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Citation: Chiou, Lesley and Tucker, Catherine. "Paywalls and the Demand for News." Information Economics and Policy 25, 2 (June 2013): 61–69 © 2013 Elsevier B.V.

As Published: <http://dx.doi.org/10.1016/j.infoecopol.2013.03.001>

Publisher: Elsevier

Persistent URL: <http://hdl.handle.net/1721.1/110528>

Version: Author's final manuscript: final author's manuscript post peer review, without publisher's formatting or copy editing

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Paywalls and the Demand for News

April 25, 2013

Abstract

Given the preponderance of free content on the Internet, news media organizations face new challenges over how to manage access to and the pricing of their content. It is unclear whether content should be free or whether customers should pay via a “paywall.” We use experimental variation from a media publisher’s field test of paywalls to examine demand for online news across several local media markets. We find a 51 percent drop in visits after the introduction of a paywall and a far larger drop for younger readers.

1 Introduction

Scholars have long argued that by providing information, news media promote community engagement and political participation (Putnam, 2000; Feddersen, 2004). Indeed, studies have shown that the diffusion of news media is associated with positive spillovers on civic awareness and engagement (Mondak, 1995a,b; Lee and Wei, 2008; Oberholzer-Gee and Waldfogel, 2009; Gentzkow et al., 2009). Though the Internet facilitates the spread of information, it is not clear how or whether news organizations should charge for their content and how this might affect consumption of the news. Recently, several large players in the media industry, including News Corp. and The New York Times, have moved from providing online content free of charge to implementing “paywalls” where readers are charged a fee for accessing content online. Vocal proponents of paywalls include Rupert Murdoch, chairman and CEO of News Corp, who has maintained that “consumers are willing to pay to be entertained and informed.”¹ In contrast, some advertisers have criticized paywalls by arguing that free content generates more page views for advertising. Rob Lynam, head of the media agency MEC, has declared, “We are just not advertising on [The Times]. If there’s no traffic on there, there’s no point in advertising on there.”²

The debate reflects how newspapers serve as a multi-sided platform or network by bringing together readers and advertisers (Rysman, 2009; Chandra, 2009; Seamans and Zhu, 2011). To our knowledge, our paper is the first to empirically investigate the effect of paywalls on newspaper readership. Our paper explores how charging for access to content affects the composition and behavior of users on one side of the network, and we discuss potential implications for pricing and targeting on other sides of the network. Like Gannett, many publishers offer their offline subscribers a free online account and encourage them to sign up, so significant overlap may occur among online and offline subscribers. Advertisers may

¹Shayon, S. The Paywall Debate: A Historical Perspective, Digital Media Buzz, February 23, 2010.

²Burrell, I. Has Rupert Murdoch’s Paywall Gamble Paid Off? The Independent, September 2, 2010.

be interested in reaching different segments of the population through online and offline advertising, so differences in the characteristics of offline and online users may influence an advertiser’s decision to multi-home and advertise on either side of the market (Athey et al., 2011).

We exploit a unique pricing experiment conducted by a media publisher. In July 2010, the Gannett Company introduced paywalls at the websites of three of its local newspapers—The Spectrum (Utah), The Greenville News (South Carolina), and The Tallahassee Democrat (Florida)—as part of an experiment. When readers navigated to the websites of these newspapers, they were prompted to sign up for a subscription to access online content as opposed to freely available content.³ According to Gannett, if the experiment was a success, it would eventually introduce paywalls at its more than 100 news sites.

We use a rich dataset on consumer online behavior to empirically estimate how paywalls affect the demand for local news sites. In particular, our study investigates the number of visits and the demographic composition of visitors before and after the adoption of the paywalls, and we study users’ subsequent behavior after navigating to a paywall. We use changes in traffic to other Gannett-owned news sites as a control for general trends on news consumption.

Overall visits to the websites after the introduction of a paywall sites fell by 51%. This decline is associated with a dramatic shift in demographics away from young readers: readership among 18-24 year olds falls by 99%. The introduction of paywalls disproportionately excludes the young, which undermines the creation of a comprehensive community (Putnam, 2000). We also find that visits for in-state and out-of-state readers fall by 50% and 56%, though the difference is not statistically distinguishable. Some evidence exists that visits may fall to a larger extent for lower income users. Visits for men and women fall by 58%

³Users could access content by either signing up for a \$9.95 monthly subscription or purchasing a daily pass for \$2. Subscribers of the print edition of the newspaper also received online access.

and 42%.

Our analysis serves as a case study, as today several papers have instituted some sort of paywall. Popular press articles suggest sizeable effects from the introduction of paywalls. The Times in UK lost almost 90% of its online readership since instituting its paywall Halliday (2010). Web traffic for The Times of London and The Sunday Times fell by 66% after a paywall was erected (Mataconis, 2010). Newsday experienced a 34 percent decline in traffic the month after introducing a paywall (Grant, 2009). Our results fall within the middle of this range, and our analysis controls for underlying trends in news consumption over time.

2 Institutional Setting

2.1 Paywalls

A paywall refers to any type of “digital mechanism that separates free content from paid content on a website.”⁴ Sites can implement paywalls in several different ways: content-based, frequency-based, micropayment, or app-based. Typically sites will erect a content-based paywall under which certain types of information (e.g., breaking news and reporter blogs) are freely accessible while other “premium” content (e.g., popular columnists) can only be accessed with a subscription. For instance, the Pittsburgh Post-Gazette introduced a content-based paywall in September 1, 2009 by creating an additional site *PG+* that contained premium content and required a subscription. Readers could still freely access other news from the main website.

A second type of paywall, called a frequency-based paywall, does not distinguish between different types of content, but instead allows users to read only a specific number of sites over some fixed time period (e.g., per day, week, or month) for free before requiring some form of payment. As an example, The York Daily Record introduced a frequency-based paywall in

⁴InsideView, Issue 3, February 2010.

August 6, 2010 where users could access up to 25 premium articles for free; reading additional articles required a payment.

Micropayment paywalls require a small payment for each article that a user reads. In November 2009, several media sites, including Time, People, Sports Illustrated, The New Yorker, and Vogue, began charging readers for particular articles. Finally, app-based paywalls provide free online content, but users may pay if they wish to access the news through a smartphone, etc. The U.K.'s The Guardian has used app-based paywalls for its online news site.

The use of paywalls has been heatedly debated within the industry. The adoption of paywalls by News Corp. and the New York Times generated a stir among readers and news organizations. A key issue is whether paywalls will lead readers to seek their news from other online sources. News sites with paywalls face stiff competition, especially from news aggregators that collect and assemble online stories from various sources. For instance, the Watertown Daily Times in New York had introduced a paywall around 2000, but in 2008, it reverted back to free online content. Executive Editor Bert Gault of the Daily Times stated that the creation of a local news aggregator played a “partial role” in the decision. During this time, a local man created an online aggregator of local headlines at Newzjunky.com, which consistently drew more traffic than the Daily Times.⁵

2.2 Gannett Company Newspapers

Gannett is an international media company that owns over 100 U.S. newspapers and TV station websites. The company has substantial reach into the market for local news. It owns 81 U.S. Community Publishing information centers that engage local communities through a variety of media such as newspapers, sites, mobile content, and other publications. Gannett has local newspapers in 30 states across the country.

⁵Saba, J. Web Ad Revenue Up Against “The Wall”, Editor & Publisher, April 1, 2008.

Our analysis focuses on paywalls erected at three local newspaper sites owned by Gannett Company: The Spectrum (Utah), The Greenville News (South Carolina), and The Tallahassee Democrat (Florida). Starting July 1, 2010, users could access content online by either purchasing a monthly subscription of \$9.95 or a daily pass for \$2. Subscribers of the print edition of the newspapers were offered online access. Prior to the paywall, all content on the sites had been free of charge. Gannett indicated that these three sites would serve as an “experiment,” and if deemed successful, Gannett would eventually introduce paywalls at its other news sites. Appendix A-1 provides an announcement issued by the publisher.

The three newspapers that adopted paywalls had different circulation levels. The Spectrum is a community daily newspaper that is based in St. George, Utah and covers an area spanning 200 miles that includes communities in Arizona and Nevada. According to their website, they are the only daily newspaper between Provo, Utah and Las Vegas, Nevada. The Spectrum joined Gannett in 2000, and of the three Gannett newspapers, it has the smallest circulation (23,000 for its Sunday edition.)⁶ The Tallahassee Democrat serves the Tallahassee, Florida region. As Tallahassee’s only daily newspaper, it covers local news in Leon County and the surrounding counties in northwestern Florida and southern Georgia. The Tallahassee Democrat has an average circulation of 49,627 for its Sunday edition. The Greenville News is a daily newspaper published in Greenville, South Carolina and is the largest of the three Gannett sites we study. In 1995, Gannett purchased the newspaper as part of Multimedia, Inc. The Greenville News has a circulation of 103,298 for its Sunday edition; according to the Audit Bureau of Circulations, only one other newspaper (Columbia State) has a (slightly) larger circulation within South Carolina.

Table 1 reports the demographics of the online users for each of the three Gannett sites as reported by Experian Hitwise for April 2010. The readers of the newspapers are predominantly male and are older than the general US population. The Greenville News

⁶Audit Bureau of Circulations, eCirc.

Table 1: Demographic description of online users

Measure	The Spectrum	Greenville News	Tallahassee Democrat	Other Gannett
Male	59.95	57.06	62.09	51.90
Age 18-34	1.69	42.52	15.00	22.30
Age 35-44	9.39	7.76	13.05	15.83
Age 45-54	54.91	9.4	49.50	20.42
Age 55+	34.01	40.33	22.45	41.45
Income <30k	21.7	30.01	28.65	24.77
Income 30-60k	19.43	21.96	29.96	31.30
Income 60-100k	39.66	23.07	30.18	24.94
Income >100k	19.21	24.96	11.21	18.98

Source: Hitwise, April 2010

Notes: This table reports the fraction of online users of a particular website within each demographic category. Statistics are reported for online users of The Spectrum, the Greenville News, the Tallahassee Democrat, and all other Gannett websites.

captures a larger fraction of younger readers compared to the other two newspapers. The median income is similar across the three sites. The table also includes demographics for other sites owned by Gannett.⁷

According to the Newspaper Association of America, 48.5% of US newspaper readers are men during 2010. Approximately 30.0% are between the ages of 18-34 and 70.0% are older than 35 years of age. Forty-seven percent have an annual household income below \$50,000; 31.9% have a household income between \$50,000 and \$100,000; 20.6% have an income above \$100,000.

3 Data Description

Our primary data source is Experian Hitwise. Hitwise aggregates data from website logs created on Internet Service Providers and combines the information with data from opt-in

⁷The column “Other Gannett” includes all other sites owned by Gannett as well as one site that covers news in Guam. For our analysis of site visits in all the following sections, we focus on US sites. Please refer to Table A-1 in the Appendix for the full list of newspapers in our sample for site visits.

panels. The resulting dataset forms a geographically diverse sample with usage data from 25 million people worldwide. For further detail, Chiou and Tucker (2010) also use this data.

First, we identified sites of local newspapers owned by the Gannett Company. Hitwise reports the share of visits to a given website that originates from each state. For instance, we observe the fraction of visits that `greenvilleonline.com` receives from each of the 50 states. Hitwise defines a “visit” as a “series of one or more page requests by a visitor without 30 consecutive minutes of inactivity.” The data are aggregated and reported over a period of four weeks, so we collect visit information for the two months before and the two months after the paywalls were implemented—four rolling weeks ending 5/29, 6/26, 7/24, and 8/28 in 2010. We observe state-level data for 79 sites. Table A-1 in the Appendix supplies the full list of newspapers in our sample.⁸

Since Hitwise reports traffic as a fraction of visits, we acquire additional data from Compete to estimate the number of visits to a site from each state. Compete collects data from a panel of 2 million consumers who have given permission to have their Internet clickstream behaviors observed and from opt-in survey responses. It estimates the total number of monthly visits for each site. To calculate the number of visits from each state, we multiply the fraction of visits that originate from each state (as reported in Hitwise) with the total number of visits (as reported in Compete).

We use the classification defined by Gannett Publishing on their official website to determine which states these “community newspapers” cover. The definition allows us to categorize visits that originate from “in-state” and “out-of-state” readers.

Table 2 reports the summary statistics for our sample. The number of observations reflects 4 months of data for 79 sites, i.e., $4 \times 79 = 316$. Each observation in the summary statistics represents a website-month combination. For instance, we observe the number of

⁸Some websites receive relatively low traffic and do not meet the minimum reporting standard. We focus our analysis on US newspapers and omit one newspaper with coverage in Guam.

Table 2: Summary statistics

	Mean	Std Dev	Min	Max
Number of visits	668480.5	982402.8	439.9	7419216
% visits in-state	0.23	0.11	0.047	0.66
% visits out-of-state	0.77	0.11	0.34	0.95
Paywall newspaper	0.038	0.19	0	1
Post	0.50	0.50	0	1
Observations	316			

visits that the Tallahassee Democrat received in July 2010. On average, a website received 668,500 visits during a given month. Approximately one-quarter of the visits are from users within the newspaper’s state, and three-quarters of visits are from users who reside out of state. The three “paywall” newspapers—The Spectrum, Greenville News, and the Tallahassee Democrat—comprise 4% of our sample. The other Gannett media sites serve as our control group to account for general trends in news consumption.

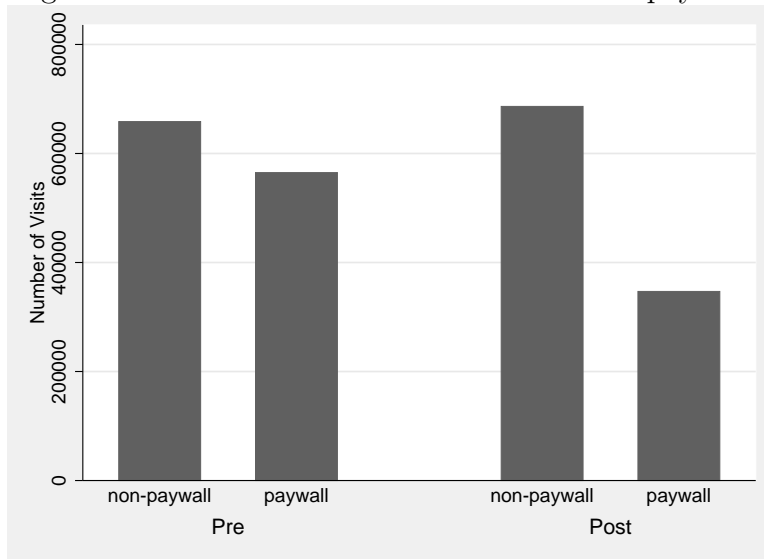
4 Empirical Analysis

We are interested in how the adoption of paywalls affected visits to the paywall sites. For our preliminary analysis, we focus on visits to each site by state. Figure 1 graphs the number of visits to sites before and after the paywalls were introduced for the Gannett sites. “Paywall” site refers to the three newspapers that eventually adopted paywalls, and “non-paywall” site refers to all other sites within our sample. As seen in the figure, paywall newspapers experience a decline in visits after the introduction of paywalls while other sites appear to experience relatively little change.

To explore this relationship more formally, we estimate the following regression for the logarithm of the number of visits to website i in month t :

$$\log(visits_{it} + 1) = \beta_0 + \beta_1 Post_t \times Paywall_i \quad (1)$$

Figure 1: Average number of visits to sites before and after paywalls implemented



Notes: This figure shows the number of visits to sites before and after the implementation of paywalls.

$$+ \alpha_i + \gamma_t + \epsilon_{it}$$

where *Paywall* is an indicator variable for whether a site is one of the three sites that adopted a paywall during our time period, and *Post* is an indicator variable equal to one after the paywalls were implemented. The coefficient α represents website fixed effects, and the coefficient γ represents month fixed effects. We employ a semi-log regression to account for differences in scale across the different sites. Since some states report no visits to a given sites within a month, we add a small positive number before taking the logarithm of visits. We cluster our standard errors at the website level. The main effects for *Paywall* and *Post* are dropped due to collinearity with monthly dummies and website fixed effects.

Given the semi-log specification, we interpret our estimated coefficients as the “ratio-of-ratios” (Mullahy, 1999). For instance, to determine the effect of paywall adoption on visits,

we compute the corresponding ratio-of-ratios:

$$\frac{\left\{ \frac{E[visits|Paywall=1,Post=1]}{E[visits|Paywall=1,Post=0]} \right\}}{\left\{ \frac{E[visits|Paywall=0,Post=1]}{E[visits|Paywall=0,Post=0]} \right\}} = exp(\beta_1). \quad (2)$$

For Equation (2) above, the fraction in the numerator (proportionately) compares the expected number of visits to a paywall site before and after the introduction of the paywall. The fraction in the denominator compares the expected number of visits to the control sites before and after the introduction of the paywall. The advantage of this interpretation is that we avoid the “retransformation bias” for estimating the number of visits from the semi-log regression. The expression offers a natural interpretation for the estimated coefficients directly (Mullahy, 1999). Consequently, $exp(\beta_1)$ captures the extent to which visits to paywall sites fall proportionately compared to visits to other sites after the adoption of the paywall. If this expression is less than one, then the “interaction” between paywall adoption and paywall sites is negative; visits to paywall sites decrease compared to other sites after paywall adoption. If this expression is equal to one, then no interaction effect exists. If this expression is greater than one, then the interaction is positive; visits to paywall sites increase compared to other sites after paywall adoption.⁹

Table 3 reports our results for the estimated coefficients in Equation (1). We use the ratio-of-ratios to interpret the estimated coefficients. As seen in Column (1), the estimated coefficient β_1 on $Post \times Paywall$ of -0.723 implies that the ratio-of-ratios $exp(\beta_1)$ is 0.49, which is less than one. After the adoption of paywalls, visits to sites are 49 percent of the level relative to the control group. In other words, visits to paywall sites fall by 51 percent after the implementation of paywalls. As expected, the implementation of paywalls led to a sharp decline in visits to a site.

⁹This interpretation is equivalent to a traditional difference-in-differences setup where a positive coefficient on the interaction term ($exp(\beta_1) > 1$) implies a positive effect on the treatment group; a zero coefficient ($exp(\beta_1) = 1$) implies no effect.

Table 3: Visits before and after the implementation of paywalls

	(1)	(2)	(3)
	All	In-state	Out-of-state
Post \times Paywall site	-0.723*** (0.156)	-0.696*** (0.186)	-0.819*** (0.180)
Website Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Observations	316	316	316
R-Squared	0.965	0.963	0.961

Notes: Robust standard errors clustered at website level. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. The dependent variable is the logarithm of visits plus one. The main effects for *Paywall* and *Post* are dropped due to collinearity with monthly dummies and website fixed effects. The number of observations reflects 4 months of data for 79 sites, i.e., $4 * 79 = 316$.

Table 4: Falsification check of visits before the implementation of the paywalls

	(1)	(2)	(3)
	All	In-state	Out-of-state
June \times Paywall site	-0.126 (0.110)	-0.199 (0.122)	0.139* (0.0827)
Website Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Observations	158	158	158
R-Squared	0.992	0.993	0.988

Notes: Robust standard errors clustered at website-state level. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. The dependent variable is the logarithm of visits plus one. The main effects for *Paywall* and *Post* are dropped due to collinearity with monthly dummies and website-state fixed effects.

In Table 4, we run a falsification exercise with our sample. A concern might be that the estimated effects of the paywall implementation reflect a pre-existing trend or decline in visits prior to the introduction of paywalls. For our falsification check, we restrict our data to the two months (May and June) prior to the paywall implementation, and we split this data into two time periods—where the variable *June* is a dummy variable equal to one for the month of June (the second half of this time period). As expected, our results suggest that a negative trend did not exist prior to the implementation; we cannot reject the hypothesis that the coefficients are zero.¹⁰

¹⁰In fact, we even observe a positive trend for out-of-state visits.

Our results indicate that paywall sites experienced a large decline in visits after the introduction of paywalls. Since newspapers form a multi-sided network between advertisers and users, how the decline will affect the other sides of the network will depend largely upon which users continue to use the network. In the next section, we consider the characteristics and behavior of the remaining users of the paywall.

5 Do Paywalls Shift the “Quality” of Reader Demographics?

In this section, we explore whether how a paywall shifts the demographics of the readership and the resulting public policy implications. We first examine how readership changes by geography and then investigate how readership changes by age, income, and gender.

We split our sample and run the regressions separately for users within and outside of the state whose news is covered by the newspaper. First, the demand for news may vary by a user’s location. For instance, readers of the Tallahassee Democrat who live outside of Florida—the area of news coverage—may respond differently to the paywall than readers of the site who live within Florida. Second, users within state are also more likely to be offline subscribers with access to online content.

In Table 3, Columns (2) and (3) run regression (1) for total visits by in-state and out-of-state users. We calculate the total number of visits that originate from users outside of the newspaper’s state. Table A-1 in the Appendix lists the city and state covered by each newspaper in our sample.

After the paywall adoption, visits by in-state users fall by 50 percent while visits by out-of-state users fall by 56 percent. Calculating the ratio-of-ratios, we find that paywall sites experience a slightly larger decline in visits by users located outside of the state compared

to users located inside of the state.¹¹ However, the coefficients are not precise enough to statistically distinguish the difference.

Next we examine three additional measures of demographics: age, income, and gender. We focus on these three categories, since Hitwise reports visits by age, income, and gender.¹² For each website, Hitwise reports the share of monthly visitors that fall into each demographic category. We run regressions similar to Equation (1) for each demographic category. Tables 5-7 report the results of the regressions. For instance, Column (1) of Table 5 reports the results of the regression for visits by users in the 18-24 age group during a given month; an observation reports the number of visits by users in the 18-24 age group to a particular site during a given month.

In Table 5, a general pattern emerges where visits fall to a much greater extent for younger visitors after the implementation of paywalls. For instance, visits by users of 18-24 years of age fall by 99 percent while visits by users over the age of 55 fall by 46 percent.¹³ In Table 6, the four columns report visits by each of the four income groups: <\$30,000, \$30,000-\$59,999, \$60,000-\$99,999, and >\$100,000.¹⁴ For the lowest income users in Group 1, the coefficient on $Post \times Paywall$ is significant at the 10.1% significance level. Given the magnitude of the coefficients, visits by users in the lowest income group fall by a larger amount than visits by higher income groups. For instance, visits by users with incomes below \$30,000 fall by 91 percent while visits by users with incomes above \$100,000 decline by 51 percent.¹⁵ Finally, in Table 7, visits by male users fall by more than visits by female users

¹¹To calculate the ratio-of-ratios for in-state users, we find that visits are 50 percent of their previous levels ($exp(-0.696) = 0.50$); in other words, visits fall by 50 percent ($= 1 - 0.50 = 0.50$). For out-of-state users, visits are 44 percent of previous levels ($exp(-0.819) = 0.44$); visits fall by 56 percent ($= 1 - 0.44 = 0.56$).

¹² We also perform falsification checks for each of the demographic categories, and we verify that no pre-existing trend exists in the dataset.

¹³To calculate the ratio-of-ratios, we find that visits by ages 18-24 are 1 percent of their previous levels ($exp(-4.895) = 0.01$). For users over 55, visits are 54 percent of previous levels ($exp(-0.608) = 0.54$).

¹⁴We combine the two highest income categories, since the fraction of visitors to each were relatively small. This gives us four equally-sized income brackets.

¹⁵To calculate the ratio-of-ratios, we find that visits by income group 1 are 9 percent of their previous levels ($exp(-2.464) = 0.09$); in other words, visits fall by 91 percent ($= 1 - 0.09 = 0.91$). For users in income group

Table 5: Visits by age group (1=lowest, 5=highest)

	(1)	(2)	(3)	(4)	(5)
	Group 1	Group 2	Group 3	Group 4	Group 5
Post \times Paywall	-4.895*** (0.705)	-1.832 (1.318)	-1.300*** (0.197)	-1.025*** (0.118)	-0.608*** (0.106)
Website Fixed Effects	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	316	316	316	316	316
R-Squared	0.614	0.724	0.699	0.834	0.956

Notes: Robust standard errors clustered at website level. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. The dependent variable is the logarithm of visits plus one. The five age categories from Group 1 to Group 5 are: 18-24, 25-34, 35-44, 45-54, and over 55 years of age. The main effects for *Paywall* and *Post* are dropped due to collinearity with monthly dummies and website fixed effects. The number of observations reflects 4 months of data for 79 sites, i.e., $4 * 79 = 316$.

Table 6: Visits by income group (1=lowest, 4=highest)

	(1)	(2)	(3)	(4)
	Group 1	Group 2	Group 3	Group 4
Post \times Paywall	-2.464 (1.484)	-0.603** (0.261)	-0.968*** (0.308)	-0.721** (0.276)
Website Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Observations	316	316	316	316
R-Squared	0.750	0.951	0.955	0.856

Notes: Robust standard errors clustered at website level. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. The dependent variable is the logarithm of visits plus one. The four income groups from Group 1 to Group 4 are: $< \$30,000$, $\$30,000-\$59,999$, $\$60,000-\$99,999$, and $> \$100,000$. The main effects for *Paywall* and *Post* are dropped due to collinearity with monthly dummies and website fixed effects. The number of observations reflects 4 months of data for 79 sites, i.e., $4 * 79 = 316$.

after the implementation of paywalls. Visits by male users decline by 58 percent while visits by female users decline by 42 percent. While the differences across demographics groups for the income and age brackets are not statistically significant, they are suggestive. The coefficient differences between the lowest age bracket (group 1) and the higher age brackets are significant the 1% level for group 2 and 5% level for groups 2-5.

The results suggest that the introduction of the paywalls dramatically shifts the readership away from young users. The decline in young readers is a cause of concern. In particular, 4, visits are 49 percent of previous levels ($\exp(-0.721) = 0.49$); visits fall by 51 percent ($= 1 - 0.49 = 0.51$).

Table 7: Visits by gender

	(1)	(2)
	Male	Female
Post \times Paywall	-0.858*** (0.159)	-0.538*** (0.203)
Website Fixed Effects	Yes	Yes
Month Fixed Effects	Yes	Yes
Observations	316	316
R-Squared	0.963	0.958

Notes: Robust standard errors clustered at website level. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. The dependent variable is the logarithm of visits plus one. The main effects for *Paywall* and *Post* are dropped due to collinearity with monthly dummies and website fixed effects. The number of observations reflects 4 months of data for 79 sites, i.e., $4 * 79 = 316$.

Lee and Wei (2008) find that a decrease in newspaper readership among 17- to 24- year olds is associated with a decline in political participation.

Our result is related to prior work that finds the Internet more generally has had the effect of drawing younger and more educated readers out of the market for traditional news (George, 2008). We find that younger readers are more price sensitive.

The decline in young readers also has potential implications for media organizations. In the short-run, high income readers remain and can subscribe to paywalls, generating revenues and preventing local newspapers from failing. However, in the long run, the ability to attract new readers and maintain circulation may be diminished. Losing a youthful audience on one side of the market could also affect pricing on the other side of the market. While advertising rates from Gannett were held fixed during their paywall experiment, some evidence exists that advertisers are willing to pay higher advertising rates for young audiences in other media such as television (Goettler, 1999).

Ultimately, the welfare implications and political externalities of paywalls will depend on what people do instead of visiting the paywall sites. It is particularly important that the trend to implement paywalls centers on local newspapers. Such local media presumably has fewer substitutes, so it may be likely that paywalls will lead to less local news consumption

overall. Other studies have found that lowering the costs of consumption can shift attention towards local news (Athey and Mobius, 2012).

6 Conclusion

Granting access and charging for online content has been a controversial issue. The debate over how to provide and whether to charge for information is particularly heated, since the dissemination of information by the Internet has also coincided with declining print circulation and advertising revenues. To our knowledge, our paper is the first to empirically study whether charging for content shifts the quality and composition of readers to media sites. On the one hand, some argue that because technological advances—such as the Internet—have created the plethora of alternative sources of information and lowered consumers’ costs of searching for news, consumers will not be willing to pay for content. On the other hand, others argue that information is highly differentiated and can be targeted to a specific geographic market or audience that readers will be willing to pay for such differentiated products.

We study a unique pricing experiment by a publisher that implemented paywalls at three of its local media sites. We find that imposing paywalls leads to a large decline in readership, particularly among young readers.

Our study has implications for the future of media. The introduction of paywalls disproportionately excludes young readers, which undermines policymakers’ attempts to create a comprehensive community. Scholars have emphasized that newspaper readership as imperative to the promotion of democracy and civic engagement (Putnam, 2000; Feddersen, 2004; Oberholzer-Gee and Waldfogel, 2009; Gentzkow et al., 2009).

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Appendix

A-1 Announcement by Patrick Dorsey, President and Publisher and Bob Gabordi, Executive Editor of Tallahassee Democrat

Today, we announce an historic change in how we do business

June 23, 2010

Three years before the first Model T automobiles rolled out of Henry Ford's factories, the Tallahassee Democrat began serving our communities with invaluable news and information.

Through the Great Depression, two world wars and dropping of the atomic bomb, the Cold War, man's first walk on the moon, civil rights, feminism and the ADA, we have been here. We helped you understand social change and civil unrest. We celebrated with you when the 'Noles brought home two national football championships. And we documented the resignation of a president and the impeachment and acquittal of another as well as historic elections in 2000 and 2008.

Today, as we struggle to fend off the worst environmental disaster in American history along our coast, we remain your best source of information with more reporters with greater experience on the oil spill story than all other local media outlets combined.

For more than 105 years, we have been proud to report on the cycles of local life, from the birth of your children and grandchildren to their achievements in school, graduations, weddings and children of their own to the passing of your parents and grandparents. We have been honored to help recognize local volunteers, small business excellence and the achievements of local women.

Our journalists continue to win important state and national awards for investigative and watchdog reporting on stories from pollutants seeping into Wakulla Springs to insurance reform to ecological change at Dog Island to the Rachel Hoffman case and bureaucratic inefficiencies that hurt the homeless. We have worked hard to bring attention to government waste and shameful infant-mortality rates and have fought for the public's right to know and access its government, even taking on the powerful NCAA and winning.

As other news outlets have pulled away from coverage of state government, we have remained steadfast in our commitment to the most complete coverage of news for state employees and about Florida government. And, simply put, no one covers our two universities or Tallahassee Community College better than we do, on and off the athletic fields.

In recent years, some have openly wondered if the type of journalism that has sustained democracy since the American Revolution can survive. We have innovated in how we deliver news, but have operated under an old business model for how we pay for that journalism.

Today, we are announcing an historic change in how we do business, becoming one of the first community news outlets to take decisive steps toward protecting the journalism so vital to the social and economic well being of our community, now and long into the future.

Beginning July 1, we will be introducing a new model for our subscribers to pay for and access our valuable content either in print or online:

- Full-media content/dual delivery: All current home delivery subscribers will receive this model. A single subscription entitles you to all of our media, in print delivered to your home or office, online on Tallahassee.com, NoleSports.com, RattlerNews.com and affiliated websites, and through an electronic edition that replicates the print edition on Tallahassee.com. As a subscriber, you benefit from ALL we have to offer, from home delivery to 24/7 digital coverage on Tallahassee.com. As they do now, rates will vary based on home delivery frequency of delivery. Current subscribers will receive information on their rates in the mail, or call 800-999-2271 for more information.
- Full-media content/electronic delivery (digital and e-edition): For \$14.95 per month, you get all of our websites and the e-edition replica version of the Tallahassee Democrat.
- Web content (digital-only model): For \$9.95 per month, you can subscribe to Tallahassee.com, NoleSports.com, RattlerNews.com and the full suite of Tallahassee.com affiliated websites.
- Single copy and day passes: Copies of the printed Tallahassee Democrat will continue to be sold in vending machines and through local retail outlets. You can also get a 24-hour pass on our websites for \$2 per day.

Although our exclusive local and other website content will require a subscription, website users will still have free access to all of our section fronts, classifieds, local search and shopping channels, including, but not limited to, CareerBuilder.com, Apartments.com, HomeFinder.com, FindItNow.com, MomsLikeMe.com and eHarmony.com.

For our advertising customers, we will continue to deliver the best audience reach across our deep suite of print and digital products to deliver customers for your goods and services. The new model will give us enhanced capabilities to target your marketing message.

We believe in our hometown, and our reporting is all about giving our readers and advertisers a sense of place the big and the small things that are going on in our community, where we live and work. We bring to you the news on local people, events, entertainment, businesses, sports and more in our pages and online on a daily basis.

In reality, more people are reading us now than ever before in print and online. It no longer seems fair to have only half of our readers pay for content while the other half reads for free online. This is about changing how we do business, not simply putting up a paywall on digital content.

We take great pride in serving the needs of our readers, and the role we have played in your lives and your families' lives for more than a century. We believe these dramatic and bold changes announced today will help ensure we are here serving our communities through our journalism well into this century and beyond.

Table A-1: Gannett media sites in sample

Newspaper	Location
Argus Leader, Sioux Falls	Sioux Falls, SD
Asbury Park Press	Asbury, NJ
Asheville Citizen-Times	Asheville, NC
Battle Creek Enquirer	Battle Creek, MI
Chillicothe Gazette	Chillicothe, OH
Coshocton Tribune	Coshocton, OH
Courier-Post, Cherry Hill	Cherry Hill, NJ
Daily Press & Argus, Livingston County	Howell, MI
Daily Record, Parsippany	Parsippany, NJ
Daily World, Opelousas	Opelousas, LA
Detroit Free Press	Detroit, MI
Florida Today, Brevard County	Brevard, FL
Fort Collins Coloradoan	Fort Collins, CO
Great Falls Tribune	Great Falls, MT
Green Bay Press-Gazette	Green Bay, WI
Hattiesburg American	Hattiesburg, MS
Herald Times Reporter, Manitowoc	Manitowoc, WI
Indianapolis Star	Indianapolis, IN
Iowan City Press Citizen	Iowa City, IA
Journal and Courier, Lafayette	Lafayette, IN
Lancaster Eagle-Gazette	Lancaster, OH
Lansing State Journal	Lansing, MI
Marshfield News-Herald	Marshfield, WI
News Herald, Port Clinton	Port Clinton, OH
News Journal, Mansfield	Mansfield, OH
Observer & Eccentric, Newspapers, Livonia	Livonia, MI
Oshkosh Northwestern	Oshkosh, WI
Palladium-Item, Richmond	Richmond, IN
Pensacola News Journal	Pensacola, FL
Poughkeepsie Journal	Poughkeepsie, NY
Press & Sun-Bulletin, Binghamton	Binghamton, NY
Reno Gazette-Journal	Reno, NV
Rochester Democrat and Chronicle	Rochester, NY
Springfield News-Leader	Springfield, MO
St. Cloud Times	Saint Cloud, MN
Star-Gazette, Elmira	Elmira, NY
Statesman Journal, Salem	Salem, OR
Stevens Point Journal	Stevens Point, WI
Tallahassee Democrat	Tallahassee, FL
Telegraph-Forum, Bucyrus	Bucyrus, OH
The Advocate, Newark	Newark, OH
The Arizona Republic, Phoenix	Phoenix, AZ
The Baxter Bulletin	Mountain Home, AR
The Burlington Free Press	Burlington, VT
The Cincinnati Enquirer	Cincinnati, OH
The Clarion-Ledger, Jackson	Jackson, MS
The Courier-Journal, Louisville	Louisville, KY
The Daily Advertiser, Lafayette	Lafayette, LA
The Daily Journal, Vineland	Vineland, NJ
The Daily News Journal, Murfreesboro	Murfreesboro, TN
The Daily News Leader, Staunton	Staunton, VA
The Daily Times, Salisbury	Salisbury, MD
The Daily Tribune, Wisconsin Rapids	Wisconsin Rapids, WI
The Des Moines Register	Des Moines, IA
The Desert Sun, Palm Springs	Palm Springs, CA
The Greenville News	Greenville, SC
The Ithaca Journal	Ithaca, NY
The Jackson Sun	Jackson, TN
The Leaf-Chronicle, Clarksville	Clarksville, TN
The Marion Star	Marion, OH
The Montgomery Advertiser	Montgomery, AL
The News Journal, Wilmington	Wilmington, DE
The News-Messenger, Fremont	Fremont, OH
The News-Press, Fort Myers	Fort Myers, FL
The News-Star, Monroe	Monroe, LA
The Post Crescent, Appleton	Appleton, WI
The Reporter, Fond du Lac	Fond du Lac, WI
The Salinas Californian	Salinas, CA
The Sheboygan Press	Sheboygan, WI
The Spectrum, St. George	St. George, UT
The Star Press, Muncie	Muncie, IN
The Tennessean, Nashville	Nashville, TN
The Times, Shreveport	Shreveport, LA
The Town Talk, Alexandria	Alexandria, LA
Times Herald, Port Huron	Port Huron, MI
Times Recorder, Zanesville	Zanesville, OH
Tucsoncitizen.com	Tucson, AZ
Visalia Times-Delta	Visalia, CA
Wausau Daily Herald	Wausau, WI

Notes: This table lists the 79 Gannett local media sites that appear within our sample of visits.