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**Price wars in a highly concentrated industry: Mobile
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Abstract

This work focuses on the main variables that explain the prices of the voice services established by mobile service providers in Colombia. This will be done by analyzing different variables that characterize this sector, like, historical prices established by all operators, all the investments made in network development, market sharing and all the existing regulatory measures. We develop a model for data panels in the period between 2005 and 2011, which makes evident the existing interdependence amongst the different companies when setting rates. It is also evident the leadership of one of the competitors and the existing price war between providers.

Keywords: Telecommunications, price wars, Investment, Regulation, Colombia

JEL Classification: D43, C23

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1. Introduction

The mobile market in Colombia has been one of the fastest growing over the last 10 years. This sector is characterized by constant technological, regulatory, demographic and economic changes that test the ability of the companies belonging to the sector to obtain income, while being forced to compete on price and implement measures issued by regulators to stay on the market (Gomez, Polo and Rivera, 2011).

Nowadays in Colombia there are 10 mobile service providers, of which 70% have their own network infrastructure and the remaining 30% work on existing networks. These operators according to the Ministry of Information Technology and Communications - MinTIC (2014), have 52,194,012 subscribers, i.e., in Colombia the number of active lines already exceeded the population and yet not all citizens of the country have a mobile phone.

This industry is characterized as highly concentrated as only three of the operators have 95.24% of the market share. Comunicación Celular SA (Claro) with a 55.77% stake, Colombia Telecomunicaciones SA E.S.P. (Movistar) with a 23.53% stake and Colombia Movil SA E.S.P (Tigo) with a 15.94% stake. The Herfindahl-Hirschman Index (HHI) in the fourth quarter of 2013 was 4133.

These three operators are mostly private equity although they were initially fully public, such was the case of Movistar and Tigo. This indicates that the Colombian government used privatization as a means to increase their income in addition to seeking the encouragement of the investment of foreign capital in this country (Newbery 2000). This is confirmed when considering that Claro is owned by the Mexican company America Movil, Movistar is mostly property of Telefonica from Spain (30% state and 70% of Telefónica) and Tigo has a large share of the Swedish company Millicom (50 Millicom% and 50% of the state).

Gutierrez and Berg (2000) indicate that the privatization of these companies and the creation of regulatory figures are due, in part to flawed policies that were set for this sector in the past, in addition to the poor performance that had been happening in this industry in the Latin American countries.

The attraction of foreign capital made network investments grow by 359%, from 2.9 billion Colombian pesos in 2004 to 10.7 billion at the end of 2013. This allowed to bring mobile services to many parts of the country where it would have been unimaginable before. So the more coverage you have with telecommunication networks, the more people can access these services and therefore an interconnection between all regions of the country is created, allowing the rapid exchange of information.

This behavior benefits the country's economic growth generating a bidirectional relationship where the GDP growth implies increased demand for telecommunications services and increased demand for these services implies growth in the GDP (Lee Shiu, 2010).

On the other hand, all the investments have a direct relationship with the standards and laws on each country. A state with a good regulatory practice ensures higher levels of investment in telecommunications networks (Gutierrez and Berg, 2000).

The regulation must be focused on incentivizing a competition that allows users, companies and the country to benefit from it. Thus, as in recent years in Colombia it has been given authorization for the creation of virtual mobile operators (MVNO) in order to encourage competition in the short term through a wider range of services. MVNOs addition to helping with the competition in the sector, also help to encourage greater investment in networks in the long term. However, these measures lead operators who own infrastructure to not make large investments in the short term, which is reflected in lower service quality, and to achieve only a few technological advances (Kim, Kim, Gaston, Lestage, Kim and Flacher, 2011).

This possible lack of investment in the short term should also be monitored by regulators as it brings negative effects on competition and causes an increase on prices for network access, consequently eliminating some of the competitors and harming consumers (Kotakorpi , 2006), obtaining the opposite effect to that intended with the approval of the start in operation of MVNOs.

It is important to note that one of the characteristics of a regulator in any sector is to be independent so it has a good and clean operation, that is, all decisions should not have any political approach

thus providing freedom for companies to set their rates and manage their budgets according to what they estimate necessary (Gutierrez, 2003).

An important aspect in this sector is that the rates charged to users for mobile phone services have been declining in recent years. This is due in part to the fall in prices of network equipment, as these are electronic and like so their prices tend to decrease over time. In addition, the increased competition that has been given by the entry of new operators, MVNOs as mentioned above, make increasing prices of services similar to the costs (Gruber, 1999).

Lower prices for voice and data services has a direct relationship with a possible price war that occurs in this sector, which is consistent with economic theory as established by Lipczyhski, Wilson and Goddard (2009) and according to Urbany and Dickson (1991), these price wars usually begin when one company wants to increase its market share causing a downward pressure on prices and leading other competitors to follow this behavior. The theory suggests that we can talk about price war when effectively a competitor lowers its prices and its contenders try to match them (Urban and Star, 1991).

With the growth in demand for telecommunications services in Colombia it's possible that there may have been price wars because, as proposed by Saloner and Rotenberg's (1986) study, price wars occur in periods of high demand. With low prices the consumers get more benefits. However, this can cause users to have a reference of unrealistic prices and may experience a lower quality of services in the long term (Heil and Helsen, 2001).

Once you have these price wars is very difficult to leave them, because to do so it is necessary to agree with competitors (collusive agreements), which can be seen as a joint price setting or a possible cartel, this would immediately call the attention of regulators to impose sanctions (Rao, Bergen and Davis, 2000 and Perdiguero, 2010).

The aim of this study is to analyze what are some of the main variables that affect the price of voice services offered by mobile phone companies in Colombia, including price wars. In this country, the telecommunications sector has experienced all this, such as the privatization process,

high demand, large investments, high growth, new regulatory policies and possible price wars. This study seeks to contribute to the literature on the behavior of the industry in developing countries. Importantly, the processes lived in industrialized economies have been very different, where operators are monopolistic structures, such as the case of British Telecom in England and Telefonica in Spain suffered a privatization process that was affected by a pretty complex regulatory system including several institutions (Bel and Trillas, 2005). Or the case of Telecom Italia in which is evident how the incentive of competition along with a good regulatory framework can contribute to reducing prices charged to consumers (Scalera, 2012).

Based on previous literature, the assumptions made to understand what are the main variables that affect the price of voice services offered by mobile phone companies in Colombia are:

Hypothesis 1. *Although the telecommunications sector in Colombia is a highly concentrated industry, price wars are present.*

Hypothesis 2. *The network investments made by mobile operators in Colombia, are made to stay in the market or to charge higher prices to users.*

2. Data and Methodology

2.1 Data

Information concerning the prices of each of the operators was taken from the Unique Information System Telecommunications Sector (SIUST). This system is managed by the Communications Regulatory Commission of Colombia (CRC) and there the most important figures of the sector are unified. Prices registered there are those reported by each one of the operators as these are obliged to do so whenever there is any change in their rates.

A database was created by taking the monthly prices of each of the providers of mobile telephone services in Colombia from January 2005 to December 2011, because until that date they were officially published in the SIUST.

The numbers of network investments were taken from management reports of each of the companies, and the SIREM page, which is a tool that is provided by the Superintendence of Societies of Colombia, where the financial statements are recorded for companies operating in this country.

The data used were grouped by month from 2005 to 2011 and are in constant values discounted with the inflation reported by the Bank of the Republic of Colombia.

Regarding the regulation, the information used was taken from the website of the Ministry of Information Technology and Communications (MinTIC). There it was consulted each of the decisions in which it was awarded spectrum to all service providers that own mobile network infrastructure.

2.2 Main Variables of Mobile Telephony in Colombia

The mobile operators in Colombia have in their portfolios basically two services: voice and data services. In voice services, we can classify those reported by the companies into 5 Price groups: Onnet¹ prepaid and postpaid prices, offnet² prepaid and postpaid prices and SMS³ prices. The behavior of these prices from 2005-2011 had a downward trend as it can be seen in Figure 1. While in 2005 prepaid offnet prices were above 1400 pesos by the end of 2011, these did not exceed 560 pesos. In the case of postpaid offnet prices reached a peak in 2005 of 1,411 pesos and in 2011 the highest rate was 299 pesos. So does the price of SMS with rates of 403 pesos in 2005 and 185 pesos at the end of the studied period. Onnet prices exhibit the same behavior with a maximum of 885 pesos for prepaid and 576 for postpaid in 2005 while in 2011 prepaid rates were 560 pesos and 299 pesos for postpaid.

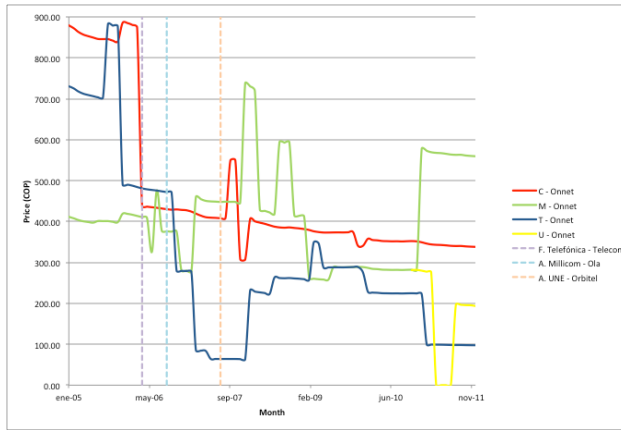
¹ Onnet Prices refer to the value charged for calls made between users of the same operator.

² Offnet Prices refer to the value charged for calls made between users of different operator.

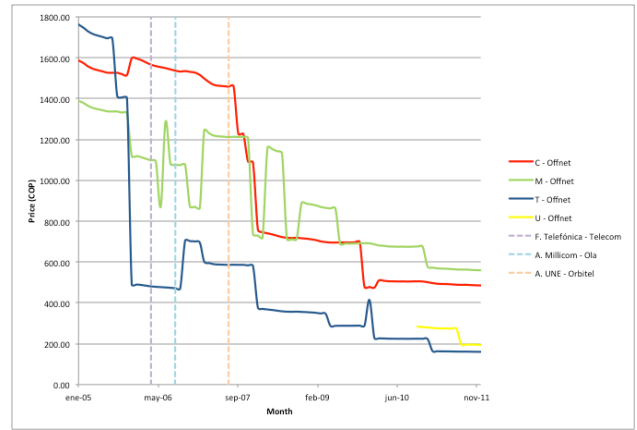
³ Text messages.

Figure 1. Voice Services rates from 2005 to 2011.

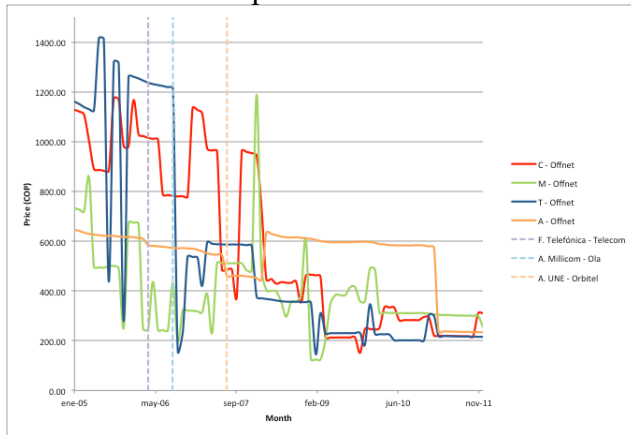
1.1 Prepaid Onnet Prices



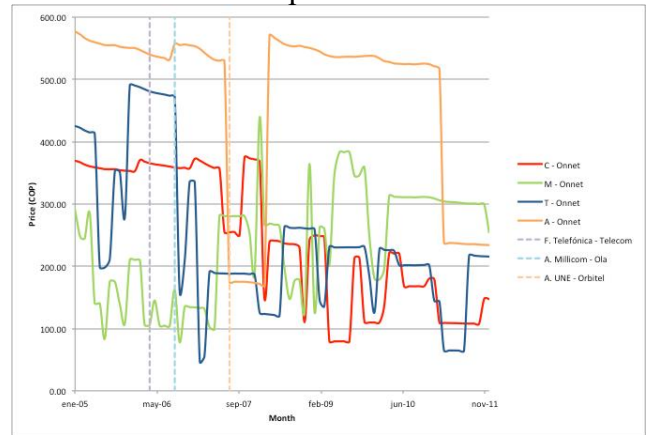
1.2 Prepaid Offnet Prices



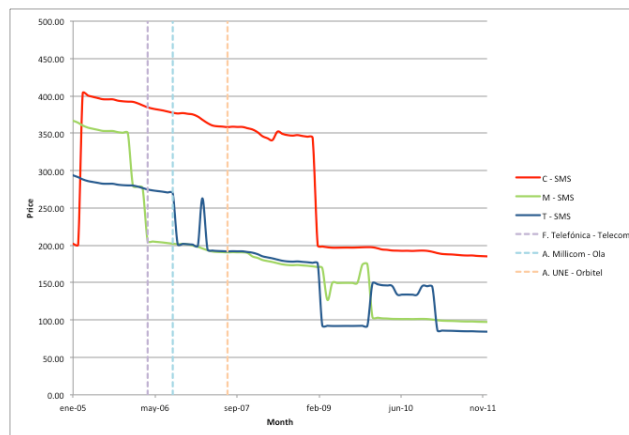
1.3 Postpaid Offnet Prices



1.4 Postpaid Onnet Prices



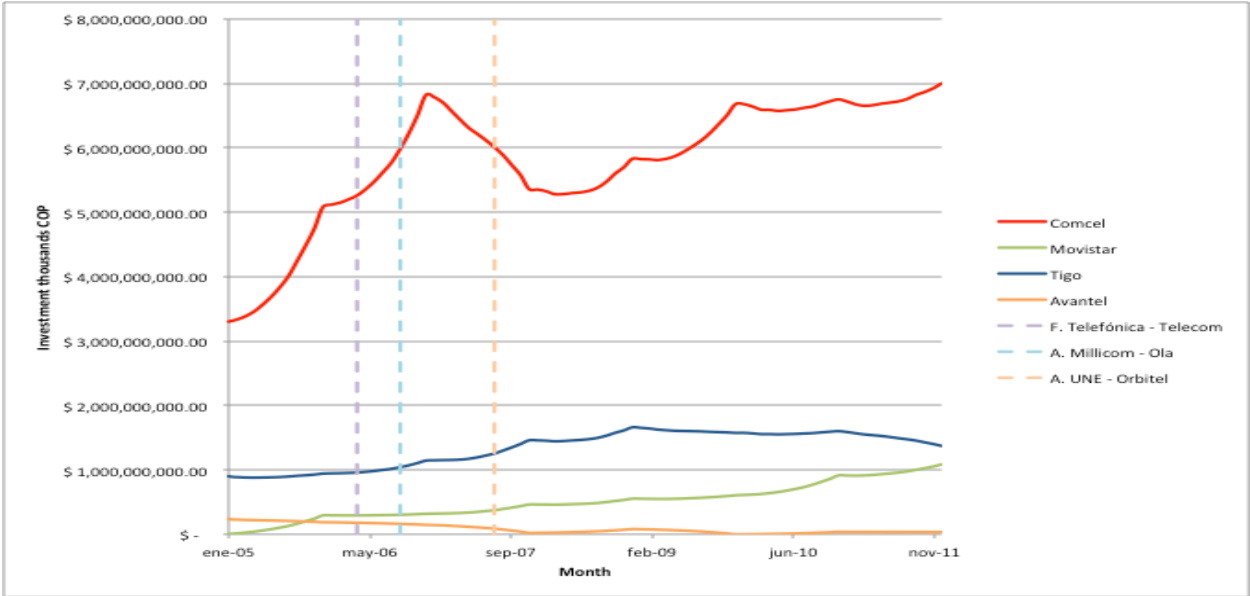
1.5 SMS Prices



Source: Own elaboration.

These prices are directly related to the investment made in networks by the operators. These investments have been growing since 2005 as shown in Figure 2. Claro moved from investing 3.3 billion Colombian pesos in 2005 to have an investment of 7 billion Colombian pesos by the end of 2011. On its side, the investments made by Movistar and Tigo were 1.08 and 1.37 billion Colombian pesos respectively, towards the end of that period. This can be observed in Figure 2 where it's confirmed that the operator with the largest number of subscribers (Claro) is the one making investments in its network and exceeding by 5.1 times the investments of its closest competitor, equivalent to about 5.62 billion pesos apart.

Figure 2. Investments by operators from 2005-2011.

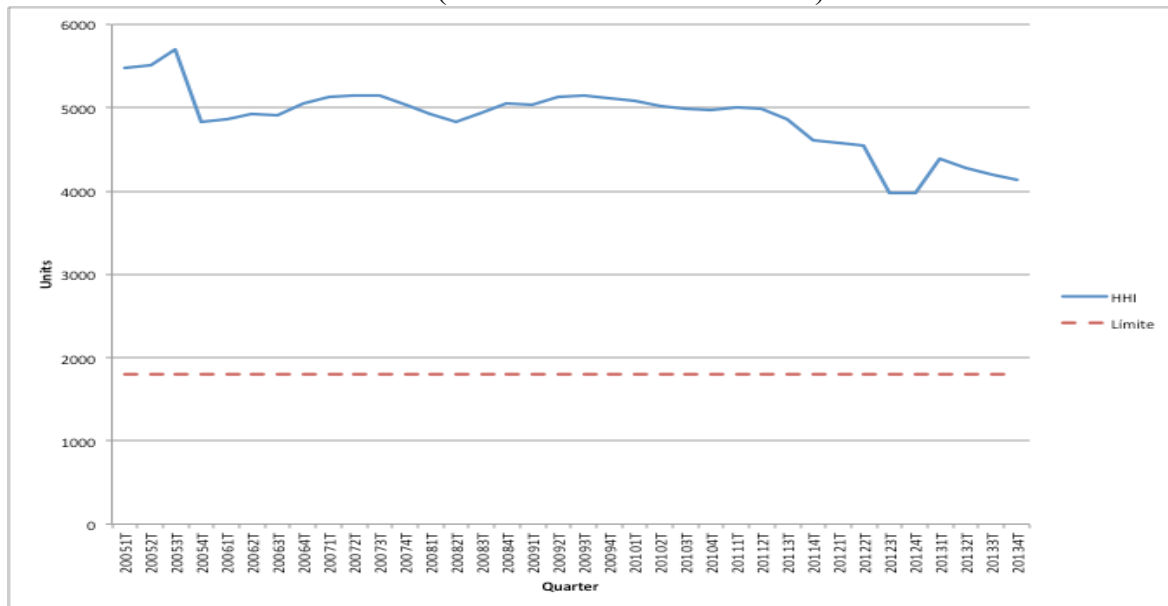


Source: Own elaboration.

The growth of network investments made in Colombia's mobile service has reached more and more users starting in 2005 with 10.7 million subscribers and closed 2011 with around 46.4 million. A growth of 333% users. In 2011, these users were distributed among 4 big companies: Communication Celular SA (Claro) with 62.04% of subscribers, Colombia Telecomunicaciones SA ESP (Movistar) with a 24.52% of subscribers, Colombia Movil SA ESP (Tigo) with 12.36% of subscribers and Uff Mobile SAS with 1.07% of subscribers.

With this data, we calculated the Herfindahl index (HHI) which shows that the market for mobile telephone services in Colombia is highly concentrated and uncompetitive, as shown in Figure 3 this index exceeds the value of 1800 throughout the whole studied time period, with a value of 5480 in 2005 and 4604 in the last quarter of 2011; however for the study period it shows a decreasing trend. According to the FERC, a market is considered highly concentrated if the HHI is above 1800.

Figure 3. Level of market concentration (Herfindahl Hirschman Index)



Source: Own elaboration.

Despite the high levels of concentration, it is an oligopolistic market where there have been price wars between the rivals, as shown in Figure 1. This can be justified since it is a quick way to gain market share (Rao, Bergen and Davis 2000). It is worth pointing out that as recognized by Sweeting (2007) a highly concentrated market is not always synonymous of a greater market power, as established by the economic theory that depends on the specific conditions of it.

Being a highly concentrated market, the regulatory authorities like the CRC in Colombia, have a very important role because users depend on them to not be affected by the excessive power of some of the companies. Consequently, it was found that measures such as the allocation of new spectrum are used by the regulator to encourage competition. Between 2006 and 2011 30 Mega Hertz of spectrum were allocated through 4 resolutions that are summarized in Table 1.

Table 1. Resolutions issued by the MinTIC Spectrum Allocation

Resolution	Date	Description
Mod. 6	10/03/09	10 Mhz (1890-1895MHz and 1970-1975MHz)
443	16/04/10	10 MHz (1855-1860MHz parecido con 1935-1940MHz)
1157	15/06/11	5MHz (1850-1852,5 MHz and 1930-1932,5MHz)
2106	15/09/11	5MHz (1850-1852,5 MHz and 1930-1932,5MHz)

Source: Own elaboration.

Another important factor for this market are the fusions and acquisitions that have occurred in recent years. In the studied time period the merging between Telefonica and Telecom that happened in April 2006, the acquisition of OLA by Millicom in September of the same year and finally the acquisition of Orbitel by UNE in August 2007.

These fusions were initially raised as a possible cause of the change in all service prices. However, when analyzing the three fusions and acquisitions made during the studied period, it was found that these had no statistically significant impact on the change in prices offered by operators to consumers, as it has been proposed it is a sector with a very high competition leading prices to fall.

2.3 Theoretical Background

The mobile service market in Colombia has few competitors who offer the same products to a group of consumers. This indicates that the mobile telecommunications sector in this country is an oligopoly in which an interdependence between different operators is experienced.

In oligopolies, companies are faced with the constant doubt of not knowing what will define their best strategy without knowing the one of the competitors. Something that often is reflected when setting the price of their products, thus to a change in these is clearly seen how rivals try to follow this variation.

Given the above this research is based on the combination of an oligopolistic Bertrand model type, in price competition and a competition model in amounts to Stackelberg, to analyze the behavior of pricing in the mobile telecommunications sector (Belleflamme and Peitz, 2010), where there is a clear leadership of one of the companies that resembles a barometric model, i.e., the leader is not necessarily the biggest but the most agile.

It is important to note that the primary goal in this type of model in some cases, becomes the maximization of profits through increased prices due to market power (Lipczyhski et al, 2009; Carlton and Perloff, 2004; Ivaldi, Jullien King, Seabright and Tirole, 2003 and Garcia, Velázquez and Montenegro, 2014). However, in other cases according to the strategic behavior of companies, the fundamental objective in addition to profit is to stay in the market leading existing companies to take on price wars (Lipczyhski et al., 2009 and Carlton and Perloff, 2004).

Markham (1951) suggests that the barometric price leadership model has two types: competitive and monopolistic. This sector is closer to the monopolistic type that has the following characteristics: a small number of relatively large enterprises, there is little product differentiation and also have high entry barriers that stand between network investments.

This investment made by operators is very important for Colombia and in general for all countries, as there is a relationship between investment and economic activity (Cronin, Parker, Colleran and Gold, 1993). That is, as we raised Hardy (1980) phone and mobile telephony in general contribute to the economic development of a country.

In the case of Colombia, the economic growth has been due in part to the attraction of foreign capital invested in telecommunications and that is due to the effort made by the regulatory authorities of this country. In addition, to facilitate communication and make it more efficient. Therefore, best regulatory practices make the economy have better performance in terms of per capita GDP (Paleogos and Polemis, 2013).

2.4 Methodology

To explain what are some of the possible variables that affect the price of voice services offered by mobile phone companies in Colombia, it was proposed an econometric panel data model, specifically a form data pool:

$$Y_{it} = \gamma X_{it} + d_{it}\delta + \alpha + \varepsilon_{it} \quad (1)$$

where Y_{it} represents each of the dependent variables (prepaid and postpaid rates Offnet and Onnet and SMS), X_{it} represents the explanatory variables and the lagged price and investment, with their respective coefficients γ . The dummy variables of price rises and falls are given by d_{it} with their corresponding coefficients δ , ε_{it} is the error term and finally the constant term α .

Accordingly, for each of the prices of voice services a different pool was raised where the cross terms are given by the three operators with more market share in Colombia and greater infrastructure.

For prepaid and postpaid onnet prices, prepaid and postpaid offnet SMS the following equations were raised:

$$Price C = C_1 \log(Price M) + C_2 \log(Price T) + C_3 Dummy\ price\ rises\ C + C_4 Dummy\ price\ falls\ C + C_5 \log(Price C(-1)) + C_6 \log(Investment C(-1)) + C_7 \log(Investment C(-2)) \quad (2)$$

$$Price M = C_1 \log(Price C) + C_2 \log(Price T) + C_3 Dummy\ price\ rises\ M + C_4 Dummy\ price\ falls\ M + C_5 \log(Price M(-1)) + C_6 \log(Investment M(-1)) + C_7 \log(Investment M(-2)) \quad (3)$$

$$Price T = C_1 \log(Price C) + C_2 \log(Price M) + C_3 Dummy\ price\ rises\ T + C_4 Dummy\ price\ falls\ T + C_5 \log(Price T(-1)) + C_6 \log(Investment T(-1)) + C_7 \log(Investment T(-2)) \quad (4)$$

Where C represents the variables associated with operator Claro, the M for Movistar and T for Tigo.

These equations were simulated by a pool by ordinary least squares (OLS), which allows an estimation of the price and try to explain the variables in an efficient and consistent way.

3. Results

The proposed model takes into account variables such as the prices offered by other operators, reductions and price increases, the prices of the previous period and investments made by operators 1 or 2 months before.

In addition variables such as mergers and acquisitions, Colombia's GDP, the HHI and regulation were simulated. However, none of these was statistically significant.

The variables that were significant for the five sets of prices were the dummy variable price reduction, the price in the period of time immediately prior and the investment made one to two months before. So, since the dummy variable price reduction was meaningful in all scenarios, it is observed that the market for mobile telephony in Colombia is experiencing a strong price war, which has reference to Movistar who is the operator who is in the second position, that is, both Claro and Tigo in first and third respectively, set their prices according to what makes its closest

competitor who has a price leadership. This confirms in the Colombian market the existence of a price leader as raised by Markham's (1951) study.

Regarding investments, the results show that the investment in the previous month had a negative effect on the price, that is, when operators make network deployment they desire to grow in users and hope to offer a lower price without affecting their returns. However, the fact that the investment from two months before is significant and has a positive impact on the price clearly indicates that it is not growing in users as wanted, therefore, the investment must be recovered through increased rates of the offered products. That is, it is found that the issues raised by Noam (2006) are also true for the Colombian market, as they are trying to transfer part of the investment value to users through price, since there is the risk of not covering the fixed costs.

The last variable that is significant in all scenarios raised is the price of the previous month. This shows us that the charges that are billed to the users already have a downward or upward tendency, which is modified when changes occur in the prices of the other competitors.

In the case of prepaid onnet prices (see Table 2) they are significant in addition to the variables referred to above, Claro's prices have a positive effect on the amounts charged to users. This shows that Claro as the biggest player in this market, tries to set prices as high as possible in order to increase their income. However, prices for Movistar and Tigo have a negative effect clearly showing a price war, as suggested for Urban and Star (1991), it can be seen how Movistar and Tigo try to match their prices when one of the two tries to reduce them. In addition, the dummy variable price increase confirms this hypothesis because, once one player tries to raise the price, the other two try to lower it.

Table 2. Results for Prepaid Onnet Prices Model

Prepaid Onnet Prices Claro, Movistar, Tigo		
Variable	Coefficient	Standard Deviation
Claro Price	63.10482**	(28.85204)
Movistar Price	-48.84063**	(22.90218)
Tigo Price	-27.66464**	(13.82413)
Dummy Price Rises	-306.7527***	(69.98432)
Dummy Price Falls	-329.4566***	(69.24255)
Price (-1)	258.2918***	(14.17337)
Investment (-1)	-355.9469***	(99.92979)
Investment (-2)	321.4467***	(97.07252)

Standard deviation in parentheses. *** P < 0.01, ** p < 0.05, * p < 0.1. (-1) It indicates that the variable is introduced with a delay. (-2) It indicates that the variable is introduced with two delays.

Source: Own elaboration.

Prepaid Offnet Prices as shown in Table 3 show clearly how Tigo tries push the price up, for this period the lack of regulation made the costs of interconnection with other networks harder to take for this company that was the third of the market at that time. That is, the lack of a good regulatory framework, directly harms a competitor (Gutierrez and Berg, 2000), making it to take higher operating costs and therefore make a smaller investments. In addition, it confirms that operators like Tigo participate in price wars in order to stay on the market (Lipczyhski et al., 2009 and Carlton and Perloff, 2004). Moreover, as evidenced again, Movistar has a price leadership by price wars.

Table 3. Results for Prepaid Offnet Prices Model

Prepaid Offnet Prices Claro, Movistar, Tigo		
Variable	Coefficient	Standard Deviation
Claro Price	42.7355	(56.36832)
Movistar Price	-507.5519***	(68.28209)
Tigo Price	265.4977***	(40.87687)
Dummy Price Rises	-411.0913***	(131.1899)
Dummy Price Falls	-424.703***	(128.8568)
Price (-1)	563.0152***	(28.38134)
Investment (-1)	-483.9559***	(173.5652)
Investment (-2)	441.9987***	(169.4455)

Standard deviation in parentheses. *** P < 0.01, ** p < 0.05, * p < 0.1. (-1) It indicates that the variable is introduced with a delay. (-2) It indicates that the variable is introduced with two delays.

Source: Own elaboration.

Regarding postpaid Onnet and Offnet prices (Tables 4 and 5) the same prepaid price trend is observed, with Movistar applying a price war, which again confirms the hypothesis, despite being a highly concentrated market price wars still occur. Also, you can see how Tigo drives the price up in Offnet calls, because as discussed above, is having higher interconnection costs due to the lack of regulation.

Table 4. Results for postpaid Onnet Prices Model

Postpaid Onnet Prices Claro, Movistar, Tigo		
Variable	Coefficient	Standard Deviation
Claro Price	-1.592571	(9.175943)
Movistar Price	-28.06067***	(10.01199)
Tigo Price	7.303152	(8.973697)
Dummy Price Rises	-70.66289	(45.57687)
Dummy Price Falls	-128.3788***	(44.8106)
Price (-1)	152.1763***	(9.629645)
Investment (-1)	-222.8814***	(60.56327)
Investment (-2)	206.7284***	(58.83443)

Standard deviation in parentheses. *** P <0.01, ** p <0.05, * p <0.1. (-1) It indicates that the variable is introduced with a delay. (-2) It indicates that the variable is introduced with two delays.

Source: Own elaboration.

Table 5. Results for Postpaid Offnet Prices Model

Postpaid Offnet Prices Claro, Movistar, Tigo		
Variable	Coefficient	Standard Deviation
Claro Price	-54.98268	(35.17061)
Movistar Price	-85.01845**	(33.9804)
Tigo Price	165.6281***	(32.9216)
Dummy Price Rises	-672.7073***	(175.2376)
Dummy Price Falls	-798.884***	(174.128)
Price (-1)	353.3582***	(33.41289)
Investment (-1)	-703.5679***	(175.8391)
Investment (-2)	655.5726***	(171.4948)

Standard deviation in parentheses. *** P <0.01, ** p <0.05, * p <0.1. (-1) It indicates that the variable is introduced with a delay. (-2) It indicates that the variable is introduced with two delays.

Source: Own elaboration.

A price war is also observed on texting services (see Table 6), however, in this case Claro is the leader. This variable has a negative effect and Movistar and Tigo's prices are not statistically significant. This confirms that the text messages are not a market in which Tigo and Movistar are focused on, as prices of these, plus the volume of messages carried out are very low and so are the generated revenues. However, Claro having 28,818,791 subscribers in the fourth quarter of 2011 compared to the 11,391,072 subscribers that Movistar has or the 5,741,616 subscribers belonging to Tigo, has a significant volume of SMS that can maximize the earnings through an increased service price. This is a clear example of maximizing profits through increased prices due to market power (Lipczyhski et al, 2009; Carlton and Perloff, 2004; Ivaldi, Jullien, King, Seabright and Tirole, 2003 and Garcia, Velázquez and Montenegro, 2014).

Table 6. Results for SMS Prices Model

SMS Prices Claro, Movistar, Tigo		
Variable	Coefficient	Standard Deviation
Claro Price	-108.3336***	(19.98053)
Movistar Price	1.351102	(14.56494)
Tigo Price	10.14689	(15.24728)
Dummy Price Rises	-76.05625***	(24.95643)
Dummy Price Falls	-82.53576***	(24.14891)
Price (-1)	245.034***	(11.21301)
Investment (-1)	-125.842***	(39.28066)
Investment (-2)	104.8256***	(38.23472)

Standard deviation in parentheses. *** P < 0.01, ** p < 0.05, * p < 0.1. (-1) It indicates that the variable is introduced with a delay. (-2) It indicates that the variable is introduced with two delays.

Source: Own elaboration

4. Conclusions

In this study the main variables that affect the price of voice services offered by mobile phone companies in Colombia during the period of 2005-2011 are studied. Using a model of data panel that shows that variables such as investments of one and two months earlier, the price of the previous period and a variable that simulates the effect of price wars, are statistically significant for all voice services offered in the product portfolio of mobile service companies in Colombia.

In Colombia an oligopolistic model of price leadership characterized by the existence of a small number of all relatively large companies, with a little product differentiation and high entry barriers among which include network investments (Markham is also evidence 1951).

In the analyzed period, despite the high market concentration price wars are evident, which supports the results found by Sweeting (2007) for the electricity pool of England and Wales. These price wars are used by mobile operators to grow in users. This behavior has made the service provider companies make investments to avoid losing ground to its competitors, that is, investments are made to stay in the market rather than only raising prices. However, some of these investments are still reeling from the second month when they are finally transferred to users through the prices of services rendered or else there's a risk of not covering the fixed operating costs (Noam run, 2006). In Colombia companies work with a weighted average cost of capital, WACC of 11% on average, which means that even with price wars, there are incentives via compensation of invested assets to remain in the industry. There are companies that evidence a WACC close to 15%.

It is expected that the results of this work will serve to understand the behavior of the mobile phone companies when setting prices. It is also expected that the results will be useful to those interested in this subject that has been treated in some developing countries, characterized by oligopolies in the sector unlike the monopolies present in developed countries.

Given the limited access to the information in this sector in Colombia, is recommended for future studies to analyze other products in the portfolio of services that have taken a lot of strength in recent years, such as data services offered by these companies, thus observe the behavior of prices and investments. This is to verify if whether there continues to be price wars and whether or not the regulatory measures have had an impact on this, because for the studied time period in this work were not significant.

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