No	-
Haiti	No	-
Honduras	Yes	2011
Mexico	Yes	2008
Nicaragua	No	-
Panama	Yes	2011
Paraguay	Yes	2012
Peru	Yes	2010
Uruguay	Yes	2022
Venezuela	No	-

*Source:* Sartor et al. (2020) and Partridge and Pigg (2012).

### ***2.1 Switching Costs and Customer Behavior***

Switching costs refer to the actual or perceived cost a consumer must take on when changing from one product or service provider to another. As Padilla et al. (2003) explain, these costs would not exist if the customer retained their current provider. In this way, switching costs create a disutility or inconvenience for consumers, and thereby they remove incentives for customers to switch when considering alternative providers. In effect, switching costs can transform products and services viewed as essentially interchangeable between providers before selection into offerings seen as differentiated after a provider is chosen (Klemperer, 1995). This ex-post differentiation imparts an advantage to the incumbent provider already serving the customer.

According to the literature,<sup>3</sup> we can distinguish several types of switching costs that create disincentives for the customer to change providers. The distinct types of switching costs, that allow

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<sup>3</sup> Klemperer (1987 and 1995), De Tudela et al. (2009), Otsuka and Mitomo (2013).

us to identify the specific sources of consumer stickiness and inertia, are i) transaction costs, ii) compatibility costs, iii) artificial or contractual costs, iv) learning costs, and v) psychological costs.

Transaction costs are those incurred in the process of switching, such as time spent searching and evaluating information and alternatives, bureaucratic account cancellation, and opening procedures, among others. The compatibility costs involve the potential need to replace equipment to make it compatible with a new provider's services and offerings. Artificial or contractual costs include fees and penalties aimed at deterring switching or forfeited benefits and preferential treatment in loyalty programs after leaving. The learning costs refer to investments required to become familiar with a new provider's customer service, contract terms, and product details, among others. The psychological costs are factors tied to brand relationships, habits, status quo bias, and other emotional barriers unrelated to rationality in the economic literature. Some authors also include the uncertainty caused by the change in terms of not knowing the quality level of the new service or the performance of the new provider.

Theoretical research on switching costs consistently finds that increasing barriers to change serve to lessen competition and benefit incumbent firms. As summarized by Czajkowski and Sobolewski (2016), high switching costs allow firms to raise profits, preempt new market entry, and reduce pressure to lower prices. Numerous empirical studies across different industries support these arguments, showing switching costs decrease market contestability (Ausubel, 1991; Knittel, 1997; Stango, 2002) and competition (Grzybowski and Pereira, 2011; Frank, 2015).

Essentially, by discouraging consumers from changing providers, switching costs make individual demand more inelastic. This confers greater market power to established firms, as customers become less responsive to price and more anchored to previous selections, weakening rivals' entry (Klempere, 1987). With diminished competition and increased dominance, incumbent providers can raise prices or reduce quality while relying on barriers to entry to block threats from potential competitors (Farrell and Klemperer, 2007; Klemperer, 1987, 1995).

Therefore, policies aimed at lowering switching costs can promote contestability and benefit consumers through enhanced competitiveness. This is especially important in cases where switching costs tend to be endogenous to firm strategies, and in markets or industries where the number of competitors is inherently limited. This is often the case in network industries such as mobile communications, where there are considerable economies of scale and network effects that restrict market forces.

That is, economies of scale and network effects make the emergence of a few dominant providers more likely. Incumbents benefitting from reduced competitive incentives may then strategically exploit switching costs to further improve their advantage. With competition already hampered, firm actions to raise switching barriers and restrict consumer choice warrant additional scrutiny from regulators.

Various studies highlight switching costs as a key factor shaping the competitiveness of mobile markets (Shi et al., 2006; Viard, 2007; Grzybowski, 2008; Grzybowski and Pereira, 2011). Sources are wide-ranging, from contract termination fees and bureaucratic account transfer procedures to uncertainty about alternate carriers and loyalty program benefits. However, two factors stand out for enabling significant switching frictions: handset locking policies and lack of mobile number portability (Lee et al., 2006; Nakamura, 2010; Maicas, 2009; Maicas et al., 2011; Kitano and Ohashi, 2011; Sánchez and Asimakopoulos, 2012).

Overall, in markets prone to oligopolistic structures, the potential for endogenous firm exploitation of switching costs to harm competition calls for more scrutiny of regulation and competition policy.

## ***2.2 MNP as a Tool to Reduce Switching Costs***

The lack of number portability imposes clear obstacles for customers to freely choose service providers that best meet their needs. However, unlike other switching cost sources, this factor has direct potential for intervention by regulators: enabling number portability has thus become a key policy tool for authorities seeking to reduce market friction.

The marketplace benefits of MNP can be categorized into i) direct gains for customers who utilize portability in changing carriers, ii) indirect gains for non-porting users from heightened competition, and iii) economy-wide efficiencies as the broadened set of choices compels operators to enhance quality and value.

**Direct Benefits to Users of Portability.** Users who opt to port their numbers enjoy several direct gains. By retaining their existing number, porting customers avoids the costs of informing contacts, missing calls, and losing social connectivity tied to that number (Bühler et al., 2006; Otsuka and Mitomo, 2013). Additionally, nowadays, many public and private services and applications now require registration and verification via a mobile phone number. Users build up an association between their phone number and access to multiple services. Losing one's phone number could

cut off access to numerous services that users have subscribed to and relied upon in their daily lives. The importance of retaining mobile connectivity via one's phone number has thus substantially increased.

Portability also increases consumer bargaining power relative to providers. Freed from phone number lock-in, customers can better select carriers matching their preferences and utility (Bühler et al. 2006).

**Indirect Benefits to Non-Porting Subscribers.** In addition to porting adopters, non-porting mobile users also gain from number portability's introduction. With subscribers able to retain numbers when switching carriers, the costs of unsuccessful calls or communicating updated contact details decline (Bühler et al., 2006; Otsuka and Mitomo, 2013).

Lower switching barriers also intensify price competition and consumer willingness to change operators. As Sepúlveda (2015) found in Chile, cross-elasticities rose post-portability as users became more responsive to rival offerings. This compels providers to offer better deals and discounts to discourage switching. For example, carriers may reduce device upgrade costs or launch unlimited data packages to retain subscribers when porting makes account closure easier (Otsuka and Mitomo, 2013; Czajkowski and Sobolewski, 2016).

Larger operators can leverage network effects to minimize port-outs, offering discounted on-net calls and enhanced connectivity. Smaller carriers counter by reducing off-net charges, providing unlimited minutes, or boosting plan features (Shi et al., 2006; Czajkowski and Sobolewski, 2016). Consequently, all mobile customers can benefit from these competitive responses aiming to preserve subscriber bases.

**Indirect Benefits to All Users from the Increase in Competition Generated by Mobile Number Portability.** By intensifying competition for subscribers, number portability creates incentives for providers to improve offerings to both retain customers and attract switchers. Consequently, porting users and non-porting customers alike can benefit from better deals as carriers strive to restrain churn. If market price declines result, aggregate consumer welfare rises thanks to expanded choice sets and affordability (Sánchez and Asimakopoulos, 2012; Otsuka and Mitomo, 2013).

Empirical evidence finds portability's impacts on competitive dynamics and pricing. Analyses across European and Asian countries find portability lowers the dominant carrier's market share over time while increasing overall market churn rates (Sánchez and Asimakopoulos

2012; Podvysotskiy 2006). Studies in Japan and the USA similarly document pricing declines, particularly among higher-end service plans, alongside greater rate convergence across the market post-portability (Otsuka and Mitomo 2013; Park 2011; Pemberton 2013).

By compelling providers to improve value propositions to counter subscriber losses, portability can benefit all mobile customers through downward pricing pressure and better offerings. Preserving these enhancements, however, may require complementary policies to sustain market contestability (Chahuara et al., 2018; Bühler et al., 2006; and Lyons, 2010).

### **3 Institutional Background and Data Sources**

#### ***3.1 Market Agents***

The Uruguayan mobile services market is marked by competition among three operators: one state-owned (ANTEL), and two multinational private companies. ANTEL started to operate in 1974 as a spinoff of the, also state-owned, electricity company (UTE). Initially, the telecommunication services consisted only of telephony and telegram services. It was not until 1994 that ANTEL started to offer mobile telecommunications services.

Three years earlier, the Spanish company Movistar (formally known as Movicom), established in Uruguay as the first private mobile phone operator. Movistar is owned by the company Telefónica. Nowadays, the company operates in 13 Latin American countries, the United States, Canada, and 27 European countries.

In 2004 the Brazilian company Claro (then CTI Móvil) began its operations in Uruguay. This company is owned by América Móvil and it operates in 16 Latin American countries, the United States and Canada.

Currently, ANTEL, apart from providing mobile services, offers other telecommunication services under a monopoly regime. This setup allows it to benefit from network economies and cross-subsidization.

The private operators, Movistar and Claro, as international private firms enjoy negotiating advantages with global suppliers, thus reducing costs in device acquisition and roaming.<sup>4</sup> They also develop new business lines in other markets, such as content production for their streaming platforms, an area where ANTEL has been less active.

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<sup>4</sup> See Sartor et al. (2020).

### **3.2 Data**

To empirically assess the introduction of MNP, we leveraged data provided by the national telecommunications regulator URSEC.

Since January 2022, every quarter, the URSEC publicly releases the “Informe de Portabilidad Numérica” (Mobile Number Portability Report). The “Informe de Portabilidad Numérica” encompasses information on the total number of portability requests, as well as the number of portations *in* and portations *out* at the operator level (quarterly frequency). The report additionally provides details on monthly pricing and the data performance (in GB) of mobile phone plans offered by the three mobile operators without offering a detailed breakdown. Upon request URSEC has given us access to a more granular breakdown of this information by individual operators.

Since 2006 the URSEC has published biannually the “Informe de Mercado de Telecomunicaciones” (Telecommunication Market Reports). This report sheds light on the aggregated level of revenue and subscription figures. Additionally, there is information on subscriptions and traffic data (phone calls, internet use) by operators which allows us to discern the offerings of these operators before and after the introduction of MNP. This information, at the operator level, is also available based on contract type (postpaid or prepaid services). These details are of crucial importance since the effectiveness of portability hinges on the composition of postpaid and prepaid subscriptions. Upon request, URSEC has given us access to revenue information by operator and monthly figures for all statistics reported semi-annual in their published report.

## **4 Results**

### **4.1 Market Overview**

This section makes extensive use of graphical representations to facilitate visualization. In each figure, we mark two key milestones: the approval of LUC and the effective implementation of MNP, which allowed users to start changing providers.

Figure 1 presents an aggregated market overview since 2018. The Uruguayan mobile services market has seen consistent growth in the number of users (Panel A). There is a general upward trend in the number of subscribers to mobile services, suggesting that market dynamics could be driven by technological advancements and the emergence of new applications. While

subscriber numbers provide one perspective on industry growth, another perspective can be followed from the sector-wide revenue. In nominal terms, there were revenue increases but in constant pesos, there has been a decrease in real value (Panel B).

The way users communicate has been changing for reasons beyond MNP. Applications like WhatsApp or Telegram have been substituting traditional calls. Thus, there is a secular tendency towards less voice traffic and more data traffic. Panels C and D show this general tendency. This is consistent with the results that we present further ahead of a substantial decrease in the cost of internet usage.

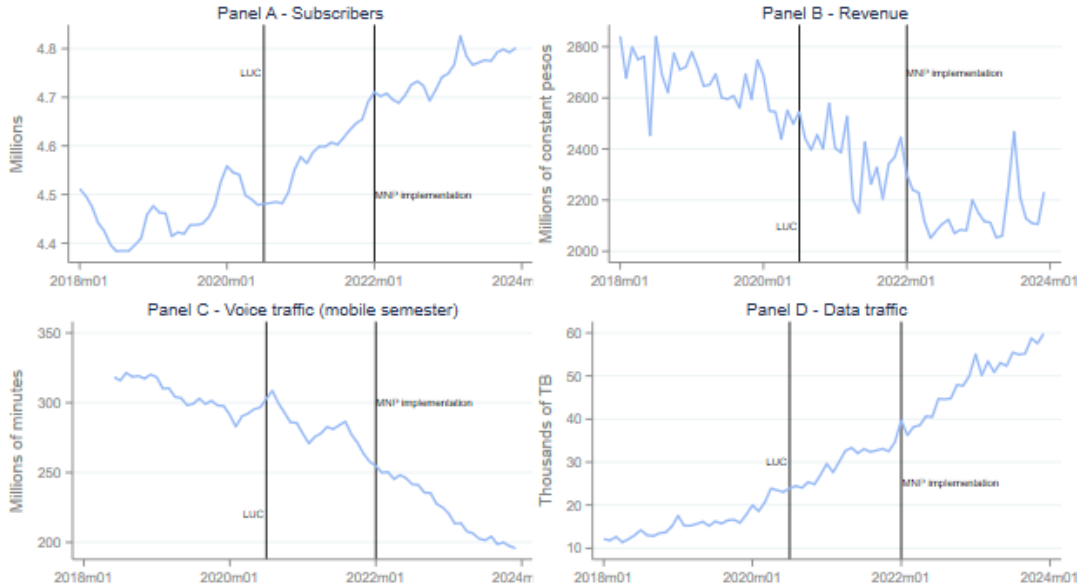
In a market with high network effects and in a context where switching costs tend to be reduced due to number portability, the relative proportion of prepaid and postpaid customers can determine the competitive dynamics and market positioning of operators. The implementation of mobile number portability coincides with an accelerated shift towards more post-paid services. Figure 2 highlights a clear increase in the share of postpaid customers, with subscribers rising from 40 percent to 47 percent, voice traffic growing to 88 percent, and postpaid data traffic increasing from 44 percent to 59 percent.

Additionally, Figure 2 presents a simulation based on pre-MNP data, including a linear projection and the corresponding 95 percent confidence interval. The sharp rise in postpaid contracts clearly deviates from the expected trajectory, suggesting that the increase cannot be explained by pre-MNP dynamics alone.

This is a key finding in our study. The shift to postpaid contracts inherently creates new barriers for customers, who must now contend with early termination fees if they wish to switch providers. This evidence indicates that firms responded to the exogenous reduction in switching costs brought about by MNP by endogenously generating new switching costs, effectively limiting customer mobility.

**Figure 1.**

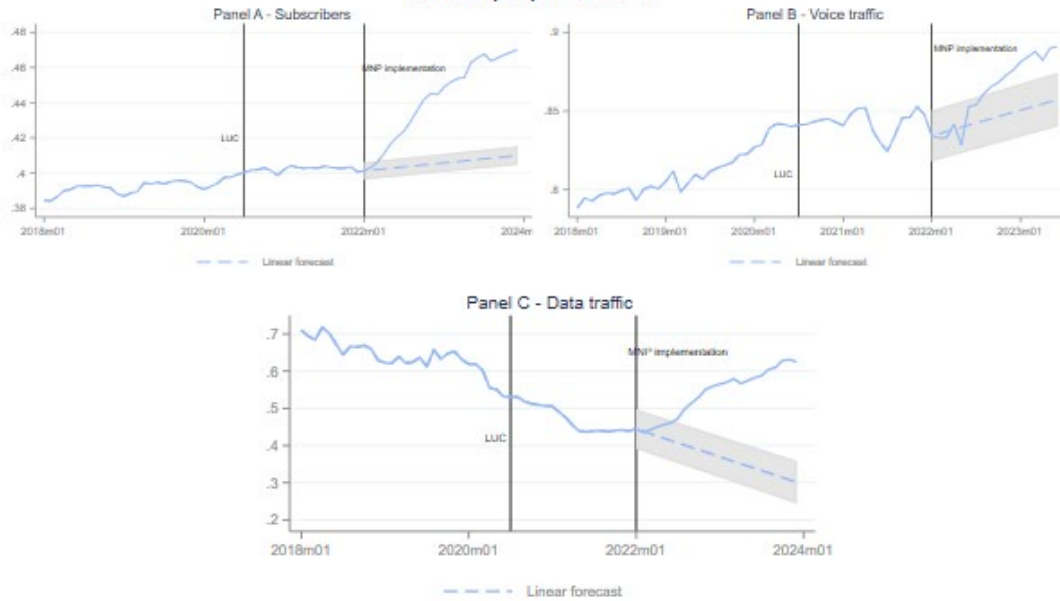
**Market Overview**



Note: Revenue is in millions of constant pesos for 2023. Voice traffic in millions of minutes and data traffic in TB. Source: owned elaboration based on URSEC

**Figure 2.**

**Share of postpaid contracts**



Gray area IC 95%. Source: owned elaboration based on URSEC



## ***4.2 Market Concentration***

Figure 3 presents the participation share of each firm. The largest and smallest firms, ANTEL and Claro, gain participation at the expense of Movistar in the number of subscribers (Panel A). The results are less clear for the other market dimensions.

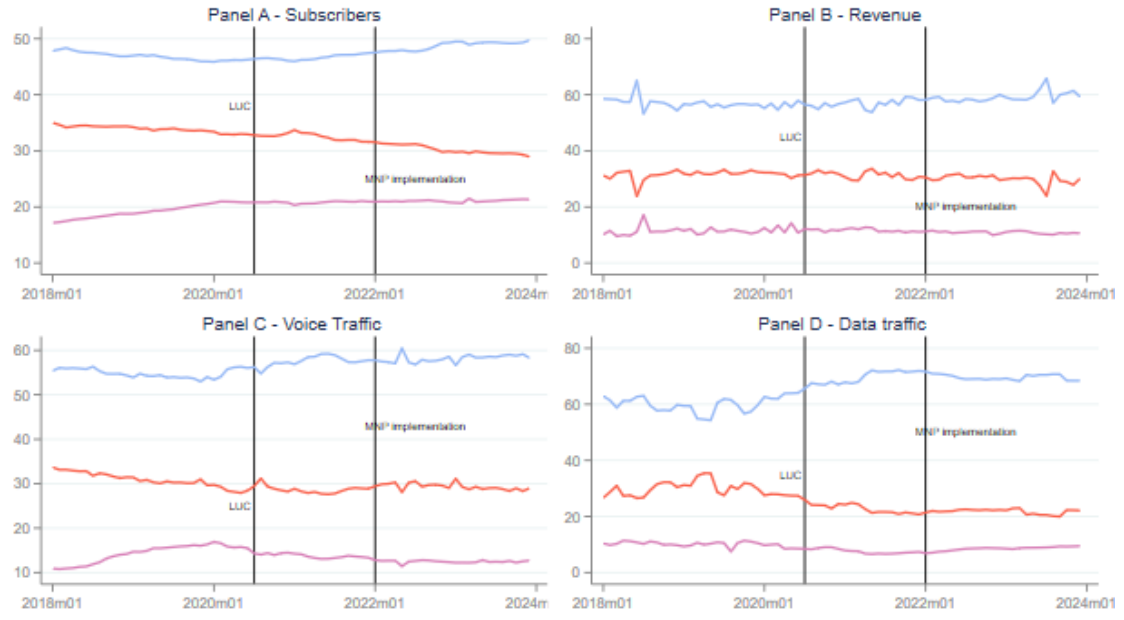
The net effect of both movements generates an increase in market concentration as measured by the Herfindahl-Hirschman Index for subscribers (Figure 4A) but a decrease in concentration in data traffic (Figure 4D). Similarly to the previous pictures, legislative and regulatory events concerning mobile number portability are marked. These influenced the structure and competitiveness of the market.

The approval of the LUC is associated with a sharp increase in the HHI. Theoretically, number portability should enhance competition by making it easier for consumers to switch providers. However, the increase in HHI for subscribers suggests that, in this case, the market has become more concentrated, which could imply that the dominant firms have become even stronger.

At the same time, the decrease in concentration for data traffic suggests a differentiation in the type of clients, with smaller firms having a higher participation of clients that make intensive use of the internet. This may be the result of network effects as ANTEL clients enjoy reduced tariffs to call within ANTEL while Movistar and Claro have to compensate their clients with larger data packages that would allow to substitute traditional voice traffic with data traffic through WhatsApp and similar services.

**Figure 3.**

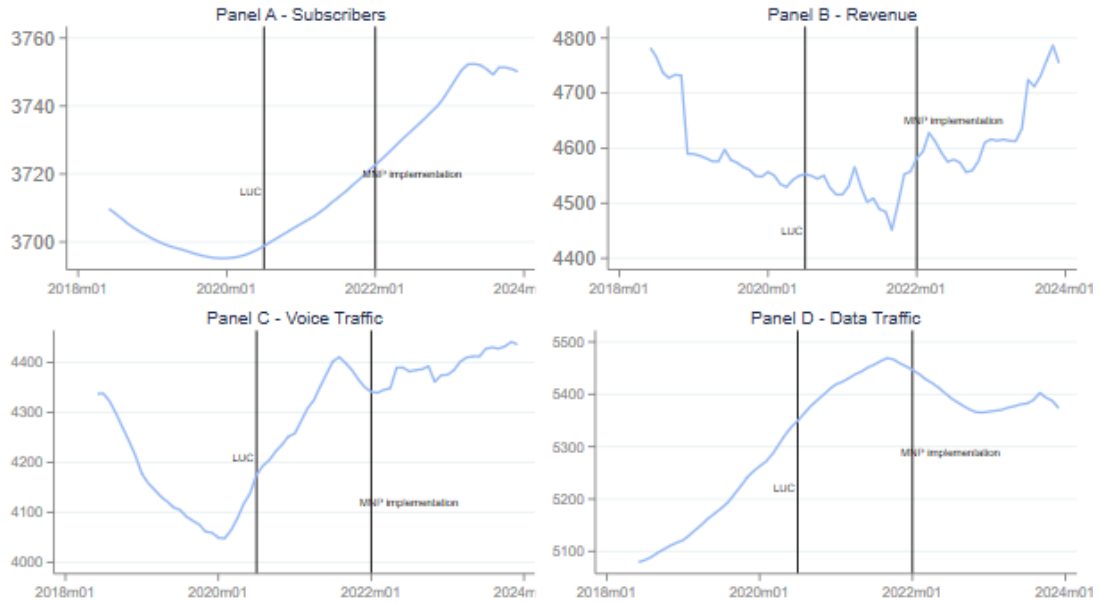
Participation by firm (shares)



Source: owned elaboration based on URSEC

**Figure 4.**

Herfindahl-Hirschman Concentration Indicator



Note: mobile semesters all panels. Source: owned elaboration based on URSEC

### *4.3 Changing Customers and New Customers*

The introduction of number portability insufflates new dynamics in the Uruguayan mobile market. It requires operators to focus more intensely on customer retention, loyalty-building, and attractive offers to grow market share. By removing a major mobility barrier, operators' future performance now depends on their capabilities and proactiveness in anticipating and meeting consumer needs.

Figure 5 shows the port-in and port-out differences by operators and its picture is consistent with the differences in market share from mobile firms. The graph depicts the net gains or losses of subscribers for three mobile operators—Antel, Claro, and Movistar—over a series of months from March 2022 to September 2023. The values represent the difference between the number of subscribers switching to the operator (port-ins) and those leaving it (port-outs). Thus, a bar with positive values indicates a net gain (more port-ins than port-outs), while a negative value indicates a net loss.

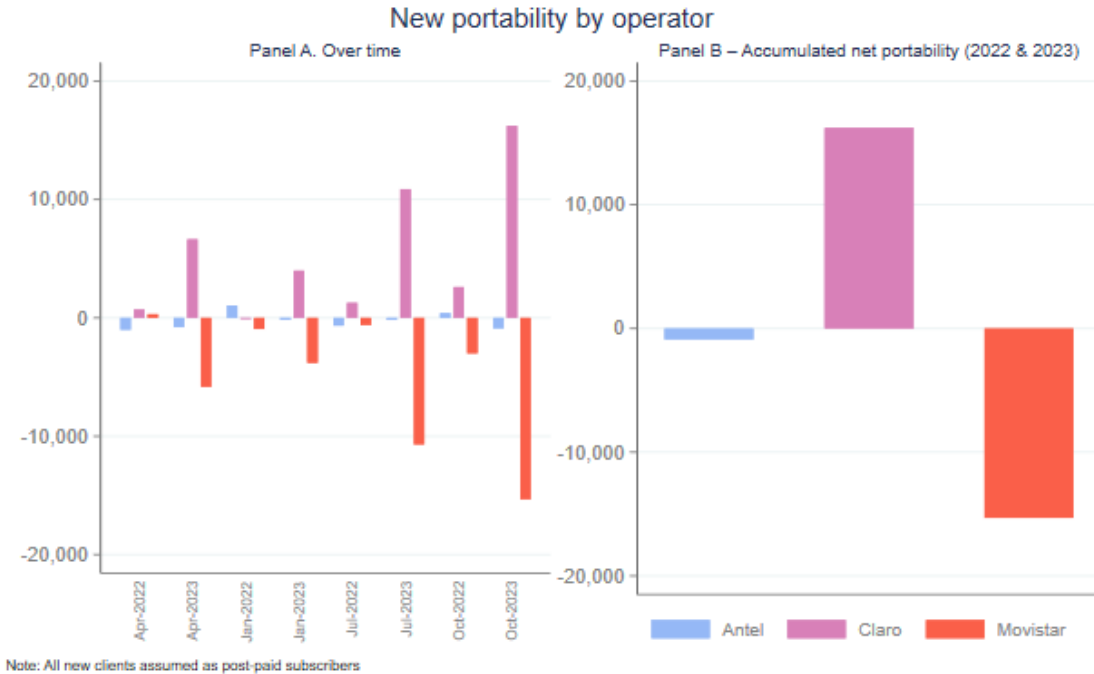
Panel A suggests that the portability process has been gaining dimension over time. Especially for private operators with Claro having a net gain in customers and Movistar having a net loss because of the MNP. Panel B shows the accumulated data that confirms that for the state-owned ANTEL, the effect in absolute values is almost zero, while Claro gains and Movistar loses customers.

To understand the size of these changes it is important to put them in relative terms. This is done in Figure 6, where we present the churn rates where the denominator is the number of subscribers just before the MNP was implemented. Panel C shows the accumulated data that confirm that for the state-owned ANTEL, the effect in absolute values is almost zero, while Claro gains the equivalent of almost 3 percent of its clients and Movistar loses around 4 percent of its clients. However, it is necessary to note that these net effects are achieved with greater mobility between firms, which suggests a much more competitive framework.

Up to this point, we have presented information on total subscribers and those who carried. Implicit in these numbers is the net between “new customers” (that did not operate with any telecom firm) minus “customers who discontinued service” (without changing providers). Assuming that the latter is null, it is possible to calculate the number of new subscriptions for each firm and for the entire market. Figure 7 presents these statistics for January 2022 to June 2023. Antel gained almost 200.000 new users, Movistar more than 50.000, and Claro about 20.000. This represents 20 percent of Antel's previous base of clients, 4 percent of Claro's previous users, and

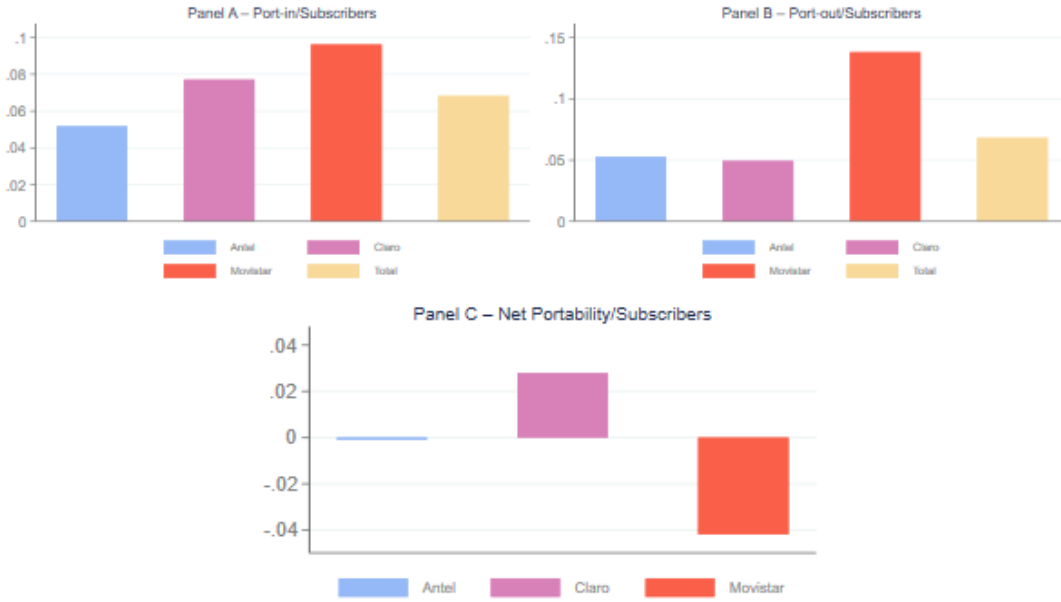
more than 15 percent for Movistar. This confirms that MNP generated a dynamism in the market that went beyond those who carried it. Even more, our estimates suggest that the effect was greater through new users than through those who were already served by companies in the sector and changed providers.

**Figure 5.**



**Figure 6.**

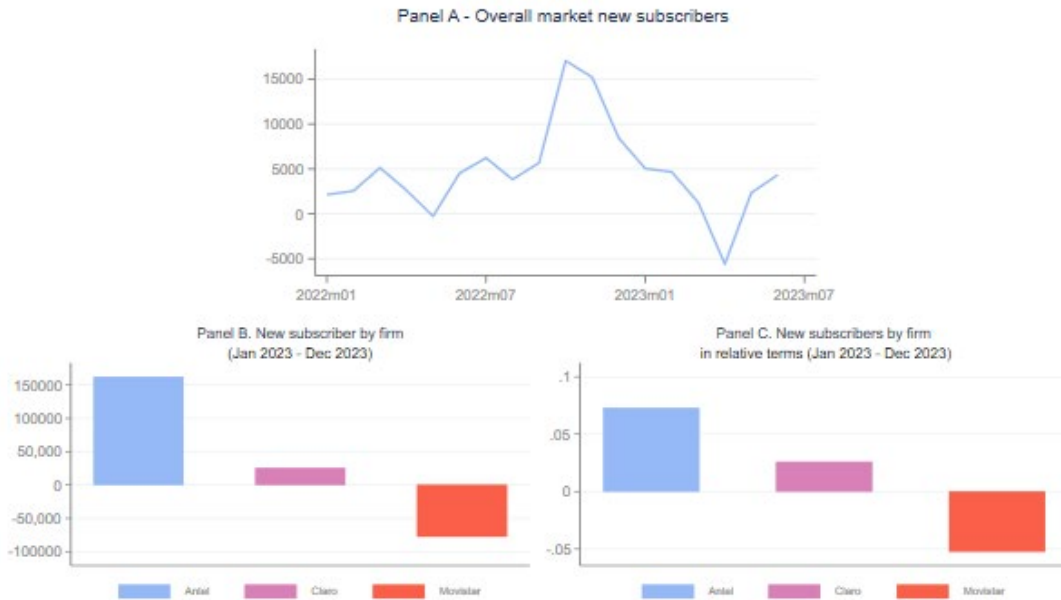
**Churn rates**



Note: subscribers measures in December 2021 before NMP. Portability 2022 and 2023

**Figure 7.**

**New Clients**



Note: All new clients assumed as post-paid subscribers

#### *4.4 Prices and Packages*

In this section, we present several approaches to price evolution. First, we use the data of the main plans offered by the firms (and gathered by URSEC for its portability report). In Figure 8, we plot the number of GB offered depending on the price. We do so for the first and second quarter of 2022. We use a short-time window to avoid changes in the supply curve that could be produced by technological advancements. The graph shows a notable movement towards the right. This implies that for the same price, customers can access a much larger amount of internet. That is, the cost of data traffic decreased substantially.

A second approximation is through data from Cable Co. Cable Co is a company primarily dedicated to comparing broadband across countries. To measure the average cost of 1GB of data for each country, Cable Co collects prices of mobile data plans from all providers in each country. Cable Co gathers data for SIM-only mobile plans that often include a quantity of calls and texts. It also includes “pure data” plans such as those used for tablets. Subsequently, the average monthly cost of 1GB per plan is calculated. The median of all registered plans is then used as the average monthly cost of 1GB for each country. We present this information in Figure 9.

According to Cable Co, Uruguay already had a low cost per GB even before portability was implemented (Panel B). In 2021 it had an average cost per GB of \$1.51, while other Latin American and Caribbean (LAC) countries without MNP had a cost of \$4.90 and LAC countries with MNP had a cost of \$2.69 per GB. The advent of MNP in Uruguay it lowered the cost of GB from \$1.51 to \$0.27 (Panel A). These figures suggest both from the cross-section evidence and through the time variation that MNP is a power source for price reductions in data traffic.

The Cable Co data allows for a more comprehensive analysis of the effects of Mobile Number Portability (MNP). Using data from 223 countries between 2019 and 2023, we observe that 132 countries had MNP throughout the entire period, 80 countries did not have MNP at any point, and 11 countries introduced MNP during this time. In Table 2, we present the results of an OLS regression of the logarithm of mobile service prices on a dummy variable, which takes the value of 1 if the country had MNP in a given year, along with a dummy for Uruguay and year fixed effects. We did not include an interaction term between the MNP and Uruguay dummies, as identification would rely on just two observations.

We provide four estimations: the first includes all countries, the second restricts the sample to countries where Cable Co measured at least 10 different mobile plans in 2023 (used as a proxy

for competition), the third focuses on countries classified by the International Telecommunication Union (ITU) as having partial or full competition in IMT services (3G, 4G, etc.) in 2022,<sup>5</sup> and the fourth includes only LAC countries.

For the time dummies, the omitted year is 2019 which serving as the base year. The coefficients for the subsequent dummies are consistently negative and increasing in absolute value, indicating a general downward trend in prices over time.

The MNP dummy is statistically significant, with a coefficient suggesting that countries with MNP had prices 42 percent to 50 percent lower, depending on the comparison group.<sup>6</sup> Additionally, the dummy for Uruguay indicates that prices in Uruguay were consistently 64 percent to 68 percent lower compared to the global average, and 76 percent lower compared to other LAC countries.

Cable Co prices are calculated as the ratio between a price and the maximum GB allowed for each plan. This has two limitations. First, plans with unlimited data use must be excluded (the price would be 0). Second, the average price does not refer to the amount of GB effectively consumed but rather to the maximum that consumers could have consumed.

In our third approach to price dynamics, we compute the ratio between market revenue and the total number of subscribers and between market revenue and GB consumed (Figure 10). Panel A shows that the revenue per subscriber has been roughly constant before the MNP with a tendency to decrease. After MNP was implemented revenue per subscriber decreased by 10 percent. Comparing with the moment the LUC was approved revenue per subscriber decreased by 16 percent.

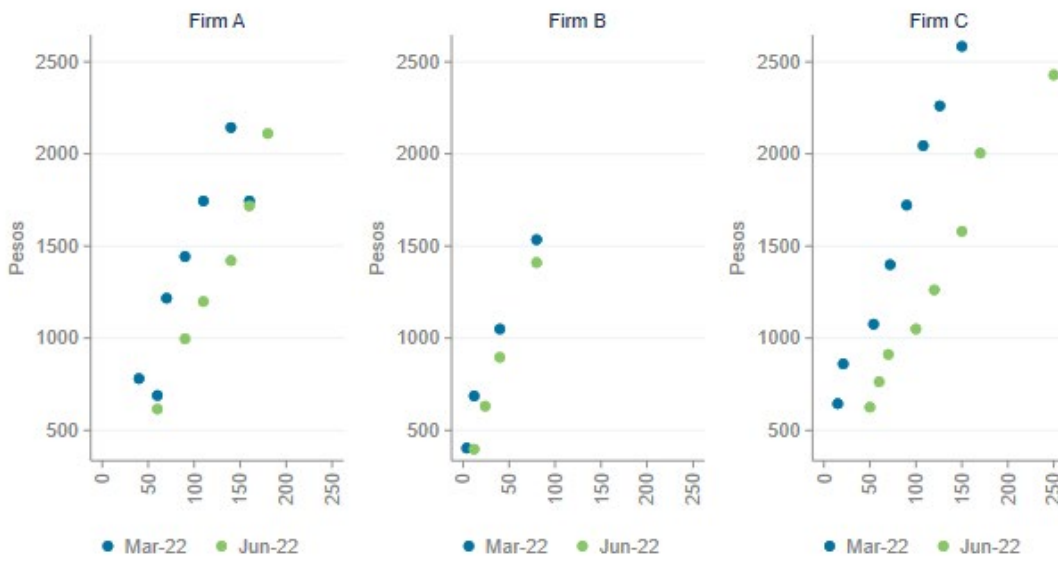
A better proxy of the cost of internet traffic is revenue GB consumed (Panel B). This estimate improves that of Cable Co, since it considers actual consumption. On the other hand, it has the weakness that the revenue is not pure from the use of mobile services. From the LUC was approved until July 2020 the decrease in the cost of the GB has been 60 percent. Since the implementation of MNP the reduction was 39 percent. Thus, within a tendency of price reduction MNP consolidated this tendency.

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<sup>5</sup> <https://app.gen5.digital/tracker/metrics>

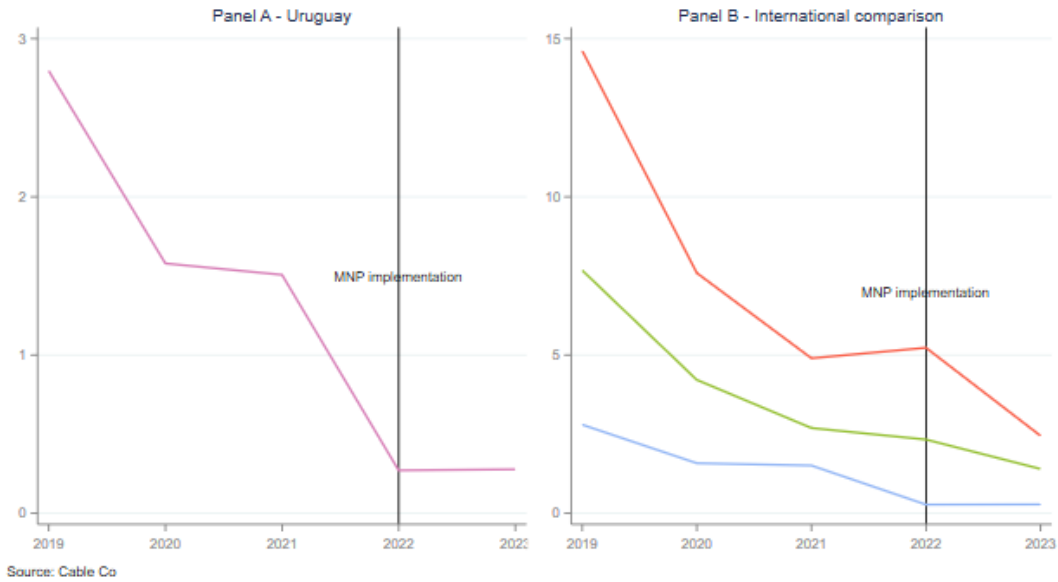
<sup>6</sup> Since the dependent variable is the log of price the effect of each dummy explanatory variables is  $(e^\beta - 1)$  where  $\beta$  is any of the estimated coefficients reported in Table 2.

**Figure 8.**  
Packages



Source: Authors' formulation based on URSEC.

**Figure 9.**  
Average price of 1GB  
(US dolar)



Source: Cable Co



**Table 2. Effect of MNP on Internet Price**

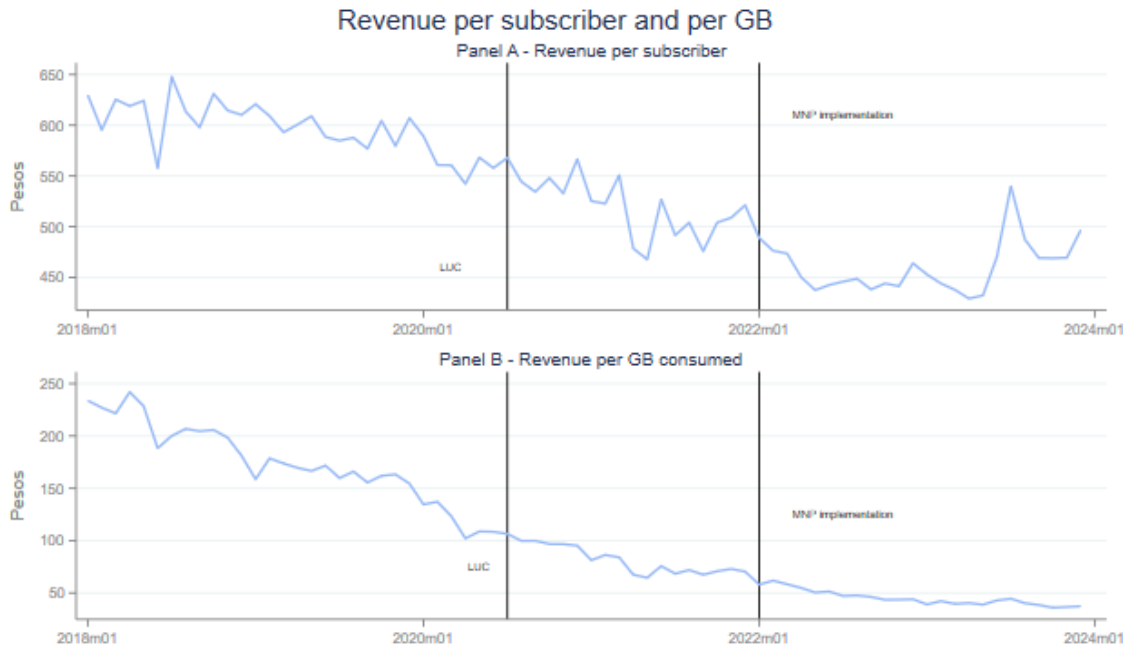
	All	10 Plans	Partial or full competition	LAC
MNP	-0.684*** (0.075)	-0.603*** (0.086)	-0.547*** (0.095)	-0.683*** (0.110)
dummy Uruguay	-1.149** (0.545)	-1.073* (0.551)	-1.022* (0.573)	-1.431*** (0.369)
dummy 2020	-0.499*** (0.115)	-0.500*** (0.129)	-0.484*** (0.138)	-0.540*** (0.166)
dummy 2021	-0.881*** (0.115)	-0.913*** (0.129)	-0.906*** (0.138)	-0.956*** (0.166)
dummy 2022	-1.128*** (0.115)	-1.184*** (0.129)	-1.140*** (0.139)	-1.219*** (0.166)
dummy 2023	-1.440*** (0.115)	-1.502*** (0.129)	-1.461*** (0.139)	-1.687*** (0.166)
Constant	2.073*** (0.093)	1.995*** (0.107)	1.900*** (0.116)	2.446*** (0.137)
Observations	1,115	905	850	240
Countries	223	181	170	48
R-squared	0.204	0.200	0.174	0.429

Notes: Dependent variable is the log of the price of 1 GB.

Data source: Cable Co.

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Figure 10.**



Note: Both panels in constant pesos of 2023

## 5 Conclusions

The implementation of number portability in Uruguay was not without controversy. The strong opposition from the state company's workers' union suggests that the regulatory change was perceived that could anticipate rent losses. However, post-MNP data shows that the state company remains the dominant player in the telecommunications market. In this regard, the fears of those opposing portability did not materialize. This outcome suggests that increased competition, while enhancing customer welfare, does not necessarily result in negative impacts on incumbent firms.

The implementation of mobile number portability generated a framework of much greater competitiveness in the telecommunications market. Nevertheless, incumbent firms reacted increasingly favoring postpaid contracts that endogenously generate switching barriers. In regulation terms this highlights the importance of considering policies to minimize the effect of early termination fees.

The concentration indicators might be misleading. We find that the Herfindahl-Hirschman Indicator for subscribers increased after MNP. This is the result of the gain of market share of the dominant state company (probably the advantages derived from network effects). On the other hand, the concentration indicator for data traffic decreases. Thus, customers of the state-owned provider and the private competitors seem to have differences in the way they use voice and data traffic.

The dynamism in the market is apparent from the number of clients who change carriers but much more from the new clients who join the market. This is evidence that the MNP generates positive effects even among those who do not use the possibility of changing providers.

Lastly, the effect of the MNP has materialized in prices for Internet use, which have a substantive reduction, even starting from levels that were not high in comparison with other LAC countries. This evidence is consistent with our estimation of MNP effects in a country panel data set.

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