Report on a New Local News Media Diversity Measure

Ethan Kaplan

University of Maryland at College Park

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Abstract

Review of "Local Media Ownership and Viewpoint Diversity in Local Television News" by Adam D. Rennhoff and Kenneth C. Wilbur.

1 Paper Description

"Local Media Ownership and Viewpoint Diversity in Local Television News" has two components to it: (1.) a new measure of local news media diversity and (2.) a method for estimating the impact of various measures of media ownership on local media news diversity. Their main contribution is their measure of diversity. One approach to measuring diversity has been to look at viewership. A location, then, is said to have diverse media if there is substantive variation in viewership across different news sources. However, viewership numbers are impacted by both supply and demand side factors. The authors try to separate out the demand side factors so that they can construct a supply side measure of media diversity. The do this with a structural model based essentially on comparing relative viewership on local versus national news. Since supply-side parameters for news are fixed across locations, the authors use cross-sectional variation to recover demand parameters (essentially a variance in preferences parameter) and then, assuming invariance of parameters between local and national news, use the demand-side parameters to recover supply-side parameters for local news. The measure of diversity, then, is an absolute measure of media diversity (i.e. based solely on differences in perspective across locations independent of differences in preferences across locations). The idea is quite nice in theory and I think that more can be done with it. Partially, it is nice because it introduces an easy to compute one-dimensional measure of diversity. Unfortunately, as the paper currently stands, the identification also relies upon some very strong assumptions about functional form of the distribution of preferences and invariance of the functional form (up to one location and one scale parameter) across locations in addition to assumptions that viewership is solely decided upon using political perspective as opposed to quality.

The authors then use the measure to estimate the impact of ownership changes on diversity. They try a few specifications. Their main specifications use first difference estimation and pooled OLS estimation. They find very little impact of changes in local news ownership upon changes in local news diversity. This result has a very similar flavor to the well known paper by Gentzkow and Shapiro (2010) who show that, conditional on state fixed effects, measures of newspaper ideology are much more strongly correlated with demand-side factors than supply-side factors. However, the current paper bases their measure of diversity on viewership whereas a measure of diversity based upon Gentzkow and Shapiro's work would be based upon content (language usage by local news media).

2   Measure of Diversity

2.1   Distributional Functional Form Assumption

The authors assume that the distribution of preferences is the same across locations up to the distribution mean and the distribution variance. Assume that differences in metric of ideology should be measured as differences in inverse of readership from an associated normal distribution. The shape of the normal distribution then impacts the measures of diversity that get constructed. Differences in viewership shares lead to larger differences in measured ideology when the viewership shares are very unequal (i.e. 10% and 60% as opposed to 35% and 35%); however, this is not true, for example, if a uniform distribution is used. Moreover, it is not clear that the preferences over the ideological component of demand for news follows a normal distribution.

The formula for diversity is:

$$D_m = \sigma_m \left(\Phi^{-1} \left(1 - s_3^m\right) - \Phi^{-1} \left(s_1^m\right)\right) \tag{1}$$

where s_i^m can be are viewership shares for local news stations. Substituting in for σ_m (a parameter measuring the dispersion of preferences which is obtained from viewership of national t.v. news), we get:

$$= \left(\hat{x}_{BC}^N - \hat{x}_{AB}^N\right) \frac{\Phi^{-1}\left(1 - s_3^m\right) - \Phi^{-1}\left(s_1^m\right)}{\Phi^{-1}\left(1 - s_C^m\right) - \Phi^{-1}\left(s_A^m\right)} \tag{2}$$

where s_k^m are viewership shares for national news stations. From the above formula, we see that essentially the relative measure of diversity across locations is determined solely by (1.) the size of the second national news station (diversity is decreasing in the size of the second news station's viewership) and (2.) the size of the second local news station's viewership (diversity is increasing in the size of the second news station's viewership). To fit the normal model, it must be that the smaller the size of local viewership of the second news station, the higher the variance of preferences in the local distribution and, thus, for a given percentage of the population differentially viewing the third and first local news media

2

sources, the media sources must be more polarized. This can be very misleading if the true distribution of preferences is skewed (and thus not normal). In that case, its possible, for example, that having a small percentage of the population watching the middle news source is evidence of low not high variance in the local distribution of political preferences and thus, for a given differential percentage of media consumers watching local news, the gap in ideology across local news stations is larger. The assumption of normally distributed political preferences with a common metric is probably incorrect (and verifiably so - i.e. if one media market has high viewership for national news 1 and 3 and another media market for 2 and 3, they would be incompatible). Most likely this assumption leads to strong biases in measurement of local media diversity.

2.2 National Media Relationship to Local Media

I do think that using national media to infer ideological preferences over media is a nice idea. Instead, I would argue for a more "non-parametric" approach which partials out national media by controlling for national media viewership rates.

2.3 Other Comments

1. It wasn't clear to me how the decision of what is considered media outlets numbers 1, 2, and 3 are. The order matters a lot since the measure of diversity is completely determined by the relative size of the 2nd news outlet.

2. There isn't much variation in the political viewpoints of the main non-cable networks; most of the variation across locations could be noise. What about benchmarking diversity measures with Fox, CNN, and MSNBC viewing? These should be available in all but a few localities.

3. The measure of diversity of media is increasing in the percentage of the population watching local media station #2: $\Phi^{-1}\left(1 - s_3^m\right) - \Phi^{-1}\left(s_1^m\right)$. It is not clear to me that media diversity is increasing in the percentage of people watching media station #2. For example, suppose that all 3 media stations were identical and 1/3 of the population watched media #2. Now increase the media diversity. Suppose that pulls people away from source #2, media diversity has increased but the measure of media diversity will have decreased. Again, this is due to the assumption of a common distribution of preferences - up to mean and variance - across localities which is normally distributed.

4. There are two notions of media diversity that could be computed. One is an absolute measure which just looks at differences in perspectives across locations. The other is a relative measure which incapsulates the possibility for media to influence public debate. For example, if a locality is very right wing and there are two news stations: one is far right and the other far-left,

then local media will be very diverse but will not encourage public debate. A less diverse media, then, will increase diversity of thought in public debate. I definitely think that absolute measure like the one presented by the authors should be constructed but I do think that conditional measures would also be both useful for the FCC and interesting.

5. Many things besides political preferences could impact viewership such as production quality. In other words, there might be concentrated viewership in a locality due to quality differentials across stations rather than diversity of views (diversity in quality may be strongly positively correlated with the authors' measure of diversity).

3 Estimation of Impact of Ownership on Diversity

1. There are endogeneity concerns. For example, ownership changes could be related to quality issues. An ownership change may change product quality. For example, if an acquisition increases quality, that could increase viewership for a less-viewed station which lower measured diversity. Of course, the opposite is also possible.

2. Another concern is obviously that there could be lags in adjustment in media markets. This could be due either to (1.) lags in change in programming after a change or (2.) lags in viewership response.

3. The authors say that they can not estimate the fixed effects model due to an incidental parameters problem. Actually, they do have the degrees of freedom to estimate fixed effects. However, It is true that they can not get consistent estimates of the fixed effects. Nonetheless, they can subtract the group mean from each observation. This "within estimator" is identical in linear models and is easily implemented in stata using areg.

4. First differencing the data induces autocorrelation. After first differencing the data:

$$\begin{aligned} \mu_{mt} &= \epsilon_t - \epsilon_{t-1} \\ \mu_{mt-1} &= \epsilon_{t-1} - \epsilon_{t-2} \end{aligned}$$

Thus,
$$cov\left(\mu_{mt}, \mu_{mt-1}\right) = -\sigma_\epsilon^2$$

Therefore, the data should be clustered at the group level when first differencing. The authors can test for autocorrelation both with and without first differencing using tests like the Dickey-Fuller test or just be regressing residuals on lagged residuals by media market.

5. There are very high R-squared in levels estimation ($\sim 65\%$) but very low ones ($\sim 2.5\%$) in first difference specification. The R-squareds are so high in the first difference estimation because of the high degree of serial correlation in viewership of local media within localities. The persistence is most likely especially high because the time period is short and during a period without a lot of change in local tv programming. There are two possible reasons for the low fixed effects R-squareds : (1.) changes in media diversity are hard to predict, (2.) the measure of media diversity is not terribly informative. The latter is potentially worth investigating empirically. The authors could do this by drop their first differencing effects and see what R-squareds look like cross-sectionally with just the demographic variables. Moreover, the authors could compare the explanatory power of covariates on their measure to other measures of local news media diversity. It would also be nice for the authors to discuss the relation between their measure and other measures of media diversity.

6. Fixed effects can exacerbate measurement error. For similar reasons, so can first differencing the data. This can cause coefficient attenuation. This may not be an issue if the ownership variable is well measured. On the other hand, the measurement of the ownership variable should be at the time of the Nielsen data collection. This could exacerbate measurement error.

7. The tables could be more self-explanatory.

4 Bibliography

Gentzkow, Matthew and Jesse Shapiro (2010), "What Drives Media Slant? Evidence from U.S. Daily Newspapers.", *Econometrica* 78(1), pp. 35-71.