

BROADBAND USE AND CIVIC ENGAGEMENT

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# **BROADBAND USE AND CIVIC ENGAGEMENT**

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## **ABSTRACT**

In recent years, federal and state governments have placed strong emphasis on building out broadband Internet connections in the United States. Given the technological capabilities associated with high-speed Internet, and the opportunities for civic engagement that exist online, I examine whether broadband Internet results in a citizenry that is more aware of, and involved with, community and political affairs. Through quantitative analysis of data from the Pew Internet & American Life Project, I find positive correlations between broadband use — as measured by household broadband connections, blogging, using social networking sites, and getting news online — and several indicators of civic engagement. In particular, broadband is well suited to enhancing activities that are predicated on access to sufficient information, such as discussing politics or registering to vote. It does not, however, affect more fundamental perceptions such as perceived ability to make a difference in one's community. Overall, there is ample evidence to further support the theory that high-speed Internet, both in terms of the physical presence of a connection and the applications it enables, has a positive impact on the extent to which Americans participate in civic life. My findings suggest that widespread deployment of broadband infrastructure can help support democratic institutions and enrich communities.

To my parents, for their unwavering support and for stimulating my interest in the subject matter related to this thesis; and to Andrew Wise, my advisor, for his expert advice and for precluding procrastination as an option.

Many Thanks,  
Rafi M. Goldberg

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## 1. Introduction

As with railroads, phone service, and other modern infrastructure, recent advancements have ignited a movement towards building out broadband Internet connections in the United States. Justification for investing in broadband is based in part on the notion that fast and persistent Internet connections deliver the promised benefits of a connected society. The National Broadband Plan (“the Plan”) published by the Federal Communications Commission (FCC) details a number of such benefits, including an entire chapter devoted to civic engagement. The FCC notes in the Plan that government can use broadband to deliver multimedia and other transparency-enhancing applications requiring persistent access to high bandwidth (FCC 2010). The technological capabilities associated with broadband are impressive and easily observable, yet the question remains whether broadband tends to result in a citizenry that is more aware of, and involved with, community and political affairs. I examine whether, given the current opportunities for civic engagement that exist online, broadband connections demonstrably increase such activity. Given the ease with which broadband can provide information and connect individuals who share common interests, my hypothesis is that broadband Internet access does lead to higher levels of civic engagement.

In a recent study, the National Telecommunications and Information Administration (NTIA) found that the proportion of Americans with broadband Internet connections has increased dramatically, from just 4.4 percent of households in August 2000 to 68.2 percent of households as of October 2010. The large majority of Internet users now use a broadband connection, with dial-up connections present in just 2.9 percent of households as of October 2010. While these numbers may at their face suggest that broadband access is already a foregone conclusion, the overall statistics mask substantial disparities in access to broadband technology, as well as

drawing attention away from the 28.9 percent of households with no Internet connection at all. Statistically significant disparities in broadband use have been found based on age, race, income, population density, and other factors (NTIA 2011). This gap between persons with broadband and those without is sometimes referred to as the “digital divide,” and it is a driving force behind government efforts to invest in bringing broadband to areas where the private sector has not deemed it profitable to build out the necessary infrastructure. Given that government probably cannot build a network any more cheaply than a private firm, it is important to assess the societal benefits incurred by such an investment of taxpayer money. A positive association between broadband use and civic engagement would suggest substantial advantages to universal access, including more active participation in community life and a government that is more responsive to the entirety of its constituency.

I test my hypothesis using survey data on Americans’ participation in civic life and Internet usage habits by employing multivariate regression. I begin by placing this question in the context of previous research and contemporary thinking related to civic engagement, broadband use, and the potential for the information age to influence trends in active citizenship. Second, I propose a mathematical model for civic engagement that focuses on broadband and its associated applications, and then I follow up by detailing an empirical method for estimating this model in the third section. In the fourth section, I detail the collected data, and following that I report my results. In the final sections, I interpret my findings, and attempt to draw conclusions about the relationship between broadband use and civic engagement.

## 2. Background and Literature Review

I turn to previous academic literature in search of a concrete definition of civic engagement, and methods of measuring its magnitude in individuals. Some of the most cited work in this field

is by Robert Putnam, who in a journal article and subsequent book explores the decline of social capital in the United States. Putnam sorts indicators of civic engagement into several groups, including political participation, organizational membership, and informal social capital such as family and neighborhood ties. In other words, he conceives of civic engagement as encompassing many forms of participation in community life. In examining various indicators, Putnam comes to the chilling conclusion that “democratic disarray may be linked to a broad and continuing erosion of civic engagement” (Putnum 1995).

Given this alarming decline, subsequent studies in this field have understandably focused on what causes the set of behaviors we refer to as civic engagement. One important finding is that “people who hold a value commitment to benefit the collective” are more likely to be civically engaged, suggesting that the inculcation of community-centric values can translate into behavior consistent with those values (Funk 1998). In a related vein, there is evidence that church attendance and other religious activities also lead to greater involvement in civil society (Smidt 1999). A subsequent study of children’s attitudes towards community service and citizenship reveals that interpersonal trust, religious valuation, and “individualistic attribution of social responsibility” are predictors of civic orientation, which are “the values and habits that lead to civic engagement” (Crystal and DeBell 2002). Opportunities can also influence civic engagement, as demonstrated by the G.I. Bill’s success in enhancing “civic capacity and predisposition for involvement” (Mettler 2002). Education also affects civic engagement, as D. Sunshine Hillygus finds that “verbal SAT scores and a social science curriculum are related to future political engagement” (Hillygus 2005). A final study builds upon previous research to confirm that nonpolitical associations, including informal socializing, public attendance, and

interpersonal trust, “contribute to participation in collective action” (Kwak, Shah, and Holbert 2004).

Having gained an understanding of what civic engagement is and what causes it, I next look to understand why it may be important enough to warrant government stimulation. A decline in civic engagement, which can include such symptoms as decreased voter turnout or a lack of volunteers to work in a soup kitchen, may be understood intuitively as somehow bad for society, but what are the measurable consequences? In one attempt to answer this question, Tolbert, Lyson, and Irwin examine data on small businesses in the United States and conclude that communities of civically engaged religious denominations may experience greater socioeconomic outcomes (Tolbert, Lyson, and Irwin 1998). In a different example, Kirlin and Kirlin analyze Americans’ response to the terrorist attacks on September 11, 2001 to find that “increased civic engagement strengthens democracy and can contribute to the development of public judgment, which is critical to sustaining support of efforts to thwart terrorism” (Kirlin and Kirlin 2002). Evidence of the practical need for civic engagement even extends into the world of nonprofits, with Jeffrey Berry arguing that the federal tax code’s discouragement of nonprofits from engaging in political advocacy has dire implications. He notes that “nonprofits usually are the only organizations that work on behalf of the poor” and other vulnerable groups, so a lack of participation in political discourse by these groups skews policy outcomes (Berry 2005). Brandon Soublet’s analysis of the effect of the 501(h) election on nonprofits further emphasizes Berry’s point, finding that participating in the election may be “a way to enhance the political activity of nonprofits who perceive government funding as a barrier to entry into the policy process” (Soublet 2010).

If civic engagement is an important and measurable output, then my next task is to examine broadband use as an input. Before broadband connections became the norm among American Internet users, many attempts were made to measure the effects of Internet access on various areas of public policy. A range of topics has been examined, with one study suggesting that comparison shopping web sites enabled “the growth of the Internet [to reduce] term life [insurance] prices by 8–15 percent” during the 1990s (Brown and Goolsbee 2002). Thanks to the efficiencies enjoyed by online bookstores, another analysis “indicates that the increased product variety of online bookstores enhanced consumer welfare by \$731 million to \$1.03 billion in the year 2000” (Brynjolfsson, Hu, and Smith 2003). As broadband access has become more mainstream, recent studies have focused on how this type of connection leads to different results compared with dial-up use. Stephen A. Rains, for example, uses National Cancer Institute survey data to find that “those with a broadband connection were more likely to use the Internet for health-related information seeking and communication than those with a dial-up connection” (Rains 2008). Other studies examine the relationship between broadband deployment and economic development, suggesting “a positive relationship between broadband expansion and employment growth” (Kolko 2010). Crandall, Lehr, and Litan specifically suggest that “a one percentage point increase” in broadband deployment “is associated with nearly 300,000 more jobs” (Crandall, Lehr, and Litan 2007). The research suggests that, in addition to Internet use in general affecting outcomes, broadband connections have particular effects warranting separate examination.

Finally, several attempts have been made to measure the impact of the information age on civic engagement. Despite Internet use more than doubling between 1996 and 1999, Bruce Bimber finds no link between Internet use and levels of political activity, except for

campaign donations (Bimber 2001). As more data became available, however, the observed impact of Internet access began to change. Respondents who reported access to online election news “were significantly more likely to report voting in the 1996 and 2000 presidential elections” (Tolbert and McNeal 2003). Another study from the same period finds that reliance on the Web for political information positively influences the feeling that respondents have the “power to bring about political change” (Johnson and Kaye 2003). In asking the most similar question to my own, Jennings and Zeitner conduct a longitudinal analysis to assess the relationship between Internet use and civic engagement with mixed results, finding positive effects on some indicators, based in part on generational differences (Jennings and Zeitner 2003).

While previous work has begun to relate civic engagement to Internet use in general, there has been no specific treatment of broadband or the applications it enables. According to the Census Bureau, approximately 3 percent of households reported having a dial-up connection in 2010, compared with 11 percent in 2007 and 35 percent in 2003 (NTIA 2011). At the same time, data suggest that “the diffusion of the Internet has become more rather than less polarized by family income in the United States” (Martin and Robinson 2007). In other words, besides inherent interest in how broadband may affect civic engagement, such an association would imply that low-income families are disproportionately missing out on any benefits. The speed and persistence of broadband connections have changed the character of Internet use, leading a wide range of users to participate in online social networks, share ideas on blogs, and access a constant stream of multimedia news updates. These new applications may have profound effects on civic engagement, and given widespread interest both in strategies for enhancing civic engagement and in ensuring proper investment of taxpayer money, this topic has important public policy implications. This study therefore seeks to capture the impact of broadband use on indicators of

civic engagement, which in light of recent advancements may differ significantly from the impact of a less-developed Internet accessed primarily via dial-up connections.

### 3. Theoretical Model

Based on the existing literature and consistent with my hypothesis that broadband use does influence civic engagement, I conceive of a general formula predicting civic engagement levels in the following fashion:

$$\text{Civic Engagement} = f(\text{Connectivity}, \text{Values}, \text{Community}, \text{Time}, \epsilon) \quad (1)$$

Connectivity measures how easily an individual can obtain information about his environment and interact with others in a community. Broadband use falls under this category. The other factors that seem to influence civic engagement are Values; community factors such as population density, liberty, and existing levels of community involvement (Community); and the amount of free time a person has for activities outside of work and other responsibilities (Time). “ $\epsilon$ ” represents the random error inherent in any observational study. As discussed, previous work on civic engagement points to the importance of these factors, for example the established association between religious affiliation and civic engagement, which could speak to both personal values and the community environment. Ultimately, civic engagement requires having both the means (Time and Connectivity) and the motivation (Values and Community) to participate.

### 4. Empirical Model

In my attempt to assess the impact of broadband use on civic engagement using real-world data, I propose the following econometric model:

$$\text{Civic Engagement} = \beta_0 + \beta_1(\text{Broadband at Home}) + \beta_2(\text{Blogger}) + \beta_3(\text{Social Networking}) + \beta_4(\text{Online News}) + \beta_5(\text{Old Media Attentiveness}) + \beta_6(\text{Age}) + \beta_7(\text{Gender}) + \beta_8(\text{Education}) + \beta_9(\text{Income}) + \beta_{10}(\text{Race}) + \beta_{11}(\text{Married}) + \beta_{12}(\text{Parent}) + \beta_{13}(\text{Student}) + \beta_{14}(\text{Religious Attendance}) + \varepsilon \quad (2)$$

I test this model using different regression techniques depending on the form of the dependent variable, as discussed in the Results section, below. In this model, I employ four different variables to measure broadband use. The first simply measures the presence or absence of a broadband Internet connection at home. The next three variables measure specific applications that are commonly used with broadband connections. One identifies whether respondents write for a blog, another measures the use of social networking sites such as Facebook, and the third is based on whether respondents obtain news-related information online.

The remaining variables control for various demographic factors that can affect the results. I measure attentiveness to “old” (e.g. television and newspapers) media to control for whether a respondent’s use of online news is simply a manifestation of attentiveness to current events in general. I also take age, gender, education, income, and race into account as potentially important factors impacting civic engagement levels. Marital status, parental status, student status, and religious attendance further control for demographic disparities.

Consistent with the literature and my own hypotheses, I anticipate the direction of the relationships between the variables in my model and civic engagement. The four measures of broadband use will, in my estimation, correlate positively with civic engagement. I hypothesize that having broadband at home will lead to higher levels of civic engagement based on the enhanced ability to obtain up-to-date information on community events and current issues. Similarly, I expect blogging and social networking to lead to increased civic engagement due to the connections fostered with others who share similar priorities and experiences. A parent who

is interested in local education issues, for example, may be more likely to attend a school board meeting if he is in touch with other like-minded parents. Along the same lines, I anticipate that getting news online enhances civic engagement due to heightened awareness, and in particular the ability to obtain more news related to local matters or more obscure issues that lack the wide appeal necessary to make the news on a major television network or in a large-circulation newspaper.

My sign expectations for demographic factors are varied. Similar to my expectation of a positive coefficient for getting news online, I believe old media attentiveness will correlate positively with civic engagement because the news is informative, and civic engagement requires individuals to have some sense of what is currently happening in their communities and the discourse on issues of the day. Age should also have a positive coefficient, as older respondents are more likely to engage in activities such as voting (U.S. Census Bureau 2010). My expectations for education and income are similar; more education likely leads to more information that enables civic engagement, and a greater income may leave individuals with more free time for involvement as they might not have to work longer hours to make ends meet.

The rest of the demographic controls are binary variables, so sign expectations are a function of how each variable is coded in my dataset. For gender, I expect females to show higher levels of civic engagement than their male counterparts, based on my own speculation as well as demonstrated greater voter turnout among women (Rutgers 2009). Literature has also persuaded me that regular religious attendance will indicate increased levels of civic engagement (Smidt 1999), so I expect a similar finding in my own study. I expect married respondents and parents to be more involved with their communities due to greater community attachment, while students will show less civic engagement because they tend to be younger and lack such attachment.

Finally, I do not anticipate significant effects for race because I am holding income, education, and other factors constant; my hypothesis is that any observed differences in civic engagement based on race are largely due to disparities in those areas.

## 5. Data

Having established a formal framework with which to assess the relationship between broadband use and civic engagement, I seek to apply this model to real-world data. I collected data from the August 2008 edition of the Pew Internet & American Life survey, which focused on civic engagement. From these data, I formed a panel dataset with between 1,638 and 1,661 observations, depending on the regression. The Pew study asked respondents a range of questions indicative of civic engagement, including participation in community groups, voter registration, charitable contributions, and political activism. Pew also asked about Internet access and use, including the type of Internet connection at home (cable, DSL, dial-up, etc.), and the use of common applications like social networking sites and blogs. Some demographic information was also included, such as each respondent's age, gender, race, education level, community density (urban, suburban, rural), and income range. Following are descriptive statistics for the collected variables:

Table 1: Descriptive Statistics					
Variable	N	Mean	Standard Deviation	Minimum	Maximum
Age	2198	53.49409	17.48806	18	96
Volunteerism	2251	1.238116	1.598662	0	8
Broadband at Home *	2184	1,246	0.4951163	0	1
Female *	2251	1,162	0.499848	0	1
Education	2230	1.874439	0.9986179	0	3
Black *	2206	195	0.2839333	0	1
Hispanic *	2206	117	0.2241584	0	1
Other Race *	2206	93	0.2009945	0	1
White *	2206	1,801	0.3872374	0	1
Married *	2234	1,301	0.49328	0	1
Parent *	2247	601	0.4427369	0	1
Student *	2235	179	0.2714924	0	1
Regular Churchgoer *	2230	946	0.4943342	0	1
Income Range	1757	4.198634	2.385138	0	8
Blogger *	2250	173	0.2664743	0	1
Uses Social Networking *	2247	410	0.3863137	0	1
Gets News Online *	2250	1,254	0.4968124	0	1
Registered To Vote *	2231	1,910	0.3510484	0	1
Political Discussion Rate	2238	2.333333	1.389875	0	4
Impact On Community	2187	1.857339	0.9355952	0	3
Gave To Charity *	2243	1,613	0.4495262	0	1
Importance of Old Media	2239	2.555605	0.6949412	0	3
* Binary variable, where a value of 1 indicates the presence of a condition and 0 indicates its absence. For binary variables, the mean is replaced with the number of observations where the value equals 1.					

As described in Table 1, all variables marked with an asterisk are binary variables, where a condition is present if the value is one and absent if the value is zero (e.g., a respondent is registered to vote if the value of that variable is one for the observation in question). Age is a continuous variable, beginning at 18, that signifies the respondent's age in years at the time of the survey. The remaining variables, volunteerism, education, income range, political discussion rate, impact on community, and importance of old media are all ordinal-level variables. Those ordinal variables used as indicators of civic engagement, which include volunteerism, political discussion rate, and impact on community, are discussed in the Results section, below. Education equals zero for respondents who did not complete high school, one for high school graduates

without higher education, two for respondents who attended college but did not earn a degree, and three for college graduates. Income range equals zero if family income is below \$10,000 per year, one if greater but below \$20,000 per year, two if greater but below \$30,000 per year, three if greater but below \$40,000 per year, four if greater but below \$50,000 per year, five if greater but below \$75,000 per year, six if greater but below \$100,000 per year, seven if greater but below \$150,000 per year, and eight if greater than \$150,000 per year. Finally, the importance of old media variable is zero if respondents do not consider television, newspapers, or radio to be at all important to their obtaining of political information, one if at least one of those media is “not too important”, two if “somewhat important”, and three if “very important.”

## 6. Results

Using the described dataset, I employ five different measures of civic engagement, each of which is represented in a separate regression, but with the same independent variables. First, I regress my independent variables on volunteerism, as measured by the number of types of volunteer events respondents indicate attending during the past twelve months, using a tobit model. The tobit model allows specification of a lower or upper bound in the dependent variable, in this case enabling me to account for the fact that the value of volunteerism can never be less than zero, and that many observations do in fact report zero volunteerism. The second indicator of civic engagement is political discussion rate, or how often respondents say they discuss politics. I model this indicator using ordered probit, as the answer choices represent ordinal ranking assessments of relative frequency (i.e. a value of zero means “never,” one means “less than once per month,” two means “at least once per month,” three means “once per week,” and four means “daily”). Third is voter registration status, represented as a binary variable, and modeled using probit. Fourth is respondents’ perceived ability to make a difference in their

communities, which is modeled using ordered probit because the answer choices are structured in a similar fashion to political discussion rate. The final indicator I use is a binary variable representing whether respondents made a charitable donation during the past twelve months, modeled using probit. Diagnostic statistics for each regression are listed in Table 2, while coefficient estimates and robust standard errors are listed in Table 3.

<b>Table 2: Diagnostic Statistics for Models of Civic Engagement</b>			
<b>Model</b>	<b>McFadden's R<sup>2</sup></b>	<b>Number of Observations</b>	<b>F-Statistic or Chi<sup>2</sup>-Statistic</b>
<b>Volunteerism</b>	0.0661	1,661	23.45 ** (F)
<b>Political Discussion Rate</b>	0.0615	1,657	295.97 ** (Chi <sup>2</sup> )
<b>Registered to Vote</b>	0.1987	1,651	212.67 ** (Chi <sup>2</sup> )
<b>Impact on Community</b>	0.0445	1,638	175.23 ** (Chi <sup>2</sup> )
<b>Gave to Charity</b>	0.2064	1,658	340.33 ** (Chi <sup>2</sup> )
<b>** indicates 99% confidence that the regression is statistically significant</b>			

Table 3: Regressions of Broadband and Demographic Variables on Indicators of Civic Engagement										
Regression On:	Broadband at Home	Blogger	Uses Social Networking	Gets News Online	Age	Female	Education	Black		
<b>Volunteerism</b>	0.1875141 (0.1750503)	0.9865815 ** (0.2282133)	0.1119141 (0.1822733)	0.8357104 ** (0.1674761)	0.0046917 (0.0053475)	-0.2242132 † (0.1298198)	0.5069305 ** (0.0780114)	0.3582536 (0.2283815)		
<b>Political Discussion Rate</b>	0.155713 * (0.0742451)	0.2233195 * (0.0982022)	0.0739653 (0.0813569)	0.3502118 ** (0.0717644)	0.0036656 † (0.0021401)	-0.117165 * (0.0545717)	0.127972 ** (0.0325352)	0.0678757 (0.0987301)		
<b>Registered to Vote</b>	0.3320873 ** (0.1109652)	-0.2805399 † (0.1558722)	-0.0734979 (0.1272223)	0.1666096 (0.1079291)	0.0199558 ** (0.0033294)	0.1686164 † (0.0884138)	0.2679121 ** (0.0497062)	0.5469481 ** (0.1762417)		
<b>Impact on Community</b>	0.1058286 (0.0708898)	0.087916 (0.10348)	0.0911037 (0.0802335)	0.0786698 (0.0696138)	-0.0094938 ** (0.0023006)	0.0689097 (0.0544187)	0.0895243 ** (0.0327254)	0.249368 * (0.1025426)		
<b>Gave to Charity</b>	0.0827931 (0.0993141)	0.0466035 (0.1414675)	0.0641379 (0.1116868)	0.3017402 ** (0.098237)	0.0101043 ** (0.0028532)	0.2762476 ** (0.0758208)	0.2599135 ** (0.0439562)	-0.6272737 ** (0.1239748)		
Regression On:	Hispanic	Other Race	Married	Parent	Student	Regular Churchgoer	Income Range	Importance of Old Media		
<b>Volunteerism</b>	-0.2341109 (0.3224983)	-0.0183999 (0.3591844)	-0.1396278 (0.157731)	0.3102485 † (0.1593747)	0.4565687 † (0.2426648)	0.5253587 ** (0.1310013)	0.1785076 ** (0.0355166)	0.3026881 ** (0.1041374)		
<b>Political Discussion Rate</b>	-0.1957328 (0.1266678)	-0.1566521 (0.154236)	0.0272877 (0.065183)	0.0576024 (0.066774)	0.1010741 (0.1072356)	0.0922824 † (0.0555091)	0.0244195 (0.0156727)	0.4535986 ** (0.0437794)		
<b>Registered to Vote</b>	-0.0002653 (0.1911912)	-0.5301839 ** (0.1872)	0.319365 ** (0.1006291)	-0.0256826 (0.107037)	-0.1641615 (0.1567448)	0.2870173 ** (0.091569)	0.0584067 * (0.0232039)	0.2381768 ** (0.0567186)		
<b>Impact on Community</b>	-0.2475179 * (0.1168103)	-0.1778011 (0.1342948)	0.0889513 (0.0670644)	0.1429396 * (0.0681725)	0.1971545 † (0.1039372)	0.1941954 ** (0.0566309)	0.020361 (0.0154992)	0.1286175 ** (0.0443481)		
<b>Gave to Charity</b>	-0.1051862 (0.1642718)	0.0016251 (0.1801695)	0.0875865 (0.086269)	-0.0098439 (0.0954088)	0.038947 (0.1409285)	0.3406999 ** (0.0780585)	0.1660202 ** (0.020918)	0.1424004 * (0.0557524)		
Estimates listed with robust standard errors in parenthesis. † indicates 90% confidence, * indicates 95% confidence, ** indicates 99% confidence										

## Broadband at Home

In each of the five models, four binary variables are used to represent broadband use: whether respondents have broadband connections at home; whether they blog; whether they use social networking applications; and whether they get news-related information online.<sup>1</sup> Having broadband at home has statistically significant effects on two of the five indicators of civic engagement, including political discussion rate and voter registration status. In both cases (as well as in the three models where the variable fails to achieve significance), the coefficient estimates are expectedly positive, suggesting that the presence of a broadband Internet connection at home positively influences those aspects of civic engagement. Particularly of note is that this variable's significance in these two models comes despite measuring it separately from the three associated applications (blogging, social networking, and getting news online) that are also in the model. Therefore, the presence of broadband by itself positively influences certain kinds of civic engagement, irrespective of particular applications used.

The magnitude of the effect of having broadband at home on the aforementioned measures of civic engagement suggests it is a relatively important factor, considering the role of values and other intangible sentiments in civic engagement. Using the average partial effects method of estimating the real magnitude of probit coefficients, the model projects that the average respondent is 5.8 percentage points more likely to be registered to vote if he or she has a broadband Internet connection at home. Of course, a truly average respondent does not exist, particularly given the preponderance of binary variables in the regression (for example, because

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<sup>1</sup> While blogging, social networking, and getting news online are all technically possible using a dial-up connection, such activities are overwhelmingly pursued over broadband due to the infrequency of dial-up use by the time of data collection for this study (see, e.g., NTIA 2011).

approximately 58 percent of respondents are married, this method assumes the value of the “married” variable to be 0.58, even though any given observation will either have a value of one or zero). In an attempt to better understand the effect of home broadband on voter registration, I further calculated that the likelihood of registration for the average male increases by 6.4 percentage points, and for the average female by 5.2 percentage points. The impact of having high-speed access to information at home is relatively large, though apparently even bigger for men than for women.

A similar analysis for the effect of broadband at home on the political discussion rate is also possible, albeit more complex due to the model’s use of ordered probit. In this case, the presence of five different possible outcomes requires observing how the likelihood of each outcome is altered. For the fictional average respondent, having broadband at home results in the likelihood of never discussing politics decreasing by 3.3 percentage points, and decreases the likelihood of doing so less than once per month by 1.2 percentage points. The middle outcome, discussing politics at least once per month (but less than once per week), decreases in likelihood by just 0.1 percentage points for the average respondent. The odds of having political discussions at least once per week increases by 1.2 percentage points, and finally, the likelihood of participating on such conversations on a daily basis increases by 4.2 percentage points. In summary, the average respondent is more likely to talk about politics frequently, and less likely to do so infrequently, if he has a broadband Internet connection at home.

While broadband at home has significant effects on political discussion rate and voter registration status, it does not show significance in the volunteerism, perceived ability to impact one’s community, or charitable giving models. The distinction here seems to be between

activities that are primarily a matter of having sufficient information, and those that require a higher level of dedication. Discussing politics implies knowing something about current issues, and registering to vote requires knowing the process and locating the appropriate paperwork in one's jurisdiction, but neither is a particularly demanding task. Volunteerism, on the other hand, requires a greater time commitment, and charitable giving is a financial obligation. Furthermore, the perceived ability to make a difference in the community seems to be a matter of feeling inspired or optimistic, which might have more to do with personal values than access to information. The impact on community model is the only regression where none of the four broadband variables is significant. Unlike the other four models, this is the only measure of civic engagement that speaks solely to perceptions rather than actions, and it would appear that information and communication do little to influence such fundamental beliefs.

### **Blogger**

The second variable representing broadband use is whether respondents report writing or contributing to a blog. Blogging shows statistically significant effects on volunteerism, political discussion rate, and voter registration status. While the positive coefficients for volunteerism and political discussion rate are in line with expectations, the negative estimate of blogging's effect on voter registration status is surprising, particularly as it is the only statistically significant negative coefficient for a broadband-related variable in any of the five regressions (though it should be noted that its significance is limited to the 90 percent confidence level). That said, there is some doubt associated with all of the estimates for bloggers given the possibility that my model might be confusing cause and effect. Given that blogging is a time-consuming activity often requiring some level of dedication, it is possible that being civically engaged might

motivate an individual to blog, rather than blogging (solely) influencing civic engagement.

Alternately, it is possible that bloggers are more cynical or otherwise differently-motivated than the general population. Any attempt to untangle the true relationship between blogging specifically and civic engagement would be an interesting topic for future work.

Based on the reported coefficient, bloggers are projected to participate in 0.99 more of the activities asked about under the umbrella of volunteerism than non-bloggers, although this estimate only applies to individuals who have participated in any volunteer work over the past year. This would appear to be a modest but significant relationship between blogging and volunteerism, although as discussed above, the direction of the relationship is unclear. For the effect on political discussion rate, being a blogger decreases the likelihood of never engaging in that activity by 4.7 percentage points, doing so less than once per month by 1.8 percentage points, and doing so at least once per month (but not once per week) by 1.2 percentage points. The odds of responding with “at least once per week” increase by 1.7 percentage points, and talking about politics daily is 6.0 percentage points more likely. Finally, the regression on voter registration status suggests that being a blogger decreases the likelihood of registration by 4.9 percentage points for the average respondent, 5.4 percentage points for males, and 4.4 percentage points for females—an unanticipated and borderline-statistically significant outcome, but one with a large magnitude nonetheless.

Because blogging requires a significant time commitment, it is unsurprising to find a substantial direct relationship with volunteerism, a set of activities which themselves require some level of dedication. Yet, as with broadband at home, blogging does not show significant effects on perceived ability to impact the community or on charitable giving. Though it is one of

the more “active” applications available on the Internet — bloggers create content rather than merely consuming it — blogging is still primarily about the exchange of information, which does not seem to fundamentally change respondents’ levels of optimism or willingness to commit funds to a charitable cause.

### **Uses Social Networking**

Use of social networking applications is the only measure of broadband use that is not statistically significant in any of the five models. Facing a dearth of evidence in support of social networking affecting civic engagement, I can only posit potential explanations. It is still possible that certain forms of social networking, among a certain segment of the population, could influence civic engagement. Such a relationship may not show up in the regressions due to the popularity of social networking sites like Facebook at the time of the study, meaning that any influence from the site’s organizing and information sharing tools might have been overwhelmed by more mundane activities like looking at friends’ vacation photos or tracking down old classmates. Alternately, social networking simply might have no perceptible effect on civic engagement, with no returns from enhanced peer communication to real-world activities. Future research could study specific features of social networking applications to better assess whether they can be of any benefit (or detriment) to civic engagement.

### **Gets News Online**

The final measure of broadband use is whether respondents report getting news online. This variable is statistically significant in three of the five models, and shows positive coefficients in all cases — putting the estimates in line with my expectations that rapid access to current events information can improve civic engagement. This projection is made for volunteerism, political

discussion rate, and charitable giving, and statistical significance is at the 99 percent confidence level in all three cases. Further bolstering the case for obtaining news online as a driver of civic engagement is the inclusion of a measure of old media attentiveness in each model, as measured by the extent to which respondents consider old media sources important for obtaining political information. The inclusion of this variable should help to control for individuals who simply pay attention to the news, irrespective of source, and might be more civically engaged due to something inherent in choosing to be attentive to the media.

Among respondents showing some level of volunteerism, obtaining news online increases the number of categories of activities joined by 0.84. This may appear to be a small effect, and is in fact somewhat smaller than the coefficient for bloggers in the volunteerism regression, but it still suggests a real benefit to the cause of encouraging participation in charity walks, working at a soup kitchen, and other volunteer activities. As for returns to the political discussion rate, getting news online is associated with the average respondent being 7.4 percentage points less likely never to talk about politics, 2.8 percentage points less likely to do so less than once per month, and 1.9 percentage points less likely to do so at least once per month but less than once per week. The likelihood of discussing politics at least once per week increases by 2.6 percentage points for respondents who get news online, and the odds of doing so on a daily basis increases by 9.4 percentage points.

Perhaps the most interesting result for getting news online is that it is the only measure of broadband use with a significant effect on charitable giving. Furthermore, the magnitude of its effect is quite large, with the average respondent's likelihood of having made a donation in the past year increasing by 9.0 percentage points if he reports getting news online (the effect is even

larger for the average male, at 9.8 percentage points, while it is smaller for females, at 8.0 percentage points). While getting news online is very much in line with the theme of broadband as a means of exchanging information, the difference might be that getting news online is specifically aimed at enhancing respondents' understanding of current events, as opposed to more general idea sharing. It is possible that rapid access to an expansive array of news sources may promote a sense of urgency to act in support of civic ideas, which would explain the variable's positive relationships with both charitable giving and volunteerism. The case for online news increasing political discussion rate is more straightforward, as politics and current events tend to be deeply intertwined, so reading more news may enhance the propensity for forming political opinions and wanting to share them. The lack of significance in perceived ability to impact one's community is consistent with the other broadband variables, while insignificance in voter registration is somewhat less expected. While this may be partially explained by the fact that getting news online, as opposed to general broadband access, does not help an individual learn about registering to vote, my assumption would have been that increased knowledge of current events increases the desire to participate in the political process. Perhaps the main barrier to voter registration is insufficient information on the process and regulations, rather than a lack of interest.

### **Other Major Factors in Civic Engagement**

The behavior of demographic and control variables in the five regressions is largely consistent with the aforementioned literature on civic engagement. Age is statistically significant in every regression except volunteerism, and shows positive coefficients in each of the remaining models except for perceived ability to impact one's community. The positive correlation between age

and voting has been noted in other works (U.S. Census Bureau 2010). The effects on charitable giving and political discussion rate may be due to a tendency of older individuals to feel they have a stake in the future of their communities. On the other hand, the inverse relationship between age and perceived ability to impact one's community suggests rising levels of cynicism as respondents get older. The suggestion that older individuals simultaneously become more civically engaged while feeling less empowered to make a difference is interesting and may benefit from further study.

Gender also plays an important role in civic engagement, showing significant results in every model except for perceived ability to impact one's community. The direction of the relationship, however, varies based on the aspect of civic engagement being modeled. While I had expected females to be more civically engaged than their male counterparts, this was true only of voter registration and charitable giving. The results suggest they are less likely than males, however, to engage in volunteerism and political discussions. These represent the most overt forms of civic engagement being measured, in the sense that volunteering and talking about politics are somewhat more likely to be controversial. Any attempt to assess the real meaning of this disparity between males and females is beyond the scope of this study, though I suspect that social pressures may play some role in these findings.

Education is the only variable that is significant at the 99 percent confidence level in all five models, and in all cases shows a positive relationship with civic engagement. More educated respondents were more likely to volunteer, talk about politics, register to vote, give to charity, and feel they have the ability to make a difference in their communities. The high level of statistical significance remains despite the inclusion of income as a factor in the models, lending

further credit to the results as truly indicative of education's effect, rather than income as influenced by education. These findings are consistent with the literature on the relationship between education and civic engagement (Hillygus 2005).

Regular attendance at religious services is also significant and positively correlated with all five indicators of civic engagement, with significance reaching the 99 percent confidence level in four of the five models (but limited to the 90 percent confidence level in the regression on political discussion rate). Individuals who are involved with their religious institutions are more active in their communities, consistent with the findings of previous studies (Smidt 1999, Crystal and DeBell 2002). In addition to these institutions providing opportunities for volunteer work and other community activities, people who attend services on a regular basis tend to have values that predispose them to civic engagement.

Income range shows significant positive effects on volunteerism, voter registration status, and charitable giving. The relationship with charitable giving is perhaps the most intuitive, as having discretionary income is a prerequisite for making donations. The positive relationship with volunteerism may be due to high income earners having more free time to volunteer (rather than working overtime or taking on a second job), while voter registration could be influenced by the stability and better information typically afforded by high family income status.

Importance of old media such as television and newspapers, as measured by the extent to which respondents value these sources for political information, is significant and positive in all five models. This variable was included for the specific purpose of controlling for high-information respondents, or people who pay close attention to current events. While this control was specifically meant to improve the accuracy of the measured effects of getting news online

(as opposed to being attentive to media in general), it appears to be an important factor in its own right. Intuitively, this seems to make sense, as individuals who pay attention to current events and politics might be expected to make the leap from passive interest in their surroundings to wanting to improve their communities. Relying on old media is even positively correlated with perceived ability to impact one's community, so while the specific online conduit for obtaining news information may not affect perceptions, an overall state of attention to current events could increase belief in the ability to make a difference.

### **Other Demographics**

Results are mixed for the variables representing race and ethnicity. Respondents who identified as black are more likely to be registered to vote and to feel they can make a difference in their communities, but are less likely to have made a charitable donation during the last year. Any effects of being black on volunteerism and the political discussion rate were not statistically significant. The other variables representing race produced few statistically significant coefficients. There is an inverse relationship between identifying as Hispanic and the extent to which respondents feel they can impact their communities, and another negative correlation between identifying as "other race" (i.e. not white, black, or Hispanic) and being registered to vote. These findings are particularly interesting because I controlled for income, education, and other factors commonly associated with racial disparities, although it is possible that other sources of disparities are not expressed in the models. Analyzing the root causes of these differences would be an interesting exercise for future work. It may also be important to note that the survey was conducted in August 2008, just before that year's presidential election, which may be associated with higher voter registration among blacks.

Marital status was a significant factor only in voter registration status, with married respondents being more likely to have registered to vote. This finding is consistent with my impression that married individuals feel a greater attachment to their communities, as voting is one of the simplest ways to participate in deciding local issues. Similarly, being a parent is positively correlated with increased levels of volunteerism and the perceived ability to make a difference in the community, although the coefficient for volunteerism is only significant at the 90 percent confidence level. Finally, contrary to my expectations, being a student is positively correlated with volunteerism and feeling able to impact one's community, albeit at the 90 percent confidence level. These results may stem from a sense of idealism among students, or perhaps an abundance of free time.

## 7. Conclusion and Policy Recommendations

My results suggest a positive relationship between broadband use and several aspects of civic engagement. Bloggers and people who get news information online are more likely to volunteer in their communities, even when controlling for a range of demographic and other characteristics. Having a broadband connection at home, blogging, and getting news online are all positively correlated with increased frequency of political discussions. A household broadband connection is further associated with increased likelihood of voter registration, although there is also an inverse relationship between blogging and this measure of civic engagement. Getting news online is positively correlated with making charitable contributions. Finally, the one indicator of civic engagement where broadband has no apparent effect is respondents' perceived ability to make a difference in their communities. Overall, there is ample evidence to further support the theory that high-speed Internet, both in terms of the physical

presence of a connection and the applications it enables, has a positive impact on the extent to which Americans participate in civic life.

While these results are largely supportive of my hypothesis, some questions remain that merit further study. Negative correlation between blogging and voter registration status is the most unexpected of the results, and future work could reexamine this relationship with new data or attempt to explain it with empirical evidence. More generally, there is also some doubt as to the direction of the relationship between blogging and civic engagement, as people who are involved in their communities might be encouraged to engage in this form of media. Another interesting topic for future work would be a more in-depth study involving social networking. Although it was the one broadband-indicating variable that lacked statistical significance in any of my regressions, the binary nature of this variable may have obscured the potential of some aspect of social networking to influence civic engagement. For example, while millions of people might use social networking sites for no other purpose than to keep track of their friends, it is possible that event organizing and news sharing features on these sites may serve as positive influences.

Perhaps the most important caveat to note alongside my general conclusion is that no broadband variable could be correlated with respondents' perceived ability to make a difference in their communities. This important aspect of civic engagement does not appear to be influenced by broadband use, despite correlation between broadband and the other indicators. A more sophisticated explanation of my findings becomes clear when the lack of an impact on this outcome is taken together with the results for political discussion rate, which is most extensively influenced by broadband in both significance and magnitude. Getting news online, for example, increases the odds of talking about politics on a daily basis by an average of 9.4 percentage

points, while it has no significant impact on perceived ability to make a difference. Similarly, having a broadband connection at home increases the likelihood of talking about politics daily by 4.2 percentage points, but it again fails to affect the perception question. With the other regressions showing results that can generally be characterized as falling in between the aforementioned two in terms of strength, I interpret my findings as indicative that broadband use is best suited to enhancing activities that are based on access to sufficient information. At its core, the Internet is an information access tool, so it makes sense that its impact on civic engagement is most significant for those activities that rely on information. Talking about politics requires some knowledge of current events and issues, and voter registration, while not a particularly difficult process, is only possible when people know how to go about registering in their locales. Volunteerism and charitable giving require some level of commitment to a cause, but knowledge of upcoming events and campaigns is vital to those who would be predisposed to participating in such activities. Of the five indicators of civic engagement, the perceived ability to impact one's community stands alone in being a feeling rather than an action, and mere access to information is limited in its ability to change deeply held beliefs.

High-speed Internet alone is not a panacea for the decline of civic engagement in the United States, and will not fundamentally change attitudes, but it does appear to inspire some level of participation in civic life. A connected society may be a healthier one, marked by increased attention to our institutions and concern for other citizens. To the extent that civic engagement can enrich local culture, foster community responsibility, and enhance democracy, the widespread deployment of broadband infrastructure may help stimulate such outcomes. Yet while broadband availability and adoption are both on the rise, rural and low-income

communities and certain demographic groups remain without high-speed Internet access (NTIA 2011). Because the benefits of civic engagement are unlikely to be valued by private firms, the result is a positive externality, meaning that broadband use has benefits that the market has not taken into account when deploying and pricing access services. Government therefore could improve the welfare of its constituents by investing in broadband infrastructure and working to make it accessible to underserved groups.

My findings therefore enhance the argument in favor of government investment in broadband deployment in the United States. Billions of dollars have been set aside for broadband infrastructure in the 2009 American Recovery and Reinvestment Act, but far from merely justifying a preexisting program, I conclude that additional investments may have long-term benefits that outweigh their costs. For example, reforming the Universal Service Framework to provide subsidized broadband access to low-income individuals and in high connection cost regions may help to achieve this goal, while simultaneously modernizing an existing program originally created to promote telephony. By closing the “digital divide” between Americans with broadband access and those who lack it, we could potentially increase volunteerism, voter registration, and other important aspects of civic life.

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