OUTCOMES AND ALTERNATIVES FOR UNIVERSAL TELECOMMUNICATIONS SERVICE: A CASE STUDY OF TEXAS

JERRY ELLIG[*] & JOSEPH ROTONDI[†]

   * Senior research fellow, Mercatus Center at George Mason University, and adjunct professor, George Mason University School of Law. A.B. 1984, Xavier University, Economics; M.A. 1986, George Mason University, Economics; Ph.D. 1988, George Mason University, Economics.
   † Legal fellow, Mercatus Center at George Mason University. B.A. 2001, Saint John's University, Economics; J.D. 2003, University of Minnesota Law School.

2   *Texas Review of Law & Politics*   Vol. 12

I. INTRODUCTION

New technologies, deregulation, and expanded competition pose substantial challenges for federal and state "universal service" programs that subsidize telephone service for low-income households and rural residents. At both levels of government, decisionmakers have scrambled to determine whether newly competitive markets require universal service subsidies,[1] whether new competitive services should contribute or receive subsidies,[2] whether historic subsidy levels are still appropriate,[3] and whether current funding mechanisms for universal service programs are sustainable.[4] Legislation, regulatory proceedings, and litigation have all provided fora to debate these questions.

The State of Texas provides an informative case study of technology, deregulation, competition, and universal service reform. Texas is a large state with a substantial low-income population, large rural areas, and a $600 million universal service fund that supplements federal

---

1. *See* TEX. PUB. UTIL. COMM'N, REVIEW AND EVALUATION OF THE TEXAS UNIVERSAL SERVICE FUND PURSUANT TO PURA SECTION 56.029 28 (2007) [hereinafter UNIVERSAL SERVICE REPORT] ("The most significant issue identified by the Commission and discussed by stakeholders is 'What lines should be eligible for this high-cost support (e.g., lines in regulated vs. deregulated market areas, quantity of lines at any given residence, stand-alone lines vs. lines with vertical services included, etc.)?'").

2. *See In re* IP-Enabled Services, Notice of Proposed Rulemaking, 19 F.C.C.R. 4863, ¶ 63–65 (2004) (commenting on how the regulation of new services would affect the "Commission's ability to fund universal service"); *In re* Universal Service Contribution Methodology, 21 F.C.C.R. 7518, ¶ 17 (2006) (describing the need for immediate interim measures to respond to developments in the industry marketplace, including the growth of new services); Kevin J. Martin, Chairman, FCC, Opening Remarks at the Federal-State Joint Board on Universal Service En Banc Meeting 2 (Feb. 20, 2007), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-271011A1.pdf [hereinafter Martin Remarks] ("Congress . . . did not envision that services supported by universal service would remain static. Instead, the Act views universal service as an evolving level of telecommunications services.").

3. UNIVERSAL SERVICE REPORT, *supra* note 1, at 24 ("[W]hether this level of funding is necessary to achieve reasonable rates in high-cost areas going forward is yet to be determined."), *id.* at 62 ("The Commission also notes that when or if stand-alone BLTS rates increase, it would be appropriate for the Commission to review the Lifeline Program and the amount of support it provides to recipients."); Jerry Ellig & Alastair Walling, *Regulatory Status of VoIP in the Post-Brand X World*, 23 SANTA CLARA COMPUTER & HIGH TECH. L.J. 89, 128–29 (2006) ("Unlike conventional wireline telephony, however, VoIP has the potential to serve customers in a wide variety of locations at approximately the same cost, provided that they already have the requisite Internet connection."). *See also* R. Alex DuFour, *Voice Over Internet Protocol: Ending Uncertainty and Promoting Innovation through a Regulatory Framework*, 13 COMMLAW CONSPECTUS 471, 496–97 (2005) (noting that the VoIP provider who brings "service to rural markets will not need governmental incentives because the potential profit is enormous").

4. *In re* Universal Service Contribution Methodology, *supra* note 2, ¶ 17; *In re* IP-Enabled Services, *supra* note 2, ¶¶ 63–65; Martin Remarks, *supra* note 2, at 7 ("A system focused on subsidizing voice service competition is not sustainable in a broadband world.").

universal service subsidies.[5] Texas has moved aggressively to promote competition, deregulate rates, and reform its universal service programs. In 2005, the Texas Legislature enacted sweeping telecommunications legislation that effectively deregulated the prices of many telecommunications services, reduced mandated hidden subsidies from long-distance to local service, established statewide franchising for cable television, and authorized electric utilities to offer broadband over power lines.[6] The principal telephone service for which the price remains regulated is "basic local residential service."[7] For the largest companies that serve the bulk of residential lines, the price of basic local residential service cannot change until the Public Utility Commission (PUC) of Texas determines how to reform the universal service programs that subsidize telephone service for low-income households and high-cost rural areas.[8] Realistically, the PUC is unlikely to alter the regulated basic local rates of smaller rural telephone companies in the absence of universal service reform either. In December 2006, pursuant to the 2005 legislation, the PUC issued a report that reviewed and evaluated the Texas Universal Service Fund (TUSF).[9] This report will surely serve as a starting point for subsequent PUC proceedings to reform the universal service programs.

The Texas universal service debate has been highly contentious. One dispute concerns whether the Large Company High-Cost Program is achieving its purpose. The Large Company High-Cost Program subsidy recipients—AT&T, Embarq, Windstream, and Verizon—all "unequivocally stated that the program's purpose had been achieved."[10] Competitors—notably the Texas Cable and Telecommunications Association together with Time Warner Telecom of Texas, L.P. (collectively "TCTA/TWTC") and Grande Communications (Grande)—disagreed.[11] TCTA/TWTC said that the Large Company High-Cost Program is far larger than needed to achieve its purpose, "in part because there is no direct linkage between the subsidy provided

---

5. The $600 million figure is approximate. The Texas Universal Service Fund collected assessments of $618 million in fiscal 2005 and $649 million in fiscal 2006, with disbursements of $580 million in fiscal 2005 and $572 million in fiscal 2006. UNIVERSAL SERVICE REPORT, *supra* note 1, at 6–7.

6. *Act Relating to Furthering Competition in the Communications Industry*, 2005 Tex. Sess. Law Serv. 2nd Called Sess. Ch. 2 (S.B. 5) (West) [hereinafter S.B. 5].

7. By various statutory definitions, basic service includes flat rate residential local exchange telephone service, residential tone dialing service, access to directory assistance services, and others. TEX. UTIL. CODE ANN. §§ 51.002(1), 58.051(a), 65.002(4) (Vernon 2007).

8. TEX. UTIL. CODE ANN. §§ 65.102(a)(3), 65.153(b)(2) (Vernon 2007).

9. UNIVERSAL SERVICE REPORT, *supra* note 1, at ix.

10. *Id.* at 22.

11. *Id.*

and the rates charged consumers in many markets and for most services."[12] Grande complained of difficulty in determining what a reasonable rate is.[13] Nonmarket participants like the Office of Public Utility Counsel and the Texas Attorney General's office said, respectively, that confidential company information would need to be made public and that more analysis would be necessary to determine whether the program is achieving its intended purpose.[14] A second dispute surrounds how large-company support should be disbursed in deregulated markets. Grande and TCTA/TWTC maintained that subsidies to companies in wire centers that have been deregulated should be stopped.[15] On the other hand, companies receiving subsidies, their associations, and the state attorney general argued that support for deregulated exchanges should continue.[16]

Similar disagreements abound throughout the Universal Service Report.[17] In this Article, we hope to bring a modicum of order to the debate by proposing an analytical framework for assessing the effects of various reform proposals and evaluating the extent of the PUC's authority to implement reforms. To fulfill its statutory mission and advance overall consumer welfare, the PUC should consider the outcomes and forgone benefits of both the current universal service programs and possible alternatives. The overarching purpose of Texas telecommunications law is to serve the public interest, which in the case of universal service means achieving the allocative objective of

---

12. *Id.*

13. *Id.*

14. *Id.* at 22–23.

15. *Id.* at 29 ("According to Grande, the presumption for a deregulated market is that such a market will provide for communications services and that TUSF is not required. Further, Grande recommended that the Commission consider expanding TUSF support to include broadband services. TCTA/TWTC recommended that the Commission should recommend to the Legislature that exchanges that have been deregulated be immediately removed from the fund. TCTA/TWTC also opined that public subsidy should be provided only for those lines where the customer subscribes solely to basic local telephone service.").

16. *Id.* at 29–30 ("Embarq . . . argued that eligibility for any large company area high-cost program support is not determined by the level of competition but on the level of costs. According to AT&T, support should be available in deregulated wire centers because a wire center can be competitive yet still need universal service support to ensure [basic local telephone service] is available everywhere. Verizon stated that only those carriers in deregulated exchanges that retain provider of last resort (POLR) responsibilities should receive TUSF support. [Texas Statewide Telephone Cooperative, Inc.] believed that the receipt of TUSF support is simply not relevant to the level of competition in a market or to the issue of determining a market's eligibility for deregulation and the deregulatory status of a market should not be a factor. The State asserted that support, to the extent it is provided, should be provided equally to all [eligible telecommunications providers] in a deregulated wire center.").

17. For each disagreement, see *id.* at 24–25, 27–28, 30–32, 33–34, 43, 45–46, 46–47, 48–49, 50.

the TUSF with as small a sacrifice of overall consumer welfare as possible.[18] Achieving this objective requires substantive analysis of the outcomes and forgone benefits of alternative subsidy and funding mechanisms. Without such analysis, decisionmakers cannot know whether they are achieving the law's public interest objectives.

The issues we consider are hardly unique to Texas. Both state and federal policymakers are grappling with the effects of technology, deregulation, and competition. The outcomes created by the universal service programs, the social costs of the funding mechanisms, and the impact of proposed reforms are generic issues that have been raised repeatedly in universal service debates.[19] Specific aspects of the Texas system, such as its use of revenue and rate benchmarks, have been proposed on the federal level as well.[20] Several members of the Federal-State Joint Board on Universal Service have proposed to devolve more decisionmaking about the use of federal universal service funds to the states, thus expanding the potential impact of state decisions.[21] For these reasons, our analysis should have wide applicability to universal service debates both in other states and on the federal level.

This Article has six major sections. Section I provides basic background information on the Texas Universal Service Fund and explains how the largest subsidy programs interact with price regulation for telephone service. Section II explains why the "public interest" standard for evaluating universal service programs requires substantive analysis of alternative subsidy and funding mechanisms. Section III evaluates the outcomes produced by the Lifeline and High-Cost Programs in Texas. Section IV estimates the effect of the current funding mechanism on consumer welfare. Section V analyzes the effects of various reform options on the size of the Universal Service Fund and on overall consumer welfare. Section VI concludes.

---

18. *See infra* Part II.

19. For a concise history, refer to ROBERT W. CRANDALL & LEONARD WAVERMAN, WHO PAYS FOR UNIVERSAL SERVICE? (2000).

20. FCC Public Notice, *Federal-State Joint Board on Universal Service Seeks Comment on Proposals to Modify the Commission's Rules Relating to High-Cost Universal Service Support*, CC Docket No. 96–45 at 11, 22 (Aug. 17, 2005), *available at* http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-05J-1A1.pdf.

21. *Id.* at 12, 14–15, 20.

II. OVERVIEW OF TEXAS UNIVERSAL SERVICE PROGRAMS AND REGULATION

A. *Universal Service Subsidies*

The Texas Universal Service Fund disburses money for eleven different programs.[22] Universal service money reduces rates for low-income households, subsidizes phone lines in high-cost parts of the state, provides discounts for broadband service to schools and libraries in certain areas, funds telecommunications relay service for people with disabilities, and pays for an audio newspaper program to read newspapers to blind and other visually impaired people.[23] Ninety-seven percent of the money, however, funds three programs: Lifeline (5%), Large Company High-Cost (75%), and Small Company High-Cost (17%).[24]

1. Lifeline

The Lifeline Program reduces the monthly cost of phone service for low-income households. Customers with incomes no greater than 150% of the federal poverty level are eligible for Lifeline.[25] Households are also eligible if a person in the household is enrolled in one of several low-income social programs.[26] Lifeline has both federal and state components. To assess the effects of the Texas Lifeline Program, one must separate the effects of the federal and state programs.

The federal Lifeline Program waives the Federal Subscriber Line Charge (a maximum of $6.50 per month) and provides a discount of $1.75 per month on the local phone rate[27] regardless of the structure of the state Lifeline Program. An additional discount on the local rate is state-funded, and the federal government provides $0.50 of matching funds per dollar up to an additional $1.75.[28] The Texas Universal Service Fund provides a state subsidy of $3.50 per month, thus garnering the maximum possible federal match.[29]

---

22. The full list appears in UNIVERSAL SERVICE REPORT, *supra* note 1, at 2 tbl.1.
23. *Id.*
24. *Id.* at 8 fig.3.
25. TEX. UTIL. CODE ANN. § 55.015(d–1) (2007).
26. *Id.*
27. 47 C.F.R. § 54.403(a)(2) (2007).
28. *Id.* § 54.403(a)(3).
29. 16 TEX. ADMIN. CODE § 26.412(f)(1)(C) (2007).

2. High-Cost

The Large Company High-Cost Program subsidizes high-cost lines in areas served by the four largest incumbents: AT&T, Verizon, Embarq, and Windstream.[30] The Small Company High-Cost Program provides per-line subsidies in areas served by the other fifty-four incumbents.[31] Both programs were established by PUC orders issued in January 2000.[32] Both orders established per-line subsidy amounts, which have not changed since then.[33] Although the subsidy per line is fixed, the total subsidy a carrier receives may change as the number of lines it serves changes. Subsidies are portable. Any company designated by the PUC as an "Eligible Telecommunications Provider" (ETP)—incumbent or competitor—can receive the per-line subsidy the incumbent receives in the location where service is offered.[34] In practice, incumbents have received 96% of the disbursements from the Large Company High-Cost Program[35] and 98% of the disbursements from the Small Company High-Cost Program.[36]

The two high-cost programs were designed to replace large hidden subsidies that flowed from long-distance to local service.[37] The PUC believed that these subsidies would not be sustainable in a more

---

30. UNIVERSAL SERVICE REPORT, *supra* note 1, at 21 tbl.6.

31. *Id.* at 40, tbl.7.

32. Tex. Pub. Util. Comm'n, Compliance Proceeding for Implementation of the Texas High Cost Universal Service Plan, Docket No. 18515 (Jan. 14, 2000) (final order), *available at* http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/172930.DOC. [hereinafter Large Company Decision]; Tex. Pub. Util. Comm'n, Compliance Proceeding for Implementation of the Small and Rural Incumbent Local Exchange Carrier Universal Service Plan, Docket No. 18516 (Jan. 14, 2000) (final order), *available at* http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/172929.DOC. [hereinafter Small Company Decision].

33. While the revenue benchmarks of $38 for residential lines and $52 for business lines remain for the moment, the PUC recently passed a new rule. The Commission removed the distinction between business and residential lines in its regulations, replacing it with the prospect that "[a]fter notice and opportunity for hearing, the commission shall determine which lines shall receive support." 16 TEX. ADMIN. CODE § 26.403(e)(1)(C)(i) (2007). Further, it removed the previous method for determining revenue benchmarks, replacing it with language stating that "[a]fter notice and opportunity for hearing, the commission shall establish an appropriate benchmark or benchmarks." 16 TEX. ADMIN. CODE § 26.403 (e)(1)(B). The previous eligible lines and revenue benchmarks remain in place until these opportunities for hearing have taken place. *See* Tex. Pub. Util. Comm'n, PUC Rulemaking to Revise Substantive Rule § 26.403 Texas High Cost Universal Service Plan (THCUSP), Docket No. 34060, (June 27, 2007), at 3 (Order Adopting an Amendment to § 26.403 as Approved at the June 22, 2007 Open Meeting) [hereinafter High Cost Revision Order].

34. UNIVERSAL SERVICE REPORT, *supra* note 1, at 11–12.

35. *Id.* at 15.

36. *Id.* at 36.

37. Large Company Decision, *supra* note 32; Small Company Decision, *supra* note 32.

competitive telecommunications market.[38] The hidden subsidies mostly took the form of high access charges imposed when delivering and receiving calls from long-distance companies, high rates for local toll, and some pooling of toll revenues among companies.[39] Both PUC decisions required the companies to reduce access charges and local toll rates by amounts approximately equal to the new subsidies.[40] Thus, the high-cost programs replaced opaque and implicit subsidies with explicit subsidies.

PUC Order 18515 established the Large Company High-Cost Program.[41] The order determined which lines are eligible for subsidies, as well as per-line subsidy amounts. The PUC used a cost model to estimate the companies' forward-looking cost per line in each wire center.[42] If the forward-looking cost per line in a wire center exceeds a PUC-determined revenue benchmark ($38 per month for residential lines or $52 per month for business lines),[43] each line in that wire center is eligible for a subsidy equal to the difference between the per-line cost and the per-line revenue benchmark.[44] Federal high-cost universal service subsidies received by the carrier are subtracted from the total subsidy for which the carrier is eligible to determine the actual payment the carrier receives from the Texas high-cost program.[45] Thus, the Texas Large Company High-Cost Program "tops up" federal subsidies, so that the companies have the opportunity to cover the PUC's estimate of their forward-looking costs.

---

38. *See* Large Company Decision, *supra* note 32, at 8–9 (holding that implicit subsidies will be eliminated); Small Company Decision, *supra* note 32, at 12–13 (holding that implicit support will no longer be supplied).

39. Large Company Decision, *supra* note 32; Small Company Decision, *supra* note 32.

40. *See* Large Company Decision, *supra* note 32, at 76–84 (regulating the allowed rates given particular programs); Small Company Decision, *supra* note 32, at 22–33 (detailing how rate reductions affect off-setting support).

41. Large Company Decision, *supra* note 32; UNIVERSAL SERVICE REPORT, *supra* note 1, at 11.

42. "Forward-looking cost" includes both capital and operating costs. Forward-looking cost is the cost of building and operating the telephone network that actually exists today, if it were built now at current costs. Large Company Decision, *supra* note 32, at 12–13 ("Only long-run forward-looking economic cost may be included in the model. The long-run period used must be a period long enough that all costs may be treated as variable and avoidable. The costs must not be the embedded costs of the facilities, functions, or elements. The study or model, however, must be based upon an examination of the current cost of purchasing facilities and equipment, such as switches and digital loop carriers . . . .").

43. UNIVERSAL SERVICE REPORT, *supra* note 1, at 12.

44. These benchmarks are under examination and will likely soon be changed. High Cost Revision Order, *supra* note 33, at 9–10.

45. UNIVERSAL SERVICE REPORT, *supra* note 1, at 14.

PUC Order 18516 established the Small Company High-Cost Program.[46] Due to data limitations, this program did not require cost studies. Rather, the PUC eliminated pooling of toll revenues and mandated reductions in long-distance access charges and local toll rates.[47] It then calculated the subsidy amount necessary to replace these revenue sources in each small company study area.[48] Each study area's subsidy was divided by the number of lines to yield a per line subsidy for that study area.[49]

Universal service funds come from percentage assessments on intrastate telecommunications services.[50] In 2005, the assessment rate was 5.65%; it fell to 5% in 2006 and 4.4% in 2007.[51] The vast majority of the money comes from assessments on three services: local, intrastate long-distance, and wireless.[52]

This study focuses on the three largest universal service programs, which provide the bulk of the subsidies for local telephone service, and the three services that contribute most of the assessments to the universal service fund.

B. *Local Telephone Regulation*

1. Deregulated Markets

To understand fully the effects of universal service programs on local telephone service, one must also understand how Texas regulates that service. In 2005, the Texas legislature passed Senate Bill 5 (S.B. 5), which deregulated all Incumbent Local Exchange Company (ILEC) markets unless the PUC determined—by January 1, 2006 for markets with at least 30,000 people and by January 1, 2007 for markets with fewer—that a particular market should remain regulated.[53] S.B. 5 prohibited the Commission from maintaining regulation in a market with at least 100,000 people.[54] If a market contained at least 30,000 but

---

46. Small Company Decision, *supra* note 32.

47. *Id.* at 2.

48. *Id.* at 3.

49. *Id.* at 1–4.

50. UNIVERSAL SERVICE REPORT, *supra* note 1, at 5.

51. UNIVERSAL SERVICE REPORT, *supra* note 1, at 6; TEX. PUB. UTIL. COMM'N, ORDER CHANGING THE TUSF ASSESSMENT, PROJECT NO. 21208 (April 12, 2007).

52. UNIVERSAL SERVICE REPORT, *supra* note 1, at 6 (reporting that wireless carriers contributed 43% of USF assessments and the four largest incumbent local exchange carriers contributed 37%). It is clear from the Large Company Decision and Small Company Decision that the other major contributor is long-distance.

53. TEX. UTIL. CODE ANN. §§ 65.051, 65.052(f) (Vernon 2007).

54. *Id.* § 65.052(b)(1).

fewer than 100,000 people, the commission could not continue regulation if:

> [I]n addition to the incumbent local exchange company, there [were] at least three competitors of which: (A) at least one [was] a telecommunications provider that h[eld] a certificate of operating authority or service provider certificate of operating authority and provide[d] residential local exchange telephone service in the market; (B) at least one [was] an entity providing residential telephone service in the market using facilities that the entity or its affiliate own[ed]; and (C) at least one [was] a provider in that market of commercial mobile service . . . not affiliated with the incumbent local exchange company.[55]

For markets with fewer than 30,000 people, the market was prima facie deregulated, but the bill mandated the PUC to devise a test to decide whether particular markets should remain regulated.[56] In addition, "an incumbent local exchange company may elect to have all of the company's markets remain regulated on and after January 1, 2006."[57] As of January 2007, 57 of 62 ILECs had elected to remain regulated.[58] A total of 71 markets have been deregulated: "36 in markets with a population greater than 100,000, 18 in markets with a population between 30,000 and 100,000, and 17 in markets with a population less than 30,000."[59] The figure and map provided in the commission's 2007 *Scope of Competition* Report show that these markets cover 74% of residential Texas access lines but only a small portion of the state's landscape.[60]

2. Regulated Markets

For markets that are still regulated, the type of regulation that governed each particular company before S.B. 5 passed still stands. The two types are traditional rate-of-return regulation and incentive regulation.

---

55. *Id.* § 65.052(b)(2).
56. *Id.* § 65.052(f).
57. *Id.* § 65.053(a).
58. TEX. PUB. UTIL. COMM'N, SCOPE OF COMPETITION IN TELECOMMUNICATIONS MARKETS OF TEXAS 3 (2007), *available at* http://www.puc.state.tx.us.telecomm/reports/scope/2007scope.tele.pdf [hereinafter COMPETITION REPORT].
59. *Id.*
60. *Id.* at 4.

a. *Rate-of-Return Regulation*

Under rate-of-return regulation, which was once the norm, the PUC has fairly broad discretion to set rates[61] under a statutory framework requiring the PUC to consider a range of objectives, including giving each company a "reasonable opportunity to earn a reasonable return on the utility's invested capital."[62]

b. *Incentive Regulation*

In an effort to transition to a competitive marketplace,[63] the 1995 Texas legislature gave incumbent local exchange companies the option to elect incentive regulation.[64] All four of the large company subsidy recipients elected this option.[65] Nine of the 54 small company subsidy recipients did too.[66] For companies that elected incentive regulation, rate governance splits into three parts: stand-alone basic network services, nonbasic services, and packages. The first part is stand-alone "basic network services."[67] The Texas legislature temporarily capped rates on basic network services at "the rates charged by a company on June 1, 1995, or, for a company that elect[ed] after September 1, 1999, the rates charged on the date of its election . . . ."[68] The cap was to last until the later of September 1, 2005, and the fourth anniversary of the

---

61. TEX. UTIL. CODE ANN. § 53.001(a) (Vernon 2007); Pedernales Elec. Coop. v. Pub. Util. Comm'n of Tex., 809 S.W.2d 332, 338 (Tex. App.—Austin 1991, no writ) ("So long as the Commission addresses the rate considerations set by PURA, the particular factors and the weight to be given those factors are within the Commission's discretion."); Tex. Ass'n of Long Distance Tel. Cos. v. Pub. Util. Comm'n of Tex., 798 S.W.2d 875, 886 (Tex. App.—Austin 1990, writ denied) ("The PUC is given broad discretion to design a utility's rate structure.").

62. TEX. UTIL. CODE ANN. § 53.051 (Vernon 2007).

63. *Id.* § 58.001 ("[I]t is the policy of this state to: (1) provide a framework for an orderly transition from the traditional regulation of return on invested capital to a fully competitive telecommunications marketplace in which all telecommunications providers compete on fair terms . . . .").

64. *Id.* § 58.021(a); UNIVERSAL SERVICE REPORT, *supra* note 1, at 23 n.35.

65. UNIVERSAL SERVICE REPORT, *supra* note 1, at 21 tbl.6.

66. *Id.* at 40 tbl.7.

67. For purposes of incentive regulation, the following (unless the PUC reclassifies them as nonbasic services under PURA § 58.024) are basic network services:

> (1) [F]lat rate residential local exchange telephone service, including primary directory listings and the receipt of a directory and any applicable mileage or zone charges; (2) residential tone dialing service; (3) lifeline and tel-assistance service; (4) service connection for basic residential services; (5) direct inward dialing service for basic residential services; (6) private pay telephone access service; (7) call trap and trace service; (8) access for all residential and business end users to 911 service provided by a local authority and access to dual party relay service; (9) mandatory residential extended area service arrangements; and (10) mandatory residential extended metropolitan service or other mandatory residential toll-free calling arrangements.

TEX. UTIL. CODE ANN. § 58.051(a) (Vernon 2007).

68. *Id.* § 58.054(b).

particular provider's election.[69] After the capped period ends, a company can raise stand-alone basic network service rates as long as the commission approves the raise and the increase is ". . . [c]onsistent with achieving universal affordable service."[70]

The second part is nonbasic services.[71] Incentive regulation capped rates for many nonbasic services until September 1, 2005, but now incentive-regulated companies have pricing flexibility on all nonbasic services without needing PUC approval.[72]

The final part consists of packages with both basic and nonbasic services. Incentive regulation allows a packaging company to independently and flexibly price bundles of services, including embedded basic services that would on their own be more strictly monitored.[73] For incentive-regulated companies, then, only stand-alone basic network services remain legislatively capped until the applicable statutory date, at which point a company wishing to increase rates must obtain PUC approval.

The overall trend is toward full deregulation. Through Senate Bill 5, ILECs with deregulated markets are able to increase rates on all services in those markets, except for nonbundled basic residential service.[74] These rates are capped until the PUC decides whether and how much to revise per-line universal service subsidies,[75] and the first day on which that decision could be made was September 1, 2007.[76]

Thus, Senate Bill 5 set the stage for the PUC to simultaneously consider reforms of both the universal service programs that subsidize local telephone service and changes in the price of nonbundled basic residential service.

---

69. *Id.* §§ 58.054(a), (c).

70. *Id.* § 58.060.

71. Nonbasic services are defined to include flat rate business local exchange telephone service, business tone dialing service, service connection for all business services, and "all other services subject to the commission's jurisdiction that are not specifically classified as basic network services in Section 58.051." *Id.* § 58.151.

72. *Id.* § 58.152.

73. *Id.*

74. UNIVERSAL SERVICE REPORT, *supra* note 1, at 23 n.35, 42 n.112.

75. TEX. UTIL. CODE ANN. § 65.102(a)(3), § 65.153(b)(2) (Vernon 2007).

76. *Id.* § 56.031.

III. STANDARDS FOR EVALUATING UNIVERSAL SERVICE FUND REFORMS

The overriding policy of Texas telecommunications legislation is to protect telephone customers in the "public interest."[77] Federal universal service legislation uses the same standard.[78] The public interest standard in the telecommunications context is closely linked to consumer welfare.[79] In 1986, an FCC commissioner phrased the test as follows: "[f]irst . . . every action must be judged by the public interest benchmark: does it advance or diminish consumer welfare?"[80] One year later, in determining whether to move from traditional rate-of-return regulation to incentive regulation, the FCC stated that "[o]ur goal in this proceeding is to determine if the price cap model could be adapted so that it better protects and promotes consumer welfare and the public interest in an efficient and reasonably priced telecommunications network than does cost-of-service regulation."[81] Nearly a decade after, when the FCC decided "the public interest w[ould] be better served" by granting limited regulatory waivers to a local telephone company with a regional monopoly in exchange for increased competition within its market, it focused on whether

---

77. *Id.* § 51.001(a) ("To encourage and accelerate the development of a competitive and advanced telecommunications environment and infrastructure, new rules, policies, and principles must be formulated and applied to protect the public interest. . . . It is the purpose of this subtitle to grant the commission authority to make and enforce rules necessary to protect customers of telecommunications services consistent with the public interest."); *id.* § 11.002(c) ("It is the purpose of [the Public Utility Regulatory Act] to grant the Public Utility Commission of Texas authority to make and enforce rules necessary to protect customers of telecommunications . . . services consistent with the public interest.").

78. 47 U.S.C. § 254(b)(7) (mandating that the FCC protect "the public interest, convenience and necessity" in implementing the universal services provision of the Telecommunications Act of 1996); *id.* § 254(c) (requiring the FCC to "consider the extent to which such telecommunications services . . . (D) are consistent with the public interest . . . " to decipher what services should be supported by the universal service fund).

79. Numerous commentators have emphasized the equivalence of the public-interest standard and the consumer welfare standard in telecommunications. *See, e.g.*, Calvin S. Goldman, Ilene Knable Gotts & Michael E. Piaskoski, *The Role of Inefficiencies in Telecommunications Merger Review*, 56 FED. COMM. L.J. 87, 113 (2003) (describing an FCC opinion which said that consumer welfare was the method of determining whether a merger passed the public interest test); Jerry Hausman & Howard Shelanski, *Economic Welfare and Telecommunications Regulation: The E-Rate Policy for Universal-Service Subsidies*, 16 YALE J. ON REG. 19, 28 (1999) (reporting an FCC Commissioner's assessment of the public interest test as asking whether the policy advanced consumer welfare or not); Jerry A. Hausman & J. Gregory Sidak, *A Consumer-Welfare Approach to the Mandatory Unbundling of Telecommunications Networks*, 109 YALE L.J. 417, 422-24 (1999) (proposing that the FCC adopt a the consumer welfare standard to maximize public interest).

80. *In re* GTE Sprint Communications Corporation, No. 85-348, 1986 FCC LEXIS 3217, at *40 (June 19, 1986).

81. Policy & Rules Concerning Rates for Dominant Carriers, 2 F.C.C.R. 5208, 5208 (1987).

competition would "help[] to maximize consumer welfare."[82] Thus, consumer welfare is an important criterion on which to analyze telecom regulation.

In the universal service context on both state and federal levels, the public interest also contemplates distributional objectives—namely, reducing telephone rates for certain types of consumers in order to make service available at reasonable and/or affordable rates.[83] The Public Utility Regulatory Act (PURA),[84] the Texas PUC's recent report on universal service,[85] the PUC's decisions creating the High-Cost subsidy programs,[86] and the PUC's regulations implementing the universal service fund[87] all state that the goal of the high-cost programs is to make basic local telecommunications service available to target populations at reasonable rates. Similarly, Lifeline service is meant to provide low-income consumers access to telecommunications services at just and reasonable rates.[88]

Achieving these objectives likely requires some reduction in overall consumer welfare, because the assessments that fund universal service programs alter prices and distort consumer behavior.[89] The universal service funding mechanism increases the prices of various telecommunications services, and these price increases lead consumers to use less of these services. Consumers, telecommunications firms selling these services, and governments reaping tax revenue from these services are all worse off as a result.

---

82. Ameritech Operating Cos. Petition for a Declaratory Ruling & Related Waivers to Establish a New Regulatory Model for the Ameritech Region, 11 F.C.C.R. 14,028, 14,082 (1996).

83. *See*, *e.g.*, Reza Dibadj, *Saving Antitrust*, 75 U. COLO. L. REV. 745, 816–17 (2004) ("[D]istributional goals are front and center in economic regulation."); Thomas G. Krattenmaker, *The Telecommunications Act of 1996*, 29 CONN. L. REV. 123, 172–173 (1996) (advocating the need for a Federal Spectrum Commission to manage spectrum assignment).

84. TEX. UTIL. CODE ANN. § 56.021 (Vernon 1998 & Supp. 2006) (PURA).

85. UNIVERSAL SERVICE REPORT, *supra* note 1, at 11, 22, 35, 40–42.

86. Large Company Decision, supra note 32, at 1; Small Company Decision, supra note 32, at 1.

87. 16 TEX. ADMIN. CODE §§ 26.401(a), 26.403(a) (large company), 26.404(a) (small company) (Vernon's 2007).

88. 47 U.S.C. 254(b)(3) ("[L]ow-income consumers . . . should have access to telecommunications and information services . . . that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas."); TEX. UTIL. CODE ANN. § 56.021(5) (linking Lifeline service to 47 C.F.R. Part 54, Subpart E, the federal regulations implementing Lifeline). That set of regulations flows from the statutory principles underlying universal service, including 47 U.S.C. 254(b)(3). *See also In re* Federal-State Joint Board on Universal Service, Recommended Decision, 12 F.C.C.R. 87, 272 (1996) ("The 1996 Act states that low-income consumers should have access to telecommunications services at rates that are just, reasonable, and affordable, and comparable to rates charged in urban areas.").

89. Jerry Ellig, *Costs and Consequences of Federal Telecommunications Regulations*, 58 FED. COMM. L.J. 37, 57–60 (2006).

Combining the consumer welfare and distributional components of the "public interest" standard, the ideal is to achieve the intended outcomes of universal service at the smallest possible cost to overall consumer welfare.[90] Some parts of the TUSF may be outdated and might be updated to save consumers millions of dollars without diminution of universal service goals.[91] Other parts can be administratively improved to better achieve legislative objectives while maintaining a well-functioning, less-distorted market for telecommunications services. In short, there is significant room to improve. To do so requires a clear understanding of intended outcomes, actual outcomes, and forgone consumer welfare associated with alternative funding and subsidy mechanisms. Without such analysis, decision makers cannot know whether they are achieving the public interest objectives of the universal service programs.[92]

IV. OUTCOMES OF UNIVERSAL SERVICE PROGRAMS

A. *Basic Principles*

1. Outcomes are Public Benefits

The desired outcomes of a program are the intended public benefits produced or public harms avoided as a result of the program. Statutory language may or may not identify the ultimate outcomes desired. The outcomes associated with universal service programs should be defined as the intended benefits to the public that actually occur as a result of the programs.

2. Assessment of Outcomes Requires Analysis of Causality

A meaningful assessment of outcomes must identify the extent to which the program has actually caused improvements in outcomes. It is not enough to identify positive trends. Either the outcome measure or some accompanying analysis should identify whether the program actually caused any change in the outcome.

---

90. *See* Hausman & Shelanski, *supra* note 79, at 32 ("It seems an uncontroversial principle that statutory goals should be achieved at the lowest possible cost. If one mechanism makes American consumers just as well off as another, more expensive mechanism, the public's interest lies in having the Commission implement the cheaper option.").

91. Indeed, the PUC has begun a process of revision to the Large Company Program. High Cost Revision Order, *supra* note 33.

92. *See generally* Hausman & Shelanski, *supra* note 79 (analyzing the consumer welfare losses associated with funding a particular federal universal service program through assessments on long distance and determining that lower-cost and better ways exist to serve the public interest).

Accurate evaluation requires a determination of the extent to which the outcome was actually caused by the program. A broad economic recovery, for example, might increase telephone subscribership among low-income households by increasing their incomes. Conversely, a recession might decrease subscribership by reducing incomes.[93] In either case, the observed change in subscribership should be attributed to changing economic conditions, not to the existence of the universal service program. Similarly, a local economic boom created when a rural area becomes an "outer suburb," retirement haven, or tourist destination might increase subscribership, but such improvement should also not be attributed to universal service programs.

3. Identifying Causality Requires Counterfactual Analysis

The most accurate way of determining causality is to compare the actual outcome to the outcome that would have occurred in the absence of the program. Careful counterfactual analysis, often based on econometrics or on careful selection of "treatment" and "control" groups, may be necessary. Regulatory economists often conduct this type of analysis, and it is often an input into regulatory and policy decisions.[94] Counterfactual analysis is also a well-understood method for assessing program effectiveness. It is a critical component of valid performance measures.

B. *Outcomes for the Lifeline and High-Cost Programs*

Numerous sources, including the Texas PUC, cite the goal of universal service programs as availability at reasonable or affordable rates.[95] Availability at reasonable rates, however, should not be an end in itself. Rather, access to basic telecommunications at reasonable rates presumably creates some type of benefit to the public that should be substantiated. Logically, access at reasonable rates cannot cause public benefits to occur unless it results in an increase in subscription or connectivity above the levels that would exist in the absence of the

---

93. Economic analyses of telephone subscribership usually find that income is a significant determinant of subscribership. CRANDALL & WAVERMAN, *supra* note 19, at 89–104.

94. For example, the debate over public policy toward cable television has been heavily informed by FCC statistics and FCC and GAO econometric analyses of the effects of wireline cable competition on the price of cable service. These statistics can be found in FED. COMMC'NS COMM'N, CABLE PRICE REPORT, FCC 06–179 (2005), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-06-179A1.pdf; U.S. GOV'T ACCOUNTABILITY OFFICE, TELECOMMUNICATIONS: DIRECT BROADCAST SATELLITE SUBSCRIBERSHIP HAS GROWN RAPIDLY, BUT VARIES ACROSS DIFFERENT TYPES OF MARKETS, REPORT # GAO-05-257, at 31 (April 2005).

95. *See supra* notes 77–80.

universal service programs.[96] Program evaluation, therefore, should be based on the following causal chain:

- Universal service programs cause basic local telecommunications service to be available at reasonable rates;
- Affordable access causes an increase in subscription; and
- Increased subscription generates economic or social benefits for the public.

1. Availability at Reasonable Rates

The PUC's universal service report concluded that the High-Cost and Lifeline Programs, in conjunction with rate regulation, achieve their purposes.[97] The report said that the purpose of the High-Cost Programs is "to provide financial assistance to ETPs [eligible telecommunications providers] that serve high-cost rural areas of Texas so that BLTS [basic local telephone service] may be provided at reasonable rates in a competitively neutral manner."[98] The commission noted that basic local rates have risen little if at all in high-cost rural areas of Texas since the programs began.[99] Thus, the PUC reasoned that the subsidies—along with regulation that has prohibited companies from unilaterally increasing basic local rates—have assisted in maintaining such rates at or near current levels over the life of the programs.[100]

The commission did note, when discussing the large-company program, that "[t]he preservation of existing BLTS rates, some of which have been in effect for decades, does not necessarily mean that existing rates are still reasonable."[101] As a result, for both programs, the commission recommended "resizing" and "retargeting" of payments along with reexamining the term "reasonableness."[102]

With regard to Lifeline, the PUC surveyed stakeholders' responses to the questions asked and noted that all stakeholders thought the program

---

96. COMPETITION REPORT, *supra* note 58, at 26 ("The percentage of households that have telephone service (telephone penetration) is one of the fundamental measures of the extent of universal service."); 29 Tex. Reg. 953 (January 30, 2004) (stating that the Office of Public Utility Counsel noted that an "increase in subscribership . . . furthered the goal of universal service").

97. UNIVERSAL SERVICE REPORT, *supra* note 1, at 24 (Large Company High-Cost); *id.* at 42 (Small Company High-Cost); *id.* at 61 (Lifeline).

98. *Id.* at 22 (Large Company); *id.* at 41 (Small Company).

99. *Id.* at 23 (Large Company); *id.* at 41 (Small Company).

100. *Id.*

101. *Id.* at 24.

102. *Id.* at 28, 46.

was accomplishing its intended purpose.[103] Because the stakeholders thought so, the PUC agreed.[104]

Given the recent deregulation of basic rates and the historical mixture of rate caps, High-Cost Program subsidies, Lifeline discounts, and other factors, the PUC did not quite conclude or demonstrate that the universal service programs *caused* service to be available at reasonable rates.[105] In other words, it is unclear that but for the universal service programs in their current form, service would either not be available or would not be available at reasonable rates. We now examine this issue further.

a. *Availability*

To determine the effects of universal service programs on availability of service requires fairly careful analysis. For each program, the challenge is ascertaining whether some kind of infrastructure to provide the service would be available without the subsidy. This task is different from ascertaining whether the infrastructure that currently exists would have been available without the subsidy.

In some rural areas, wireline telephone service might not exist in the absence of subsidies, but other solutions might now be feasible. Wireless phone service, for example, is available from major carriers for $30–$40 per month.[106] Wireless infrastructure exists in rural areas covered by these wireless networks, so basic telecommunications service is available in these areas from wireless companies. The FCC's most recent report on wireless competition includes a series of maps that indicate wireless service is available in every county in Texas.[107] Maps that measure availability of the wireless signal, however, indicate that some rural areas in Texas lack wireless coverage.[108]

---

103. *Id.* at 61.

104. *Id.*

105. COMPETITION REPORT, *supra* note 58, at 19 ("Historically, [low local rates have] been accomplished by the combination of legally capped rates, Provider of Last Resort obligations, Federal Universal Service Fund (FUSF) and Texas Universal Service Fund (TUSF) support programs.").

106. Sprint, http://www.sprint.com (follow "Plans" hyperlink; then follow "Individual Plans" hyperlink) (last visited Dec. 16, 2007) (offering a 200 minute wireless package for $29.99); T-Mobile, http://www.T-mobile.com (last visited Dec. 16, 2007) (offering a 300 minute wireless package for $29.99).

107. In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, WT Docket No, 06–17, Eleventh Report 109 (2006) *available at* http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-06-142A1.pdf [hereinafter FCC Wireless Report].

108. *Id.* at 110–11.

One can purchase 50–500 minutes per month of stand-alone satellite phone service for $50.00–120.00, with an unlimited usage plan that costs $49.99 per month with a multi-year subscription.[109] Vonage, one of the leading VoIP providers which charges $24.99 per month, claims that its voice service will work with a satellite Internet connection.[110] Satellite broadband Internet is available for $79.99 or more per month, including equipment rental.[111]

A key question, of course, is whether wireless, satellite, and VoIP count as available services for universal service purposes. Texas law gives the PUC wide latitude in this regard. The Commission has the power to "adopt eligibility criteria . . . to fund the universal service fund and make distributions from that fund."[112] It also "determine[s] which telecommunications providers meet the eligibility criteria."[113] The statute mandates only that "[t]he eligibility criteria must require that a telecommunications provider, in compliance with the commission's quality of service requirements: (1) offer service to each consumer within the company's certificated area . . . and (2) render continuous and adequate service within the company's certificated area . . . ."[114] Within this legislative framework, the PUC decides eligibility criteria and quality of service standards.[115]

---

109. Global Satellite, http://www.globalstarusa.com/en/airtime/voicepricing/ (last visited Dec. 16, 2007) (offering 50–500 satellite phone minutes for $50–$120, an unlimited usage plan with multi-year subscription for $49.99 in the first year, declining to $39.99 in the second year and $19.99 in the third and fourth years, and various equipment rental options).

110. Vonage,   Premium   Residential   Unlimited   Plan, http://www.vonage.com/call_plans_residential_premium.php?lid=residential_premium&refer_id= WEBSR0706010001W1 (last visited Dec. 16, 2007).

111. HugesNet for Home, Pricing, http://go.gethughesnet.com (follow "Pricing" hyperlink) (last visited Dec.16, 2007).

112. TEX. UTIL. CODE ANN. § 56.023(a)(1) (Vernon 2007).

113. *Id.* § 56.023(a)(2).

114. *Id.* § 56.023(b).

115. As corollary to requirements for companies to achieve ETP status, incumbent companies serving as providers of last resort (POLR) in a particular area must meet quality of service standards to maintain their POLR status. For companies providing POLR service through new (i.e., nonwireline) technologies, service standards are uncertain. Texas statute allows a holder of a certificate of convenience and necessity to "meet the holder's provider of last resort obligations using any available technology." TEX. UTIL. CODE ANN. § 54.251(c) (Vernon 2007). If a company uses nonlandline technology, "[a]s determined by the commission, the certificate holder shall meet minimum quality of service standards . . . comparable to those established for traditional wireline or landline technologies." *Id.* The PUC has initiated a project to develop quality of service standards for certificate holders attempting to meet POLR obligations using alternative technologies, but the project appears stalled. *See* Texas PUC, Establishment of Telecom Service Quality Standards for Alternate Technologies use by a POLR: Project #31958, http://www.puc.state.tx.us/rules/rulemake/31958/31958.cfm (last visited Dec. 16, 2007) (listing the last action of the Texas PUC on this issue was the announcement of a meeting). As a result, no service quality standards governing the use of alternative technologies to meet POLR obligations have yet been established.

Under current PUC regulations, ETPs must, among other criteria, "assume[] the obligation to offer any customer in its ETP service area basic local telecommunications services . . . at a rate not to exceed 150% of the ILEC's tariffed rate,"[116] "provide[] the federally designated services to customers in order to receive federal universal service support,"[117] and render:

> [C]ontinuous and adequate service within the area or areas, for which the commission has designated it an ETP, in compliance with the quality of service standards defined in § 26.52 of this title (relating to Emergency Operations), § 26.53 of this title (relating to Inspections and Tests), and § 26.54 of this title (relating to Service Objectives and Performance Benchmarks).[118]

Only two nonwireline providers have been granted ETP status in Texas.[119] One is DialToneServices, a satellite service provider, which applied to be an ETC (to receive federal subsidies) and an ETP (to receive state subsidies).[120] Through five different dockets, the PUC granted its application in parts on August 2, 2005, and June 22, 2006.[121] The other is Western Wireless, a wireless provider that received its ETC and ETP status on October 31, 2000.[122] In its decision granting the application, the PUC explicitly advocated for competition.[123] The likely reason more nonwireline providers have not

---

116. 16 TEX. ADMIN. CODE § 26.417(c)(1)(B) (2007).

117. *Id.* § 26.417(c)(1)(A).

118. *Id.* § 26.417(c)(1)(D).

119. UNIVERSAL SERVICE REPORT, *supra* note 1, at 88–90 tbl. 9.

120. *Id.* at 88–90 tbl.9; Mobile Satellite Ventures Signs Agreement with DialToneServices as New Distribution Partner, http://www.msvlp.com/news_docs/releases/MSV_DialTone_PR-2.pdf (last visited Dec. 16, 2007).

121. *Id.* at 88.

122. *Id.* at 90.

123. Tex. Pub. Util. Comm'n, Application of WWC Texas RSA Limited Partnership for Designation as an Eligible Telecommunications Provider Pursuant to 47 U.S.C. § 214(e) and PUC Subst. R. 26.417, PUC Docket No. 22295, (final order) (2000); Tex. Pub. Util Comm'n, Application of WWC Texas RSA Limited Partnership for Designation as an Eligible Telecommunications Provider Pursuant to 47 U.S.C. § 214(e) and PUC Subst. R. 26.418, PUC Docket No. 22289 (final order) (2000) ("In making its decision in this matter, the Commission, in addition to ensuring compliance with statutory and regulatory requirements, was mindful of the effect of its decision on the competitiveness of the local telephone exchange market. As a matter of public policy, this Commission's actions should ensure that people have competitive opportunities they did not have before, not resulted in people losing existing competitive opportunities. Designating WWC as an ETC and ETP will afford people both choice for a local exchange carrier and increased access to enhanced services. As a result, customers in Texas are more likely to have lower prices, higher quality, and the rapid deployment of new telecommunications technologies. In addition, the Commission is unwavering in its support of a simple proposition: Rural Texans are not second class citizens and should not be deprived of competitive alternatives or access to new technologies. Finally, no citizen should be deprived of existing competitive opportunities as a result of implementing the Federal Telecommunications Act of 1996 (FTA).").

applied for ETP status is the difficulty in meeting the slew of regulatory requirements. However, as long as a particular company providing wireless, satellite, or VoIP service meets the statutory requirement to provide continuous and adequate service, the Commission can use its statutory discretion to create rules to include more of these as comparable services and thereby help achieve universal service in the most cost-effective way possible.

Even if the Commission does not revise its standards so more of these service providers qualify as ETPs and receive subsidies, it might still be reasonable to take the presence of their infrastructure into account when determining whether basic telecommunications services are available in rural areas. Reasonable people can disagree about whether the prices of wireless or satellite phone service satisfy the regulatory definition of "reasonable," but a great deal of wireless and satellite infrastructure is clearly available in rural areas. The only rural areas where the Texas universal service programs currently *cause* service to be available where it would not otherwise be available are those that would not have wireline, wireless, or satellite phone service in the absence of the subsidy programs.

b. *Rate Reasonableness*

Whether universal service subsidies have caused rates to be reasonable depends on one's definition of "reasonable." The PUC concluded that the universal service programs, along with rate caps, have kept rates at levels believed to be reasonable when the programs were created in 2000.[124]

It is quite likely that the universal service subsidies, combined with rate regulation, caused basic local rates to remain at their 2000 levels. Regulation forced basic local rates below long-run cost in all but the most densely populated areas.[125] Lifeline rates are also likely below the long-run cost of serving most Lifeline customers.[126] Universal service subsidies provide a pool of revenues that replace unsustainable hidden subsidies, thus allowing the companies to continue to offer service in

---

124. UNIVERSAL SERVICE REPORT, *supra* note 1, at 24, 42.

125. ROBERT W. CRANDALL & JERRY ELLIG, TEX. PUB. POLICY FOUND., TEXAS TELECOMMUNICATIONS: EVERYTHING'S DYNAMIC EXCEPT THE PRICING 41 (2005), *available at* http://www.texaspolicy.com/pdf/2005-01-telecom.pdf.

126. *See infra* p. 26 (estimating that the typical Texas consumer pays $19.32 for residential basic local service when all taxes and surcharges are included, versus $3.28 for a Lifeline customer).

high-cost areas and to low-income consumers at rates that fail to cover long-run costs.[127]

The subsidies might not deserve credit for causing rates to remain at 2000 levels if the universal service programs, combined with other regulations, crowded out competitive alternatives that could have provided even lower rates. This appears highly unlikely for all but a handful of lines. The lowest-cost competitive alternative we had been able to find is a limited stand-alone VoIP service, which was available to residential customers at an advertised price of $14.95, but that is no longer offered, and even that required a broadband Internet connection.[128] Basic local residential service appears to cost less than this on the vast majority of large company lines.[129] Just six of the fifty-four small incumbents have any residential rates above $14.95 per month.[130] The subsidized price may have crowded out competitive alternatives with lower *costs* than the incumbents,[131] but it is doubtful any competitive alternatives could have beaten the *subsidized rates* the incumbents charged on these lines. If one accepts the 2000 rate levels for basic local service as the appropriate benchmark for "reasonable" rates, then the universal service programs likely caused rates for rural and low-income consumers to satisfy this definition of "reasonable."

While finding that universal service subsidies have led to reasonable rates, the Commission also hinted that higher rates for basic local telecommunications service might also be considered reasonable.[132] These statements are not necessarily contradictory. It appears the PUC concluded that rates on lines subsidized by the universal service programs are not unreasonably high. While hinting that higher rates might also be reasonable, the PUC declined to label the current rates unreasonably low.[133] However, a reasonable person might reasonably make that inference.

---

127. *See supra* Part I.A.2.

128. *See* Skype, Help, http://support.skype.com/index.php?_a=knowledgebase&-_j=questiondetails&_i=103 (last visited Dec. 16, 2007) (explaining that stand-alone VoIP requires that the consumer have a broadband Internet connection, which, of course, is an additional expense).

129. UNIVERSAL SERVICE REPORT, *supra* note 1, at 21 tbl.6. Verizon and Embarq both have some lines priced at $16, but we cannot determine from the data in the PUC report if any of these lines receive universal service subsidies.

130. These six are Border (all residential lines $19), Dell (all residential lines $15), Five Area (all residential lines $17), SW Arkansas (all residential lines $18), Sugar Land (maximum $16), and Valley (maximum $15). *Id.* at 54 tbl.7.

131. CRANDALL & ELLIG, *supra* note 125, at 30–31.

132. UNIVERSAL SERVICE REPORT, *supra* note 1, at 24, 28, 46.

133. *Id.* at 24.

2. Effect on Subscription

Both the High-Cost and Lifeline Programs help reduce telephone rates for targeted populations. As a result, they bring more rural and low-income households onto the phone network. However, most studies find that subscription levels for local telephone service change very, very little in response to changes in price.[134] Many recent studies find elasticities of demand between -0.01 and -0.026; that is, a 1% change in price leads to 0.1% or 0.2% change in subscriptions.[135] Empirical studies commonly presume that low-income households are more sensitive to the price of local phone service than high-incomes households.[136] Therefore, it might be appropriate to use a somewhat higher elasticity of demand to estimate the effects of the Lifeline Programs. The highest elasticity of demand for local phone service estimated since 1980 appears to be about -0.05.[137]

The elasticity of demand can be used to estimate the effects of the Lifeline and High-Cost Programs on subscribership. Mathematically, the elasticity of demand is defined as $(\Delta q/q_1)/(\Delta p/p_1)$,[138] where:

q_1 = observed number of subscribers;

Δq = change in the number of subscribers associated with a postulated price change;

Δp = the postulated price change;

p_1 = observed price.

If one has an estimate of the elasticity and also the values of p_1, Δp, and q_1, then one can solve for the key variable of interest: Δq, the number of new subscribers caused by the subsidy program. Dividing

---

134. A.H. Barnett & David L. Kaserman, *The Simple Welfare Economics of Network Externalities and the Uneasy Case for Subscribership Subsidies*, 13 J. REG. ECON. 245, 252–53 (1998); David L. Kaserman, John W. Mayo & Joseph E. Flynn, *Cross-Subsidization in Telecommunications: Beyond the Universal Service Fairy Tale*, 2 J. REG. ECON. 231 (1990); CRANDALL & WAVERMAN, *supra* note 19, at 91.

135. CRANDALL & WAVERMAN, *supra* note 19, at 91.

136. *Id.* at 110 (assuming that the elasticity of demand declines in absolute value from -0.0475 for the lowest-income households to -0.001 for high-income households).

137. *Id.* at 90 (citing Perl's 1983 study implying a demand elasticity of -0.055); *id.* at 91 (citing several other studies estimating a demand elasticity of -0.04); *id.* at 110 (assuming that the lowest-income households have a demand elasticity of -0.0475). *See also* Christopher Garbacz & Herbert G. Thompson, *Estimating Demand with State Decennial Census Data from 1970-1990,* 21 J. REG. ECON. 317, 326 (2002) (showing elasticities between -0.028 and -0.047 when using pooled 1970–1990 data).

138. WALTER NICHOLSON, MICROECONOMIC THEORY: BASIC PRINCIPLE AND EXTENSIONS 176 (8th ed. 1994).

the cost of the program by the number of new subscribers generated by the program yields a key measure of cost-effectiveness: dollars spent per successful outcome.

a. *Lifeline*

To analyze the effects of Lifeline, one can examine the total effect of the combined federal and state funding, the effect of the federal component only, or the additional effect of the state component when added on top of the federal component. The following table estimates the average monthly cost of local phone service for a non-Lifeline customer and for a Lifeline customer. It also shows how much the Lifeline customer would pay if the Texas Lifeline Program did not exist.

The Texas and federal programs combined reduce the average price of local phone service significantly, from $19.32 per month to $3.28 per month. If there were no Texas Lifeline Program, the federal program would still cut the price by about $10, from $19.32 to $9.52. The Texas program facilitates an additional price reduction of about $6.25, from $9.52 to $3.28. This occurs partly because of the Texas Lifeline subsidy, partly because of the additional federal matching funds, and partly because consumers who receive the discounts pay lower taxes and universal service fees, since taxes and universal service assessments are calculated as a percentage of revenues.

	Non-Lifeline	Texas Lifeline	Federal Lifeline Only
Local Rate	$9.76	$9.76	$9.76
Federal Subscriber Line Charge (Maximum)	$6.50	$0	$0
Federal Lifeline Discount	$0	-$3.50	-$1.75
Texas Lifeline Discount	$0	-$3.50	$0
Subtotal	$16.26	$2.76	$8.01
Add-on Charges			
Texas State/Local Tax (Average 9.5%)	$1.54	$0.26	$0.76
Texas USF Assessment	$0.78	$0.13	$0.38
Federal Tax (3%)	$0.49	$0.08	$0.24
Federal USF Assessment	$0.24	$0.04	$0.12
Total Price	**$19.32**	**$3.28**	**$9.52**

FIGURE 1: Effect of Lifeline Program[139]

These price changes, combined with Lifeline subscribership data and an estimate of the elasticity of demand, can be used to calculate the effects of the Lifeline Program on telephone subscribership. We estimate how much the price paid by Lifeline customers would increase and how much subscribership would decrease, if there were no Lifeline Program at all, or if the federal program continued but there were no Texas Lifeline Program.

Our results suggest that Lifeline has a noticeable effect on the number of low-income subscribers but a relatively small effect on overall telephone penetration. As a whole, the Lifeline Program appears to have increased telephone subscribership in Texas by about 141,589 households at most. Of that amount, about 55,062 can be directly attributed to the expenditures from the Texas Universal Service Fund and the matching federal expenditures. The Lifeline Program has *not* increased subscribership by the full 579,339 households enrolled in the

---

139. *See infra* Appendix.

program in 2005 because many of these households would have had telephones even in the absence of Lifeline. Overall, about one-quarter of Lifeline subscribers are on the phone network because of Lifeline, and about ten percent of Lifeline subscribers are on the phone network because of the state of Texas' Lifeline Program. The Texas Lifeline Program appears to have increased total subscribership in Texas by approximately four-tenths of one percent.

Figures on subscribership induced by the program can be combined with cost figures to measure cost-effectiveness. The table shows that Lifeline as a whole adds new subscribers to the phone network in Texas at a cost of $663 per new subscriber. The figure falls slightly if one counts just the Texas USF expenditures and ignores the cost of the federal matching funds.

These results paint a brighter picture of Lifeline's success in Texas than most other studies that assess the effects of Lifeline nationally. A big reason is that we assumed a relatively high elasticity of demand, -0.05. This elasticity figure is toward the high end of the elasticities estimated in previous studies.[140] Therefore, an elasticity of -0.05 may somewhat overstate the effects of Lifeline subsidies on low-income households' demand for phone service.

Several earlier studies using nationwide data found that Lifeline has a smaller effect on subscribership, but some found no effect. A 1997 study by Christopher Garbacz and Herbert G. Thompson, using data from the 1990 Decennial Census, found that expenditures on Lifeline and Linkup Programs do increase telephone penetration but by very small amounts.[141] A ten percent increase in expenditures would lead to less than a one tenth of one percent increase in the percentage of households with telephones.[142] Studies by the same authors, using 2000 census data, estimate that Lifeline and Linkup increase subscription at a cost of $1,581–$2,200 per additional subscription.[143] The authors conclude:

> This is a direct result of the fact that a high proportion of program monies go to households that are already on the network and do not plan to leave. How to target those not on the network, while denying

---

140. *See supra* note 137.

141. Christopher Garbacz & Herbert G. Thompson Jr., *Assessing the Impact of FCC Lifeline and Link-Up Programs on Telephone Penetration*, 11 J. REG. ECON. 67, 77 (1997).

142. *Id.*

143. Garbacz & Thompson, *supra* note 137, at 320, 328; Christopher Garbacz & Herbert G. Thompson, *Estimating Telephone Demand with State Decennial Census Data from 1970–1990: Update with 2000 Data*, 24 J. REG. ECON. 373, 377 (2003).

payments to those already on the network who are in no danger of leaving is a conundrum.[144]

More recently, Garbacz and Thompson used the same method to assess the effects of Lifeline and Linkup separately.[145] They found that Linkup had no effect on telephone penetration and that Lifeline was responsible for most of the effect they previously attributed to both programs jointly.[146]

A 2004 study confirms these estimates and inferences, finding that Lifeline and Linkup Programs increased total subscribership by about 0.155% in 2000.[147] Overall, the programs cost about $97 per household that receives subsidies but increased subscribership at a cost of approximately $1,899 per additional subscriber.[148]

Finally, some studies find that the low-income programs have no effect on subscribership at all. One of the most extensive recent studies found that monthly charges have no influence on telephone penetration rates and that Linkup Programs sometimes increase and sometimes decrease penetration, depending on the data set used to estimate the relationship.[149]

Surveys of phoneless households help explain these results. The most common reasons that phoneless households give for not subscribing to telephone service is concern about uncontrollable usage-based charges, not the cost of basic local service.[150] A 1994 study of low-income households in New Jersey found that the cost of usage-related charges and optional services—such as long-distance, collect calls, calling-card calls, and voice mail—were the most common reasons that households lacked phone service.[151] Heads of households noted that other family members or friends living with them had run up large usage-related bills in the past, often without the knowledge or approval of the heads of households.[152] The authors concluded that "[i]ncome, employment, and other measures of wealth or poverty are strongly related to low penetration not because the price of basic local phone service is too

---

144. Garbacz & Thompson, *supra* note 137, at 328.

145. Christopher Garbacz & Herbert G. Thompson Jr., *Universal Telecommunication Services: A World Perspective*, 17 INFO. ECON. & POL'Y 495 (2005).

146. *Id.*

147. Daniel J. Ryan, Universal Telephone Service and Rural America 18 (April 30, 2004) (unpublished manuscript, on file with authors).

148. *Id.* at 18–19.

149. CRANDALL & WAVERMAN, *supra* note 19, at 94–104.

150. Milton L. Mueller & Jorge Reina Schement, *Universal Service from the Bottom Up: A Study of Telephone Penetration in Camden, New Jersey*, 12 INFO. SOC'Y 273, 287 (1996).

151. *Id.*

152. *Id.*

high, but because low-income users who run up large usage-related bills are unable to cover them."[153]

A 1995 survey of Texas households without telephones found that about half of them said the cost of local service makes it difficult to afford a telephone, but about 80% of phoneless households said they could afford to pay $16 per month, the actual average cost of local service in Texas at the time of the survey.[154] The primary barriers to phone service were 1) the fact that long-distance charges were variable and hence perceived as harder to control, 2) the cost of reinstallation for people who previously had service disconnected due to nonpayment of bills, and 3) difficulty in controlling who uses the phone.[155]

Viewed in this light, our calculation of the effects of the Texas Lifeline Program is quite optimistic. If we assume a lower price elasticity of demand, then we get results similar to those in many previous studies. At an elasticity of -0.02, for example, the Texas Lifeline Program causes just 22,025 additional subscriptions, at an average cost of $1,657 per additional subscriber (or $1,105 ignoring the federal matching funds). An elasticity of -0.01 reduces the number of new subscribers to about 11,000 and increases the cost per new subscriber to $3,314 (or $2,210 ignoring the federal matching funds).

---

153. *Id.*
154. JOHN B. HORRIGAN & LODIS RHODES, THE EVOLUTION OF UNIVERSAL SERVICE IN TEXAS (1995).
155. *Id.*

	Total Effect of Lifeline	Effect of Texas Lifeline
Inputs		
Lifeline Subscribers (q_1)	579,339	579,339
Price Without Program (p_2)	$19.32	$9.52
Change in Price Due to Program (Δp)	$16.04	$6.24
Price with Program (p_1)	$3.28	$3.28
Elasticity of Demand $(\Delta q/q_1)/(\Delta p/p_1)$	-0.05	-0.05
Results		
Change in Quantity (Δq), Subscribers	141,589	55,062
Change in Subscribers as a Percentage of Lifeline Households	24.4%	9.5%
Change in Subscribers as a Percentage of Total Texas Primary Lines	1.1%	0.4%
Total Government Expenditures on Lifeline	$94 million	$36 million
Total Expenditure per New Subscriber	$663	$663
Texas USF Expenditures on Lifeline	$24 million	$24 million
Texas USF Expenditures per New Subscriber	Not Applicable	$442

FIGURE 2: Differences between Texas Lifeline Program and total program[156]

b. *High-Cost*

The High-Cost Programs are more complex than Lifeline, and hence assessing their effect is also more complicated. Nevertheless, as with Lifeline, we can estimate the effects of the High-Cost Programs by first determining their effect on local telephone rates, then using the elasticity of demand to calculate the effect of that rate reduction on

---

156. *See infra* Appendix.

subscribership. For both the large company and small company programs, the PUC's Universal Service Report's data on line counts, rates, and subsidy amounts can be used to estimate the prices that various consumers would pay, on average, in the absence of the subsidies.

Because the two programs are structured somewhat differently and the PUC's report presents the data differently for the two programs, the details of the estimation methods are slightly different. The Large Company High-Cost Program provides different subsidy amounts for residential and business lines, so these can be analyzed separately.[157] The Small Company High-Cost fund provides a flat, per-line subsidy.[158]

The table below shows that, while an estimated 1.8 million lines receive High-Cost subsidies, the subsidies generate relatively few additional telephone subscriptions. Overall, the High-Cost programs cause about 50,000 new subscribers to be added to the phone network. The programs spent about $512 million in 2005, which works out to a cost of slightly more than $10,000 per new subscriber generated by the programs. Telephone subscribership in Texas is about one-third of one percentage point higher due to these programs.

There are some slight differences among the effects of High-Cost subsidies for large company residential lines, High-Cost subsidies for large company business lines, and High-Cost subsidies for small companies. The range of per-line subsidies is similar for large company residential lines and small company lines. But because the small companies' rates are generally lower, the per-line subsidy is larger in proportion to their rates. That means the per-line subsidy generates a larger percentage price reduction for customers of many small companies, which leads to a larger increase in subscribership for the same per-line subsidy. As a result, the small company program appears to be slightly more cost-effective. Similarly, the subsidies for business lines served by large companies have a much smaller effect, because business rates are higher than residential rates. A dollar of subsidy gives business customers a lower percentage price reduction, which means the subsidies for business lines will be less effective at generating new subscribers. This shows up as a much smaller percentage increase in business lines, and a much higher cost per new business subscriber.

---

157. UNIVERSAL SERVICE REPORT, *supra* note 1, at 12–13.
158. *Id.* at 13.

Overall, however, these calculations suggest that the High-Cost Programs are much less effective than Lifeline at bringing additional subscribers onto the phone network. The principal reason is our assumption, grounded in other authors' empirical research, that low-income subscribers are more price-sensitive than the market as a whole. Dollar for dollar, subsidies for low-income people will add more new people to the telephone network than subsidies in high-cost areas.

These results are consistent with previous findings in the scholarly literature.[159] Previous studies have focused on High-Cost support provided by the federal universal service program.[160] The federal High-Cost support programs appear to be a very costly way of increasing subscribership.[161] The most recent study on this topic estimates that the cost of adding one subscriber through loop support was at least $11,000 in 2000, up from $3,350 in 1990.[162] The cost of adding one subscriber through local switching support was $5,155, up from approximately $2,030 in 1990.[163] These figures are substantially similar to our estimates. They are also much higher than the $666 estimated by another study for 1985–1993.[164]

	Large Company, Residential	Large Company, Business	Large Company, Total	Small Company	Total, Large and Small
Inputs					
Subsidized Lines 2005 (q_1)	1,165,007	225,837	1,390,844	412,025	1,802,869
Weighted Average Subsidized Price (p_1)	$19.47	$36.95	Not Applicable	$17.09	Not Applicable
Average Subsidized Price, Range	$19.47	$36.95	Not Applicable	$13.66–$30.29	Not Applicable

159. Ryan, *supra* note 147.

160. *Id.*; Ross C. Eriksson et al., *Targeted and Untargeted Subsidy Schemes: Evidence from Post-Divestiture Efforts to Promote Universal Service*, 41 J.L. & ECON. 477, 499–500 (1998). This study uses data only for the Bell telephone companies, which receive a small portion of total High-Cost support and may not be typical.

161. Ryan, *supra* note 147.

162. *Id.* at 19.

163. *Id.* at 21.

164. Eriksson, *supra* note 160.

Total Annual Subsidy	$367 million	$65 million	$432 million	$80 million	$512 million
Average Monthly Support per Line (Δp), Range	$3.73–$226.39	$0.53–$212.39	$0.53–$226.39	$4.00–$236.00	$0.53–$236.00
Weighted Average Unsubsidized Price (p₂)	$50.69	$65.26	Not Applicable	$36.23	Not Applicable
Estimated Average Unsubsidized Price, Range	$23.90–$288.42	$37.59–$289.27	Not Applicable	$20.79–$310.67	Not Applicable
Elasticity of Demand (Δq/q₁)/(Δp/p₁)	-0.02	-0.02	-0.02	-0.02	-0.02
Results					
Change in Quantity (Δq), Lines	37,356	3,459	40,816	9,201	50,017
Change in Quantity as a Percentage of Subsidized Lines	3%	1.5%	2.9%	2.2%	2.8%
Change in Quantity as a Percentage of Total Texas Primary Lines	0.28%	0.03%	0.3%	0.07%	0.37%
Subsidy per Additional Line Caused by Program	$9,834	$18,663	$10,582	$8,655	$10,228

FIGURE 3: Effect of program broken down by type of company[165]

---

165. *See infra* Appendix.

One significant caveat to these results involves the elasticity of demand for local wireline telephone service. Consistent with previous studies, we assumed a demand elasticity of -0.02. Empirical studies of U.S. demand elasticities utilize data of actual prices which are distorted due to the presence of high-cost universal service subsidies. In the absence of the subsidies, prices in some rural areas would be much higher; at higher prices, consumers might be more price-sensitive. In the absence of good data on consumer responses to unsubsidized prices, we cannot know whether the elasticity of demand in rural areas would be higher. We can, however, test the effect of the demand elasticity assumption by recalculating our results using an elasticity of -0.05, the elasticity we assumed for Lifeline customers. It is at least plausible that if rural telephone rates rose very high rural consumers would behave much like low-income consumers because telephone rates would constitute a larger share of the household budget. If we assume a higher demand elasticity, the results change proportionately, as the table below shows.

Sensitivity Analysis	Large Company, Residential	Large Company, Business	Large Company, Total	Small Company	Total, Large and Small
Demand Elasticity	-0.05	-0.05	-0.05	-0.05	-0.05
Results					
Change in Quantity (Δq), Lines	93,391	8648	102,039	23,003	125,042
Change in Quantity as a Percentage of Subsidized Lines	8.0	3.8	7.3	5.6	6.9
Change in Quantity as a Percentage of Total Texas Primary Lines	0.70	0.06	0.76	0.17	0.93
Subsidy per Additional Line Caused by Program	$3,933	$7,465	$4,233	$3,462	$4,091

FIGURE 4: Effect after demand elasticity is adjusted

The higher elasticity of demand leads to an estimated increase of about one percent in telephone subscriptions attributed to the High-Cost Programs. The programs are much more effective, but still quite costly per new subscription caused.

V. FORGONE BENEFITS OF UNIVERSAL SERVICE ASSESSMENTS

A. *Basic Principles*

Texas universal service funds come from percentage assessments against telecommunications carriers' intrastate revenues.[166] The three principal sources of universal service assessments are local service,

---

166. UNIVERSAL SERVICE REPORT, *supra* note 1, at 5.

intrastate long-distance, and wireless.[167] When firms' revenues vary with the amount of service customers choose to buy, universal service contributions often act like a usage-based tax.[168] When applied to price-sensitive services such as long-distance and wireless, the assessment leads to substantial reductions in usage and output.[169] When applied to local phone service, where decisions about subscription and usage are not very sensitive to price, universal service assessments generate very little reduction in usage and output.[170]

Consumers are worse off when they use less of a service due to a price distortion, and telecommunications firms are worse off when they sell less of the service.[171] Other entities that receive more revenue when more of the service is sold—such as local telephone companies that charge per-minute fees for long-distance access, and federal, state, and local governments (which collect taxes based on the value of the service sold)—are also made worse off when consumption declines as a result of the price increase induced by the universal service assessment. Economists call these forgone benefits the "excess burden" or "deadweight loss" associated with the assessment.[172]

The forgone benefits associated with universal service programs can be measured in three ways:

- The amount of the assessment, which could have been spent on something else;
- The deadweight loss associated with the assessment; or
- The total of (1) and (2), which might be called the total cost of the program.

For each service that pays universal service assessments, the size of the assessment is equal to the price change times the number of units of output sold, or (mathematically) $\Delta p \cdot q_1$. The deadweight loss consists of two parts: forgone "consumer surplus" and forgone "producer surplus."[173]

---

167. *Id.* at 6.

168. The term "tax" here is used in the economist's sense, meaning a price difference imposed by government whose effects can be analyzed using standard tools for understanding the economics of taxation. We offer no opinion on whether universal service assessments satisfy the legal definition of a "tax" under either Texas or U.S. law.

169. Ellig, *supra* note 89, at 59–60.

170. *Id.* at 55–56.

171. Hausman & Shelanski, *supra* note 79, at 36–37; Jerry Hausman, *Taxation Through Telecommunications Regulation*, 12 TAX POL'Y & ECON. 29, 31 (1998).

172. Ellig, *supra* note 89, at 46–47.

173. Hausman & Shelanski, *supra* note 79.

When universal service contributions raise the price of a service, consumers use less of the service, and they are worse off as a result. The value that consumers forgo, minus the price they would have paid, is the forgone consumer surplus. The change in consumer surplus is approximately equal to one-half of the change in price attributable to universal service contributions times the change in quantity induced by the price change, or $0.5 \cdot \Delta p \cdot \Delta q$.[174]

When inflated prices prompt consumers to use less of a service, producers sell less of it. Producers lose operating profits and governments lose tax revenue. In the case of telecommunications, other parties (such as local phone companies that collect per-minute access charges from long-distance companies) also lose revenues. These lost revenues from forgone sales are called forgone producer surplus.[175] Forgone producer surplus is approximately equal to the change in quantity induced by the price increase times the difference between the price that would exist in the absence of universal service contributions minus the marginal cost, or $\Delta q(p_2 - m)$.[176] "Marginal cost" is the change in cost associated with producing one more unit of output.[177]

The total deadweight loss is thus equal to $0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$. The total cost of universal service assessments is the sum of universal service assessments plus deadweight losses for each service that pays assessments.

The trickiest aspect of these calculations, aside from actually getting the relevant data, is ascertaining how much of a change in quantity occurs as a result of the price change caused by the assessment. The change in quantity can be calculated from the change in price with the aid of an estimate of the price elasticity of demand, defined as $(\Delta q/q_1)/(\Delta p/p_1)$.[178] If one has an estimate of the elasticity and the values of p, Δp, and q, then one can solve for Δq. Our estimates of the forgone benefits associated with universal service programs are all derived from these simple mathematical relationships.

B. *Calculating the 2005 Baseline*

To provide a baseline for comparing the effects of alternative policies, we first estimate the effects of the universal service

---

174. *Id.* at 40.

175. *Id.*

176. *Id.*

177. 1 ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS 71 (1988).

178. NICHOLSON, *supra* note 138, at 176.

assessments using 2005 data and the 2005 assessment rate of 5.65%.[179] The year 2005 is the most recent year for which all the data necessary to perform the calculations are available. In 2007, the assessment rate declined to 4.4%.[180] We performed a sensitivity analysis to estimate the deadweight loss if the rate had been 4.4% in 2005. We caution, however, that the results of the sensitivity analysis do not measure the effects of the programs in 2007; to do that, we would need complete 2007 data, which are not available as of this writing.

1. Local Service

Universal service assessments likely have a negligible effect on subscription or usage of local voice telephone service. Local voice service is priced at a flat rate per month, and the elasticity of demand for local service is low.[181] Therefore, the deadweight loss associated with universal service assessments on local service is somewhere between zero and very small.

Universal service assessments might have a larger effect on another component of local service: the optional "vertical" features that many consumers now choose to purchase from the local phone company, such as voice mail, call-waiting, and caller ID. If the demand for these services is sufficiently elastic, then the universal service assessments on these services could reduce purchases and generate deadweight losses. Unfortunately, we have been unable to locate any reliable, publicly available data on subscription levels or the elasticity of demand for these services. Universal service assessments probably generate some deadweight loss by reducing sales of vertical services, but we are unable to calculate it.

2. Long-Distance

Because consumer demand for long-distance service is very responsive to price, a universal service funding mechanism that inflates the price of long-distance service generates significant reductions in consumer and overall social welfare. Historically, universal service assessments have acted like a per-minute surcharge on the price of intrastate long-distance service.[182] This is because most long-distance customers paid by the minute—either explicitly or because they chose

---

179. UNIVERSAL SERVICE REPORT, *supra* note 1, at 6.
180. TEX. PUB. UTIL. COMM'N, ORDER CHANGING THE TUSF ASSESSMENT, PROJECT NO. 21208 (April 12, 2007).
181. Ellig, *supra* note 89, at 55–56.
182. Ellig, *supra* note 89; Hausman & Shelanski, *supra* note 79.

to purchase "buckets" of minutes whose price varied with the number of minutes purchased. Consequently, researchers typically estimate the effects of universal service assessments by modeling them as an increase in the per-minute price of long-distance service.[183]

Consumers now purchase packages that include unlimited long-distance service. These customers do not face a price per minute each time they make a long-distance call. Nevertheless, it is likely still accurate to model universal service assessments on long-distance as an increase in the per-minute price. If many of the most price-sensitive customers still purchase long-distance by the minute or in buckets with finite numbers of minutes, then a per-minute surcharge will still have a significant effect on the amount purchased.[184]

The table below shows the most likely estimates of Texas intrastate long-distance assessments and the accompanying deadweight loss, using 2005 data and the 2005 assessment rate of 5.65%.

The universal service assessment on intrastate long-distance clearly generates a large deadweight loss—approximately $21 million annually. Put another way, the deadweight loss equals approximately $0.54 for each $1 contributed by intrastate long-distance to the universal service fund. These costs are far above those estimated for other, more general forms of taxation, which usually involve a reduction in consumer welfare (or "excess burden") of $0.25–0.40 per $1 raised.[185]

Our estimates are consistent with the results of other scholarly analyses of the effects of long-distance surcharges. Previous research has found that federal universal service assessments on long-distance generate a deadweight loss ranging from $0.43–0.79 per $1 of assessment.[186] Crandall and Ellig estimated the size of the Texas universal service deadweight loss by extrapolating from national research results that found each $1 raised through an assessment on long-distance service leads to a deadweight loss of $0.65–0.79.[187] Estimating a Texas universal service assessment on long-distance of $80 million based on pre-2003 data, they concluded that the

---

183. Ellig, *supra* note 89; Hausman & Shelanski, *supra* note 79.

184. This conclusion follows the same reasoning as in Jerry Ellig & James N. Taylor, *The Irony of Transparency: Unintended Consequences of Wireless Truth-in-Billing*, 19 LOY. CONSUMER L. REV. 43, 61–62 (2006).

185. Jerry Hausman, *Efficiency Effects on the U.S. Economy from Wireless Taxation*, 53 NAT'L TAX J. 733, 740 (2000).

186. Ellig, *supra* note 89, at 98–99; Hausman, *supra* note 171, at 40; Hausman & Shelanski, *supra* note 79, at 42–43.

187. CRANDALL & ELLIG, *supra* note 125, at 27.

deadweight loss totaled \$52–63 million annually.[188] Multiplying the \$0.65–0.79 figure by our estimated 2005 long-distance assessment of \$39 million yields a deadweight loss of \$25–30 million—not too far from our estimate in the table of \$21 million.

Inputs	
Price Including Taxes and USF (p_1)	\$0.083 per Minute
Per-Minute Universal Service Assessment (Δp)	\$0.004 per Minute
Price Without TUSF Assessment (p_2)	\$0.079 per Minute
Percent Change in Price Due to Assessment ($\Delta p/p_1$)	4.8%
Quantity (Q_1), Conversation Minutes	9.9 billion
Elasticity of Demand ($(\Delta q/q_1)/(\Delta p/p_1)$)	-0.7
Change in Quantity (Δq), Conversation Minutes	331 million
Marginal Cost (m)	\$0.017 per Minute
Results	
Estimated Universal Service Assessment ($\Delta p \cdot Q_1$)	\$39 million
Deadweight Loss ($0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$)	\$21 million
Total Social Cost ($\Delta p \cdot Q_1 + 0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$)	\$60 million
Deadweight Loss Per Dollar of Assessment	\$0.539

FIGURE 5: Long-distance using 2005 as a baseline (all figures annual)[189]

3. Wireless

Like the long-distance universal service assessments, universal service assessments on wireless are levied as a percentage of revenues. Since revenues from a customer depend on the size of the calling plan the customer purchases, universal service assessments act roughly like per-minute charges. Of course, to the extent that the most price-sensitive customers purchase small buckets of minutes and then pay a per-minute rate for minutes in excess of those allowed in the calling

---

188. *Id.*

189. *See infra* Appendix.

plan, universal service assessments also vary directly with usage. This means that they will likely have the same economic effects as a per-minute tax on wireless usage.[190]

The following table shows the most likely estimate of the effects of Texas intrastate universal service assessments on wireless service. We use 2005 data. In theory, the 5.65% assessment rate applies to intrastate revenues only. In practice, wireless providers rarely break out a separate price for intrastate minutes, so it is doubtful that consumers perceive the Texas universal service assessment as a price increase on intrastate wireless minutes. Since the assessment appears as an add-on charge on the bill that varies with the size of the charges, the more likely scenario is that consumers perceive the universal service charge as a surcharge on all minutes. This is how we model the effects of the universal service assessment on wireless: we multiply the assessment rate times the percentage of wireless charges that are allocated to the intrastate jurisdiction, then apply the resulting percentage price change to all minutes. Thus, a 5.65% assessment on intrastate minutes is perceived by consumers as a 2.9% price increase on all minutes. A 4.4% assessment on intrastate minutes would be equivalent to a 2.3% price increase on all minutes.

The universal service assessments on wireless generate a deadweight loss of $155 million, or $0.486 for every $1 of revenue raised. This result is consistent with findings in previous research. Crandall and Ellig estimated that Texas universal service assessments on wireless created a deadweight loss of $114 million.[191] This estimate, however, was based on data from the early 2000s, when wireless accounted for about 35% of universal service assessments.[192] Wireless now accounts for about 43% of universal service assessments, according to the Texas PUC.[193] Prior research found that federal universal service assessments on wireless generate deadweight losses of $0.53–0.56 per $1 of universal service funds raised.[194]

---

190. Ellig & Taylor, *supra* note 184, at 61–62.
191. CRANDALL & ELLIG, *supra* note 125, at 27.
192. *Id.*
193. UNIVERSAL SERVICE REPORT, *supra* note 1, at 6.
194. Ellig, *supra* note 89, at 98 tbl.2 (2006); Hausman, *supra* note 185, at 733.

Inputs	
Price Including Taxes and USF (p_1)	$0.082 per Minute
Per-Minute Universal Service Assessment (Δp)	$0.0024 per Minute
Price Without TUSF Assessment (p_2)	$0.0796 per Minute
Percent Change in Price Due to Assessment ($\Delta p/p_1$)	2.9%
Quantity (Q_1), Minutes	133 billion
Elasticity of Demand ($(\Delta q/q_1)/(\Delta p/p_1)$)	-1.12
Change in Quantity (Δq), Minutes	4.4 billion
Marginal Cost (m)	$0.045 per Minute
Results	
Estimated Universal Service Assessment ($\Delta p \cdot Q_1$)	$320 million
Deadweight Loss ($0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2-m)$)	$155 million
Total Social Cost ($\Delta p \cdot Q_1 + 0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2-m)$)	$475 million
Deadweight Loss per Dollar of Assessment	$0.486

FIGURE 6: Wireless with 2005 as a baseline (all figures annual)[195]

4. Totals

The current method of funding the Texas Universal Service Fund leads to substantial forgone benefits. Because assessments apply to price-sensitive services, the funding mechanism generated a deadweight loss totaling $176 million in 2005—equal to about half of the assessments raised from wireless and long-distance service. Thus, the total social cost of the universal service programs significantly exceeds the amount of revenue raised.

195. *See infra* Appendix.

Estimated Universal Service Assessment ($\Delta p \cdot Q_1$)	$618 million
Deadweight Loss ($0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$)	$176 million
Total Social Cost ($\Delta p \cdot Q_1 + 0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$)	$794 million
Deadweight Loss per Dollar of Assessment, Wireline	0
Deadweight Loss per Dollar of Assessment, Long Dist	$0.539
Deadweight Loss per Dollar of Assessment, Wireless	$0.486
Deadweight Loss per Dollar of Assessment, Overall	$0.286

FIGURE 7: Totals using 2005 as a baseline (all figures annual)[196]

C. *Social Cost-Effectiveness*

Since Texas universal service assessments generate substantial deadweight losses in addition to the revenues raised, an alternative measure of cost-effectiveness for universal service programs should include deadweight loss. "Social cost-effectiveness" can be calculated by dividing the total social cost by the increase in subscribership caused by the universal service programs.

The following table presents the results of this calculation for Lifeline, the Large Company High-Cost Program, and the Small Company High-Cost Program. We then calculated the deadweight loss associated with each program by estimating the deadweight loss associated with the universal service assessment that would be necessary to fund only that program. In each case, the total social cost per successful outcome (additional subscription) is quite large and substantially higher than the figure obtained when cost is measured by expenditures only.

When cost-effectiveness is measured by expenditures, the only strategies for improving cost-effectiveness are increasing effectiveness or reducing expenditures. When cost-effectiveness is measured by total social cost, one can also improve cost-effectiveness by altering the funding mechanism, so that the money is raised in some way that generates less deadweight loss.

---

196. *See supra* FIGURES 5, 6.

	Texas Lifeline	Large Company High-Cost	Small Company High-Cost
Increase in Subscribership Caused by Program	55,062	40,816	9,201
2005 Expenditure	$36 million	$432 million	$80 million
Deadweight Loss	$10.3 million	$124 million	$23 million
Total Social Cost	$46.3 million	$556 million	$103 million
Expenditure/Increase in Subscribership	$663	$10,582	$8,655
Social Cost/Increase in Subscribership	$841	$13,622	$11,184

FIGURE 8: Social cost-effectiveness of universal service programs[197]

D. *Sensitivity Analysis*

1. Universal Service Fund Assessment Rate

If the USF assessment rate had been 4.4% in 2005, the costs and deadweight losses would have declined proportionately. As the accompanying table shows, total deadweight loss falls from $176 million to $138 million at the lower assessment rate. Deadweight loss per dollar of revenue raised is relatively unchanged. This suggests that, even though the assessment rate has fallen, the costs of the programs are still fairly large.

---

197. *See supra* FIGURES 1–3.

Sensitivity Analysis:	Long-Distance	Wireless
Estimated Universal Service Assessment ($\Delta p \cdot Q_1$)	$30.4 million	$249 million
Deadweight Loss ($0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$)	$16.5 million	$122 million
Total Social Cost ($\Delta p \cdot Q_1 + 0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$)	$47 million	$371 million
Deadweight Loss per Dollar of Assessment	$0.543	$0.49

FIGURE 9: Effect of 4.4% USF assessment

2. Wireless Demand Elasticity

We assumed universal assessments on wireless act like per-minute charges. If consumers do not perceive them as per-minute charges, then a different assumption about the elasticity of demand may be warranted.

The elasticity of demand for wireless *subscription* is much lower than the elasticity of demand for wireless *minutes of use*. Most economic studies that estimate the demand for wireless subscription (using the number of subscribers per hundred or the probability of subscription as the dependent variable) yield elasticities between -0.43 and -0.71.[198] That is, a 1% increase in the monthly subscription price reduces the number of subscribers by between four-tenths and seven-tenths of 1%. This contrasts markedly with studies measuring the elasticity of demand for wireless minutes, which usually find that a 1% price change leads to a greater than 1% change in quantity.[199]

Some price-sensitive consumers might perceive universal service assessments as fixed rather than usage-based charges. It is possible, therefore, that the most accurate elasticity of demand for our

---

198. Jerry Hausman, *Cellular Telephone, New Products, and the CPI*, 17 J. BUS. & ECON. STAT. 188, 191 (1999) (estimating a demand elasticity of approximately -0.5 with 1988–1993 data); Hausman, *supra* note 185, at 738 (estimating a demand elasticity of -0.71); Mark Rodini et al*., Going Mobile: Substitutability Between Fixed and Mobile Access*, 27 TELECOMM. POL'Y 457, 470 (2003) (estimating an elasticity of -.43 with respect to the monthly access charge and an overall price elasticity of demand of -0.6 with 2000-2001 data).

199. THOMAS W. HAZLETT & ROBERTO E. MUÑOZ, AEI-BROOKINGS JOINT CENTER FOR REGULATORY STUDIES RELATED PUBLICATION 04-18, A WELFARE ANALYSIS OF SPECTRUM ALLOCATION POLICIES 15 (2004), *available at* http://www.aei-brookings.org/admin/authorpdfs/page.php?id=1024; J. GREGORY SIDAK, CRITERION ECONOMICS, IS STATE TAXATION OF THE WIRELESS INDUSTRY COUNTERPRODUCTIVE? (2003), *available at* http://www.criterioneconomics.com/docs/sidak_pacific_research.pdf (using 1999-2001 U.S. data).

calculations would be somewhere between the elasticities for wireless subscription and wireless usage. To test the sensitivity of our results to the elasticity assumption, we recalculated the deadweight loss in wireless assuming the demand elasticity equals -0.57, the midpoint of the elasticities of demand for wireless subscription reported in previous empirical studies. With this elasticity, the deadweight loss associated with universal service assessments on wireless in 2005 falls to $79 million. This lowers the total deadweight loss (wireless + long-distance) to $100 million.

VI. REFORM OPTIONS

The same analytical framework used to assess the outcomes and forgone benefits of universal service programs can be used to estimate the effects of various reform options. Below, we analyze a variety of reform options and discuss whether the PUC has authority to undertake the reforms without further legislation.

A. *Turn Back the Clock*

One conceivable option might be to scrap the current funding system and return to the pre-2000 system of subsidizing local phone service with high access charges or other fees on long-distance service. In 2000, the PUC concluded that the old system was not sustainable in a more competitive market.[200] Economic analysis demonstrates that the PUC was absolutely right.

1. Economic Analysis

At 2005 levels of intrastate long-distance conversation minutes (9.9 billion), prices ($0.05–0.10 per minute), and a demand elasticity of -0.7, it is mathematically impossible to set a long-distance access charge that will generate anywhere near the $619 million collected by the Texas Universal Service Fund in 2005. The following table shows the access charge that maximizes access revenues at various prices for long-distance service. At the 2005 level of conversation minutes and prices, it is doubtful that access charges could raise even half the money that the current universal service assessments generate. Access charges higher than those in the table would have led to a "death spiral" for wireline long-distance, in which higher access charges would have

---

200. Large Company Decision, *supra* note 32, at 1.

reduced traffic so much that the revenues available for subsidies would have fallen.

Long-distance traffic has fallen dramatically over the past few years as consumers have switched their long-distance calls to wireless and (more recently) voice over Internet. At the 2000 level of traffic and prices, an access charge of $0.0715 per conversation minute could have generated enough revenues to fund all of Texas's universal service programs.[201] Even in this case, however, the social cost would have been enormous, with deadweight losses exceeding $1.00 for every dollar in access charges.

Hindsight confirms that the old system of implicit subsidies was not sustainable, given the way competition for wireline long-distance service evolved. Even if price and traffic levels had remained at their 2000 levels, the social costs of implicit subsidies would have been huge. Although Texas's current system of universal service assessments generates large deadweight losses, it is clearly more sustainable and less costly than the system it replaced.

	Intrastate Conversation Minutes[202]	Price Per Minute	Access Charge	Revenues	Deadweight Loss	Deadweight Loss per Dollar Revenue
2005	19.7 billion	$0.05	$0.036	$176 million	$254 million	$1.43
	19.7 billion	$0.07	$0.05	$247 million	$385 million	$1.56
	19.7 billion	$0.10	$0.072	$353 million	$592 million	$1.67
2000	26 billion	$0.15	$.0715	$619 million	$732 million	$1.18

FIGURE 10: Deadweight loss over 2000–2005

2. Commission Authority

Texas legislation gives the PUC discretion to fund the TUSF through a "statewide uniform charge"[203] on "services and at rates the

---

201. This is quite close to the actual average intrastate access charge of $0.076834 per conversation minute calculated by the PUC in TEX. PUB. UTIL. COMM'N, REPORT TO THE 77TH TEXAS LEGISLATURE: SWITCHED ACCESS CHARGES Chart B-2 (2001), *available at* http://www.puc.state.tx.us/telecomm/reports/ISAC/rpt77leg_isac.pdf.

202. *See infra* Appendix.

commission determines."[204] In adopting rules implementing the current High-Cost Programs, the PUC replaced the previous unsustainable implicit subsidies with a general assessment on intrastate revenues.[205] The Commission had authority to change the funding mechanism without legislative mandate; thus it also has authority to change it back.

Since the pre-2000 system was unsustainable, however, the Commission cannot turn back the clock completely. If the Commission wanted to replace the current funding mechanism with per-minute fees solely on long-distance, it would have to cut the subsidies, since it is impossible to raise the same amount of money raised in 2000 given current levels of long-distance traffic and prices. Such an initiative would require a finding that the goals of the universal service programs can be accomplished with lower subsidies or that higher prices for basic local service in high-cost and rural areas are reasonable. If higher prices are reasonable, then a funding mechanism that generates less revenue could still satisfy the goals of the universal service programs.

B. *Per-Number Charge*

A per-number charge would shift the assessment from services that are very price-sensitive (long-distance and wireless usage) to services that are less price-sensitive (wireline and wireless subscription). In some sense, this would continue the evolution the PUC initiated in 2000 when it adopted the current funding system and stopped relying solely on elevated long-distance charges to fund universal service.

1. Economic Analysis

A per-number charge would apply to wireline, wireless, and cable telephony. Excluding Lifeline, there were approximately 26.7 million lines in Texas in 2005.[206] That implies a per-number charge of

---

203. TEX. UTIL. CODE ANN. § 56.022(a) (Vernon 2007).

204. *Id.* § 56.022(c).

205. *See* 16 TEX. ADMIN. CODE § 26.417(c)(2) (2007); Large Company Decision, *supra* note 32, at 3; Small Company Decision, *supra* note 32, at 21 (all noting the ILEC rate reductions are offset by universal service fund distributions).

206. There were 9,974,587 lines served by incumbent local exchange carriers, 2,032,641 lines served by competitive local exchange carriers, and 260,288 lines served by cable companies. COMPETITION REPORT, *supra* note 58, at 13 fig.3. Stand-alone VoIP providers are excluded because they do not contribute to the Texas universal service fund. We estimate there were 15,011,531 million wireless subscriptions in Texas in 2005—the midpoint of figures reported for June and December. FCC Wireless Report, *supra* note 107, at 97 tbl.2. These figures sum to 27,278,964.We then subtract the 579,339 Lifeline customers. UNIVERSAL SERVICE REPORT, *supra* note 1, at 60 fig.12. The remaining total is 26.7 million lines.

approximately $1.93 per month, to raise the $618 million in 2005 assessments.

We have already noted that the elasticity of demand for local wireline telephone service is close to zero.[207] A per-number charge would create negligible deadweight loss for wireline phone numbers and eliminate the deadweight loss on long-distance. It would still create some deadweight loss for wireless, but since wireless subscription is less price-sensitive than wireless usage, the deadweight loss would be lower.[208] The table below compares the 2005 baseline figures, which reflect the current funding mechanism, with a hypothetical system designed to raise approximately the same amount of revenue via a per-number assessment. The per-number charge may raise slightly less revenue due to the reduction in wireless subscriptions induced by the per-number charge.[209] The deadweight loss shrinks by about 50%, from $176 million to $86 million.

LINES	
Incumbent Local Exchange Carrier	9,974,507
Competitive Local Exchange Carrier	2,032,641
Cable	260,288
Wireless	15,011,531
TOTAL LINES	27,278,964
Minus Lifeline	579,339
TOTAL EXCLUDING LIFELINE	26,699,625
2005 Assessment	$618,000,000
Charge per number per month	$1.93

FIGURE 11: Per-number charge for Texas universal service

207. *See supra* p. 25.
208. Ellig & Taylor, *supra* note 184, at 61.
209. We qualify this statement with the word "may" because estimates of the elasticity of demand for wireless access typically control for the price of local wireline service—which means they assume the price of local wireline service remains unchanged when the price of wireless access changes. Demand for wireless access may be less elastic when a per-number charge on wireless is accompanied by a similar charge on wireline.

	Baseline	**Per-Number Charge**
Estimated Universal Service Assessment ($\Delta p \cdot Q_1$)	$618 million	$612 million
Deadweight Loss ($0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$)	$176 million	$86 million
Total Cost ($\Delta p \cdot Q_1 + 0.5 \cdot \Delta p \cdot \Delta q + \Delta q(p_2 - m)$)	$794 million	$704 million
Deadweight Loss per Dollar of Assessment, Wireline	$0	$0
Deadweight Loss per Dollar of Assessment, Long Distance	$0.539	$0
Deadweight Loss per Dollar of Assessment, Wireless	$0.486	$0.251
Deadweight Loss per Dollar of Assessment, Average	$0.286	$0.14

FIGURE 12: Effects of a per-number universal service charge[210]

These kinds of results are not unusual in telecommunications. Since the mid-1980s, for example, federal regulators have consistently sought to replace per-minute "access charges" that inflate the price of long-distance service with flat monthly federal-subscriber line charges.[211] Since subscribership is much less sensitive to price increases than per-minute long-distance use, the result has been a substantial increase in economic welfare.[212]

2. Commission Authority

The PUC has the authority to switch from a percentage assessment to a numbers charge on its own.[213] The applicable statute states that "[t]he uniform charge is on services and at rates the commission determines."[214] Based on this open mandate, the PUC promulgated

---

210. *See infra* Appendix.

211. *See* Jerry Ellig, *Intercarrier Compensation and Consumer Welfare,* 2005 U. ILL. J.L. TECH. & POL'Y 97, 98–99 (2005) (stating that the PUC has moved away from usage fees and made subsidy charges more transparent).

212. *See id.* (noting consumers have benefited with increased transparency as usage fees have been abandoned).

213. TEX. UTIL. CODE ANN. § 56.022(c) (Vernon 2007).

214. *Id.* Further, "[t]he commission shall: (1) . . . adopt eligibility criteria and review procedures . . . the commission finds necessary to fund the universal service fund . . . ; . . . (5)

regulations that based assessments on a telecommunications provider's "monthly taxable actual intrastate telecommunications services receipts."[215] Since this method for collecting assessments comes from PUC regulations, the PUC in turn can change the method to a numbers charge.

C. *Eliminate Rate Disparities*

The cost of providing wireline telephone service generally falls as population density increases. Cost-based pricing would result in lower rates in urban areas than in rural areas. Texas explicitly pursues the opposite policy, charging higher telephone rates as population increases.[216] The largest incumbent's local residential rates range from $8.00–11.00 per month, and its business rates range from $19.00–28.00 per month.[217] Other large incumbents have even wider disparities.[218] Some small incumbents charge residential or business customers the same price, but others have multiple rates.[219] The small incumbent with the widest range of residential rates is Sugar Land, whose rates vary from $5.00 to $16.00.[220]

Whatever the merits of making rates inversely related to cost as a general policy, the PUC might reasonably conclude that it should make an exception for customers whose lines receive explicit subsidies from other customers via the Universal Service Fund.

Rate disparities for nonbundled basic residential service could be eliminated in one of several ways. Within a company, the maximum rate on subsidized lines could be raised to the highest rate the company currently charges for nonbundled basic local service. Within the Large Company and the Small Company Programs, the maximum rate on subsidized lines could be set equal to the highest rate any incumbent in that program charges. Finally, the maximum rate for nonbundled basic

---

approve procedures for the collection and disbursal of the revenue of the universal service fund." *Id.* § 56.023.

215. 16 TEX. ADMIN. CODE § 26.420(f)(3)(A) (2007).

216. *See* PUB. UTIL. COMM'N OF TEX., REPORT TO THE 78TH TEXAS LEGISLATURE, SCOPE OF COMPETITION IN TELECOMMUNICATIONS MARKETS OF TEXAS 58, n.115 (2003), *available at* http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/24727_448_379188.PDF ("The Commission priced rate bands by value of service rather than by cost. Value of service assumes availability of the access line to the public switched network. Because a customer in a larger exchange is able to call or receive calls from a greater number of lines at no cost than can a customer in a smaller exchange, the larger exchange has more value and should be priced higher.").

217. UNIVERSAL SERVICE REPORT, *supra* note 1, at 21 tbl.6.

218. *Id.*

219. *Id.* at 40 tbl.7.

220. *Id.*

local service on subsidized lines could be set at the highest rate charged by any incumbent in the state.

Rate increases on subsidized lines would be accompanied by concomitant reductions in universal service subsidies. In the Large Company Area High-Cost Program, the PUC currently assumes a revenue benchmark of $38 for residential lines and $52 for business lines.[221] In some sense, this benchmark is the average revenue that the PUC assumes the company "ought" to be able to earn on that line from customers or other companies (including the regulated rate, the federal subscriber line charge, switched access charges, and other services for which a customer pays). This benchmark is subtracted from an estimate of each line's forward-looking cost when determining how much of a subsidy the line is eligible to receive.[222] If the PUC in its upcoming notice and opportunity for hearing on determining new benchmarks determines that the expected revenues have increased since 2000, then the revenue benchmark could increase with a concomitant decrease in per-line subsidies for Large Companies. Although the Small Company subsidies are not based on a cost model or revenue benchmark,[223] the PUC could similarly allow Small Companies to increase rates and adjust Small Company per-line subsidies downward, since rate increases will increase the expected per-line revenues.

1. Economic Analysis

The following table estimates the effects on program expenditures of eliminating rate disparities and using the additional revenues to reduce high-cost subsidies. Eliminating urban-rural rate differentials within each company for non-bundled residential service on subsidized lines would reduce the annual cost of the High-Cost Programs from $512 million to $466 million, for a savings of $46 million. As might be expected, raising all rates to the highest rate charged by an incumbent in each program generates larger savings. Large Company residential rates would rise to $16, and Large Company business rates would rise to $41—the highest rate charged by any Large Company.[224] Small

---

221. These numbers are subject to change, given the PUC's recent order concerning the High-Cost Universal Service Plan. *See* High Cost Revision Order, *supra* note 33, at 1 (calling for establishment of new benchmarks and new determination of which lines will receive support).

222. UNIVERSAL SERVICE REPORT, *supra* note 1, at 12.

223. *See id.* at 35 ("Unlike the Large Company Area High-Cost Program, wherein a cost model was used to establish wire-center-specific per-line support amounts, the per-line support amounts in the Small Company Area High-Cost Program were based upon an outright buy-down of certain rates.").

224. *Id.* at 21 tbl.6.

Company residential rates would rise to $19, the highest residential rate charged by any Small Company.[225] This step would save a total of $151 million. Finally, the largest savings come from eliminating rate differentials across all companies on subsidized lines. Residential rates would rise to $19 and business rates would rise to $44, the highest rates charged by any company.[226] Total expenditures on the High-Cost Programs would fall from $512 million to $329 million—a $183 million drop.

	Large Company Residential	Large Company Business	Small Company	Total
Baseline				
Expenditure	$367 million	$65 million	$80 million	$512 million
Within Company				
Expenditure	$338 million	$54 million	$74 million	$466 million
Savings	$29 million	$11 million	$6 million	$46 million
Within Programs	**$16 Maximum**	**$41 Maximum**	**$19 Maximum**	
Expenditure	$296 million	$39 million	$26 million	$361 million
Savings	$71 million	$26 million	$54 million	$151 million
Across All Companies	**$19 Maximum**	**$44 Maximum**	**$19 Maximum**	
Expenditure	$268 million	$35 million	$26 million	$329 million
Savings	$99 million	$30 million	$54 million	$183 million

FIGURE 13: Effects of rate equalization[227]

---

225. *Id.* at 40 tbl.7.
226. *Id.*
227. *See infra* Appendix.

2. Commission Authority

There are several ways to increase rates on subsidized lines. The options available depend on the regulated status of the particular market, company, and service.

a. *Deregulated Markets*

In markets deregulated pursuant to Senate Bill 5, the PUC does not have much discretion or authority to change rates directly. Since stand-alone BLTS rates are legislatively capped until the date that the PUC decides what to do with universal service, a rate change on stand-alone BLTS in deregulated markets before that time would need further legislation.[228] After universal service changes are settled, however, companies essentially have full pricing discretion in deregulated markets, even on stand-alone BLTS rates.[229] In these markets, the PUC could not order an increase in BLTS rates, but it could increase the revenue benchmark and reduce subsidies under the assumption that the companies would increase these rates once they are deregulated.

Though the PUC loses direct control over such rates in deregulated markets, it can decide on its own motion to re-regulate a market with fewer than 100,000 people.[230] If it does so, it regains control of stand-alone BLTS rates in that market, pursuant to either incentive or rate-of-return regulation.

If a company sells packaged BLTS in a deregulated market, that company can price flexibly even before the PUC has the opportunity to change universal service subsidies.[231] In that case, the company will bring the price of the bundle somewhere near a market price. Coupling this increase in revenue, which is already happening,[232] with an increased revenue benchmark would cut subsidies for Large Company High-Cost Programs and reduce the required funding.

Since the rural markets with lower population densities are less likely to be deregulated, lines receiving high-cost subsidies may be concentrated in markets that are still regulated. It is not, however,

---

228. TEX. UTIL. CODE ANN. § 65.153(b)(2) (Vernon 2007).

229. *Id.* §§ 65.102(a)(3), 65.153(b)(2).

230. *Id.* § 65.055.

231. *Id.* § 58.063.

232. *See* COMPETITION REPORT, *supra* note 58, at 19 ("For many Texas customers, rates for residential local telephone service (when combined with one or more vertical services) have increased since the introduction of Chapter 65."); *id.* at 20 ("[For AT&T local rates, t]hese increases have been approximately $2.00 to $3.00 per month per line.").

possible to determine from the data in the PUC's report how many of the subsidized lines are in deregulated markets.[233]

b. *Incentive Regulated Companies*

In markets that remain regulated, companies that have elected incentive regulation can bundle basic services with non-basic services in rural areas and price flexibly as though their markets were deregulated.[234] The PUC has little control over those prices. Companies that package and raise prices on subsidized lines in this way also contribute to eliminating rate disparities by raising prices on lines that, in a deregulated market, would cost more than their urban counterparts.

For companies that have elected incentive regulation but do not sell BLTS as part of a package, rates on basic services are capped until the applicable statutory date for the cap to end.[235] The PUC has discretion under only very limited circumstances to raise rates during the capped period.[236] One of those circumstances arises if a company experiences access line growth, in which case "the commission, on request of the electing company, shall allow a rate group reclassification."[237] In the absence of this or one of the other narrow statutory circumstances, any movement to eliminate rate disparities during the capped period would require legislation.

After the capped period, "an electing company may increase a rate for a basic network service only: (1) with Commission approval subject to this title; and (2) to the extent consistent with achieving universal affordable service."[238] Feasibly, the PUC could propose universal service reform and invite companies to submit proposed basic local rate increases that would offset lost subsidies. The Commission would then

---

233. TCTA/TWTC estimated in their comments to the Commission that "more than 80% of AT&T-Texas' [the largest ILEC] residential lines reside in exchanges where the Commission no longer constrains its prices" and "that AT&T-Texas receives approximately $15 million in public subsidy each year associated with wire centers that have been deregulated." TEX. CABLE TELECOMM. ASS'N/TIME WARNER TELECOMM., COMMENTS OF THE TEXAS CABLE AND TELECOMMUNICATIONS ASSOCIATION AND TIME WARNER TELECOM OF TEXAS, L.P. REGARDING REVIEW AND EVALUATION OF THE TEXAS UNIVERSAL SERVICE FUND PURSUANT TO PURA SECTION 56.029 6,12 (Mar. 1, 2006), *available at* http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/31863_45_504735.PDF [hereinafter TCTA/TWTC COMMENTS]. We have not verified whether these numbers are correct, but they do provide an estimate.

234. TEX. UTIL. CODE ANN. § 58.063.

235. The later of September 1, 2005, and the fourth anniversary of the date a company is elected. *Id.* §§ 58.054(a),(c).

236. *See id.* §§ 58.054–58.059 (stating the circumstances in which the PUC may raise capped rates).

237. *Id.* § 58.058.

238. *Id.* § 58.060.

have proposals on which it could act in line with the statute to help eliminate rate disparities.[239]

Another lever the PUC can pull is to try to reclassify basic services as nonbasic[240] and thereby give companies pricing flexibility on a wider range of services. Given pricing flexibility on a new set of services, companies would likely bring prices for rural subsidized lines closer to their urban unsubsidized counterparts. The PUC in most cases[241] has discretion to reclassify a basic service as nonbasic if the service has become open to competitive pressures.[242] If a particular service is still monopolized, however, it seems that its status as a basic service is legislatively fixed and would require legislation to be changed.[243]

c. *Rate-of-Return Regulated Companies*

For the Small Company High-Cost Program subsidy recipients that still remain subject to rate-of-return regulation, the PUC has fairly broad discretion to decide rate design issues.[244] Thus, this is one case where the PUC can independently raise rates on subsidized lines, thus helping to eliminate rate disparities, as long as it stays within the statutory guidance the legislature has provided.[245]

D. *Other Increases in Revenue Benchmark*

Eliminating rate disparities is not the only way the PUC could establish permissible rate increases for nonbundled basic residential service and accompanying reductions in subsidies. The PUC's *Universal Service Report* hints at one possible benchmark when it notes that both residential and business rates in Texas are generally below the national average.[246] The prices of competitive alternatives could be

---

239. The Commission has a history of doing this. For example, the PUC gathered proposals and information from stakeholders in creating the two high-cost subsidy programs. Large Company Decision, *supra* note 32, at 4; Small Company Decision, *supra* note 32, at 6–7.

240. TEX. UTIL. CODE ANN. § 58.024(a).

241. *See id.* § 58.024(c)–(d) (providing limitations and conditions).

242. *See id.* § 58.024(b) ("The commission shall establish criteria for determining whether a service should be reclassified. The criteria must include consideration of the: (1) availability of the service from other providers; (2) effect of the reclassification on service subscribers; and (3) nature of the service.").

243. *See id.* § 58.024(b)(1) (requiring the PUC to consider "availability of the service from other providers" in making a decision to reclassify); *id.* § 58.024(c)(1) (prohibiting the PUC from reclassifying until "competitive safeguard[s]" are "fully implemented").

244. *See supra* note 63.

245. TEX. UTIL. CODE ANN. §§ 53.051–53.065.

246. UNIVERSAL SERVICE REPORT, *supra* note 1, at 23; COMPETITION REPORT, *supra* note 58, at 19 ("[L]ocal telephone rates in Texas for years have been below the national average.").

other realistic benchmarks. These may be alternatives that actually exist in the high-cost areas. Alternatively, they may be alternatives that exist in only some parts of Texas, but their rates could be used as a yardstick to determine reasonable rates on subsidized lines in high-cost areas.

Aside from rate increases, another reason for increasing the revenue benchmark would be if expected revenues are now larger than the PUC anticipated when it established the current benchmarks in 2000.[247] Reasons for higher revenues per line might include increased prices or sales of vertical services, increased sales of DSL, or, most recently, sales of video programming over lines capable of carrying it. Of course, all of these services involve costs additional to those of building and maintaining a voice phone line. Thus, it would be inaccurate to increase the revenue benchmark by the full revenues earned on these services. Nevertheless, some amount of increased sales or prices on high-cost lines might generate incremental revenues that could reasonably count toward the revenue benchmark.[248]

Reducing universal service subsidies in response to some of these revenue increases is different from forcing new services in general to subsidize local phone service. A subsidy would arguably occur if the PUC or legislature forced phone companies to reduce their regulated rates because of new revenues from unregulated services. The proposal here is merely to reduce the subsidy that high-cost lines receive from other customers to reflect the increased revenue-generating potential of these lines.

The PUC's most recent *Scope of Competition Report* documents some illustrative price increases for vertical services. Between September 1999 and September 2006, AT&T's prices for popular vertical services like caller ID, call blocking, three-way calling, and call forwarding increased by more than $3.00.[249] Each price is about $1.00 higher than in September 2004.[250] Verizon's prices for these services increased by between $1.25 and $2.75 each between September 1999

---

247. The recent PUC decision to reexamine the revenue benchmark sets the stage for this kind of change. High Cost Revision Order, *supra* note 33, at 10.

248. Reducing universal service subsidies in response to some of these revenue increases is different from forcing new services to subsidize local phone service in general. A subsidy would arguably occur if the PUC or legislature forced phone companies to reduce their regulated rates because of new revenues from unregulated services. The proposal here is merely to reduce the subsidy that high-cost lines receive from other customers to reflect the increased revenue-generating potential of these lines.

249. COMPETITION REPORT, *supra* note 58, at 21 tbl.4, 22 tbl.5.

250. *Id.*

and September 2006.[251] Since 2004, Verizon's price for caller ID has risen by more than $1.00.[252]

These price increases need not be evidence of price "gouging." Regulated, stand-alone, basic local rates are often below the actual cost of service, even in suburban areas. For companies choosing incentive regulation, the legislature grants "pricing flexibility" for vertical services and packages of basic and vertical rates.[253] Therefore, these price increases may simply move the total price of the local phone service package closer to its full cost. Nevertheless, to the extent that the PUC did not anticipate these price increases when setting the revenue benchmark for universal service subsidies in 2000, the benchmark adjustment contemplated by the PUC's recent order should take those increases into account.[254]

To avoid creating new, hidden cross-subsidies from urban to rural phone service, any such adjustment would need to examine whether new revenues have actually materialized, or are likely to materialize, on the subsidized high-cost lines. If rural customers are more likely to forego vertical services, or if some services (like DSL) are not as widely available in rural areas due to the distance from the telephone company's switching office, then the revenue potential from these services is lower on rural than on urban lines.

1. Economic Analysis

The following table estimates the effects of increasing the revenue benchmark and reducing per-line subsidies for Large Companies, and implementing a similar subsidy reduction for Small Companies. We modeled the effects of allowing rates on subsidized lines to rise to the national average and to the price of various competitive alternatives: VoIP, unsubsidized wireless, and two possible satellite phone rates. We also modeled the effects of two assumed increases in monthly revenues. For lines that receive per-line subsidies that are less than the rate increase permitted by the benchmark, we assume that rates rise only high enough to eliminate the subsidies. Thus, these calculations generate savings only by eliminating subsidies—not by assuming that customers on lines that currently receive low subsidies will start paying very high rates that subsidize the customers on lines receiving high subsidies.

---

251. *Id.*

252. *Id.*

253. TEX. UTIL. CODE ANN. § 58.152(b) (Vernon 2007).

254. High Cost Revision Order, *supra* note 33, at 6–13.

Merely increasing rates on subsidized lines to the national average would cut the cost of the High-Cost Programs by one-fifth, from $512 million to $406 million.[255] Since the prices of potential competitive benchmarks all exceed the national average price for wireline, the cost savings from allowing rates to rise to a competitive benchmark are even larger.

There is growing evidence that many consumers now view wireless as a substitute for wireline service.[256] PURA clearly regards wireless as an emerging competitor, as one of the criteria for deregulation is the presence of a wireless competitor not affiliated with the incumbent wireline provider.[257] Consequently, the effects of allowing local rates to rise to the cost of an unsubsidized wireless plan may be of special interest. Several carriers offer 200–300 minute plans for $29.99;[258] this might be regarded as equivalent to "basic" telephone service. Allowing local rates to rise to this level, and reducing subsidies accordingly, would cut expenditures on the High-Cost Programs in half, from $512 million to $252 million.[259]

Wireless service is available in many, but not all, rural areas of Texas. In some places, the service may be available only because wireless companies qualified as eligible telecommunications carriers and are also receiving high-cost subsidies. Satellite, on the other hand, is available virtually everywhere. If a desirable benchmark for a rate increase is the unsubsidized price of a service that must be available in virtually all rural areas, then the price of satellite phone service may be the most relevant benchmark. Satellite phone is available both as a stand-alone service and as a VoIP service that works with an existing satellite broadband connection. If rates on subsidized lines are allowed to rise to the monthly subscription cost of one satellite plan ($49.99)[260], expenditures on high-cost subsidies fall to one-fifth of their level in 2005. If rates on subsidized lines are allowed to rise to the cost of a more expensive satellite phone plan ($100 per month),[261] very few high-cost subsidies are necessary; total expenditures fall to just $40 million.

---

255. *See supra* FIGURE 3; *see infra* FIGURE 14.

256. *See* COMPETITION REPORT, *supra* note 58, at 2 ("Wireless phones also are increasingly serving as a substitute for traditional wireline telephone service."); FCC Wireless Report, *supra* note 107, at 89 (reporting survey results showing about 8% of households and 12–20% of cell phone users no longer have landline phones).

257. TEX. UTIL. CODE ANN. § 65.052(b)(2).

258. FCC Wireless, *supra* note 107.

259. *See supra* FIGURE 3; *see infra* FIGURE 14.

260. *See* Global Satellite, *supra* note 109.

261. *Id.*

Increasing the revenue benchmark to reflect assumed new revenues generates some incremental savings. If the revenue benchmark rises by $3, high-cost subsidies fall by about $60 million. A $5 increase in the benchmark reduces subsidies by $99 million.

	Large Company Residential	Large Company Business	Small Company	Total
Baseline				
Expenditure	$367 million	$65 million	$80 million	$512 million
National Average Rate	**$14.52**	**$32.81**	**$14.52**	
Expenditure	$309 million	$50 million	$47 million	$406 million
Savings	$58 million	$15 million	$33 million	$106 million
VoIP Rate	**$14.95**	**$39.99**	**$14.95**	
Expenditure	$306 million	$40 million	$45 million	$391 million
Savings	$61 million	$25 million	$35 million	$121 million
Unsubsidized Wireless Rate	**$29.99**	**$29.99**	**$29.99**	
Expenditure	$185 million	$54 million	$13 million	$252 million
Savings	$182 million	$11 million	$67 million	$260 million
Satellite (Low)	**$49.99**	**$49.99**	**$49.99**	
Expenditure	$91 million	$23 million	$5 million	$119 million
Savings	$276 million	$42 million	$75 million	$393 million
Satellite (High)	**$100**	**$100**	**$100**	

Expenditure	$30 million	$9 million	$139,711	$40 million
Savings	$337 million	$56 million	$80 million	$473 million
New Revenues	**$3.00**	**$3.00**	**$3.00**	
Expenditure	$325 million	$59 million	$65 million	$449 million
Savings	$42 million	$6 million	$15 million	$63 million
	$5.00	**$5.00**	**$5.00**	
Expenditure	$303 million	$55 million	$55 million	$413 million
Savings	$64 million	$10 million	$25 million	$99 million

FIGURE 14: Effects of increased revenue benchmark[262]

2. Commission Authority

As noted above, for markets that remain regulated under the traditional rate-of-return rubric, the PUC still has fairly broad discretion to increase rates.[263] For companies that have elected incentive regulation (which includes all of the Large Company subsidy recipients) and now have the ability to raise BLTS rates with Commission approval, the PUC has the ability to request that companies submit rate increase proposals on which the Commission can act.[264] Further, the PUC can reclassify basic services as non-basic under certain circumstances.[265] Legislation requires the PUC to consider the "(1) availability of the service from other providers; (2) [the] effect of the reclassification on service subscribers; and (3) [the] nature of the service."[266] To the extent available from other service

---

262. *See infra* Appendix.

263. *See supra* note 63.

264. TEX. UTIL. CODE ANN. § 58.059 (Vernon 2007).

265. *Id.* § 58.024(a).

266. *Id.* § 58.024(b). *See also* 16 TEX. ADMIN. CODE § 26.175(e) (2007) ("[T]he following conditions must be satisfied in order to reclassify a basic network service as a competitive service or to reclassify a discretionary service as a competitive service: (1) There is an alternative facilities-based provider offering the same, equivalent, or substitutable service at comparable rates, terms, and conditions in the reclassification area; (2) At least 60% of access lines of the type,

providers in a particular area, all of the above comparable services would, through competition, "cap" the unregulated price of a stand-alone, basic-turned-competitive service at the price of the comparable service.[267] Of course, if the basic service is offered as part of a larger package, companies under incentive regulation already have price flexibility on it.[268]

Rather than raise rates, the PUC could just increase revenue benchmarks. The current $38 per residential line and $52 per business line are based on statewide averages using data from the end of 1997.[269] The PUC is revisiting these benchmarks.[270] In doing so, it can use newer data and adjust it upward in accord with that data. Alternatively, since universal service legislation does not define the basis upon which disbursements are to be made, the PUC has the ability to set that basis within most any reasonable bounds, including using the prices of comparable services like VoIP, satellite, or wireless. Indeed, since the revenue benchmark is a regulatory, not a legislative, creation, the PUC could even alter subsidies without reference to a benchmark, if it so chose.[271]

---

either residential, business, or both, for which the service is provided that are located in the reclassification area have access to alternative, facilities-based providers; (3) Substantial barriers to entry do not exist for the relevant market; (4) The existing competitors have or can easily obtain additional capacity, or new competitors may easily enter the market in response to an increase in price of the electing ILEC's rates; and (5) The electing ILEC does not have market power sufficient to control, in a manner that is adverse to the public interest, the price of the service in the reclassification area."). Of course, this is a PUC rule that the PUC can, if it wishes, amend to make it easier to reclassify more services as nonbasic. *See* 16 TEX. ADMIN. CODE § 21.1(b)(3) (stating that rules control when in conflict with chapter 16 of the code).

267. As mentioned above, as long as VoIP, wireless, and satellite provide continuous and adequate service in a particular certificated area in line with statutory mandate, the Commission can rearrange its quality of service and ETP designation rules to make these comparable and competing services that can obtain ETP status. *See supra* Part III.B.1.a.

268. The incidence of stand-alone basic service is dwindling in favor of packaged services. COMPETITION REPORT, *supra* note 58, at 19. ("[T]here has been a continuing trend toward packages, bundles, and term agreements that offer discounts to residential and business customers."). As TCTA/TWTC noted in their comment filed with the PUC on universal service:

> Verizon has announced that 65% of its consumers subscribe to a package of services, while 68% of AT&T's residential subscribers purchase phone service as part of a package. Indeed, at this point, the basic-only subscriber is rapidly disappearing—in neighboring Oklahoma, for instance, AT&T has revealed that only 5.7% of its customers subscribe to only basic local exchange service.

TCTA/TWTC COMMENTS, *supra* note 233, at 13.

269. UNIVERSAL SERVICE REPORT, *supra* note 1, at 12.

270. High Cost Revision Order, *supra* note 33, at 1.

271. The PUC appears, however, to be set on using benchmarks. Its recent order replaces the previous benchmark determination with a requirement that "[a]fter notice and opportunity for hearing, the commission shall establish an appropriate benchmark or benchmarks." 16 TEX. ADMIN. CODE § 26.403(e)(1)(B).

E. *Adjust to Reflect Cost Reductions*

In the proceeding that generated the PUC's *Universal Service Report*, a number of commentators argued that costs that have changed since 2000 should result in adjustments to high-cost subsidies.[272] There are two possible types of cost changes that might affect the level of high-cost subsidies. First, economic growth and migration may have generated changes in population densities that could affect per-line costs.[273] Second, alternative technologies, such as wireless, VoIP, or satellite, may make it possible to serve rural areas at a lower per-line cost than the incumbent wireline networks.[274]

The first cost shift could be identified through updated cost studies for the Large Companies. Since no cost studies were conducted for the Small Companies, cost shifts for them would have to be identified by undertaking de novo cost studies. A suggestive shortcut might involve a study of population shifts in the areas served by the Small Companies and the High-Cost areas served by Large Companies to see if population density in some of these areas has increased.

The second type of cost change could not be identified unless the PUC undertook a different type of cost study. The cost studies underlying the Large Company Program were forward-looking cost studies conducted in the late 1990s.[275] These cost studies estimated the turn-of-the-century cost of building the wireline network that existed at that time. The studies did not estimate the lowest possible cost of serving rural areas with the lowest-cost technology. A cost study cannot identify the effects of alternative technologies unless it compares the costs of alternative technologies that could realistically serve rural areas.

In the absence of both kinds of cost studies, we cannot estimate with any accuracy the likely effects of cost reductions on the High-Cost Programs. However, it is possible to examine the effects of several hypothetical cost reductions. The results may assist the PUC in

---

272. UNIVERSAL SERVICE REPORT, *supra* note 1, at 34 (TCTA/TWTC estimated that AT&T's high-cost subsidy could be reduced if the costs and revenues are updated); TCTA/TWTC COMMENTS, *supra* note 233, at 3–4, 10–11.

273. TCTA/TWTC COMMENTS, *supra* note 233, at 24–25.

274. CTR. FOR ECON. FREEDOM, TEX. PUB. POLICY FOUND., COMMENTS OF THE TEXAS PUBLIC POLICY FOUNDATION REGARDING THE REVIEW AND EVALUATION OF THE TEXAS UNIVERSAL SERVICE FUND PURSUANT TO PURA SECTION 56.029 3, 6–7 (Mar. 1, 2006), http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/31863_43_504726.PDF [hereinafter TPPF COMMENTS]; Crandall & Ellig, *supra* note 125, at 5.

275. Large Company Decision, *supra* note 32, at 12–13.

deciding whether the potential savings from cost reductions are worth the trouble of undertaking new cost studies.

1. Economic Analysis

The following table shows the results of two types of hypothetical cost reductions. The first two options examine the effects of eliminating subsidies for the lines that currently receive the lowest subsidies per line.[276] Lines which required low subsidies in 2000 are most likely located in "borderline" areas that may once have been rural but have now become outer suburbs, vacation communities, or retirement havens. These are the kinds of places where costs are most likely to have fallen due to population shifts. Eliminating subsidies for the least subsidized group of lines ($10 or less residential, $6 or less business) would save about $27 million annually. [277] Eliminating subsidies for the two least subsidized groups (residential lines subsidized less than $20 per month, and business lines subsidized less than $16 per month) [278] would generate substantially larger savings of approximately $130 million. Thus, if cost reductions due to population shifts affect only the least subsidized lines, the savings generated as a result of new cost studies may be relatively modest. If the cost reductions affect lines receiving subsidies between $10 and $20 per month, the potential savings are quite large.

The second two options examine the effects of capping the highest subsidies. The cost-based justification for capping the highest subsidies is that alternative technologies may be able to provide phone service in the highest-cost areas more cheaply than the existing wireline network. A cap would not eliminate funding for the highest-cost wirelines. Rather, it would indicate that the state does not believe it is reasonable to expect consumers in lower-cost areas to completely subsidize very high-cost wireline service when less expensive alternatives are available.

A cap on the highest subsidies could be accompanied by an increase in the price of basic local service. Other, more creative options might also be employed that would redefine the nature of the incumbent's "provider of last resort" obligation. An incumbent who lost a customer to a competitor in a high-cost area, for example, might be relieved of

---

276. The PUC is currently reconfiguring what lines to subsidize. 16 TEX. ADMIN. CODE § 26.403(e)(1)(C) ("After notice and opportunity for hearing, the commission shall determine which eligible lines shall receive support."); High Cost Revision Order, *supra* note 33, at 1.

277. *See infra* Appendix.

278. *Id.*

the provider of last resort obligation for that customer. Alternatively, the incumbent might be permitted to abandon the wireline but to satisfy its provider of last resort obligation by purchasing wireless or satellite phone service for the consumer.

If regulators want the subsidy cap to reflect options available in rural areas, the cap should reflect the cost of actual technologies that either have been or realistically could be deployed in rural areas. We examine two potential subsidy caps. A cap of $100 per line equals the cost of a high-cost satellite phone service.[279] A cap of $150 per line exceeds the total cost of satellite broadband plus VoIP.[280]

The $100 per line subsidy cap would reduce subsidy expenditures by about $30 million. The $150 per line cap would save about $13 million. Interestingly, most of the savings would come from the Large Company Program rather than the Small Company Program because only one Small Company receives per-line subsidies greater than $100 per month. This result may be driven by the fact that the data for the Large Company Program breaks lines down into ranges based on subsidies per line, but the Small Companies receive the same subsidy for every line they serve. Additional savings might be possible to identify if the PUC undertook cost studies for the Small Companies, or found some other way of identifying, and reducing subsidies on, the Small Company lines whose costs exceed customer revenues by more than $100 or $150 per month.

	Large Company Residential	**Large Company Business**	**Small Company**	**Total**
Baseline	$367 million	$65 million	$80 million	$512 million
Cut Lowest Subsidy Range	**<$10 per Line**	**<$6 per Line**	**<$10 per Line**	
Expenditure	$350 million	$64 million	$71 million	$485 million
Savings	$17 million	$1 million	$9 million	$27 million

---

279. See Globalstar, *supra* note 109, for a range of satellite phone rates.

280. *See*, *e.g.*, Vonage, Calling Plans, http://www.vonage.com/call_plans.php (last visited Dec. 16, 2007) (listing pricing plans).

Cut 2 Lowest Subsidy Ranges	<$20 per Line	<$16 per Line	<$20 per Line	
Expenditure	$300 million	$57 million	$25 million	$382 million
Savings	$67 million	$8 million	$55 million	$130 million
Cap 2 High Subsidy Ranges	>$100 per Line	>$86 per Line	>$100 per Line	
Expenditure	$344 million	$58 million	$79.52 million	$482 million
Savings	$23 million	$7 million	$480,000	$30 million
Cap Highest Subsidy Range	>$150 per Line	>$136 per Line	>$150 per Line	
Expenditure	$357 million	$62 million	$79.56 million	$499 million
Savings	$10 million	$3 million	$440,000	$13 million

FIGURE 15: Effects of assumed cost reductions[281]

2. Commission Authority

The PUC "may revise the monthly per-line support amounts…any time after September 1, 2007, after notice and an opportunity for hearing."[282] Legislation on universal service gives the PUC discretion to, "in a manner that assures reasonable rates for basic local telecommunications service, adopt eligibility criteria and review procedures . . . the commission finds necessary to fund the universal service fund and make distributions from that fund."[283] Further, it allows the Commission to "approve procedures for the collection and

---

281. *See infra* Appendix.
282. TEX. UTIL. CODE ANN. § 56.031 (Vernon 2007).
283. *Id.* § 56.023(1).

disbursal of the revenue of the universal service fund."[284] These are fairly broad statutory mandates. Since the method for determining costs in defining monthly per-line support amounts for both the Large and Small Company Programs comes from the regulations,[285] the PUC could change its method by promulgating new regulations in line with any of the above recommendations.

Moreover, a company can discontinue service on a particular wireline if it loses a subsidy for that line when the customer opts for wireless or satellite. "[T]he holder of a certificate of convenience and necessity may not discontinue, reduce, or impair service to any part of the holder's certificated service area except for: (1) nonpayment of charges; (2) nonuse; or (3) another similar reason that occurs in the usual course of business."[286] The company can also cease operations in its entire certificated area[287] if the PUC approves and:

> (1) [A]nother provider of basic local telecommunications services has adequate facilities and capacity to serve the customers in the certificated area; or (2) the utility is an 'exiting utility,' . . . no other telecommunications utility has facilities sufficient to provide basic local telecommunications service in the defined geographic area, and the utility acts in good faith to provide for a transition of the utility's existing basic local telecommunications service customers to another holder of a certificate for that area.[288]

F. *Target to Low-Income (Exempt Lifeline)*

Numerous studies, as well as the results discussed in Outcomes, above,[289] indicate that universal service programs targeted at low-income households are much more cost-effective at getting new subscribers on the telephone network. For this reason and for equity considerations as well, various scholars (and some commenters in the PUC's universal service study docket) have suggested that universal service programs should be made more progressive.[290] A more

---

284. *Id.* § 56.023(5).

285. *Id.* §§ 26.403(e)(1)(A), 26.404(e).

286. *Id.* § 54.252(a).

287. *Id.* § 54.253 ("A telecommunications utility that holds a certificate of operating authority or a service provider certificate of operating authority may . . . cease operations in the utility's certificated area.").

288. *Id.* § 54.253(d)(1)–(2).

289. *See supra* Part III.

290. TPPF COMMENTS, *supra* note 274, at 4–5; TEX. TEL. ASS'N, REPLY COMMENTS REGARDING REVIEW AND EVALUATION OF THE TEXAS UNIVERSAL SERVICE FUND PURSUANT TO PURA SECTION 56.029 9 (Apr. 3, 2006), *available at* http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/31863_109_507210.PDF.

progressive program is one that targets more of the financial assistance to low-income households.

Progressivity could be accomplished in many different ways. Some would require a complete restructuring of the Texas Universal Service Program. There is, however, a relatively straightforward way of increasing progressivity when implementing the reform options discussed above, without requiring much restructuring: simply exempt Lifeline households from the effects of any reforms that would require consumers to pay more of the costs of subsidized lines.

Such an exemption could be accomplished through either the High-Cost Programs or the Lifeline Program. Within the High-Cost Programs, the PUC could continue to provide the current level of per-line subsidy for any Lifeline line. Only the non-Lifeline lines would have their subsidies reduced. Alternatively, the PUC could apply the chosen reforms to all High-Cost lines but increase funding for the Lifeline Program. Lifeline customers located in high-cost areas would be eligible for additional Lifeline subsidies equal to any increase in rates on regulated lines they might experience as a result of the reforms to the High-Cost Programs. Either option should have roughly the same effect on total Texas universal service expenditures, though the totals for the High-Cost and Lifeline Programs would be different under the two scenarios.

1. Economic Analysis

It is possible to estimate the effect of a "Lifeline exemption" on the cost savings from all of the reform scenarios discussed thus far. Lifeline accounted for about 4.8% of wireline phone lines in 2005.[291] If all geographical areas have the same proportion of Lifeline customers, then exempting Lifeline customers from a reform will reduce the cost savings by about 4.8%

The actual effect might be larger or smaller. It might be larger if the universal service reforms alter the behavior of households eligible for Lifeline. If reforms of the High-Cost Programs raise the price consumers pay for phone service in high-cost areas, some low-income households not enrolled in Lifeline might now find that the savings make it worthwhile to find out about the program and enroll. If, on the other hand, Lifeline households tend to be concentrated in urban areas

---

291. There were 579,339 Lifeline lines in Texas in 2005. UNIVERSAL SERVICE REPORT, *supra* note 1, at 60 fig.12. Incumbent plus competitive local exchange carrier lines totaled 12,007,148. COMPETITION REPORT, *supra* note 58, at 13 fig.3.

that do not receive high-cost subsidies, then exempting Lifeline customers from reforms to the High-Cost Programs will not reduce the savings by as much as we estimate. Finally, if Lifeline subscribers as a percentage of total telephone subscriptions have increased since 2005, the cost savings would of course be lower if Lifeline customers were exempted from any reforms.

2. Commission Authority

As noted, the PUC can adjust per-line support amounts for High-Cost Programs anytime after September 1, 2007.[292] In contrast to the statutory requirement that the Commission must levy a uniform charge to fund universal service,[293] no such mandate exists for disbursements. Since the main purpose of the High-Cost Programs—and universal service in general—is to allow customers to obtain "basic local telecommunications services at reasonable rates,"[294] the PUC can be preferential to low-income consumers when making reforms. As a result, the PUC likely has authority to exempt from decreases in High-Cost Program subsidies the high-cost lines that benefit from Lifeline support.

The converse is also probably true. Texas' universal service statute provides Lifeline service in accord with the federal program.[295] The regulations subsidize providers up to a maximum of $7.00 per line,[296] enough to max out the federal contribution of $1.75 per line tied to the state payment.[297] It is not clear whether the PUC can increase the amount it spends on Lifeline. On one hand, the specific amount of subsidy comes through PUC regulation, so presumably the PUC has the ability to change it. On the other hand, the state program relies on the federal program, saying that the Universal Service Fund will "reimburse a telecommunications carrier providing lifeline service as provided by 47 C.F.R. Part 54, Subpart E, as amended."[298] Given this

---

292. TEX. UTIL. CODE ANN. § 56.031.

293. *Id.* § 56.022.

294. *Id.* § 56.021(1).

295. *Id.* § 56.021(5).

296. *See* 16 TEX. ADMIN. CODE § 26.412(c) (2007) ("Participating telecommunications carriers provide qualifying customers with a waiver of the federal subscriber line charge (SLC) and an additional discount up to $7.00 per monthly bill, for which participating telecommunications carriers are reimbursed from federal and state universal service funds.").

297. *See id.* § 26.412(c)(2)(iii) ("A participating telecommunications carrier shall give a qualifying low-income customer the following: (I) an additional state-approved reduction of up to a maximum of $3.50 in the monthly amount of intrastate charges; and (II) a further federally approved reduction equal to one-half the amount of the reduction in subclause (I) of this clause up to a maximum of $1.75.").

298. TEX UTIL. CODE ANN. § 56.021(5).

language, the PUC created the state payment system directly in line with the federal framework.[299] There is, however, no express statutory prohibition on the PUC's adding to the Lifeline subsidies. Thus, if the PUC can decipher the effect on rates that the reforms above will have on basic services, it is likely able to increase Lifeline Program subsidies accordingly without further legislation. Indeed, the PUC's report implies that it can do so. "[W]hen or if stand-alone BLTS rates increase, it would be appropriate for the Commission to review the Lifeline Program and the amount of support it provides to recipients."[300]

G. *Other Reforms*

Our simple model may not be able to fully accommodate other, more significant structural reforms that would alter subsidy amounts or competitive dynamics in ways we cannot predict. Such reforms include limiting per-line subsidies in high-cost areas based on household income,[301] eliminating high-cost subsidies in deregulated exchanges,[302] eliminating subsidies in deregulated exchanges where unsubsidized competitors operate, or providing vouchers directly to households whose amounts would be calibrated based on costs and income.

Such reforms deserve serious consideration, even if we cannot estimate their effects based on publicly available data. In general, the PUC has wide latitude to make these kinds of changes.

1. Limit Per-Line Subsidies Based on Household Income

This one is likely possible. While the stated purpose of the rural High-Cost Programs is availability of basic services at reasonable rates,[303] what is "reasonable," of course, is a flexible standard. There does not seem to be an express prohibition on limiting per-line subsidies based on household income in the rural High-Cost Programs. As long as the statutory standard is met, i.e. the fund still "assist[s] telecommunications   providers   in   providing   basic   local

---

299. *See* 16 TEX. ADMIN. CODE § 26.412 (describing federal connections to the Lifeline Program).

300. UNIVERSAL SERVICE REPORT, *supra* note 1, at 62.

301. *See, e.g.*, TPPF COMMENTS, *supra* note 274, at 4–5 (suggesting that fund monies be targeted to low-income households).

302. TCTA/TWTC COMMENTS, *supra* note 233, at 3.

303. TEX. UTIL. CODE ANN. § 56.021(1) (Vernon 2007).

telecommunications service at reasonable rates in high cost rural areas,"[304] there does not appear to be a problem.

2. Eliminate Subsidies in Deregulated Exchanges

The PUC can likely do this as part of its broad discretion. Under the Texas Public Utility Regulatory Act, section 56.023(a), "[t]he commission shall: (1) in a manner that assures reasonable rates for basic local telecommunications service, adopt eligibility criteria and review procedures, including a method for administrative review, the commission finds necessary to fund the Universal Service Fund and make distributions from that fund."[305] Prices for packaged BLTS in deregulated markets are likely already at or near market levels. Assuming those rates meet the legal requirement of "reasonable rates for basic local telecommunications service"—as they likely do since the legislature was the agent of deregulation—subsidies for lines already at those levels will likely not affect the rates charged. Increased revenues from the sale of packaged service in deregulated exchanges may qualify as revenues that were not anticipated when the PUC established its revenue benchmarks in 2000.

3. Eliminate Subsidies Wherever Unsubsidized Competitors Offer Service at Prices Comparable to Those They Offer Elsewhere

Some markets may have competition only because multiple ETPs have qualified for universal service subsidies. Eliminating subsidies in these markets might not yield reasonable rates, because the unsubsidized prices might be very high due to high costs.

Many other markets, however, have multiple competitors offering service at unsubsidized prices. If the unsubsidized price is equivalent to prices the competitor charges elsewhere in the state, it could likely fit the statutory definition of "reasonable." Thus, the PUC could independently implement this reform under its discretion to disburse funds as long as rates remain reasonable.[306]

4. Provide Vouchers Directly to Low-Income or High-Cost Households

Vouchers are one reform the PUC may not have authority to implement on its own. The PUC cannot independently provide subsidies directly to consumers rather than companies. Under the

---

304. *Id.*

305. *Id.* § 56.023(a)(1).

306. *See id.* (noting the Commission's distribution power).

current statute, universal service is to "assist telecommunications providers in providing basic local telecommunications service at reasonable rates in high-cost rural areas."[307] With regard to Lifeline, the Program "reimburse[s] a telecommunications carrier . . . ."[308] The Lifeline language has no wiggle room, and the High-Cost Program language has little. Any wiggle room is squelched, however, in other parts of the statutory framework discussing which telecommunications providers are eligible to receive subsidies[309] and mechanisms to replace reductions in high-cost assistance revenue for companies resulting from a Commission order, rule or policy.[310] In short, direct subsidies to consumers would probably require new legislation.

VII. CONCLUSIONS

Universal service reform in Texas would be well worth the effort. The current funding mechanism, while more sustainable and less costly than the implicit subsidies it replaced in 2000, generates substantial social costs in addition to the direct cost from the amount of revenue raised. This is an argument both for reducing the size of the subsidies and for finding a more efficient way of raising the required revenues.

The latter is easier to accomplish than the former. By moving to a numbers-based charge, the PUC could reduce the "deadweight loss" associated with universal service funding approximately in half, from $176 million to $86 million. The PUC has legal authority to move to a numbers-based charge to fund universal service, as long as the charge is uniform across the state.

Though reducing subsidies is more complicated, the PUC has a wide variety of options it could pursue on its own initiative, without the need for further legislation. The Commission could permit or require rate equalization, establish a new benchmark for reasonable rates on lines that are currently subsidized, or simply reduce subsidies to reflect cost reductions and revenue opportunities it did not anticipate when it created the High-Cost Programs in 2000.

Most of these reforms could be accomplished with little or no reduction in the outcomes the Lifeline and High-Cost Programs are supposed to produce. The PUC's report did not state that subsidized rates are unreasonably low, but it did hint that higher rates on these

---

307. *Id.* § 56.021(1).
308. *Id.* § 56.021(5).
309. *Id.* §§ 56.023(a)(2), (b).
310. *Id.* § 56.025(b).

lines might be reasonable. [311] New technologies have made telephone infrastructure available in rural areas previously served only by wireline incumbents, so a reduction in subsidies would not necessarily deprive consumers of access to phone service. Finally, consumer demand for basic local telephone service is not very sensitive to price. As a result, the High-Cost Programs have increased telephone subscription by less than 1%, at a cost of $4000–10,000 per additional subscriber. The Texas Lifeline Program has increased subscription by about 0.4%, at a cost to Texans of $442 per additional subscriber. These results imply that modest rate increases on subsidized lines would induce few households to leave the phone network. Low-income households have somewhat greater price sensitivity. Exempting low-income households on subsidized lines from rate increases, or increasing Lifeline funding to offset rate increases, would reduce the savings from reform in proportion to the percentage of telephone subscribers enrolled in the Lifeline Program.

Though we have focused on Texas as a concrete case study, our findings hold useful implications for any type of universal service reform in the United States. Technological change, deregulation, and increased competition in telecommunications are hardly unique to Texas. Indeed, our analysis of outcomes, consumer welfare, and reform options is based on economic research that typically uses national data and focuses on federal as well as state programs. If Texas is different in any significant way, it is that the state has chosen to address universal service proactively as part of a comprehensive telecommunications regulatory reform. That makes our findings prescient and hence even more relevant.

---

311. UNIVERSAL SERVICE REPORT, *supra* note 1, at 24.

APPENDIX: DATA SOURCES AND CALCULATIONS

Data sources and calculations are listed in the order in which the summary tables on that topic appear in the text. An Excel spreadsheet containing all data and calculations is available upon request from the authors.

Effects of Lifeline on Subscribership

LIFELINE SUBSCRIBERS: Lifeline subscribers are included in Figure 12 of the Public Utility Commission's *Universal Service Report*.[1]

PRICE WITHOUT PROGRAM: There is no single "price" for local phone service in Texas. Different companies charge different prices, and customers of the same company may pay different prices depending on the "rate group" in which the customer is classified.[2] We estimate the price by calculating a weighted average local rate, then adding the federal subscriber line charge, federal and state universal service assessments, and federal, state, and local taxes.

The estimate of the weighted-average local rate ($9.76) assumes that residential subscribers of each phone company paid an average price equal to the midpoint of the residential price range reported for each company in Tables 6 and 7 of the Texas Public Utility Commission's (PUC) *Universal Service Report*.[3] Large Company rates from Table 6 are weighted by residential subscribership figures in the 2005 FCC ARMIS reports.[4] Small Company rates are weighted with total subscribership figures, estimated by dividing each company's annual Universal Service Fund (USF) receipts in Table 7 by annual USF receipts per line.

The Federal Subscriber Line Charge is assumed to be $6.50, the maximum possible.[5] This may slightly overstate the actual effect of the federal Lifeline Program on rates and subscription since the federal Lifeline Program reimburses carriers when they waive this charge for Lifeline customers. The federal universal service assessment

1. TEX. PUB. UTIL. COMM'N, REVIEW AND EVALUATION OF THE TEXAS UNIVERSAL SERVICE FUND PURSUANT TO PURA SECTION 56.029 60 fig.12 (2007) [hereinafter UNIVERSAL SERVICE REPORT].

2. *Id.* at 21, 40 (showing that Large Companies and many Small Companies charge different customers different rates).

3. *Id.* at 21 tbl.6; *id.* at 40 tbl.7.

4. FED. COMMC'NS COMM'N, 2005 BILLABLE ACCESS LINES (2006), http://fjallfoss.fcc.gov/eafs7/preset/billableaccesslines/BAL.cfm (select "2005"; then click "SUBMIT").

5. UNIVERSAL SERVICE REPORT, *supra* note 1, at 59.

percentage is 1.5%, which equals a federal contribution rate of approximately 10% in 2005[6] multiplied by the 15% of local phone companies' revenues assumed to be interstate under the PUC's "safe harbor" determination.[7] The Texas universal service assessment is 4.8%, equal to the 5.65% universal service assessment percentage[8] multiplied by the 85% of local phone companies' revenues assumed to be intrastate under the PUC's "safe harbor" determination. The federal tax rate is 3%.[9] The combined state and local tax rate is 9.5%; this figure includes state sales tax, local sales tax, and the telecommunications infrastructure fund.[10]

In the "Effect of Texas Lifeline" column, the "Price without Program" ($9.52) is the price a Lifeline customer would have paid if there were only the federal Lifeline Program.

ELASTICITY OF DEMAND: Assumed to equal -0.05.

CHANGE IN SUBSCRIBERS: Calculated as Lifeline subscribers multiplied by percentage change in price due to the program multiplied by elasticity of demand.

CHANGE IN SUBSCRIBERS AS PERCENTAGE OF TOTAL TEXAS PRIMARY LINES: Figure for primary lines in 2005 (13,464,593) is from Figure 3 of the PUC's 2007 *Scope of Competition Report*.[11]

TOTAL GOVERNMENT EXPENDITURES ON LIFELINE: Estimated by multiplying 579,339 Lifeline customers[12] by the total government expenditure in Texas ($13.50 per Lifeline customer per month)[13] or the total expenditures resulting from the Texas Lifeline Program ($3.50 in Texas' USF funds plus $1.75 in federal matching funds).

TEXAS USF EXPENDITURES ON LIFELINE: Estimated by multiplying 579,339 Lifeline customers by the Texas USF's expenditure of $3.50 per customer per month multiplied by 12 months. The resulting estimate ($24 million) is quite close to the $27.5 million in 2005

---

6. FED. COMMC'NS COMM'N, UNIVERSAL SERVICE MONITORING REPORT, CC DOCKET NO. 98-202 1-33 tbl.1.10 (2005) (data received thourgh May 2005) [hereinafter FCC MONITORING REPORT].

7. Tex. PUB. UTIL. COMM'N, ORDER CHANGING THE TUSF ASSESSMENT, PROJECT NO. 21208 5 (April 12, 2007) [hereinafter TUSF ASSESSMENT].

8. UNIVERSAL SERVICE REPORT, *supra* note 1, at 6.

9. Scott Mackey, *The Excessive State and Local Tax Burden on Wireless Telecommunications Service*, 33 ST. TAX NOTES 181, 183 tbl.1 (2004).

10. *Id.* at 193 app.A.

11. TEX. PUB. UTIL. COMM'N., SCOPE OF COMPETITION IN TELECOMMUNICATIONS MARKETS OF TEXAS 13 fig.3 (2007), *available at* http://www.puc.state.tx.us/telecomm/reports/scope/2007scope.tele.pdf [hereinafter COMPETITION REPORT].

12. UNIVERSAL SERVICE REPORT, *supra* note 1, at 60 fig.12.

13. *Id.* at 59.

expenditures reported in the Texas PUC's *Universal Service Report*, Figure 13.[14]

Effects of Large and Small Company High-Cost Programs on Subscribership

SUBSIDIZED LINES: The Large Company residential figure is in the PUC's 2007 *Universal Service Report*, Table 5.[15] This table also shows the number of residential lines sorted into various per-line support ranges (e.g., $0.02–$10.00, $10.01–$20.00, all the way up to greater than $150). Large Company business figure was estimated by assuming that business lines are distributed among these per-line support ranges in the same proportion as residential lines, and the subsidy for business lines totaled $65 million (calculated by subtracting the $367 million in residential subsidies reported in the PUC's *Universal Service Report*, Table 5, from the High-Cost Program's total disbursements of $432 million reported in the *Universal Service Report*, Table 2).[16] Small Company figure was estimated from data on each company's USF subsidy and subsidy per line reported in the *Universal Service Report*, Table 7.[17] Technically, this is the line count used in the test year that established the Small Company High-Cost Program, not the current line count. Since Table 7 of the PUC's *Universal Service Report* indicates total Small Company subsidies of $79.6 million based on the test year line count,[18] but Table 2 reports Small Company subsidies of $98 million in 2005,[19] we can only conclude that Small Company line counts have increased somewhat since the test year.

WEIGHTED-AVERAGE SUBSIDIZED PRICE: This is an estimate of the total price (including subscriber line charge, taxes, and universal service contributions) actually paid by customers using subsidized lines. There is no single "price" for local phone service in Texas. Different companies charge different prices, and customers of the same company may pay different prices depending on the "rate group" in which the customer is classified.[20] We estimate the price charged by each company by estimating an average local rate for each company,

---

14. *Id.* at 60 fig.13.
15. *Id.* at 16 tbl.5.
16. *Id.* at 16 tbl.5, 9 tbl.2.
17. *Id.* at 40 tbl.7.
18. *Id.*
19. *Id.* at 9 tbl.2.
20. *Id.* at 21, 40 (showing that large companies and many small companies charge different customers different rates).

then adding the federal subscriber line charge, federal and state universal service assessments, and federal, state, and local taxes.

We assume that subscribers of each phone company paid an average price equal to the midpoint of the price range reported for each company in the Texas PUC *Universal Service Report*, Tables 6 and 7.[21] The Federal Subscriber Line Charge is assumed to be $6.50, the maximum possible.[22] The federal universal service assessment percentage is 1.5%, which equals a federal contribution rate of approximately 10% in 2005[23] multiplied by the 15% of local phone companies' revenues assumed to be interstate under the PUC's "safe harbor" determination. The Texas universal service assessment is 4.8%, equal to the 5.65% universal service assessment percentage[24] multiplied by the 85% of local phone companies' revenues assumed to be intrastate under the PUC's "safe harbor" determination. The federal tax rate is 3%.[25] The combined state and local tax rate is 9.5 percent; this figure includes state sales tax, local sales tax, and the telecommunications infrastructure fund.[26]

For the Large Company High-Cost Program, the PUC *Universal Service Report*, Table 5, provides subsidy information for residential lines grouped by various per-line subsidy ranges, but not by company.[27] We calculated a weighted-average Large Company price, using residential subscribership figures in the 2005 FCC ARMIS reports as the weights.[28] We used this price to analyze the effects of the Large Company High-Cost Program in each per-line subsidy range, then summed the figures to provide the results reported in the table above.

For the Small Company High-Cost Program, the *Universal Service Report*, Table 7, reports prices and subsidies for each company.[29] In the absence of any information about the number of business subscribers served by the Small Companies, we analyzed this program assuming

---

21. *Id.* at 21 tbl.6, 40 tbl.7.

22. *Id.* at 59.

23. FCC MONITORING REPORT, *supra* note 6, at 1-33 tbl.1.10.

24. UNIVERSAL SERVICE REPORT, *supra* note 1, at 6.

25. Mackey, *supra* note 9, at 183 tbl.1.

26. *Id.* at 193 app.A.

27. UNIVERSAL SERVICE REPORT, *supra* note 1, at 16 tbl.5.

28. FED. COMMC'NS COMM'N, 2005 BILLABLE ACCESS LINES (2006), http://fjallfoss.fcc.gov/eafs7/preset/billableaccesslines/BAL.cfm (select "2005"; then click "SUBMIT").

29. UNIVERSAL SERVICE REPORT, *supra* note 1, at 40 tbl.7.

that all customers pay residential rates.[30] We calculated the effects of the program on each company, then summed the figures to provide the results reported in the table above. The weighted-average price reported for Small Companies uses each company's line count as the weight. Line counts were estimated by dividing each company's annual USF receipts in Table 7[31] by annual USF receipts per line. This price was not used in the Small Company analysis but is reported for comparative purposes.

AVERAGE SUBSIDIZED PRICE, RANGE: This line shows the range of subsidized prices that were actually used in our analysis. Since the PUC *Universal Service Report* does not report company-specific, per-line subsidies for the Large Company High-Cost Program, we used a single, weighted-average price in our analysis of this program. Since the *Universal Service Report* indicates company-specific, per-line subsidies for the Small Company High-Cost Program,[32] we can use these figures to analyze the effect on each company, and hence report the range of estimated prices we actually used in the analysis.

TOTAL ANNUAL SUBSIDY: The subsidy for Large Company High-Cost residential lines is from the *Universal Service Report*, Table 5.[33] The subsidy for Large Company High-Cost business lines was calculated by subtracting the $367 million in residential subsidies from the High-Cost Program's total disbursements of $432 million reported in the *Universal Service Report*, Table 2.[34] The subsidy for Small Company High-Cost lines is from the *Universal Service Report*, Table 7.[35] This table reports a subsidy amount of $79.6 million based on the test-year line count, not the current line count. Since Table 2 of the *Universal Service Report* says Small Company subsidies totaled $98 million in 2005,[36] we can only conclude that Small Company line counts have increased somewhat since the test year. We use the lower figure because it is consistent with the only line count we can calculate.

AVERAGE MONTHLY SUPPORT PER LINE, RANGE: For Large Company residential lines, this is the range of average monthly per-line support amounts for the various per-line support ranges reported in the

---

30. This assumption tends to increase the estimated effect of the program on subscribership, since residential rates are lower than business rates. Therefore, the subsidy amount is higher as a percentage of the residential rate, which leads to a larger quantity effect.

31. UNIVERSAL SERVICE REPORT, *supra* note 1, at 40 tbl.7.

32. *Id.*

33. *Id.* at 16 tbl.5.

34. *Id.* at 9 tbl.2.

35. *Id.* at 40 tbl.7.

36. *Id.* at 9 tbl.2.

Universal Service Report, Table 5.[37] For Large Company business lines, this is the range of estimated average monthly per-line support amounts for various per-line support ranges. We created the per-line support ranges for business lines by subtracting $14 from the residential support ranges because $14 is the difference between the revenue benchmark for residential and business lines. For Small Company lines, this is the range of monthly per-line support figures reported in the *Universal Service Report*, Table 7.[38]

WEIGHTED-AVERAGE UNSUBSIDIZED PRICE: This figure was calculated in the same way that the weighted-average subsidized price was calculated. We assumed that, in the absence of subsidies, the local rate would equal the current local rate plus the per-line subsidy. Thus, this analysis assumes no cost reductions or efficiency improvements if the subsidy were eliminated.

ESTIMATED-AVERAGE UNSUBSIDIZED PRICE, RANGE: For the Large Company Program, this shows the range of rates across the various per-line support ranges if there were no subsidies. For the Small Company Program, this shows the range of rates across companies if there were no subsidies. We assumed that in the absence of subsidies, the local rate would equal the current local rate plus the per-line subsidy. Thus, this analysis assumes no cost reductions or efficiency improvements if the subsidy were eliminated.

ELASTICITY OF DEMAND: Consumer decisions to subscribe to telephone service are not very sensitive to the fixed monthly charge.[39] In other words, local service has a relatively low price elasticity of demand. This elasticity appears to have fallen over time. Several recent studies using census data, for example, have found that the elasticity in 1990 was about one-third of the value in 1970,[40] and in 2000, it was only one-eighth of 1970 value.[41] It may even be equal to zero in the

---

37. *Id.* at 16 tbl.5.

38. *Id.* at 40 tbl.7.

39. A.H. Barnett & David. L. Kaserman, *The Simple Welfare Economics of Network Externalities and the Uneasy Case for Subscribership Subsidies*, 13 J. REG. ECON. 245, 252–53 (1998); Michael H. Riordan, *Universal Residential Telephone Service, in* 1 HANDBOOK OF TELECOMMUNICATIONS ECONOMICS: STRUCTURE, REGULATION, AND COMPETITION 423, 431 (Martin E. Cave et al. eds., 2002); David L. Kaserman, John W. Mayo & Joseph E. Flynn, *Cross-Subsidization in Telecommunications: Beyond the Universal Service Fairy Tale*, 2 J. REG. ECON. 231, 232 (1990).

40. Christopher Garbacz & Herbert G. Thompson, *Estimating Telephone Demand with State Decennial Census Data from 1970–1990: Update with 2000 Data*, 24 J. REG. ECON. 373, 376 (2003).

41. Christopher Garbacz & Herbert G. Thompson, *Estimating Demand with State Decennial Census Data from 1970–1990*, 21 J. REG. ECON. 317, 326 (2002).

United States and other developed countries.[42] At best, the most recent studies find elasticities between -0.026 and -0.01.[43]

CHANGE IN QUANTITY (LINES): Calculated as subsidized lines multiplied by percentage change in price due to the per-line subsidy multiplied by elasticity of demand. For the Large Company Program, we calculate the change in quantity for each per-line support range, then sum these figures to produce the totals reported in the table. For the Small Company Program, we calculate the change in quantity for each company, then sum these figures to produce the total reported in the table.

CHANGE IN QUANTITY AS A PERCENTAGE OF SUBSIDIZED LINES: Calculated by dividing the change in quantity by the subsidized Large Company residential, Large Company business, Small Company, or total lines.

CHANGE IN QUANTITY AS A PERCENTAGE OF TOTAL TEXAS PRIMARY LINES: The figure for primary lines in 2005 (13,464,593) is from the *Scope of Competition Report*.[44]

SUBSIDY PER ADDITIONAL LINE CAUSED BY PROGRAM: Calculated by dividing the total annual cost of the program by the number of additional lines caused by the program.

Forgone Benefits of Universal Service Assessments on Long-Distance

PRICE: There is no single per-minute "price" of long-distance service. To identify the most relevant per-minute price, in October 2006, we checked the range of prices for intrastate long-distance offered on the web sites of five companies: AT&T Texas and GTE/Verizon Texas (the two largest incumbents), MCI and Sprint (long-distance carriers), and Bigredwire.com (a discount long-distance reseller that charges by the minute). Depending on the package chosen, Texas intrastate long-distance cost between $0.04 and $0.12 per minute. Plans priced solely per minute (Sprint, MCI, and Bigredwire.com) ranged from $0.07 to $0.12 per minute.[45] Plans that

---

42. ROBERT W. CRANDALL & LEONARD WAVERMAN, WHO PAYS FOR UNIVERSAL SERVICE? 91 (2000).

43. *Id.* at 90–91.

44. COMPETITION REPORT, *supra* note 11, at 13 fig.3.

45. Sprint, Sprint Long Distance Calling Plans, http://shop.sprint.com/residential/voiceservices/longDistance/plans/allPlans/allPlans.jsp?bmUID= 1197654302825 (last visited Dec. 16, 2007); MCI, Compare Instate Rates, http://consumer.mci.com/res_long_distance/LocalToll.jsp?SHOW_NAV=true (last visited Dec. 16, 2007); bigredwire, http://www.bigredwire.com/visitors/welcome.jsp (click "rates+>"; then select "within us") (last visited Dec. 16, 2007).

included a flat fee (AT&T and Verizon) charged $0.04 to $0.05 per minute.[46] A figure of $0.07 per minute assumes that many consumers opt for packages that include a flat fee and lower per-minute price. A higher per-minute price generates a larger deadweight loss.

To this posted price we add universal service assessments and federal, state, and local taxes. The federal tax rate is 3%.[47] The combined state and local tax rate is 9.5%; this figure includes state sales tax, local sales tax, and the telecommunications infrastructure fund.[48] The Texas universal service assessment rate is 3.6%.[49] All of these rates are applied to the $0.07 per minute price to yield a total price of $0.083 per minute. There is no need to account for federal universal service assessments, because the quantity variable is intrastate long-distance only. The federal universal service assessment does not apply against intrastate long-distance.

PER-MINUTE ASSESSMENT: Calculated by multiplying the $0.07 per minute price by the 2005 Texas universal service assessment rate of 5.65%.

PRICE WITHOUT ASSESSMENT: Calculated by subtracting the $0.004 per minute universal service assessment from the total price of 8.3¢/minute.

PERCENTAGE CHANGE IN PRICE DUE TO ASSESSMENT: This is the $0.004 per minute universal service assessment divided by the $0.083 per minute total price.

QUANTITY: Estimating the number of conversation minutes required several assumptions. We start with FCC ARMIS data, which shows that the four largest incumbents had 13.5 billion intrastate interLATA billed access minutes in 2005.[50] Next, we adjust this number by adding

---

46. AT&T, CallVantage, http://www.usa.att.com/callvantage/index.jsp (last visited Dec. 16, 2007); Verizon, Long Distance Calling Plans, https://www22.verizon.com/Residential/Phone/Long+Distance/Long+Distance.htm (last visited Dec. 16, 2007).

47. Mackey, *supra* note 9, at 183.

48. *Id.* at 193 app. A.

49. *Id.* at 193.

50. This is the sum from each provider's respective table: FED. COMMC'NS COMM'N, FCC PAPER REPORT 43-08, THE OPERATING DATA REPORT tbl.4 (2006), http://fjallfoss.fcc.gov/eafs7/paper/43-08/PaperReport08.cfm (select "2005," "SWTR AT&T/Southwestern Bell Telephone," "Table IV – Telephone Calls"; then click "SUBMIT"); FED. COMMC'NS COMM'N, FCC PAPER REPORT 43-08, THE OPERATING DATA REPORT tbl.4 (2006), http://fjallfoss.fcc.gov/eafs7/paper/43-08/PaperReport08.cfm (select "2005," "GTSW GTE of The Southwest, Inc. dba Verizon Southwest," "Table IV – Telephone Calls"; then click "SUBMIT"); FED. COMMC'NS COMM'N, FCC PAPER REPORT 43-08, THE OPERATING DATA REPORT tbl.4 (2006), http://fjallfoss.fcc.gov/eafs7/paper/43-08/PaperReport08.cfm (select "2005," "VANT Valor Telecommunications of Texas, LP d/b/a Windstream Comm. Southwest," "Table IV – Telephone Calls"; then click "SUBMIT"); FED. COMMC'NS COMM'N, FCC PAPER REPORT

an estimate of intraLATA long-distance minutes used by customers of these companies. To do so, we first assume that customers averaged the same number of minutes on intraLATA long-distance phone calls as they did on intrastate interLATA calls. Dividing interLATA billed access minutes by the number of interLATA calls provides an estimate of the number of access minutes per call. Multiplying this figure by the number of intraLATA long-distance calls provides an estimate of the number of intraLATA long-distance minutes.[51] Adding this figure to interLATA billed access minutes yields a total of 14.6 billion access minutes for the largest incumbents. We then scale this figure up by assuming that customers of the smaller phone companies use the same number of intrastate long-distance minutes as customers of the large incumbents.[52] Multiplying 14.6 billion access minutes by the ratio of total lines (12 million) to Large Company lines (8.9 million) yields an estimate of 19.7 billion access minutes.[53] An access minute is a minute any caller accesses the phone network. Since each phone call takes two people—each one using a telephone that accesses the network—it takes two access minutes to make a conversation minute. Therefore, we divide the number of access minutes by two to get 9,874,536,774 conversation minutes.

ELASTICITY OF DEMAND: A large body of empirical research estimates the effect of surcharges on consumer welfare by examining their effect on long-distance prices and usage. Most studies find that the price elasticity of demand for long-distance service is relatively large, in a range between -0.5 and -0.72; a 1% increase in long-distance prices reduces use by about one-half to three-quarters of one percent.[54] A consensus estimate of the elasticity is -0.7.[55] Hence, long-distance price increases generate relatively large reductions in long-distance usage.

43-08, THE OPERATING DATA REPORT tbl.4 (2006), http://fjallfoss.fcc.gov/eafs7/paper/43-08/PaperReport08.cfm (select "2005," "CETX Central Tel. of Texas," "Table IV – Telephone Calls"; then click "SUBMIT").

51. Technically, intraLATA long-distance calls are not measured in access minutes. We remove this inaccuracy later when we divide access minutes by two to calculate conversation minutes.

52. This may underestimate the total number of minutes because customers of the smaller companies may use more long-distance service since they typically live in rural areas with smaller local calling areas.

53. The number of Large Company lines is from FCC ARMIS data. The number of total lines is from COMPETITION REPORT, *supra* note 11, at 13.

54. Jerry Hausman & Howard Shelanski, *Economic Welfare and Telecommunications Regulation: The E-Rate Policy for Universal-Service Subsidies*, 16 YALE J. ON REG. 19, 36–37 (1999).

55. Michael H. Riordan, *Universal Residential Telephone Service*, *in* 1 HANDBOOK OF TELECOMMUNICATIONS ECONOMICS: STRUCTURE, REGULATION, AND COMPETITION 423, 436 (Martin E. Cave et al. eds., 2002).

Texas Review of Law & Politics   Vol. 12

CHANGE IN QUANTITY: Calculated as quantity multiplied by percentage change in price multiplied by elasticity of demand.

MARGINAL COST: The marginal cost of a minute of long-distance service is unknowable but likely quite low. We construct an estimate of the average variable cost of long-distance service, using the equation *AVC = p(1-margin) - per-minute access charges*. We exclude access charges totaling $0.0428 per conversation-minute[56] because they are merely transfers from long-distance customers to long-distance companies to the local phone companies that impose the access charges.[57] The "margin" is the contribution to fixed costs and operating profit that the long-distance company has left over after paying all of its variable costs. Data on long-distance margins are hard to find, but Sprint recently reported a margin of 15% on long-distance for 2005[58] which yields an average variable cost (excluding access charges) of $0.017 at an assumed price of $0.07. This is very close to the $0.0175 per minute marginal cost calculated when using Hausman and Shelanski's assumption that marginal cost equals 25% of the price.[59]

Forgone Benefits of Universal Service Assessments on Wireless

PRICE: There is no single per-minute price for wireless service, as minutes are sold in various sized "buckets" with additional charges for incremental usage exceeding the monthly limit. We estimate the average price per minute by using a combination of national and Texas data. Use of national data implicitly assumes that prices and usage in Texas are similar to national averages. Since the major wireless carriers make service available on uniform national pricing plans, this assumption is likely to be pretty accurate. The national average monthly wireless phone bill in 2005 was $49.98, and average minutes of use totaled 740.[60] To this figure we add an estimate of Texas taxes

---

56. Calculated from data in TEX. PUB. UTIL. COMM'N, PROJECT TO DEVELOP COA/SPCOA STATEWIDE AVERAGE SWITCHED ACCESS RATES FOR NOVEMBER 2006 PUBLICATION PURSUANT TO PURA SECTION 52.155 AND PUC SUBST. R. 26.223, Docket No. 32679 (2006), at 1.

57. Another way to look at it is that local phone companies lose out on access charges when universal service assessments reduce the amount of long-distance service used. By subtracting access charges from average variable cost, we ensure that the access charge revenues that the local companies forego are included in our calculation of the deadweight loss.

58. See SPRINT, INVESTOR QUARTERLY UPDATE: FOURTH QUARTER 2006 RESULTS, at 6 tbl. 3, http://media.corporate-ir.net/media_files/irol/12/127149/Q406Finalrelease.pdf for details.

59. Hausman & Shelanski, *supra* note 54, at 42.

60. In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, WC Docket No, 06-17, Eleventh Report 106 tbl.10 (2006), *available at* http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-06-142A1.pdf [hereinafter FCC Wireless Report].

and universal service charges (14.19%)[61] plus the federal tax (3%) and a federal universal service charge of 3.7%.[62] Dividing the total by average minutes of use yields a price of $0.082 per minute.

PER-MINUTE UNIVERSAL SERVICE ASSESSMENT: The Texas universal service assessment was 5.65% of intrastate revenues for 2005.[63] Universal service assessments are levied against wireless carriers' intrastate revenues. Dividing the pre-tax average monthly bill ($49.98) by average monthly minutes (740) yields a pre-tax price of $0.06754 per minute. The Texas assessment applies to the 62.9% of revenues considered intrastate.[64] Multiplying the assessment rate by the pre-tax price by the intrastate percentage yields a price change of $0.0024 per minute. If the 4.4% assessment rate is used, the pre-tax price change is $0.0019 per minute.

PRICE WITHOUT ASSESSMENT: Calculated by subtracting the $0.002 per minute assessment from the $0.082 per minute price.

PERCENTAGE CHANGE IN PRICE DUE TO ASSESSMENT: Calculated by dividing the $0.002 per minute assessment by the $0.082 per minute price.

QUANTITY (MINUTES): We estimated the total number of minutes by multiplying 15 million Texas subscribers (the midpoint between figures for June and December 2005 listed in the FCC's wireless report[65]) by 740 minutes by 12 months.

ELASTICITY OF DEMAND: Studies that estimate the demand for wireless, employing minutes of use as the dependent variable, yield elasticities between -1.12 and -1.29 using domestic U.S. data and between -1.71 and -3.62 using international data.[66] We use -1.21, the midpoint between the findings using U.S. data.

CHANGE IN QUANTITY (MINUTES): Calculated as quantity multiplied by percentage change in price multiplied by elasticity of demand.

---

61. Mackey, *supra* note 9, at 183 tbl.1.

62. This represents the federal interstate safe harbor percentage of 37.1% multiplied by a federal universal service assessment rate of 10%. In the Matter of Universal Service Contribution Methodology, 21 F.C.C.R. 7518, 7520 (2006); Jerry Ellig & Alastair Walling, *Regulatory Status of VoIP in the Post-Brand X World*, 23 SANTA CLARA COMPUTER & HIGH TECH. L.J. 89, 123 (2006).

63. UNIVERSAL SERVICE REPORT, *supra* note 1, at 6.

64. TUSF ASSESSMENT, *supra* note 7, at 5.

65. FCC Wireless Report, *supra* note 60, at 97 tbl.2.

66. J. GREGORY SIDAK, CRITERION ECONOMICS, IS STATE TAXATION OF THE WIRELESS INDUSTRY COUNTERPRODUCTIVE? (2003) (using 1999–2001 U.S. data), http://www.criterioneconomics.com/docs/sidak_pacific_research.pdf; THOMAS W. HAZLETT & ROBERTO E. MUÑOZ, AEI-BROOKINGS JOINT CENTER FOR REGULATORY STUDIES, A WELFARE ANALYSIS OF SPECTRUM ALLOCATION POLICIES 04–18, 15 (2004), http://www.aei-brookings.org/admin/authorpdfs/redirect-safely.php?fname=../pdffiles/phpvz.pdf.

MARGINAL COST: We know of no research estimating the marginal cost of wireless service, nor data that would permit us to do so. Instead, we estimate average variable cost using the formula *AVC = p(1-margin)*. Wireless carriers have recently reported margins in the range of 24–38%, which implies average variable cost ranging between $0.042–0.051 per minute.[67] These figures seem consistent with a 2000 study that assumed a marginal cost of $0.05 per minute.[68] We use $0.045 per minute, approximately the average of the figures for the four largest providers.

Per-Number Charge

Data sources remain the same from the previous section.[69] Formulas used for calculations are the same. Quantity is measured as subscribers, price is monthly revenue per customer, and a per-number charge is used as Δp instead of a per-minute charge.

ANNUAL PRICE: Calculated by multiplying the total per-minute price from Forgone Benefits of Universal Service Assessments on Wireless[70] by the national average monthly minutes per subscriber by 12. Monthly average number of minutes per subscriber can be found in Table 10 of the *FCC Wireless Report*.[71]

QUANTITY: Number of Texas subscribers (15 million) is the midpoint between figures for June and December 2005 listed in Table 2 of the *FCC Wireless Report*.[72]

PER-NUMBER CHARGE: Calculated as shown in table in main text from data sources cited there.

---

67. *See,   e.g.*,   VERIZON,   2005   Q4   INVESTOR   QUARTERLY, http://investor.verizon.com/financial/quarterly/vz/4Q2005/4Q05Bulletin.pdf (38%); SPRINT, INVESTOR QUARTERLY UPDATE, FOURTH QUARTER AND YEAR-END 2005 RESULTS, http://media.corporate-ir.net/media_files/irol/12/127149/quarterly_2005/Q4F.pdf (31% adjusted OIBDA   margin);   AT&T   Inc.,   Financial   Data, http://www.att.com/Investor/Financial/Earning_Info/docs/Segments_IB_4Q05.xls (last visited Dec. 16, 2007) (24%); T-Mobile.com, Company Information, http://www.t-mobile.com/Company/InvestorRelations.cspx?tp=Abt_Tab_InvestorRelations&ViewArchive=Yes (last visited Dec. 16, 2007) (32% OIBDA margin). Because depreciation and amortization are fixed costs, the appropriate margin for calculating average variable costs is the margin that excludes these from operating costs—the Operating Income Before Depreciation and Amortization (OIBDA) margin. When a company does not report this margin, we calculate it by adding depreciation and amortization charges to operating revenues.

68. Jerry Hausman, *Efficiency Effects on the U.S. Economy from Wireless Taxation*, 53 NAT'L TAX J. 733, 737 (2000).

69. *See supra* notes pp. 84–86.

70. *Id.*

71. FCC Wireless Report, *supra* note 60, at 106 tbl.10.

72. *Id.* at 97 tbl.2.

ELASTICITY OF DEMAND: Most economic studies that estimate the demand for wireless access using the number of subscribers per hundred or the probability of subscription as the dependant variable yield elasticities of between -0.43 and -0.71.[73] We use -0.57, approximately the midpoint of the range of estimates in empirical studies.

INCREMENTAL COST: Incremental cost of a subscriber is average variable cost per minute, calculated above under Forgone Benefits of Universal Service Assessments on Wireless,[74] multiplied by the average monthly number of minutes per subscriber. Monthly average number of minutes per subscriber is found in Table 10 of the *FCC Wireless Report*.[75]

Turn Back the Clock

2005 PRICES AND TRAFFIC LEVEL: All data and calculation methods are the same as described in Forgone Benefits of Universal Service Assessments on Long-Distance.[76] The only difference from the calculations in that section is that we used a spreadsheet to search by trial-and-error for a per-minute access charge that would maximize the revenues available to subsidize local service.

2000 PRICES AND TRAFFIC: Calculation methods and data sources are the same as described in Forgone Benefits of Universal Service Assessments on Long-Distance.[77] The estimated intrastate long-distance price of $0.15 per minute is based on the PUC's finding that the rates Small Companies charged for intrastate long-distance would average $0.15 per minute after the access charge reductions mandated by the implementation of the Small Company High-Cost Program.[78]

---

73. Christopher Garbacz & Herbert G. Thompson Jr., *Universal Telecommunication Services: A World Perspective*, 17 INFO. ECON. & POL'Y 495, 506 tbl.5 (2005); Jerry Hausman, *Cellular Telephone, New Products, and the CPI*, 17 J. BUS. & ECON. STAT. 188, 191 (1999) (estimating a demand elasticity of approximately -0.51 with 1989–1993 data); Hausman, *supra* note 68, at 738 (estimating a demand elasticity of -0.71); Mark Rodini et al*., Going Mobile: Substitutability Between Fixed and Mobile Access*, 27 TELECOMM. POL'Y 457, 470 (2003).

74. *See supra* notes pp. 84–86.

75. FCC Wireless Report, *supra* note 60, at 165 tbl.10.

76. *See supra* notes pp. 84–86.

77. FCC Wireless Report, *supra* note 60, at 165 tbl.10.

78. Texas Pub. Util. Comm'n, Compliance Proceeding for Implementation of the Small and Rural Incumbent Local Exchange Carrier Universal Service Plan, Docket No. 18516 (Jan. 14, 2000) (final order), *available at* http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/172929.DOC [hereinafter Small Company Decision]; ROBERT W. CRANDALL & JERRY ELLIG, TEX. PUB. POLICY FOUND., TEXAS TELECOMMUNICATIONS: EVERYTHING'S DYNAMIC EXCEPT THE PRICING 40 (2005), *available at* http://www.texaspolicy.com/pdf/2005-01-telecom.pdf.

We used a spreadsheet to conduct a trial-and-error search for a per-minute access charge that would raise approximately the same amount of revenue as the Texas Universal Service Fund collected in assessments in 2005.

Rate Equalization

The rate equalization proposals[79] allow rates on subsidized lines to rise to each incumbent company's highest rate, the highest rate charged by an incumbent company in each of the two programs, or the highest rate charged by any incumbent. We can produce a ballpark estimate of the effect of rate equalization if we assume that the midpoint in each company's range of rates is also the average rate. If the midpoint is also the average, then raising all rates to the highest rate is similar to increasing the average rate by one-half the difference between the lowest and the highest rate.

For the Large Company Program, data on residential per-line subsidies in the PUC's *Universal Service Report* are broken down by various subsidy ranges, but not by company.[80] For each subsidy range, we calculate an average per-line subsidy. Each rate equalization proposal involves raising all rates to equal some new maximum rate. For each proposal, we calculate the difference between the Large Company weighted-average rate and the new maximum rate. If this difference is smaller than the per-line subsidy, the reduction in per-line subsidy is equal to the rate difference. If the rate difference exceeds the per-line subsidy, the reduction in per-line subsidy is simply the actual amount of the subsidy. The sum of the estimated subsidy amounts for each subsidy range is the total expenditure.

For the Small Company Program, data on per-line subsidies are available for each company. For each proposal, we calculate the difference between each Small Company's average rate and the new maximum rate. If this difference is smaller than the per-line subsidy, the reduction in per-line subsidy is equal to the rate difference. If the rate difference exceeds the per-line subsidy, the reduction in per-line subsidy is simply the actual amount of the subsidy. The sum of the estimated subsidy amounts for each company is the total expenditure.

CURRENT RATES, SUBSCRIBERSHIP, AND WEIGHTED-AVERAGE RATES: Calculated as described under Effects of Large and Small

---

79. *See supra* Part V.C.
80. UNIVERSAL SERVICE REPORT, *supra* note 1, at 8 fig.3.

Company High-Cost Programs on Subscribership from data sources cited.[81]

LARGE COMPANY RESIDENTIAL SUBSIDY RANGES AND SUBSIDY EXPENDITURES: Information is taken from the PUC's *2007 Universal Service Report*, Table 5.[82]

LARGE COMPANY BUSINESS SUBSIDY RANGES AND SUBSIDY EXPENDITURES: Calculated as described under Effects of Large and Small Company High-Cost Programs on Subscribership from data sources cited.[83]

SMALL COMPANY PER-LINE SUBSIDIES, SUBSIDY EXPENDITURES, AND SUBSCRIBERSHIP: Information is taken from the PUC's *2007 Universal Service Report*, Table 7.[84]

Increasing the Revenue Benchmark

Many of the reform proposals involve allowing regulated rates to rise to some external benchmark, then reducing per-line subsidies concomitantly.[85] We analyze these proposals the same way we analyzed rate equalization.[86] The only difference is that, instead of assuming that companies' rates rise to some current maximum rate, we assume that companies' rates rise to some external benchmark.

The "New Revenue" reform proposals simply assume that the per-line subsidy falls by an amount equal to the assumed new revenues per line.[87] Analysis proceeds in the same way we analyzed rate equalization.[88]

NATIONAL AVERAGE RATES: Information is taken from the PUC's *2007 Universal Service Report*, Table 5.[89]

VOIP RATES: The lowest VoIP rates appear to be offered by the stand-alone VoIP providers, rather than the phone or cable companies.[90]

---

81. *See supra* notes pp. 77–81.

82. UNIVERSAL SERVICE REPORT, *supra* note 1, at 16 tbl.5.

83. *See supra* notes pp. 77–81.

84. UNIVERSAL SERVICE REPORT, *supra* note 1, at 40 tbl.7.

85. *See supra* Part V.D.

86. *See supra* notes pp. 88–89.

87. UNIVERSAL SERVICE REPORT, *supra* note 1, at 40 tbl.7.

88. *See supra* notes pp. 88–89.

89. *Id.* at 16 tbl.5.

90. Skype, http://www.skype.com (last visited Dec. 16, 2007) (residential) ("Make calls from your computer — free to other people on Skype and cheap to landlines and cell phones around the world."); Vonage, Small Business Premium Unlimited, http://vonage.com/index.php?ic=l (follow "Big Savings for Small Businesses" hyperlink) (last visited Dec. 16, 2007) (business) ("Unlimited

UNSUBSIDIZED WIRELESS RATE: Sprint offers a 200-minute wireless package for $29.99.[91] T-Mobile offers a 300-minute wireless package for $29.99.[92]

SATELLITE PHONE: Global Star offers 50–500 satellite phone minutes for $50–$120, an unlimited usage plan with multi-year subscription for $49.99 in the first year, declining to $39.99 in the second year and $19.99 in the third and fourth years, and various equipment rental options.[93]

Effects of Assumed Cost Reductions

LOWEST AND TWO LOWEST SUBSIDY RANGES: The two lowest subsidy ranges for Large Company residential lines are $0.02–$10.00 and $10.01–$20.00.[94] To calculate the effect of assumed cost reductions on these lines, we subtracted the subsidies for these lines from the total Large Company residential subsidy figure. Similarly, we subtracted Small Company subsidies below $10.00 and below $20.00 per line from the total subsidy figure for Small Companies, found in the *Universal Service Report*, Table. 7.[95] The two lowest subsidy ranges for Large Company business lines, estimated as described under Effects of Large and Small Company High-Cost Programs on Subscribership,[96] are under $6.00 and $6.01–$16.00. We subtracted subsidies for these lines from the total business subsidy figure.

CAP HIGHEST AND TWO HIGHEST SUBSIDY RANGES: The two highest subsidy ranges for Large Company residential lines are $100.01–$150.00 and greater than $150.00.[97] To calculate the effect of capping subsidies on these lines, we subtracted the portion of the average per-line subsidy that exceeds the cap from the total Large Company residential subsidy figure. Similarly, we subtracted the portion of Small Company subsidies that exceeds the cap from the total subsidy figure for Small Companies, found in the *Universal Service Report*, Table 7.[98] The two highest subsidy ranges for Large Company

---

local and long distance calls anywhere in the US, Canada, Puerto Rico and select European countries.").

91. Nextel, http://www.sprint.com/index.html?brand=Nextel (click "Plans"; then follow "View All Plans" hyperlink") (last visited __, 2007).

92. T-Mobile, All Plans, http://www.t-mobile.com/shop/plans/ (last visited Dec. 16, 2007).

93. Global Star, North America Plans, http://www.globalstarusa.com/en/airtime/voicepricing (last visited Dec. 16, 2007).

94. UNIVERSAL SERVICE REPORT, *supra* note 1, at 16 tbl.5.

95. *Id.* at 40 tbl.7.

96. *See supra* notes pp. 77–81.

97. UNIVERSAL SERVICE REPORT, *supra* note 1, at 16 tbl.5.

98. *Id.* at 40 tbl.7.

business lines, estimated as described under Effects of Large and Small Company High-Cost Programs on Subscribership,[99] are $86.01–$136.00 and greater than $136.00. We subtracted the portion of average per-line subsidies that exceeds the cap from the total business subsidy figure.

---

99. *See supra* notes pp. 77–81.