Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Updating the Intercarrier Compensation	)	WC Docket No. 18-155
Regime to Eliminate Access	)	
Arbitrage	)	

EXPERT REPORT OF DANIEL E. INGBERMAN

August 24, 2018

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I. INTRODUCTION

I.A. Qualifications

1. I am Daniel E. Ingberman. I provide expert economic consulting services in conjunction with several economics and finance consulting and expert services firms.
2. I hold a Ph.D. in Economics, awarded in 1986 by the Tepper School of Business at Carnegie Mellon University, where I was also a Sloan Foundation Doctoral Dissertation Fellow and awarded the Alexander Henderson Award for Excellence in Economic Theory. In addition to my Ph.D., I also hold an M.S. Degree in Economics, awarded by Tepper in 1983, and an A.B. Degree from Duke University, awarded in 1981, where I majored in Economics and History and was inducted into Phi Beta Kappa.
3. I taught at the University of California, Berkeley, starting in 2001. From 2001 to 2005 I held the position of Visiting Associate Professor at the Haas School of Business, where I taught graduate business students in my MBA classes, "Economic Analysis for Business Decisions" and "Competitive Strategy and Corporate Strategy." Also, starting in the 2002–2003 academic year and continuing through 2010, I taught "Law and Economics I (LS 145)" and "Law and Economics II (LS 147)," which are undergraduate courses in the Legal Studies Department, an undergraduate program in the Boalt School of Law. Since 2011, I have held the position of Adjunct Professor of Managerial Economics at the Olin School (Washington University in St. Louis), where I teach "Competitive Strategy and Industry Analysis" to executive MBA students. I also taught at Olin from 1993 to 1998 as a Visiting Associate Professor and later as an Associate Professor. Prior to my initial appointment at Olin in 1993, I taught from 1985 to 1993 at the Wharton School of the University of Pennsylvania (as the Anheuser-Busch Lecturer and, later, as the Anheuser-Busch Assistant Professor of Public Policy and Management), and from 1982 to 1985 at the Graduate School of Industrial Administration at Carnegie Mellon University (as a Lecturer).
4. Overall, I have taught undergraduate, MBA, professional MBA, executive MBA, MA, and Ph.D. students in Economics, Public Policy, Legal Studies, Management,

Decision Sciences, Regional Sciences, and other related fields. I have supervised Ph.D. research, teaching, and dissertations. I have won teaching awards (at both Wharton and Olin) and received a Dean's commendation for perfect median evaluation scores in my core EMBA course at Haas.

5. My teaching and research interests span a broad range of subject matters, including the economics of legal rules and institutions; econometrics and statistics; public economics; and industrial organization, business strategy, and competition policy. I have taught courses in competitive and corporate strategy; economic analysis of law; macroeconomics; managerial economics; microeconomics; research methods; political analysis and political economy; political, regulatory, legal and market environment of business and determinants of business strategy; public economics; public policy; social choice and social justice; economics of torts and products liability; economics of damages, including punitive damages; and litigation strategy and settlement incentives.

6. As detailed in my curriculum vitae, I have authored or co-authored more than 20 published peer-reviewed academic articles. My scholarly research is ongoing and covers a variety of areas. It has been presented in a variety of academic and non-academic settings, including conferences, faculty workshops, legislative hearings, and professional presentations. I have also served as an independent referee in reviewing articles for major journals.

7. I have substantial experience in economic consulting. Plaintiffs and defendants have retained me as an expert economist in litigation matters involving antitrust, contracts, intellectual property, and products liability issues, as well as other situations where it is necessary to assess the economic impact of policy or conduct. I have developed my own independent analyses and have reviewed and commented on the analyses offered by other experts. I have presented my opinions in the form of expert reports, declarations, and/or oral testimony. I have also served as an expert in the economic analysis of punitive damages.

8. In my academic and consulting activities, I have become familiar with the economics of a range of industries and products, including: automobiles and parts; biotechnology; computer components and software; construction materials,

including carpets, siding, and drywall; consumer products; credit cards; display technologies; food; internet commerce and distribution; medical devices and pharmaceuticals; music; oil; publishing; semiconductors; and, telecommunications markets, transmission, and equipment. For example, recently I advised the Department of Justice regarding the competitive effects of the proposed AT&T/T-Mobile merger and assisted Samsung in its dispute with Qualcomm regarding FRAND royalties on handsets.

9. A current copy of my curriculum vitae, including professional appointments, publications, and a list of my prior testifying and consulting experience, is included as **Attachment A**.

10. I am being compensated for my work in this matter at my normal 2018 rate of $925 per billable hour.

I.B. Assignment

11. Counsel for certain Competitive Local Exchange Carriers (the "CLECs") asked me to evaluate an assertion made by the Federal Communications Commission ("FCC" or "Commission") in the Notice of Proposed Rulemaking in Docket Number 18-155, *In the Matter of Updating the Intercarrier Compensation Regime to Eliminate Access Arbitrage*,[1] which claims that access stimulation "harms consumers." The CLECs also asked that I form my own expert opinion as to the economic efficiency properties of access stimulation arrangements.

II. SUMMARY OF ANALYSIS

12. The first fundamental theorem of welfare economics indicates that, under broad conditions, markets yield (Pareto) efficient outcomes. That is, there is no reallocation of resources, production, or consumption which can make at least some people better off, and no one worse off. When those conditions are violated, however, markets need not reach equilibrium, and so efficiency cannot be guaranteed. For example, network effects and scale economies are outside the set

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[1] *In the Matter of Updating the Intercarrier Compensation Regime to Eliminate Access Arbitrage*, WC Docket No. 18-155 (June 5, 2018).

of guaranteeing conditions.[2]

13. In this report, I present two simple models of messaging markets to evaluate the competitive and efficiency implications of "access stimulation," which I view as a method of "purchasing" additional volume by a smaller rural carrier. Specifically, an "access-stimulating" local carrier's network is generally defined by two characteristics. First, it is smaller and located in rural areas and, therefore, may be costlier to use than larger (*i.e.*, more urban) networks. Second, compared to the rates paid by its other customers, the access-stimulating carrier offers discounted rates in the form of revenue sharing to entities that agree to site incremental traffic in their network (*i.e.*, free conference calling and broadcasting providers).
14. Some commenters, particularly interexchange carriers, have argued that access-stimulation by these small networks is inefficient, uneconomical, and lacking a legitimate business justification, because terminating calls at these small networks in rural areas is potentially more costly than terminating this traffic on a larger network, typically in a more urban area.[3]
15. The access charges paid by interexchange carriers, however, are only part of the efficiency equation. Consumer surplus matters as well.[4] Generally, the efficiency of any arrangement in the marketplace depends on demand, technology,

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[2] The proof that competitive equilibrium exists relies on the assumption that there are no increasing returns to scale in production. In that case, firms' demand functions are guaranteed to be continuous, which is a mathematical requirement of the proof of the existence of a competitive equilibrium. The welfare theorem shows that competitive equilibria are efficient (*i.e.*, Pareto Optimal). *See, e.g.*, HAL R. VARIAN, MICROECONOMIC ANALYSIS 164, 184 (1978) (citing GERALD DEBREU, THEORY OF VALUE (1959)). When increasing returns are present, competitive equilibria can still exist whenever firm demand functions are continuous, even though the standard proofs used to guarantee existence need not apply directly.

[3] *See, e.g.,* Comments of AT&T, at 1, WC Docket No. 18-155 (July 20, 2018) (asserting that rural CLECs engage in access stimulation "not for any legitimate engineering or business reasons, but solely to allow the collection and dispersal of inflated intercarrier compensation revenues"); Comments of Verizon Communications, Inc., at 1, WC Docket No. 18-155 (July 20, 2018) (referring to access stimulation as "[u]necomonical arbitrage schemes"); Reply Comments of AT&T, at 9, WC Docket No. 18-155 (Aug. 3, 2018) (asserting that access charges are a cost that a long-distance carrier may pass on to consumers, but providing no evidence that access stimulation-related charges, in particular, are material to the rates set by long-distance carriers).

[4] Other factors may also be relevant to the efficiency equation, including, but not limited to: (1) the desire to ensure rural consumers have access to competitive alternatives; (2) the ability and willingness of carriers to provide consumers with additional services, including broadband; and (3) the savings consumers realize by using "free conferencing" services, rather than having to pay to use more expensive offerings.

competition, and institutional arrangements. Network and scale economies imply spillover consequences, which may extend to upstream and downstream competition as well. Thus, a complex set of interactions will determine efficiency.

16. Section 0 analyzes a simple market for telecommunications designed to focus on the effects of returns to scale, while abstracting – for now – from many other elements of interest.

17. In the example, there are two communities, large and small. Each locality has its own telecommunications network. Each uses the same technology with the same fixed and marginal costs of traffic. All consumers have the same demand curves. Inter-and intra-network traffic is equally costly.

18. There are no access charges for switching or transport beyond the central office. Instead, a "central office bill and keep" pricing regime is in place. That is, each network bills its own local customers and keeps the entire proceeds.[5] Prices to users of each network equal the average (economic) cost of all traffic originating in the locality.

19. Even though it may be costlier to site the incremental demand in the smaller network, it can be most efficient to do so. Specifically, siting in the smaller network is more efficient when the incremental traffic causes small network costs and prices to fall sufficiently so that the pre-existing small network demanders' gains in consumer surplus exceed the larger network's gains by more than the amount

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[5] It is known that "Central Office Bill-And-Keep," in which the calling party's network is responsible for the cost of transporting the call to the called party's network's central office, leads to efficient incentives for carriers. *See* Patrick DeGraba, *Central Office Bill and Keep as a Unified Intercarrier Compensation Regime*, 19 YALE J. REG. 37 (2002) (hereinafter "DeGraba 2002"). DeGraba notes that:

> In the early stages of moving toward a competitive market – when incumbent local carriers still possess monopoly power over local network facilities – it will most likely be necessary to require the incumbents to provide transport facilities to interconnecting networks at regulated rates. Nevertheless, even if the incumbent network provides the facilities, the cost of transporting the call will remain on the calling party's network, which will either lease the incumbent's facilities or purchase transport services from the incumbent.

Id. at 41 n.13. In a related paper, DeGraba shows that it is most efficient when calling and called parties share the cost of the call, in proportion to the benefits they receive. *See* Patrick DeGraba, *Efficient Intercarrier Compensation for Competing Networks When Customers Share the Value of a Call*, 12 J. ECON. & MGMT. STRATEGY 207 (2003). Thus, a system in which two networks exchange traffic at specified points on a bill-and-keep basis can generate more efficient network utilization than a regime in which the calling party bears all the costs.

needed to subsidize the incremental traffic for the difference in the market prices between the small and large networks. I demonstrate that there are always technologies, demand functions, and constellations of pre-existing demand for which this is so.

20. That is, under these assumptions, when it is efficient to site the incremental traffic in the small network, market participants' unilateral incentives are expected to lead them to that outcome. And, whenever siting in the small network is a market equilibrium, then it is efficient.
21. However, other specifications of the responsiveness of demand and costs to incremental volume can imply it is efficient to site the incremental traffic in the large network. If this is true, however, the small network will not outbid the large one, and, in equilibrium, markets will efficiently site the incremental traffic in the large network.
22. Section IV provides the proof of the two major propositions underlying the efficiency analysis.
23. Section V elaborates upon the model in the context of CLECs interacting with rate-of-return regulated entities, such as CEA providers, when IXCs connect to LECs through CEA providers. The same result holds: markets will site incremental traffic with a small network CLEC only when it is efficient.
24. Section VI discusses the conclusions that I reach, including my conclusion that, when access stimulation is in market equilibrium, policymakers should respect this market outcome. That is, market arrangements concerning the siting of telecommunications traffic are likely to be efficient. Thus, efficiency is not likely to be improved by regulatory interventions that reallocate traffic that is currently sited in large or small networks through voluntary market arrangements.

III. RETURNS TO SCALE AND CONSUMER SURPLUS

25. Consider two communications networks, large (*L*) and small (*S*) whose customers generate and exchange intra-network and inter-network messages.[6] Assume network *L* – which has more traffic – has lower costs, and that, generally, a network's unit and marginal costs fall as it acquires more traffic. Specifically, the fixed and variable costs of the communications technology are such that the (economic) unit cost M_L of originating and terminating messages (intra- and inter-network combined) generated in network *L* is strictly less than M_S, the unit cost in network *S*. Assume that the marginal costs of any type of messages *t* are also no larger in network *L* as compared to network *S*: $m_{St} \leq m_{Lt}$.

26. Assume competition ensures that prices to each networks' end user customers are equal to their economic unit costs M_L and M_S, which are functions of the total traffic on each network. Each network bills its own customers for its costs and keeps the proceeds. There are no access charges associated with any services provided beyond the central office.

27. Suppose now that incremental traffic totaling *I* messages is to be added to the system. It can be sited in either network or divided between the two. However, the large network will continue to have more traffic, irrespective of where the incremental traffic is sited.

28. Define a *market equilibrium* as the (non-cooperative Nash equilibrium) situation in which each player plays their best individually rational strategies and all potential gains from trade are exhausted.

29. The basic results can now be stated:

> **Proposition 1**. For any networks *S* and *L* as above, there always exists consumer demands and communications technologies, such that siting all the incremental demand in the small network *S* is both efficient and a market equilibrium.

[6] This example abstracts from the details of interconnection. For concreteness, one can assume that *L* and *S* connect directly or indirectly through a third party. *See* Section IV.

Proposition 2. If siting all the incremental demand in the small network *S* is not efficient, then it cannot be a market equilibrium.

30. The proofs of these propositions are found in Section IV.
31. Siting the incremental traffic in the small network can only be efficient when the gain in consumer surplus among the pre-existing small network demand from the incremental traffic, less the amount needed to compensate the incremental traffic for the difference in prices between the networks, exceeds the gain in surplus that the large network would obtain from siting the incremental traffic there instead. As long as this condition holds, gains to trade are realized by siting the incremental traffic in the small network: the small network can effectively outbid the large until those gains are exhausted. Thus, small network siting is a market equilibrium in this case.
32. For example, suppose that economies of scale are nearly exhausted in the large network, so siting the incremental traffic there has little or no effect on prices to pre-existing large network customers. Thus, the large network's gain in consumer surplus from the incremental traffic goes to zero. Suppose also that the incremental traffic allows the small network to gain substantial scale economies, so siting there would produce a correspondingly substantial increase in consumer surplus among the pre-existing small network demand. When the incremental traffic is large enough so that it would drive the unit cost in the small network close enough to that of the large network, the small network can efficiently compensate the incremental traffic for the difference in prices between the networks. In this case, the small network can profitably compensate the incremental traffic for the difference in prices between the networks, while still having enough surplus left over to leave its pre-existing customers better off.
33. Such an example is depicted in **Figure 1**. Before any traffic is added, demand in is D_1 (dark blue) in the small network and D_3 (grey) in the large network. Unit costs (light blue) fall as traffic increases, up to a point. However, the large network is sufficiently large so that additional demand does not result in further scale

economies.

34. Total traffic in the large network is initially shown as Q_3^* (blue dot and vertical dotted line). If the additional demand is sited in the large network, the demand shifts out and the new demand (yellow) generates total traffic shown as Q_4^* (rust dot and vertical dotted line).

35. The incremental traffic is a total quantity equal to Q_4^* minus Q_3^*. To be induced to locate in the small network, this traffic must be offered at a price that is no larger than the large network price. If sited in the small network, the unit cost is found at the intersection of the cost curve and the orange demand curve, which is derived by adding Q_4^* minus Q_3^* at every price to D_1 (the original small network demand curve).

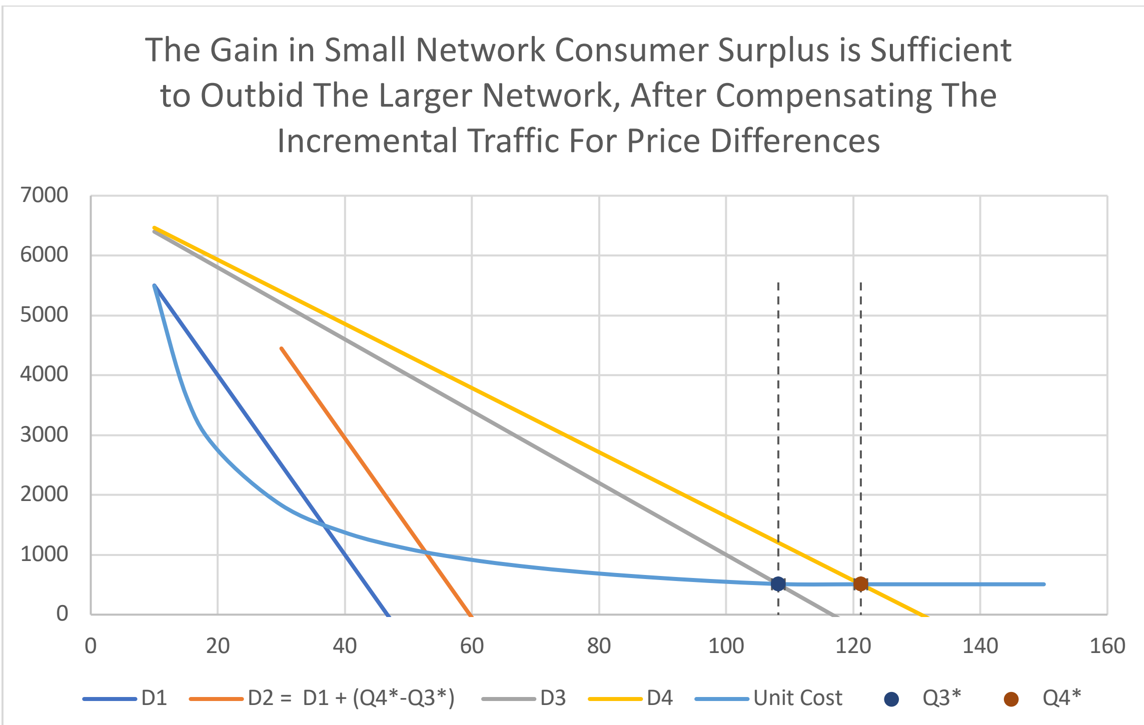

Figure 1

36. In this example, the incremental traffic reduces unit costs in the small network, which lowers prices there and generates consumer surplus for the pre-existing demand. By contrast, scale economies are already exhausted in the large network, so siting the incremental traffic there generates no consumer surplus for the pre-existing demand in that network. Parameter values have been chosen so that the increase in consumer surplus is larger than the amount needed to compensate the

incremental demand for the difference in prices between the large and small networks.[7]

37. In summary, Propositions 1 and 2 demonstrate that, under plausible conditions, siting incremental traffic in the small network – at a subsidized price – is efficient whenever it is a market outcome. This is true despite the assumption that siting in the large network is less expensive.

IV. PROOFS OF PROPOSITIONS

38. Each network's prices equal its economic unit costs. Therefore, producer surplus always equals zero. Total welfare is therefore the sum of consumer surplus in each of the networks, $C_S + C_L$.

39. For $J = S, L$, let $M_J(i)$ denote the unit costs in network J when i messages are added to that network. Also let $C_J(i)$ denote the consumer surplus among the pre-existing demand as a result of adding traffic i to network J.

40. Note also that if it does choose to site in the small network, the incremental demand pays the same unit price (due to the subsidy of $I * (M_L(I) - M_S(I))$ by locating in the small network) and has the same usage as if it were in the large network.

41. Define $\Delta M_J(i) = M_J(i) - M_J(0)$, and $\Delta C_J(i) = C_J(i) - C_J(0)$. Under the assumptions made, for any networks S and L, one can choose a technology such that

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[7] In the example, unit costs in each network are equal to 54,900 divided by Q (the traffic in that network) up to Q_3^* and are constant thereafter. The demand curve D_3 is specified by a willingness to pay equal to -60Q + 7000. If sited in the large network, the incremental demand is added to D_3 in the form of additional identical demanders (so the price intercept of the new demand, D_4, is the same as D_3). D_4 is specified by a willingness to pay equal to approximately -53.6Q + 7000. Demand D_3 crosses the unit cost curve at Q_3^* (approximately 108.2) and D_4 crosses the unit cost at Q_4^* (approximately 121.2). In each case, the implied unit cost (network unit price) of traffic is equal to approximately 507.3. Since siting the incremental demand in the large network does not reduce unit costs there, it does not generate any additional consumer surplus for the pre-existing demand in that network.

D_1 is defined by a willingness to pay equal to -150Q + 7000. Without the incremental traffic, unit costs cross D_1 at quantity of about 39.7, where the unit cost equals about 1496.3. D_2 is derived by adding $Q_4^* - Q_3^*$ to D_1, at every price. The intersection of D_2 and the unit cost curve defines the price that will prevail in the small network if the incremental traffic is located there. In this case that price is about 1041.6. The change in consumer surplus in the small network is 17,371.6 whereas the cost to compensate the incremental demand for the difference in prices between the networks equals about 6937.3. Thus, the incremental demand can be fully compensated for the price difference while leaving positive surplus gains in the small network. Indeed, the small network could offer a zero price to the incremental demand while still earning positive net surplus from siting it (equal to about 3846.2).

Additional details are available from the author upon request.

$$\Delta C_S(I) - \left[I * \left(M_L(I) - M_S(I) \right) \right] > \Delta C_L(I). \qquad (*)$$

42. For example, choose a technology that has
    i. $\Delta M_L(I) \rightarrow 0$, and
    ii. $M_L(I) - M_S(I) \rightarrow 0$.
43. Note that 43.i. implies $\Delta M_L(I) \rightarrow 0$, which in turn implies that $\Delta C_L(I) \rightarrow 0$. Similarly, 43.ii. implies that $\left[I * \left(M_L(I) - M_S(I) \right) \right] \rightarrow 0$. But due to returns to scale, $\Delta C_S(I) > 0$.
44. Therefore, under the assumptions made, condition (*) holds. This completes the proof of Proposition 1.
45. Regarding Proposition 2, note that a market equilibrium requires that all participants follow their individual self-interests. When siting the incremental quantity in network *S* is an equilibrium, it must be true that:
    i. The small network generates enough surplus from the incremental traffic to be able to compensate the incremental traffic for the price difference between the large and small networks and outbid the larger network for the incremental traffic.
    ii. This requires that the small network's net consumer surplus, *i.e.*, its consumer surplus less the amount needed to compensate the incremental traffic, is strictly positive:

    $$\Delta C_S(I) - \left[I * \left(M_L(I) - M_S(I) \right) \right] > 0.$$

    iii. It also requires that the small network's net surplus from the incremental traffic exceeds the surplus the large network would obtain from that traffic, considering the fact that the large network does not need to provide compensation, *i.e.*:

    $$\Delta C_S(I) - \left[I * \left(M_L(I) - M_S(I) \right) \right] > \Delta C_L(I).$$

46. Combining the conditions in 46.iii. and 46.ii. yields condition (*), which completes the proof of Proposition 2.

V. COMPLEMENTARY COEXISTENCE OF COMPETITIVE AND RATE-OF-RETURN REGULATED PROVIDERS

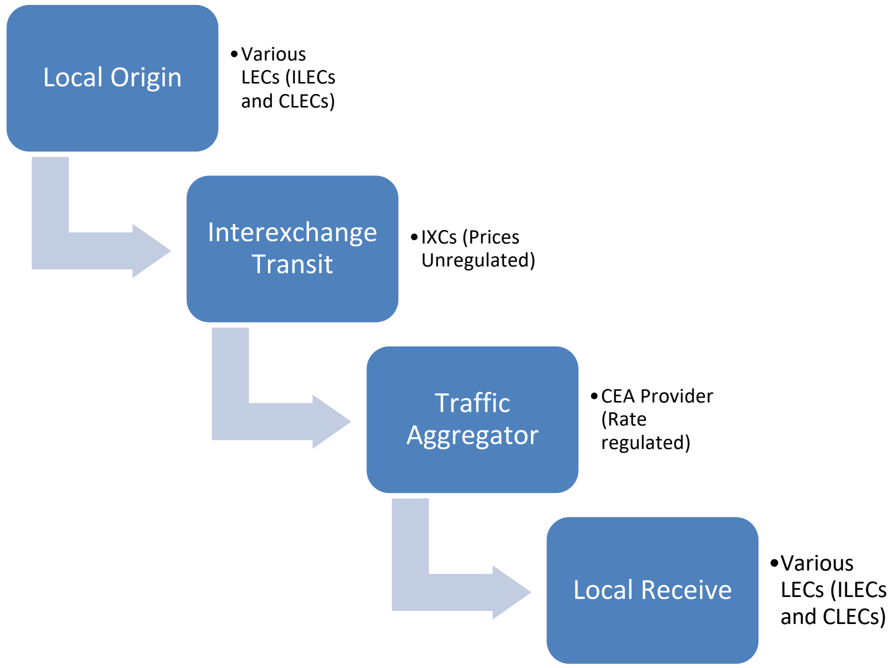

Figure 2

47. Elements of U.S. telecommunications law have enabled competitive service providers ("CLECs") to coexist with incumbent providers ("ILECs") and, in certain rural states, centralized equal access providers ("CEA providers"), which provide interconnections between local networks and long distance providers ("IXCs").[8]

48. **Figure 2** illustrates the general roles of each entity in communications.[9] Analytically, assume the following:

a. To send and receive messages, end users engage the services of a LEC

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[8] *See, e.g.,* 47 U.S.C. § 251 (requiring direct or indirect interconnection of incumbent and competitive carriers); *see also In re: AT&T Corp. v. Iowa Network Services, Inc. d/b/a Aureon Network Services*, 32 F.C.C. Rcd. 9677, ¶ 19 (Nov. 7, 2017) ("AT&T argues that CEA service 'was approved for the limited purpose of facilitating the provision of equal access service to small, rural LECs carrying very low traffic volumes' and that 'access stimulation traffic has virtually nothing in common with legitimate CEA traffic.' As an initial matter, AT&T overstates its claim concerning the 'limited purpose' of the CEA service. The order authorizing a CEA network in Iowa states—and subsequent authority reaffirms—that Aureon's CEA network also would serve to 'speed the availability of high quality varied competitive services to small towns and rural areas.' Further, AT&T's allegation that CEA networks were intended to carry low traffic volumes is of little weight since, as a Section 61.38 carrier, Aureon's calculated rates should decrease to reflect the increase in the volume of traffic.") (internal citations omitted).

[9] **Figure 2** is analogous to Figure 1 in DeGraba 2002.

(ILEC or CLEC) to provide "local" service and an IXC to provide "long distance" service.[10] These entities bill their customers directly. When LECs compete, customers choose the LEC that offers them the best combination of prices and services.

b. ILECs operate under a "must serve" mandate known as "carrier of last resort" obligations, but they are eligible to receive explicit subsidies in order to maintain their profitability. All end users can engage the services of an ILEC.

c. Compared to ILECs, CLECs have access to newer technology, which enables lower costs and/or the bundling of other valuable services or attributes (*e.g.*, quality). CLECs may share facilities (fixed costs) with nearby ILECs or may have their own facilities. If they share facilities, they pay their proportional share of the costs of those facilities.

d. CLECs provide services in areas where they believe they can make a profit. However, some states have historically required a CLEC to be able to serve every customer in a telephone exchange, thus imposing requirements akin to "carrier of last resort" obligations on CLECs.[11]

e. IXCs are responsible for transit between sending and receiving LECs. Their rates are unregulated.

f. In at least some cases, CEA providers perform transit services between IXCs and LECs. CEA providers do not directly bill customers, but instead finance their operations through access charges assessed to calling parties. CEA providers are subject to rate-of-return regulation, and, according to recent FCC orders, must also keep their prices at or below those of the competing ILEC in their state.[12]

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10 In some cases, these services may be bundled by a single entity that provides both services.

11 *See, e.g.,* Iowa Code § 476.29.5 (2015) ("Each local exchange utility has an obligation to serve all eligible customers within the utility's service territory, unless explicitly excepted from this requirement by the board.") (repeal effective July 1, 2017).

12 *See In re Iowa Network Access Division, Tariff F.C.C. No. 1*, WC Docket No. 18-60, 2018 WL 3641034, at *11 (July 31, 2018); *see also* 47 C.F.R. § 61.38 (describing rate-of-return regulation application to CEA providers); 47 C.F.R. § 61.26 (describing CLEC benchmark applicable to CEA providers).

g. All entities use technologies that have positive fixed costs and non-zero marginal costs to provide access or convey traffic. Marginal costs do not increase with traffic.

49. Under these assumptions, can access stimulation by CLECs be efficient? Note first that CLECs do not engage in access stimulation unless they can profitably offer favorable rates compared to incumbent LECs.[13]

50. Suppose first that CLECs rely, in part, on the CEA provider's facilities (and cover their proportional share of cost, based on traffic), but do not divert customers away from the other members of the CEA provider. Instead, CLECs' access stimulation traffic is all incremental.

51. Then the CLECs' operations increase consumer surplus for all the customers of the CEA provider. When CLECs increase their traffic through CEA provider facilities, it allows the CEA provider and its members to obtain additional economies of scale, thereby also increasing consumer surplus as lower costs become reflected in lower prices.

52. Thus, under these assumptions, the analysis of Propositions 1 and 2 can be applied to show that markets will site incremental traffic with a small network CLEC only when it is efficient.

53. Now suppose that the CLEC does not add any incremental traffic to the CEA provider's network, but simply diverts traffic from other members of the CEA provider. If each LEC can serve all customers at a constant marginal cost, then the competition from the CLEC is again likely to improve allocative efficiency. This follows because the CLEC serves profitable customers but shares fixed costs with the ILECs compromising the CEA provider membership. The CLEC may also stimulate the CEA provider and its member ILECs to adopt less costly technologies.

54. In sum, access stimulation by CLECs that share facilities with CEA providers is likely to be efficient, particularly when that traffic is incremental (*i.e.*, when the

[13] In 2011, the Commission adopted rules that require CLECs that engage in revenue sharing relationships to mirror the rates charged by the lowest cost price-cap LEC in the state. *See* 47 C.F.R. § 61.26(g). *See also* Shane Greenstein & Michael Mazzeo, *Differentiation Strategy and Market Deregulation: Local Telecommunications Entry in the Late 1990s* (Nat'l Bureau of Econ. Research, Working Paper No. 9761, 2003), http://www.nber.org/papers/w9761 (describing how CLECs seek to provide differentiated services as part of a competitive strategy).

ILEC members do not serve high volume customers).

VI. CONCLUSIONS

55. In this report I have shown that, when the costs of operating local networks are subject to economies of scale, "access stimulation" arrangements that increase local volume in return for discounted pricing can be efficient, and, when they are efficient, they will be market equilibria. The scale economies obtained by the smaller network can generate enough consumer surplus to make it possible to outbid the larger network for the traffic, while subsidizing the incremental traffic. This is true even though it is cheaper to site incremental traffic in the larger network, which has already achieved more substantial scale economies.
56. Therefore, overall, these results imply that, under modest assumptions, existing market arrangements concerning the siting of telecommunications traffic are likely to be efficient. Thus, efficiency is not likely to be improved by regulatory interventions that reallocate existing traffic that voluntary market arrangements have currently sited in either large or small networks.
57. In the richer institutional environments, this implies that it is efficient to permit small networks – CLECs and, similarly, rate-of-return regulated CEA providers, which have built out capacity to serve this additional traffic – to keep whatever traffic is sited there. Access stimulation emerges as market equilibria. Otherwise, the efficiencies obtained by these arrangements would be lost.
58. The conclusion that one should respect market outcomes holds whenever regulation or competition causes prices to end user customers to fall and whenever additional scale leads to lower costs. In that case, additional volume in small networks that enable scale economies will also translate into lower prices in those networks and lower prices for end users.

Respectfully submitted,

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Daniel E. Ingberman