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Broadcast Licensing Study #3



Final Report

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Logistic Regression Models of the Broadcast License Award Process for Licenses Awarded by the FCC

Prepared for the FCC as a deliverable under the contract "Estimation of Utilization Rates/Probabilities of Obtaining Broadcast Licenses from the Federal Communications Commission or of Obtaining Broadcast and Wireless Licenses through Secondary Market Transactions"

prepared by
KPMG LLP
Economic Consulting Services

For
Federal Communications Commission

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I. Introduction

KPMG LLP has prepared this report as a deliverable under the contract "Estimation of Utilization Rates/Probabilities of Obtaining Broadcast Licenses from the Federal Communications Commission or of Obtaining Broadcast and Wireless Licenses through Secondary Market Transactions".¹ Part of that contract requires KPMG to develop a model of the license award process for participants who were awarded licenses by the FCC. During the periods of time that we examined, the FCC's stated policy was to provide preferences to minorities and women. During this period, the FCC awarded licenses under two regimes.² First, the FCC would award a license to individual applicants (singletons) who were judged as qualified when only a single application was received. Secondly, if more than one applicant applied for the same license, then the FCC used Comparative Hearings, an administrative hearing process, to allocate broadcast licenses during the period from the 1940s until 1993.

The overall study will assist the FCC determine if there has been previous discrimination by the agency or passive participation by the FCC in discrimination by the private sector.

Herein we provide our model results developed from data collected on the participation and success of applicants in the FCC's license award process. This includes a model of the comparative hearing award process for radio and television licenses and a model that examines factors that are deterministic of whether a license was awarded through a comparative hearing or directly to a singleton applicant. In addition, we present results for a model of the award process for all licenses regardless of whether they were awarded through comparative hearings or to singleton applicants. Some of the questions that this study will address are:

- (1) How is the probability of license award affected by minority status when minority status is defined based on participation and when minority status is defined as minority ownership greater than 50% of equity?
- (2) Did the comparative hearing process result in an allocation of licenses according to the stated rules of the FCC?
- (3) Did the participation and success of minorities and women for the award of licenses differ depending upon whether they participated through the comparative hearing process or as singleton applicants?
- (4) How did factors such as minority status and gender affect the probability of being a singleton application that encountered no competition and which did not end up in a comparative hearing?

¹ While the RFP for this work also requested a study of secondary market transactions for wireless and broadcast licenses, the secondary market study was cancelled due to the lack of accessible data sources. KPMG examined data in FCC archives and found insufficient information on secondary market transactions. Therefore, KPMG petitioned and received approval from OMB to carry out this data collection effort. However, KPMG first conducted a pilot study to determine what the response rates would be for a survey of secondary market participants. Because the response rate to the pilot study was extremely low (less than 5%), it became obvious that the cost of acquiring the necessary data would be prohibitive and the FCC cancelled this portion of the project.

² After 1993, the FCC began to use lotteries to award licenses.



Major Findings

Before we present the details, we will briefly describe our major findings. Then we will present the supporting analysis.

- Some statistical evidence suggests that applications with high minority participation were more likely to face competition and to enter the comparative hearing process rather than receive an award as a singleton applicant. The reasons for this are not clear but the effect was that participation of minorities in uncontested singleton applications was low.
- Based on the models that we estimated, we can conclude that there was a lower overall probability for an application with minority ownership winning a license than a non-minority application after controlling for a variety of important variables. This is because there was a lower probability of winning a license as a singleton and no greater chance for an application with minority ownership to win a license in a comparative hearing.
- Minority participation in comparative hearings was very low relative to minority representation in the U.S. population.
- The minority participation rate for singleton licenses, which appear to be less valuable than those allocated through comparative hearings, was even lower than the low rate of minority participation in comparative hearings.
- The results are consistent with a view that minority and female preferences encouraged applicants to recruit minorities and females in order to compete more effectively in comparative hearings.
- The process for awarding licenses through the comparative hearing process provided credit to applications that contained minorities and females, as was the stated policy of the FCC.
- However, while minority participation -- as defined by minority percentage of body counts -- appears to have positively influenced the win rates in comparative hearings, minority participation when defined by percentage ownership or majority percentage ownership, does not significantly influence the probability of acquiring a license.
- This finding is consistent with another finding that minority participation is greatest when there is little minority equity ownership -- a finding consistent with the existence of non meaningful (sham) participation.
- We found a statistically significant relationship between win rates and minority body count but not between win rates and minority equity ownership. This finding is consistent with the hypothesis of sham participation.
- The mechanism of providing credit to minorities seems to be significantly related to the amount of assets stated in applications with minority participation.
- Applicants with minority participation seem to have received extra credit for assets relative to applicants with lesser or no minority participation.
- Applications with minority participation seem to have been treated less favorably with respect to liabilities than those applicants with lesser or no minority participation.
- The net effect of the credit provided for assets and liabilities was positive for minorities since assets on applications generally substantially exceed liabilities.
- We may also interpret the results as suggesting that while financial strength was judged more favorably when minorities were present, financial weakness was judged more harshly when minorities were present.



- These data generally support the theory that minority and female participation occurs most when the stations are most valuable and where the presence of minorities and females can bolster the probability of winning a license. Height of the station antennas, population, and household income are higher when minorities and females participate in applications. These are all indicators of the value of the station.
- Payments and receipts are higher when there is nominal minority and female participation in applications; this is another indication that nominal minority and female participation occurs most in competitive situations.
- The number of parties in applications is substantially higher when minorities participate; however this phenomenon is much less obvious when minorities control equity.
- Because minorities tend to participate when valuable licenses are at stake, and because the number of participants in these applications is greater by far, it is possible that minorities were added to these applications in order to improve the likelihood of winning, but may not add much in the way of meaningful minority ownership to these applications.

FCC License Award Process

From the late 1940s until 1993, the FCC conducted comparative hearings when more than one applicant applied for the same broadcast license. A comparative hearing was a legal proceeding that was presided over by an Administrative Law Judge (ALJ). The purpose of the comparative hearing was to determine which applicant for a broadcast television or radio license was best qualified to hold the license.³ KPMG submitted a report, *History of the Broadcast License Application Process*, which identifies in significant detail the criteria that were pertinent to the award of licenses. In this report, we develop models that determine whether the FCC applied these criteria as stated in its regulations and in such a way that the resulting license awards favored minorities as was the stated objective of the FCC during the period when minority preferences were in place.

A record of the comparative hearing proceedings is maintained in paper files at the National Records Center in Suitland, MD. These files contain data on the declared minority status of the parties to applications for broadcast licenses that were considered in the comparative hearing process. The files also contain the dispositions or outcomes of the comparative hearings, i.e. a record of which applications have been awarded the licenses.

For this study, KPMG collected data on approximately 60 comparative hearings, which included 203 applications, and 66 singleton license awards⁴ Data was collected from applicant files, which included the information that the applicants provided to the FCC during the comparative hearing process. We collected these data for the period 1978 to 1981 and 1989 to 1993. During these periods, the FCC had a stated policy of providing preference for minority applicants.⁵

³ Note that participants could also settle or buy out other participants prior to receiving a decision from the ALJ.

⁴ These 60 hearings were drawn from a larger sample of 230 comparative hearings that KPMG collected data for for the purpose of calculating "Utilization Rates, Win Rates, and Disparity Ratios for Broadcast Licenses Awarded by the FCC." The larger sample of 230 hearings did not require the level of detailed information that was required for this study.

⁵ The FCC also requested an analysis of the period before minority preferences were in place. However, the cost of acquiring the necessary data prior to the minority and female preference period would have been prohibitive. KPMG examined the records in the FCC archives and determined that there was insufficient data on race of applicants. This



The remainder of this report is organized as follows.

- Section II, *Data Collection*, outlines the efforts taken to collect these data.
- Section III, *Data Characteristics*, examines the characteristics of the data collected for the applications considered in comparative hearings and singleton applications.
- Section IV, *Logistic Regression Model Results* summarizes the results that were obtained for the model of the licensing process. Part A of this section describes the results for Comparative Hearing awards. Part B presents a model that examines what factors were deterministic of whether a license was allocated through a comparative hearing or was awarded as a singleton license. Part C describes the findings for a model of license awards in general that includes awards to singleton applicants as well as awards made through comparative hearings.
- Appendix I provides an example of the data collection forms used to acquire these data.
- Appendix II contains formal definitions for all of the measures shown in the various tables of this report and summary statistics for the data.
- Appendix III provides details of the weighting schemes used on the data to adjust for the issue of oversampling of minorities for comparative hearings.

II. Data Collection

KPMG collected data from FCC archives in Suitland Maryland during the period October, 1999 through March, 2000 in order to develop statistics about the success of women and minorities and non-minorities in the comparative hearing process. Data collection involved extracting information for a sample of 230 comparative hearings that occurred over the periods 1978 to 1981, and 1989-1993. These two periods were selected to satisfy a number of conditions. First, these were both periods when financial information was collected on the license application.⁶ Secondly, during these periods, the FCC's stated policy was to provide credit for minority applicants.

would have require KPMG to locate and survey license applicants using contact (name and address information) that was 20 or more years old. Based on a pilot survey of secondary market participants who sold a broadcast station between 1993 and 1999, KPMG estimated that a lower than 5% response rate would be achieved from a survey of pre preference period applicants. Because these contact information were approximately 20 years old, it was highly unlikely that KPMG would have been able to collect sufficient data for the pre-preference period; therefore this part of the study was terminated.

⁶ While financial information was not necessary for the construction of success ratios for groups in attaining broadcast licenses (utilization ratios), it was necessary for developing a regression model of the award process based on the factors and policies identified by the FCC as important to the award of a broadcast license.



KPMG collected data from a random sample of the hearings that occurred during these two time periods. The universe of available hearings was made available to KPMG in two formats. For the period prior to 1983, the Administrative Law Judge Listing was used. This is a paper database. For the period after 1983 we relied upon the BAPS database, which is an electronic database containing information on each comparative hearing that took place from the early 1980's up to the present. Both data sources provide the following important information about each hearing:

- unique hearing identifiers (docket number)
- service
- call sign (BAPS only)
- start date for hearing
- end date for hearing

KPMG also utilized a paper database of comparative hearing history cards, which contains a record of motions filed by applicants and orders from Administrative Law Judges in comparative hearings. This database was used to collect information on the number and types of motions made during the comparative hearings. ⁷For the purposes of our analysis, the number of motions was summed and used as an indicator of attorney effort in models of the license award outcome.

To identify the location of hearing dockets, KPMG used the '314 record listing' at the FCC. The '314 record listing' contains the date retired and accession number of each comparative hearing docket that is archived.⁸

Once the selected hearing docket was located and obtained, researchers collected information on the following categories: general, legal, financial, attorney and trial, settlement, technical, ownership and integration, race, and gender.⁹

- **General Information** includes the docket number, application reference number, type of service, name of applying organization, date applied, date designated, date terminated, and hearing fee.

Although the selection of these time periods was guided by the requirements of the regression model, these periods are also useful for the construction of utilization ratios. Both of these time periods encompass the period when minority preference policies were used by the FCC in the award of broadcast licenses.

⁷ Among the types of motions are motion for leave to amend, motion for summary decision, and motion for protective order.

⁸ Date retired and accession number are defined as:

Date Retired: After a comparative hearing is completed, all documents associated with the hearing are bound, boxed, and sent to the Nation Records Center (NRC) for archival purposes. The date that the documents are sent to archives is the date retired: in other words, this is the date the hearing is retired to the NRC.

Accession number: When the NRC receives boxes from the FCC, each box receives a number for location purposes. This number is called the "accession number" and this number is used to locate a box when requesting records from the NRC.

⁹ The data collection form show in Appendix I was used to collect these data.



- **Legal information** includes type of organization, citizenship, alien status and interests, criminal activity, character, other broadcast interests, and organization stock structure.
- **Financial information** includes an itemization of construction costs, itemization of funds available for construction, assets and liabilities (in some cases), source of funds listing, total debt relied on.
- **Attorney and trial information** includes name of attorney and law firm, hearing fee paid, final disposition of applicant, number of applicants, presiding judge, and motions filed.
- **Settlement information** includes amount paid by an applicant in settlements, amount received, lawyer's fees, and number of applications paid to settle.
- **Technical information** includes principle community to be served, class of license, elevation of antenna above average terrain, geographical size of proposed area, population coverage, and power of signal.
- **Ownership information** includes (for each party to the application) number of shares, percent of shares owned, number of voting shares, percent of voting shares, position at the station, integration, and full-time/part-time indicator.
- **Race and gender information** includes (for each party to the application) gender and race broken out by Black, Hispanic, American Indian/Eskimo, Asian, and Caucasian.

Tables 1 and 2 show the population counts and sample sizes for hearings and applications for radio and television licenses for each of the two time periods for which preferences were the stated policy of the FCC and for which race and financial data were available.

Table 1:
Number of Hearings in Population and Sample Size

Years	1978- 1981	1989 - 1993	Total Population	Total Sample
All Licenses	421	142	563	230
Radio	286	134	420	155
AM	85	0	85	25
FM	201	134	335	130
TV	135	8	143	75



Table 2:
Number of Applications in Population and Sample

Years	1978- 1981	1989 - 1993	Total Population	Total Sample
All Licenses	1,064	595	1,659	740
Radio	716	583	1,299	494
AM	177	0	177	64
FM	539	583	1,122	430
TV	348	12	360	246

A sample of 230 comparative hearings (which included 740 applications) was drawn from the population of hearings using stratified random sampling. The sample was stratified by service (AM, FM, and TV). This sample size was selected in an effort to balance the cost of data collection with the need to obtain a reasonable level of precision at various levels of disaggregation.

Once the sample was drawn, data collection personnel, who were primarily made up of individuals with legal or paralegal background, retrieved the files from the National Records Center in Suitland, MD. and collected the necessary data.¹⁰ There were two objectives for the data collection effort. The first was to collect data on all 230 comparative hearings for a limited set of information that would allow us to calculate utilization and disparity ratios.¹¹ The results of this effort were discussed in the report "Win Rates and Disparity Ratios for Broadcast Licenses Awarded by the FCC". The second objective was to collect more detailed data for the purpose of modeling the award process.

For this purpose, we developed a sub-sample of the 230 hearings for which to collect this much more detailed data about the applicants. Because we were interested in examining the process by which decisions to award licenses were made, and in particular whether any active or passive discrimination was apparent in the process, we oversampled hearings with minority participation for the model. Thus, our sample of hearings contains more minority participation than does the larger set of 230 comparative hearings. For the purposes of modeling the impact of minority status on the license award process, hearings with applications reflecting a variety of degrees of minority participation are most informative. The statistical analysis properly accounts for the oversampling of such hearings.

Table 3 in Appendix III, which describes a method for weighting that was applied to correct for oversampling of minorities, contains the sample sizes that were acquired for the detailed data necessary for the logistic regression models.

Our period of analysis was chosen to capture the time when preferences were in place. This period included both 1978-1981 and 1989-1993. Some complexities were introduced as a result of choosing these 2 periods. They were chosen based on the availability of financial data in the applications submitted to the FCC and the need to cover the entire period during which comparative hearings were used. During the early period, applications contained full asset and liability data for applications while in the latter period only total funds necessary to construct and operate the station was available. This makes the analysis a bit more complicated because there are discontinuities in some of these data.

¹⁰ A combination of KPMG staff and a subcontractor were used to collect these data.

¹¹ The data collected for the development of the utilization ratios was limited to a few key items.



Our analysis starts at the point where an application has been made. We do not model the decision process by which some people decide to submit applications and some do not. It is possible that the number of female or minority applicants is not optimal because minorities and females may have had lesser chance to submit an application due to impediments such as inability to secure financing. That issue is beyond the scope of this analysis which only considers the license award decision after an application has been made.¹² We do note, as the following data will suggest, that minority participation in broadcasting is very low relative to minority representation in the general population.

Table 3 shows the percentages of minority participation in comparative hearings, singleton applications, and minority shares of the U.S. population.

¹² Other studies, which we understand are ongoing, will address the issue of whether there are such impediments.



Table 3.
Participation by Race in Comparative Hearings, Singleton Applications and Percent of
U.S. Population in 1990*

	Percent of Parties in Hearings (1)	Percent of parties in singleton applications (2)	Percent of U.S. Population in 1990 (3)
Total Minority	8.9%	3.8%	23.8%
Black	3.4%	n.a.	12.2%
Asian	.4%	n.a.	2.7%
Hispanic	3.9%	n.a.	8.7%
American Indian, Eskimo, Aleut	.4%	n.a.	.7%
White	91.1%	96.2%	76.2%
Male	79.3%	71.7%	48.7%
Female	20.7%	28.3%	51.3%

*Notes: (1) Detailed race and ethnic categories do not sum to total minority for the Percent of parties in hearings, due to nonreporting of this level of detail for a small portion of the minority applicants (.8% fail to report the level of detail about their minority status). These percentages are based on the data collected from 230 randomly selected comparative hearings. (2) Percent of parties in singleton applications is based on data from 66 randomly selected singleton applications. Data are available for minority only because singleton applications do not designate race of minority. (3) For the percent of U.S. population (which comes from 1990 Census data), there is slight overlap in the figure for black and Hispanic because black includes those blacks of Hispanic origin (about .5% of the 12.2% of blacks are of Hispanic origin).

III. Data Characteristics and Preliminary Thoughts Based on Basic Data Analysis

Appendix II presents means, standard deviations and counts for the data used in the logit models. Also shown are similar data for singleton applications. We present these statistics for raw data before any imputations were performed to fill in missing values. Imputation techniques were used for some of the variables where lack of data was problematic for the purpose of estimating models of the license allocation process.¹³

¹³ The following variables were imputed for missing values for the logistic regression model. Motions (4 values imputed); aassets (109 values imputed), totfunds (10 values imputed), and apliabil (138 values imputed). Stata's imputation procedures are based on the following primary references.

Goldstein, R. 1996. Sed10: Patterns of Missing Data. Stata Technical Bulletin 32: 12-13.

Little, R. J. A. and D. Rubin. 1987 Statistical Analysis with Missing Data. New York: John Wiley and Sons.

As evident in Table 3, there is certainly a large difference between the minority share of participants in comparative hearings and singleton applications and the minority share of the U.S. population. There is also a large difference in the minority share of participants in comparative hearings and the minority share of participants in singleton applications. Part of our analysis will be to try and understand this latter difference. One hypothesis is that because preferences were part of the comparative hearing process, this encouraged minority participation in hearings. However, even when we compare minority participation in the first application filed for a license and compare participation rates for those applications that were unopposed (singletons) with those that faced competition (first applications in hearings), a significant difference in minority participation persists. It is puzzling why we would see more minority participation in comparative hearings than in singleton applications.

One hypothesis is that the preferences incorporated into the comparative hearing process encouraged recruitment of minorities to participate in applications going to comparative hearings. However, minority participation in the first application filed for a license for which additional applications were subsequently filed is substantially higher than minority participation in applications that were unopposed (singletons).

This difference in minority participation in first applications between those subsequently opposed and unopposed is consistent with the recruitment hypothesis only if applicants had advance knowledge of the probability of opposition.

An alternative hypothesis is that first applicants with minority participation were more likely to be challenged, leading to their higher representation in hearings and lower representation in singleton applications. This could happen if their applications were perceived as weak relative to singleton white applicants, and if this encouraged challengers to vie for the license. Other explanations involve differences in the characteristics of licenses, such that minorities may not have been aware of or interested in licenses that were not as highly valued, and thus obtained by unopposed applications.

Some of these explanations suggest that there were issues with the comparative hearing system such that it either encouraged applicants to challenge a perceived weak application or that it encouraged minority participation in body only and not as meaningful equity ownership and control roles.

One fact that is supportive of the idea of nominal minority participation is the substantially higher number of parties per application for applications with minority participation. Applications with minority participation in comparative hearings average 6.1 parties per application, while applications without minority participation average only 3.0 parties per application. Applications with greater than 50% minority ownership average 4.5 parties per application. It is interesting to note that when minority participation is substantive, there are fewer parties than when minority participation is combined with non-minorities and where minorities have no equity control.

The tables below show the results of "t tests" testing the statistical difference in means of variables under various minority, singleton, and gender groupings. As discussed above, number of parties per application (cntpty) and the number of minority parties per application (mincnt) are included in the variables below. Table 4 considers minority versus non-minority differences. Table 5 considers differences between applications that went to comparative hearings and singletons. Table 6 considers differences between females and white males. Formal definitions for all of these variables are provided in Appendix II.



Table 4
t tests for Differences in Mean Values for Variables in Minority Applications

	(1) Minority Ownership ≥ 50%	(2) Minority count ≥ 1	(3) Minority Count ≥ 1 & < 50% ownership	(4) Minority count = 0
Apassets	644,620	704,973	820,650	1,354,609
Apequity	551,011	579,083	628,210	449,688
Apliabil	207,969	321,419	605,044	302,788
Applcnt	3.6**	3.7*	3.9***	2.8
Corp	.65**	.70*	.79*	.49
Cntpty	4.5**	6.1*	8.9*	3
ExperM	64.4	68.3	75.4	76.3
Femcnt	1.3	1.8*	2.6*	0.9
Fempctb	0.26	0.29	0.34	0.31
Fempcto	0.31	0.30	0.27	0.27
First Year Revenue	144,955	183,449	252,419	103,355
Height	1,161***	1,192***	1,247	757
Income	26,897	27,555**	28,613	24,993
IntegM	18.5*	18.1*	17.5***	8.6
Mincnt	2.8*	2.6*	2*	0
Minpctb	0.71*	0.56*	0.29*	0
Minpcto	0.82*	0.60*	0.22*	0
Motions	19.9*	21.1*	23.2*	6.6
Otherown	0.8*	1.2	2	1.8
Population stated on Application	202,774	213,861	232,535	158,248
Census Population	67,608***	67,300**	66,748	38,461
ResidM	88.8	87.7	85.8	55.6
Settlpay	3,661*	23,858	59,591***	19,445
Settlrec	26,670	35,035	51,767	26,463
Totcons	677,127***	868,734*	1,180,096**	363,630
Totfunds	650,611	952,176*	1,476,635**	449,405

* Significant difference at 1% level; ** Significant difference at 5% level; *** Significant difference at 10% level.

Variable definitions appear in Appendix II.

Group 1 includes applications where minority ownership is at least 50%. Group 2 includes applications where there is any minority participation. Group 3 includes applications where there is



minority participation, but there is less than 50% minority ownership. Group 4 includes applications where there is only non-minority participation. Group 5 includes all applications in comparative hearings and group 6 includes only singleton applicants. Group 7 includes applications with any female participation and Group 8 includes applications with female ownership of at least 50%. Group 9 includes applications where there is only white male participation.

Table 5
t tests for Differences in Mean Values for Variables in Singleton and Comparative Hearing Applications

	(5) All Hearings	(6) Singleton Applications
Apassets	1,144,388	505,379
Apequity	503,484	462,015
Apliabil	312,902	179,827
Applcnt	3.7	1*
Corp	.58	.42**
Cntpty	4.2	2.4*
ExperM	76.1	68.7
Femcnt	1.2	0.7*
Fempctb	0.31	0.30
Fempcto	0.29	0.25
First Year Revenue	162,334	3,256*
Height	1,034	348*
Income	25,633	25,474
IntegM	12.7	5.6*
Mincnt	0.8	0.1*
Minpctb	0.17	0.045*
Minpcto	0.18	0.046*
Motions	13.4	0.6*
Otherown	1.8	1.2**
Population stated on Application	203,571	75,594*
Census Population	54,850	17,328*
ResidM	63	65.4
Settlpay	20,320	-
Settlrec	28,912	-
Totcons	599,449	127,571*
Totfunds	705,234	162,925*

* Significant difference at 1% level; ** Significant difference at 5% level; *** Significant difference at 10% level.

Variable definitions appear in Appendix II.



T tests were conducted on each of these groups to determine if there was a difference relative to the mean for applications with either no minorities or no females. Groups 1, 2, and 3 are tested against group 4. Group 5 is tested against group 6. Groups 7 and 8 are tested against group 9. Where there is statistical significance, it is indicated with asterisks. (see note to table).

Table 6
t tests for Differences in Mean Values for Variables
in Female and White Male Applications

	(7) Female count ≥ 1	(8) Female ownership ≥ 50%	(9) White Males
Apassets	1,312,130***	558,755	457,519
Apequity	507,695	157,814	387,501
Apliabil	373,083***	234,957	155,160
Applcnt	3.2	3	2.8
Corp	.63*	.43	.39
Cntpty	4.7*	2.8**	2.1
ExperM	57.1**	51.8*	97.2
Femcnt	1.8*	1.7*	-
Fempctb	0.51*	0.69*	-
Fempcto	0.46*	0.77*	-
First Year Revenue	161,859*	106,017	60,008
Height	977**	919	622
Income	26,274	26,895***	24,501
IntegM	13.1*	10.7*	6.9
Mincnt	0.8*	0.4*	-
Minpctb	0.15*	0.11*	-
Minpcto	0.17*	0.15*	-
Motions	12.5*	9.8***	5.8
Otherown	1.6	1.3**	2.0
Population stated on Application	187,417	219,402	143,085
Census Population	49,563	41,879	40,785
ResidM	70.8	89.1	54.3
Settlpay	28,095*	23,908**	4,136
Settlrec	31,215	20,084	23,733
Totcons	569,680**	392,380	368,930
Totfunds	684,427**	410,671	428,781

* Significant difference at 1% level; ** Significant difference at 5% level; *** Significant difference at 10% level.

Variable definitions appear in Appendix II.

These data generally support the theory that greater minority and female participation occurs when the stations are most valuable and where the presence of minorities and females can bolster the probability of winning a license. Height of the station, population, and household income are higher when minorities participate in applications. These are all indicators of the value of the station. Because minorities and females tend to participate more when these valuable licenses are at stake, and because the number of participants in these applications is greater by far, it is possible that minorities and females are added to these applications in order to improve the likelihood of winning, but do not add much in the way of meaningful minority or female ownership to these applications.

Other support for this theory that the acquisition of more valuable licenses is more likely to include minority and female presence comes from the fact that total construction costs for the station and expected first year revenues for the station are higher when there are more minorities and females present in applications. In addition, more applications were received when minorities and females were present than when only non-minorities were included in applications. Finally, settlements in the form of both payments and receipts are higher when minorities are present, which is yet another indicator of the competitive nature of the hearings in which these applications were involved.

Another interesting observation that we make from these data is that when minorities own greater than 50% of the application, which is suggestive of meaningful participation, the count of parties to applications is much lower than when they are present in applications without significant minority ownership. This is consistent with the hypothesis that minorities supplement rather than substitute for others in applications. We also note that when minorities have substantive ownership, most of the measures that we noted previously such as income, population, and first year revenues expected, are all lower than when they are present but not substantial equity participants in applications. This fact supports the idea that minorities may be participating marginally (in body only) in hearings where more valuable licenses were awarded.

IV. Logistic Regression Model Results

As we described previously, licenses were awarded by the FCC under two regimes. 1) if a single applicant applied for a license, then the license was granted provided that basic minimum qualifications were met. 2) If more than 1 applicant applied for the license, then an administrative process called a comparative hearing was used to allocate the license. This process encouraged competition and those with a good understanding of the process were likely motivated to put forth stronger applications. One criterion that the FCC stated as providing positive credit was whether applicants included minority or female participation in the application. The FCC claimed that it provided some credit for minority or female participation.

Other characteristics of applicants that the FCC claimed influenced the decision to award a license were:

- Integration in station affairs (FCC stated as positively influencing outcome)
- Broadcast experience (FCC stated as positively influencing outcome)
- Local residence (FCC stated as positively influencing outcome)
- Financial condition of applicants (amount and sources of funds, application assets, liabilities)
(FCC stated financial condition as influencing outcome)



- Ownership of other stations (FCC interest in diversity suggests a negative influence on outcome)

Other variables that we have included to reflect the competitive nature of the hearing process are:

- Number of motions filed (proxy for attorney effort or quality)
- Experience of the attorney
- Form of Organization
- Number of parties in the application
- Number of applications in the comparative hearing
- Order in which the Application is filed

Variables that we have included to reflect the value of the station are:

- Height of the proposed station above natural terrain
- Population in the proposed area of service as stated on the application
- Population in the proposed area of service based on Census Bureau data
- Household income in the proposed area of service

We have estimated three models as part of the analysis.

The first is a conditional logit model of the comparative hearing process. This model is designed to examine what factors were important in determining which applicant received a license and specifically to establish whether the criteria for award stated by the FCC were indeed applied in the comparative hearing licensing process. The conditional logit model estimates the importance of various independent variables in determining the outcome of the hearing process.¹⁴ In this model, our data set is based on the licenses awarded in 60 comparative hearings. Singleton applications are not considered because they did not participate in the comparative hearing process.

One major problem in modeling the outcome of a comparative hearing process is the presence of varying numbers of applicants. The chance that a particular applicant is successful depends on that applicant's characteristics, and on the number and type of rival applicants for the license. The conditional logit model is able to account for the different probability of selection across the hearings given the varying numbers of applications and different characteristics of applicants for each hearing. The model groups applications that are in the same hearing together, and recognizes the fact that the Administrative Law Judge was required to make an award to only a single applicant.

The second model that we estimate is a model of the decision of competitors to contest the awarding of a license to an initial applicant by submitting competing applications. In the case of the first model of the comparative hearing process, we were modeling the choice function of the judge. In this case, we are modeling the choices of potential competitors who must decide whether they should apply for a license that already has an initial applicant. Obviously, we expect that potential applicants are more likely to submit competing applications when the license in question is particularly valuable or the

¹⁴ Stata's conditional logit model procedure is based on the work of Hosmer and Lemeshow (1989), Bresnow and Day (1980, 247-249), and Collett (1991, 262-276). Other references in Stata documentation are: Green (1997, chapter 19), Chamberlin (1980), and Hamerle and Ronning (1995).

initial application seems to be weak. However, other factors may complicate this simple explanation. Entry may also be likely when the initial applicant has substantial financial resources that could be used to buy out competing applicants. We are specifically interested in the effects of race and gender which should indicate, all other things equal, a stronger application and hence deter competing applications.

The third model that we estimated is an unconditional logit model. This model examines the probability of attaining a license, regardless of whether the license is awarded by a comparative hearing or based on the receipt of a single application for the license. A feature of the unconditional logit model is that it looks across all of the hearings and attempts to classify winners and losers based on the characteristics of the applications. In this model, our data set is based on licenses awarded in 60 comparative hearings and 66 licenses awarded in cases where only a single application was filed. As discussed below, statistical issues require the results of the model to be interpreted with caution.

Because the objective of the analysis is primarily to determine if there was differential treatment of minorities and women in the process of awarding licenses, we focus on the role of race and gender in the models.

A. Conditional Logit Model

Table 7 presents estimation results for a variety of specifications of the conditional logit model. The results that are presented below represent the most consistent and reasonable estimated results from a variety of specifications. Statistical significance is indicated in the table by 1, 2 or 3 asterisks ‘*’ depending upon whether significance is evident at the 1%, 5% or 10% confidence level. We provide a detailed discussion of the variables in this model but will not repeat this level of detail in our discussion of the following two models.

Winner is the dichotomous dependent variable and equals 1 if the application was the winner in a comparative hearing and 0 for a losing applicant. All of these regression results in table 7 attempt to explain how the independent variables affect the probability of winning.

One of the criterion that the FCC stated would be used to judge applicants in comparative hearings was integration of the applicants in station affairs. That is, what positions would the applicants hold? To measure this for the purpose of the model, we created a variable called IntegM0 which is a dummy variable that equals 1 where there was no integration at all in station affairs. The negative coefficient for this variable indicates that no integration significantly reduces the likelihood of award.

We also used a variable called IntegM, which represents a measure of how much integration in station affairs was planned. The negative sign on the coefficient for IntegM suggests that more integration into station affairs reduces the probability of license award. This result was unexpected because the FCC’s stated policy was to provide credit for integration. However the regression results for this variable are not statistically significant.¹⁵

¹⁵ We separated integration, residence, and experience into bifurcated variables to determine if judges may have treated zero experience, residence, or integration differently. We found that it made no difference to the overall regression results if the 3 variables that represented zero experience, residence and integration were removed. We also specified these



ExperM represents a measure of experience of the parties in applications. The coefficient on ExperM is close to zero and insignificant. ExperM0 is a dummy variable that equals 1 if the applicant has no experience at all. The negative sign is reasonable, i.e. no experience at all reduces the likelihood of award. However the results for both of these variables suggest that any impact from experience was minimal and the results are not statistically significant.

ResidM represents a measure of years of local residence of the parties in applications. The sign on the estimated coefficient for ResidM is negative but close to zero, suggesting that no credit is provided for local residence.

ResidM0 is a dummy variable, which equals 1 if the applicant has no local residence at all and zero otherwise. The negative sign is reasonable, i.e. no experience at all reduces the likelihood of award. However the results for both of these variables are not significantly different from zero, suggesting no effect on hearing outcome for years of local residence.

Number of motions (Motioni) is the total number of motions filed by the applicant during a hearing. The results indicate that the number of motions is very significant and increases the likelihood of license award. The same variable squared is intended to determine if there is any nonlinear influence of motions. The negative and significant sign on this variable indicates that the importance of the marginal motion falls as the number of motions increases. If this were not the case, then we might expect lawyers to file even more motions than they did.

Assets (Apassi) and liabilities (Apliabi) stated on the application have the expected effect.¹⁶ Assets increase the likelihood of award while liabilities diminish the likelihood of award. Both of these variables are significant. However the size of the coefficients suggests that the influence of a dollar of liabilities has a greater negative influence on the probability of a win than the influence that a dollar of assets has on positively influencing the probability of a win. However, because assets are significantly greater than liabilities, it is unclear which effect dominates. To address this question, we also included a variable in the model to measure net assets (Netassi).

The effect of an increase in net assets, measured as the difference in assets and liabilities, is small and positive as indicated by the positive estimated coefficient of the variable Netassi (see specification 3 in table 7). The positive effect of net assets in comparative hearings may reflect the ability of an applicant to pay other applicants to withdraw. It is important to remember that the outcome of a

variables to give more weight to greater experience, integration, and residence – see appendix II for the precise definitions. However, we also ran this model with a version of these variables that were simple sums of the parties' stated experience, planned integration, and stated years of residence. Estimation of the model using these simpler versions produced results that were no different than the results using the more sophisticated specifications of residence, experience, and integration.

¹⁶ Note that we only have data on assets and liabilities during the early period of analysis (93 observations). While we imputed the rest of the observations for the late period, the imputation is having no substantial impact on results. We have verified this by running the same regression on only the early period data and the results are similar to those for the entire period. We have also included a variable (apassm) which is a dummy variable that equals 1 when assets were missing on an application. This coefficient on this variable is insignificant, suggesting that there is nothing different about the applications that did not report assets.

comparative hearing reflects both judgment of the Administrative Law Judge and prior agreements among applicants that may cause one or more to withdraw.

Ownership of other media interests (Otherown) significantly diminishes the probability of license award. This is consistent with the FCC's stated policy of promoting diversification and diffusion of ownership in broadcasting.

Corporate form of organization (Corp) has a positive impact on the likelihood of award. We can speculate that this form of organization may be correlated with sophistication of the applicant or that it reflects access to lower cost capital that is roughly equivalent to additional net worth. Note that both have a positive effect on winning.

Interestingly, total funds (Totfundi) available to fund the station for the first year of operation has almost no impact on the likelihood of award once assets and liabilities and net worth are taken into account.¹⁷

As seen in the first three specifications in table 7, both minority participation (Minpctb) and female participation (Fempctb) -- as measured by percentage body count in the application -- increase the likelihood of award. This is unsurprising given that the FCC's stated policy was to provide credit for applications with female and minority participation. The effect of female or minority presence on the likelihood of award is stronger for females than for minorities. The minority squared and female squared terms are also both significant but they are negative and relatively very small. This indicates that positive influence of minority and female presence diminishes as the percentage of female and minority presence rises. There is a positive but diminishing return to minority and female participation in terms of how they influence the likelihood of license award.

While minority participation as measured by percentage body count seems to have had a positive impact on the likelihood of award, there is no statistically significant positive relationship between minority ownership and probability of license award. This is true when we measure ownership based on the percentage that is minority (see specification 4 in Table 7) or when we define true minority ownership as occurring only when minorities own greater than 50% of the application (see specification 5 of Table 7). This finding is consistent with our previous finding that minority participation is greatest when there is little minority equity ownership -- a finding suggestive of the existence of non-meaningful (sham) participation. If the comparative hearing process encouraged sham participation, we would find a statistically significant relationship between win rates and minority body count but not between win rates and minority equity ownership.

The results for female ownership (Fempcto) are different than the results for minority ownership (Minpcto). There is a positive and significant relationship between female ownership and probability

¹⁷ This variable was developed by using two different application forms. The 1989 form asked the applicant to enter only 1 data element for the total cost of constructing and operating the station for 3 months. Applications from earlier years requested detailed construction cost and operation data for the entire year. The variable was developed by splicing the two periods together and adjusting the pre 1989 data to put operating costs on a quarterly basis. While we believe that the adjustment is able to concord the data from the 2 time periods, we note that the mean value from the early period is significantly higher than the mean value from the later period. This is indicative of measurement error across the two periods and is likely due to the two different means that the FCC used to collect data during these periods.

of license award. This is true when we measure ownership based on the percentage that is female or when we define true female ownership as occurring only when females own greater than 50% of the application.

Submission of the first application (First) tends to have a negative and sometimes marginally significant estimated coefficient. This might appear to be a surprising result because first movers should be well qualified applicants. However, there is an important selection effect at work here. These estimates are conditional on a comparative hearing which implies that the first applicant faces competition from subsequent applicants. The presence of subsequent applicants is an indication that they believe the first applicant's case can be challenged. Put another way, first applicants who are challenged and face a comparative hearing may not be strong applicants.¹⁸

There are also some curious results for one of the variables in the model (attorney experience). We know that the lack of an attorney was fatal for those who applied without them. No applicant without an attorney won a comparative hearing. A logical result from our perspective is that use of an attorney with zero experience should reduce the likelihood of winning (see the negative and significant sign on attny0 which is a dummy that equals 1 when the attorney has no experience.)

However, while lack of an attorney eliminates the possibility of winning a license, and the use of an attorney with no experience lowers the probability of winning, further increases in attorney experience (Attnyexp) also seem to reduce the likelihood of winning a license. This is a curious result, which can have a number of explanations. For example, it may be due to measurement error in the variable used as a measure of attorney experience. This measure was developed by counting the number of times an attorney showed up as having been involved in any of the hearings in our sample. So the measure represents experience based only on the sample of 60 hearings that are used in this analysis. Alternatively, attorneys who are employed by many applicants may simply be less expensive, rather than better. Finally, attorneys involved in more cases may be more inclined to settle for payments from competing applicants.

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Winning First Applicants by Minority Status and Type of Award

	First Applicants	% Singleton Awards	%Comparative Hearing Awards
(1) Total	95/133 (71%)	64/95 (67%)	31/69 (45%)
(2) Non Minority	78/102 (76%)	58/78 (74%)	20/44 (45%)
(3) Minority Count>0	17/31 (55%)	6/17 (35%)	11/25 (44%)
(4) Minority % ownership>50%	11/16 (54%)	3/11 (27%)	8/13 (61%)
(5) Minority % ownership<=50%	6/15 (40%)	3/6 (50%)	3/12 (25%)

(1) = sum of (2),(3) and (3) = sum of (4), (5).

According to these data, 58 of 78 or 74% of non-minority first applicants were awarded licenses without the need to compete in a comparative hearing. For minorities, 6 of 17 or 35% of first applicants was awarded a license without the need to compete in a comparative hearing. Once first applicants got into comparative hearings, minorities and non-minorities won the hearings at about the same rate. (non-minorities won in 20 of 44 or 45% while minorities won in 11 of 25 or 44%.



As we discussed earlier, we place a great deal of the focus on the minority status of applicants. Therefore, we have included some interaction terms in the models to determine if there is any sort of disparate treatment of minorities. For example, we have included two variables that measure the interaction of race and assets (Aimpctb) and the interaction of race and liabilities (Limpctb). The interaction of race (where race is defined as minority headcounts as a percentage of total headcounts in the application) and assets is significant, indicating that the importance of assets is enhanced when minorities are present in applications. We might also say that as the percentage of minority parties in applications increases, a dollar of assets contributes more toward increasing the probability of license award. The interaction of race and liabilities is also significant though not as robust as the results for the interaction of race and assets. This result works conversely to the results for assets. A dollar of liabilities contributes more adversely to the probability of license award as the percentage of minority parties in applications rises.

These results are interesting because it means that a dollar of assets in an application with minority presence was treated more favorably than a dollar of assets generally. At the same time though, a dollar of liabilities had a more adverse impact on the probability of a win for an application with minority presence than for an application with lesser minority involvement. Because the coefficient on the liabilities variable is generally about twice as large as the coefficient on the asset variable, this indicates that an extra dollar of liabilities may have hurt minorities more than they were helped by an extra dollar of assets.

However because average assets exceed average liabilities, this effect is mitigated by the fact that there is a greater volume of assets than liabilities. This is supported by the fact that when we estimate the model with a term for net assets (where net assets = assets minus liabilities), we get a positive and significant sign on the variable indicating that overall, minorities received more credit for their assets than they lost for their liabilities.

Another way to interpret these results is that financial weakness may have been judged more harshly when minorities were present in applications and financial strength may have been judged more favorably when minorities were present in applications.

The fit of the conditional logit model is quite good. The regression explains as much as 76% of the variation in the dependent variable (win or lose license).



Table 7.
Selected Conditional Logit Model Results

Variables	1		2		3		4		5	
	Coef.	z	Coef.	Z	Coef.	Z	Coef.	Z	Coef.	z
Attnyexp	-.68**	-2.4	-1.10**	-2.4	-.33**	-2.4	-.40*	-2.6	-.318**	-2.5
Attny0	-3.2	-1.4	-4.3	-1.6	-.9	-.8	-1.8	-1.2	-1.72	-1.2
Totfundi (1)	.00008	.4	-.00025	-.9	.00008	.4	-.00018	-.7	-.0003	-1.2
IntegM	-.07	-1.6	-.05	-1.1	-.03	-1.2	-.04	-1.5	-.028	-1.2
IntegM0	-3.3**	-1.7	-4.9**	-2.0	-1.1	-1.2	-3.2*	-2.7	-2.35**	-2.4
ExperM	.0019	.6	-.0012	-.3	-.0001	.0	-.0033	-1.2	-.0017	-.6
ExperM0	-.48	-.4	-.62	-.6	-.69	-.9	-.22	-.3	-.071	-.1
ResidM	-.003	-.7	-.006	-1.1	.003	1.2	-.002	-.7	-.0003	-.1
ResidM0	-1.86	-1.0	-2.8	-1.4	.20	.2	-.77	-.7	-.35	-.4
Motioni	.77*	2.8	1.20**	2.5	.41*	3.3	.53*	3.3	.44*	3.3
Motion2	-.0049**	-2.5	-.0088***	-1.7	-.0029**	-2.4	-.0031**	-2.4	-.0026**	-2.5
Apassi (1)	.0026**	2.4	.0046*	2.7			.0023*	3.2	.002*	3.4
Apassm	1.32	.7								
Apliabi (1)	-.0111**	-2.5	-.0202**	-2.5			-.0010*	-3.1	-.009*	-3.1
Netassi (1)					.0011**	2.3				
Minpcto							7.2	1.4		
Minpcto2							-.0007	-1.3		
Minpctb	16.6**	2.6	16.5**	2.1	10.6**	2.4				
Minpctb2	-.0022*	-2.7	-.0022**	-2.1	-.0011**	-2.2				
Fempcto							10.3**	2.1		
Fempcto2							-.0007***	-1.7		
Fempctb	20.5**	2.3	33.0**	2.3	8.0**	2.3				
Fempctb2	-.0011***	-1.9	-.0022**	-2.2	-.0004	-1.4				
Minmajo									.74	.7
Femmajo									2.5*	2.7
AimPctb	.006***	1.8								
LimPctb	-.024	-1.5								
NetPctb					-.00029	-.3				
Height			.0034***	1.9			.0009	1.5	.0009***	1.7
Cntpty	-.12	-.7	-.46***	-1.7	-.04	-.40	-.14	-1.0	.01	.1
Corp	3.5**	2.0	4.1***	1.8	.7	.9	2.1**	2.4	1.99**	2.4
First	-2.4***	-1.7	-1.3	-1.2	-.6	-1.2	-.18	-.3	-.16	-.3
Otherown	-.84*	-2.7	-.52	-1.2	-.42**	-2.6	-.27	-1.3	-.26	-1.2
Pseudo R ²		.69		.76		.55		.62		.58
Number of observations		201		199		201		199		199

*Significant at 1% level; ** Significant at 5% level; *** Significant at 10% level.

Variable definitions appear in Appendix II.

(1) All these dollar denominated values have been deflated using data from The BEA National Income and Product Accounts Price Deflator series



B. Model of Singleton versus Comparative Hearing License Disposition

In this model, we investigate whether there are any significant effects of characteristics of applications on whether an application is challenged once the first application for a station is filed. I.e., does the first application filed remain a singleton application or is it challenged and thus result in a comparative hearing? Our hypothesis is that weak applications are more likely to be challenged and also that more valuable licenses will be contested. A third possibility is that applicants with greater resources may provoke competitive applicants seeking to be bought out as part of the comparative hearing process.

In order to test these hypotheses, we have estimated an equation where the dependent variable is 1 if the application is a singleton and 0 if the application was the first application filed in a comparative hearing. We refer to the applicant who files the first application as a first mover.

First we review some of the details of the disposition of an application within a comparative hearing or as a singleton application. These procedures are important because there may have been a strategic aspect to the decision to file an application first and also a decision about how to configure that application with both types of people and financial backing.

The first applicant for a station followed somewhat different procedures based on whether they applied for an AM or FM/TV license.

A party interested in broadcasting over an AM frequency was required to prove to the FCC, through an engineering study, that a usable bandwidth is available for a certain geographical area during some portion of the day. After the interested party completed the study, at his or her own expense, the FCC reviewed the study, and if the study was valid, created a permit for the available space. The interested party had to submit an application for this permit and was also required to publish a public notice (in the federal register) announcing the intent to gain a construction permit. Other interested parties were then allowed a window of time (one to three months) to file complaints against the initial party or apply for the permit themselves. If no other applications were received and no substantial reason to deny the applicant the construction permit existed, the FCC issued the permit to the first and only applicant. If more than one valid application was received, and none of the applicants were disqualified for reasons other than those considered in comparative hearings, the FCC assigned the applicants to a comparative hearing to decide which applicant would receive the permit. While a fixed deadline existed at the FCC for receiving applications, amendments to applications were accepted throughout the comparative hearing process where good cause existed.

Unlike AM, the FCC identified bandwidths and geographic areas available for FM and TV broadcasting and published dates when interested parties could apply. Interested parties, however, could also petition the FCC to make licenses available for certain unconsidered bandwidth/geographic spaces. If, after the window of time elapsed, only one application for permit was received and the application was deemed valid, the application was granted. If multiple applications are received and at least two remained after dismissing invalid applications, the applicants were assigned to a comparative hearing.

RTMG

Setup of the data for Singleton Model:

We have a sample of 66 singleton applicants - these are applicants who faced no competition from alternative bidders. We have also identified the most likely first mover for our sample of comparative hearings. Recall that a first mover is the first applicant to file an application for a license. We identified the first movers by using the application file date that was available in the comparative hearing file. Taken together, these two groups form what can be termed the first applicants for a license.

The object of the "Singleton" test is to determine what factors induce competition - i.e. what characteristics of an initial applicant prompt competing applications to emerge. Accordingly the dependent variable of the singleton test = 0 if the first applicant faced competition that forced a comparative hearing; and the dependent variable = 1 if the first applicant was the only applicant - i.e. a singleton. This singleton test can be thought of as the first stage, with the conditional logit analysis describing the second stage. Taken together, these two stages model the ultimate determination of the license holder.

The independent variables in the singleton test are the characteristics of the license or applicant that were readily observable when the application was made. These include variables reflecting the financial value of the station and the resources of the initial applicant. The minority and female status indicators are also appropriate to the extent that these are determined before the precise nature of any competing applications can be observed.

The interpretation of the Singleton test is as follows. If the estimated coefficient of minority or female is negative and significant, it means that higher minority or female percentages were associated with lower chance of being a singleton. This may mean that competing firms are not deterred by high minority and female percentages on an initial application; indeed they see these cases as opportunities to win in the comparative hearing process. This contradicts the notion that an initial applicant with high minority percentages would deter competing proposals.

This model is specified as follows:

Singleton = f(height, houseinc, totfunds, population, fmDum, TVDum, minpctb, fempctb)

We expect that the most significant factor determining whether an application is awarded to a singleton or goes to a comparative hearing is the value of the station. Value of the station in our model is based on three variables, height of the antenna above the natural terrain, population of the area, and median household income of the area.

We also include a variable for total funds available for constructing and operating the station and minority and female participation percentages within applications. Recall the hypothesis that greater resources of an initial applicant may either suggest a stronger application that will deter competition, or greater ability to buy off competition in the comparative hearing process and promote competition.

In addition, we include dummy variables that indicate whether the station is a TV station (TVDum) or an FM (FMDum) station.



Table 8 reports the most reasonable results from estimating this model.

Results from this specification show that height of the station, minority percentage participation in the application or minority percentage ownership of the application, and total funds available to construct and operate the station all significantly enhance the probability that an application will end up in a comparative hearing, i.e. that the application will be challenged. This is entirely consistent with our hypothesis that more valuable licenses attract more competing applications.

The negative and significant effects of total funds available suggests that strength of application is less important in deterring competition than possibility of settlement is at attracting competitors. It appears that entry into the comparative hearing process, for some applicants, was strategic behavior designed to achieve a buy out.

Most interesting for our purposes is the finding that applications with higher proportions of minority first movers are more likely to be challenged, i.e. less likely to be singletons. This is not true for initial applications with more female participants. Given that the comparative hearing process results suggest minority preferences were important, higher minority presence on the initial application should have deterred rival applications and resulted in singleton status. Failure to find this result for minorities means that the singleton selection process tended to work against the goal of higher minority participation. It may also reflect an ability of rival applicants to easily increase minority participation to compete with initial applicants. This is consistent with other results suggesting that applications subject to comparative hearings that had high minority participation also had greater total participation than singleton applications with high minority participation.



Table 8.
Singleton Model Results

	1		2		3		4		5	
	Coef.	z	Coef.	Z	Coef.	z	Coef.	z	Coef.	Z
height	-.0011	-1.3	-.0006	-.8	-.0014***	-1.9	-.0008	-.99	-.001	-1.4
Minpctb			-3.84***	-1.8	-1.16	-1.3				
Minpcto	-1.53***	-1.6					-1.76***	-1.8		
Minmajo									-1.44	-1.4
Fempctb			.48	.6	.44	.65				
Fempcto	.066	.08					.0026	.003		
Femmajo									-.1	-.1
Corp	-.56	-.95	-.58	-1.0			-.653	-1.1	-.61	-1.0
Totfundi	-.006**	-2.4	-.007*	-2.8	-.0048**	-2.3	-.006**	-2.1	-.006**	-2.5
fundsM0			5.5*	3.2						
Populati			-.007	-.6			-.012	-.9		
Otherown	-.245	-1.05	-.302	-1.4			-.31	-1.3	-.24	-1.0
IntegM	.012	.21	.024	.5			.0123	.2	.01	.3
IntegM0	1.69***	1.83	2.37**	2.4			1.83***	1.9	1.67***	1.8
ExperM	-.00045	-.2	-.0015	-.6			-.00068	-.3	-.0006	-.3
experM0	.44	.59	-.032	-.04			.53	.7	.42	.6
ResidM	.0013	.46	.0016	.5			.0018	.6	.0011	.4
ResidM0	-.98	-1.17	-.51	-.5	-.42	-.86	-.82	-.9	-.98	-1.2
hou_inci			-.06	-1.1						
hou_inc0			2.9**	2.3						
Pseudo R2	.23		.29		.15		.23		.23	
Observations	133		132		133		133		133	

* Significant difference at 1% level; ** Significant difference at 5% level; *** Significant difference at 10% level.

C. Unconditional Logit Model Results

The unconditional logit model attempts to capture the probability of an applicant receiving a license, regardless of whether the license is awarded as a singleton or through the comparative hearing process. The dependence of this overall probability on minority status is an important issue in assessing the role of minority status in the broadcast license award process. It is not captured either by the conditional logit model, which considers comparative hearings only, or the singleton model, which considers only whether or not first applications are contested. The unconditional logit model uses data on all applicants in the comparative hearing sample used for the conditional logit, and data on all singletons sampled. In this model, the dependent variable is equal to 1 if a license was awarded, regardless of whether the award was made through a comparative hearing or as a singleton application. The dependent variable equals zero if the applicant was a loser in a comparative hearing. Thus, this model treats the hearing process and the singleton awards jointly.



The results of the unconditional logit model are suggestive of the characteristics of applications more and less likely to end up with licenses. However, the results should be interpreted with caution for at least two reasons. First, unlike either the conditional logit model or the singleton model, this model does not attempt to reflect the decision making of a single class of actors in the license award process. Second, the model does not fully account for the statistical implications of varying numbers of applicants for each license. The results, and particularly the statistical significance of various factors, are fully statistically valid only under an assumption that every applicant made a decision to apply for a license independently of any knowledge regarding the number of applicants for that license, and that the characteristics of the application (including minority equity participation, assets included in the application, etc.) were determined independently of any knowledge of the number of applications for the license. With these cautions, however, the unconditional logit model is useful as an overall summary of the characteristics of applications more and less likely to ultimately receive a broadcast license.

Because we collected data for a sample of comparative hearings that oversampled for minorities, it was necessary to construct sample weights to adjust the data for the purpose of estimating the logistic regression models. The results below are provided for an unweighted version of the regression and for the weighted results using weights that are based on minority participation in the sample relative to minority participation in the population. Details of the weighting scheme are provided in appendix III.

The results for the unconditional logit model are somewhat different than for the conditional logit model. The unconditional model does not fit nearly as well as the conditional logit model. This is because it reflects the effects of two different decision processes, the choice of competitors to enter, and the choice of Administrative Law Judges in comparative hearings. While most of the signs on the variables are reasonable, there are not very many statistically significant¹⁹ relationships between license awards and the characteristics of the applicants. Table 9 shows the model results before we weight the data to account for the issue of oversampling of minorities in comparative hearings. Table 10 shows the model results after weighting the data to account for the oversampling.

The sign on the variable for total funds available for constructing and operating the station (Totfundi) is negative. While this makes little sense from the perspective of the license award process, it does make sense given that singleton applicants generally have much lower funds available than do comparative hearing applicants. This is naturally true since the licenses that were decided by comparative hearing are generally much more valuable than the singleton licenses. Therefore, total funds available is highly correlated with the comparative hearing observations, and because, unlike in the singleton case, the chance of winning is always less than certain in a comparative hearing, the total funds regression coefficient is negative and statistically significant.

What this really suggests is that the model may suffer from misspecification. While we place less faith in what the unconditional logit model is telling us due to possible misspecification, there are some

¹⁹ In this section, statements of statistical significance are made under special assumption required for statistical validity in this model. As discussed above, such validity requires strong assumptions on the process determining the characteristics of the applications.



results from this model that corroborate what the conditional logit model revealed. For example, the importance of assets and liabilities is also evident in the unconditional logit model.

We have used three separate specifications for the measure of minority participation in this model. The three are minmajo (a dummy variable which equals 1 when minorities own more than 50% of the equity of and application, and zero otherwise), minpcto (percentage of application that is minority based on equity ownership), and minpctb (percentage of application that is minority based on body count). While the sign is negative for all of these specifications, indicating minority presence reduces the likelihood of a win, these results are not statistically significant. Female percentage of body count or ownership is positive but is also not statistically significant.

Also important in this specification is that ownership of other media reduced the chances of winning a license while corporate form of organization increased the chance of winning a license.



Table 9.
Unweighted Unconditional Logit Model Results

Variables	1		2		3	
	Coef.	z	Coef.	z	Coef.	z
Totfundi (1)	-.00035**	-2.1	-.0003**	-2.0	-.0003**	-2.0
IntegM	-.001	-1	-.003	-3.1	-.003	-3.0
ExperM	-.001	-9	-.001	-8.8	-.001	-7.4
ResidM	.0015	1.5	.0016	1.5	.0015	1.5
Apassi (1)	.0003**	2.1	.00036**	2.3	.00037**	2.3
Apliabi (1)	-.002**	-2.0	-.002**	-2.4	-.002**	-2.4
Aimb	.0002	.3				
Limb	-.003	-.8				
Minmajo	-.31	-.6				
Femmajo	.3	.9				
Minpcto			-.66	-1.5		
Fempcto			.42	1.1		
Minpctb					-.71	-1.5
Fempctb					.54	1.3
Height	-.0001	-.95	-.0001	-.84	-.0001	-.86
Corp	.15	.53	.167	.58	.15	.53
Cntpty	.076	1.5	.074	1.5	.07	1.5
		4				
First	.096	.34	.107	.38	.12	.43
Otherown	-.115**	-2.0	-.119**	-2.1	-.12**	-2.1
Pseudo R ²	.074		.074		.076	
Number of Obs	264		264		264	

* Significant difference at 1% level; ** Significant difference at 5% level; *** Significant difference at 10% level.

Variable definitions appear in Appendix II.

(1) All these dollar denominated values have been deflated using data from The BEA National Income and Product Accounts Price Deflator series



Table 10.
Weighted Unconditional Logit Model Results

Variables	4		5		6	
	Coef.	z	Coef.	z	Coef.	z
Totfundi (1)	-.0002	-1.25	-.0002	-1.21	-.0002	-1.2
IntegM	.012	1.20	.010	1.0	.010	1.0
ExperM	-.0007	-.59	-.0007	-.58	-.0005	-.37
ResidM	.0017	1.43	.0015	1.3	.0014	1.3
Apassi (1)	.0004**	2.2	.0004**	2.2	.0004**	2.2
Apliabi (1)	-.0012	-1.3	-.0014	-1.6	-.0015	-1.6
Aimb	.0002	.3				
Limb	-.003	-.96				
Minmajo	-.023	-.04				
Femmajo	.67***	1.8				
Minpcto			-.192	-.46		
Fempcto			.75***	1.8		
Minpctb					-.15	-0.3
Fempctb					.98**	2.0
Height	-.00008	-.58	-.00007	-0.54	-.00007	-0.6
Corp	.432	1.3	.393	1.2	.362	1.1
Cntpty	.016	.3	.013	0.24	.015	0.3
First	-.47**	1.5	.47	1.5	.491	1.6
Otherown	-.13*	-2.3	-.13**	-2.3	-.13**	-2.3
Pseudo R ²	.084		.081		.085	
Number of Obs	264		264		264	

* Significant difference at 1% level; ** Significant difference at 5% level; *** Significant difference at 10% level.

Variable definitions appear in Appendix II.

(1) All these dollar denominated values have been deflated using data from The BEA National Income and Product Accounts Price Deflator series



V. Conclusions

Based on the comparative hearing model and the singleton model, we can reach the following conclusions.

The comparative hearing process during the period of minority preferences that we examined seems to have awarded credit for minority participation that was the stated objective of the FCC. However, the process seems to have encouraged figurative minority participation that supplemented rather than substituted for non-minority participation.

This conclusion is supported by the fact that there is no statistically significant influence of minority ownership on the probability of winning a license in a comparative hearing after controlling for the factors that the FCC announced were used to award licenses in comparative hearings. This is true whether minority ownership is defined as a continuous variable (i.e. on a zero to 100 percent interval) or when ownership is defined as minority only if minorities own more than 50% of the application.

The probability of winning a license is lower for a minority (where minority is defined either by ownership or percentage body count) who files as a singleton than for a non-minority who files as a singleton because minority singleton applications are challenged more often than non-minority singleton applicants.

Based on the models that we estimated, we can conclude that there was a lower overall probability for an application with minority ownership winning a license than a non-minority application after controlling for a variety of important variables. This is because there was a lower probability of winning a license as a singleton and no greater chance for an application with minority ownership to win a license in a comparative hearing.

We have provided some evidence to support the hypothesis that some minority participation was sham in the sense that minorities were probably recruited by non-minorities in order to enhance the prospect of non-minority firms to win a license. The evidence of this phenomenon comes from the fact that there are fewer minority parties participating when licenses are not as valuable. In addition, the total number of parties in applications is greater when minorities participate in applications for more valuable licenses which suggests that minority participation supplements rather than substitutes for other parties in applications. Also supporting this idea of sham participation is the fact that the phenomenon of increased overall participation only applies to applications that do not have significant minority ownership. If there is greater than 50% minority equity in an application, the number of parties is not nearly as high, suggestive that minorities supplement rather than substitute in non-minority applications.

Minority participation in comparative hearings was very low relative to minority representation in the U.S. population.

The minority participation rate for singleton licenses, which appear to be less valuable than those allocated through comparative hearings, was even lower than the low rate of minority participation in comparative hearings. A reason for this may be due to the fact that minority and female preferences

encouraged applicants to recruit minorities and females in order to compete more effectively in comparative hearings.

The process for awarding licenses through the comparative hearing process provided credit to applications that contained minorities and females, as was the stated policy of the FCC.

However, while minority participation -- as defined by minority percentage of body counts -- appears to have positively influenced the win rates in comparative hearings, minority participation when defined by percentage ownership or majority percentage ownership, does not significantly influence the probability of acquiring a license.

This finding is consistent with another finding that minority participation is greatest when there is little minority equity ownership -- a finding suggestive of the existence of non meaningful (sham) participation.

We found a statistically significant relationship between win rates and minority body count but not between win rates and minority equity ownership. This finding supports a hypothesis of sham participation.

The mechanism of providing credit to minorities seems to be significantly related to the amount of assets stated in applications with minority participation. Applicants with minority participation seem to have received extra credit for assets relative to applicants with lesser or no minority participation.

Applications with minority participation seem to have been treated less favorably with respect to liabilities than those applicants with lesser or no minority participation.

The net effect of the credit provided for assets and liabilities was positive for minorities since assets on applications generally substantially exceed liabilities. We may also interpret the results as suggesting that while financial strength was judged more favorably when minorities were present, financial weakness was judged more harshly when minorities were present.

These data generally support the theory that minority and female participation occurs most when the stations are most valuable and where the presence of minorities and females can bolster the probability of winning a license. Height of the station antennas, population, and household income are higher when minorities and females participate in applications. These are all indicators of the value of the station.

Payments and receipts are higher when there is nominal minority and female participation in applications; this is another indication that nominal minority and female participation occurs most in competitive situations.

The number of parties in applications is substantially higher when minorities participate; however this phenomenon is much less obvious when minorities control equity.

Because minorities tend to participate when valuable licenses are at stake, and because the number of participants in these applications is greater by far, it is possible that minorities were added to these



applications in order to improve the likelihood of winning, but may not add much in the way of meaningful minority ownership to these applications.

These are all important conclusions because we examined the differences in minority and non-minority license award during a period when minority preferences were in place. These results suggest that the impact of minority preferences on license award rates was minimal at best.