Telecommunication Regulatory Reform in Mexico and the Effect on Competition, Access and Adoption of Telecommunication Services, 2013-2018

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Key Words: Regulations, Institutions, digital inclusion, infrastructure development.

Introduction

This paper analyzes the effects of the public and regulatory policy on promoting competition, which has been one of the main objectives of the Telecommunications Reform in Mexico (2013-2018), due to its effects on prices, adoption, and in the quality of the services, in addition to offering greater legal certainty to the investment.

It also examines the public policy of digital inclusion; the constitutional amendments that increased access to broadband as a fundamental right of all Mexicans. This policy makes special emphasis on the most vulnerable sectors of the population and emphasizes not only access, but also adoption, including the development of digital skills.

The regulation of infrastructure industries, such as those that offer telecommunications services, in developing countries faces fundamentally different problems when contrasted with that of developed countries. Evidence suggests that this is largely due to the institutional environment in which the regulation and the policy are implemented in less developed countries (Estache, 2009; Tirole & Laffont, 2000).

For more than two decades (1990-2013), before the enactment of the Reform, there were failures in the regulation as a result of a weak institutional framework and a marked imbalance of power between the regulatory authorities and the operators of the dominant conglomerate in the market. The latter includes Telmex with 67.10% of landlines, Telcel with 67.95% of mobile lines (1st Quarter, 2013) and 70.70% of fixed broadband Internet services (1st Quarter, 2013) and Grupo Televisa with market share of 59.6% in Pay TV services (1st Quarter, 2013) (IFT, 2019).

In 2012, the Organization for Economic Cooperation and Development [OECD] published a study in which a careful analysis was made of the consequences of regulatory failures in the behavior of telecommunications services markets and their effects on low adoption of these services by the population, in addition to estimating the costs on welfare and for the economy as a whole. The OCDE (2012) found that:

> The poor development of telecommunication infrastructure in Mexico is due to a large part to lack of effective competition, and market concentration. In turn, this has implications for consumers, leading to lower levels of consumption as a result of high prices across the range of telecommunication services. This has resulted in a significant welfare loss for users in Mexico. This welfare loss is incurred by existing users who are overcharged in their use of telecommunication services, and from the welfare loss resulting from unrealized subscriptions to telecommunication services (2012, p. 17).

In this context, a structural reform was designed for the telecommunications broadcasting sector**.** The Reform of this sector began with the establishment of a new regulator, The Federal Institute of Telecommunications (IFT), with the power and autonomy to intervene in the promotion of competition in telecommunications and broadcasting services.[1]

This process of establishing a more robust institutional framework allowed for the proposal of a new generation of universal coverage or digital inclusion policies.

In order to evaluate the effects that result from the implementation of the regulations and public policies associated with the Telecommunications Reform, this paper analyzes the variations registered in the participation or market shares of the operators in the different telecommunications services, specifically in landline, mobile services, fixed and mobile broadband, and Pay TV services.

[1] This paper places a especial emphasis on telecommunication services, although it is acknowledged that technological change allows the provision of different services broadcasting services include, based on the same infrastructure.

The effects of the Reform on the changes in the adoption of the different telecommunications services are also analyzed, especially among the population that has not been covered so far due to infrastructure deficiencies, or that has not been satisfactorily served, due to service prices or low levels of income.

Additionally, this paper examines the digital inclusion policies, specifically the evolution of the *Mexico Connected* Program ("México Conectado"), whose objective was to offer free access to broadband Internet in all public facilities in the country, which include educational institutions, clinics, health centers, government offices and public squares.

Likewise, an analysis is made of the achievements of the *Wholesale Shared Network* ("Red Compartida Mayorista") project, established as a public-private partnership responsible for the design, installation, operation, maintenance and updating of a wired and wireless voice and data transmission network throughout Mexican territory. The analysis covers the period from the election of the private consortium, the start of the construction and operation of this network, in 2016, to 2019. The availability of this infrastructure helps create incentives so local telecommunications companies can take advantage of their capillarity and reach isolated and remote communities that to this day lack sufficient supply of telecommunications services. The wholesale shared network offers the possibility of driving wholesale traffic nationwide, with low rates.

Lastly, this study carries out an econometric analysis in order to investigate the effect of regulations and policies associated with the Telecommunications Reform, both on the prices of services and on the adoption thereof. This analysis employs two econometric tools; the first one is the analysis of fixed effects, and the second tool is the synthetic control method.

The article begins with a brief description of the Telecommunications Reform, which is the most important proposal for institutional, regulatory and inclusion policy change in the last 25 years in Mexico.

The Telecommunications Reform

As part of this new institutional environment, specialized courts were created and an amendment to the Amparo (injunction) law was made to prevent any immediate revocation of the regulator's decisions.

Regarding foreign investment, the Reform allowed a 100% investment in the telecommunications sector and an opening of the broadcasting sector that allows up to 49% of foreign capital, subject to reciprocal investment agreement with the corresponding country of origin, being able to increase up to 100%.

When it comes to policies for the promotion of competition in the services market, the new appointment of "preponderant agent" (market power) implemented by the Reform, granted the new regulator the immediate right to impose requirements for promotion of competition, to any economic agent with more than 50% of market share nationwide in a given sector. Consequently, the regulator has the authority to impose an asymmetric regulation, whose purpose is to level the playing field in favor of operators with lesser participation or share in the market.

On March 6, 2014, two company groups were declared preponderant economic agents: the América Móvil Group (Telmex-Telnor and Telcel) and the Televisa Group (IFT, 2014). These designations laid the foundation for the application of the asymmetric regulation to these groups.

The most important measures that are part of this asymmetric regulation are the elimination of charges for interconnection or termination of traffic in the networks operated by the preponderant agent, América Móvil Group, as well as the requirement for these operators to provide the elements of the last mile in a disaggregated fashion, in addition to requiring the obligation to sublet, as a wholesaler, their dedicated links. These asymmetric measures

include the obligation to share passive infrastructure and the elimination of the *roaming* charge.

Other regulations to encourage competition in the telecommunications sector were the elimination of charges for national long-distance calls throughout Mexico (IFT, 2014).

To promote digital inclusion, the constitutional amendments that accompanied the Reform posed access to broadband as a fundamental right. The Reform established, as part of the universal digital inclusion policy, programs and strategies aimed at providing access to information technologies and communication, including broadband Internet. This policy made special emphasis on the most vulnerable sectors and highlighted not only access, but also the use or adoption of these technologies.

The *Wholesale Shared Network* program, coordinated by the SCT and the IFT, consists of a common infrastructure that will serve to offer wholesale data services,[2] in order to facilitate the transit of calls of local operators of mobile networks, fixed networks operators or virtual mobile operators, and encourage the deployment of their services to communities that have not been covered so far.

In turn, the *Mexico Connected* Program aimed to offer access points to the Internet in all public facilities in the country, including schools, clinics, health centers, government offices and public places. The objective was to enable 250,000 access points (Secretaría de Comunicaciones y Transportes [SCT], 2014).

The main results of institutional change driven by the Telecommunications Reform in Mexico (2013-2017) are presented below.

Achievements of the Reform in the promotion of competition (2014-2018)

[2] It is a G4 network, which will evolve to 4.5G and later to 5G.This infrastructure transports data and Voice over Internet Protocol (VoIP).

In order to identify the extent to which the Reform has contributed to reducing the concentration levels in the markets, this section analyzes the evolution of the market share indicators of the main operators in the five main services: fixed telephone services and Internet access services, mobile telephone services and mobile Internet access and restricted TV.

The starting point is considered to be 2014, because although the implementation of the Reform formally began in 2013, that year was characterized by the establishment of a new institutional framework. It was in 2014 when the América Móvil Group and the Televisa Group were declared economically preponderant agents and the asymmetric regulation came into force. Additionally, it was in 2014 when the Federal Telecommunications and Broadcasting Law came into force. For this reason, this analysis takes the year 2014 as the year in which the most important *regulatory intervention* takes place, within the period between 2013 and 2018.

Evolution of Concentration Levels in the Fixed Line Telephone Services and Internet Access Markets

In 2018, the América Móvil Group (Telmex-Telnor) continued to concentrate close to 60% of the fixed line telephony services (57.6%), and 51.9% in fixed Internet access services. It should be noted, however, that it is in the fixed telephony market where the market share of América Móvil has declined the most, between 2014 and 2018, mainly due to competition from other operators offering triple play services, especially from Televisa (its market share reduced by 11.5% in the case of fixed telephony and 25.8% in the case of fixed access to the Internet, (see Table 1).

It is difficult to claim that the decrease registered by the dominant operators in the different fixed line service markets is exclusively due to the policies of promotion of competition associated with the Reform, such as the statements made to the economically preponderant groups, in this case the América Móvil Group. It is very probable that a greater legal certainty

to the investment, which is the result of the new institutional framework, influenced that greater competition is registered in the fixed telephony and Internet services.

However, an important explanatory factor lies in technological change, which allows convergence and the possibility of offering three services, and sometimes up to four services, based on the same infrastructure (usually fixed telephony, Internet access and Pay TV). This factor decisively influenced greater competition in fixed service markets by giving other operators, recent or who had been providing services a while ago, the possibility of participating by offering several additional services.

In 2018, the Televisa Group was the operator with the second largest market share after América Móvil (Telmex-Telnor), with 18.3% in the fixed telephony service market and 22.9% in the fixed Internet access market. Televisa's share in these markets was followed by Megacable, with 9.8% in the fixed telephony service market and 16.0% in Internet access services. In turn, Totalplay has emerged as a major player in the fixed line service market; although the market share of this operator is still small (5.2%), its participation experienced significant growth in both fixed line services and in fixed Internet access services in the reference period (300% and 436% between 2014 and 2018).

In contrast with previous operators, that have been subtracting market share from Telmex-Telnor (América Móvil) with the offer of "triple play" services, there is a group of operators that went into debt in the process of building their own infrastructure, very possibly before the Reform, in order to become independent from operators of América Móvil. In this group of operators, we find Axtel, which decreased its share of both fixed telephony services and fixed access to the Internet (from 4.7% in 2014, to 3.4% in 2018.) Regarding Internet services, its share decreased from 3.8% to only 2.1%.

Axtel and Alestra completed their merger in 2015, Alestra with extensive experience in serving corporate clients, while Axtel served both the residential and corporate markets. The report corresponding to the fourth quarter of 2018 sent by Axtel to the Mexican Stock Exchange (Bolsa Mexicana de Valores, BMV) indicated that this operator reversed the net

loss of the same quarter of 2017 (BMV, 2019). By the end of 2019, the market share is expected to increase with its new market
strategy focused on large corporate and government clients, reducing its share in the residential market (Corona, 2018).

A case similar to that of Axtel is the case of Maxcom, which has undergone a process of financial restructuring between 2016 and 2017. Some of its most relevant strategies include an alliance with Megacable to provide service in several cities in the central region of the country. Maxcom's share in fixed telephony services decreased from 1.5% in 2014 to 0.9% in 2018.

This decrease was even more evident in the case of the fixed Internet access services market (from 1.3% to 0.2%); as a result, Maxcom's revenues were reduced by 34% (see Table 1).

However, the financial and operational restructuring has paid off. In the first quarter of 2017, Maxcom was able to report a net profit of 177.3 million pesos in the quarter, compared to the loss of 97.8 million pesos from a previous year (Lucas 2017).

Additionally, there are operators with the lowest market share that have been focused on addressing certain market niches; this has been the case of Marcatel, Transtelco and Axesat. Marcatel carried out an operational restructuring, reducing its share as residential operator and becoming a "carrier of carriers" through the fiber optic infrastructure it has. Data communication has become its main business (around 80% of its income). This explains its lower share in the retail market. Another company focused on a specific niche is Axesat, founded in 2003, which offers satellite data transport services to corporate clients, with a barely measurable share in the market for fixed Internet access services.

Lastly, there are companies with extremely small participation in the market that have not decreased their share during the 2014-2018 period; among these we find Ultravisión and Transtelco (00.1% of the market between 2014 and 2018).

Table 1. Operators' market share in land-line and fixed access to Internet: 2014-2018.

		2014	2015	2016	2017	2018
América Móvil	Telephony	67.3	63.1	61.97	60.2	57.6
	Internet	64.1	59.6	57.4	54.0	51.9
Grupo Televisa	Telephony	11.5	14.8	16.2	17.1	18.3
	Internet	18.5	20.7	20.6	22.0	22.9
Telefónica	Telephony	7.3	7.1	4.7	3.2	2.7
(Movistar)	Internet	0.00	0.00	0.00	0.00	0.00
Megacable	Telephony	4.6	5.6	7.1	8.7	9.8
	Internet	9.2	12.4	13.9	15.3	16.0
Axtel	Telephony	4.7	4.1	3.7	3.5	3.4
	Internet	3.8	3.0	2.6	2.4	2.1
Alestra	Telephony	1.6	1.7	N/A	N/A	N/A
	Internet	0.02	0.05	N/A	N/A	N/A
Totalplay	Telephony	1.3	2.0	3.2	4.3	5.2
	Internet	1.1	2.0	3.6	4.9	5.9
Maxcom	Telephony	1.5	1.5	1.2	0.9	0.9
	Internet	1.3	1.1	1.0	0.4	0.2
Marcatel	Telephony	0.1	0.2	0.2	0.2	0.3
	Internet	N/D	0.00	0.00	0.00	0.00
Axesat	Telephony	0.03	0.00	0.00	0.00	0.00
	Internet	0.03	0.00	0.00	0.00	0.00
TV Rey	Telephony	0.01	0.07	0.06	0.1	0.06
	Internet	0.06	0.07	0.06	0.06	0.06
Transtelco	Telephony	0.00	0.01	0.01	0.01	0.01
	Internet	0.00	0.01	0.01	0.01	0.01
Ultravisión	Telephony	0.00	0.00	0.00	0.00	0.00
	Internet	0.01	0.01	0.01	0.01	0.01
Otros	Telephony	0.0	0.0	1.7	1.9	2.00
	Internet	1.9	1.1	0.0	0.9	0.9
Total		100	100	100	100	100

IFT, BIT: 2019.

Evolution of concentration levels in mobile telephony services and Internet services

In mobile cellular services, Telcel's (part of the América Móvil group) share continues to be very high, exceeding 60% of the market. It decreased by only 4% in the reference period (from 67.6% in 2014 to 63.4% in 2018. Table 3).

The decrease in Telcel's share in the mobile broadband market was even smaller. Telcel, maintained the highest share and a marginal decrease, going from 74.6% in 2014 to 71.6% in 2018. In as far as Telcel keeps concentrating most of the mobile telephony services, it will also concentrate mobile Internet access services, in the two modalities of payment for this service, that is, prepaid (83.1% in 2018) and postpaid (16.9% in 2018).

Telefonica's market share in mobile telephony services varied very little between 2014 and 2018, with a market share of 20.7% in 2014 and 21.0% in 2018. However, the market share of this operator decreased in the mobile Internet access market (from 15.3% in 2014 to 11.7% in 2018) (see Table 3).

In contrast with Telefónica, AT&T's market share has been increasing. A&T began its foray into the mobile services market with the acquisition of Iusacell-Unefon and Nextel Mexico, in early 2015. The joint market share of the operators acquired by AT&T in 2015 was 8.1; three years later, in 2018, this participation increased by 14.3 (a growth of 77%). In fact, it was AT&T and Virgin Mobile, the latter a virtual operator, who experienced the highest growth in the reference period (the latter by 136.7%, respectively), despite the fact that the market share of this virtual operator is still very small (0.3%, see Table 2).

Similar to the case of mobile telephony, the market share of Telcel (América Móvil) in Internet access services decreased very little, from 74.6% in 2014 to 71.6% in 2018. Telefónica's market share decreased even more, from 15.3% in 2014 to 11.7% in 2018.

On the other hand, the new player in these markets, AT&T, experienced a growth of 49.5%, with a market share of 9.9% in 2014 and 15.0% in 2018 (see Table 2).

With regard to virtual mobile operators, although their share has grown steadily in the reference period, their market share does not reach 1.0%. Among these, Virgin Mobile stands out, as it had a market share of 0.40 in these services in 2018 and registered a 300% growth between 2014 and 2018.

Table 2. Operators' market share in mobile telephony and mobile Internet services: 2014-2018

		2014	2015	2016	2017	2018
América Móvil	Telephony	67.6	68.0	64.9	64.3	63.34
	Internet	74.6	70.4	71.3	70.7	71.6
TELEFONICA (Movistar)	Telephony	20.7	23.1	23.3	21.0	21.0
	Internet	15.3	18.45	14.1	12.5	11.7
AT&T	Telephony	N/A	8.06	10.66	13.2	14.3
	Internet	N/A	9.9	13.0	15.0	14.8
Iusacell-Unefón	Telephony	8.8	0.00	N/A	N/A	N/A
	Internet	6.00	0.014	N/A	0.00	0.00
Nextel	Telephony	2.80	0.00	N/A	N/A	N/A
	Internet	4.00	0.00	N/A	N/A	N/A
Virgin Mobile	Telephony	0.11	0.65	0.75	0.56	0.26
	Internet	0.1	1.10	1.10	0.80	0.40
Maz Tiempo	Telephony	0.01	0.03	0.01	0.01	0.01
	Internet	NA	0.07	0.10	0.00	0.01
Cierto	Telephony	0.01	0.02	0.02	0.01	0.02
	Internet	0.00	0.01	0.00	0.00	0.02
Weex	Telephony	0.00	0.01	0.01	0.13	0.13
	Internet	N/A	0.01	0.00	0.00	0.20
Telecomuni-caciones 360	Telephony	0.00	0.00	0.00	0.14	0.27
	Internet	0.00	0.00	0.00	0.00	0.00
Otros telefonía	N/A	0.00	0.09	0.31	0.69	0.69
Otros Internet	N/A	0.00	0.10	0.40	0.90	1.30
Total telefonía	N/A	100	100	100	100	100
Total Internet	N/A	100	100	100	100	100

IFT: BIT, 2019.

Concentration levels in Pay TV market

The market structure of Pay television services has not changed in the period after the Reform. Televisa concentrates more than 60% of this market; the decrease recorded in its market share is only 2% (62.9% in 2014 and 60.9% in 2018).

The other two important players are Dish MVS and Megacable. Although Dish MVS has decreased its market share, this change has been minor and possibly in favor of Megacable, a company that increased its market share, although also marginally. The other player that increased its participation has been Totalplay, as even though its market share is very small, it records the greatest dynamism in the market and is emerging as an important player in the future (from 0.57% in 2014, it increased to 3.2% in 2018).

When it comes to the other contenders in the market, some are suppliers of the "triple play" service, like Megacable, Maxcom; TV Rey. These operators have experienced operational and

financial restructurings in the reference period; specifically, in the PayTV market, their market share has decreased noticeably.

While Ultravisión shut down its signal in locations like Aguascalientes and Ciudad Victoria, and with that its share in the market has decreased, Star Group emerged in 2018 with 1.3% of the market (see Table 3).

Table 3. Operators' market share in Pay TV services: 2014-2018.

	2014	2015	2016	2017	2018
Grupo Televisa	62.9	60.94	61.00	61.91	60.92
Dish-MVS	17.6	18.92	19.12	16.68	15.23
Megacable-	13.3	13.78	13.15	13.76	14.2
Totalplay	0.57	1.08	1.76	2.53	3.19
Axtel	0.51	0.52	0.55	0.55	0.55
Maxcom	0.37	0.28	0.19	0.09	0.05
Ultravisión	0.19	0.15	0.08	0	0.00
TV Rey	0.15	0.11	0.06	0.09	0.09
Airecable	0.08	0.08	0.09	0.08	0.09
Star-Group	N/D	N/D	N/D	N/D	1.29
Other	4.38	4.14	4	4.31	4.4
Total	100	100	100	100	100

IFT: BIT, 2019.

In March 2015, the IFT issued a preliminary ruling on Televisa with substantial market power. Later, towards the end of that year, the IFT Plenary (by majority vote) ruled that Televisa did exercise this market power.

In February 2017, as presented before, this resolution was challenged by several companies in the pay TV market, giving rise to a new investigation, which concluded with a telecommunications declaration in Mexico.

In February 2018, the Supreme Court of Justice ruled in favor of Televisa in the *amparo* (injunction) that this company filed. Such ruling revokes the resolution in which it was determined that Televisa had substantial power in the pay television market, that is, that it exerted price pressure on its competitors. This represented an important setback for the regulator (IFT), for the industry and for consumers.

To sum up, regarding the effects of the regulatory measures associated with the Telecommunications Reform and the market structure of the telecommunications services, it can be said that this Reform has not had an effective impact on the concentration levels, since with the exception of fixed service markets, the operators with the largest market share, which are part of the large conglomerates América Móvil and Televisa, continue to concentrate more than 60% of the telecommunications service markets.[3]

The participation of companies such as AT&T is one of the main achievements of the Reform. The trends observed in investment are presented below; for this purpose, there is information from the IFT (with information provided by the operators), available for the period between 2013 and 2017 (IFT, 2019).

Lastly, in the Pay TV market, although there have been several attempts to declare Televisa as an agent with substantial power in the market (in accordance with the Telecommunications and Broadcasting Law), these attempts have not succeeded, and therefore the concentration of this operator remains virtually intact.

Trends in the Investment of Telecommunications Companies

It is possible to argue that the new institutional framework that emerged after the enactment of the Reform has strengthened the legal certainty, which may have contributed to encourage private investment in the telecommunications sector. This section presents the evolution of the investment per operator, making a distinction between fixed lined services and mobile services.

[3] Pay television has been defined as a telecommunications service; hence this service is not subject to asymmetric regulation, unless it is declared that Televisa has a substantial market power in the provision of this service.

The changes recorded in fixed line services, based on information available in the statistical resources of the IFT, covering the period from 2013 to 2017, are analyzed below.

Investment in fixed line services (2013-2017)

The changes observed in investment flows suggest that the companies of the América Móvil and Televisa Groups are the ones that have increased their investment to a greater extent, particularly in the "triple play" markets: voice, video, and data, provided in a single access subscription. In fact, between 2013 and 2015 Telmex-Telnor from the América Móvil Group more than doubled its investment from 12,904 million pesos (MDP, as per its acronym in Spanish) in 2013 to 25,208 MDP in 2015. In turn, the Televisa Group increased its market share 2.4 times in the same years, going from 9,195.8 MDP in 2013 to 22,271.2 MDP in 2015 (see Table 4).

In a more robust institutional environment, which results from the regulatory changes associated with the Reform, it has gradually modified the strategy that increasingly resides in strengthening the ability to compete, and less and less in the exercise of lobbying of these large conglomerates, with regulatory institutions and courts, which in the past resulted in regulatory capture.

Megacable is another company that has responded to the changes introduced by the Reform in more than doubling its investment between 2013 and 2016 (from 1,967 MDP in 2013 to 4,758 in 2016) sustaining this growth in subsequent years. Similarly, the merger of Axtel and Alestra was completed in 2015. The growth of investment in this case is not as evident in the years after the merger; however, this operational restructuring places this company in the fifth place of importance in investment in the fixed services market (see Table 1).

Table 4. Investment registered by fixed-line companies, 2013-2017
(millions of pesos)

	2013	2014	2015	2016	2017	2013-2015	2013-2016	2013-2017
Telmex-Telnor (América	12,904	14,011	25,208	22,830	16,561	95	77	28

Móvil)								
Grupo Televisa	9,196	10,957	35,955	22,271	20,027	291	142	118
Megacable	1,967	2,356	3,751	4,758	4,532	91	142	130
Alestra	1,781	2,144.9	N/A	N/A	N/A	N/A	N/A	N/A
Axtel	16.4	11.4	N/A	N/A	N/A	N/A	N/A	N/A
Axtel+Alestra	N/A	N/A	1,884	0.5	0.9	4.8	-100.0	-100.0
Marcatel	26	32	52	81	201	97	209	667
Totalplay	348	348	0.0	0.0	0.0	-100	-100	-100
Ultravisión	4.8	2.4	0.8	1.3	N/D	-83	-74	-100
Air cable	0.0	0.0	0.8	0.8	0.9	0.0	0.0	0.0
TV Rey	4.5	20.3	0.1	0.5	0.0	-98.4	-88.1	-100
BT Latam	13.4	24.9	2.2	0.0	0.0	-83.2	-100.0	-100
Convergia	1.2	20.6	0.0	1.5	0.0	-100.0	19.6	-100
Marcaless	0.2	1.7	1.8	9.4	2.6	1,053	5,989	1,615

IFT:BIT, 2019.

Evolution in the mobile telephony and Internet access services

In contrast to the investment recorded in fixed telephony and Internet access services, the analysis of the evolution of investment in the mobile services markets shows a tendency to decrease it. Telcel's investment in 2013 stands out, far higher than the one registered by other operators but, as discussed before, Telcel, from the América Móvil Group, concentrates more than 60% of the market in 2018 (63.4% in mobile telephony and 71.6% of mobile access to the Internet) and we do not have historical information of the investment made by this operator, and therefore it is not possible to identify whether the investment in that year marks a trend in response to the expected effects of increased competition as a result of the Reform.

In the case of AT&T, in 2015 this company made a substantial investment of 3 billion dollars for the deployment of a high-speed mobile network (51,900 million pesos)[4]. This investment is in addition to the initial investment made at the beginning of 2015 with the acquisition of Iusacell and Nextel Mexico, equivalent to 4.4 billion dollars (76,296 million pesos). AT&T completed the deployment of the high-speed network (4G LTE) four months earlier than promised, in July 2018. This network is technically similar to the 4.5G network implemented by América Móvil and it has a potential coverage of 100 million people (Lucas, 2018).

[4] The dollar-peso exchange rate from December 2015, 17.34 MXN per USD (IDC Indicator, 2015), is taken as reference.

Telefónica's Movistar has a similar amount of investment. It increased its investment in 2016 and 2017, without reaching the levels recorded in the case of fixed services operators. However, these increases indicate its intention to remain contenders in the mobile services market, in which they have around a 20% market share (21% in telephony and 11.7% in Internet access), as presented in the previous section.

There is no information available about the investment made by virtual mobile operators or it is very scarce. For example, no information is available at the source in the case of Virgin Mobile, which is the virtual mobile operator with the largest market share, in 2018, with almost 0.3% of the market in voice services and 0.4 in mobile access to the Internet (see Table 8).

Price Trends for Telecommunications Services (2013-2017)

In this section we discuss the possible effect of the Reform on the prices of the telecommunications services; with this purpose in mind, we take as reference the National Consumer Price Index, 2009-2017.

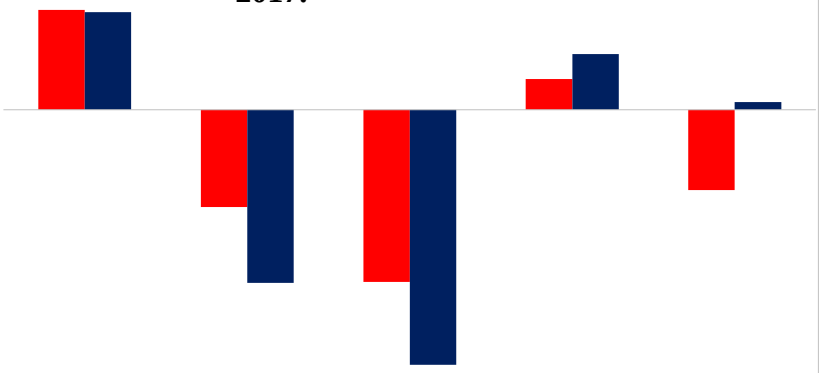
The analysis shows that the asymmetric regulation has had a visible impact on the prices for the end user of some telecommunications services, as shown in Figure 1. The interconnection or zero termination rate of calls in the networks of the predominant group has led to a reduction in operator costs; as mentioned above, these transferred their savings to the end user. This is particularly evident in mobile services, and to a lesser extent, in fixed line services.

In fact, the most significant decrease was observed in mobile services, whose prices registered a reduction of 42.6% between June 2013 and June 2017. In the case of fixed lines, although there is a decrease between 2013 and 2017, the most significant decrease was observed in the period before the Reform (2009-2013).

On the other hand, the Reform had no impact on broadband Internet services, which increased by 9.3% in the same period. That was also the case of Pay TV services, whose prices

increased by 1.3%. América Móvil's Telcel has a market share of 65.1% in fixed broadband Internet and 70.8% in mobile broadband Internet. As shown before, the concentrations in the pay TV market and the frustrated attempts to declare the operator with substantial power in the market may be the factor that explains the behavior of the prices of these services, which did not decrease between 2013 and 2017 (Figure 1).

Figure 1. Telecommunications Services Prices, 2009-2013 and 2013-2017.



	CPI	Fixed-line	Mobile	Broadband Internet	Pay TV
June 2009-June 2013	16.7%	-16.3%	-28.8%	5.2%	-13.4%
June 2013-June 2017	16.3%	-29.0%	-42.6%	9.3%	1.3%

The measures of the Reform and the decrease in prices.

With respect to the decrease observed mainly in mobile services and, to a lesser extent, in fixed line services, can be explained by regulatory measures, which have had a significant impact on the markets and on the prices of these services. The most relevant was the zero-interconnection rate and that the operators transferred these savings to prices to end users, in an environment of greater competition among operators. An additional factor that probably has an effect on the decrease in prices was the elimination of roaming charges by Telcel (América Móvil Group), the operator declared as the preponderant economic agent that provides its services with the network of greater coverage. The third factor has been the elimination of the long-distance fee.

However, at the beginning of 2018, the zero interconnection rates were eliminated by the ruling issued by the Supreme Court of Justice of the Nation (August 16, 2017), in favor of the América Móvil Group. The bases of the *amparo* (injunction) question the constitutionality of the law to regulate the rates.

The result of the Court's decision has been the application of the cost model in the estimation of the interconnection rate. By 2018, the result of the fixing of the interconnection rates was adequate, since although the interconnection rate was no longer zero, it was low and maintained the principle of asymmetry, leveling the playing field and favoring the smallest operators.

Nevertheless, there are no guarantees about the future interventions of the regulator that establishes the interconnection rates, there is uncertainty about the quality of the cost models that will be in place and the results of the lobbying, or the pressure margins to which the regulator will be subject, which will ultimately influence the estimation of interconnection rates in the future.

The Telecommunications Reform and the Universal Digital Inclusion Policy

Among the digital inclusion policies, as mentioned above, we find the Wholesale Shared Network program, which focuses on the development of a high-speed "carrier of carriers" infrastructure.

In addition, the Reform proposed the *México Conectado* Program, which consists in offering Internet access point in all public facilities in the country, including schools, clinics, health centers, government offices and public places. The proposed objective was to enable 250,000 access points (SCT, 2014). These two policies are presented in more detail below.

The Wholesale Shared Network

The objective of the wholesale shared network has been to promote effective access of the population to broadband communication and telecommunications services. The structure chosen to implement this policy was that of a public-private partnership.

The availability of driving traffic at a national level, with low rates, through this wholesale network, will create incentives for cable companies, mobile services and virtual mobile operators to offer additional telecommunications services, which, taking advantage of their capillarity, could offer coverage in remote communities that do not have telecommunications services to this day or that have been under-served in that regard.

Therefore, the Concession Bases issued by the SCT established that the participant would be the consortium that guaranteed greater population coverage, which must be equal to or greater than 85% in 2021 to progressively reach the maximum coverage offered in the year 2023.

In this Public-Private Partnership, the government contributed with the right of use and exploitation over the radio spectrum in the 700 MHz and the rights of use of a pair of fiber optic cables installed initially by the Federal Electricity Commission, which total about 30,000 kilometers.

The radio frequencies in this tender were more affordable, due to what the regulator calls the "regulatory load", which consists mainly of the conditions of social coverage required by the bidding of the participants, which, as mentioned above, seeks to privilege the operator or Consortium that offered the broadest coverage in unattended regions or with coverage gaps.

The main objective of the project is to provide network capacity to telecommunications operators and businesses so that they can offer voice and mobile Internet services from a next generation network such as 4G, 4.5G and, in the near future, the 5G network.

On March 21, 2018, the Wholesale Shared Network was deployed on time, with coverage of 32.2%. It is expected that by 2020, it will have a coverage of 50% of the population and in 2024, 92.2%, which implies a potential reach of approximately 110 million people (Expansión, 2017).

Policy measures to subsidize broadband Internet access and adoption by this population could play an important role. With this objective in mind, the México Conectado Program was launched.

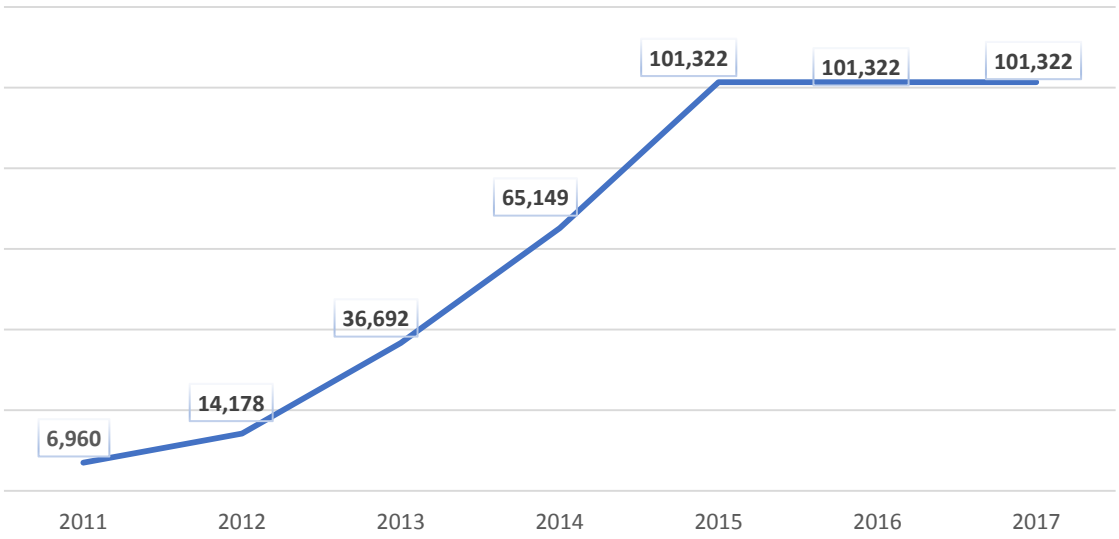
The México Conectado Program

Mexico Connected set itself the projective of providing broadband Internet to all public sites and spaces in the country, free of change. Initially, it aimed at providing connectivity to 250,000 sites and public spaces in the country, as schools, libraries, health centers, community centers, town halls, government offices, parks and public squares throughout the national territory. The original budget for this Program included a government investment of 18,600 million pesos, approximately 242 million US dollars (SCT, 2013).

In September, 2016 the goal of Mexico Connected to provide connectivity to 250 thousand sites in 2018, was reformulated for 2017, offering connection to only 150 thousand sites.

The last Activity Report of the SCT (2015-2017) reports 101,322 connected points or sites, that is, sites and public spaces with Internet services as of August, 2016, which accounted for only 40.5% of the number of sites that were originally proposed (250,000 points), of which 68% have broadband and 32% do not get to enjoy the speed of the broadband (narrow band, lower speed) (see Figure 2).

Figure 2. Mexico Conectado: Internet Access Points 2011-2017.



In 2017, 67% of the connected points of the program were schools (6.6%), government buildings; 9.5%, health institutions; 9.4%, public spaces; 7.4%, community centers, and 0.1%, research institutions (México Conectado, 2017). There is no doubt that access to broadband Internet in educational institutions will strengthen the quality of school education; however, the location of these access points limits the connectivity possibilities of the population that does not participate in school educational activities. This is also the case of the México Conectado points located in health institutions and research centers, thus reducing the number of access points that are truly public to 16.8% of these centers, which only accounts for 17,013 México-Conectado points of access. This number of public access points shows that México Conectado's offer is insufficient to meet the potential demand for broadband connectivity of 36.1% of the lower income population that still does not have access to this service, mainly in rural areas.

The abrupt interruption of this program is worrisome, since almost half of the households lack an Internet connection (47.1%, ENDUTIH, 2017). It is considered crucial to resume the policy of access to broadband Internet (México-Conectado), with special emphasis on the acquisition of digital skills by the population.

In the next section, we analyze the results of the Reform, in the adoption of telecommunications services. As mentioned above, the increased adoption of these services is the most reliable proof of the success of the regulations and policies associated with the Reform.

The Effect of the Reform on the Adoption of Telecommunications Services: Econometric Analysis

The question that this section intends to answer is to what extent the Telecommunications Reform (variable of interest or independent variable) has had a significant effect on the adoption of telecommunications services. This analysis focuses on the adoption of fixed line, mobile cellular, and fixed broadband services (dependent variables).

The analysis employs two econometric tools; the first one is the analysis of fixed effects, the second one is the synthetic control method. In the case of the first analysis, data were used in Mexico, the variables of interest or dependent variables are the changes in the adoption of fixed line, mobile cellular and fixed broadband services. The variable Telecommunications Reform (independent variable), is introduced as a dichotomous variable (dummy). Other control variables that participate in the analysis are: The Gross Domestic Product per capita and the Gini Coefficient. In addition, variables related to educational levels are considered, such as enrollment in upper secondary education and higher education, since education is a factor that facilitates the dissemination and adoption of information and communication technologies. Lastly, these models include institutional quality variables related to the quality of democracy (World Economic Forum, 2016; World Justice Project Rule of Law Index, 2019).

The synthetic control analysis allows us to compare the behavior of the adoption of fixed line, mobile cellular and fixed broadband services in Mexico, associated with the Reform, to the synthesis that results from the behavior of adoption of these same services in other economies with characteristics similar to those of Mexico, such as Argentina, Brazil, Chile, Colombia,

Ecuador, Paraguay, Peru and Uruguay. The difference between these countries was that a regulatory and public policy change like the Reform in Mexico did not occur in them.

The adoption of services in the analysis of fixed effects.

The model of fixed effects is expressed as follows, when it comes to analyzing the adoption of fixed-line services:

$$\delta\text{línea fija}_t = \beta_1 + \beta_2 \text{Ref}_t + \beta_3 \text{Edu1}_t + \beta_4\ \text{Edu2}_t + \beta_5\ \text{Pib}_t + \beta_6 \text{Gini}_t + \beta_7 \text{Insti}_t +$$

The model of fixed effects is expressed as follows, when it comes to analyzing the adoption of mobile cellular services:

$$\delta \text{mov}_t = \beta_1 + \beta_2 \text{Ref}_t + \beta_3 \text{Edu1}_t + \beta_4\ \text{Edu2}_t + \beta_5\ \text{Pib}_t + \beta_6 \text{Gini}_t + \beta_7 \text{Insti}_t + \varepsilon$$

Lastly, the model of fixed effects is expressed as follows, when it comes to analyzing the adoption of fixed broadband services:

$$\delta \text{broadband}_t = \beta_1 + \beta_2 \text{Ref}_t + \beta_3 \text{Edu1}_t + \beta_4\ \text{Edu2}_t + \beta_5\ \text{Pib}_t + \beta_6 \text{Gini}_t + \beta_7 \text{Insti}_t + \varepsilon$$

In these models, each of the variables [or factors] expressed are defined below:

Δfixedline[línea fija]$_t$ = Number of fixed line service subscriptions per 100 people.

δmov_t = Number of mobile cellular service subscriptions per 100 people.

$\delta \text{broadband}_t$ = Number of broadband subscriptions per 100 people.

Ref_t = La presence or absence of the Telecommunications Reform (dichotomous variable or "dummy variable").

Edu1_t = Upper secondary education enrollment.

$Edu2_t$ = Higher education enrollment.

Pib_t = Domestic product per capita at constant market prices.

$Gini_t$ = Gini Coefficient.

$Insti_t$ = Index of the quality of democratic institutions and the rule of law.

The Reform, and the adoption of telecommunications services: results of the fixed-effects analysis

The analysis of the effects of the Reform on the adoption of fixed line, mobile cellular and fixed broadband services shows that the institutional, regulatory, and digital inclusion policy changes associated with the Reform have not had a significant effect on the adoption of telecommunications services, as can be seen in the following (see Table 5).

Table 5. Fixed line, mobile and broadband adoption in Mexico.
Fixed Effect Analysis

	Teledensidad de línea fija (por 100 personas)	**Celular móvil teledensidad (por 100 personas)**	**Banda ancha teledensidad (por 100 personas)**
Reform	-1.59** (-5.35)	7.16 (0.15)	-1.58** (-5.51)
GDP per-cápita	0.056 (0.23)	0.056 (0.23)	5.49E-07 (1.34)
Gini-Coefficient	-0.0005** (-2.01)	-0.78 (-0.92)	-0.017** (-2.36)
Secondary enrollment	2.71E-08 (0.16)	2.04E-06 (0.16)	1.07E-07 (0.68)
Higher education enrollment	1.46E-07 (0.47)	3.15E-05** (6.03)	1.39E-06** (4.75)
Quality of Mexican institutions: democracy and rule of law	1.98** (4.61)	9.16* (1.92)	1.25** (2.78)

On the effect of the control variables, the analysis identified that the GDP (PIB, as per its acronym in Spanish) per capita has no effect on the adoption of services. In contrast, the distribution of income (Gini coefficient) has a significant effect in the case of fixed line and mobile broadband services.

Regarding the effect of the educational variable, only the higher education level was found to have a significant effect on the adoption of telecommunications services: fixed line services, mobile cellular, and fixed broadband services.

Higher education and income distribution are then the variables that explain the adoption of mobile and broadband services. Additionally, the variable enrollment in higher education nor only accounts for greater human capital, but also income. In fact, the higher education level in Mexico is correlated to the income of families (Barceinas, s/f).

In sum, the result of this analysis shows that the Telecommunications Reform and price reduction, which has been the most outstanding result of this regulatory and public policy Reform, have not had an impact on the adoption of mobile cellular services; nor has it affected the adoption of fixed line and broadband services.

Two possible interpretations can be advanced to the lack of dynamism in the adoption of services by the population. In terms of supply, one of them may be that the decrease in prices (in mobile and fixed line services) was not enough to ensure the affordability of services by the lower income population (in 2017, the population in poverty, according to the observation, in Mexico amounts to 53.4 million people, which accounts for 43.6% of the population. (See Coneval, 2018).[5]

Another possible explanation to the lack of adoption of the services is that there has not been enough supply thereof due to the deficiencies in the development of infrastructure. In remote regions or with complex orography, which are regions defined as high cost, is where the lower income population often lives and it is in these regions that the infrastructure to offer services is often not yet available. These two factors, on the supply side and on the demand side, often appear together, that is, the services are not accessible to the population and there are also deficiencies in the development of the infrastructure.

[5] Data from 2016 is the latest available.

Next, we present the results of the second econometric analysis based on the synthetic control that that puts into international perspective (Latin America) the effects of the Reform in the adoption of telecommunications services.

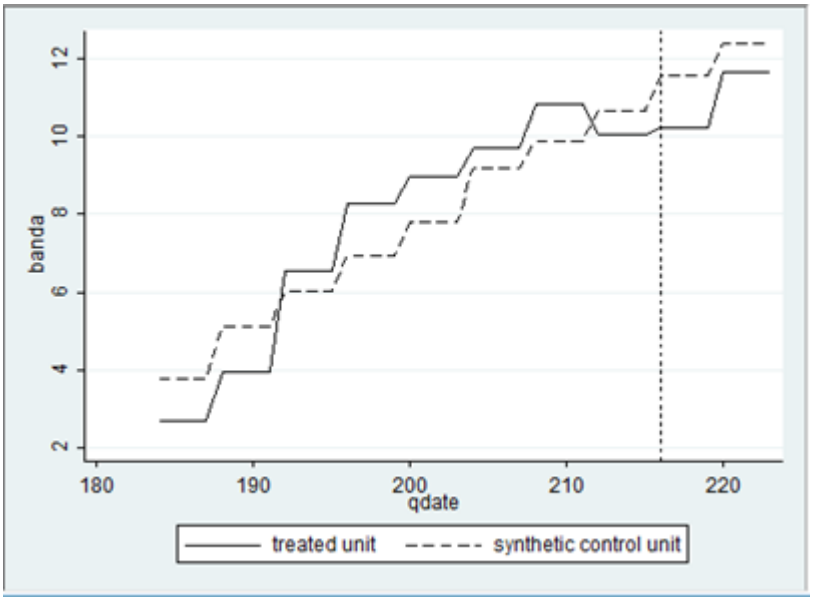
The Reform and the adoption of telecommunications services: results of the synthetic control analysis

In addition to the analysis of fixed effects, the effect of the Telecommunications Reform on the adoption of services was estimated, comparing the performance of Mexico to the performance in the adoption of these services in other Latin American countries, using the *synthetic control analysis*.

Fixed line services

The exercise of synthetic control for fixed lines confirms what was observed in the analysis of fixed effects. The gap between the real series ("treated") and the theoretical series ("synthetic") shows that the Reform had no effect on the adoption of fixed lines in Mexico, when the quarters prior to the Reform are contrasted with the quarters immediately after it (see Figure 3).

Figura 3. La Reforma y la adoption de servicios de línea fija (análisis de control sintético).



Additionally, the behavior of the real variables shows a lower adoption of fixed lines in Mexico than expected, taking into consideration their economic, educational and institutional characteristics (GDP [PIB] per capita, Gini, higher education enrollment and institutional quality: democracy and rule of law).

It is possible to put these findings into perspective if we take as reference the Affordability index of the telecommunications services, prepared by the World Economic Forum, which shows that, despite the fact that this variable improved in Mexico between 2013 and 2016 before and after the regulatory intervention of the Reform (going from place 87 in 2013, to place 54 in 2016 (Baller et al, 2016). This improvement was not reflected in a significant increase in the adoption of fixed lines.

Mexico ranks third in terms of the decrease in the number of lines, among the countries to which it is compared (see Table 6).

Table 6. The effect of the Telecommunications Reform on the adoption of fixed lines per 100 inhabitants (Teledensity), 2013-2016.

Country	**2013**	**2016e**	**2013-2016**
Uruguay	30.8	31.6	2.8%

Argentina	23.3	23.0	0.0%
Brazil	22.5	22.3	-0.6%
Chile	19.0	18.6	-1.9%
Mexico	16.2	15.5	-4.4%
Ecuador	15.2	16.1	5.6%
Colombia	14.8	13.5	-9.0%
Peru	10.6	10.4	-1.3%
Paraguay	10.4	5.7	-11.6%

World Bank Database, 2017.[6]

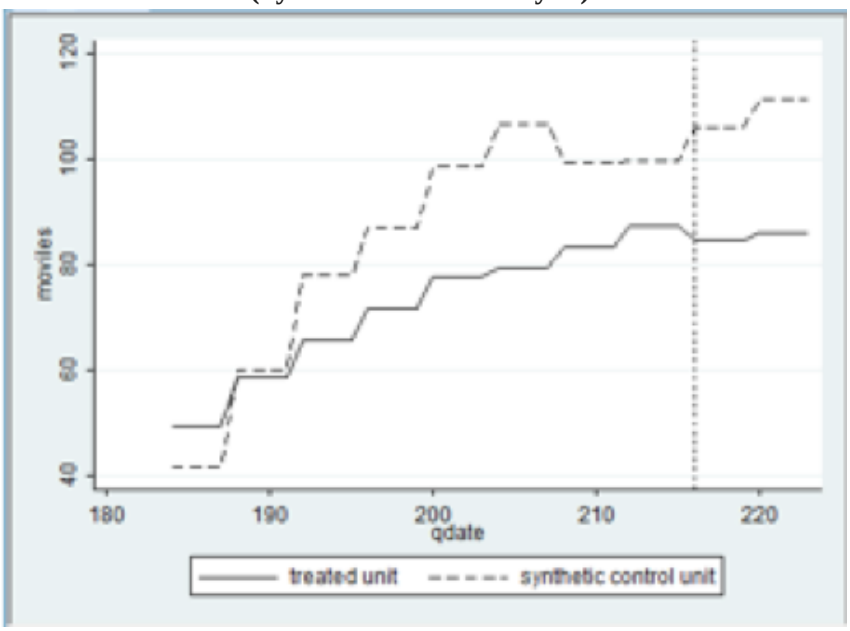
In Mexico, the number of fixed lines decreased by 6.2%, if the number of lines per 100 people is taken as a metric (World Bank,2017). However, if the metric of lines per household is adopted, the number of lines registers a slight increase due to the entry of new companies offering this service (IFT, 2013-2017).

Mobile cellular services

In a similar fashion to the case of fixed line services, mobile cellular services, regulations and public policies introduced by the Reform did not have an effect on the adoption of these services, notwithstanding the fact that cellular mobile services were the ones that recorded a higher price decrease. The synthetic control analysis presents a total discrepancy between the real series ("treated") and the theoretical series ("synthetic"), for most periods (2006-2016, (See Figure 4).

[6] The estimation of fixed line teledensity (services per 100 people) was due to its possibility of making comparisons with the other Latin American countries in this analysis.

Figure 4. Reform and adoption of mobile cellular services (Synthetic control analysis).



Although the prices of these services decreased, this was likely not enough to ensure the affordability of these services to a still majority segment of the unattended population. In Mexico, the adoption of cellular services is lagging behind when compared to the other countries in Latin America, with the exception of Ecuador.

Additionally, as mentioned before in the case of fixed lines, it is likely that these results are due to the fact that there has not been sufficient infrastructure development to ensure the supply of these services in cities with smaller population and in rural areas.

Taking as perspective the changes observed in the teledensity of mobile cellular services, as discussed in the previous paragraph, although in 2013 the teledensity was 87.8, in 2018 it increased only to 94.

Table7. mobile cellular services teledensity (services per 100 people) in Mexico, 2010-2017.

2010	88.3

2013	87.8
2014	85.0
2015	89.0
2016	90.0
2017	91.1
2018	94.0
Growth 2013-2018	7.1 %

IFT, BIT: 2019.

Teledensity in cellular services in Mexico is at clear disadvantage when compared to the teledensity reached by countries with an average income similar or even lower than that of Mexico, as shown in the following Table with data from 2017 (Table 8).

Table 8. Teledensity of mobile cellular services subscriptions comparisons, 2013-2016

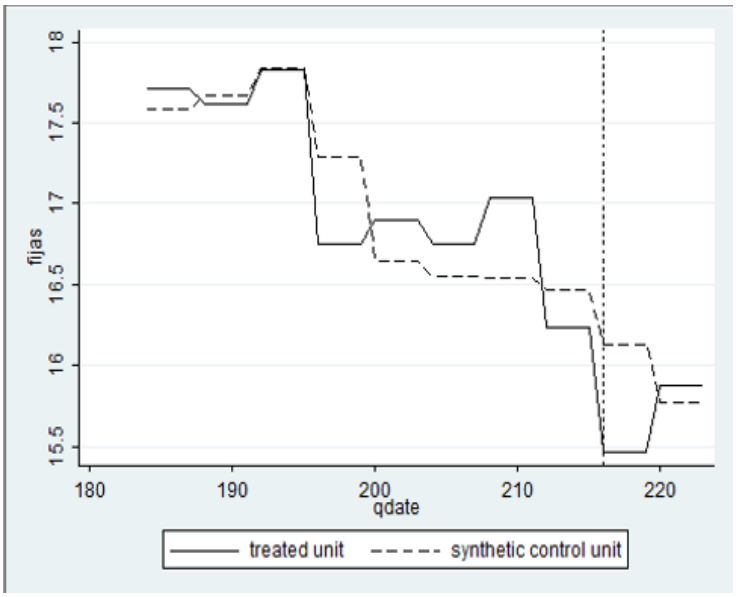
Country	**2013**	**2016**	**2013-2016**[1]
Argentina	162.5	150.7	-7.3%
Brazil	135.3	118.9	-12.1%
Chile	134.3	127.1	-5.4%
Colombia	104.1	117.1	12.5%
Peru	98.1	117.1	19.4%
Paraguay	103.7	104.8	1.2%
Uruguay	154.6	148.7	-3.8%
Mexico	**87.3**	**90.0**	**3.1%**
Ecuador	105.6	84.3	-20.2%

Our estimates based on IFT, 2016 and ITU Database. The estimates are for 2016 to allow International comparisons.

Fixed broadband services

The results of the analysis of fixed effects and of the synthetic control analysis coincide in showing that there is no significant relationship between the regulatory and public policy measures that are part of the Reform, and the increase in the adoption of fixed broadband services. The synthetic control analysis shows a discrepancy between the real series ("treated") and the theoretical series ("synthetic"), for most periods (2006-2016) (see Figure 5).

Figure 5. The Reform and the adoption of fixed broadband. (Synthetic control analysis).



In 2016, the Reform has not yet altered the trend of lower relative penetration of access to fixed broadband services. In the case of mobile broadband services, Mexico is below other countries in Latin America with a similar development, such as Brazil, Chile, Argentina and Uruguay. However, access to this service is slightly higher that the average for Latin America and the Caribbean, which brings together 41 countries with a very diverse level of development (12.3 in Mexico vs. 11.2 in Latin America).

Teledensity in access to fixed broadband in Mexico shows a lag in relation to countries in the regions of Europe and Central Asia, whose per capita income is very similar to that of Mexico. However, in Mexico it is very similar to the average of the countries of the Middle East and North Africa. Broadband connections in Mexico show a slight advantage when compared to the number registered by countries with smaller economies in Eastern and Pacific Asia, South Asia, Sub-Saharan Africa and the average in the countries of Latin America (see Table 9).

Table 9. Teledensity of fixed-telephones, mobile cellular and fixed broadband subscriptions, 2017.

Region	Fixed-broadband subscriptions per 100 inhabitants, 2017[1]	GDP per cápita 2017[2]

Mexico	13.3	17,336.5
Latin America	11.8	9,166.0
Europe & Central Asia	18.1	17,221.9
Eastern and Pacific Asia	8.1	10,981.6
South Asia	12.8	8,732.8
The Middle East & North Africa	8.6	18,290.5
Subsaharian Africa	4.7	16,895.3

IFT, 2018;World Bank, 2018.

The greatest relative teledensity of fixed broadband subscriptions in the case of Mexico is partly explained by the offer of Internet services by private operators, which in 2018, in 98.9% of cases, was broadband (Endutih, 2018).

To conclude, the constant in the previous analysis of fixed effects and synthetic control over the adoption of telecommunication services (fixed line, mobile cellular and fixed broadband) coincides in sowing lower adoption of fixed line services, mobile cellular and broadband in Mexico. This happens when compared to the teledensity reached by other countries in Latin America that participated in this analysis.

The low relative penetration is not only found in the comparisons with other countries of the region in this analysis, similar results are also observed when this comparison is made with developing countries with levels similar to those of Mexico.

The most evident lag is in the adoption of mobile cellular services and to a lesser degree in fixed line services. In contrast, this lag is not evident when the comparison is made with the countries of the Latin American region as a whole; since it comprises 41 different countries with different levels of economic development (see Table 9).

In sum, the results of the two analyses, the one of fixed effects and the one of synthetic control, show that the problem of low adoption of services in Mexico has not yet been reversed by the Telecommunications Reform (2013-2018).

The regulatory changes associated with the Reform have not yet been translated into greater competition in the markets for these services and at affordable prices for a large group of the population. Additionally, between 2013 and 2018, the Reform has not created enough incentives for a greater development of infrastructure in regions that do not have coverage or is still insufficient.

Conclusions: The Telecommunications Reform in Mexico: Regulation, Competition and Digital Inclusion

In this new institutional environment, substantive measures were implemented to promote competition through the statements of market power by sector, through the preponderant economic agent status. In March 2014, the América Móvil Group and the Televisa Group were declared preponderant and subject to asymmetric regulation, which would lead to leveling the playing field, favoring competition.

The analysis of the structure of the telecommunication services markets shows that the concentration levels of the América Móvil Group have slightly, and those of Televisa in the pay TV service have not changed. Furthermore, these Groups continue to maintain a share equal to or greater than 60% of these markets.

Only in the case of fixed broadband, the market share of Telmex-Telnor (América Móvil) decreased moderately to levels below 60% (56.1%). This is due to the competition represented by the participation of the Televisa Group in this market, offering broadband services or bundled services ("triple play") that include broadband Internet services.

Regarding the market power of the Televisa Group in restricted TV and radio, the statement by the IFT to Televisa as an economic agent with substantial market power is still pending.

Another problem that could represent a setback in the policy of promotion of competition, could be due to the estimation of the interconnection rate in the networks of the preponderant economic agent (AEP, as per its acronym in Spanish). In 2018, the interconnection rates

turned out to be adequate, fostering competition and maintaining the principle of asymmetric regulation intact.

The study concludes the decision of the SCJN, on the one hand it strengthens the mandate of the IFT as arbitrator of last resort in the decisions of the rate and of the technical, economic, and legal conditions that govern the interconnection. But on the other hand, questions are raised about the future interventions of the regulator and the pressure or lobbying margins to which it will be subject, which will influence the results of the application of the parameters in the cost models and in the estimation of interconnection rates in the future.

The analysis of the latest events surrounding Televisa's participation and share in the Pay TV and radio markets, and the resumption of collection of the interconnection fee suggest that, even within the framework of the law, the interests of the operators that were declared preponderant economic agents can challenge regulatory measures for the promotion of competition.

The impact of the reforms designed to foster competition in the telecommunications and broadcasting service markets will take time to mature and show results, through the greater participation of other companies or operators other than those operated by the preponderant economic agents; América Móvil and Televisa.

Nevertheless, it is possible to say that in the markets of the sector they have raised the levels of "contestability" that refers to the real possibility or credible threat about the participation of new contenders in the market, which makes current participants behave competitively. This "contestability" is due to the strength of the institutional environment associated with the Reform, responsible for defining and implementing the regulations and policies of the sector, including those related to the promotion of competition.

The theory of contestability goes beyond the perspective of perfect competition, stating that the threat about the entry of new players is a sufficient incentive for market participants to gradually adopt a competitive behavior (Willing, 2008;Baumol, 1982). The measures that may favor greater competition reside in the achievement of an effective policy of functional

separation.

The most critical pending issue is the adoption of telecommunication services, since, a better quality of life of the population and a higher growth of the economy depend on the adoption of such telecommunication services.

The two econometric exercises consistently confirm that the institutional, regulatory, and digital inclusion policy changes associated with the Reform has not yet had a significant effect on the adoption of telecommunications services. The gap is particularly evident in the case of mobile cellular services, in which Mexico shows an important lag.

The second pending issue is access to broadband Internet, due to its positive effects on economic development and as a factor that contributes to well-being, and to the overcoming of poverty. It is essential to resume the policy of access to broadband Internet (México Conectado).

Lastly, the social policy in telecommunications has not been able to reverse this trend of lag in the adoption of telecommunications services among low-income families in the country. The findings on the limitations of this social coverage policy lead us to conclude that the government faces difficulties in offering an adequate response through a public policy of digital inclusion that responds to the connectivity needs of the population living in poverty.

The future implementation of this policy requires active and committed management, with clear objectives, set goals to be periodically evaluated, and accountability on the results ("governance"), which acquires special relevance in Mexico, in the context of the slow growth in the adoption of services and lag in the adoption of services, compared to the achievements of other countries with development levels similar to those of Mexico.

The real test of the effectiveness of the Reform will be whether it generates genuine competition in the sector, in a sustained manner, as well as predictable effects on the quality and prices of telecommunications services. These effects will result in the adoption of the

services by an increasingly larger sector of the population. The test will also be whether the objectives of the digital inclusion policy, supported by the *Wholesale Shared Network* and the *México Conectado Program*, are properly and completely fulfilled, with a budget that is aligned with its objectives, a design that guarantees feasibility/viability, and qualified personnel to facilitate the acquisition of digital skills.

The continuity and sustainability of the Reform require that institutional change be sustainable, not only in the field of telecommunications and broadcasting. In the short term, the successful implementation of a policy that raises the quality of education cannot be postponed. Raising the levels of education of the population is, unquestionably a facilitator in the adoption of information and communication technologies and in the establishment of virtuous circles between the adoption of information technologies, education and continuous training. The optimal interaction of these two policies will have an impact on productivity, welfare, citizen participation, and the comprehensive growth of the economy.

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