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Spectrum Auction Tragedies: the case of the Mexico spectrum auction for AWS services.

Ramiro Tovar Landa¹

Instituto Tecnológico Autónomo de México

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Abstract

Last July 19th the Mexican Federal Government concluded the auction of the 1.9/2.1 GHz band blocks for Advance Wireless Services (AWS). The auction design and the spectrum cap imposed by the Federal Competition Commission led to the participation of only one bidder with a price at the minimum posted by the government for one of the two national coverage blocks put to auction. The remaining national block was not assigned because no bidders qualified and a third block identical to the national blocks was divided in 27 regional blocks but the auction final value was 28 times the minimum posted price for the national block. The social cost and the implicit subsidy generated by the auction result obey to an industrial policy in telecommunication oriented to pick winners and modify the market structure from the regulators goals instead of the market evolution.

Keywords: Spectrum, Auctions, Mexico, Regulation, Competition Policy

JEL Classification: H82, L51, L96, P14, P32, Q28

The 1.9/2.1 GHz band spectrum auctions, by simultaneous ascendant bids, offered by the Federal Government for Advance Wireless Services (AWS) ended last July 19th. AWS will include advanced applications of the current 3G services and a new generation of high-speed broadband (LTE). The auction consisted on two blocks of 30 MHz each with national coverage and 27 blocks of 10 MHz each with regional coverage, distributed into 3 blocks in each of the 9 regions the national territory was divided in. This would increment the spectrum used in the

¹ Ramiro Tovar Landa is an economic competition and regulation consultant, Tenure Professor and Advisor for the Instituto Tecnológico Autónomo de México Rector Office.

telecommunications market from 120 MHz to 210 MHz which is still inferior to Chile (260 MHz), Brazil (350 MHz) and Indonesia (260)². At the auction end only were allocated 60 MHz instead of 90 auctioned therefore the spectrum in use raise to only 180 Mhz.

Mobile phones “traditional” frequency bands (850 MHz, 1900 MHz) are being used by existent networks (AMPS/DAMPS, CDMA and GSM). Therefore, there is no available spectrum to develop 3G³ and 4G networks (UMTS/HSPA or LTE), which requires a broader band. Consequently, the industry tends to develop 3G and 4G Networks in new frequencies, such as 1.7 / 2.1 GHz (AWS) or 700 MHz where the broadband is enough for multiple new and existing operators to implement networks allowing the massification of broadband services with an extensive coverage.

The auction resulted in a deserted national block of 30 MHz for which there were no bidders, and the rest of the national block was authorized to one bidder, Televisa-Nextel⁴, acting as a group and who offered the

² The spectrum usage in United States is 593 MHz, in Canada is 265 MHz, and in Spain is 358 MHz.

³ Until before the auction only one operator, Telcel, had spectrum to offer 3G.

⁴ Grupo Televisa S.A. is the largest media company in the Spanish-speaking world, and a major player in the international entertainment business. It has interests in television production and broadcasting, programming, direct-to-home satellite services, publishing and publishing distribution, cable television, radio production, show business, feature film and internet portal. By its cable systems is the second biggest triple play provider in Mexico with coverage in 77 cities included Mexico City and Monterrey Metropolitan areas.

minimum initial amount. Regarding the regional blocks, Telcel⁵ obtained 21 blocks distributed in the 9 regions, whereas Telefonica⁶ got only one block in each region of a group of six regions. The deserted block had no bidders due to the restrictions of spectrum accumulation, and not for the lack of interest in the market. Obviously, the minimum of 180.3 million pesos (13.9 million USD) prevailed for a national coverage block in the 1.7 GHz band, which ended in favor of Televisa-Nextel.

Similar to what happened in the assignation of dark optic fiber from the Federal Electricity Commission (CFE *as per its abbreviation in Spanish*); only one bidder obtained it with the minimum possible amount. The bidder who obtained it was a group of investors integrated by Telefonica, Televisa and Megacable⁷. Mexico government auctioned more than 12,000 miles of dark optical fiber along the public electricity transmission network. The concession was awarded for 20 years to the only legal bidder, a joint bid made by a consortium formed ad hoc (Telefonica - Megacable - Televisa). The lack of competitors in the auction generate a winner bid equal to the minimum value established, 68 million USD. Also the selection process was questioned because left out a potential bidder related to the third cellular operator and to the second national TV broadcaster, and mainly because the competition

⁵ Telcel is the brand name in Mexico from America Movil. It is the main mobile telecommunications provider with a market share of 71%.

⁶ Telefonica operate in Mexico under the Movistar brand name, Movistar is the second mobile network with a market share of 21%.

⁷ Megacable Holdings SAB, Mexico's biggest cable-TV provider with coverage in 231 cities and is the main triple play provider in Mexico.

authority approved the consortium joint bid which otherwise would have been separate competitors in the auction.

The government needs to know how highly the operators value the spectrum blocks if it is to allocate spectrum efficiently. A bid reveals approximately the bidder's valuation, in fact the bid underestimate value, since the bidder is bidding for some profit. Bids are quite close to value if there are enough bidders to generate significant bidding competition and bidders are confident of their estimates. An auction, therefore, is not just about raising money; it reveals information about how valuable the spectrum blocks are and which bidder values it the most.

The Mexico spectrum auction was distorted by regulators to such level it was no useful to efficient allocation and to reveal value in the two national blocks and therefore raise the values in the third block divided regionally because the design was equivalent to a spectrum shortage by entry barriers to compete for the national blocks. For determining the competition absence effect in the national block, we could use the values resulting from biddings in the third block, which was divided regionally, and in three fractions of 10 MHz per region. If we ask what would the auction value have been for duplicating the national coverage of the Televisa-Nextel block formed by regional blocks? The answer, considering the same band and the same 30 MHz, is \$5,067.7 million pesos (389.8 million USD). That is to say, that Televisa-Nextel would only pay 3.6% of the value the same auction indicated for the national

block in the same band and with the same broad in MHz, or the equivalent to 4.7% regarding the value of the same broadband but only in region 9 which covers the Federal District and the federal states of Mexico, Hidalgo and Morelos, the most populated region and with the highest income in Mexico. The difference comes from not having competition in the national block and from having, in the regional blocks, a competitive environment with at least two identified competitors: Telcel and Telefonica.

The block obtained by Televisa-Nextel gives 30 MHz for each of the nine regions simultaneously. In other words, it includes 8 additional regions, and 30 MHz in region 9, which is the most important region. When contrasting the value of the same region based on the same auction but in a competitive environment in regional blocks, we observe something ridiculous: the value paid only for region 9, \$3,795.5 million pesos is 21 times over the one offered to pay for the whole national territory. In terms of the MHz value per capita, it is US\$0.38 for region 9, and for the whole national territory Televisa-Nextel offered only US\$0.0005 due to the competitors' absence.

Auction 21 Statistics (1.9 / 2.1Ghz)			
	Televisa-Nextel	Telcel	Telefonica
Total of Regional MHz	270	210	60
Price resulting from the bidding (MX pesos millions)	\$180.3	\$3,793.9	\$1,273.9
MHz Price per capita	\$0.0065 (US\$0.0005)	\$0.1749 (US\$0.01345)	\$0.3045 (US\$0.0234)

The table above shows that when considering the 9 regions, Telcel and Telefonica acquired fractions of a national block break up into regional sections but equivalent to the Televisa-Nextel acquisition for an increased amount of \$5,067.7 million equivalent to \$0.1818 pesos per MHz per capita, 28 times above the payment per MHz per capita that Televisa-Nextel offered for a similar block.

The auction results in an equivalent of set-aside spectrum to Televisa-Nextel. This set-aside is equivalent to an ex ante subsidy, rather than directly giving the entrants money, the government creates the same effect by limiting the potential range of bidders and hence manipulating the price of the license downwards. In fact the Televisa-Nextel venture is not an entrant because Nextel is the fourth wireless operator in Mexico it has about 4% of the market, mostly higher-end users, allowing it to earn more per contract than most of its rivals. Televisa acquired a 30% stake in Nextel Mexico, a unit of NII Holdings just before the auction process start.

In The United States a similar auction took place in August, 2006, which concluded a month later after 161 rounds. The auction was for 1,087 licenses in blocks per regions for the same frequencies and for the same service (AWS). It generated a net income of 13.7 billion dollars. In the areas with more than 250 thousand inhabitants approximately 0.53 dollars per MHz per capita were paid. Historically, in the United States, the values of auctioned spectrum have had a wide range, from \$0.15 per

MHz per capita in 1999 up to \$4.74 per MHz per capita in a sale between NextWave and Verizon Wireless of 10 MHz in New York, always in a competitive environment. However, in Mexico, the national block, with the participation of only one bidder is 0.0046 dollars per MHz per capita (118 times less than the US average), while region 9 was US\$0.38 (82 times above the price offered for the national coverage block).

When comparing internationally the price per MHz per capita the most similar auctions should be taken into consideration, that is: for the same frequency, for the same use, and adjusted by population and per MHz amount. The metrics are internationally known and several authors use the same metrics in their comparatives, as well as all the international spectrum valuation companies⁸.

The gross domestic product (GDP) differential per capita between United States and Mexico is 3.25 times according to OECD's statistics. Even considering the variations in investment rights and liabilities for the US⁹, there is no other way to explain the difference except for the competition absence during the bidding: A differential of 115 times between the value per MHz per capita and the amount paid for the same spectrum and the same use in United States and Mexico and for the case of the national coverage block of 1.7Ghz.

⁸ Madden, G., Saglam I., y Morey A., "Auction Design and the Success of the National 3G Spectrum Auctions" and Global View Partners, "Momentum Building in the AWS Band". May, 2009.

⁹ Madden *et al.*, provide empiric evidence on the effect of several variables on price per MHz per capita, using a sample of 21 international auctions between 2000 and 2007: to more income, more population and more Lifetime of the concession, the higher the price per MHz per capita. Nevertheless, annual fee right payment for the exploitation of the spectrum had not a statistically significant result.

PCS and AWS Auctions in United States

Auction	Date	Spectrum	Revenue	Price/ MHz-POP
PCS A and B Block	1994	40 MHz	\$7,721,103,797	\$0.76
PCS C Block	1995	30 MHz	\$10,071,708,841	\$1.33
PCS D, E and F Blocks	1996	30 MHz	\$2,517,439,565	\$0.33
AWS Auction	2006	90 MHz	\$13,700,267,150	\$0.53

Source: FCC, KB Enterprises LLC.

AWS Auctions in Canada

Auction	Date	Spectrum	Revenue	Price/ MHz-Pop
PCS	2001	40 MHz	\$1,481,920,000	\$1.23
AWS	2008	90 MHz	\$4,177,503,000	\$1.55
PCS Expansion	2008	10 MHz	\$74,681,077	\$0.13

Source: Industry Canada, KB Enterprises LLC.

The Anticompetitive Effect of Limiting the Spectrum Possession

The main objective of establishing limits to the broadband is to maximize the number of operators in order to avoid the existence of market power. Nonetheless, such limit implies an inevitable cost that is the loss of efficiency that could otherwise be obtained for accessing a broader band. Such efficiency would necessarily mean a competitive effect and a higher consumption due to a greater offer and quality of the wireless broadband service (quality measured by latency, delay and error parameters in the data packages).

The regulation of 80 MHz per operator must be eliminated or substantially relaxed if its permanence implies a net cost. That is to say, that the effectiveness of the regulation in increasing the number of operators has a lower benefit than the market cost for the efficiency loss among operators, who could incur in lower costs in the absence of such

regulation, as long as their minimum efficient scale implies a broader band than the top established. On the other hand, an opportunity cost for the user as he could have better quality and more broadband services for mobile access.

The social cost of limiting the broadband is represented by: i) the possibility that the minimum efficient scale, of at least one operator, exceeds the spectrum limit established, and ii) the addition of the efficiency losses for the operators and the reduction of the user comfort for having restrictions on the quality and service variety offered for wireless access.

In the *“Program for frequency bands of the radio electric spectrum for determined uses that could be subject to public auction”*, published by the Ministry of Communications and Transportation (SCT *as per its abbreviation in Spanish*) in the Official Gazette of the Federation (DOF) on March 31, 2008, the regulatory authorities defined for the band 1710-1770/2110-2170 MHz two blocks of 20 MHz and five blocks of 10 MHz for each of the nine PCS regions. Nevertheless, the bases for the auction (auction 21) modified such segmentation and were defined by the COFETEL with the favorable opinion of the Federal Commission on Competition (CFC) as follows:

i) A maximum spectrum accumulation limit of 80 MHz adding the possessed spectrum and/or granted as a concession in the following bands: 806-821/851-866 MHz, 824-849/869-894 MHz, 1850-

1910/1930-1990 MHz and 1710-1770/ 2110-2170 MHz, at the end of the corresponding auctions.

ii) Modification of the originally established blocks in order to define them in two national blocks of 30 MHz each and only three blocks of 10 MHz for each of the nine PCS regions in the country.

The objective of having a spectrum accumulation limit is to avoid monopolized practices in the future, by the operators who could act as dominant operators by having more spectrum and stopping the entrance to new competitors. However, the preventive policy have had the opposite effect, it has elevated the operating cost in front of a great demand of broadband which requires more spectrum. The operators from United Kingdom and United States have more spectrum than the current limit established in Latin American countries like Mexico. For the reasons above mentioned, eliminating or substantially incrementing the spectrum accumulation limit has been chosen in developed countries (in 2003, United States eliminated the limit of 55Mhz), as shown in the following table:

Europe, United States and Mexico		
Country / Region or Operator	Accumulated Spectrum per Operator (MHz)	Regulatory Spectrum Limit Existence
European Average	92.6	No
Germany	65	No
United Kingdom	82.2	No
France	138.5	No

Italy	72.7	No
Spain	100.6	No
Sweden	92	No
Denmark	118.4	No
Mexico	80	Yes
US- Verizon Wireless	National Average: 89	No
US- AT&T	National Average: 96	No
US- T-Mobile	National Average: 75	No

Source: Arthur D. Little, December 2008.

Internationally, a competition policy which acts upon the really current practices has prevailed in order to avoid being over restrictive. As such limits are established discretionally and with a lack of information on what would be the market evolution and its technologic requirements, the limit established by Federal Telecommunications Commission (COFETEL) following the recommendation of the Federal Competition Commission (CFC). The cap was discretionary and was incompatible with the demand expectations for spectrum for mobile broadband services in the years to come. The limit was incremented 15 MHz when the technical recommendation for Mobile broadband of over 300 Mbps with LTE technology is 40 (2x20) MHz at least¹⁰.

But the social immediate damage was caused in the auction process by stopping the concurrence entrance to the auction of national blocks in

¹⁰ *Emerging Technologies and Their Implications on Regulatory Policy*, Ericsson, ITS Biennial Plenary, Montreal, June 25th. 2008.

two ways: i) subsidizing Televisa-Nextel giving it the exclusive of being the only bidder for a national block, which allowed it to present and keep a price substantially under the market price, which would have been a price in a competition environment of free concurrence; and ii) preventing the entrance to potential bidders for the remaining regional block, which by being deserted it significantly restricted the offer or supply of available spectrum for the business use in the country.

Only by observing the amounts in the 86 rounds of auction 21, we can corroborate that Televisa-Nextel did not have the need to increment their initial bid (round 1) of 180.3 million pesos due to the lack of competition in that block, and to the fact that the other block had no bidder. This contrasts with the amounts offered for the rest of the regional coverage blocks. For example, only for 10 MHz in region 9, after round 86, a bid of \$1,059.5 million pesos (81.5 million USD) was observed, while round 1 bid was of 24 million pesos (1.8 million USD). So, due to the competition among the bidders in that block, the initial value increased more than 44 times.

Therefore it is demonstrated that regulatory authorities, like Federal Competition Commission and Federal Telecommunications Commission, make the common mistake intended or unintended, known by economics literature but ignored by regulators, of regulating the specifics in such way that it provokes a social damage due to its inherent disadvantage of not having the information about what the market really requires. It is more likely to have anticompetitive effects

with a mandate of an authority, acting preclusive manner, rather than letting the private companies follow their course by acting freely in the market.

Both regulators justify the spectrum cap and the bias in favor to the Televisa-Nextel arguing the relative high concentration in the Mexican mobile market in the OECD¹¹. But this superficiality approach ignore Measurements based upon market shares are poor indicators of the level of competitive pressures in the wireless market. The industry is fast growing and driven by technological innovation. Hence, the traditional method of assessing competition is inadequate. On the contrary, the current measurements, a few large firms surrounded by a competitive fringe, could be an indicator that the competitive pressures are relatively intense. Basing policy decisions on a measurement that could over-estimate or under-estimate the level of competition in telecommunications is obviously less than ideal¹².

Public Finances Damage Due to 1.7 GHz Band Auction's Design.

The concessionaires of 1.7 GHz band will enjoy an almost two year period with no rights payment for the spectrum assigned from auction 21, thanks to the Act by which several provisions are reformed, added

¹¹ Mexico has at 2009 a 5,537.7 in the Herfindahl Index scale but has the average revenue per minute of \$0.06 USD close to the \$0.04 USD in the US and efficient use of spectrum, subscribers served per MHz of spectrum allocated of 661,666 more than the US which is 660,073 (CTIA and Glenn Campbell, et al., "Global Wireless Matrix 1Q09", Merrill Lynch June 2009).

¹² Boyer, M. "Optimal Policy Relative to Spectrum Auction", Montreal Economic Institute, May 25, 2007

or abolished from the Federal Law of Rights published in the DOF on November 27, 2009. According to this Act winning bidders of the 1710-1770/2110-2170 MHz band spectrum will pay the corresponding rights for the use, profiting or exploitation of such spectrum from:

- I. January 1st, 2012, when the corresponding concessions are delivered no later than November 30, 2010.
- II. January 1st, 2013, when the corresponding concessions are delivered after December 1st, 2010.

According to Article 244-E of the current Federal Law of Rights (LFD *as per its abbreviation in Spanish*), all concessionaires obtaining band spectrum will have to pay the corresponding rights for its use, enjoyment, profiting or exploitation. Therefore, Televisa-Nextel cannot say that it would pay a higher price than the others, because even the established rights in such law for 1850-1910/1930-1990 MHz band are the same (Article 244-E).

For the rights payment exception, Televisa-Nextel will save:

- \$1,352 million pesos (104 million USD) for the 30 MHz with national coverage, if the concession license is granted on August 1st, 2010.
- \$1,909 million pesos (146.8 million USD) for the 30Mhz with national coverage, if the concession license is granted on January 1st, 2011.

This could be stated as an exclusive privilege conferral with anticompetitive effects for the future of telecommunications in Mexico. Therefore, there is a different treatment among the bidders of auctions 20 and 21 as the mobile phone concessionaires who already have and will have assigned 1850-1910/1930-1990 MHz band spectrum at the end of the auction, will have the liability to pay the established rights on Article 244-B of the LFD, during the whole lifetime of their own licenses.

Considering such scheme of rights, there is an undoubtful damage to public finances resulting from the auction due to the following:

- i) Discount over the market price, or the price of a competitive environment is equal to the difference between the only bid from Televisa-Nextel and the equivalent block price based on regional blocks but which price was the result of free competition among bidders, price used as an approximation to the true market price. Such difference goes up to \$4,887.4 million pesos (376 million USD), which would be the cost for public finances of getting a lower payment than the market price.
- ii) Allowing the entrance of the consolidation of Televisa and Nextel as one bidder and stopping the free entry mean a national “deserted” block, which cost is not getting a market price for such block. So it prevent the and income of \$5,067.7 millions (389.8 million USD) as the auction price plus the rights payment flow for 19 years at the most, considering only

one year of no payment, such flow is equal to \$8,677 million (667.5 million USD) in present value. The total cost of public finances for having a deserted 30 MHz block is \$13,744.7 million pesos (1,057.3 million USD).

- iii) The total fiscal cost for the 1.7Ghz band blocks auction is \$18,632.1 million pesos (1,433.2 million USD), a figure above but close to the one of the Federal Expenditure Budget of 2010 for the program supporting bank savers and debtors' outgo \$13,762.4 million pesos plus the Supreme Court of Justice of the Nation's budget \$4,476.2 million pesos.
- iv) Another social cost is the cost derived from the overpricing the other operators were forced to offer for not being able to have more spectrum given the limit restriction imposed by CFC and accepted by COFETEL that launched the price rise of the regional blocks.
- v) The cost for society as a whole for having no commercial use of the block declared deserted, not for a spectrum excess on the operators, but for the discretionary nature and blindness of CFE when recommending such spectrum accumulation limits.

Additionally, it is worth mentioning that 1710-1770/2110-2170 MHz band has 120 MHz available, but the SCT and the COFETEL decided to auction only 90 MHz. Therefore, with the auction bases' design of 30 MHz, 60 MHz will not be assigned. Half of this band will not be used for mobile telecommunication services even though it is available, with the subsequent detriment of the effective development of the sector,

resulting on the opposite effect the authorities should be looking for regarding competition and efficiency for the country resources use.

Final Considerations

In this document it has been said that all regulations, such as establishing a maximum spectrum holding or spectrum cap per operator, should be subject to a social cost-benefit analysis in terms of the cost that every regulation generates, and the benefits it could give the market in static and dynamic terms.

The spectrum cap regulation has unknown and even non-existent benefits as long as the objective of limiting the spectrum is maximizing the number of operators in the market, but such objective does not necessarily involve a greater competition as it could generate a market with higher costs and lower innovation, both in detriment of the rivalry in the market.

Currently Mexico has a active industrial policy in the telecommunications market, picking winners and stopped the rest of the operators. Televisa and Megacable as the main triple play providers don't face any competition at all in convergence services because each avoid to compete each other in any location and, mainly because the regulators maintain TELMEX, the public traditional telephony network since its privatization 20 years ago, out of the triple play business with the tacit objective of subsidizing alternative networks as the cable networks.

The Mexico Government and Regulators include the Federal Competition Commission modify and use spectrum caps to bias the auction toward an administrative process for deciding who receives the right to use the spectrum and address its policy goals with lack of transparency in the auction design and in the cap limit decision. The most important role of government, however, is not to favour groups in the hopes of what it thinks is greater competition, but to act as an effective regulator to make sure that the necessary conditions for competition exist, within safeguards. Ex post regulation, allows freely experimentation and innovation in business models allowing dynamic efficiency.

Designating any one specific entity or group of entities for special treatment have adverse effects. Leveling the playing field may enhance competition, but favors to designated entities nullified the auction mechanism benefits leading to the “absolute worst outcome in a spectrum auction... licenses tied up in litigation.”¹³ The mere risk of litigation can also deter bidding activity, lower revenues and consequently lead to non-market outcomes. In fact, one of the strongest reasons for strengthening ex post regulatory approach is that the regulatory agency may have insufficient information to adopt an efficient ex ante approach as the CFC and COFETEL did it in the auction design. Moreover, such measures are likely to generate significant losses for the public treasury by limiting the competitive intensity in the

¹³ Cramton Peter (2002), “Spectrum Auctions”, in Martin Cave, Sumit Majumdar, and Ingo Vogelsang, eds., Handbook of Telecommunications Economics, Elsevier Science B.V.

auction process. As we have shown above, the auction rules, which determine the competitive intensity and the value of the licenses being auctioned, are the only key elements of the success of the auction procedure.

There are more effective reforms in the spectrum administration to maximize the competitive environment of the industry: offering the greatest amount of frequencies; incrementing the scope of property rights for the use and commercialization of assigned frequencies among private companies; eliminating implicit or explicit subsidies in terms and conditions of the auctions for new operators to avoid opportunist behaviors that the Government and eventually the industry will pay; and increasing the private cost of having idle spectrum in such way that the cost of social opportunity of an unused resource could be absorbed.

Mexico's case illustrates the cost of arbitrarily establishing spectrum limits or caps and the use of such regulation with anticompetitive purposes. It is worth mentioning that the spectrum limit established in Mexico was a regulation with net costs, with no social benefit, only serving as a regulatory capture vehicle, and creating rents whose distribution obeyed an entrance subsidy, overestimating the concentration indicators and without considering the current or future rivalry among operators, all of that damaging the competitive environment and its evolution. Increasing the number of operators does not necessarily mean a social gain as the number and size of the competitors should be determined by the market size and the

competitors' optimum scale and should not be determined by an administrative process resulting from an imperfect regulation with respect to the market's dynamics.