

Use of Designated Entity Preferences in Assigning Wireless Licenses

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I. INTRODUCTION

The Federal Communications Commission (FCC or Commission) was granted the power to auction licenses for use of the electromagnetic spectrum in the 1993 Omnibus Budget Reconciliation Act in which Congress added section 309(j) to the Communications Act.¹ Congress mandated the new auction policy on the grounds that new telecommunications services were to be deployed quickly, but also that licenses be assigned to “a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women.”² In general, auctions have been a faster and less costly means of license assignment than previous FCC methods. As the auction process has progressed, however, it is apparent that the mandate for speed and efficiency has clashed with the preference programs established to facilitate the diversity mandate. Specifically, in some instances, the very structure of the preference programs has encouraged entry of comparatively inefficient telecommunications providers. In turn, this has led to delay in the provision of telecommunications services to consumers.

This Article attempts to isolate the delays in license allocation and in the provision of consumer services that are directly associated with the FCC preference programs for small, woman, and minority-owned businesses. This Article then estimates the consumer costs associated with those delays and compares those costs to the quantifiable benefits of the preference programs—such as subsidies to producers and enhanced auction revenues for the government. In other words, the Article constructs the framework for a social welfare analysis to assess changes in both producer and consumer welfare as well as the amount of deadweight loss—the amount that is not captured by either telecommunications producers or consumers—associated with the preference program structure.

1. Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, sec. 6002, § 309(j), 107 Stat. 312, 387-88 (codified at 47 U.S.C.).

2. 47 U.S.C. § 309(j)(3)(B) (1994).

II. GENERAL FRAMEWORK OF THE FCC DESIGNATED ENTITY PREFERENCE PROGRAM

The FCC adopted its initial regulations governing general auction structure on March 8, 1994. To meet its mandate of assigning licenses to a wide variety of applicants, the FCC structured the auction under the assumption that the primary impediment to participation by small businesses and minority or woman-owned firms was their lack of access to private capital markets.³

To compensate for this lack of access, or more precisely the inability of small start-up firms to obtain low-interest financing, the FCC established a program of multitiered benefits—consisting of various combinations of government financing programs and bidding credits—for “designated” bidders. To be designated for a particular benefit package, the potential bidder had to meet certain criteria based on firm size and ownership status. A few subcategories of the designated entity status were fairly consistent across auctions. The FCC categorized designated entities by average revenues over the three years preceding the filing for auction eligibility. The most widely used categories were very small business, for those firms with average revenues of \$15 million; small business, for those with revenues not in excess of \$40 million; and entrepreneur, for those with revenues in excess of \$40 million and not in excess of \$125 million.⁴ Entrepreneurs were to have no more than \$500 million in gross assets.⁵

This Article highlights only two of the several auctions with designated entity programs: the Regional Narrowband Personal Communications Services (RNPCS) and the Personal Communications Services (PCS) C block auctions.⁶

III. DESCRIPTION OF DELAYS ASSOCIATED WITH DESIGNATED ENTITY PREFERENCES

By examining the performance of the designated entities versus their nondesignated counterparts, one can compare the delays from license allo-

3. Implementation of Section 309(j) of the Communications Act—Competitive Bidding, *Fifth Report & Order*, 9 F.C.C.R. 5532, para. 174, 75 Rad. Reg. 2d (P & F) 859 (1994) [hereinafter *Competitive Bidding Fifth Report & Order*].

4. See generally Implementation of Section 309(j) of the Communications Act—Competitive Bidding Narrowband PCS, *Third Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 10 F.C.C.R. 175, 75 Rad. Reg. 2d (P & F) 1211 (1994).

5. For a summary of financial caps and offered benefits for selected auctions, see app. tbl.1.

6. To see where these two auctions fall in the context of the 17 auctions scheduled, there is a summary of all the auctions divided by license type, number of licenses auctioned, net high bids, dates of the auction, and number of rounds in app. tbl.2.

cation until market deployment associated with the various program structures. Specifically, this Article examines the licensing and subsequent performance of the RNPCS firms and the licensing and subsequent performance of the designated entities in the C block versus the nondesignated entities of the A and B block auction.

A. *The Auction Process Versus Previous Methods*

Auctions were intended to correct problems associated with lotteries and comparative hearings—the previous FCC license assignment procedures. It was argued that auctions would reduce rent seeking, speed licenses into the marketplace, capture license rents for the Federal Treasury rather than “squander” them on lucky or politically connected applicants, and enhance performance because the auction winners would be most likely to implement services most efficiently.⁷

When comparing the time delays associated with various assignment methodologies, it is important to be precise in setting the end points. While the evidence indicates that, on average, auctions reduce the time between license application and license grant, it is more difficult to determine differences in time from license grant to time of market deployment. It must be noted that this analysis does not measure the total “regulatory lag,” which would include the time delay associated with FCC spectrum allocation. Licenses to operate wireless businesses are issued by the FCC only after a rule making has established how a given block of radio spectrum is to be utilized by private parties. The FCC’s block allocation function remains intact across all three license assignment methods and, hence, is not the subject of this inquiry.

The average number of days between the application for, and the grant of, an auctioned license is approximately 233 days for all licenses auctioned and 276 days for broadband PCS excluding C block. That is 136 to 179 days faster than license distribution under the lottery system. The differential between auctions and comparative hearings is greater still, with auctions averaging between 444 and 487 days faster.⁸

7. It has been estimated that the ten-year delay in allocating additional licenses for wireless services cost the U.S. economy 2% of its Gross National Product, or approximately \$80 billion. Jeffrey H. Rohlfs et al., *Estimate of the Loss to the United States Caused by the FCC’s Delay in Licensing Cellular Telecommunications* (National Economic Research Associates Nov. 1991).

8. FCC Report to Congress on Spectrum Auctions, *Report*, 13 F.C.C.R. 9601, app. E (1997) [hereinafter *Spectrum Auctions Report*].

B. Designated Entities Versus Nondesignated Entities in the Regional Narrowband Personal Communications Services Auctions

1. From License Allocation to License Grant

In analyzing the use of designated entities, one can compare two distinct preference structures because of the Supreme Court's landmark decision in *Adarand Constructors, Inc. v. Peña*.⁹ The decision cast doubt on the FCC's authority to single out minority-owned firms for bidding preferences. The only observable use of designated entity versus nondesignated entity status before *Adarand* was the RNPCS auction.

There, the FCC auctioned thirty licenses—six blocks with five licenses each. The licenses allowed the awardee to provide advanced paging and data services. Any firm, regardless of size, could participate in the auction, but where nondesignated entities had to pay their full bid price upon completion of the auction, designated entities—or more precisely, small businesses—were eligible for a highly favorable payment plan. Those that qualified for the preference were required to make a down payment of only 20 percent of their bid at the time of license grant, with the remaining 80 percent, plus interest set at the Treasury Bond rate of 7.5 percent, to be paid over ten years. Payments on the bid principal were deferred until years three through ten.¹⁰ Assuming that the cost of capital for firms qualifying for designated entity status was 14 percent, the implicit subsidy embedded in the financing package constituted over 20 percent of the net—after credit—price bid.¹¹

9. *Adarand*, 515 U.S. 200, 227 (1995) (stating that the constitutionality of all government-imposed racial classifications will be determined under a “strict scrutiny” standard of review); *see also* *United States v. Virginia*, 518 U.S. 515, 534 (1996) (holding that a state-imposed gender classification was unconstitutional because the state failed to show an “exceedingly persuasive justification” for the program).

10. Implementation of Section 309(j) of the Communications Act—Competitive Bidding, *Third Report and Order*, 9 F.C.C.R. 2941, paras. 66-74, 75 Rad. Reg. 2d (P & F) 230 (1994); Implementation of Section 309(j) of the Communications Act—Competitive Bidding, *Order on Reconsideration*, 9 F.C.C.R. 5306, para. 8, 75 Rad. Reg. 2d (P & F) 1342 (1994).

11. To calculate the market value of the subsidy in figure 1, subtract the present value of payments under the designated entity program from the nonsubsidized price (assumed to be \$1 billion). The subsidy value can be stated in percentage terms by dividing that number by the purchase price (i.e., \$1 billion).

Figure 1				
Implicit Subsidy in Designated Entity Credit Terms:				
RNPCS License Auctions				
Example Assuming: \$1 billion bid, 14% cost of capital				
<i>Year</i>	<i>Principal Payment</i> (\$ millions)	<i>Interest Payment</i> (\$ millions)	<i>Total Payment</i> (\$ millions)	<i>Present Value</i> (\$ millions)
0	200.0	0.0	200.0	200.0
1	0.0	60.0	60.0	52.6
2	0.0	60.0	60.0	46.2
3	100.0	60.0	160.0	108.0
4	100.0	52.5	152.5	90.3
5	100.0	45.0	145.0	75.3
6	100.0	37.5	137.5	62.6
7	100.0	30.0	130.0	52.0
8	100.0	22.5	122.5	42.9
9	100.0	15.0	115.0	35.4
10	100.0	7.5	107.5	29.0
SUM				794.3

In addition to the installment plan, a bidding credit of 25 percent was awarded to any small business that bid on one of the ten licenses in blocks two and six—that is, for each dollar bid a small business paid only \$0.75. Small businesses that were also owned by women or minorities¹² received an additional 15 percent, a total bidding credit of 40 percent, in blocks two and six. These credits effectively reserved blocks two and six for designated entities.

It took 105 rounds of bidding to determine the final nine winners. Of this group, four designated entities won a total of eleven licenses, and five other bidders won a total of nineteen licenses. The government's net revenue for the RNPCS auction was posted at \$394 million.¹³

12. To qualify as a minority or woman-owned business, the "control group," composed of members of a minority group and/or of women, was required to hold 25% of firm equity. Up to 75% of the firm's equity could belong to passive investors who on their own would not have qualified for the special minority or woman-owned designation. The control group had to also hold a minimum of 50.1% of the voting stock. *Competitive Bidding Fifth Report & Order*, *supra* note 3, paras. 160-62.

13. Wireless Telecomm. Bureau, FCC, *Regional Narrowband (PCS) Auction Charts: Fact Sheet* (visited Mar. 15, 1999) <<http://www.fcc.gov/wtb/auctions/rnpcs/rnp1fact.html>>.

Of the twenty-eight bidders to qualify, twenty had some form of preference, and those preferences significantly influenced the outcome of the auction. The incentives attracted many bidders to the set-aside licenses, and competition among designated entities was intense. Aided by bidder's credits and installment payments, designated entities bid up the prices paid by non-designated entities in blocks one, three, four, and five. The designated entity demand was so strong that even taking account of *both* the bidding credit and the installment subsidy, the designated firms paid more for blocks two and six than the nondesignated firms would have been willing to pay.¹⁴ Only one small business won a license outside of blocks two or six. However, that small business still qualified for the installment plan.

2. From License Grant to Market

As of July 1998, all designated entity RNPSC licensees have developed services, either on their own or through resale contracts as quickly, but not as fully, as their nondesignated entity counterparts.¹⁵ The only designated entity to have a national footprint, Conxus, is currently operational in ten major markets. Of the other three licensed designated entities, at least two are reselling within their license area. These ratios are quite favorable to those of the nondesignated businesses. Only one of the five nondesignated entities, SkyTel, is currently operational. The other four are reselling the services of the two facilities-based providers.

However, future plans for deployment sharply separate the two groups. Whereas four of the five nondesignated entities expected to have their own systems deployed by the end of 1998, only one designated entity, Conxus, has plans to expand its system.

C. *The A and B PCS Block Auction Versus C Block*

1. Time to Auction

The C block auction was first contemplated as a set-aside auction exclusive to woman and minority-owned businesses. However, before the auction was planned and executed, the Supreme Court decided *Adarand*. Due to the outcome of that case, the FCC had to reassess its original C block auction design. The allocation of the 493 licenses within the C block was subsequently delayed for over six months; the auction originally scheduled for spring of 1995 did not begin until December 1995. The susceptibility of

14. Ian Ayres & Peter Cramton, *Deficit Reduction Through Diversity: How Affirmative Action at the FCC Increased Auction Competition*, 48 STAN. L. REV. 761, 790.

15. See app. tbls.3 & 4.

preferences to greater administrative process, as well as to legal challenges from would-be competitors,¹⁶ is a factor to be included when calculating policy costs and benefits.

In the C block auction, the FCC sold the fifth license for the provision of wireless telephone services in any given market following the wireline and non-wireline cellular licenses and the A and B block PCS licenses. The broadband PCS licenses of the C block were allocated to permit mobile voice and data transmissions. In contrast to RNPCS, designated entity status was required for eligibility in the auction.¹⁷ The C block became termed an "entrepreneur block" due to the restriction on bidding entrants to include only firms classified under the blanket definition of "entrepreneur," which included entrepreneurs, small, and very small businesses. Again, an entrepreneur was defined as a firm with average revenues under \$125 million and total assets under \$500 million. Passive nonvoting investment by firms of unlimited size was allowed, however, and the attribution rules were liberal, allowing for as much as 75 percent of the total equity of the firm to be held by large investors who would otherwise not be eligible to bid.¹⁸

As originally designed pre-*Adarand*, the C block was framed akin to the RNPCS auction. It allowed for a 10 percent bidding credit for small businesses and an additional 15 percent credit to minority and woman-owned businesses.¹⁹ However, these rules were modified after the Supreme Court's decision in *Adarand*: All small businesses were eligible for the 25 percent bidding credit.²⁰

In addition to the bidding credit, small businesses were eligible for an installment plan slightly more favorable than that in the RNPCS auction. A down payment of only 10 percent—as opposed to 20 percent—was due at the time of license grant, with the remaining 90 percent to be paid over ten years at an interest rate of 6.5 percent, as discussed *infra* at Part IV.A. Principal payments in the C block were deferred three years, compared to the two-year deferment in the RNPCS auction. Therefore, the value of the implicit subsidy in the installment plan was higher for the C block than it was

16. See, e.g., *Omnipoint Corp. v. FCC*, 78 F.3d 620 (D.C. Cir. 1996).

17. The rules for F block were similar. Eligibility for the C and F blocks' set-asides was limited "to entities that, together with their affiliates and certain investors, have gross revenues of less than \$125 million in each of the last two years and total assets of less than \$500 million." *Competitive Bidding Fifth Report & Order*, *supra* note 3, para. 121.

18. The attribution rules are analogous to those of minority and woman-owned small businesses. *Id.* paras. 130-47.

19. *Id.* para. 130.

20. See *Omnipoint Corp.*, 78 F.3d at 632-33; see also Implementation of Section 309(j) of the Communications Act—Competitive Bidding Amendment of the Comm'n's Cellular PCS Cross-Ownership Rules, *Sixth Report and Order*, 11 F.C.C.R. 136, 78 Rad. Reg. 2d (P & F) 934 (1995).

for the RNPCS designated entities—a value of about 28 percent of bid price versus 20 percent—under reasonable assumptions concerning the opportunity cost of capital.

Figure 2				
Implicit Subsidy in Designated Entity Credit Terms:				
PCS C Block License Auctions				
Example Assuming: \$1 billion bid, 14% cost of capital				
<i>Year</i>	<i>Principal Payment</i> (\$ millions)	<i>Interest Payment</i> (\$ millions)	<i>Total Payment</i> (\$ millions)	<i>Present Value</i> (\$ millions)
0	100.0	0.0	100.0	100.0
1	0.0	58.5	58.5	51.3
2	0.0	58.5	58.5	45.0
3	0.0	58.5	58.5	39.5
4	128.6	58.5	187.1	110.8
5	128.6	50.2	178.8	92.9
6	128.6	41.8	170.4	77.6
7	128.6	33.5	162.1	64.8
8	128.6	25.0	153.6	53.8
9	128.6	16.7	145.3	44.7
10	128.6	8.3	136.9	36.9
SUM				717.3

2. Time from Auction to License Grant

The A and B block auction assigned ninety-nine licenses: two in each of fifty-one Major Trading Areas (MTAs), with three licenses being assigned by the FCC's policy of "pioneer's preferences" for companies contributing innovative technology. It took ninety-eight days to complete the 112 rounds of bidding, making the A and B block the fastest broadband auction to date. At the end of bidding on August 13, 1995, eighteen winners emerged with reported revenue to the federal government of \$7.736 billion. Because the winning bidders were mostly previous filers with the FCC, review of the bidders' final applications for licenses was expedited. There was little delay in granting licenses once bidding closed.²¹

The C block was a different story. The special ownership rules and specific criteria of the preference program increased administrative analysis

21. See app. tbl.2.

and competitor scrutiny. A notable example of licensing delay is that of General Wireless, Inc. (GWI), the third highest bidder in the C block auction, whose application was not granted until nine months after the auction was closed.

In general, it took approximately 400 days from the start of the C block auction to the time when almost all licenses were granted, compared to less than 100 days for the A and B block. The increase in time is due in part to the increased number of both licenses and winning applicants—eighty-nine in the C block versus eighteen in the A and B block. The C block auction itself took 140 days and consisted of 184 rounds. In the end, the 493 auctioned licenses garnered \$10.216 million net of bidding credits. The average price per person in the relevant market was almost \$40 in the C block compared to \$15 to \$16 per person in the A and B blocks;²² alternatively, the average price paid per person per MHz was \$1.35 in the C block compared to only \$0.51 in the A and B blocks.²³

The C block license agreement hit a delay soon after the close of the auction when two bidders—having “won” eighteen licenses—could not pay the down payment within five days.²⁴ Because the licenses had not yet been transferred, the FCC was able to announce a reauction of the eighteen licenses just twenty-four days after the close of the C block auction. The auction itself took place on July 3, 1997. The total time from the end of the original auction to the determination of winning bids was less than eighty days. Unfortunately, this was only the first of longer delays to come.

3. The C Block Settlement

Although the exceptionally high bids from the C block auction were, at first, a source of pride to the FCC, it became readily apparent that the license winners would not be able to fund their bids. Several large license holders threatened bankruptcy, potentially throwing the licenses into legal proceedings with uncertain outcomes. The FCC’s claim that it fully owned and controlled the licenses, even those licenses assigned by competitive bidding, had never been decided by a court. The threat of the bankruptcies, therefore, was that the licenses would be held by the license winners until courts could determine the rights of the FCC and the winners’ other creditors. At the very least, the possibility of bankruptcy litigation meant long delays in the time consumers would benefit from the services represented by

22. *Spectrum Auctions Report*, *supra* note 8, at 9632 n.52.

23. CBO, *WHERE DO WE GO FROM HERE? THE FCC AUCTIONS AND THE FUTURE OF RADIO SPECTRUM MANAGEMENT* xii tbl.1 (Apr. 1997).

24. Under FCC rules, winning bidders had five working days to pay the first half of the down payment—that is, 5% of total bid price, net of credits.

each license. More salient to regulators, perhaps, was the spectacle of the FCC fighting “preferred” bidders for money while the much touted auction plan leaked billions of dollars in defaults. The FCC decided to work out a settlement plan releasing bidders from commitments made at auction.

After declaring a moratorium on installment payments on March 31, 1997, the FCC announced its new settlement plan on September 25, 1997. The C block winners were given three choices: (1) full amnesty with the return of a license, (2) the disaggregation of licenses, or (3) the resumption of payments.²⁵ By July 1998, over 262 licenses had been returned to the FCC under the various settlement alternatives.²⁶ This accounts for 53 percent of the 493 licenses first auctioned in the C block. Returns as a percentage of licenses rise to 62 percent if the sixty-seven licenses for which an election has not been made are excluded.²⁷

The rate of license sales in the secondary market can be a measure of efficiency. A high resale rate would signify that the initial allocation was relatively inefficient. The en masse return of designated entity licenses and the number of bidders completely withdrawing from the industry are, therefore, preliminary evidence that the loss of efficiency in license assignment is substantial. By way of comparison, in 1991 there were seventy-five resales out of approximately 1,400 cellular telephone licenses distributed by lottery from 1984 to 1989.²⁸ Following the broadband PCS A and B block auction, twelve licenses were resold in 1996.²⁹

25. See app. tbl.5.

26. Wireless Telecommunications Bureau Announces Broadband Personal Communications Services C Block Elections, *Public Notice*, 13 F.C.C.R. 16,705 (1998) [hereinafter *C Block Public Notice*]. See also app. tbls.1-5.

27. As of July 1998, three firms hold the 67 licenses for which there is yet to be an election. NextWave is by far the largest holder with a total of 63 C block licenses. Anishnabe holds three licenses and Southern Communications Systems holds one license. *C Block Public Notice*, *supra* note 26, app. D. It should be noted that NextWave won more than 64 C block licenses for which it bid approximately \$4.4 billion, accounting for roughly 41% of the reported C block revenue of \$10.2 million. Wireless Telecomm. Bureau, FCC, *Broadband PCS: C Block Auction Fact Sheet* (visited Mar. 15, 1999) <http://www.fcc.gov/wtb/auctions/blk_c/5hbidding.gif>. The NextWave decision will obviously have a major impact, not only on government revenues, but also on the business plans of many of the C block winners. NextWave accumulated sufficient licenses to establish a national footprint that it intended to build-out and market exclusively to resellers. At least seven of the C block winners had contracted to resell NextWave services. See CBO, *Impending Defaults by Winning Bidders in the FCC's C Block Auction: Issues and Options* (visited Mar. 15, 1999) <<http://www.cbo.gov/showdoc.cfm?index=37&sequence=0&from=1>>.

28. Thomas W. Hazlett & Robert J. Michaels, *The Cost of Rent-Seeking: Evidence from Cellular Telephone License Lotteries*, 59 S. ECON. J. 425, 429 (1993).

29. *Spectrum Auctions Report*, *supra* note 8, at 9625.

In addition to the inefficiency of initial allocation, the delay in distributing licenses has been significant. The original auction began in December 1995. Nearly three years later, 262 licenses of 493 have yet to be assigned. It is difficult to estimate how much more delay can be expected in the reauction of the returned licenses. While the chosen mechanism proved speedy in the first C block reauction, that reauction only involved eighteen licenses under the same minority preference rules as the original C block auction. This reauction will entail the design of new rules and may have more bidders.

4. Time to Market

Given the fact that, as of the time of the writing of this Article, the FCC is still in the process of assigning C block licenses, it is difficult to judge how quickly C block licenses will deploy new services. Because the focus of this Article is to isolate the delays associated with designated entities versus nondesignated firms, the time to market comparison is better left until a future date when the relevant, designated entity data is available.

IV. SOCIAL WELFARE COSTS OF THE DESIGNATED ENTITY PROGRAMS

Unfortunately, it is difficult to calculate the social welfare costs of delays in the deployment of licenses without more information than is readily available. What follows is a rough approximation of the costs and benefits to designated entities, the federal government, and consumers.

A. *The Value of Designated Entity Subsidies*

A subsidy to an FCC auction participant can also be thought of as foregone government revenues that could have been used to reduce taxpayers' liability. Government funds used to subsidize designated entities are a welfare transfer from consumers to producers. One direct subsidy to the designated entities was the bidding credit awarded to them by the FCC. Depending on the auction, this credit ranged from 10 to 40 percent of the amount bid. Yet, winning prices bid by designated entities, net of bidding credits, were at or above the prices paid by nondesignated entity bidders. Evidence of this price inflation is found in both the RNPCS auction and the C block auction.³⁰

Not only do bidding credits appear to be "bid away," but the low-interest installment plan appears to drive auction prices even higher. This is predicted by economic theory, as the value of the license—including financ-

30. Ayres & Cramton, *supra* note 14, at 791.

ing subsidies—is equivalent to the market price that an auction is designed to reveal. Under this plan the qualified bidders receive essentially two subsidies: the value of low-interest financing over the payment period and the value of the deferment of principal payments until years three or four. In addition to what the FCC explicitly granted designated entity bidders, some bidders seem to have viewed the rules more favorably yet. Because the FCC installment plan allowed bidders to incur liabilities without collateral, the obligation could be opportunistically interpreted to include an option—the licensee would continue to pay only if the market value of the license rose to justify the high auction bid. In the event of a downturn in license values, a licensee could suspend payments—that is, choose not to “exercise its option.” Adding to the value of the latter position would be the possibility of keeping the license under protection of bankruptcy. This path is not fanciful; it was successfully pursued by GWI. General Wireless, Inc. bid \$1.06 billion for a set of fourteen C block PCS licenses and paid its \$106 million down payment—then transferred FCC licenses to shell corporations without other assets. General Wireless then declared bankruptcy and sought reduction of its FCC debt alleging fraudulent conveyance. The bankruptcy court reduced GWI’s liability to \$166 million, wiping out about \$894 million in debt obligations.³¹

The value to designated entities of the low-interest financing is considerable. Designated entities received financing at 6.5 percent to 7.5 percent interest, a rate far below market. The subsidy value is equivalent to the present value of the installment payments discounted by the risk-adjusted interest rate. Choosing the proper discount rate is always problematic, but since designated entities are largely start-up companies, a reasonable discount rate is 14 percent.³² The installment subsidy is equivalent to a subsidy of about 28 percent of the net bid.³³

The installment payments and the lower interest rate explain only about one to two-thirds of the increase in bids in the C block auction.³⁴ Theories explaining the additional differential include: changes in the capital market between auctions; the need to pay an aggregation premium in the C

31. See Transcript at 43, line 22, *In re GWI, PCS* (Bankr. N.D. Tex. Apr. 24, 1998) (Bankr. No. 397-39676-SAF-11).

32. *Id.* at 14.

33. See *supra* Part III.C.1 fig.2. Compare this value to the estimated value of the RNPCS auction subsidies, where the Authors calculate about a 20.6% subsidy value assuming 14% cost of capital. See *supra* Part III.B.1 fig.1.

34. The price differential is especially surprising given that game theory predicts that when items are sold in sequence, the later items usually sell for *less* than the earlier items due, in part, to risk-adverse bidders and market advantages associated with early entry. See Ayres & Cramton, *supra* note 14, at 780.

block to have the equivalent of an MTA license similar to those of the A and B block; or the failure of C block bidders to fully discount their bid in anticipation of the “winner’s curse.” None are compelling; given the massive defaults evidenced, the most appealing explanation is that the preference program itself encouraged opportunistic bidding. The resulting costs and delays due to nonpayment of bids and the need to reauction the licenses are, therefore, consumer welfare costs directly associated with the preference program.

To explain further, opportunism is defined as the adoption of a bidding strategy based on revenue projections that are not fully justified assuming compliance with the terms of the financing contract. An opportunistic bid is one in which the bidder increases the amount bid because it hedges against adverse values in the market for telecommunications services by leaving open an option to simply not pay the bid. The more viable the nonperformance option—that is, the fewer penalties associated with a default—the higher the initial bid. The incentives leading to opportunistic bidding are apparent in the structure of the low-interest financing terms used for designated entities. Any scheme that defers the payment of the license fee shifts downside risk from the bidder to the government, since the bidder can default on its promised payment to the government if license values fall below the net auction price. Thus, it effectively insures the bidder against losses at the government’s expense.³⁵ Consequently, small firms have aggressively bid and won licenses even if they were not among the most efficient in providing PCS. This exposes the government and consumers to excessive risks. Opportunism is contagious: In an auction, an aggressive bidder forces competitors to adapt or drop out. Even firms not attempting to incorporate the default option can be pulled in by competitive market forces.³⁶

B. Government Revenues and Expenditures

1. Revenues

In a social welfare context, government revenues from auctions are transfers from producers to taxpayers. Intuitively, the higher the aggregate bid prices, the greater the government revenue raised; and therefore, the greater the welfare transfer from producers to taxpayers. In a dynamic context, license values—in the pre-auction assignments by lottery or comparative hearings—were not captured by applicants without some costs. A com-

35. See Bhaskar Chakravorti et al., *Auctioning the Airwaves: The Contest for Broadband PCS Spectrum*, at 13 (on file with authors).

36. See, e.g., Transcript at 10, *In re GWI, Inc.* (Bankr. No. 397-39676-SAF-11) (finding that competing bids supported the optimistic bids by GWI).

petition for “windfalls” developed that forced applicants to expend real resources. The potential savings of such socially wasteful “rent seeking” were the primary argument for initiation of the auction reform. While more efficient transfers are preferred to less efficient ones, and auctions have played a positive role here, the most substantial welfare gains are attained via expanded outputs and lower prices. That implies that important payoffs from FCC licensing are observed when firms invest in infrastructure to offer competition, thereby driving down service prices and improving economic efficiency.³⁷

2. Expenditures

Government expenditures in auction development, rule making, litigation, and settlements must be netted from the revenues received for an accurate calculation of consumer welfare changes. Total costs of all FCC auctions to date have been approximately \$74 million, which is about 0.62 percent of the total auction revenues.³⁸ The FCC spent almost \$50 million on its auctions through fiscal year 1996. A significant amount of spending through 1996, perhaps as much as one-half, was for auction design, facilities, and hardware and software that the FCC can use for a number of years.

In a cost comparison to previous alternatives, the auctions have performed quite favorably. While it is difficult to assemble cost figures for comparative hearings and lotteries, one FCC analysis suggests that the time necessary to assign licenses and the volume of license applications are indicators of the cost to both the government and the private sector.³⁹ For example, the comparative hearings for assigning licenses to provide cellular telephone services in the thirty largest markets took more than two years compared with just several months to auction and assign the broadband PCS licenses that provided national coverage. The lotteries that were used to assign the remaining cellular licenses attracted a large volume of applicants. For example, the thirty licenses available in markets 91 through 120 drew more than 5,000 applications, requiring the Commission to expend significant resources reviewing them. In contrast, only thirty applicants sought the first group of broadband PCS licenses that were auctioned.

When a final total is calculated, there is little doubt that the C block licenses will have been the most costly to assign by auction. Not only will at least three separate auctions be required, the direct cost to the FCC for liti-

37. Gregory L. Rosston & Jeffrey S. Steinberg, *Using Market-Based Spectrum Policy to Promote the Public Interest*, 50 FED. COMM. L.J. 87, 107-08 (1997).

38. *Spectrum Auctions Report*, *supra* note 8, at 9624.

39. EVAN KWEREL & ALEX D. FELKER, USING AUCTIONS TO SELECT FCC LICENSEES 3-6 (FCC, Office of Plans and Policy Working Paper Series No. 16, 1985).

gation, rule makings, and settlement negotiations will be substantial. Beyond these direct costs is the potential stream of indirect costs that flow from the FCC's choice for settlement, as opposed to forced bankruptcies. The danger is that settlement will only intensify the incentive to engage in opportunistic behavior in future auctions. This distortion will generate continuing inefficiencies in the assignment of licenses.

C. *Consumer Costs and Benefits*

In general, the auctions the FCC held in 1994 through 1998 were less costly to the private sector than comparative hearings. Ultimately, the cost of the method of assigning licenses turns on whether the assignment process distributes licenses to the parties that value them most. If not, society bears the cost of additional transactions and likely delays and inefficiencies in providing telecommunications services. It is evident that the C block auction did not accomplish this goal of efficient allocation. Even if reaction is quickly accomplished, deployment will be delayed by the need to renegotiate contracts for reselling and build-out financing.

One estimation of what the private sector may expend in transaction costs as a result of the reaction is by comparison to the secondary market purchases of cellular telephone licenses initially distributed by lotteries. In 1991, the transaction costs associated with the resale of cellular licenses have been estimated at \$190 million.⁴⁰

The greatest cost to consumers emanating from delayed licensing of telecommunications service providers is in the form of high telecommunications prices that result from an absence of competition. Economic models allow one to estimate the effect that firm entry would have on consumer prices at $t = 0$. When dealing with a small number of providers, the profit-maximizing pricing strategy of one firm will inherently depend on the behavior of the other. Such strategic interactions render pricing outcomes indeterminate.

A standard method used by economists to analyze oligopoly pricing, however, views competition proceeding in the following manner: Prices are set by either firm, in sequence, on the assumption that the other firm's output will not change as a consequence of its actions. In a duopoly market, the first firm will initially set a monopoly price on the assumption that the second firm will produce nothing. The second firm then sets a lower price on the assumption that the first firm will continue to produce a monopoly level

40. *Spectrum Auctions Report*, *supra* note 8, at 9610 (citing Amendment of the Comm'n's Rules to Establish New Personal Communications Services, *Notice of Proposed Rule Making and Tentative Decision*, 7 F.C.C.R. 5676, para. 57 n.41, 73 Rad. Reg. 2d (P & F) 462 (1992)).

of output. The first firm then sets a new price that is lower than monopoly because now it assumes that the second firm will produce a positive level of output. The process iterates price and output levels until both firms set identical levels and, therefore, have no tendency to change. This is called a Cournot equilibrium.⁴¹

Under this set of assumptions, one may analyze what happens to price as additional firms enter a market featuring constant unit and marginal costs, using a Lerner Index:

where n is the number of competitors and e is the elasticity of demand for the market as a whole. The Lerner Index shows where a profit-maximizing firm sets price, given marginal cost and the elasticity of demand.

Figure 3 shows how price will change with entry by new firms under the assumption of constant elasticity of demand equal to unity and constant returns to scale.

Figure 3

Price Changes with Competitive Entry in Cournot Equilibrium

No. of Firms	Elasticity of Mkt. Demand	Price/MC Ratio	% Price Drop w/ Marginal Entrant
2	1	2.00	
3	1	1.50	25.00
4	1	1.33	11.30
5	1	1.25	6.00
6	1	1.20	4.00
7	1	1.17	2.50

41. This model is used by policymakers to estimate the likely effect of new entry on service prices in telecommunications markets. See EVAN KWEREL & JOHN WILLIAMS, CHANGING CHANNELS: VOLUNTARY REALLOCATION OF UHF TELEVISION SPECTRUM 82-83 (FCC, Office of Plans and Policy Working Paper Series No. 27, 1992).

100	1	1.01	0.01
	1	1.00	0.00

The results of this analysis are straightforward. Consumer prices are expected to decline with the number of entrants, barring some possibility for potential entrants to bargain with customers or to otherwise credibly threaten entry. Since barriers to entry in a market requiring federal licensing are secure—firms without licenses simply cannot compete—the analysis developed here is thought by economists to be a good representation of what will happen in real markets: Firms will reliably set prices above what would prevail in the face of additional entrants. In determining the likely price differences that result from adding a third competitor to the cellular telephone marketplace, for instance, FCC policy analysts Evan Kwerel and John Williams infer a price reduction of 25 percent based on this standard economic analysis.⁴²

The accuracy of the analysis must be tested by actual marketplace experience. One study of the wireless telephone industry released in April 1997 reports that markets with one or more broadband PCS operators have average combined rates for cellular and broadband PCS between 15 percent and 18 percent below the cellular rates in markets with just two cellular operators.⁴³ In general, PCS operators are setting prices between 10 percent and 15 percent below the cellular operators in their markets.⁴⁴ This is similar to the theoretical calculations that a third competitor would reduce prices by 25 percent and a fourth by about 11 percent. New competitors appear to have a strongly positive impact on rates of subscribership,⁴⁵ the economic consequences of price reductions of 25 percent or more. In the Washington, D.C. market, for example, the launch of the APC Sprint Spectrum system led to a 35 percent to 55 percent decrease in cellular rates.⁴⁶

Setting elasticity of demand to zero, one can determine a first order approximation of the transfer of surplus from consumers to producers due to delays caused by administrative problems in assigning PCS C block li-

42. *Id.* at 83.

43. Implementation of Section 6002(b) of the Omnibus Budget Reconciliation of 1993, *Third Report*, FCC 98-91, at 19 (June 11, 1998) [hereinafter *Third Annual CMRS Report*]. Another study in September of 1997 estimated that PCS rates were 17% to 20% below cellular. *Id.* (citing Yankee Group, *Competition Begins to Have an Impact on Wireless Pricing*, YANKEEWATCH: MOBILEFLASH, Apr. 18, 1997, at 1).

44. *Id.* at 4 (citing Yankee Group, *Competition Begins to Have an Impact on Wireless Pricing*, YANKEEWATCH: MOBILEFLASH, Apr. 18, 1997, at 3).

45. United States wireless telephone subscribership reached 69 million in 1998, up from over 33 million in 1995. Cellular Telecomm. Indus. Ass'n, *Statistics—Annual Revenues* (visited Mar. 15, 1999) <<http://www.wow-com.com/images/1298datasurvey2.gif>>.

46. *Third Annual CMRS Report*, *supra* note 43, at 4 n.14.

censes. The C block auction was originally conducted between December 1995 and May 1996; reauction of the bulk of the C block licenses did not begin until March 1999. Therefore, the Authors assume a delay of three years.⁴⁷ Using the simple model of the price-reducing effects of entry outlined above, the absence of a fifth competitor results in consumer losses (i.e., higher prices) approximately equivalent to 0.06 of revenues. A three-year delay results in additive annual losses equivalent to 0.06 multiplied by the revenues of the relevant year, compounded to account for the yield those price savings would generate when reinvested. Assuming the reinvestment rate to be 7 percent, the real, long-term yield for U.S. equities, consumer losses may be approximated as follows.

Figure 4

Year	Total Service Revenues for Wireless Service⁴⁸ (in Millions)	Consumer Loss (Revenue x 0.06)	Reinvestment Factor	Present Value of Consumer Loss
1996	\$23,634,971	\$1,418,098	1.07 ²	\$1,623,580
1997	\$27,485,633	\$1,649,138	1.07	\$1,764,578
1998	\$33,133,175	\$1,987,990	1.00	\$1,987,990

In sum, a first order approximation of the consumer losses due to the three-year delay of the C block auction equals \$5.376 billion.⁴⁹

V. PRELIMINARY CONCLUSIONS AND POINTS FOR FURTHER STUDY

From the brief analysis presented here, it appears that the private value—to designated entities—of the various subsidies is zero. Previous studies have demonstrated that bidding credits and the installment subsidy

47. The Authors do not assume that C block licensees would have been operational in 1996, only that the license assignment problems delayed deployment by three years. The Authors also note that the original schedule for the first C block auction was in the spring of 1995. Therefore, they are conservative in assuming a three-year lag.

48. Cellular Telecomm. Indus. Ass'n, *supra* note 45.

49. This is offset by an equivalent gain to incumbent wireless operators; in the Authors' first approximation, they rule out welfare issues that accrue when demand retracts at higher prices—that is, elasticity is less than zero.

are effectively “bid away” by auction participants.⁵⁰ Moreover, the effect of the installment subsidies is to encourage competitive and opportunistic bidding so as to raise the overall license prices paid by designated entities.⁵¹ Although this may⁵² result in increased revenues to the government, it does not fulfill the FCC’s intended objective of subsidizing the entry of those firms.

On the other hand, the cost of these subsidies to consumers is substantial. As consumer loss has been approximated in this Article, every year of delay represents in excess of \$1.4 billion in lost consumer surplus. That consumer losses are offset by gains to incumbent operators—by virtue of their opportunity to charge higher prices due to delays in the entry of new competitors—would be an ironic defense of the preference program: Incumbents are supposed to be challenged by new competitors, not subsidized at their expense and the expense of the public. The problems inherent in awarding subsidies by taking bids at auction, the designated entity preference programs’ ineffectiveness in encouraging viable competitive entry, and the very substantial costs borne by consumers strongly suggest that policymakers should seriously examine options for fundamental reforms.

50. See Ayres & Cramton, *supra* note 14, at 791. Ayres and Cramton state that “taking account of both the bidding credit and the installment subsidy” the designated entities paid more than the nondesignated entities “were willing to pay.” *Id.* at 791. Assuming that the price nondesignated firms were willing to pay was equivalent to the market price, the differential could be explained by the apparent opportunistic bidding evidenced in the C block auction. However, at other points in their article, Ayres and Cramton are ambiguous as to whether the entire installment subsidy was in fact bid away. See *id.* (“The designated [entity] demand was sufficient to compete away virtually all of [the 40 percent] bidding credit . . . [S]uperficially suggest[ing] that the installment subsidy did all the work”) The reason some of the installment subsidy might have remained effective is provided earlier in their article—auctions with few bidders can generate selling prices below the highest bidder’s valuations. See *id.* at 766. Therefore, because the RNPCS auction was an auction of few participants, in contrast to the C block auction, competition among bidders may have been insufficient to drive the subsidy to zero. If this were the case, any remaining subsidy value should be accounted for as a producer benefit.

51. See *id.* at 790.

52. Or may not, when one has accounted for the cost of litigation, bankruptcies, and delays.

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APPENDIX

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