Social Networks and the Demand for News

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Abstract

We demonstrate that larger local social networks increase consumption and sharing of news and information. Using data on visits to online news outlets and information sharing on Twitter, we document a positive relationship between shared preferences in a market and consumption, focusing on the black/African-American population in the United States. Results suggest that the well-documented relationship between group size and consumption in media markets is influenced not only by supply but also by demand factors. This implies that policies to increase offline and online social networks can be more important than supply interventions in raising news consumption among minority groups.

Keywords: News, Social Media, Media, Internet, Digitization

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1 Introduction

The importance of shared preferences in media consumption is well documented across news and entertainment. Larger markets see higher newspaper sales, greater radio listening, and more television viewing. Shared preferences are especially important for minority groups with distinct tastes – a larger black or Hispanic population in a market, all else equal, is linked to higher news consumption and greater political participation among individuals in these groups.

The theoretical mechanism driving the relationship between group size and media consumption has been understood to arise from supply-side incentives in the framework of a spatial model: when some costs are fixed, more people with shared preferences induce media firms to produce content suited to those preferences, which in turn increases consumption. Empirical evidence supports this mechanism: markets with larger black populations see more black-targeted newspaper content and radio stations, while markets with more hispanics see more Spanish language television news .

Yet despite evidence that group size matters, our understanding of the mechanism at work remains incomplete. Demand-side factors might contribute to, or deepen, the relationship between group size and media consumption that arise from targeted entry. A substantial literature documents the role of peer effects in both pro-social and anti-social behavior, often with an explicit or implicit role for information sharing. It is reasonable to expect that a larger number of peers might raise the utility, or lower the cost, of sharing news and information.

Why does the potential for network effects matter? Because it extends the scope for under-consumption or under-provision of news and information for minority groups. Supply-side models are grounded in a spatial framework where fixed production costs limit entry, so they naturally apply in local settings where few products must be targeted at defined groups. If social networks influence news consumption, then a larger local population with shared preferences might increase consumption for *any* targeted

media, not solely local outlets. The important determinant of consumption would not be the presence of *local product markets*, but rather the presence of *local social networks*. Because social networks are more likely to be tied to a local environment than product markets, the scope for shared preferences to drive consumption is significantly expanded.

Moreover, demand-side externalities become increasingly relevant in digital media, where firms increasingly steer resources to content most readily shared, forwarded and "liked".. Existing approaches to studying preference externalities emphasizes the role of fixed costs in limiting the number of products, so as digital technology lowers these costs minority groups should be better served. But if larger groups have a greater tendency to share information, then even when fixed costs are very low firms will have a differential incentive to serve large groups. Simply put, if the tendency to share information depends on shared preferences, groups with a higher tendency to share will find themselves better served and better informed.

To make these ideas concrete, it is worth considering a constructed example. Traditional supply-side models predict that local newspaper readership among blacks in markets with a large black population such as Atlanta will be higher than in a market with a smaller black population such as Seattle. But black viewership of CNN would not systematically increase with black population because the national outlets would be targeted at the national taste distribution. However if local social networks affect demand for news, we would observe a positive relationship between group size and consumption for both CNN and the local outlet. This comparison of national and local outlets is the first test of social network effects we present in the paper.

Similarly, traditional supply-side models would predict that news sharing on social networks is related to group size due to selective targeting by media outlets. Information sharing by users would not exhibit this relationship. Evidence that group population influences social sharing would suggest the presence of demand-side pref-

erence externalities that might magnify firm incentives to cater to the tastes of large groups. Examining the relationship between group size and social sharing is the second set of tests in the paper.

A deeper understanding of the role of social networks in information sharing has important implications for policy. News consumption is associated with political participation, and this link drives policy interest in the industrial organization of media markets. If low consumption and low engagement results from lack of targeted content, then under-consumption can be remedied with supply-side interventions. In addition, lower fixed costs brought about by digitization should ameliorate under-provision by enlarging markets for niche content. But if social networks play a substantial role, digitization and supply-side remedies might have less impact than demand-oriented policies aimed at building on-line and off-line communities.

This paper studies the link between group population and information sharing in two ways. We first examine the relationship between minority and majority population in local markets and news consumption online. We focus on the population of black/African American consumers both for comparability to the literature and because of long-standing policy interest in racial diversity in news regulation. Using a household panel of internet users in 2011, we find that both local and national news consumption by black individuals is positively associated with the black population in a market and negatively associated with the white population. White readership also depends positively on group population, though to a lesser extent. Because national products are not targeted to local markets, the link between group population on national news readership cannot be explained by supply-side factors alone.

The second part of the paper considers information sharing on social networks directly. We first show that online visits to social networks such as Facebook and Myspace is positively related to group size. To observe social sharing directly we turn to the microblogging platform Twitter Using data from 5.5 million "tweets" by a

sample of 2,505 black and 9,324 white users from 2010-2013, we find that a larger black population in a local market is associated with greater Twitter activity among blacks relative to whites. A larger white population is associated with greater activity among whites relative to blacks. Shared preferences increase information exchange.

It is worth emphasizing at this stage that we rely on racial classifications for our analyses not to study race *per se*, but because of well-documented evidence that preferences for news and other media differ by race in measurable ways. While individuals with different racial background may prefer different news topics due to a mix of socioeconomic, ethnic and cultural factors, race captures this mix of factors that together constitute a distinct set of preferences of interest in research, policy and practice. Population by race thus offers a clear and practical measure of shared tastes in a market that links our results to policy and the literature. For economy of language we refer throughout the paper to black and white populations and users, recognizing that these are simplified, shorthand references to complex, culturally-based classifications.

In addition to the now substantial literature on preference externalities cited above, our work contributes to a growing literature on news sharing in social networks (Berger (2012), Petrović et al. (2013)) and also word-of-mouth advertising in consumer purchase (Mayzlin 2011, Tucker 2013). From an econometric standpoint, the research shares challenges with the literature on peer effects (for example Bramoulle (2009), though the theoretical mechanism is more akin to indirect network effects than peer effects traditionally conceived.

The paper proceeds as follows. Section 2 describes the data. Section 3 outlines the identification strategy and presents results for local and non-local news readership. Section 4 presents results for social media. Section 5 concludes.

2 Data

2.1 Online News Visits

Our analysis of online news consumption is based on monthly visits to local and non-local news outlets by 39,102 black and non-Hispanic white households across 322 MSA's in 2011. The working data are constructed from click-level data from the ComScore Web Behavior Database. Local and non-local news outlets are identified from Burrelle's Media Directory, Bulldog Media Directory, and the Newspaper Association of America web site as well as sites appearing on *Google News*. This is an expansive set of outlets with a broad definition of news. News visits are classified as local to a user if the MSA from which a site receives the most visits matches the MSA of the user. The classification process matches that used in George and Hogendorn (2013), which provides additional detail on construction of the working data. We exclude from the analysis households residing outside of MSA's as well as websites with more than 500,000 unique visits per month, largely platforms with a very small share of news visits.[1] The household sample includes a small number of demographics: race, age of oldest household member, income categories, household size and zipcode residence. We supplement with zipcode demographics for some specifications.

Table 1 summarizes the working sample. For the full sample, the probability of a news visit each month is .66, with an average of 12.52 visits per month to all sites and 1.35 visits to local sites. Black households comprise about one third of the sample across 322 markets.

2.2 News on Twitter

With data from the Comscore Web Behavior database we observe news and aggregate social media consumption. To better observe social sharing, we collect data from the

[1] Excluded domains are aol.com, google.com, msn.com, yahoo.com and youtube.com.

Table 1: News Consumption Sample Statistics

	Observations	Mean	S.D.	5th Pct	95th Pct
News Visit Probability	469,224	0.66	0.47	0.00	1.00
News Visits	469,224	12.52	41.64	0.00	56.00
Local News Visits	469,224	1.35	8.16	0.00	5.00
Non-Local News Visits	469,224	11.16	38.63	0.00	49.00
Black Household	39,102	0.31	0.46	0.00	1.00
High Income Household	39,102	0.16	0.37	0.00	1.00
Household Size	39,029	3.18	1.52	1.00	6.00
Black MSA Pop	322	0.09	0.22	0.00	0.43
White MSA Pop	322	0.46	0.63	0.07	1.82

social network site Twitter.

Our working sample is a weekly panel of all tweets by 2,505 black and 9,324 white users in 357 localities spanning 2010-2013, though we do not have data for all users over the entire study period. We identify tweets containing links overall and those linking to a media outlet. To construct our sample, we start with the set of users active from June 30 to August 15, 2011 studied in Petrović et al. (2013). For each user in that sample with a (self-reported) city and state in the United States, we extract all Tweets using the Twitter public API. (Limitations on the Twitter service prevent us from extracting a sample from 2011 to correspond to the ComScore sample.) We merge the sample to census 2010 population characteristics. We use the Amazon Mechanical Turk service to remove institutional profiles and code race from profile photos. Classifications are randomly checked by the authors. We drop users without classifiable photos.

Table 2 summarizes the working Twitter sample. Social networking behavior among white users is shown in the top panel, among black users in the center panel, and for all users in the lower panel. The typical user sends 20 tweets per week, 11.13 with a link or re-tweetUsers follow an average of 615 other Twitter users, with a standard deviation of 1,984. Overall, blacks in the sample are more active users, averaging 27 vs 19 Tweets per week, but share relatively fewer links to news or other outlets. The

Table 2: Shared Preferences and Social Networks in News Consumption

	Total			
	Mean	S.D.	5th Perc.	95th Perc.
0				
Tweets (Weekly)	19.45	35.79	0.00	77.0
ReTweets and Links	10.81	21.76	0.00	40.0
PlacePop White	272889.87	403505.81	6394.00	1212835.0
PlacePop Black	118646.17	219947.99	153.00	661839.0
friends	633.54	2147.66	46.00	1973.0
follow	1891.23	40488.35	31.00	3304.0
black	0.00	0.00	0.00	0.0
1				
Tweets (Weekly)	26.92	56.16	0.00	116.0
ReTweets and Links	12.61	28.01	0.00	49.0
PlacePop White	324074.89	445595.81	7553.00	1212835.0
PlacePop Black	203758.17	245784.12	1767.00	661839.0
friends	537.92	974.95	58.00	1728.0
follow	4790.51	131956.04	37.00	1721.0
black	1.00	0.00	1.00	1.0
Total				
Tweets (Weekly)	20.83	40.44	0.00	84.0
ReTweets and Links	11.13	23.00	0.00	42.0
PlacePop White	282343.87	412082.94	6669.00	1212835.0
PlacePop Black	134366.57	227355.26	199.00	661839.0
friends	615.87	1984.23	49.00	1942.0
follow	2426.95	67491.10	32.00	3053.0
black	0.18	0.39	0.00	1.0
Observations	1453592			

average social network size for blacks is also smaller than for wites, 537 versus 633, with a lower variance.

2.3 News Preferences by Group

Before moving to the empirical analysis, we first look to the data for evidence that tastes vary by race. Why does this matter? If minority and majority tastes for information are the same, then the potential for under-provision would not matter: media outlets would

be expected to target the tastes of the overall population and consumption differences would derive from individual characteristics or demand-side preferences. It is only the presence of niche preferences that give rise to the potential for under-provision in the supply-side model.

To examine differences in preferences, we can study top-ranked outlets visited by blacks and whites at both the national and local level. The tables in the appendix A suggests that there is some scope for supply-driven differences in news consumption, but also that there are commonalities in many markets.

3 News Consumption and Group Size

Our goal in this section is to estimate the relationship between the minority and majority population in a market and online news consumption, focusing on black and (non-hispanic) white households. We look first a local news sites, then consider national outlets. As a first step, it is useful to consider monthly household news visits by population quartile, shown in table 3. The left column shows total news consumption for all households. Monthly visits to online news outlets increases with market size, consistent with the pattern found with aggregate newspaper circulation data. The four subsequent columns show local and non-local news consumption by black and white households. News visits for white households generally increase with market size for both groups, though the increase is not in all cases monotonic.

The consumption pattern for black households is more mixed, suggesting that overall population is not as closely linked to consumption.

To study the relationship between group size and consumption more formally, we

Table 3: News Consumption by Market Quartile

	All Visits	Local (B)	Local (W)	Non-local (B)	Non-local (W)
1st Quartile	12.106	0.563	1.549	7.634	11.871
2nd Quartile	12.184	0.581	1.767	7.206	12.285
3rd Quartile	12.554	0.521	1.647	7.619	12.684
4th Quartile	13.248	0.693	1.861	9.291	13.646
Total	12.520	0.600	1.696	8.065	12.564

estimate the following:

$$V^W_{i,m,t} = \alpha_0 + \alpha_1 W_m + \alpha_2 B_m + \gamma' C_{i,t} + \epsilon^W_{i,m,t}, \tag{1}$$

$$V^B_{i,m,t} = \beta_0 + \beta_1 W_m + \beta_2 B_m + \gamma' C_{i,t} + \epsilon^B_{i,m,t}, \tag{2}$$

where $V^W_{i,m,t}$ measures visits to news outlet of a white household i, residing in MSA m, in month t, $V^B_{i,m,t}$ is similarly defined for black households i. W_m is the number of whites in the MSA, and B_m is the number of blacks in the MSA (estimated in millions).

Because some households do not make any news visits in some months, we also estimate the model with $V^W_{i,m,t}$ and $V^B_{i,m,t}$ defined as the probability of a visit to a news outlet in a second step.

The vector $C_{i,t}$ includes household-specific control variables and a time trend implemented with monthly fixed effects. The constants α_0 and β_0 reflect each group's average propensity to consume news online. If readership increases with shared tastes, we expect a positive relationship between "own" group population and readership. In George and Waldfogel (2003) the effect of a larger white population on white circulation was small compared to the black population effect on black circulation, suggesting diminishing returns to larger population. The effect of individuals with different tastes on readership is ambiguous, but should be less than the own effect. More precisely, we expect $\alpha_1 > \alpha_2$ and $\beta_2 > \beta_1$, also $\alpha_1 > 0$ and $\beta_2 > 0$. [2]

[2] Results in George and Waldfogel (2003) indicated $\beta_1 < 0$, with more whites in a market reducing

Table 4 present estimates of equations (1) and (2). Columns (1) and (2) estimate the model using news visits (transformed as log(visits+1)) and columns (3) and (4) with probability of a news visit. In both cases, shared tastes matter for minority readership: a larger black population is associated with higher black readership. Recall that the average black MSA population is 0.09 million with a standard deviation of 0.22 million. An increase in the black population of one standard deviation would increase news visits by 4.4% and the probability of a news visit by 1.3 percentage points. An increase of one standard deviation in the white population (0.63) is associated with an increase in white visits to news outlets by 2.8%. The population effect in the linear probability model is positive but not statistically significant, suggesting that the effect of an additional person diminishes with larger populations.

Results in the tables also suggest that cross-effects matter: an increase in the white population reduces news consumption by blacks, though the estimate is smaller and noisier than with own effects. An increase in the white population of one standard deviation reduces black news visits by 2.65% and the probability of a news visit by 1 percentage point. The size of the black population does not appear to affect white readership. One interpretation of negative cross effects is that they indicate a role for the minority share as well as the population size in absolute terms. This effect might operate on the supply side, with content slanted to or away from the minority group, and also in terms of demand influence, where more heterogenous social networks dilute the peer effects of more sharing. While our social network data can shed some light on these points, the mechanism at work in largely outside of the scope of this project.

It is worth noting that the pattern of coefficients is very similar to that found in George and Waldfogel (2003) using zipcode-level newspaper circulation. While the coefficients are not directly comparable, the effects measured here are comparable in magnitude to those measured with aggregate purchasing data.

per capita readership among blacks. However because that study used zipcode aggregates rather than individual data, the focus was on relative effects

Table 4: Shared Preferences and Online News Consumption

	(1) Black Visits	(2) White Visits	(3) Black Pr Visit	(4) White Pr Visit
Black MSA Pop	0.212***	-0.0586	0.0598***	-0.00687
	(0.0405)	(0.0367)	(0.0105)	(0.00709)
White MSA Pop	-0.0421	0.0453***	-0.0162**	0.00404
	(0.0276)	(0.0139)	(0.00652)	(0.00269)
Constant	0.957***	1.185***	0.496***	0.566***
	(0.0413)	(0.0482)	(0.0135)	(0.0134)
Observations	146352	321996	146352	321996
Adjusted R^2	0.021	0.014	0.015	0.011
Mean Dep. Var.	1.258	1.577	0.612	0.684
Mean Black MSA Pop	0.553	0.362	0.553	0.362
Mean White MSA Pop	1.566	1.326	1.566	1.326

Dependent variable in columns 1-2 is log transform of all news visits. Dependent variable in column 3-4 is an indicator for at least one monthly household news visit. All specifications include month fixed effects and controls for household size, income and age, not shown. Standard errors clustered by MSA: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

With this evidence that shared preferences affect consumption in markets for online news, we turn to an investigation of theoretical mechanisms. If shared preferences increase consumption by incentivizing targeted products, the link between group size and consumption should center on local products, or perhaps products that are produced nationally but whose availability is dictated by local demand.[3] With supply-side mechanism, we would not expect the size of the local group population to affect consumption of national products targeted to national preferences.

We re-estimate equations (1) and (2) separately for local and non-local news visits. Results are shown in table 5 for (log transform) news visits and in **??** for linear probability estimates. As expected from a supply-driven model, group size matters for consumption in local media markets: a larger black population has a positive effect on local media consumption among blacks and a larger white population has a positive

[3]For example, during the 1990's the *New York Times* expanded first into markets with a large college-educated population.

Table 5: Local Preferences and Non-Local Media (News Visits)

	(1) Black Local	(2) Black Non-Local	(3) White Local	(4) White Non-Local
Black MSA Pop	0.0902***	0.200***	-0.0334	-0.0456
	(0.0154)	(0.0409)	(0.0475)	(0.0323)
White MSA Pop	-0.0200**	-0.0378	0.0350**	0.0379***
	(0.00873)	(0.0282)	(0.0166)	(0.0137)
Constant	0.113***	0.930***	0.175***	1.143***
	(0.0141)	(0.0407)	(0.0227)	(0.0472)
Observations	146352	146352	321996	321996
Adjusted R^2	0.010	0.021	0.004	0.015
Mean Dep. Var.	0.176	1.217	0.332	1.501
Mean Black MSA Pop	0.553	0.553	0.362	0.362
Mean White MSA Pop	1.566	1.566	1.326	1.326

Dependent variable is log transform of visits to local and non-local news outlets. All specifications include month fixed effects and controls for household size, income and age, not shown. Standard errors clustered by MSA: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

effect on local news consumption among whites. Black readership declines with a larger white population, consistent with findings in the literature. The coefficient patterns with linear probability models are similar to those with the number of visits. But the tables also show that shared preferences matter for consumption of non-local media products, which cannot be explained by a supply-driven model. The magnitudes are also large for national media: a one standard deviation increase in black population (0.22) increases black visits to non-local media outlets by more than 4%, more than double the comparable increase in local news visits. With the linear probability models, the effects are closer to parity, with a one standard deviation increase in black population raising the likelihood of a local or non-local news visit by about 0.015.

As in the overall tables, a larger white population is also associated with higher white readership, but the effects are smaller and in some cases not different from zero at standard significance levels. This is consistent with diminishing returns to benefits from shared tastes, and also with results for traditional newspaper markets.

Table 6: Shared Preferences and Online Social Media Visits

	(1) Black Visits	(2) White Visits
Black MSA Pop	0.188***	-0.0436**
	(0.0336)	(0.0185)
White MSA Pop	-0.0455***	-0.00500
	(0.0175)	(0.00994)
Constant	2.474***	2.476***
	(0.0536)	(0.0588)
Observations	146352	321996
Adjusted R^2	0.034	0.042
Mean Dep. Var.	2.664	2.487
Mean Black MSA Pop	0.553	0.362
Mean White MSA Pop	1.566	1.326

Dependent variable is log transform visits to social media outlets per month. All specifications include month fixed effects and controls for household size, income and age, not shown. Standard errors clustered by MSA: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4 Shared Preferences and Social Media

The results above indicate that a larger population with shared tastes in a market can increase consumption of non-local as well as local products. This suggests that demand effects play a role in the widely-observed relationship between shared preferences and media consumption. But to understand the role of social networks in information sharing, we look to social media, first online and then on Twitter.

Table 6 reports a social media analog of results in section 3, estimating equations (1) and (2) with total monthly visits to social media as a dependent variable. (We also observe minutes per month spent at social media sites, but this is highly correlated with visits so we adopt the straightforward visit measure.) Results are shown in table 6. The pattern and magnitude of coefficients is similar to that in 5, with an increase in the market population of blacks of one standard deviation (.22m) raising social media visits by about 4%. A larger white population is associated with fewer visits to online social media among blacks. While still small, population explains a larger share of the

variation (about double) in social media visits compared to news visits. Because social networks are oriented toward social relationships rather than media consumption, this result offers evidence that shared preferences can affect demand for information.

To look directly into information sharing, we turn to Twitter. We ask first whether the size of a user's social network is related to group population in a local market. We then study how the tendency to produce and share information relates to group population with shared preferences.

We modify our estimation estimation equation to consider the effect of locality (census place) populations rather than metropolitan area populations, as social networks are more likely to be centered on smaller geographic units. We maintain market level fixed effects, identifying coefficents using variation across users and across places within MSA. We maintain t subscripts, but because we observe only current social network sizes we restrict attention to the user last active year. We measure social network size in two ways, the number of two-sided relationships (friends) and one-sided relationships (followers), reflecting Twitter terminology. All variables are estimated in logs. We choose a single-equation framework to allow more straightforward statistical tests. We estimate:

$$N_{i,p,t} = \alpha_0 + \alpha_1 black_i + \alpha_2 B_p + \alpha_3 W_p + \alpha_4 black_i W_p + \alpha_5 black_i B_p + \gamma' C_{m,t} + \epsilon^W_{i,p,t}, \tag{3}$$

In equation (3), the dependent variable N is a measure of social network size. The indicator variable *black* coefficient shows how network size varies with race. The coefficients α_2 and α_3 show the effect of a larger black and white place population on social network size for white users, while the interaction terms α_4 and α_5 show the effect of a larger black and white population on black users. The γ terms show MSA and year fixed effects.

Table 7: Off-line and On-line Social Networks

	Friends (1)	Followers (2)
Black	1.486**	2.010**
	(.201)	(.228)
White x Black Pop	.005	−.010
	(.009)	(.011)
Black x Black Pop	.059**	.046*
	(.017)	(.020)
White x White Pop	.058**	.151**
	(.015)	(.018)
Black x White Pop	−.036+	.039
	(.021)	(.026)
Constant	4.293**	2.993**
	(.117)	(.139)
Mean Y	5.75	5.64
N	39,401	39,416
Adj. R2	.04	.06

Dependent variables in (1) and (2) are (log) number of friends and followers in the social network at user's last activity date. All specifications include MSA and year fixed effects, not shown. Standard errors clustered by MSA: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Results are shown in table 7. Group populations are strongly related to social network size: more blacks in a market leads blacks to form larger social networks and more whites in a market leads to larger social networks among whites. There is also evidence of negative cross effects – a larger white population reduces the social network size among blacks, but a larger black population does not impact the size of social networks among whites. This pattern of negative preference externalities is often observed in the empirical literature (George and Waldfogel, 2003; Waldfogel, 2003; **?**), and the results here suggest that a smaller social network might play a role. Magnitudes are economically significant. Looking at the first column, a one standard deviation increase the black population is about 100%, which implies a 5.9% increase in friends for blacks, or about 32 friends . A one standard deviation increase in the white population, also close to 100%, leads to an increase in the social network of whites by

5.8% or 37 friends, and *reduces* the social network size for blacks by 3.6% or about 20 friends.

Table 7 provides evidence that online social networks are related to the pool of individuals with shared preferences in larger society. As a final step, we consider how shared preferences impact the tendency to generate and share information. To do this, wee estimate the relationship between group population and the number of tweets sent each week. We then separately consider re-tweets and tweets containing links. Our estimation equation is similar to 3, but we add local controls for the minority share and (log) median income to capture location effects that might be correlated with social media use.

Results are shown in table 8. The only point estimate in the population results shows that a larger black population is associated with more tweets per week among blacks. However a linear test of the difference between the effect of group population between blacks and whites is statistically significant at the 10% level. The estimates indicate that the effect of a larger black population has a greater (positive) effect on black twitter activity than white twitter activity. Similarly, a larger population of whites has a larger impact on whites than on blacks. A one standard deviation increase (about 100%) increase in the black population increases information sharing each week by 8%, or about 2 tweets. This is about double the (percentage) effect of the population increase on whites. A one standard deviation increase in the white population (about 100%) increases information generation by 4.5% more among whites than blacks.

Column two restricts attention to forwarded tweets and tweets with links. Standard errors on the point estimates are too high for confident inference, but a linear test confirms that the effect of more black is larger in the black population than in the white population.

[News Sharing]

Table 8: Group Population and Information Sharing

	All Tweets (1)	Links and ReTweets (2)
Black	1.953**	1.560**
	(.24)	(.18)
Local Minority Share	–.212	–.017
	(.30)	(.29)
Local Median Income	–.111	–.047
	(.09)	(.08)
White x Black Pop	.047	.033
	(.03)	(.03)
Black x Black Pop	.082+	.049
	(.04)	(.04)
White x White Pop	.009	.018
	(.03)	(.03)
Black x White Pop	–.038	.005
	(.04)	(.03)
Constant	1.793	.538
	(1.11)	(.95)
BxPopB-WxPopB	.0351+	.0162
WxPopW-BxPopW	.0466+	.0126
Mean Y	2.47	1.80
N	933,912	795,304
Adj. R2	.07	.06

Dependent variable in column (1) is (log) tweets per week; dependent variable in column (2) is log tweets with links or retweets. All specifications include race-specific week and year dummies as well as MSA fixed effects, not shown. Standard errors clustered by MSA: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5 Conclusions

We offer evidence that a larger population with shared preferences is associated with greater consumption of traditional news media, but also with larger social networks and more information sharing. These patterns cannot be explained with supply-side mechanisms alone, but indicate that social networks play a role in the tendency to produce and share information.

In digital markets, where media firms increasingy direct resources toward content that gathers tweets, shares and "likes", groups with a higher tendency to share content

may find themselves better served, and better informed. The results also point to the importance of policies aimed at closing the digital divide, so that disparities in online social networks do not deepen information gaps created by on by supply incentives.

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A Additional Tables

Top Local Outlets by Market & Race

Top 25 MSA's	MSA Pop (M)	Top Outlet (Whites)	Top Outlet (Blacks)	Black % 1	Black % 2
New York, NY	9.3	nytimes.com	nytimes.com	36%	
Los Angeles-Long Beach, Ca	9.5	latimes.com	latimes.com	21%	
Chicago, Il	8.3	chicagotribune.com	suntimes.com	12%	18%
Philadelphia, Pa-Nj	5.2	philly.com	philly.com	22%	
Washington, Dc	5.0	washingtonpost.com	washingtonpost.com	38%	
Detroit, Mi	4.5	freep.com	detnews.com	13%	23%
Atlanta, Ga	4.3	ajc.com	ajc.com	45%	
Houston, Tx	4.2	chron.com	chron.com	16%	
Dallas, Tx	3.6	wfaa.com	wfaa.com	41%	
Boston, Ma	3.4	boston.com	myfoxboston.com	4%	25%
Riverside-San Bernardino, Ca	3.3	pe.com	pe.com	10%	
Phoenix-Mesa, Az	3.3	cox.com	cox.com	19%	
Minneapolis-St. Paul, Mn-Wi	3.0	startribune.com	startribune.com	11%	
Orange County, Ca	2.9	ocregister.com	ocregister.com	2%	
San Diego, Ca	2.8	signonsandiego.com	signonsandiego.com	4%	
Nassau-Suffolk, Ny	2.8	newsday.com	newsday.com	7%	
St. Louis, Mo-Il	2.7	stltoday.com	stltoday.com	8%	
Baltimore, Md	2.6	baltimoresun.com	baltimoresun.com	42%	
Oakland, Ca	2.5	contracostatimes.com	insidebayarea.com	11%	33%
Pittsburgh, Pa	2.4	post-gazette.com	post-gazette.com	10%	
Seattle, Wa	2.4	nwsource.com	nwsource.com	4%	
Tampa-St. Petersburg, Fl	2.4	tbo.com	baynews9.com	11%	16%
Cleveland, Oh	2.3	cleveland.com	cleveland.com	47%	
Miami-Hialeah, Fl	2.3	miamiherald.com	miamiherald.com	34%	
Denver, Co	2.2	9news.com	denverpost.com	7%	15%

Top 25 National Outlets for Blacks, Whites

Top Sites (White)	Top Sites (Black)	Black Share
msn.com	msn.com	11%
huffingtonpost.com	nick.com	30%
cnn.com	nba.com	33%
foxnews.com	cnn.com	10%
foxsports.com	huffingtonpost.com	9%
nytimes.com	mtv.com	28%
mlb.com	cnet.com	27%
nfl.com	nfl.com	17%
ign.com	ivillage.com	41%
cnet.com	nytimes.com	14%
mtv.com	ign.com	15%
tmz.com	bet.com	61%
bbc.co.uk	tmz.com	19%
webmd.com	motortrend.com	42%
people.com	foxsports.com	10%
foodnetwork.com	bbc.co.uk	12%
cbssports.com	bossip.com	61%
sportingnews.com	redorbit.com	42%
nba.com	webmd.com	16%
popeater.com	lifescript.com	26%
aolnews.com	sheknows.com	27%
nick.com	gamespot.com	18%
drudgereport.com	cars.com	25%
usatoday.com	bleacherreport.com	19%
latimes.com	billboard.com	35%
everydayhealth.com	latimes.com	15%

Source: Comscore Web Behavior Database, 2011

Top 25 Tweeted Links for Blacks, Whites

Top Tweet Links (White)	Top Tweet Links (Black)
www.nytimes.com	www.mashable.com
www.usatoday.com	www.nytimes.com
www.washingtonpost.com	news.yahoo.com
www.buzzfeed.com	www.washingtonpost.com
www.slate.com	sethgodin.typepad.com
www.mashable.com	www.usatoday.com
www.techcrunch.com	www.buzzfeed.com
www.time.com	www.huffingtonpost.com
espn.go.com	www.cnn.com
www.huffingtonpost.com	www.time.com
www.wired.com	espn.go.com
www.reuters.com	www.thinkprogress.org
www.cnn.com	www.techcrunch.com
www.businessinsider.com	news.cnet.com
www.latimes.com	www.businessinsider.com
www.thinkprogress.org	www.nydailynews.com
www.fastcompany.com	www.slate.com
www.rollingstone.com	www.thehill.com
www.newyorker.com	www.wired.com
www.nydailynews.com	www.reuters.com
www.desmoinesregister.com	www.bbc.co.uk
news.yahoo.com	abcnews.go.com
www.npr.org	www.quotationspage.com
www.politico.com	www.bizjournals.com
www.thenextweb.com	www.npr.org

Source: Twitter 2011-2013