Assessing News Media Infrastructure: A State-Level Analysis

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Introduction

As the technological and economic conditions in which journalism operates continue to evolve, it becomes increasingly important that policymakers, funders, news organizations, and citizens have an understanding of the state of local journalism, in order to be able to engage in comparative analyses across geographic regions and over time. Unfortunately, unlike other areas of American political, economic, and cultural life, the field of journalism has received relatively little systematic and sustained measurement attention. While various governmental and non-governmental organizations have developed, and systematically apply, indicators of phenomena such as economic health, consumer confidence, environmental health, government transparency, and political activity, similar assessment efforts of the state of journalism have been lacking, with the exception of the important annual assessments of the state of the news media in the U.S. conducted by the Pew Research Center (2016). Governmental assessment of the news media has been discouraged by political pressures grounded in the premise that such monitoring represents an intrusion upon the press' First Amendment freedoms (Napoli & Friedland, 2016).

The lack of research attention no doubt reflected the long-standing perception that the health of the news media did not require systematic monitoring. However, as the economic climate for journalism has grown more challenging (Anderson, Bell, & Shirky, 2012), and as policymakers (Waldman, 2011), foundations (Glaisyer, 2016; Knight Commission, 2009), public interest organizations (Pickard, Stearns, & Aaron, 2012), and communities (McCollough, Crowell, & Napoli, 2017) have become increasingly concerned about the continued health and viability of local journalism, the need for systematic monitoring becomes more pronounced. As the Knight Commission on the Information Needs of Communities in a Democracy (2009) has

noted, "If activists, policy makers, and the general public had more concrete ways of describing, measuring, and comparing the systems of community news and information flow, it would be much easier to mobilize public interest around community information needs" (p. 39).

As with phenomena such as political participation, economic development, and environmental health, assessing the state of journalism can be directed at various levels of analysis. The most important and systematic assessments of the state of the U.S. news media – the annual Pew Research Center *State of the News Media* reports (see, e.g., Pew Research Center, 2016) have focused on the national level. The analysis presented here focuses on the individual state as the unit of analysis, in keeping with many other economic, political, and social indicators that are focused on state-level monitoring, and that are intended to facilitate cross-state comparisons and within-state comparisons over time.

The primary goal here is to develop an approach by which individual states can be evaluated and compared in terms of the relative strength of their news infrastructures. This analytical approach also is intended to complement other research efforts that focus on assessing local news media at more granular levels of analysis such, as individual DMAs (Kosterich, et al., 2017) and – even more narrowly – individual municipalities (see, e.g., Napoli, et al., 2017), in an effort to provide multiple vantage points from which to assess the state of local journalism. Ultimately, the goal here is to provide an assessment of the *news media infrastructure* of individual states in a way that facilitates comparisons across states, that can be used to track trends over time, and that can be employed as a resource in future research.

Literature Review: The Geographic Distribution of Local Journalism

As local journalism evolves in response to the many challenges posed by the technological changes that have taken place in the media sector, one growing concern is that

significant differences exist across communities/regions in terms of the extent to which sources of journalism are available and serving people's information needs. Researchers have raised concerns that, in some communities, local journalism is essentially collapsing, with the decline and (in many cases) disappearance of traditional news outlets leaving massive unfilled gaps (what Stites [2011] has termed "news deserts"; see also Ferrier, Sinha, & Outrich's [2016] analysis of "media deserts") that create greater opportunities for political and corporate corruption to flourish and that can undermine effective democratic participation (Starr, 2009).

The extent to which this is the case may vary according to the particular characteristics (demographic, economic, political, technological) of individual communities/regions (e.g., Napoli, et al., 2017; Pew Research Center, 2015). One recent report noted, for instance, that large US cities such as New York, Washington, DC, and Los Angeles are employing an increasing proportion of the country's professional journalists, with smaller cities experiencing dramatic declines (Tankersley, 2015). Such patterns suggest an emerging pattern of journalism haves and have-nots across the country.

Research addressing these concerns to date has tended to be narrowly focused within a select number of communities/regions; or, it has tended to focus on the prominence and distribution of a single type of media outlet. The former approach is illustrated by recent research by the Pew Research Center (2015), which produced an incredibly thorough analysis of the local news ecosystems in three US communities of different sizes. Extending earlier ecosystem research on the sources and flow of news in Baltimore (Pew Research Center 2010), this study included inventories of all local media outlets (regardless of technology), surveys of news consumers, and analysis of social media data. Similar (though less detailed) case studies examining the state of local journalism in a single community, or in a very limited number of

communities, are commonplace and provide valuable insights into the state of affairs within these communities (Durkin & Glaisyer, 2011; Durkin, Glaisyer, & Hadge, 2010; Gloria & Hadge, 2010; Morgan, 2011; Ramos et al., 2013).

At the other end of the continuum is research that is much broader in its geographic scope, but narrower in the scope of the news sources taken into consideration. A good example of this approach is recent media deserts research (Ferrier, et al, 2016), which, while national in scope, has focused to this point primarily on the circulation of print newspapers across the country. This focus, while incredibly valuable (given the continued centrality of newspapers to *news production*), leaves out the potential contributions of other media platforms in the news media profiles of individual regions/communities. The goal of this study is to meld the geographic breadth of such research with the media technology breadth characteristic of the community case study research, in an effort to devlop a high-level assessment tool for assessing the robustness of the *news media infrastructure* in each state.

Method: Defining and Measuring News Media Infrastructure

What do we mean by *news media infrastructure?* The term reflects an effort to extract from the entirety of the media outlets within a state those outlets – and their associated personnel – that are focused, at least to some extent, on providing local news and reporting. Thus, within the context of this analysis, we approach the notion of infrastructure in terms of the totality of news/journalism-producing media outlets that we were able to identify within the state; and in terms of the total number of identifiable individuals employed within those outlets.

For this approach, we have relied upon what is widely regarded as the best available commercial database for identifying media outlets and media workers in the U.S. – the Cision Media Database (see http://www.cision.com/us/). A secondary goal of this research was to

explore the viability of existing commercial databases for developing indicators of the state of

local journalism. Cision is the current incarnation of the media industry's primary media

contacts directory for public relations and marketing professionals. Well-known under its

previous name, Bacon's Media Directories, the Cision Media Contacts database is updated daily,

and contains information on over 1.6 million contacts and outlets across the U.S. and abroad.

With this database, it is possible to perform state-level searches of media outlets, and to filter

these searches in ways that isolate those outlets engaged in the production of news (the specific

filtering criteria are discussed in more detail below).

In addition, because one of the key functions of this database is to provide media contacts

for public relations professionals, each outlet entry contains a list of individual contacts within

each outlet, across a wide range of occupational categories. These contacts lists do not reflect

the totality of individuals employed within each outlet, but they do serve as a useful comparative

indicator of the human resources associated with each media outlet. Previous research has used

these contact data to construct indicators of the overall resource investment that news outlets

have made into different subject areas (see, e.g., George & Waldfogel, 2003; McCluskey, 2008).

We recognize that this approach represents a fairly superficial analytical approach to

local news media. This approach does not engage with the analysis of news content or other

aspects of the rigor of local news outlets (such as, for instance, budgets or revenues). However,

the goal here was to explore the viability of an analytical approach of substantial scope, as

opposed to depth. In addition, other potentially relevant types of information, such as budgets or

revenues, are not sufficiently available to facilitate analysis at the scope being undertaken here.

We also recognize that states are, in many ways, a challenging unit of analysis when it

comes to news media. For example, states are not the primary unit around which local media

organize. There are some (but relatively few) media outlets directed at serving the entirety of a state. So, for instance, New Jersey has state-wide public broadcasting and cable news networks, as well as a monthly magazine. Some online news sites have emerged that focus on covering state-level politics and policy.

However, most media in a state are oriented around individual municipalities (of which there can be tremendous variations within a state), and/or individual Designated Market Areas (DMAs). This is the case for most newspapers, hyperlocal news sites, and broadcast stations. DMAs, of course, do not always fit neatly within state boundaries. Consider, for instance, media markets such as New York, Philadelphia, Boston, Kansas City, Chicago, or St. Louis, which extend beyond their home state into neighboring states. Nonetheless, the relevance of individual states as political units provides a compelling reason for assessing news media infrastructure at the state level.

Identifying Local News Sources

The first step for this project involved effectively isolating local news-producing media outlets from the totality of media outlets located within a state. We engaged in this step in an effort to better isolate those outlets actively participating in each state's news ecosystem from the broader media ecosystem operating in each state. Given the extent to which, at this state-level unit of analysis, it is effectively impossible to analyze a sample of the content for every outlet as a means of distinguishing between outlets that produce news and those that don't, this process of outlet filtering based on outlet characteristics obtained from the Cision database was seen as a way of at least superficially tapping into this dimension of media outlets' performance, and better zeroing in on the primary concern here, which is developing a profile of the robustness of the news media infrastructure in each state.

The Cision database is organized in terms of three primary outlet categories (each with many subcategories). These are Print, Broadcast, and Online. For print media, the following publication categories were included in the analysis: 1) college newspapers; 2) community newspapers; 3) daily newspapers; and 4) magazines. Other available print media categories, such as Newspaper Bureaus and Newspaper Special Sections, were not included, in order to maintain a focus on the individual outlet as the unit of analysis (and the substantial personnel overlap likely to occur if data on such news organization components were combined with outlet-level data)

For broadcast media, the following types of outlets were included in the analysis: 1) radio stations; 2) television stations; 3) television networks (to account for regional cable news channels); and 4) radio networks (to account for regional radio news networks). Other available categories, such as individual Radio and Television Programs were not included, once again in order to maintain the focus on outlets as the unit of analysis and to avoid personnel overlap.

For online media, the following types of outlets were included in the analysis: 1) blogs; 2) news web sites; and 3) online versions. The term *online versions* refers to the online presence of any print or broadcast outlets (see above). From this standpoint, Cision essentially treats a local newspaper and its web site as two distinct outlets. In computing our outlet counts for each state, we combined online versions with their traditional print/electronic media counterparts into a single outlet. We felt that this approach better reflects the reality of the contemporary news ecosystem, in which legacy media outlets and their digital components represent a single, integrated news outlet, rather than separate and distinct entities. However, we did extract contact information from each component separately (see below), as we discovered that the individuals listed as contacts for the online version often were different individuals (with different job titles

focused specifically on digital/online responsibilities) from those listed for the associated print or broadcast outlet. Thus, both the print/broadcast and online version contacts were combined to calculate the number of individuals associated with these organizations. Other available online categories, such as Social Networking Sites and Photo/Video Sharing Sites were not included, in order to maintain the journalistic focus of concern here.

This process of outlet selection was accompanied by subject matter filtering. The Cision database allows for extensive subject matter filtering across a wide range of subject categories, including Agriculture & Farming, Building & Construction, Fashion & Beauty, Sports, etc. Most of these categories also have multiple subcategories. For this analysis, the News & Current Affairs category was employed. This is a very broad subject matter category, and preliminary analysis showed that its use did not lead to the exclusion of individual college, daily, or community newspapers; nor did it lead to the exclusion of individual television and radio stations. Essentially, all outlets of these types are tagged by Cision with the News & Current Affairs category, regardless (see below) of whether they actually engage in the *production* of such content. For the purposes of this analysis, the key value in employing the News & Current Affairs category as a content filter was to better filter out various types of blogs (review sites, mommy blogs, etc.) that are quite prevalent in the Cision database but that do not reflect the types of outlets that are the focus of this analysis – those engaged in the production and dissemination of journalism.

Further Filtering

In order to better narrow the focus of this analysis on local news *producing* outlets within each state, additional layers of filtering were employed within each outlet category. First, for News Web Sites and Blogs, the list of outlets of these types produced for each state was

manually scanned. Any News Web Sites or Blogs that did not include explicit mentions of News or Current Affairs in their Outlet Profile (a text paragraph provided by Cision describing each outlet) were excluded. This was done primarily to eliminate the many mommy blog and product review sites that were still present even after employing the News & Current Affairs filter (see above). In addition, outlets with a clear national or international focus – rather than a focus on the state or individual communities within the state, also were excluded, in order to maintain a focus on the presence of outlets directed at serving the news needs of residents of the state.

For television stations, Cision provides data that make it possible to determine if the individual station provides a local newscast. For this analysis, stations that provided no local newscasts were not included in the final analysis, in order to maintain the focus on news production. This was determined by examining each station's outlet profile, in which Cision notes if the station has no news department or news director. In some cases, the outlet profile explicitly states that the station produces no local news. Stations of this type were eliminated from the final data set. Further, in order to better narrow the focus on *sources* of local news, all stations identified as *tower stations* (i.e., repeaters of the signal of another local station) or as *multicasts* (i.e., the secondary or tertiary feed of a local station) were excluded as well. Similarly, when a station was described in its outlet profile as a *sister station* that repeats the news broadcast produced by another station, it was eliminated from the final data set. These filtering decisions reflect the intended focus here on outlets engaged in the *production* of news, and thus involve excluding those outlets whose capacities are limited to news *dissemination.*

For radio stations, Cision allows filtering according to format/genre. For this analysis, only those stations that included News and/or Talk amongst their genre classifications were included in the analysis. All other programming formats/genres were excluded. While this is

admittedly an imprecise indicator for zeroing in on radio stations engaged in providing news, it seemed a reasonable reflection of the current state of the radio industry, in which investment in local journalism is increasingly rare (Abernathy, 2016; Sanders, 2008). We believe the inclusion of state-wide radio networks (see below) is an important factor in effectively capturing a state's news infrastructure as it pertains to radio, given that many states have commercial or non-commercial radio networks that produce and disseminate news to affiliated stations.

For radio and television networks, networks whose profiles explicitly identified a focus other than news and information were excluded. Thus, for instance, regional sports networks operated by many cable providers around the country were excluded; as were religious broadcast networks. Also, in order to maintain the focus on the individual state's local news and information ecosystems, national radio/television networks located in individual states were excluded. This information was easily identifiable in the networks' Cision profiles. So, for instance, the many national television and radio networks based in New York were not included in that state's final outlets/contacts calculus.

Turning finally to print, the only outlet category for which manual filtering was employed was magazines. Here, the outlet profile of each magazine based in the state was examined to determine: 1) if the magazine's subject matter was focused within the state (as opposed to being a magazine targeting a national or international audience; and 2) if the magazine's focus was, at least to some extent, on news and information. If the magazine in question failed to meet both of these criteria, it was excluded. Thus, all magazines with subject matter of a national and/or international orientation were excluded. For those magazines that were focused on the individual state, or on individual cities or geographic/ethnic communities within the state, this process led to the inclusion of magazines such as community lifestyle and news publications, but the

exclusion of magazines such as trade association and alumni publications, visitors' guides, and entertainment/nightlife publications. Here, the presence of the term "news" in the magazine's outlet profile and subject matter categorizations was a primary determining factor in making filtering decisions.

Generally, Cision also provides the url for every outlet's web site, allowing for direct examination to provide further information when making determinations regarding inclusion or exclusion. The filtering process was handled by trained research assistants and the authors. Cases of uncertainty were resolved through consultation amongst the researchers.

Once the list of relevant outlets was determined for each state, the list of "Contacts" within these outlets was generated from the Cision database. As was noted above, Cision provides an extensive list of the individuals working within each of its listed media outlets, in order to facilitate outreach from the public relations and marketing communities. For this project, we use these contacts lists as an indicator of the size/scope of the outlet. We believe these totals provide a useful comparative indicator of the number of "news workers" operating in each state, and that this indicator provides the basis for a useful companion metric to the outlet counts. Thus, for each state, the contacts for every outlet in the outlet list generated for each state were extracted, with the total number serving as the indicator of the total news workers in each state.

For these data, we did not engage in any filtering on the basis of title or occupation, as we were primarily interested in developing an indicator of the overall human resources infrastructure associated with the news outlets serving each state. Thus, regardless of job title/responsibilities, individuals listed as contacts for an outlet were counted towards that state's news infrastructure. From this standpoint, we use the term news workers throughout the remainder of this paper

somewhat broadly, to reflect individuals directly working to produce news, as well as those working in other supportive capacities for a news-producing media outlet.

These contacts lists also were filtered in order to eliminate multiple counts of single individuals. It was often the case that a single individual served multiple roles within an individual outlet, or served in a similar role across multiple outlets in a state. In order to more accurately assess the human resources infrastructure devoted to local journalism within each state, such individuals were counted only once toward a state's final total. Similarly, all instances in which a contact entry provided no individual name, but rather only a department or position (e.g., Public Affairs Department) were excluded from the final tallies.

This process of data extraction and filtering took place from the spring of 2016 through the fall of 2016, and thus represents Cision's data on the media outlets and workers located in each state at that particular point in time.

<div align="center">Results</div>

State-by-State Comparisons

The data gathering and filtering protocols described above provide a basis from which we can develop metrics for assessing individual states and comparing them in terms of the robustness of their news media infrastructure, as defined by the quantity of news outlets and news workers directed at serving states' news and information needs. The basic totals for each state, in terms of number of local news outlets and news workers are presented in Table 1. It is important to emphasize that these totals reflect the database search and filtering protocols described above and thus do not represent the full extent of the media infrastructure in each state.

<div align="center">Insert Table 1 Here</div>

The size of a state's news media infrastructure is, of course, a function of the size of the population within that state. This makes direct comparisons across states difficult. Other state characteristics, such as their geographic size, population density, number of municipalities, and population demographics, also may have a bearing on the size of a state's local news infrastructure.

In order to develop a clearer sense of how these various state characteristics might be related to news media infrastructure, a multiple regression analysis was conducted that incorporated the following geographic factors: 1) population; 2) population density (population per square mile); 3) size (square miles); and 4) number of municipalities. In addition, a number of demographic factors were incorporated that could potentially relate to the robustness of a state's news media infrastructure. These included: 1) median household income; 2) African American population percentage; and 3) Hispanic population percentage. The incorporation of these demographic variables reflected the findings of recent research, which suggested that lower-income and more ethnically diverse communities might find themselves comparatively underserved from a local journalism standpoint (see Napoli, et al., 2017).

It is important to note that the ratio of independent variables (seven) to cases (50) is less than ideal from a statistical power standpoint, though comparable ratios can be found in state-level analyses of other phenomena such as cybercrime victimization (Song, Lynch, & Cochran, 2016) and the digital divide (Pick, Sarkar, & Johnson, 2015). In such situations, the small number of cases can contribute to Type II error (false negative); which would mean that independent variables that did not emerge as significant in the analysis would have if the number of cases had been larger. Of course, in this case, all 50 states were subjected to analysis; thus, no additional cases could be added to the point in time being analyzed.

The results of these regressions are presented in Table 2 (News Outlets) and Table 3 (News Workers). The News Outlet and News Workers measures proved to be very highly correlated (r =.98; p < .01). Nonetheless, we have included analyses of both measures below. The results indicate that at the state level, the local journalism infrastructure is overwhelmingly, and almost exclusively, a function of population size. Analysis of scatterplots of the distribution of cases indicated that this is a strongly linear (rather than curvilinear) relationship. As can be seen in the tables, the model explains 92 percent of the variance in news outlets by state, and 94 percent of the variance in news workers. Almost all of this variance is accounted for by population size; however, the number of municipalities also emerged as a significant explanatory factor (though with far less explanatory power than population size). None of the other state geographic and demographic characteristics that were incorporated into the analysis emerged as statistically significant.

In terms of the issue of statistical significance, it is worth noting that, despite the fact that this analysis contains data for all 50 states (i.e., the *population* of states), measures of statistical significance are still being employed, under the assumption that these data represent a *sample* from one specific point in time (mid-2016, when the data were gathered) and that the models presented here would have predictive value for data gathered at subsequent points in time. We recognize that some might argue that the data presented here represent a population and not a sample, and thus that indicators of statistical significance could be considered irrelevant.

Regression diagnostics indicated no problems of multicollinearity of the independent variables (tolerance statistics of between .48 and .76 for all independent variables) or of autocorrelation of residuals (Durbin-Watson statistics of 2.2 and 2.5). However, due to evidence in residual scatterplots of some heteroskedasticity, and (as indicated by significant Shapiro-Wilk

tests) non-normality in the distribution of the dependent variables, an alternative specification of these models was run using log-transformed dependent variables. The results were similar, with both population size and the number of municipalities both emerging as statistically significant, but with the standardized beta for population slightly reduced and the standardized beta for municipalities slightly increased. The adjusted R-squareds also decreased somewhat, to .70 for news outlets and .75 for news workers. Models employing log-transformed independent variables also were explored, but resulted in very high levels of multicollinearity for a number of the independent variables and less overall explanatory power.

Insert Table 2 Here

Insert Table 3 Here

The positive relationship between the number of municipalities and news media infrastructure is reflective of what we might expect – that individual municipalities have their own unique information needs associated with their local political processes and civic and cultural institutions. These unique information needs spur and sustain media outlets that serve these needs – though only to an apparently relatively moderate extent. Indeed, despite the statistical significance of this relationship, its modest practical significance is, in some ways, troubling, particularly given the relatively weak correlation between population size and the number of municipalities ($r = .27$; $p > .05$), which indicates that these two variables vary independently. From a media and democracy standpoint, it would certainly be preferable to see a state's news media infrastructure be more responsive to variation in the number of municipalities. It would be particularly interesting to explore the nature of this relationship with longitudinal data, to see if, in the past, the number of municipalities had a stronger relationship

with news media infrastructure, before economic and technological changes have undermined the viability of local news outlets.

Based on these findings, and the overwhelming significance of population size in explaining variance in the number of news workers and news outlets in a state, controlling for population size would seem to provide a potentially useful way of facilitating more direct comparisons across states. Thus, Table 4 presents the news outlets and news workers per 100,000 residents for each state.

Insert Table 4 Here

However, even this representation of state news media infrastructure has limitations in terms of allowing us to draw comparisons across states. This is because the number of news outlets/news workers per 100,000 residents also is a function of the size of a state's population. News, like all forms of media content, is what economists call a *public good* (see, e.g., Hamilton, 2004). Public goods have very high fixed costs, but very low variable costs, which means that there are huge economies of scale to be realized when the production costs can be spread across a larger audience base. Consequently, is it reasonable to expect populous states like California and New York to have as many news outlets/news workers per 100,000 residents as less populous states such as South Dakota and Wyoming? Probably not.

And, indeed, Figures 1 and 2 bear this out. In Figure 1, we have scatter plotted each state's news outlets per 100,000 residents (the y-axis of the graph) according to the state's population (the x-axis). As the figures illustrate, the relationship between outlets per 100,000 residents is much more logarithmic (the dotted line) than linear (the solid line). And, as we can also see, less populous states, such as North Dakota, South Dakota, Wyoming, and Vermont (see the upper left portion of the graph), have more outlets per 100,000 residents than do very

populous states, such as New York, California, Florida, and Texas (see the lower right portion of

the graph). The same pattern holds true for news workers per 100,000 residents (see Figure 2).

Insert Figure 1 Here

Insert Figure 2 Here

These figures illustrate which states have more – and which states have fewer – news

outlets and news workers per 100,000 residents than their population size would lead us to

expect. So, for instance, states such as Maryland, New Jersey, and Arizona sit well below the

curve, with numbers of news outlets and news workers per 100,000 residents that are

substantially lower than their population sizes would lead us to expect. We can think of these

states as being underserved from a news media infrastructure standpoint, relative to their

population. In contrast, states such as Minnesota, Iowa, and Texas have substantially more local

news outlets and news workers per 100,000 residents than their population sizes would lead us to

expect. We can think of these states as being overserved from a news infrastructure standpoint,

relative to what we'd expect based on population size.

In order to provide an additional perspective from which to consider these deviations, the

size of these deviations from expectations has been plotted in Figures 3 and 4. In these figures,

for each state we've divided the difference between the actual and the predicted value (i.e., the

residual) by the predicted value. This allows us to represent, in percentage terms, the extent to

which a state's news media infrastructure is larger or smaller than its population size would lead

us to expect. We can then compare states in terms of the extent to which their number of news

outlets and news workers per 100,000 exceeds or falls short of expectations based on population

size. As the figures indicate, states that fare the best in terms of exceeding their population-

predicted number of news outlets and news workers per 100,000 residents include South Dakota,

North Dakota, New York, California, and Iowa. At the other end of the continuum are states such as Maryland, Delaware, New Jersey, and Nevada.

Insert Figure 3 Here

Insert Figure 4 Here

We can't confidently say why some states fare better on this measure than others. As our multivariate analyses presented previously illustrated, potential explanatory factors related to a state's geographic and demographic characteristics contributed little to the substantial explanatory power offered by population size. Other factors, perhaps unique to individual states, may be at work here.

To offer another perspective on these data, in Figures 5 and 6 we've presented a map of the U.S. that is color-coded according to the magnitude of a state's deviation from predicted news outlets and news workers per 100 thousand residents. Green-coded states are those with news outlets/news workers per 100 thousand residents that exceed their predicted values. Yellow-coded states are those that underperform on this measure to a magnitude of between zero and -20 percent. Red codes states are those whose deviation from predicted values is even less than -20 percent. These are the states with news media infrastructures that, according to the measures employed here, are in the worst condition.

As the maps indicate, moderately underperforming (yellow) states are somewhat clustered in the South. The Midwest as a whole performs quite well. There are two primary geographic clusters of very poorly performing (red) states: in the Mountain West region and in the coastal Northeast. Looking at these patterns, one can't help but wonder whether the proximity of geographically small, but relatively populous, states, such as Maryland, Rhode Island, and New Jersey, to large, out-of-state media markets such as Washington, DC, Boston, New York City,

and Philadelphia, may explain significantly the lower-than-predicted ratios of news outlets and news workers per 100,000 residents in those states. In such instances, the large media outlets located just over the border may be undermining the viability of local news outlets in those states. Other unique factors may be at work in relation to other states. The significant underperformance in the Mountain West region is more difficult to explain and merits further research. The primary goal here, however, is to provide comparative indicators that facilitate an assessment of the relative robustness of the news media infrastructures across states. And, according to these data, the two regions of the U.S. most in need of support for their news media infrastructures are the Mountain West and coastal Northeast.

Discussion

As this analysis has illustrated, the robustness of a state's news media infrastructure is primarily a function of population size and, to a much lesser extent, also a function of the number of municipalities within the state. Other geographic and demographic characteristics of individual states bore no significant relationship to the robustness of their news media infrastructure.

On the basis of these findings, we have also presented a comparative assessment of the news media infrastructure within each of the 50 states, derived from the number of news media outlets and news workers in each state, controlled by population size. This analysis has given us a sense of which states are faring better than others in terms of the robustness of their news media infrastructure. Our hope is that these analyses can prove useful to policymakers, advocates, NGOs, and foundations interested in getting a fairly high-level profile of the local news media on a state-by-state basis; and that this methodological approach could potentially prove useful for more systematic, longitudinal assessments of state news media infrastructures,

so that trends over time, and the impacts of policy or philanthropic interventions, or of changing economic or demographic conditions, can be assessed.

This analysis also has illustrated the multifaceted relationship between the robustness of a state's local news infrastructure and the size of a state's population. Specifically, while there is an exceptionally strong linear relationship between a state's population size and the number of news outlets and news workers serving a state, when we consequently control for population size we see a relatively strong, curvilinear relationship between the number of news outlets and news workers per 100,000 residents of a state and the size of a state's population. Thus, reflecting the underlying economic characteristics of media, less populous states generally have more news outlets and news workers per 100,000 residents than more populous states. This relationship complicates the process of employing a simple metric of the robustness of local news infrastructures that facilitates direct comparisons across states; though we have attempted to do so by assessing states by the extent to which their population-predicted news infrastructure deviates from their actual news infrastructure.

Future research should explore if and how the nature of the relationships demonstrated in the multivariate analysis have evolved over time, particularly in terms of how the dramatically altered economic climate for local journalism over the past two decades may be reflected in these relationships. Future research might also explore how to supplement the measures developed here with some basic content indicators (perhaps drawn from a random sample of the totality of the content produced by the outlets identified in each state). It might also be fruitful to dig deeper into the data gathered here to explore, for instance, how the distribution of types of news outlets and/or news workers (based upon position titles) differs across states. For instance, have online news outlets of various types emerged more prominently in some states versus others? In

light of the declines in traditional newspapers, to what extent do they persist in some states versus others? Such questions could be answered with these data. These data could also be utilized to explore news media ownership diversity across states, given that outlet ownership data also were gathered (though not reported here). Future research could also explore if and how these indicators of the robustness of the news media infrastructure might matter in terms of their relationship to the types of outcomes we expect to be related to a healthy news media. Democratic theory perspectives on media (e.g., Christians, et al., 2009) suggest that these indicators of journalistic robustness could potentially be related characteristics of state government, such as transparency and corruption, or to political characteristics of the citizenry, such as voting behavior and civic engagement.

These are complex questions, however, with challenging issues of causality that would need to be untangled. In order to effectively address them, the type of data gathering and metric creation presented here would need to be conducted on a more regular basis, and/or would need to extend back in time. Such approaches would facilitate the tracking of trends over time and the time-lagging of different measures that could contribute to better understanding the cause and effect relationships between the geographic, demographic, and political characteristics of individual states and the news media that serve them.

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Table 1: News Outlet and News Worker Totals by State

State	Number of News Outlets	Number of News Workers
AL	249	1076
AK	59	262
AZ	162	874
AR	167	766
CA	946	5347
CO	228	1110
CT	152	762
DE	30	135
FL	481	3296
GA	332	1668
HI	51	295
ID	77	393
IL	479	2761
IN	268	1464
IA	318	1260
KS	125	837
KY	201	1054
LA	198	1080
ME	88	490
MD	61	413
MA	323	1794
MI	337	1878
MN	350	1701
MS	153	661
MO	328	1703
MT	120	504
NE	198	796
NV	78	500
NH	66	348
NJ	193	1030
NM	90	427
NY	658	4554
NC	302	1827
ND	96	389
OH	359	2497
OK	243	1083
OR	194	1016
PA	418	3016
RI	45	287
SC	161	904
SD	125	432
TN	239	1395
TX	808	4423
UT	74	507
VT	59	281
VA	260	1429
WA	262	1557
WV	107	615
WI	304	1525
WY	67	243

Table 2: Regression Analysis of Local News Outlets in a State (N = 50).

Model		Beta	t
1	(Constant)		2.25
	Population	.94**	16.14
	Municipalities	.17**	3.72
	African American %	-.03	-.70
	Hispanic %	-.06	-1.04
	Median Household Income	-.07	-1.18
	Population Per Square Mile	-.02	-.40
	State Size (Square Miles)	.02	.34

** $p < .01$. Adjusted R^2 = .92

Table 3: Regression Analysis of Local News Workers in a State (N=50).

Model		Beta	t
1	(Constant)		2.15
	Population	.94**	18.74
	Municipalities	.19**	4.61
	African American %	-.04	-.89
	Hispanic %	-..06	-1.30
	Median Household Income	-.07	-1.45
	Population Per Square Mile	.03	.52
	State Size (Square Miles)	.01	.12

** $p < .01$. Adjusted R^2 = .94

Table 4: News Outlets and News Workers Per 100,000 Residents by State

State	News Outlets Per 100k Residents	News Workers Per 100k Residents
AL	5.12	22.14
AK	7.99	35.48
AZ	2.37	12.80
AR	5.61	25.72
CA	2.42	13.66
CO	4.18	20.34
CT	4.23	21.22
DE	3.17	14.27
FL	2.37	16.26
GA	3.25	16.33
HI	3.56	20.61
ID	4.65	23.75
IL	3.72	21.47
IN	4.05	22.12
IA	10.18	40.33
KS	4.29	28.75
KY	4.54	23.82
LA	4.24	23.12
ME	6.62	36.86
MD	1.02	6.88
MA	4.75	26.40
MI	3.40	18.93
MN	6.38	30.99
MS	5.11	22.09
MO	5.39	27.99
MT	11.62	48.79
NE	10.44	41.98
NV	2.70	17.30
NH	4.96	26.15
NJ	2.15	11.50
NM	4.32	20.48
NY	3.32	23.00
NC	3.01	18.19
ND	12.68	51.39
OH	3.09	21.50
OK	6.21	27.69
OR	4.82	25.22
PA	3.26	23.56
RI	4.26	27.17
SC	3.29	18.46
SD	14.56	50.32
TN	3.62	21.14
TX	2.94	16.10
UT	2.47	16.92
VT	9.42	44.89
VA	3.10	17.05
WA	3.65	21.71
WV	5.80	33.35
WI	5.27	26.42
WY	11.43	41.46

Figure 1: Scatterplot of News Outlets Per 100,000 Residents by Population Size

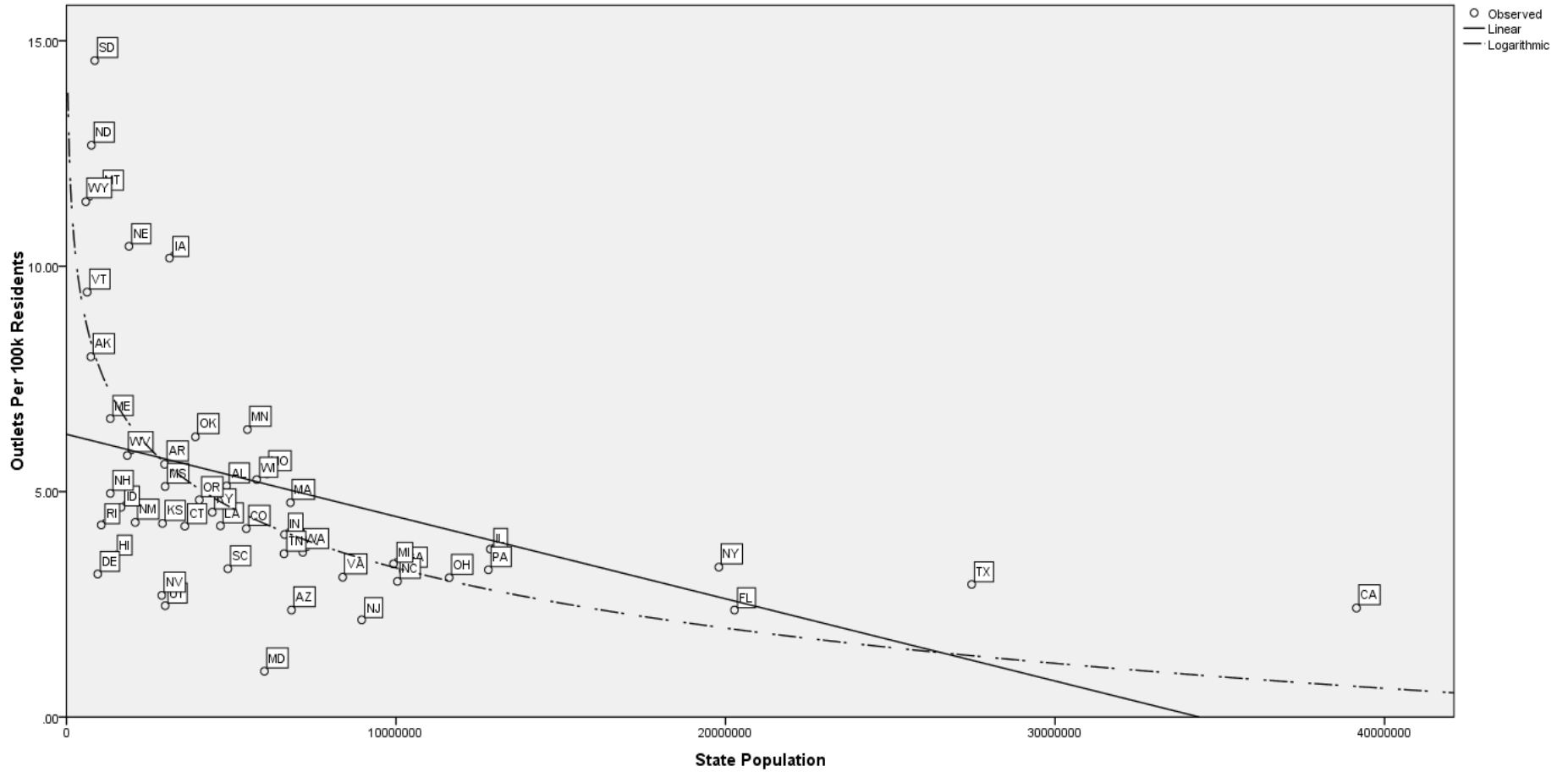Figure 2: Scatterplot of News Workers Per 100,000 Residents by Population Size

Figure 3: States Ranked by Percentage Deviation from Predicted News Outlets Per 100,000 Residents (Based on Population).
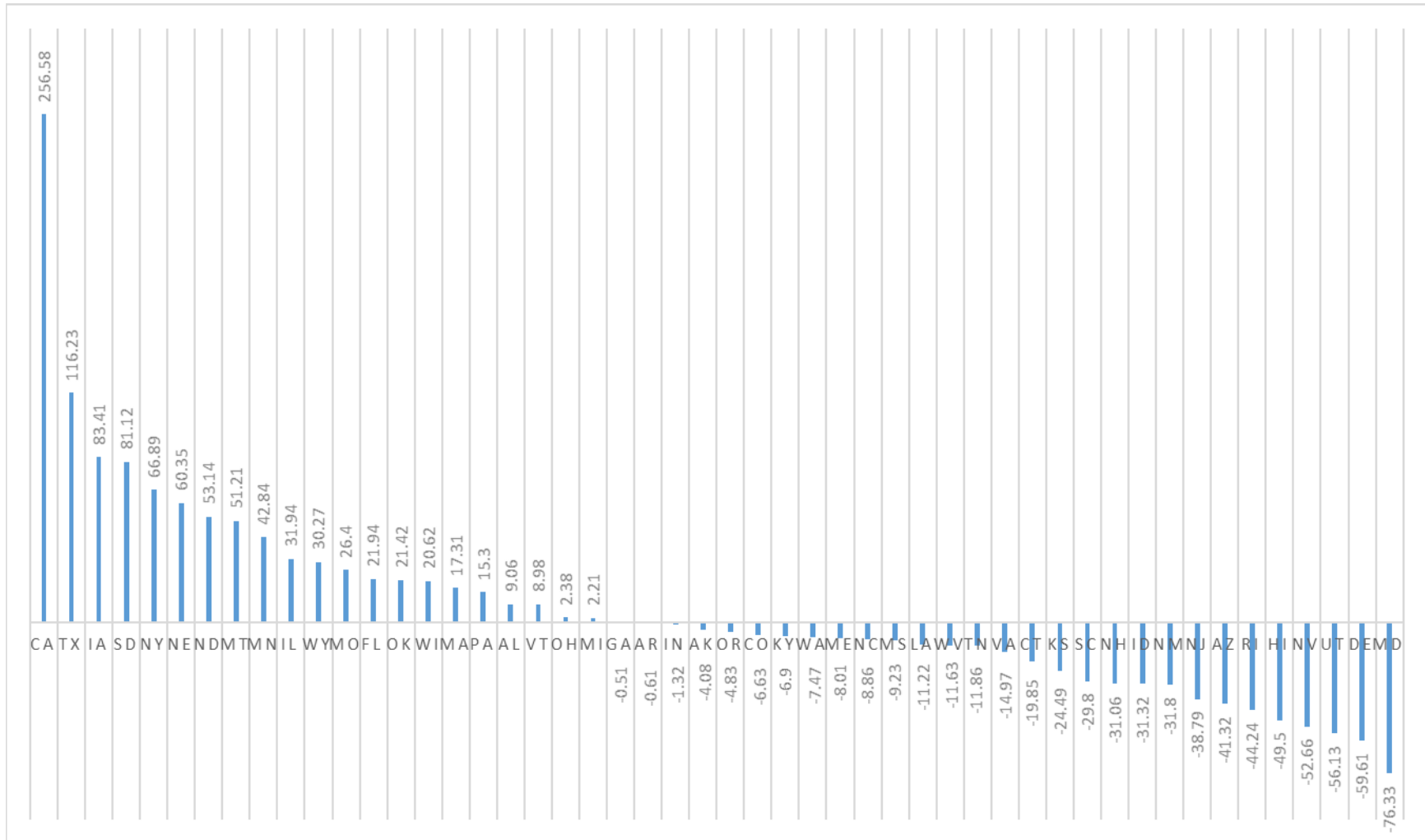
Figure 4: States Ranked by Percentage Deviation from Predicted News Workers Per 100,000 Residents (Based on Population).
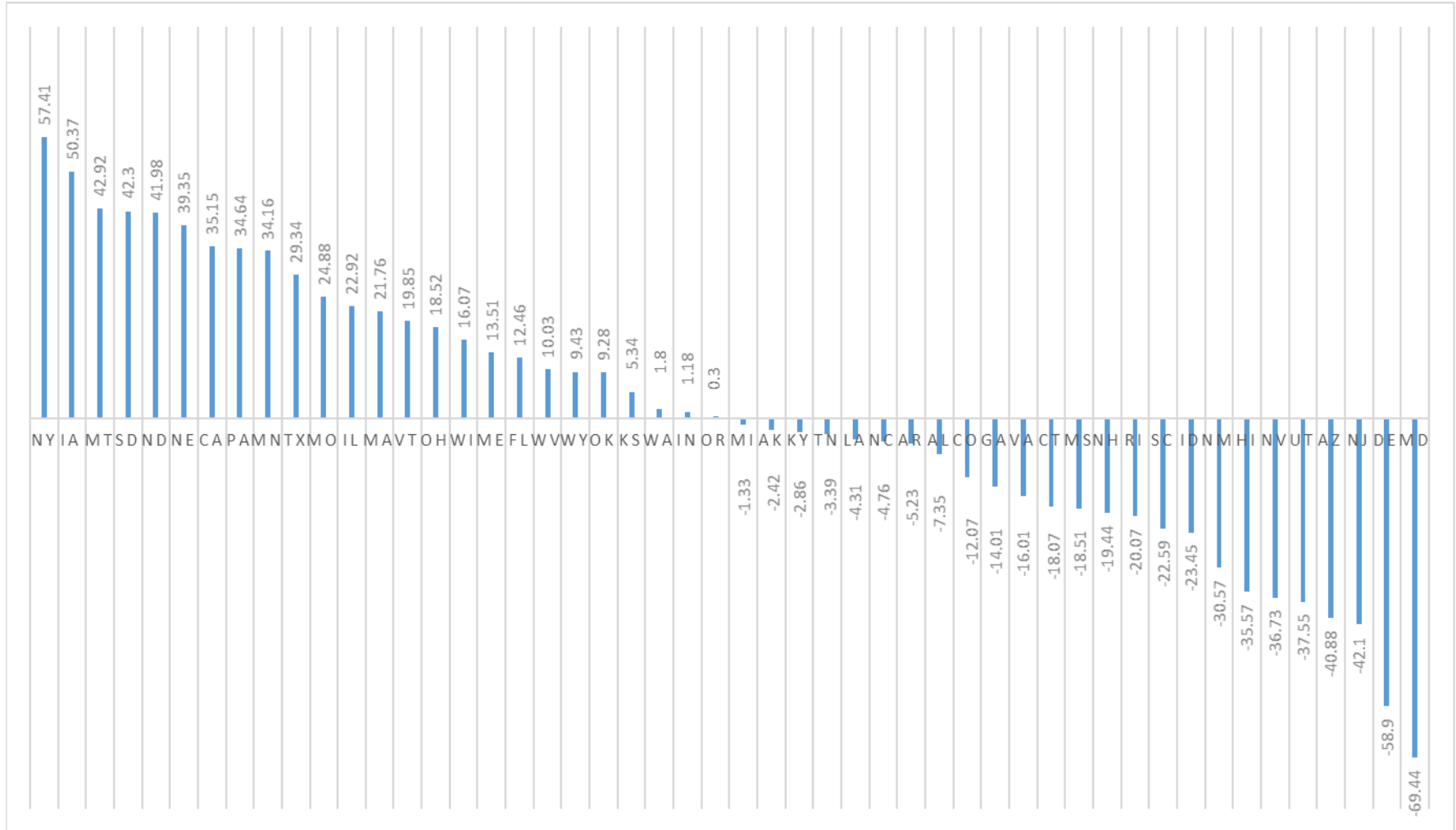
Figure 5: State Map of Magnitude of Deviation from Predicted News Outlets per 100k Residents.
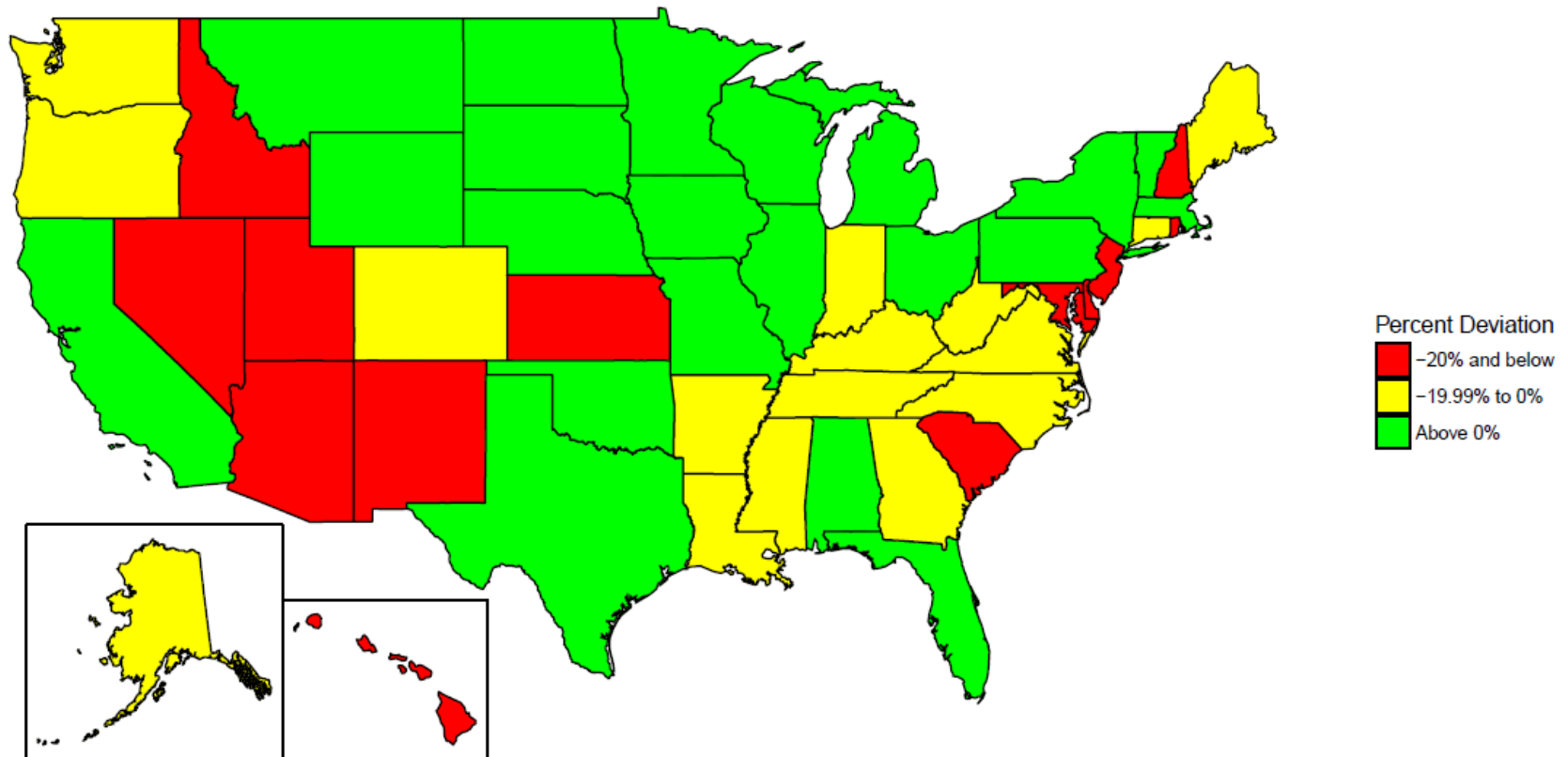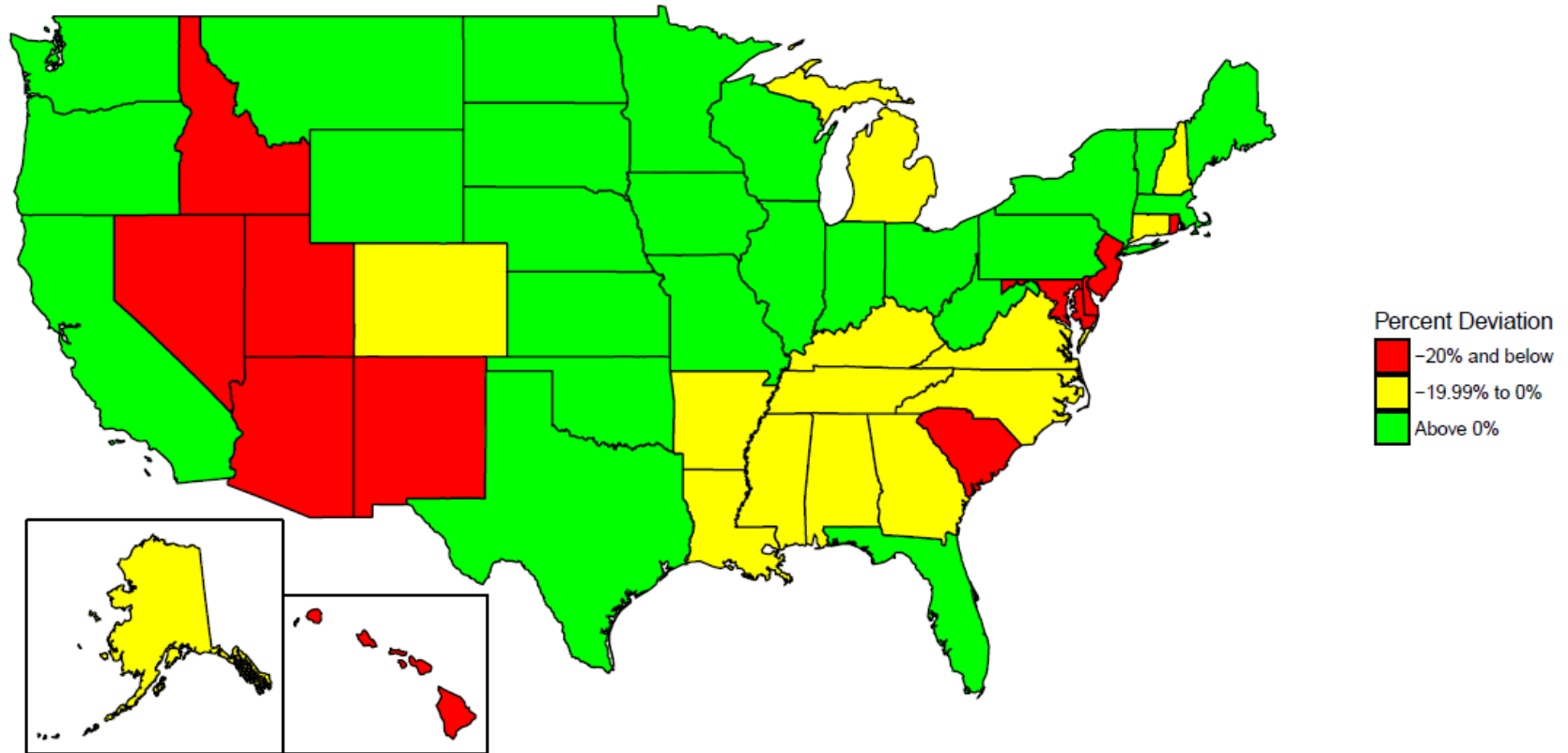
Figure 6: State Map of Magnitude of Deviation from Predicted News Workers per 100k Residents

Percent Deviation
- −20% and below
- −19.99% to 0%
- Above 0%

Author Bios

Philip M. Napoli is the James R. Shepley Professor of Public Policy in the Sanford School of Public Policy at Duke University, where he is also a Faculty Affiliate with the DeWitt Wallace Center for Media & Democracy. He is the Principal Investigator for the News Measures Research Project. His research focuses on media institutions and media policy

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About the DeWitt Wallace Center

The DeWitt Wallace Center for Media & Democracy is Duke University's hub for the study of journalism. We study the interaction between news media and policy; we support watchdog and accountability reporting in the U.S. and around the world; and we teach about the media's role in democracy. Founded in 1973, the DeWitt Wallace Center (DWC) is part of the Sanford School of Public Policy, and shares in the School's mission of teaching, research, and policy engagement, with the goal of putting knowledge in service to society.

About the News Measures Research Project

The News Measures Research Project is a multi-pronged effort to develop assessment tools for local journalism that can be used in a variety of contexts, including professional practice, academic research, policy making/policy analysis, and grant-making strategy formulation and assessment. These assessment tools cover three primary, inter-connected areas: 1) assessing the nature of journalistic content; 2) assessing the needs, interests, and preferences of local news audiences; and 3) assessing the health and rigor of the local news infrastructures in communities. The Project has been supported by The Democracy Fund and the Geraldine R. Dodge Foundation.