# Who Affects Whom in Daily Newspaper Markets?

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When consumers share similar preferences, additional consumers will bring forth products that confer positive "preference externalities" on others. However, if distinct groups of consumers have substantially different preferences, the groups bring forth products with more appeal to themselves and less appeal to others. We document that in their capacity as daily newspaper consumers, blacks and whites are more likely to buy daily newspapers in markets with larger black and white populations, respectively. Similar results hold for Hispanics and non-Hispanics, but not by education, income, or age. We provide evidence that product positioning underlies our results.

When fixed costs are large and product preferences differ among consumers, the mix of products available in the market may depend on the mix of consumer types in the market. The larger a group of persons sharing product preferences, the more suppliers will target that group, through either the introduction of additional products or positioning of available products. As a result, individuals may be more likely to consume as the market includes more people sharing their preferences and less likely to consume as the market includes more people with

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different preferences. We term this mechanism a "preference externality."

We explore the operation of preference externalities by studying patterns of daily newspaper purchase behavior among groups with different preferences across U.S. markets. For example, we ask how the black and white—and Hispanic and non-Hispanic—tendencies to purchase newspapers vary with their respective local populations. In addition to examining preference externalities among these discrete consumer groups with a well-documented record of distinct media preferences, we also consider whether preference externalities operate among groups defined by education, income, or age.

The newspaper market is both well suited for studying preference externalities and interesting in its own right. First, preferences in media products, including newspapers, differ sharply among blacks and whites and among Hispanics and non-Hispanics. Second, fixed costs in daily newspaper production are large relative to market size, so that markets typically support few products. Finally, newspapers merit study as a medium that plays an important role in political discourse.

We examine the relationship between group size in a market and the tendency for group members to purchase daily newspapers using a combination of zip code–level data on newspaper sales and demographics in conjunction with market-level data on the population of different groups. Market aggregate demographic information determines the nature of available products, which heterogeneous individuals within the market find more or less appealing. For example, among blacks and whites, our empirical approach works intuitively as follows. The sizes of local black and white populations determine targeting of each market's local newspapers. The cross–zip code variation in the fraction black and the fraction of the population buying a daily newspaper allows identification of a gap between the white and black tendencies to buy a paper in each market. We examine how this gap varies across markets with the absolute size of black and white populations. We infer that a larger local black population increases the black tendency to buy a daily newspaper if the gap in newspaper sales between blacks and whites is larger in markets with a larger white population or smaller in markets with a larger black population.

Using data on over 10,000 zip codes in 269 newspaper markets (metropolitan statistical areas [MSAs]), we look for evidence of preference externalities among groups defined by race, Hispanic status, education, income, and age. We find strong evidence that preference externalities operate among blacks and whites. The tendency for blacks to purchase a daily paper increases with the number of blacks in the market but *decreases* with the number of whites. The tendency for whites to purchase a newspaper increases in the number of whites and is unaffected by the

number of blacks. We find some similar results for Hispanics and non-Hispanics. We find little evidence of preference externalities operating along other dimensions.

We also document that product positioning underlies our results. Using data on the distribution of reporters and editors in cities with multiple papers, we confirm that different groups have different preferences for newspaper content. We then provide evidence that newspaper content in a market is sensitive to the fraction of blacks in the market, but not to other features of the demographic mix.

The paper proceeds as follows. Section I provides simple theoretical background and context for our analysis. Section II describes the data used in the study. Section III describes our empirical strategy and documents the extent to which individuals affect each other through daily newspaper markets. Section IV examines product positioning as a mechanism underlying the results. A brief conclusion follows in Section V.

## I. Background

We are interested in whether the tendency for individuals to purchase a product is sensitive to the distribution of preferences in a market, where preferences are similar within a group but vary across groups. For example, if blacks have different preferences for newspaper content than whites, do firms better tailor products to suit the tastes of black readers in markets with a larger black audience? Are blacks more likely to buy a newspaper in these markets as a result? In this section we briefly and informally outline possible mechanisms for this effect.

How can the mix of available products depend on the mix of types in the market? Imagine potential customers distributed along a Hotelling (1929) line in which the clusters of whites and blacks have different ideal locations. When there are no fixed costs, suppliers can offer a continuum of products so that each consumer is targeted by some product(s). When fixed costs are high, by contrast, the market selects only a subset of the conceivable alternatives for production (Spence 1976*a*, 1976*b*). Larger markets will support more varieties of products, and firms will tend to locate products near large clusters of potential buyers. Particularly if customers are unwilling to buy products far from their ideal, consumers located near available products will be more likely to purchase.

A large theoretical literature in industrial organization analyzes—and demonstrates the fragility of—particular models of this type.[1] Our aim

[1] The existence of equilibria in spatial models generally depends on assumptions regarding the nature of transport costs (D'Aspremont, Jaskold-Gabszewicz, and Thisse 1979), availability of outside options (Böckem 1994), the number of choice variables (Economides

is not to lean too heavily on particular predictions, which can be sensitive to model specification. We simply seek to motivate the following intuitive propositions: (1) Larger groups of consumers tend to face options closer to their ideal products, and as a consequence, (2) the tendency for individuals to purchase increases more sharply in the size of the group sharing their preference than in the size of the remaining population.[2]

The operation of this phenomenon and the testing of these propositions require a number of different conditions. First and foremost, fixed costs must be large enough to limit the number of products available in a market. Second, different groups must have different product preferences. Finally, the mix of groups must vary sufficiently across markets to give rise to substantial variation across markets in the targeting of products.

Although it is reasonable to suspect that preferences for media differ by a number of dimensions including race, Hispanic status, age, gender, income, and education, not all of these dimensions are equally suitable for documenting preference externalities. For example, while media preferences differ by gender (Waldfogel 1999), the mix of men and women varies little across local markets. We would not, therefore, expect to observe much variation in gender targeting of the available products across markets. Of the remaining candidate dimensions, all vary at least somewhat across markets. Table 1 shows the cross-MSA dispersion for fraction black, Hispanic, college educated, poor (household income less than $15,000 per year), and old (age 65 and older). The fraction black and fraction Hispanic vary most across markets; for example, the gap between the fifth and ninety-fifth percentiles for fraction black and fraction Hispanic is roughly twice as large as for other variables.

In selecting groups with different preferences, one can make a distinction between dimensions that are discrete, such as race and Hispanic status, and those that are continuous, such as education, income, or age. There is ample direct evidence that media preferences differ sharply by race and by Hispanic status. For example, the radio station formats collectively attracting two-thirds of black listening collectively attract less than 3 percent of white listening (Waldfogel 1999); and television programs that are top rated among whites tend to be bottom rated among blacks, and vice versa (Sterngold 1998). Preferences in radio programming also differ systematically by age: the differences between radio-listening choices by persons over age 55 and persons under 25 are as sharp as the black-white differential. However, preferences differ only

1989), the number of competitors (Economides 1993), and the shape of the product space (Salop 1979).

[2] One would normally expect prices to play a role as well. We abstract from prices in this study because subscriber prices are almost invariant across markets (see George and Waldfogel 2000).

TABLE 1
SUMMARY STATISTICS

| | Mean | Percentile | | | | |
|---|---|---|---|---|---|---|
| | | 5th | 25th | 50th | 75th | 95th |
| | A. Population Statistics (1990 Census) | | | | | |
| Zip codes ($N$=11,584): | | | | | | |
| Total population | 13,795 | 590 | 2,827 | 8,639 | 21,433 | 41,663 |
| Fraction black | .086 | .000 | .002 | .014 | .079 | .479 |
| Fraction Hispanic | .055 | .000 | .004 | .012 | .041 | .266 |
| Fraction college educated | .187 | .045 | .092 | .147 | .244 | .471 |
| Fraction poor (income <$15,000)* | .228 | .062 | .136 | .208 | .299 | .463 |
| Fraction old (age ≥65) | .122 | .042 | .085 | .116 | .150 | .217 |
| MSAs ($N$=269): | | | | | | |
| Total population (millions) | .574 | .119 | .293 | .907 | 2.444 | 6.253 |
| Black population (millions) | .072 | .001 | .016 | .088 | .217 | 1.085 |
| Fraction black | .100 | .008 | .046 | .083 | .176 | .290 |
| Hispanic population (millions) | .046 | .001 | .006 | .019 | .136 | .870 |
| Fraction Hispanic | .069 | .004 | .010 | .027 | .065 | .242 |
| College-educated population | .081 | .011 | .036 | .130 | .344 | 1.207 |
| Fraction college educated | .122 | .081 | .114 | .132 | .152 | .207 |
| Poor population (income <$15,000) | .129 | .030 | .074 | .200 | .444 | 1.149 |
| Fraction poor (income <$15,000) | .258 | .151 | .195 | .223 | .276 | .328 |
| Old population (age ≥65) | .069 | .014 | .038 | .105 | .273 | .784 |
| Fraction old (age ≥65) | .124 | .080 | .106 | .119 | .137 | .174 |
| | B. Circulation Statistics (Audit Bureau of Circulations) | | | | | |
| Circulation per capita: | | | | | | |
| Zip codes ($N$=11,584) | .205 | .020 | .122 | .192 | .261 | .431 |
| MSAs ($N$=269) | .234 | .149 | .202 | .233 | .264 | .318 |
| | C. Newspaper Statistics (*Burrelle's Media Directory*) | | | | | |
| MSAs: fraction hard news ($N$=269) | .585 | .407 | .530 | .580 | .640 | .750 |

* Number of observations for this variable is 11,576.

slightly for persons of similar age (persons aged 45–54 make choices very similar to those of persons aged 55–64, etc. [Waldfogel 1999]). As a result, each division of population into an "old" group and its "young" complement puts people with similar preferences in both groups. This muddies the effect of group population variables as determinants of product positioning.[3]

In light of these considerations, we are most optimistic that we shall be able to document the effect of group size on newspaper consumption using race and Hispanic status. We are less optimistic about approaches based on the continuous measures, whose suitability is further compro-

[3] Waldfogel (1999) finds that black and white radio listening increase in local black and white populations but finds no systematic patterns by age, in spite of the systematic preference differences by age.

mised because their population mixes vary little across markets. In the empirical work below we shall explore the patterns of preference externalities by race and Hispanic status as well as by other dimensions with these considerations in mind.

While the questions addressed in this paper have not, to our knowledge, been examined elsewhere in the literature, the paper is related to three separate bodies of research. First, there are theoretical studies of differentiated product markets and monopolistic competition, which tend to show that markets characterized by fixed costs and limited mechanisms for price discrimination are prone to deliver suboptimal product variety (see, e.g., Hotelling 1929; Spence 1976*a*, 1976*b*; Dixit and Stiglitz 1977). Our work can be viewed as exploring the theoretically straightforward positive implication of this work: that available product variety depends on the size of the market in relation to fixed costs and the mix of consumer tastes. Second, this paper builds on a literature on race and media markets.[4] Finally, this study contributes to a substantial body of research on the industrial organization and regulation of media markets generally and newspaper markets in particular.[5]

## II. Data

Our basic data set is a zip code–level cross section of per capita newspaper sales in 269 newspaper markets, along with population characteristics at the zip code and MSA levels. Aggregate zip code–level circulation is constructed from underlying sales for approximately 1,200 daily newspapers. Zip code population shares for whites, blacks, Hispanics, college educated, poor, and elderly, as well as MSA population by these categories, are taken from the 1990 census. Our measure of newspaper readership is circulation per capita, which we prefer to a household-level measure because of the straightforward link to demographic information from the census.

Newspaper circulation data are published by the Audit Bureau of Circulations, a membership organization providing independent audits of newspaper and magazine circulation data for use by advertisers. Audit Bureau of Circulations (1999) reports daily circulation by zip code for approximately 1,200 member newspapers. We sum circulation across newspapers to create zip code–level totals. Because some papers do not

[4] See, e.g., Spitzer (1991), Dubin and Spitzer (1993), Wildman and Karamanis (1998), and Siegelman and Waldfogel (2001). A related literature in communications considers the effect of industry concentration on the production of content and editorial diversity (see Compaine 1982; Picard 1988).

[5] The industrial organization of the newspaper industry has been extensively studied (see Reddaway 1963; Rosse 1970; Dertouzos and Quinn 1985; Bucklin, Caves, and Lo 1989; Thompson 1989; Dertouzos and Trautman 1990; Blair and Romano 1993; Genesove 1999).

report circulation data every year, to allow inclusion of more papers in the sample, the zip code totals are created from daily circulation averaged over the years 1996, 1997, and 1998.

We define a paper's market as the MSA of publication. This market definition is used by the Audit Bureau and large individual newspapers in circulation reporting and offers the advantage of a straightforward link to census data. Because much of our analysis involves the relationship between zip code circulation and characteristics of the entire market, we exclude from our analysis zip codes that are not located within a metropolitan area and those that cannot be matched to 1990 census records. We also exclude 15 MSAs for which we have incomplete data on daily newspaper circulation.[6] Our working data set has 11,584 zip codes.

In addition to the circulation and population information, we have data on the number of editors and reporters by subject specialty at each newspaper from *Burrelle's Media Directory* (Burrelle Information Services 2000). We use the reporter data to study targeting of daily newspapers across markets. Specifically, we sum the number of reporters and editors assigned to news, business, government, and other "hard-news" topics over all papers in a market to create an MSA-level measure of the fraction hard news. We also calculate the fraction of hard news for individual newspapers in markets with competing dailies.

Table 1 characterizes the data in the study, presenting population and circulation characteristics at both the zip code and MSA levels. The ratio of daily circulation to population—our basic measure of newspaper consumption—averages about 23 percent across sample MSAs. There is considerable variation at the zip code level, with per capita sales ranging from about 2 percent at the fifth percentile to 43 percent at the ninety-fifth percentile. The table also summarizes the MSA fraction of hard news, which averages about 59 percent across MSAs.

## III. Empirical Strategy and Results

### A. *Empirical Strategy*

We seek to measure the effect of group population on the tendency to consume within the group and across groups. For ease of exposition, we shall describe our approach with whites and blacks but shall explore other group definitions below. Holding white population constant, we

[6] We exclude the following markets because of incomplete circulation data: Atlanta, Ga.; Chico, Calif.; Daytona Beach, Fla.; Duluth, Minn.–Wisc.; Eau Claire, Wisc.; Janesville–Beloit, Wisc.; Joplin, Mo.; Kalamazoo, Mich.; Lake Charles, La.; Lima, Ohio; Los Angeles–Anaheim–Riverside, Calif.; New York–northern New Jersey–Long Island; Terre Haute, Ind.; Tulsa, Okla.; and Wheeling, W.V.–Ohio.

expect additional blacks in the market to bring forth supply that is more black-targeted, which, in turn, should increase the black tendency to buy a local newspaper. Similarly, we expect additional whites in the market to raise the white tendency to buy a local paper. Cross effects might be positive or negative. Overall, a larger population can support more or more extensive products, which would tend to increase readership for all groups. However, increasing the size of one group, holding the other constant, might lead producers to shift products to better suit the tastes of the larger group. Hence black readership might increase or decrease with an increase in the white population, and vice versa.

If we had zip code–level newspaper sales data by race, we might identify preference externalities by running the following straightforward regressions:

$$s_z^W = \alpha_0 + \alpha_1 W_M + \alpha_2 B_M + \epsilon_z^W, \tag{1}$$

$$s_z^B = \beta_0 + \beta_1 W_M + \beta_2 B_M + \epsilon_z^B, \tag{2}$$

where $s_z^B$ represents the fraction of the black population in a zip code purchasing a daily newspaper, $s_z^W$ represents the fraction of the white population in a zip code buying a daily paper, $W_M$ is the number of whites in the MSA, and $B_M$ is the number of blacks in the MSA. The constants $\alpha_0$ and $\beta_0$ would show the baseline part of each group's average per capita newspaper sales. The coefficients $\alpha_1$ and $\beta_1$ would measure the effect of more whites in a market on white and black readership. Similarly, $\alpha_2$ and $\beta_2$ would measure the effect of additional blacks on readership for each group. We would expect $\alpha_1$ and $\beta_2$ to be greater than zero. The cross effects $\alpha_2$ and $\beta_1$ might be greater than or less than zero.

While we have circulation data by zip code, we unfortunately do not observe zip code sales by race. However, we observe the racial composition of the zip codes, and we can use the variation in the fraction of zip code residents who are black to estimate all the coefficients of interest in equations (1) and (2). We define $b_z$ as the fraction of the zip code population that is black and $s_z$ as newspaper sales divided by the total zip code population. Note that overall per capita readership equals the sum of black readership in the zip code times the fraction black plus white readership in the zip code times the fraction white, or

$$s_z = b_z s_z^B + (1 - b_z) s_z^W. \tag{3}$$

Substituting (1) and (2) into (3) yields

$$s_z = \alpha_0 + \alpha_1 W_M + \alpha_2 B_M + (\beta_0 - \alpha_0) b_z + (\beta_1 - \alpha_1) W_M b_z + (\beta_2 - \alpha_2) B_M b_z + \nu_z, \quad (4)$$

where $\nu$ is an error term equal to $b_z \epsilon_z^B + (1 - b_z)\epsilon_z^W$. All the parameters in equation (4) are identified from interactions of MSA black and white populations ($B_M$ and $W_M$) with the zip code black ($b_z$). Baseline per capita newspaper sales among whites ($\alpha_0$) as well as the effect of an increase in the white population and black population on white readership ($\alpha_1$ and $\alpha_2$) are estimated directly as the constant term and the coefficients on $W_M$ and $B_M$. The coefficient on $b_z$ reflects the black-white gap in the tendency to read a daily newspaper. The coefficients on the interaction terms ($b_z \times W_M$ and $b_z \times B_M$) show how the gap between black and white newspaper consumption varies across markets with the absolute sizes of the white and black populations, respectively. Average per capita newspaper sales among blacks ($\beta_0$) as well as the effect of an increase in the white population and black population on black readership ($\beta_1$ and $\beta_2$) can be calculated by adding $\alpha_0$, $\alpha_1$, and $\alpha_2$ to the estimated coefficients on $b_z$, $b_z \times W_M$, and $b_z \times B_M$, respectively.

We estimate variants of the model that allow for differences in the tendency to purchase newspapers across regions. Adding region dummies to equation (4) allows estimation of the tendency to read newspapers to vary across census regions. Adding region dummies alone and interacted with $b_z$ allows for region effects that differ by race. We also estimate a specification with three MSA-level observables, the fraction college educated, fraction poor (income <$15,000), and fraction aged 65 and over. These variables are correlated with race: we include them to allow the race coefficient to better reflect race. All specifications are weighted by zip code population.

While the dependent variable is at the zip code level, the independent variables of interest are at the MSA level. Zip code observations within an MSA therefore contain a common component, and we adjust standard errors by clustering on MSA. This approach gives correct standard errors but leaves open the possibility that the MSA unobservable in $s_z$ is correlated with black or white population. For example, if large black populations are concentrated in MSAs with a high tendency to read newspapers (among both blacks and whites), then we shall find a positive coefficient on black population even if larger black populations do not cause blacks to read newspapers.

We deal with this by treating the common element of the error as an MSA fixed effect. Under this approach we cannot identify the coefficients on the black or white populations individually ($\alpha_1$, $\alpha_2$, $\beta_1$, and $\beta_2$). We can identify the coefficients on the zip code fraction black and

the interaction terms ($\beta_0 - \alpha_0$, $\beta_1 - \alpha_1$, and $\beta_2 - \alpha_2$), which show how the gap between black and white newspaper readership varies across MSA with the sizes of the black and white populations. The intuition of the approach is that cross–zip code variation in $s_z$ and $b_z$ defines a readership gap in each MSA. The coefficients on the interaction terms show how the gap shrinks or widens as black and white populations vary across MSAs. If $\beta_1 - \alpha_1$ is negative, we infer that a larger white population increases white readership more than black readership, or that the readership gap increases with the white population. Similarly, if $\beta_2 - \alpha_2$ is positive, we infer that a larger black population increases black readership more than white readership, or that the gap shrinks with an increase in the black population.

### *B. Results by Race and Hispanic Status*

Table 2 estimates equation (4) for blacks and whites. Columns 1–4 report specifications with no region dummy variables, with simple region dummy variables, with interacted region dummy variables, and with interacted region dummy variables and MSA observables. In addition to the estimated coefficients, we report estimates and standard errors for $\beta_1$ and $\beta_2$, which are linear combinations of the other coefficients. For blacks, within-group preference externalities are positive and significant in all specifications, with $\beta_2 > 0$. Increasing the black population in an MSA by 1 million increases per capita newspaper sales among blacks by about 0.15 on a base of about 0.07. Within-group preference externalities among whites, $\alpha_1$, are much smaller. Increasing the white population in an MSA by 1 million increases per capita newspaper sales among whites by only about 0.01 on a base of about 0.20. In some specifications the within-group effects for whites are not statistically significant. The difference in magnitude in within-group effects among blacks and whites may reflect comparatively small MSA black populations. Increases in the black population might raise the appeal of products to this group from a very low level.

Table 2 also shows clear evidence of negative preference externalities across groups. All else equal, the tendency for blacks to purchase daily papers *decreases* as the number of whites in the MSA increases ($\beta_1 < 0$), with an increase of 1 million whites in a market depressing per capita newspaper sales among blacks by about 0.03. As white population increases, with black population held constant, newspapers become less appealing to blacks. The tendency for whites to subscribe does not appear to depend on the MSA black population since $\alpha_2$ is insignificantly different from zero in all specifications.

Column 5 of table 2 presents results with MSA fixed effects. We estimate $\beta_1 - \alpha_1$ to be negative and significant, indicating that a larger

TABLE 2
REGRESSIONS OF NEWSPAPER SALES ON POPULATION COMPOSITION BY RACE ($N = 11{,}584$)
Dependent Variable: Zip Code per Capita Newspaper Sales, Blacks and Whites

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| MSA white population ($\alpha_1$) | .0081 | .0078 | .0078 | .0012 | |
| | (1.24) | (1.94)* | (2.11)* | (.35) | |
| MSA black population ($\alpha_2$) | .0016 | −.0002 | −.0005 | .0230 | |
| | (.06) | (.01) | (.02) | (1.25) | |
| Zip black fraction | −.1419 | −.1183 | −.1952 | −.2214 | −.1271 |
| | (13.58)** | (9.79)** | (5.88)** | (7.56)** | (12.57)** |
| Zip black fraction × MSA white population ($\beta_1 - \alpha_1$) | −.0440 | −.0430 | −.0412 | −.0287 | −.0290 |
| | (2.52)* | (2.86)** | (2.86)** | (2.40)* | (2.41)* |
| Zip black fraction × MSA black population ($\beta_2 - \alpha_2$) | .1598 | .1310 | .1295 | .0768 | .0784 |
| | (2.28)* | (2.24)* | (2.27)* | (1.61) | (1.60) |
| $\beta_1$ | −.036 | −.035 | −.033 | −.027 | |
| | (2.77)** | (2.55)* | (2.29)* | (2.51)* | |
| $\beta_2$ | .161 | .131 | .129 | .100 | |
| | (3.02)** | (2.42)* | (2.18)* | (2.24)* | |
| MSA fraction Hispanic | | | | −.0617 | |
| | | | | (1.73) | |
| MSA fraction college educated | | | | .3816 | |
| | | | | (3.75)** | |
| MSA fraction poor (income <$15,000) | | | | .0730 | |
| | | | | (.99) | |
| MSA fraction old (age ≥65) | | | | .3474 | |
| | | | | (3.57)** | |
| Census regions | no | yes | yes | yes | no |
| Interacted regions | no | no | yes | yes | no |
| MSA fixed effects | no | no | no | no | yes |
| Constant | .2112 | .1796 | .1764 | .0697 | .2259 |
| | (38.85)** | (9.49)** | (8.08)** | (1.48) | (233.38)** |

NOTE.—All regressions are population weighted with standard errors clustered by MSA. Constants in fixed-effects regressions represent the average value of the fixed effects. *t*-statistics are in parentheses.
* Significant at the 5 percent level.
** Significant at the 1 percent level.

number of whites in the market raises white readership more than black readership. In other words, the gap between black and white readership increases with the number of whites in the market. We estimate $\beta_2 - \alpha_2$ to be positive and marginally significant, indicating that a larger number of blacks in the market increases black readership more than white readership. The gap between black and white readership shrinks as the number of blacks increases. The fixed-effects estimates in column 5 confirm the asymmetry of effects documented in columns 1–4: a larger black or white population exerts a larger positive effect on the tendency to read within a group than across groups.

To this point our analysis examines only race. It is interesting to see whether the effects documented operating by race also operate on other dimensions in which preferences might differ. Aside from race, Hispanic status provides the most promising context for identifying preference externalities because of the substantial cross-market variation in His-

TABLE 3
REGRESSIONS OF NEWSPAPER SALES ON POPULATION COMPOSITION BY HISPANIC STATUS
($N$=11,584)
Dependent Variable: Zip Code per Capita Newspaper Sales, Hispanics and Non-Hispanics

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| MSA Non-Hispanic population ($\alpha_1$) | .0077 | .0040 | .0027 | .0034 | |
| | (1.73) | (1.08) | (.76) | (.91) | |
| MSA Hispanic population ($\alpha_2$) | .0177 | .0395 | .0459 | .0345 | |
| | (.59) | (1.45) | (1.66) | (1.24) | |
| Zip Hispanic fraction | −.1054 | −.1089 | −.3916 | −.3668 | −.2893 |
| | (5.40)** | (4.04)** | (7.46)** | (8.28)** | (11.42)** |
| Zip Hispanic fraction × MSA non-Hispanic population ($\beta_1 - \alpha_1$) | −.0371 | −.0419 | −.0164 | −.0330 | −.0395 |
| | (3.56)** | (4.11)** | (1.17) | (2.50)* | (8.26)** |
| Zip Hispanic fraction × MSA Hispanic population ($\beta_2 - \alpha_2$) | −.0369 | −.0065 | −.1327 | −.0572 | .2182 |
| | (.52) | (.11) | (1.48) | (.59) | (5.55)** |
| $\beta_1$ | −.029 | −.038 | −.014 | −.030 | |
| | (4.20)** | (4.48)** | (1.06) | (2.51)* | |
| $\beta_2$ | −.019 | .033 | −.087 | −.023 | |
| | (.38) | (.72) | (1.13) | (.28) | |
| MSA fraction black | | | | −.0544 | |
| | | | | (1.12) | |
| MSA fraction college educated | | | | .3788 | |
| | | | | (3.51)** | |
| MSA fraction poor (income <$15,000) | | | | .0765 | |
| | | | | (1.09) | |
| MSA fraction old (age ≥65) | | | | .4116 | |
| | | | | (3.81)** | |
| Census regions | no | yes | yes | yes | no |
| Interacted regions | no | no | yes | yes | no |
| MSA fixed effects | no | no | no | no | yes |
| Constant | .2037 | .1589 | .1610 | .0541 | .2290 |
| | (37.92)** | (8.97)** | (9.09)** | (1.10) | (190.15)** |

NOTE.—All regressions are population weighted with standard errors clustered by MSA. Constants in fixed-effects regressions represent the average value of the fixed effects. $t$-statistics are in parentheses.
* Significant at the 5 percent level.
** Significant at the 1 percent level.

panic population. Table 3 repeats the table 2 analysis for Hispanics and non-Hispanics. The results for Hispanics in columns 1–4 are mostly insignificant, although the negative and significant estimates for $\beta_1$ suggest that more non-Hispanics in a market lowers Hispanic readership. The MSA fixed-effects specification in column 5 provides more significant results. The positive and significant value for $\beta_2 - \alpha_2$ indicates that a larger Hispanic population raises Hispanic readership more than it raises readership among non-Hispanics. Similarly, the negative and significant coefficient for $\beta_1 - \alpha_1$ implies that a larger non-Hispanic population increases non-Hispanic readership more than Hispanic readership. These results are similar to results for blacks and whites in table 2. The difference between the basic and fixed-effects specifications suggests that the fixed MSA unobservables are correlated with the Hispanic population.

It is interesting to contrast the results above with analogous evidence from radio broadcasting (Waldfogel 1999). In that context, while blacks

have a negative effect on the number of white-targeted stations in each market (and vice versa), there are no significant effects of each group on the other group's tendency to consume. The negative consumption cross effect is absent because groups listen to the radio even when their most preferred programming options are not available. For example, blacks listen to white radio in markets without black-targeted options almost as much as blacks listen in markets that also offer black-targeted options. The negative consumption result for newspapers suggests that blacks are less willing to consume a less preferred newspaper option than in the radio context. Individuals do not exercise the outside option in radio: virtually all persons listen to radio during the week, whereas only about one-third of the population purchases a daily newspaper. Presumably this difference reflects availability of substitutes. There are many substitutes for daily papers, including television, radio, weekly newspapers, and magazines, but few substitutes for radio listening, particularly in cars.

### C. *Race and Hispanic Status, or Other Factors?*

The results above suggest that an increase in the size of a group with similar preferences in a market increases consumption within the group and can decrease consumption by individuals outside the group. We show that preference externalities operate among blacks and whites as well as among Hispanics and non-Hispanics. But are these results attributable to the groups themselves or to other factors correlated with race or Hispanic status? Education, income, and age are correlated with race and Hispanic status, and all three constitute plausible sources of preference variation. By repeating the analysis in tables 2 and 3 on these dimensions, we can explore whether individuals affect each other through product markets because of group affiliation or because of other factors. However, because of the limited variation in these variables across markets, we must bear in mind the weak "experiment" that analyses along these dimensions provide.

Table 4 reports basic and fixed-effects specifications using groups based on college education, low income, and age. We report basic results with region dummy variables only, which correspond to column 2 in the tables above.[7] For economy of space, we report regressions along all three dimensions in the same table, referring to population categories and their complements as "group" and "nongroup." The groups are college educated in columns 1 and 2, low income in columns 3 and

[7] Results are representative of results for other specifications.

TABLE 4
REGRESSIONS OF NEWSPAPER SALES ON POPULATION COMPOSITION BY EDUCATION, INCOME, AND AGE ($N$=11,584)
Dependent Variable: Zip Code per Capita Newspaper Sales

| | College Educated | | Poor (Income <$15,000) | | Old (Age ≥65) | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| MSA nongroup population ($\alpha_1$) | −.0163 | | .0055 | | .0290 | |
| | (1.79) | | (.55) | | (2.49)* | |
| MSA group population ($\alpha_2$) | .0497 | | .0383 | | −.1576 | |
| | (1.05) | | (.87) | | (1.70) | |
| Zip group fraction | .2191 | .2604 | −.1041 | −.1353 | .4939 | .5210 |
| | (10.74)** | (12.95)** | (4.41)** | (5.76)** | (9.51)** | (10.29)** |
| Zip group fraction × MSA nongroup population ($\beta_1 - \alpha_1$) | .0575 | .0412 | −.0110 | .0066 | −.0956 | −.1023 |
| | (2.91)** | (1.68) | (.25) | (.13) | (1.90) | (1.72) |
| Zip group fraction × MSA group population ($\beta_2 - \alpha_2$) | −.1504 | −.1187 | −.2457 | −.2812 | .4359 | .4360 |
| | (1.44) | (1.01) | (1.36) | (1.28) | (1.35) | (1.21) |
| $\beta_1$ | .041 | | −.006 | | −.067 | |
| | (2.82)** | | (.14) | | (1.43) | |
| $\beta_2$ | −.101 | | −.207 | | .278 | |
| | (1.42) | | (1.32) | | (.95) | |
| MSA fixed effects | no | yes | no | yes | no | yes |
| Constant | .1228 | .1433 | .2694 | .2605 | .0997 | .1537 |
| | (6.97)** | (47.51)** | (21.72)** | (72.70)** | (5.40)** | (32.61)** |

NOTE.—For economy of space, we report regressions along all three dimensions in the same table, referring to population categories and their complements as "group" and "nongroup." All regressions are population weighted with standard errors clustered by MSA. Specifications in cols. 1, 3, and 5 include dummy variables for census regions. Constants in fixed-effects regressions represent the average value of the fixed effects. $t$-statistics are in parentheses.
* Significant at the 5 percent level.
** Significant at the 1 percent level.

4, and old in columns 5 and 6.[8] Zip codes with a larger fraction college educated, smaller fraction poor, or larger fraction old have higher readership. The sign patterns for income and education are inconsistent with the patterns documented for race and Hispanic status. A larger educated population increases readership among the non–college educated more than among the educated. A larger poor population depresses readership among the poor more than among the nonpoor. The sign pattern for age is more similar to the estimates for race and Hispanic status, with positive effects within a group and negative effects across groups. Yet, apart from the estimates of $\beta_0 - \alpha_0$, the baseline readership gap across groups, few coefficients in table 4 are significant.

The general insignificance of results in table 4 suggests that we cannot draw many inferences from analyses of preference externalities across education, income, or age categories. What can we conclude from the fact that black-white results are stronger than other results? We must first distinguish between the operation and detectability of the preference externality. The black-white context is an auspicious one for de-

[8] We define low income as the fraction with household income less than $15,000. We define old as the fraction aged 65 and older. Results with other cutoffs are consistent with those presented here.

tection. Blacks and whites are discrete groups with strongly different preferences whose relative populations vary substantially across markets. The same is true for Hispanics. The other contexts provide less favorable conditions for testing. The race effect may ultimately be attributable to education or income. We are simply unable to document effects operating along these dimensions.

## IV. Product Positioning

We have documented that newspaper readership among blacks and whites as well as among Hispanics and non-Hispanics depends on the mix of population groups in the market. We now seek evidence that product positioning drives the results. To determine this, we must first document the product attributes preferred by different groups. We can then ask whether newspapers adjust the share of preferred content on the basis of market composition.

Our newspaper data allow us to explore the first question directly, albeit in a limited way, as follows. A small number of cities have two major dailies, generally an "upscale" broadsheet and a tabloid competitor. Prominent examples are Chicago, Philadelphia, Boston, and Washington, D.C. The papers in each city assign a different fraction of reporters and editors to hard and soft news topics, with the broadsheet placing greater emphasis on hard news than the tabloid competitor.[9] If a group systematically prefers one paper over the other where two papers are available, we can infer that preferences differ across groups. The test is limited in that it covers only four markets.

We can draw inferences about preferences from regressions of the upscale paper's market share among the two major local dailies ($s_z^1$) in the zip code on zip code demographics. Table 5 presents results. For each city, the first column reports coefficients from univariate regressions of $s_z^1$ on zip code demographic variables, one at a time. The second column reports coefficient estimates with all the zip code demographics included together. In virtually all cases, the broadsheet newspaper earns a larger market share in zip codes with a higher fraction white, non-Hispanic, college educated, high income, and age less than 65. Most of the coefficients are highly significant. Results in table 5 confirm that preferences in media content differ across a number of groups, although the survival of the race coefficients indicates that race is correlated with preference differences not explained by other observables.

[9] The fraction of reporters and editors at these papers assigned to hard news is as follows: *Chicago Tribune,* 77 percent; *Chicago Sun-Times,* 55 percent; *Philadelphia Inquirer,* 59 percent; *Philadelphia Daily News,* 53 percent; *Boston Globe,* 58 percent; *Boston Herald,* 50 percent; *Washington Post,* 68 percent; and *Washington Times,* 54 percent. We treat the *Washington Post* as the upscale competitor in Washington, which has two competing broadsheets.

TABLE 5
NEWSPAPER MARKET SHARES AND ZIP CODE DEMOGRAPHIC COMPOSITION
Dependent Variable: Newspaper Market Share

| | CHICAGO TRIBUNE (CHICAGO SUN-TIMES) | | PHILADELPHIA INQUIRER (PHILADELPHIA DAILY NEWS) | | BOSTON GLOBE (BOSTON HERALD) | | WASHINGTON POST (WASHINGTON TIMES) | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Zip fraction black | −.449 | −.365 | −.476 | −.13 | −.401 | −.132 | −.099 | .028 |
| | (14.94)** | (11.40)** | (12.46)** | (2.77)** | (5.55)** | (2.53)* | (7.52)** | −1.46 |
| Zip fraction Hispanic | −.527 | −.372 | −.916 | .163 | −.525 | .641 | .311 | .294 |
| | (6.96)** | (6.98)** | (5.48)** | −1.11 | (3.99)** | (5.60)** | (3.70)** | (4.28)** |
| Zip fraction college educated | .963 | .576 | .726 | .125 | .674 | .497 | .162 | .082 |
| | (18.48)** | (13.55)** | (8.82)** | −1.68 | (14.51)** | (12.10)** | (7.15)** | (3.02)** |
| Zip fraction poor (income <$15,000) | −1.221 | .012 | −1.318 | −1.100 | −1.189 | −1.086 | −.500 | −.489 |
| | (17.04)** | −.14 | (18.00)** | (8.05)** | (12.19)** | (9.03)** | (10.03)** | (6.57)** |
| Zip fraction old (age ≥65) | −.241 | −.785 | .181 | .379 | −.748 | −.214 | −.190 | −.024 |
| | −.89 | (5.83)** | −.62 | −1.78 | (2.85)** | −1.24 | (2.07)* | −.29 |
| Observations (zips) | 282 | 282 | 259 | 259 | 244 | 244 | 184 | 184 |

NOTE.—Dependent variable is the market share of the top among both listed papers (e.g., *Chicago Tribune*) by zip code in the home market (MSA). The first column for each paper reports coefficient estimates for five univariate regressions. The second column reports estimates for a multivariate regression. *t*-statistics are in parentheses.

* Significant at the 5 percent level.

** Significant at the 1 percent level.

TABLE 6
MSA FRACTION OF REPORTERS IN HARD NEWS AND MSA DEMOGRAPHIC COMPOSITION
($N$=269 MSAs)
Dependent Variable: MSA Fraction Hard News

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| MSA fraction black | −.191 (3.16)** | | | | | −.210 (2.82)** |
| MSA fraction Hispanic | | .027 (.68) | | | | −.028 (.61) |
| MSA fraction college educated | | | .121 (1.19) | | | .086 (.73) |
| MSA fraction poor (income <$15,000) | | | | .117 (.96) | | −.023 (.16) |
| MSA fraction old (age ≥65) | | | | | −.052 (.29) | −.032 (.16) |
| MSA population (M) | .012 (1.98)* | .010 (1.59) | .007 (1.16) | .012 (1.76) | .009 (1.48) | .010 (1.42) |
| Constant | .597 (67.25)** | .557 (16.51)** | .557 (27.54)** | .554 (20.26)** | .586 (24.89)** | .615 (9.87)** |

NOTE.—$t$-statistics are in parentheses.
* Significant at the 5 percent level.
** Significant at the 1 percent level.

To determine whether product positioning drives the operation of preference externalities, we next ask whether the relative amount of hard and soft news varies across markets with the fraction black and fraction Hispanic. Summing the number of reporters and editors in each category across papers in each market and dividing by the market total produces an MSA-level measure of the fraction of hard-news coverage. Table 6 shows a regression of the fraction of hard news on MSA population and a series of demographic characteristics. Columns 1–5 report results for univariate regressions that consider each characteristic separately. Column 6 includes all the variables together. The results show that the fraction of hard news is higher in markets with a larger fraction black. All other coefficients on demographic characteristics are insignificant in both the univariate and multivariate specifications. Because of the possibility of unobservable factors correlated with the percentage black, we would hesitate to infer that firms position products because of race. At the same time, it is clear that race is a useful variable for explaining positioning, just as it appears to be a useful variable for classifying consumers into preference groups.

## V. Conclusion

When fixed costs are large and product preferences differ among consumers, the mix of products available in any market can depend on the mix of consumer types in the market. Individuals in larger groups, facing products better tailored to their preferences, are more likely to con-

sume. We document this phenomenon across groups of consumers in daily newspaper markets. Blacks are more likely to purchase a daily newspaper in markets with larger black populations, and blacks are less likely to purchase a paper in markets with a larger white population. We find some similar results for Hispanics and non-Hispanics. We find little evidence of effects for groups defined by education, income, or age. We also provide evidence that product positioning underlies the operation of preference externalities in daily newspaper markets.

The past decade has seen substantial research on the demand for differentiated products, with the supply of product options typically treated as exogenous (see Berry 1994; Berry, Levinsohn, and Pakes 1995). This paper contributes to a developing body of evidence on the supply of differentiated products.[10] We show that product targeting varies with the composition of consumer types in a market, with different effects on the consumption tendencies for individuals in different groups.

What do our consumption results say about how differentiated product markets distribute welfare? While we cannot make any formal statements, our results are suggestive. The benefit of a product to a group of consumers is the area under their demand curve less the price they pay for the product. One could infer from positive black own-consumption effects that, as newspaper consumers, blacks benefit other blacks as long as the increased consumption is not offset by increases in price or reductions in product quality as perceived by black consumers. Prices do not vary across markets, and newspapers target blacks more closely in markets with larger black populations. Both of these factors suggest that additional blacks benefit other black newspaper consumers. Along these lines, our results also suggest that additional whites benefit whites and that both groups benefit themselves more than they benefit each other. Formal measurement of such effects awaits further research.

## References

Audit Bureau of Circulations. *Circulation Data Bank.* New York: Audit Bur. Circulations, June 1999.

Berry, Steven. "Estimating Discrete-Choice Models of Product Differentiation." *Rand J. Econ.* 25 (Summer 1994): 244–62.

Berry, Steven; Levinsohn, James; and Pakes, Ariel. "Automobile Prices in Market Equilibrium." *Econometrica* 63 (July 1995): 841–90.

Blair, Roger D., and Romano, Richard E. "Pricing Decisions of the Newspaper Monopolist." *Southern Econ. J.* 59 (April 1993): 721–32.

[10] See also Mazzeo (2002) for an empirical model of entry in which firms choose not only whether to enter but also a product attribute (whether to operate at high or low quality).

Böckem, Sabine. "A Generalized Model of Horizontal Product Differentiation." *J. Indus. Econ.* 42 (September 1994): 287–98.

Bucklin, Randolph E.; Caves, Richard E.; and Lo, Andrew W. "Games of Survival in the U.S. Newspaper Industry." *Appl. Econ.* 21 (May 1989): 631–49.

Burrelle's Information Services. *Burrelle's Media Directory, 2000 Edition.* Livingston, N.J.: Burrelle's Information Services, 2000.

Compaine, Benjamin M. *Who Owns the Media?: Concentration of Ownership in the Mass Communications Industry.* 2d ed. White Plains, N.Y.: Knowledge Industry Pubs., 1982.

D'Aspremont, Claude; Jaskold-Gabszewicz, Jean; and Thisse, Jacques-Francois. "On Hotelling's 'Stability in Competition.'" *Econometrica* 47 (September 1979): 1145–50.

Dertouzos, James N., and Quinn, Timothy H. "Bargaining Responses to the Technology Revolution: The Case of the Newspaper Industry." Rand Report no. R-3144-DOL. Santa Monica, Calif.: Rand Corp., January 1985.

Dertouzos, James N., and Trautman, William B. "Economic Effects of Media Concentration: Estimates from a Model of the Newspaper Firm." *J. Indus. Econ.* 39 (September 1990): 1–14.

Dixit, Avinash K., and Stiglitz, Joseph E. "Monopolistic Competition and Optimum Product Diversity." *A.E.R.* 67 (June 1977): 297–308.

Dubin, Jeffrey A., and Spitzer, Matthew L. "Testing Minority Preferences in Broadcasting." Working Paper no. 856. Pasadena: California Inst. Tech., 1993.

Economides, Nicholas. "Quality Variations and Maximal Variety Differentiation." *Regional Sci. and Urban Econ.* 19 (February 1989): 21–29.

———. "Hotelling's 'Main Street' with More than Two Competitors." *J. Regional Sci.* 33 (August 1993): 303–19.

Genesove, David. "The Adoption of Offset Presses in the Daily Newspaper Industry in the United States." Working Paper no. 7076. Cambridge, Mass.: NBER, April 1999.

George, Lisa M., and Waldfogel, Joel. "Who Benefits Whom in Daily Newspaper Markets?" Working Paper no. 7944. Cambridge, Mass.: NBER, October 2000.

Hotelling, Harold. "Stability in Competition." *Econ. J.* 39 (March 1929): 41–57.

Mazzeo, Michael. "Product Choice and Oligopoly Market Structure." *Rand J. Econ.* 33 (Summer 2002): 221–42.

Picard, Robert G., ed. *Press Concentration and Monopoly: New Perspectives on Newspaper Ownership and Operation.* Norwood, N.J.: Ablex, 1988.

Reddaway, William B. "The Economics of Newspapers." *Econ. J.* 73 (June 1963): 201–18.

Rosse, James N. "Estimating Cost Function Parameters without Using Cost Data: Illustrated Methodology." *Econometrica* 38 (March 1970): 256–75.

Salop, Steven C. "Monopolistic Competition with Outside Goods." *Bell J. Econ.* 10 (Spring 1979): 141–56.

Siegelman, Peter, and Waldfogel, Joel. "Race and Radio: Preference Externalities, Minority Ownership, and the Provision of Programming to Minorities." In *Advances in Applied Micro-economics,* vol. 10, *Advertising and Differentiated Products,* edited by Michael R. Baye and Jon P. Nelson. Amsterdam: JAI, 2001.

Spence, A. Michael. "Product Differentiation and Welfare." *A.E.R. Papers and Proc.* 66 (May 1976): 407–14. (*a*)

———. "Product Selection, Fixed Costs, and Monopolistic Competition." *Rev. Econ. Studies* 43 (June 1976): 217–35. (*b*)

Spitzer, Matthew L. "Justifying Minority Preferences in Broadcasting." *Southern California Law Rev.* 64, no. 2 (1991): 293–361.

Sterngold, James. "A Racial Divide Widens on Network TV." *New York Times* (December 29, 1998), p. A1.

Thompson, R. Stephen. "Circulation versus Advertiser Appeal in the Newspaper Industry: An Empirical Investigation." *J. Indus. Econ.* 37 (March 1989): 259–71.

Waldfogel, Joel. "Preference Externalities: An Empirical Study of Who Benefits Whom in Differentiated Product Markets." Working Paper no. 7391. Cambridge, Mass.: NBER, October 1999.

Wildman, Steven S., and Karamanis, Theomary. "The Economics of Minority Programming." In *Investing in Diversity: Advancing Opportunities for Minorities and the Media,* edited by Amy Korzick Garmer. Washington: Aspen Inst., 1998.