The Value of Television Time:

A Clarification of Stanley Besen's Television Time Value Model

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INTRODUCTION:

Stanley M. Besen of the Rand Corporation authored a paper in the 1976 Southern Economic Journal that examined factors leading to the profitability of television stations. He was concerned that the FCC's decision to cap the number of stations broadcasting on the VHF frequency in the top 100 markets to those currently operating might have adverse effects on the profitability of new stations. Such a policy might very well have dramatic consequences for those contemplating the creation of new television stations.

Besen hypothesized that a station's profitability was linked to the value of its broadcast air time. Both Besen (1976) and Picard (1989) recognized that air time value was reflected in a given station's spot prices -- or the quoted price each station reports for, in this case, an hour of broadcast time. A station is unlikely to accept less compensation from a spot sale than it could obtain from the best alternative use of its time. Besen hypothesized that stations not broadcasting on the VHF frequency and especially those operating as independents were selling air time that was perceived to be not as valuable as that being offered by VHF network affiliates. Because the FCC constrained new stations to operate on the UHF frequency and the organization of a fourth network seemed unlikely[1] new stations would most likely be independent UHF, and would subsequently be operating with a handicap.

The reason for the disparity in air time value rests with the intrinsic characteristics of each station. Each network affiliate, the vast majority of which do operate on the VHF frequency, have access to high quality programming that yields exceptional ratings. The cost of such programming is shared among all of the affiliates from advertising revenues allowing each affiliate to benefit without facing the prohibitive costs of production. In addition, network VHFs typically have a greater reach and share of the total television viewing households in an area stemming from stronger and better quality equipment. Finally, network VHFs enjoy a level of prestige that comes

[1]Of course the Fox network began operation in 1988 but the effects from this are not expected to be significant.

from membership in a national affiliation, high quality programs with exceptional ratings and their greater reach and share of households. Thus, when advertisers determine which station's time they will purchase, network VHFs can offer more than the others and therefore the value of their air time is higher than the rest.

Besen created a model that was designed to capture the disparity in value:

$$
\begin{aligned}
RATE = {} & B_0 + B_1(TVH/N) \\
& + B_2(TVH/N)(NU) + B_3[(TVH/N)\{NNU\text{-}NU/N\text{-}1\}] \\
& + B_4(TVH/N)(IU) + B_5[TVH/N\{NIU\text{-}IU/N\text{-}1\}] \\
& + B_6(TVH/N)(IV) + B_7[TVH/N\{NIV\text{-}IV/N\text{-}1\}] \\
& + B_8(TVH/N)(NE)
\end{aligned}
$$

Where: RATE = the price of an hour of prime-time pure time sales
TVH = the total Television Viewing Households in the ADI
N = the Number of stations in a given market (as defined by the ADI)
NU = Network UHF stations in a given market
IU = Independent UHF stations in a given market
IV = Independent VHF stations in a given market
NE = the Number of Educational stations in a given market

The foundation of Besen's theory is based on B_1(TVH/N) which is the equalization condition. If all stations experienced the same inputs such as programming, equipment, prestige and the like, the value of their air time would be a function of the total viewing households divided by the number of other stations in the market. It is expected that RATE would thus increase with TVH/N making B_1 positive.

The rest of the equation accounts for inputs to vary. The terms associated with B_2, B_4, B_6, and B_8 reflect the handicaps associated with UHF transmission, lack of network affiliation or a combination and are subsequently expected to be negative. The terms associated with B_3, B_5, and

B_7 reflect what competing stations capture in time value from handicapped stations and subsequently should be positive. Finally, the term associated with B_8 allows for the possibility that competition from a non-commercial station may well reduce the value of a commercial station.

The results of Besen's estimates of a 1972 sample of 390 commercial stations in 114 markets is as follows:

<u>VARIABLE:</u>	<u>B:</u>
CONSTANT	252.4 (5.44)
(TVH/N)	.724 (13.94)
(TVH/N)(NU)	-.446 (5.12)
[TVH/N{NNU-NU/N-1}]	.329 (3.00)
(TVH/N)(IU)	-.760 (24.89)
[TVH/N{NIU-IU/N-1}]	.971 (12.19)
(TVH/N)(IV)	-.486 (18.74)
[(TVH/N){NIV-IV/N-1}]	.705 (9.66)
(TVH/N)(NE)	-.035 (2.25)

$R^2 = .9186$. Parenthetical figures are T-scores.

Besen's results are awe inspiring. The direction of all hypothesized signs are correct and the t-scores of all coefficients are statistically better than zero with the exception of (TVH/N)(NE) which is just statistically insignificant. However, upon closer examination there are some problems with the final results.

As Park noted in his 1978 critique, the relative magnitudes of the coefficients are not consistent with a priori expectations, a point Besen concedes. It is unlikely that the capture effect would exceed the handicap as it does for independent UHFs and independent VHFs. Such a result would lead to the interpretation that converting a network VHF station into an independent UHF or VHF would raise the sum of the RATEs for all the stations in the market because the other stations' RATEs would increase by more than the changed station's decreased.

Besen's problem may stem from his use of aggregated data, which may be whitewashing the intrinsic values hidden within each individual station. Park (1978), Bates (1991), and Picard (1989) all recommend disaggregating the data -- or collecting data station by station, market by market -- to create a data set that better reflects and measures individual station characteristics. Also, Besen collected and regressed one year of data which is a rather small data set. Perhaps by expanding the number of observations and the length of time over which data is collected more reliable capture and handicap variables may be found.

The purpose of this paper is to incorporate disaggregated data collected over a 20 year period of time from 1972 through 1992 into a model closely based on that which Besen developed to determine if the expected coefficient signs and relationships are maintained while improving the relative magnitudes of the independent UHF and VHF coefficients.

THE THEORY:

Clearly intrinsic influences do vary across different classes and categories of stations. Each television station competes against a finite number of other stations in finite geographic markets supplying audiences of different tastes and incomes to advertisers. Each station faces unique constraints on operating and programing costs which are likely unique to be correlated to a particular market. Thus, by disaggregating the data, coefficients that more accurately reflect the individual characteristics of each station with respect to station class and market can be generated.

Using the price of a 30 second advertising spot -- the industry standard -- as the proxy for the value of television time, it is hypothesized that:

$$SPOT=F(\overset{+}{VAR1}, \overset{-}{VAR2}, \overset{+}{VAR3}, \overset{-}{VAR4}, \overset{+}{VAR5}, \overset{-}{VAR6}, \overset{+}{VAR7}, B)$$

Where: VAR1=(TVH/N)

VAR2=(NU)(TVH/N)

VAR3=(NCNU/[N-1])(TVH/N)

VAR4=(IV)(TVH/N)

VAR5=(NCIV/[N-1)(TVH/N)

VAR6=(IU)(TVH/N)

VAR7=(NCIU/[N-1])(TVH/N)

B=The estimated intrinsic differences between network VHF stations and independent UHF and VHF stations as well as network UHF stations.

TVH=Television Viewing Households within a given ADI

N=Number of stations within a given ADI

NU=Network UHF station

NCNU=Number of Competing Network UHF stations in a given ADI

IV=Independent VHF station

NCIV=Number of Competing Independent VHF stations in a given ADI

IU=Independent UHF station

NCIU=Number of Competing Independent UHF stations in a given ADI

It is hypothesized that VAR1 -- the equalization condition of Besen's original model -- will be positive because it is expected that SPOT will increase as TVH/N increases holding all other intrinsic factors constant. It is expected that VAR2, VAR4 and VAR6 will all be negative because they measure the handicap associated with being a NU, IV and IU respectively. VAR3, VAR5 and

VAR7 should all be positive because they represent the benefit of higher SPOT time values accrued to the competitors of those handicapped stations.[2]

WHAT CAN BE LEARNED FROM ECONOMETRICS:

The value of television time is a function of the television viewing households in a given ADI and the number of stations competing in that market. The more potential audience members a station can reach the more advertisers will be willing to pay for air time. The more stations that are in a given market the greater the likelihood that they will be forced to share potential advertising revenues, which should foster greater price competition. But these factors are observable and measurable.

Besen's model will allow for the estimation of the intrinsic factors that influence the value of television time. Such factors include the effects of television program quality, the quality of broadcasting equipment and a station's prestige. Each of these factors influences an advertiser's decision to purchase a particular station's broadcast time. The underlying assumption is that the intrinsic factors associated with network VHF stations are strongly positive with all other station classes operate under intrinsic factor handicaps.

By expanding the size and disaggregating the data set to better reflect the intrinsic values associated with individual stations, it is expected that the coefficient estimations will be more accurate. As a consequence, the relative magnitudes of the coefficients measuring the operating handicaps of non-network VHF stations will be greater than the coefficients that measure the advantage captured by the competing stations. Thus, a stronger theoretical relationship can be drawn between the handicap and capture coefficients while, simultaneously, the foundation of Besen's theory may be tested over a larger data set and over a greater period of time.

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[2]Note: Besen's original equation contained an eighth slope variable, (TVH/N)(NE), representing the effect non-commercial educational stations had on rate prices of competing to the competitors of those handicapped stations.

SPECIFYING THE ECONOMETRIC MODEL:

The hypothesized mathematical relationship is as follows:

$$SPOT_i = B_{0i}+B_{1i}(VAR1)$$
$$+B_{2i}(VAR2)+B_{3i}(VAR3)$$
$$+B_{4i}(VAR4)+B_{5i}(VAR5)$$
$$+B_{6i}(VAR6)+B_{7i}(VAR7)+e_i$$

Where:

a) VAR1-VAR7 are composed of elements that are known and observable.

b) $B_0, B_1, B_2, B_3, B_4, B_5, B_6, B_7$ are coefficients which are unknown and unobserved and must subsequently be estimated.

c) "e" represents the stochastic term.

d) "i" indexes the observation.

It is assumed that SPOT is generated by the right-hand side variables along with the stochastic term. It is therefore assumed that SPOT is endogenous to the equation and dependent upon the right-hand side variables which are assumed to be exogenous. In addition, the expected value of the right-hand side variables and stochastic term is 0.

Again, it is assumed that "e" represents those things which help to cause SPOT but are not observed. As such, the term will comprise those elements that have been omitted from the equation, any measurement errors, possible incorrect functional form, and, of course, any purely random behavior.

It is assumed that the expected value of the stochastic term is 0, that it is not correlated across observations, that its variance is the same for all observations, and that it is distributed normally. However, while the data set does not represent a pure time series, information has been collected over a 20 year period of time and thus introduces the possibility of a serially correlated stochastic term. In addition, the data is cross sectional thus introducing the potential for heteroskedasticity. These will be tested for with the proper corrections taken in the "estimating the equation" section.

DATA AND OUTLIERS:

The initial set of data for this study was compiled from statistics published for advertisers by the Standard Rate and Data Service and the Television Fact Book. Published station spot rates are generally offered from 15 seconds to an hour with the adopted industry standard being the 30 second rate. The 30 second rate represents the cost of purchasing 30 seconds of the station's most expensive time which is typically between 7 and 11 pm, or prime time. Both sources combine those stations deemed to operate and compete in the same market together for easy comparison. Market size is determined by the Area of Dominant Influence (ADI), which is a measure of the number of homes with televisions within a given metropolitan area. The data set includes 3291 observations of 29,619 variables from the years 1972 through 1992 of the top 25 television markets[3]. All Spanish language and Christian stations were eliminated along with those broadcasting to but not located within the US.

Two primary problems exist with the available data. First, it is rare indeed that sales of television time occur at the quoted spot prices. Indeed, each sale is generally negotiated between the buyer and the station with the spot price offering merely a point of departure. Subsequently it is assumed that their is some unobserved variation in the actual time prices. However, such variation is also assumed, for the purposes of this study, to be small relative to variations in price among stations, and that such variation is not correlated with any explanatory variables.

Second, the quality of reported spot rates deteriorates over time. From 1972 through 1975 reporting rates of spot prices were strong with few exceptions. In 1976, the network VHF stations

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[3]Note: Besen used the top 114 markets of 1972 in an aggregated data set.

in Los Angeles stopped reporting their rates and other large market network stations would follow. In 1980 New York, Chicago stopped, and by 1985 Boston, Washington D.C., Dallas, Philadelphia, and Detroit were all failing to report their spot rates. The trend continued through to 1992 picking up additional medium sized markets. Generally, the missing spot rate information was confined to network VHF stations and larger independent VHF stations.

The expectation is that data from 1972 - 1975 should yield the best results that are most likely to reflect the theoretical relationship between the explanatory variables and the dependent variable. After 1979 spot reporting rates deteriorate to such an extent that it is questionable whether the data can accurately reflect the advantage of being a network VHF station. When the network VHF stations in the largest markets with the largest number of television viewing households and stations fail to report their spot rates they are recorded as zeros. Thus, the stations that should have the greatest advantages and highest rates are reflecting just the opposite. Since the model is based on the strength of network VFH station it is likely that the theory will break down in regressions using data after 1979.

ESTIMATING THE MODEL:

The deterioration of the spot rate data over time inspired the creation of three regressions which were run using TSP 4.2 with the following results:

1972-1975:	coefficient	standard error	t-score
constant:	-.016374	.056245	-.291115
VAR1:	.459346E-02	.428100E-03	10.7299
VAR2:	-.315711E-02	.163411E-02	-1.932
VAR3:	.132429E-02	.277570E-02	.477101
VAR4:	-.474459E-02	.200482E-03	-23.6659
VAR5:	.355877E-02	.581228E-03	6.12285
VAR6:	-.560622E-02	.189228E-03	-29.6268
VAR7:	.347122E-02	.628510E-03	5.52294

R^2=.801706 D.W.=1.781 observations=525

1972-1979:

	coefficient	standard error	t-statistic
constant:	.139279	.073472	1.89568
VAR1:	.510139E-02	.542893E-03	9.39668
VAR2:	-.423825E-02	.205001E-02	-2.0647
VAR3:	.410637E-02	.354210E-02	1.15931
VAR4:	-.495964-02	.262521E-03	-18.8924
VAR5:	.937691E-03	.759278E-03	1.23498
VAR6:	-.579043E-02	.231776E-03	-24.9829
VAR7:	.288567E-02	.737156E-03	3.91459

R^2=.508561 D.W.=1.64117 observations=1081

1972-1992:

	coefficient	standard error	t-statistic
constant:	1.69947	.130089	13.0639
VAR1:	-.246848E-02	.102936E-02	-2.39808
VAR2:	.162503E-02	.141582E-02	1.14777
VAR3:	.600003E-02	.352284E-02	1.70318
VAR4:	-.329083E-02	.522494E-03	-6.29831
VAR5:	.992241E03	.160186E-02	.619431
VAR6:	-.478805E-02	.425759E-03	-11.2459
VAR7:	.010640	.145291E-02	7.32314

R^2=.082849 D.W.=1.83823 observations=3291

A) SOME INITIAL OBSERVATIONS:

The results of the first regression of 1972 through 1975 looks promising. A one sided T-test at 5 percent with 517 degrees of freedom yields a T-critical of approximately 1.645 indicating that all T-scores are statistically significant with the exception of VAR 3. VAR 3 measures the benefit realized by competing stations as a result of the operating handicap of network UHF stations. It is not really a surprise that VAR 3 would be statistically insignificant because only one station in each of the four years is a network UHF. Subsequently, there may not be enough observations to make any definite conclusions. Most importantly, the signs of the coefficients are consistent with a priori expectations and the capture effects of VAR3, VAR5 and VAR7 do not exceed the handicap effects of VAR2, VAR4 and VAR6.

The results of the second regression are not as bright as those of the first. The T-critical is once again 1.645 for a one sided test at 5 percent with 1073 degrees of freedom. The test results indicate that VAR3 and VAR 5 are both statistically insignificant. While there is some indication that the explanatory power of VAR3 is getting stronger -- which would be expected given the increase in observations -- VAR 5 has rapidly lost much of its explanatory power. This result is consistent with the deterioration in reporting of spot rates by network and independent VHF stations in larger markets. However it should be noted that the relative magnitudes still correspond to a priori expectations.

The results of the final regression -- taking all 20 years into account -- appears to be less successful. Again the T-critical is 1.645 for a one sided test at 5 percent with 3283 degrees of freedom. The test now indicates that VAR 2 is statistically insignificant along with VAR 5, while VAR 3 remains barely significant. More importantly, however, VAR 1 no longer has the hypothesized sign. Again, this is consistent with the deterioration in reporting of spot rates by network VHF stations in larger and mid-sized markets. VAR 1 is the foundation of the entire model because it assumes that network VHF stations have the advantages over their counterparts. Lack of spot rate data has forced many observations to become zero. The inconsistency of having large shares of the ADI's and the intrinsic benefits of network VHFs and yet having recorded spot rates of 0 has transformed VAR 1 into a negative. It is now a handicap to be a network VHF. Such a result destroys the foundation of the model's theory and throws into question all coefficient estimates of the particular data set.

B) CHECKING FOR M.C., S.C., and H.S.:

Before any definitive conclusions can be drawn from the above regressions, the existence of multicollinearity, serial correlation and heteroskedasticity must be determined. The first issue needing resolution is whether multicollinearity exists among the variables. M.C. may indeed be a problem because both TVH and N are elements in all constructed variables. Thus variance inflation factors were calculated with the following results:[4]

1972-1975:		1972-1979:		1972-1992:	
VAR1:	8.82	VAR1:	7.9	VAR1:	7.87
VAR2:	1.005	VAR2:	1.005	VAR2:	1.033
VAR3:	1.018	VAR3:	1.017	VAR3:	1.09
VAR4:	1.49	VAR4:	1.45	VAR4:	1.415
VAR5:	3.7	VAR5:	3.18	VAR5:	3.22
VAR6:	1.57	VAR6:	1.507	VAR6:	1.485
VAR7:	3.201	VAR7:	3.205	VAR7:	3.309

Studenmund (1992) recommends a decision rule of VIF>5=severe multicollinearity but also states that an equally valid decision rule of VIF>10=severe multicollinearity is often used when the data set is large and a number of explanatory variables exist. (p.276) Therefore, it appears that multicollinearity is not a problem in the time value model.

Next, serial correlation may be a possibility given the data was collected over a period of 20 years. Thus, a look at the Durbin Watson statistic is in order:

1972-1975:	1972-1979:	1972-1992:
1.781	1.64117	1.83823

Where the decision rule is: H_O: p<0; H_A: p>0

At the 5 percent one sided level: d_u=1.83; d_l=1.53

[4]For the estimated VIF equations please see the "VIF" section in the appendix.

Therefore, do not reject Ho for the 1972-1992 data set

1972-1975 and 1972-1979 data sets are inconclusive.

Although the first two data sets offer inconclusive Durbin-Watson tests, serial correlation is likely not a problem because the sample size is very large thus spreading any potential problem over a greater period of time and data. In addition, annual data was used which is far less susceptible to market shocks lasting more than one time period and it left no recognizable pattern when graphed against its residuals. These together with Studenmund's warning that GLS should not necessarily be used simply because of an inconclusive Durbin-Watson statistic provides enough reason to believe that serial correlation does not pose a threat to the legitimacy of the coefficient estimates within the model.

Heteroskedasticity is a very real threat because of the cross sectional nature of the data. Taken individually, Park tests done on TVH and N found significant potential that both elements were heteroskedastic.[5] But while both TVH and N are found in each variable, they are in the form (TVH/N), which is similar to the process of redefining the variables to eliminate heteroskedasticity. Thus, theoretically, the variable most likely to be heteroskedastic is VAR1 and since TVH is divided by N there should not be much of an issue. Park tests reveal the following:[6]

1972-1975:

	coefficient:	standard error:	t-statistic:
constant:	-11.7747	1.13030	-10.4173
LNVAR1:	1.58925	.207761	7.64943

[5]For results see appendix.

[6]See appendix under each data set section for park test estimations.

1972-1979:

	coefficient:	standard error:	t-statistic:
constant:	-9.45663	.946824	-9.98774
LNVAR1:	1.28540	.173449	7.4108

1972-1992:

	coefficient:	standard error:	t-statistic:
constant:	-.850654	.485439	-1.75234
LNVAR1:	.178892	.089297	2.00333

Where the decision rule is: H_o: $B_k < B_{ho}$; H_A: $B_k > B_{ho}$: T-critical = 1.96 @ 5% two sided

Thus, reject Ho and heteroskedasticity is a possibility in all models.

Unfortunately the correction for the apparent heteroskedasticity is not as easy to determine as its detection. Theoretically the Z value should be either TVH or N. However, redefining the variables by dividing through may change the theoretical meaning and foundation of the model. Weighted Least Squares may also change the underlying theory behind the model while simultaneously increasing the difficulty of simply interpreting the meaning of the new coefficients. The solution to this problem is a method based on White's 1980 article "A Heteroskedasticity-Consistent Covariance Matrix Estimator and A Direct Test for Heteroskedasticity" in Econometrica which outlines a process by which heteroskedastically consistent coefficients can be generated without having to select a suspect Z or introduce the risk of confusion over the interpretation of the coefficients. The process provided the following heteroskedastically consistent results:

1972-1975:

	coefficient:	standard error:	t-score:
constant:	-.016374	.061149	-.267770
VAR1:	.459346E-02	.531597E-03	8.64086
VAR2:	-.315711E-02	.202629E-03	-15.5807
VAR3:	.132429E-02	.109557E-02	1.20877
VAR4:	-.474459E-02	.334636E-03	-14.1783
VAR5:	.355877E-02	.737758E-03	4.82377
VAR6:	-.560622E-02	.186873E-03	-30.0002
VAR7:	.347122E-02	.786047E-03	4.41605

R^2=.801706 D.W.=1.781 observations=525

Heteroskedastic consistent S.E.s and variance

1972-1979:

	coefficient:	standard error:	t-score:
constant:	.139279	.082057	1.69734
VAR1:	.510139E-02	.563460E-03	9.05369
VAR2:	-.423825E-02	.236606E-03	-17.9127
VAR3:	.410637E-02	.222870E-02	1.84249
VAR4:	-.495964E-02	.375735E-03	-13.1998
VAR5:	.937691E-03	.809140E-03	1.15887
VAR6:	-.579043E-02	.274197E-03	-21.1178
VAR7:	.288567E-02	.792253E-03	3.64235

R^2=.508561 D.W.=1.64117 observations=1081

Heteroskedastic consistent S.E.s and variance.

1972-1992:

	coefficient:	standard error:	t-score:
constant:	1.69947	.114510	14.8412
VAR1:	-.246848E-02	.889385E-03	-2.77549
VAR2:	.162503E-02	.167871E-02	.968019
VAR3:	.600003E-02	.411249E-02	1.45898

VAR4:	-.329083E-02	.400014E-03	-8.22678
VAR5:	.992241E-03	.133303E-02	.744350
VAR6:	-.478805E-02	.341792E-03	-14.0087
VAR7:	.010640	.126189E-02	8.43170

R^2=.082849 D.W.=1.83825 observations=3291

Heteroskedastic consistent S.E.s and variance.

The correction did not affect the theoretical consistency of the coefficient signs, nor did it affect their relative magnitudes. Standard errors were adjusted and new t-scores were calculated but they did not change dramatically. The most dramatic change occurred with the VAR2 t-score, which became statistically significant indicating that indeed a statistically significant handicap exists for those network stations broadcasting on the UHF frequency.

It is important to note that while the relative magnitudes of the capture effects no longer exceed those of the handicap, they are not directly proportional. This reality does not discredit the results of the estimated models however. Besen's model was never intended to capture all of the factors that affect the value of television time, and the model being tested in this paper claim to do no such thing either. The hypothesis was simply that increasing the size of the data set and disaggregating it would correct Besen's original problem of capture variable coefficients exceeding the relative magnitude of the handicap variable coefficients. It has done this.

ANSWERING THE QUESTION:

The success or failure of this study has hinged on the relative magnitudes of the estimated coefficients that measure the intrinsic factors contributing to the success and domination of network VHF stations and that document the handicap all other stations must face. It was assumed that Besen was correct in his initial model specification. But it was hypothesized that the relative magnitudes of his capture coefficients were higher than those of the corresponding handicap variables because his data set was insufficiently large and not disaggregated. Subsequently, Besen's model was missing some of the intrinsic values present within each individual station that are necessary to explain the variation in value of time among station types and classes. The results of this study's estimated coefficients in comparison with those of Besen are as follows:

	Besen:	1972-1975:	1972-1979:	1972-1992:
C:	252.4	-.016374	.139279	1.69947
VAR1:	.724	.459346E-03	.510139E-02	-.246848E-02
	(13.94)	(8.64)	(9.05)	(-2.78)
VAR2:	-.446	-.315711E-02	-.423825E-02	.162503E-02
	(5.12)	(-15.58)	(-17.91)	(.968)
VAR3:	.329	.132429E-02	.410637E-02	.600003E-02
	(3.00)	(1.21)	(1.84)	(1.46)
VAR4:	-.760	-.474459E-02	-.495964E-02	-.329083E-02
	(24.89)	(-14.18)	(-13.20)	(-8.23)
VAR5:	.971	.3555877E-02	.937691E-03	-.992241E-03
	(12.19)	(4.82)	(1.16)	(.744)
VAR6:	-.486	-.560622E-02	-.579043E-02	-.478805E-02
	(18.74)	(-30.00)	(-21.12)	(-14.01)
VAR7:	.705	.347122E-02	.792253E-03	.010640
	(9.66)	(4.41)	(3.64)	(8.43)

Note: T-scores in parentheses

When the data was disaggregated and observations were made through 1975 the relative magnitudes were as hypothesized. Notice that VAR3 does not exceed VAR2, VAR5 does not exceed VAR4, and VAR7 no longer exceeds VAR6. All of the estimated coefficients for the 1972-1975 data set are statistically significant at 5 percent with 517 degrees of freedom with the exception of VAR3.

Similar results were obtained with the 1972-1979 data set. The relative magnitudes of the capture coefficients VAR3, VAR5 and VAR7 no longer exceed those of the handicap coefficients VAR2, VAR4, and VAR6. As the data set increased in observations the explanatory strength of each variable as measured by the t-statistic also increased with the exception of VAR5, which is now statistically insignificant at the 5 percent one sided level, with 1071 degrees of freedom. This is, in all likelihood, a result of the decrease in number of larger market network and independent VHF stations who reported their spot rates.

The results obtained from the 1972-1992 data set were at best inconclusive. The number of VHF stations -- particularly network stations -- in large and medium sized markets reporting spot rates dropped dramatically after 1980. The large shares of a given market's television viewing households and all the intrinsic benefits accrued by network stations were associated with spot rates of 0. Subsequently, the condition that network VHF stations command the highest spot rates while all other stations operate with handicaps no longer was true. In fact, the coefficient of equalization, VAR1, became negative indicating it was now a disadvantage to be a network VHF station. Therefore, the results from the 1972-1992 data set should not be trusted and should be discarded.

Clearly the disaggregation of the data and the increase in observations corrected Besen's relative magnitude of coefficients problem in his original equation. Both the results from the 1972-1975 and 1972-1979 data sets are reasonable and acceptable. But for the fact that the data for spot rates deteriorated after 1980, I would suspect that the trends revealed in the first two results would have held for 1972-1992. In any case, Besen's problem is solved and the theory of disaggregation validated.

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