Twitter, Texting, and Street Demonstrations: Assessing Social Media's Political Relevance for Citizen Empowerment

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Popular protest is a problem for all types of rulers, whether democratically elected or otherwise. For non-democrat leaders, however, popular protest can be particularly dangerous, leading, as it did in 2011 for several nations, to the fall of the regime, exile, or death. When almost a dozen authoritarian governments in North Africa and the Middle East came under extreme pressure from massive popular demonstrations, the discussions of those observing continually returned to the role of social media. Regional experts explained how these massive protests derived from underlying factors of national economies, internal politics, societies, and region dynamics, yet as journalists, policymakers and academics watched the mass-based revolutions unfold, everyone wondered - Did social media make a difference?

The possibility that social media could empower citizens relative to their regimes had long before been embraced by the "cyber-utopians," to use Morozov's (2010) term . A year prior to the Arab Spring, Secretary of State Clinton inaugurated the State Department's new "Internet Freedom Agenda" at the Newseum, declaring that "the Internet can help humanity push back against those who promote violence and crime and extremism" (Clinton 2010).[1]

[1] Original speech transcript available directly from the State Department at http://www.state.gov/secretary/rm/2010/01/135519.htm

Internet-empowered citizens, she argued, have greater organizing potential: "The freedom to connect is like the freedom of assembly, only in cyberspace. It allows individuals to get online, come together, and hopefully cooperate."

Clinton's remarks formalized the popularly accepted but largely untested conclusions of journalists and policymakers arising from episodes like Philippines, 2001; Spain, 2004; Moldova, 2009; and most recently, North Africa. In each case, observers highlighted the role of cell phones and the Internet as integral to coordinating the demonstrations that forced accountability on government officials. Clinton's claim that "online organizing has been a critical tool for advancing democracy" echoes statements increasingly made by journalists, policymakers, and some academics (e.g. Robbels 2001, Kruegar 2002, Benkler 2006, Kasajoo 2006, Shirky 2010 and the Human Development Reports). Yet their claims are not without equally strong detractors, who have argued that their optimism is naive at best (Kalathil and Boas 2003, O'Harrow 2005, Morozov 2010) and Western triumphalism at worst (Rich 2011).

While individual cases have excited observers and seem to offer anecdotal evidence, and it is intuitive that any tool which facilitates political mobilizing has empowering properties for citizens relative to their regimes, too little systematic attention has assessed and tested the cross-national relationship between social media use and mobilization.[2] This paper is intended to address this gap.

I argue that existing ideas about how social media facilitate or hinder mobilization are valid, but to understand their likely real-world effects we must appreciate the importance of political context. Social media does facilitate mobilization, chiefly by reducing barriers to collective action - which means the greatest effects are expected where high barriers exist. Social media should matter most in non-democracies because it overcomes disadvantages that individuals and non-regime groups face in this context. The advantages of social media discussed below are especially well-suited to mobilizing in non-democracies.

[2]An important recent exception to this trend is Pierskalla and Hollenbach's (2013) study on the link between cell phone coverage and organized violence.

This is much less true for democratic contexts, in which barriers to mobilization are already low. In a democracy, the particular advantages of social media are more redundant, even if its tools offer improvements for mobilizers. Moreover, the negative qualities of social media cited by skeptics are more likely to hold in a democratic context. Concisely, I argue that social media should have a differential effect on citizen participation depending on the nature of the political regime.

I test this effect using data on political mobilization in African democracies and non-democracies. As expected, I find that Internet use is consistently associated with greater mobilization in non-democracies, but *not* in democracies. Interestingly, this effect is not present for cell phone use, suggesting that the two types of media play different roles for protest. The effects are robust across several different model specifications, and provide empirical validation of enthusiasm about social media in non-democracies - while also validating skepticism elsewhere.

This paper is organized into five sections. The first and second sections review and analyze relevant literature on political behavior and social media, respectively, providing the foundation for my argument, and testable implications on the likely effect of social media, in the third section. The fourth section introduces and explains the data and models chosen for my empirical test, before discussing the results and potential critiques. The fifth section concludes with a view to policy implications and areas of future research inspired by these results.

Mobilization and Citizen Empowerment

Claims about citizen empowerment are best understood within the context of the behavioral literature on mobilization. Mobilization, defined as activities by which individuals and groups induce other people to participate in order to influence politics (adapted from Rosenstone and Hansen 1993, p. 25-30), is the chief means by which citizens assert leverage relative to

their governments. Leverage refers to citizens' ability to induce incumbents to be accountable or responsive to concerns. This operates by creating an undesirable situation, what McAdam (1995) calls a "negative inducement," to motivate incumbents to act.

In a democracy, mobilization takes a variety of forms: citizens may become involved in political campaigns, letter-writing to the legislature, demonstrations, or simply voting. Successful social movements may result in the replacement of elected officers with more sympathetic representatives, as in the case of the Christian Democrats in Belgium (Kalyvas 2000). The negative inducement entailed by letter-writing campaigns, canvassing for a cause, and volunteering is the threat of the vote: the risk of institutional replacement at the next election.

However when democratic institutions are weak, absent, or lack credibility, the power of the vote is drastically curtailed, and the risk of institutional replacement, low. Mobilizing activities relying implicitly or explicitly on the vote are not likely to have an effect. Demonstrations, or peaceful, public political events involving a large number of people, are effective through a different mechanism, more closely approximating what McAdam had in mind (1995, 30). This is the direct imposition of a situation which the regime finds inconvenient - disruption of business, markets, and order, expenditure on security forces, negative press - while the threat entailed is the continued imposition of that situation.

Demonstrations are particularly important for the study of citizen empowerment in non-democracies because, as McAdam emphasizes, they are viable and can be effective even when the participants have few resources and no institutional access to the regime. Naturally this will usually be the case in a non-democracy: for excluded groups or ordinary citizens with few resources, publicly demonstrating is one of the only means available to impose some accountability on officials. Though lacking access to resources or the power of the vote, groups and individuals are empowered through public mobilization - they can punish incumbents, and may succeed in winning concessions.

Barriers to Mobilization

Holding a demonstration, whether organized or spontaneously, is a fairly difficult undertaking in any political context. As Olsen's (1965) seminal work on political behavior shows, collective action for any large group of people will be difficult even in the presence of shared gains from cooperation. Studies of political participation have moreover established that although costly, political participation generally offers little individual benefit - meaning that non-participation (free-riding) is the rational norm we should expect of citizens (Downs 1957, Aldrich 1993).

A tradition of research established by Tarrow (1983, 1989b, 1998), Kitschelt (1985), Kriesi (1995), and McAdam (1982, et al 1996) focuses on the structure of political opportunity to explain when citizens *are* able to overcome the barriers to collective action. Felicitous dimensions of political opportunity, when available, facilitate mobilizing and thus citizen empowerment. Such dimensions include access to policy-making institutions, influential allies, the presence of elite divisions and stability of alignments, and the free flow of information.

Considering these factors, it is necessarily the case that mobilization will be substantially more difficult in non-democracies than democracies. The standard rational-choice calculation first explored by Downs is more grim in non-democracies, where rights of expression are not well-protected. The costs of participation will include not only the personal time and effort necessary to attend, but also the risk of violent reprisals, as well as a future risk of harassment, job loss, or black-listing. The regime may not even have to threaten much repression to maintain quiescence: since the expected benefit includes an estimate of how likely the demonstration will produce benefits, a widespread impression of powerlessness created by lack of access to the regime can be sufficient to induce passivity and disinterest in participation (Schattschneider 1960, Gaventa 1982; see also Hibbing and Theiss-Morse 2005, Polletta and Jasper 2001).[3]

[3]Indeed, although McAdam argues for the potential power and leverage of any group of cooperating citizens, he concludes that expectations of failure will cause most attempts to be stillborn (1999).

The political opportunity structures of non-democracies are moreover unlikely to be conducive to mobilization. Access to sources of power is markedly limited in regimes lacking democratic institutions; elite divisions offer some opportunity for groups (Przeworski 1991), but even quarrelsome factions may rather ally with one another than risk inviting non-regime elements into positions of power. Influential allies will be particularly important for citizens seeking to mobilize against a non-democratic regime, but they will be harder to find. Free information flow will certainly be curtailed.

For all these reasons, organizations and individuals seeking to mobilize for the purposes of forcing accountability on incumbents face much higher barriers to mobilization in non-democracies. While hosting or participating in a demonstration is a difficult and costly undertaking in any context, it is much more so in a non-democracy.

The Political Relevance of Social Media

Having reviewed relevant literature on mobilization more generally, in this section I introduce arguments regarding social media's potential role. Some writers have contended that social media have a "positive" role here, that is, social media have potential to empower citizens by facilitating their political participation. Others, however, argue that social media are likely to hamper citizens relative to their regimes, resulting in a "negative" effect on political participation.

Those who they argue for a "positive" effect credit a number of different traits for this potential. I briefly review first three of the most important traits, each of which is unique to social media, suggesting a capacity for *changed* political behavior. For each trait I also highlight the relevant actors being empowered, whether that be political *organizations* seeking mobilization, or politically dissatisfied *individuals* attempting to spontaneously overcome collective action problems to cooperation.

First and most importantly, social media depend on decentralized content production,

in which creating and publishing content for public consumption is extraordinarily cheap (Benkler 2006, Etling et al 2010). Traditional media such as newspaper, radio, and television depend on centralized content production; the substantial resources required to produce mass content entail higher barriers to entry for outsiders seeking to publish. Using social media, however, even organizations lacking a reliable stream of resources can cheaply set up a "show window" for their cause. Similarly, isolated individuals can produce their own content, whether via duplicate text messages to a network of friends or online through a weblog, creating new ways for individuals to coordinate (Goldstein and Rotich 2008, Shirky 2010). Decentralized content production also makes social media much harder to control, relative to any other media previously available to citizens (Boas 2000, Simon 2002).

Second, the potential audience accessible to an organization or an individual through social media is greatly magnified. With the exception of recent satellite-based television and radio stations, the geographical reach of traditional media is necessarily limited. Content hosted online, however, can be accessed anywhere in the world that has a connection, provided it is not blocked (Rogers and Shukla 2001). An organization reasonably expecting content consumers in the dozens or low hundreds through a newsletter can, simply by shifting that newsletter online, quickly magnify the consuming audience to the thousands. Organizations can moreover network internationally with similarly-minded organizations with greatly reduced costs (Ayers 1999). Access to the public also facilitates spontaneous connections between individuals on opposite sides of a city or region who would otherwise have been unlikely to coordinate.

Third, social media greatly shortens the time delay between an event and its public reaction, allowing immediacy. This matters in particular because it promotes quick coordination in moments of intense (but brief) public outcry. Mobilizing emotion has long been an important part of the literature on framing (Benford and Snow 2000), and Valentino et al's (2011) study of election night violence confirms the importance of using emotion to mobilize otherwise passive citizens. Immediacy allows organizations to capitalize on focal points like

national scandals or stolen elections while public anger is at its peak (see Tucker 2007). More importantly, when such a focal point has occurred the immediacy of social media allows citizens to spontaneously coordinate with other citizens, well beyond their immediate neighborhood, more easily and cheaply than before.

Skepticism About Social Media

Skeptics of the empowering potential of social media have raised three primary concerns about the supposed political advantages of social media. First, social media are better adapted to entertainment and distraction than to sustained and thought-provoking political discussion (Bannerjee 2006). While some citizens take a few seconds from their day to text about the latest scandal of a corrupt ruling party, it may be that most of their friends spend their online time playing multi-player games or chatting on dating websites (Sreberny and Khiabany 2010). Andersen's (2006) study illustrates the plausibility of this argument: though hoping to find evidence of increased political consciousness and activity among young Chinese Internet users, the researchers admitted with disappointment that their sample respondents used the Internet almost entirely in pursuit of non-political interests. Observers of Russian politics suspect that state appreciation of this has developed into a conscious strategy, where the majority is gradually de-politicized by the exciting new diversions of social media (Alexander 2004, Troianovsky 2008, Morozov 2011). If, as the Russian government seems to believe, social media's entertainment value has a distracting effect from national politics, it may even lead to *less* political activism, not more.

Second, the same qualities of social media that lower the costs of demonstrating also permit much lower-cost, but extremely low-impact, participation - while retaining any social benefits that accrue to signaling political awareness and activism. A specialty of social media is the easy formation of and membership in non-committal groupings that require no costly real-world action - a phenomenon Morozov (2010), among others, dubs "Slacktivism." Hassanpour's (2011) study of the Egyptian protests supports this view, finding that many

prefer armchair politics to actually participating in events themselves.[4] Social media offers even politicized citizens greater potential than ever before *not* to get involved - one can follow everything perfectly from the comfort, privacy, and safety of one's own home.

Finally and most simply, those aspects of the Internet which benefit democracy's activists may be censored, controlled, or removed (Bannerjee 2006; Chowdury 2008; Deibert et al 2008, 2010, 2012). Even supposing the unique advantages of social media apply as suggested, regimes may be able to pre-empt their use by closing access (Boas 2000, Morozov 2010). As Ang (2006) warns, censoring the Internet may be more difficult than print censoring but it is possible, and public punishment of a few citizens is likely to deter many.

Proactive regimes can also do better than eliminate social media's advantages. O'Harrow (2005) argues that the chief effect of social media technology has been to greatly increase the potential for state monitoring of citizens - even in private spheres. Prior to the Internet and cell phone networks, the strategies of state agents tended to require resources invested in each individual target: e.g. on-the-spot monitoring via cameras, wiretapping, and tailing. In the age of social media, however, a single software program can simultaneously monitor and send automated information regarding the online activities of millions of users to state agents, and a single database containing this information may be instantly shared with multiple security offices. While law enforcement officials have greater potential for crime detection, O'Harrow worries that this comes at the expense of individual freedoms - a concern particularly justified by recent revelations of the National Security Administration's surveillance.

The Context-Dependency of Social Media's Effects

While many of those cited here have presented it otherwise, these contending arguments are not necessarily at cross-purposes. I argue that each of these effects is valid, but context-dependent. The "positive" effects discussed, which primarily operate to lower barriers to

[4]Foreshadowing this argument, another scholar commented at the time of the protests that activists preferred to express their frustrations with the regime online; when access to the Internet was cut it forced them outside. http://www.nytimes.com/2011/01/29/technology/internet/29cutoff.html

mobilization, are likely to make a difference chiefly or only in non-democracies, where high barriers exist. On the other hand, the "negative" effects apply more to democracies. This means greater social media use should have a differential effect on political mobilization, depending on the political regime in place.

As noted above, information flows and the availability of media tools comprise a key dimension of political opportunity for mobilizing, although this tends to be more implicit than explicit in studies of democracies.[5] In a non-democracy, however, any opening in the information environment can potentially make a powerful difference to mobilization efforts. The availability of independent media has been cited as an important ally for mobilizing in El Salvador (Prendes 1983), the Philippines (Schock 1999), and the former U.S.S.R. (Dizard and Swensrud 1987). In cases where the government was able to control or shut down critical media outlets, such as Burma in 1989, mobilizing potential quickly collapsed (Schock 1999).

Non-regime organizations, particularly those critical of the regime, almost always have very poor media access in non-democracies. In such a context, introducing a tool that creates new access has a powerful effect. In democracies, non-regime organizations already enjoy media access - they are welcome to purchase time on television or radio stations, or space in a print publication; organizations are also welcome to launch their own publishing organizations if they possess the capacity. Resources remain a limiting factor, so introducing a cheaper media tool improves their potential audience, but opportunities to access the public exist without social media. In the same way, introducing technology that permits access to a large, geographically dispersed audience also makes a more substantial difference in non-democracies than in democracies. While access to a wider public can be beneficial for organizations in democracies, this aspect of social media is particularly important for organizations stymied by regime media control.

The third major benefit of social media, immediacy, allows citizens to coordinate with one another before the regime can mount counter-mobilization measures and pre-emptive

[5]Information flow is most prominently highlighted as an important but variable dimension of political opportunity in a study of non-democracies (Schock 1999).

repression to prevent or deter citizens from congregating. Immediacy also facilitates the creation of a cascade like that described by Granovetter (1968) and formalized by Kuran (1990, 1991) as citizens are able to quickly and cheaply signal changed "public allegiances" to one other. While potentially also useful for citizens in democracies, this particular benefit will be of much greater relevance for individuals without expressive rights. As the potential costs of demonstrating are higher in non-democracies and it is more critical to have strength in numbers, this quality of social media has much greater potential to change participation calcula in that context. Decentralized broadcasting, greater audience access, and immediacy each operate to lower barriers to mobilization; logically, we can expect that these effects are most powerful in a context of high barriers.

Conversely, I argue that with the exception of censorship and regime interference, the "negative" qualities of social media are most relevant to users in democracies. First, diversion can provide compensation for political or generalized discontent, but that compensation is limited. Diversion is appealing but less essential to human existence than the basic need of security. Good entertainment is less likely to inspire complacency in users denied security from arbitrary persecution, equal protection under the law, or basic rights of expression. I argue that citizens who enjoy greater security and protected rights are more likely to be sated by entertainment.

Second, slacktivism is most attractive for users who anticipate social benefits for their signaling, and who are not likely to suffer first-hand from the problem for which they cheaply crusade. As participation in causes and movements can produce social rewards (Schlozman, Verba and Brady 1995; Wickham 2002), slacktivists are incentivized to demonstrate enough political awareness and interest to collect the social benefits of participation, but not enough to expend the energy required to actually participate. Their activity depends upon at least a basic protection of free expression, as slacktivists are certainly not willing to assume the costs implied by the risk of harassment, arrest, or persecution for the sake of their causes. These politically-interested but largely content users may be found in all regimes, but I argue

that the phenomenon of slacktivism should prevail especially in regimes with institutions protecting citizens' rights of expression, offering ways for citizens to punish incumbents, and maintaining stability through changes in government - i.e., democracies.

Unlike the first two, the final negative quality - that social media can be controlled and censored to pre-empt advantages from accruing to opposition forces - naturally poses the greatest danger in non-democracies. Political censorship of social media is an increasing reality among these regimes, as is monitoring (Deibert et al 2010, 2011). While democracies also engage in some censorship, the risk will almost certainly be greatest in non-democracies. However in the absence of censorship and regime control of social media, the increasing use of social media should produce only net benefits to mobilization effort in non-democracies.

This logic suggests that the positive and negative qualities of social media apply differently depending on whether the regime is a democracy, or a non-democracy. To expand this logic, we should expect a more positive effect of social media on increased mobilization in non-democracies; in fact, given that any positive effects are accompanied by negative effects, it is unclear whether social media will have a positive effect on mobilization at all in democracies.

Implications

To incorporate the literature on mobilization reviewed above, in a non-democracy protest demonstrations are the chief and possibly only means for citizens to gain some power relative to the government.[6] If social media does indeed empower citizens to mobilize, it should do so by facilitating demonstrations through which they can leverage change. Importantly, if the effects of social media are real, they should apply to facilitating demonstrations for *any* cause, including those that are not targeted at forcing regime accountability. Given the literature reviewed and analyzed, I expect that increased use of social media will lead to greater mobilization, via demonstrations, in non-democracies.

[6] Open violence is another means, but is even costlier than protesting.

The means by which social media does this should take place through one of two different mechanisms. As noted above, the qualities of social media impact two types of actors seeking to coordinate and mobilize: organizations and individual citizens. The mobilization process undertaken by these two types of actors differs, but my argument expects that in both cases social media offers unique benefits previously unavailable in a traditional media environment. This means I expect a greater incidence of both group-organized demonstrations, planned ahead of time for specific causes, and of more "spontaneous" demonstrations that happen quickly by previously disconnected individuals in the wake of public outcry.

This expectation does not hold for democracies, however. There is less of a clear reason why social media should have a positive instead of a negative effect on mobilization in democracies, and even if a positive effect holds it may not manifest in a greater number of demonstrations. Citizens in democracies have a number of different mobilizing tools at their disposal, all of which social media may facilitate. Compared to other forms of participation through which citizens can make governments accountable (e.g. signing a petition, writing one's representative, voting), protesting and demonstrations are somewhat costly. That social media also makes it easier to join petitions and letter-writing drives, often while maximizing the public social benefit derived from public participation, means that its expected effect on demonstration incidence specifically is ambiguous at best.

This argument produces two testable hypotheses regarding the effect of social media on organizational and individual empowerment:

H1. *Social media use should be associated with a higher number of* organized *demonstrations, but only in non-democracies.*

H2. *Social media use should be associated with a higher number of* spontaneous *demonstrations, but only in non-democracies.*

Empirical Analysis

To empirically assess these two hypotheses, I employ data from a 19-year panel of 45 African nations.[7] Africa offers an excellent opportunity to conduct this study for several reasons. Most importantly, this sample demonstrates very little social media censorship, a potential interference with my predicted effect. As described above, censorship could stymie any positive mobilizing effect of the technology, as it is indeed intended to do. Whether or not censorship is effective is a fascinating but secondary research question, as it is first necessary to assess the stand-alone mobilizing potential of social media (if any) in a non-democracy. In adopting various forms of social media control, African non-democracies have tended to lag far behind their counterparts in other parts of the world, allowing for a much clearer analysis of social media's effects and rendering non-democracies more comparable to regional democracies.[8]

Also, disaggregated country-year data for all relevant variables over the last twenty years is available for almost all African nations through the new Social Conflict in Africa Database (SCAD), the International Telecommunications Union (ITU), and the World Bank. These nations moreover exhibit high variation on the key independent variable (social media use) and the key dependent variable (protest activity), both cross-nationally and over time, which permits inferential leverage regarding the relationship of those variables.

Data

This study employs two different dependent variables, "organized" demonstrations and "spontaneous" demonstrations; each variable is essentially a count of the number of demonstrations that took place in a given country and a given year.[9] This count is measured by

[7] These nations are listed in the Appendix.

[8] This lag has been noted by a number of Internet freedom observers. In particular, Deibert, Palfrey, Rohozinski and Zittrain's exhaustive (2010) examination of current Internet censorship around the world only includes two African nations, Egypt and Tunisia. Of these two only Tunisia demonstrated evidence of filtering (581), and this almost exclusively from 2008 forward.

[9] As the relevant variables change over time and across countries, the natural unit of analysis for this study is a country-year.

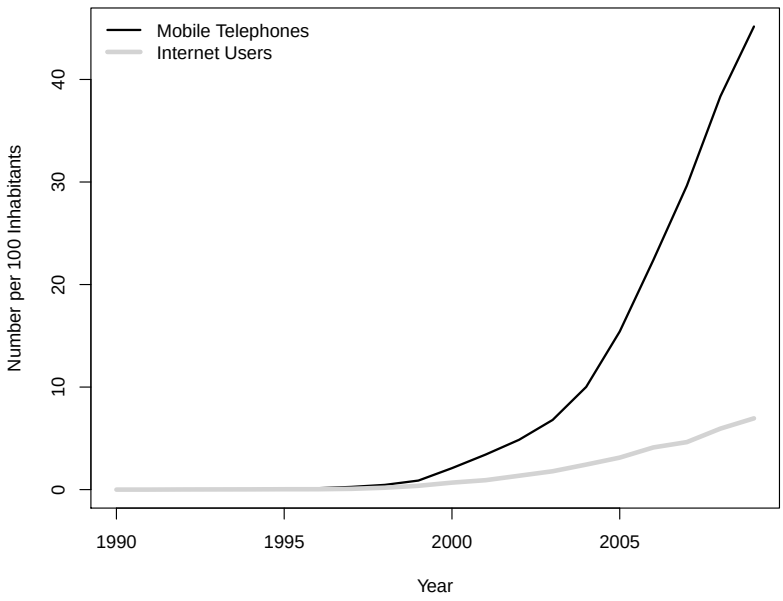


Figure 1: Social Media Diffusion Over Time (Sample Average)

SCAD researchers, who code a demonstration as "distinct, continuous, and largely peaceful activity" (SCAD Codebook). These events are further sub-coded as "organized" if a clear leader or organization can be identified as leading the demonstrations, such as the Gambian Bar Association's 2004 protests over government meddling in judicial affairs. "Spontaneous" demonstrations, on the other hand, lack such identifiable leadership, an example here being the leaderless protests that occurred in the Gambia three years later over police killing.

The independent variable, social media use, is drawn from two indicators available from the ITU: mobile phone subscriptions per capita, and estimated Internet users per capita. Measuring social media use per capita, as opposed to absolute levels, better approximates the concept of how fully social media has diffused among the population, and is moreover comparable across differently-sized nations.[10] Figure 1 shows how both of these variables have increased over time.

Since the theory posits that the effect of social media is conditional upon the structure of the regime, each of these indicators is interacted with a dummy variable for whether or

[10]The number of stable Internet subscriptions per capita is also available, but there is very little variation on this variable even in the most recent five years.

not the country in question is a democracy. I take this data from Cheibub et al's (2009) Dictatorship-Democracy data-set. As an institutional measure, the DD dichotomous indicator best captures the essential logic of the theory, that social media reduces barriers to collective action that are absent in regimes with free elections and multiple legal political parties.

To maximize my ability to clearly assess the relationship between these independent variables and dependent variables, I utilize a highly parsimonious modeling strategy. While protest activity has been shown to depend on several variables other than social media (see Bratton and van de Walle 1992, Lindberg 2006), I include in the model only those variables that could plausibly threaten inference by obscuring or magnifying the relationship with social media (Clarke 2006). This model set-up allows maximum leverage over necessarily finite data, while keeping the results as clear as possible.[11]

I therefore control for only three variables which could present the confounding "phantom menace": economic growth, which would tend to spread social media but which could also have an effect on demonstrations; wealth, which increases social media and may encourage dissent towards the regime (Magaloni 2006); and the level of urbanization, which is plausibly associated with increases in both the independent and dependent variables. Each of these variables, if omitted, could produce spurious or contrary results. Indicators are taken from the World Bank's World Development Indicators, specifically the percent annual change in gross domestic product (GDP), the log of GDP, and urban population as a percentage of total population (proportion of people living in cities over 1 million inhabitants).[12]

[11] Choosing this empirical strategy means diagnostics of how well the model predicts y, such as R^2, will be less appropriate here than those focused on examining the strength of the hypothesized relationship.

[12] I also included a control for inflation (the change in prices as an annual percentage) in several additional models with highly similar results; however, the extreme skewness of this variable prevented me from including it in the model presented here.

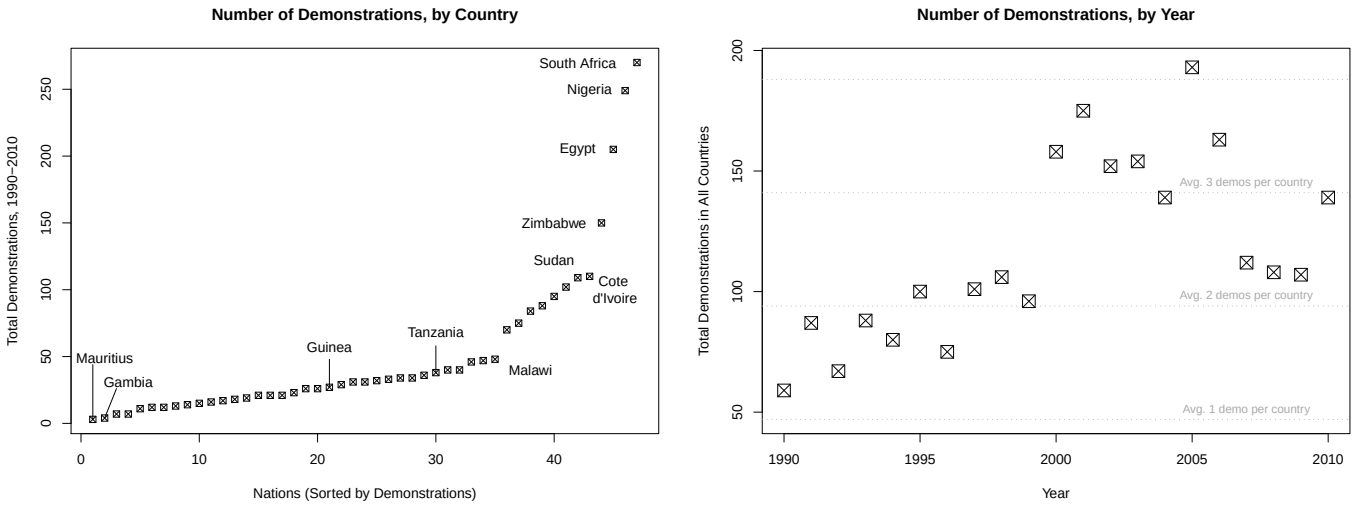


Figure 2: Unit Heterogeneity

Model

The above hypotheses are tested using multi-level Poisson event-count models with two interactions and crossed random effects. This section briefly explains the justification for this modeling choice. Since the two dependent variables are both highly right-skewed event counts (Figure 5 top); I model each separately as a Poisson distribution, the rate parameter of which is predicted by my independent variables and controls such that

$$Demonstrations \sim Poisson(e^{X\beta})$$

I include interactions in each model to accommodate my expectation that social media will have differential effects on demonstrations in a given country-year depending on whether that country is a democracy or not. Including both indicators for social media use, the specific equation for this model is

$$Demos \sim Pois(e^{\beta_0+\beta_1 mobiles+\beta_2 Internet+\beta_3 democracy+\beta 4 mobiles*Democracy+\beta_5 Internet*democracy+\beta_{6-8} Controls})$$

My sample includes a diverse set of nations with remarkably different levels of demonstrations (see Figure 2, left), while some years in the sample certainly exhibit much more mobilizing activity than others (see Figure 2, right).Such unit heterogeneity may be managed through

Table 1: Multi-Level Model Results

Dependent Variable=	*Organized Demonstrations*	*Spontaneous Demonstrations*
Mobile Phones (pc)	−0.015 (0.004)***	−0.012 (0.003)***
Internet Users (pc)	0.106 (0.017)***	0.063 (0.014)***
Democracy (0-1)	0.615 (0.199)**	0.387 (0.146)**
Mobiles ∗ Democracy	0.004 (0.017)	−0.016 (0.014)
Internet ∗ Democracy	−0.180 (0.072)*	−0.030 (0.048)
Controls:		
GDP Growth	−0.025 (0.009)**	−0.019 (0.007)**
*log(*GDP pc*)*	0.466 (0.197)*	0.076 (0.205)
Urban Population	−0.021 (0.011)	−0.003 (0.012)
Constant	−3.393 (1.237)**	−0.713 (1.302)

$n = 655$ observations in 45 countries and 19 years.
Asterisks denote significance at 95% (*), 99% (**), and 99.9% (***) confidence.

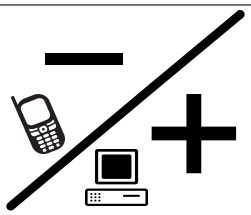
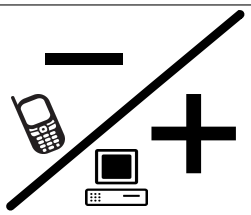
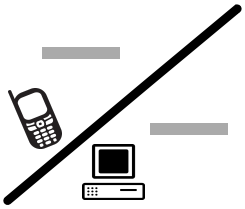
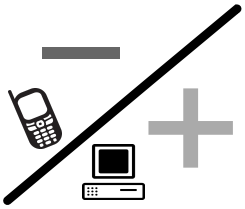
fixed or random effects, but as the panel is also unbalanced due to some missingness there are particular advantages to running a multi-level model.[13] This type of model allows for crossed random effects that accommodate country- and year-heterogeneity, while lending strength to those groups that have fewer observations. The specification maintains, however, that the effect of the independent variables should be the same across all countries with the same regime type.

Results

Table 1 reports the coefficients and standard errors estimated by the two multi-level models; as the interactions make immediate interpretation of coefficient signs more obscure, Table 2 reports the predicted effect (whether positive or negative) for each combination of regime type, demonstration type, and social media type (non-significant effects are shown in lighter grey). The largest and most significant effect is that of Internet use in non-democracies, which is consistently associated with more demonstrations. Remarkably, the use of mobile phones does not have any such positive effect, but is estimated to have a very small negative effect on the number of demonstrations in both regime types. As expected, the effect of

[13]While nations are represented in the sample on average 15 out of the 19 years, some have only 9/19.

Table 2: Effect of Social Media on Demonstrations by Regime

	Organized Demonstrations	Spontaneous Demonstrations
Non-Democracies		
Democracies		

Black indicates significance at 95% level, dark grey at 90%; grey, non-significant

social media in general does not have a consistent or statistically significant association with demonstrations in democracies, whether they be organized or spontaneous.

The effects predicted by increased social media use can be best understood through calculations of the expected change in demonstrations, given some change in social media use. Accordingly, the effect of 10% more Internet use in a non-democracy is predicted by the first model to yield a 287.5% increase in organized demonstrations, and by the second, a 187.8% increase in spontaneous demonstrations. This corresponds to almost twice as many spontaneous demonstrations as expected with lower Internet use, and almost three times as many organized events. Each effect is significant at the level of 99.9% confidence, offering very strong confirmation of both hypotheses. Meanwhile, the effect of a 10% increase in Internet use has only an ambiguous effect in democracies; the models predict a 139% increase in spontaneous demonstrations but only 47.6% as many organized demonstrations. Neither effect achieves statistical significance even at the level of 90% confidence.

While the association between cell phones and demonstrations in non-democracies is significant, it is also very slight; a 10% increase in mobile phone use is associated with 86.3% and 88.8% as many organized and spontaneous demonstrations, respectively. A similar

negative effect exists for democracies: a 10% increase in mobile phone use generates 89.9% as many organized and 75.8% as many spontaneous demonstrations. The latter effect, while greater in magnitude, is not highly confident, reaching significance only at the 90% level.

To assess the substantive significance of these relationships, I calculated the predicted distribution of demonstrations in a given regime, conditional upon how much social media use is present. Four of the eight potential combinations are depicted in Figure 3; these four are representative examples and the omitted four are similar. Each graph models the predicted distribution of demonstrations given four varying levels of social media use (all other variables constant at sample means or, in the case of *log*(GDP per capita), the sample median). The peaks of highest density in each curve indicate the maximum-likelihood estimate of how many demonstrations will occur in a given year; over several years, the yearly frequency of demonstrations is expected to follow the distribution shown.

The four levels of social media use are chosen to depict both maximum variation (from no use at all to the maximum use in the sample), as well as reasonable tendencies (the 2008 average of social media use, plus an additional value). To make the graphs maximally comparable, they are all plotted over the same range.[14] When the four curves in a graph are highly similar, as with the effect of Internet use in democracies (top right) and the effect of cell phone use in non-democracies (bottom left), this indicates that even given maximum variation the model predicts only a slight change in demonstrations. However when the curves show substantial differences, particularly a change in the peaks and thus the predicted number of demonstrations in a given year, this indicates a noteworthy effect. As the bottom-left graph shows, a non-democracy with levels of Internet use per capita below the sample average can expect fewer demonstrations than a similar regime with above-average Internet use.

A final set of graphs visually depicts these relationships in a manner that facilitates comparison between regimes, while also showing the high uncertainty around estimated effects

[14]The density (y-axis) has been allowed to vary per graph, as this is relevant only within a given graph.

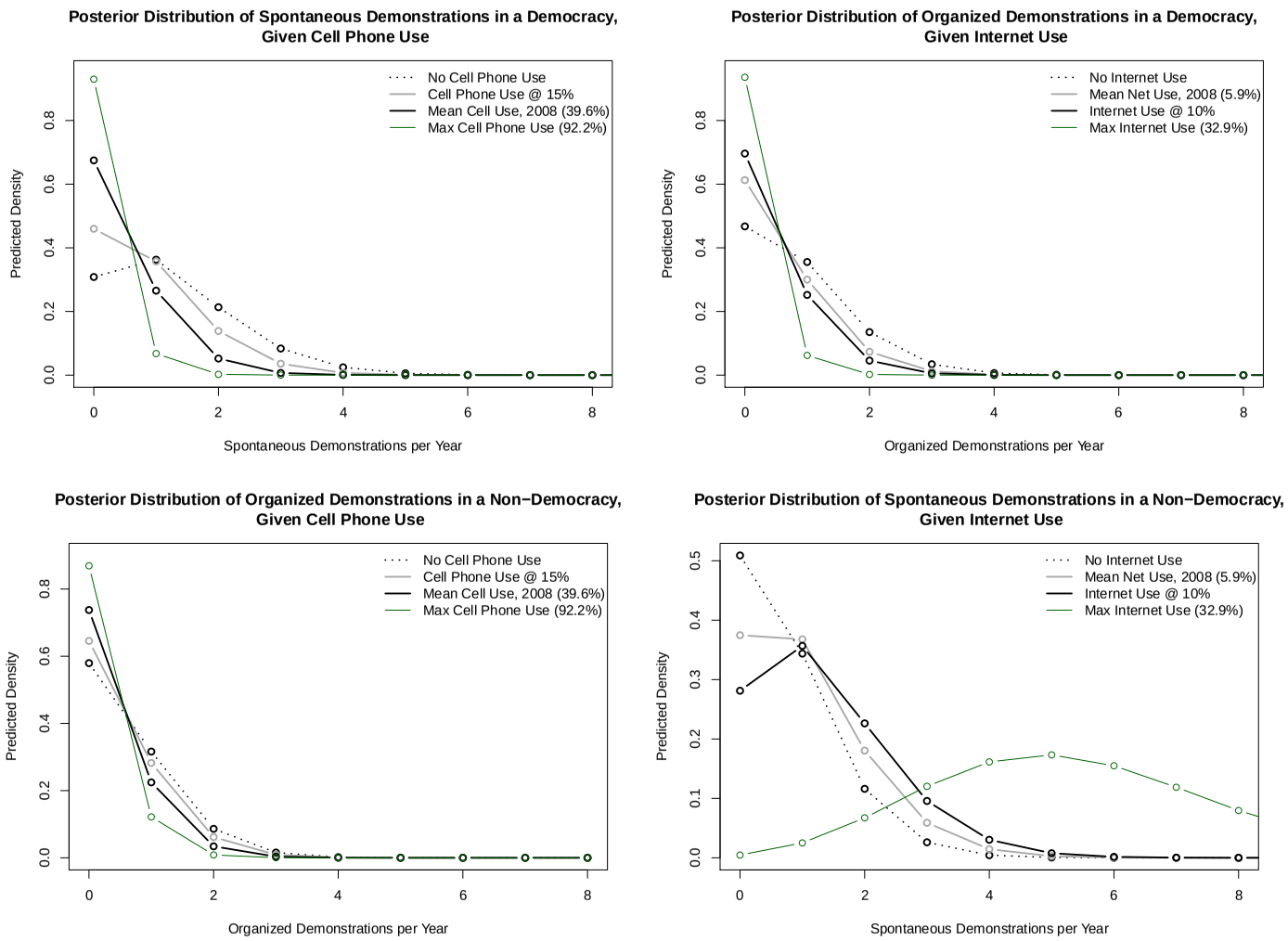


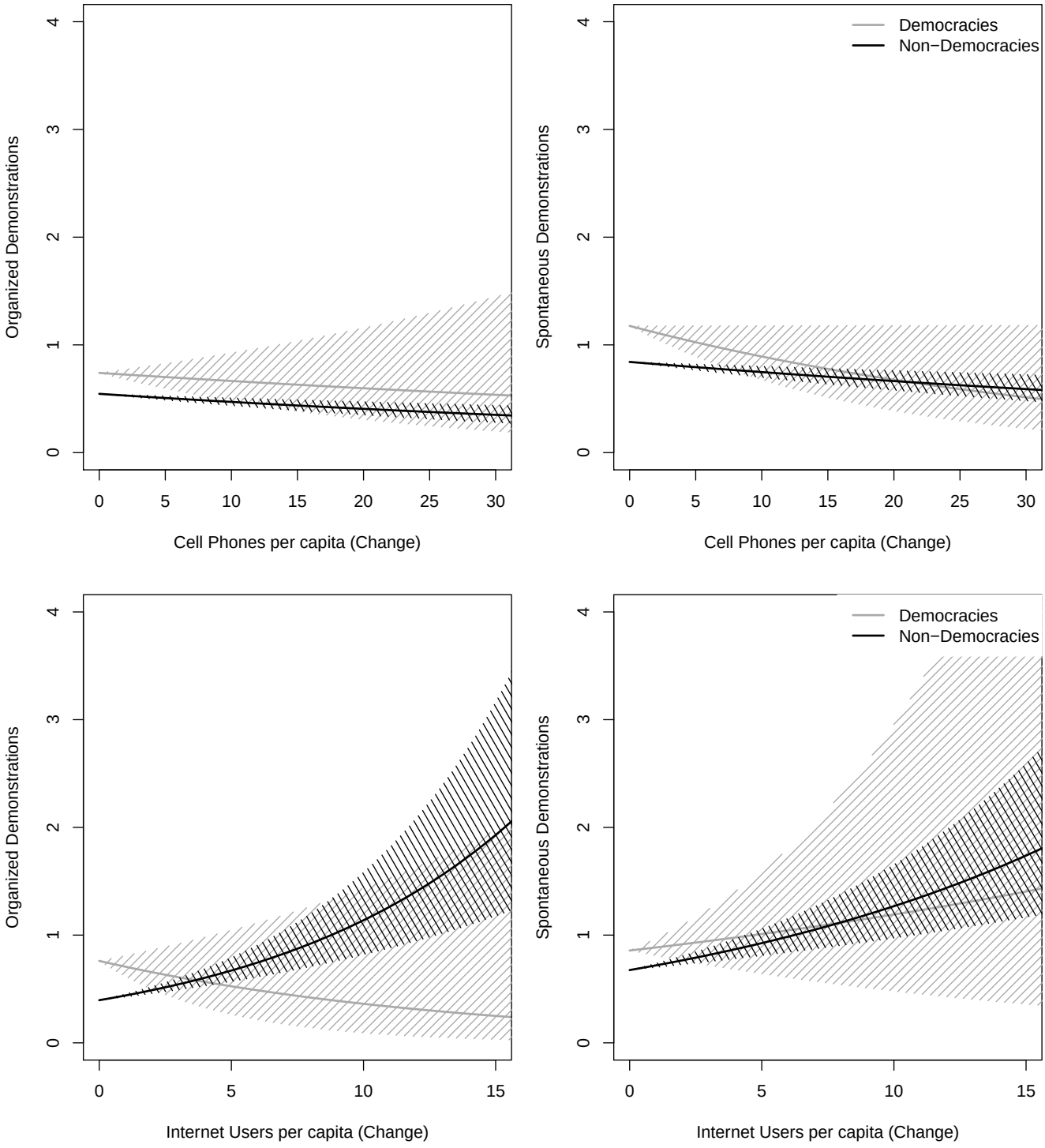
Figure 3: Expected Distributions of the Dependent Variables, Conditional on Social Media Use

in democracies. The four graphs in Figure 4 show the expected change in demonstrations as social media use increases, which it has consistently for the past 20 years (and is indeed expected to keep increasing). While the expected changes in demonstrations from a 30% increase in cell phone use are unimpressive, the predicted effects of a 15% increase in Internet use are more dramatic. Over this range, the predicted number of demonstrations increases from less than one of each type per year, to roughly two per year. Although this seems like a tiny increase, to a non-democratic incumbent the extra demonstrations, moreover *of each type*, are potentially a regime-threatening problem. SCAD codes even a week-long protest as a single event; one additional such event imposes huge costs on the regime and greatly increases the scope for accountability. Notably, no consistent effect is predicted for democracies, which demonstrate such high uncertainty we cannot confidently say that any social media, whether cell phones or Internet, has any effect, on any type of demonstration, at all.

Diverging Predictions for Social Media Technologies

Although my argument predicted a divergence in effect among democracies and non-democracies, the similar divergence between mobile phone use and Internet use was less expected. However there are a number of plausible explanations for this difference. Generally speaking, the positive effects that form the foundation of my argument apply much better to Internet technology than cell phone technology. While the Internet offers genuinely many-to-many communication (Shirky 2011), cell phones are engineered primarily for one-to-one communication - or, one-to-several typically with additional costs for each additional audience member. This presents less opportunity for organizations seeking to take advantage of the decentralized nature of the Internet to communicate with a wide potential audience, in a low-cost way. Similarly, the type of content produced and broadcasted through cell phones is much more limited than that through the Internet. While organizers can send slogans by text message, a set of photographs can be more powerful.

Figure 4: Expected Change in Demonstrations, Given an Increase in Social Media Use

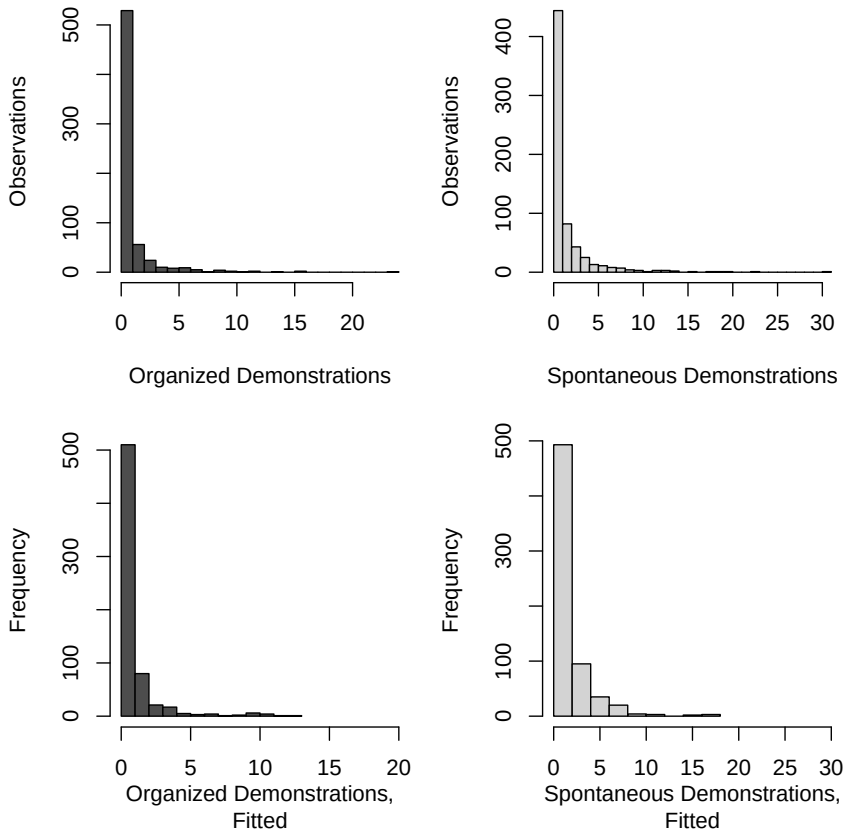


Third, the Internet promotes communication between strangers, while communication over cell phones requires that individuals know each others' numbers, or at least have a friend in common. By using the Internet to broadcast, organizations do not have to have prior knowledge of a potential subscriber for them to receive content, and similarly-minded but unconnected individuals can spontaneously connect in geographically separate locations. Coupled with the potential of genuine many-to-many communication, this quality permits more of a virtual "assembly" than the one-to-one tendency of cell phones. Historically, non-democratic regimes have minded two citizens having a private discussion much less than private assemblies; assembly seems to have an additional property that creates the potential for something more dangerous than simply shared discontent.

An alternate possibility for the differential effect seen between these two technologies draws from the greater diffusion of mobile phones in Africa, and from the idea that the first users of social media technology are the most likely to put it to political use (Davis 1999). Suppose that the "true" effect of social media on political participation is shaped like an inverted U ($\cap$): as the new technology is introduced, it is embraced by the most wealthy and the most politically active, and employed towards political ends. Mobilization therefore increases. As the technology diffuses beyond the elite to the broader population, relatively more users are interested in the non-political properties of the technology, and its effect on participation levels off, before decreasing in the face of a high-use, politically disinterested population. If this were true, by 2008 increases in cell phone use would only be contributing to less participation, while Internet diffusion would still be in the heady early days of elite use.

I tested for this possibility using several truncated samples of the "early days" of mobile phone diffusion in Africa: $1990 - 2000$, $1990 - 2002$ $1990 - 2003$, and $1990 - 2004$. In no sample was I able to produce anything like the positive and highly significant effect of Internet use estimated using the full sample. Instead, each sample retained a slight but often significant negative effect of mobile phones on demonstrations. It may yet be so that the

Figure 5: Comparison of Actual Demonstrations (top) and Predicted Demonstrations (bottom)



positive effect seen by Internet use will ultimately taper off, but mobile phones do not seem to have ever had such an effect on participation.[15]

Critiques and Alternate Modeling Choices

I conclude the results section with a view to potential criticisms of the model and alternate modeling choices. The most important critique is that the data is overdispersed. Although the models' predicted demonstrations match the overall distribution of the dependent variables well (shown in Figure 5), their dependence on a Poisson shape with its requirement that the mean be roughly equal to the variance leads to inflexibility in modeling the event counts. In particular, the two models overpredict slightly for low values (fitting 1 demonstration

[15]Full results for all additional and diagnostic models are available from the author upon request.

to many observations that have 0), and underpredict for very high values (fitting too few demonstrations to the 9 observations that have 15 or more). Although there are 402 country-years with no organized demonstrations and 318 with no spontaneous demonstrations, the two models predict only 331 and 220 zeroes, respectively.

Since the rare event nature of the dependent variables is also too highly dispersed to be sufficiently accounted for through a negative binomial distribution, I fitted a zero-inflated Poisson model to the data, with and without fixed effects to account for the unit heterogeneity described above.[16] This model assumes a two-part data generating process such that event counts can either form part of a standard Poisson distribution or a point mass at zero. In specifying the pooled and fixed-effects models, I allowed each observation to have an equal chance of belonging to either process. These models recover a very high proportion of the actual zero counts in the data.

The results of both model specifications (pooled and fixed effects) proved to be highly similar to those found above: Internet use continues to have a large and highly significant (99.9% confidence) effect on demonstrations of both types, but only in non-democracies. Mobile phone use continues to have a slight but highly significant negative effect in non-democracies, and a slightly significant negative effect on spontaneous demonstrations in democracies. In short, the results of these models are almost identical to table of coefficient signs and significance depicted in Table 2, with chief exception that in the fixed-effects model the small negative effect of mobile phones on demonstrations in democracies is significant.

While the zero-inflated Poisson model improves the fit for zero counts in the dependent variable, it is less theoretically compelling than the multi-level model. While it intuitively

[16] An alternative to using a flexible zero-supplementing model is to log the dependent variables (after adding an incremental amount) as a means of making their distributions more amenable to regression. Doing this does indeed render the two dependent variables almost perfectly Poisson-distributed (means versus variances of 0.4 versus 0.3, and 0.7 versus 0.6). However, this then no longer entails count (integer) data, such that running a model would require additional rounding - an unsystematic transformation likely to bias inference.

An alternate zero-supplementing model choice is the hurdle model, which would also produce the appropriate number of zeroes (by design), but its theoretical logic - that a separate process controls whether a zero or a count happens - is less appropriate here, especially since each SCAD-recorded demonstration is only recorded as a separate demonstration if it actually is (i.e. a multiple-day demonstration counts as one).

makes sense that observations belong to particular groups in time and space, the real-world manifestation of the bifurcated data-generating process implied by the zero-inflated model is less intuitive. In selecting among models with highly similar results, I have chosen to present the model that best captures our theoretical understanding of how the world works.

A second important consideration is the possibly hidden effect of repression on both independent and dependent variables. As discussed in the theory above, it is certainly the case that demonstrations will be more difficult in non-democracies for a number of reasons - an expectation borne out by systematic differences in these data. While there is high variation among countries generally, on average non-democracies have consistently fewer demonstrations per year than democracies. If non-democratic repression also has a depressing effect on the level of social media, this could be a powerful confounding variable provided some variation in repression among regimes - non-democracies that repress more would show lower levels on both variables, while non-democracies that repress less would show higher levels.

This possibility may be dismissed by reviewing the dispersion of social media among regimes. Although non-democracies do have fewer demonstrations, they have among the highest levels of social media. As shown in Figure 6, the highest levels of Internet use occur in non-democracies, with the sole exception of Mauritius; at the lower level (0-5% Internet use), the many non-democracies in the sample slightly outperform the democracies. That being in a non-democracy is not associated with lower levels of the independent variable means repression could not be an omitted confounder in this analysis. Moreover, if this confounding effect were real, we should see a corresponding effect for democracies, which is not borne out by the model results.

An additional criticism of the model is that random effects by year may not fully capture an underlying increase in demonstrations over time, which (since Internet use is also strictly increasing) could be responsible for the positive relationship consistently seen between these variables. While controlling for time as a variable is a reasonable option, I argue that random

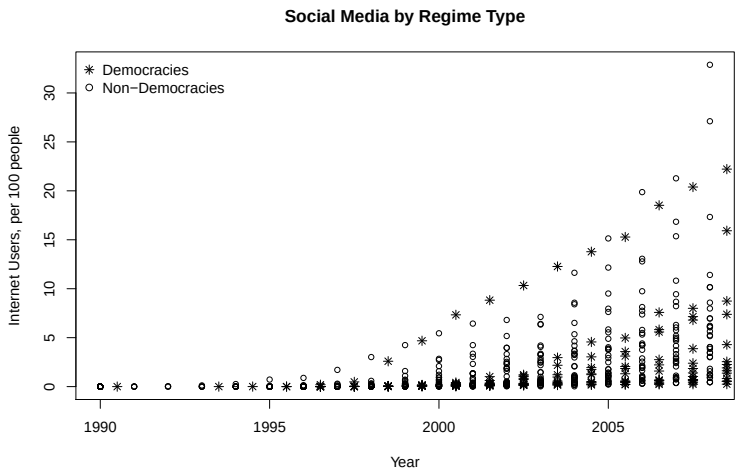


Figure 6: Social Media Diffusion, by Regime

effects are a superior approach given the noisiness of the time trend of demonstrations (Figure 1). Although the rate at which demonstrations occur tends to rise over the sample, some years simply have many more demonstrations - and others, many fewer. This reality is best captured by year groups, some of which may simply have more demonstrations (captured by a higher intercept), or fewer. Theoretical considerations aside, including time as a control variable in the multi-level model instead of applying random effects by year groups has virtually no effect on the other coefficients or their standard errors.

A final criticism is that, since the two indicators for social media use are correlated at 0.74, multicollinearity could be affecting the standard errors and thus significance-based inferences about social media effects. Although these variables are highly correlated, they present across a number of model specifications opposite effects on the dependent variables. Highly correlated variables present estimation problems when their effects are too similar, such that the model has insufficient information to parse out which effect belongs to which variable. Given the highly distinct effects attributed to these variables - effects which are moreover consistent when the same models are estimated using only one social media indicator at a time - including both of them in the same model does not present a problem.

Conclusion

This paper presents an argument and supporting evidence to the effect that social media facilitates political mobilization, but only in non-democracies. Internet use is consistently, significantly, and substantially associated with greater political mobilization by groups and individuals across a number of different model specifications. Interestingly, mobile phone use does not have the same effect; future research here could parse out why this is the case, and under what circumstances (if any) mobile phones have political relevance for mobilization.

As cross-national empirical confirmation of social media's political role, this work justifies the excitement of some cyber-optimists, albeit with several important provisos. First, there is no evidence yet to justify similar optimism about democracies, where social media may have a negative effect on political mobilization, or no effect at all. Second, the effect estimated by this sample is modest; a small increase in Internet use is likely to correspond with only a few more demonstrations in a region per year. This is nevertheless a considerable impact for regimes, political organizations, and interested citizens.

Third, as discussed above this effect may be limited to an "elite" phase. Internet use in Africa is still common only among those segments of the population that are most likely to make use of its political applications. As Internet use continues to spread across Africa, more of the population will have the opportunity to enjoy its non-political applications. The positive effect of increased use on mobilization may at this point level off, or disappear in the face of developing policies of social media control. As my analysis used a sample with very little regime control of the Internet, the effects seen here may be wholly vulnerable to censorship.

Finally and most critically, a demonstration does not a democracy make. As the Arab Spring has soberly reminded us, technology empowering citizens to punish unpopular incumbents does not offer many tools for constructing better institutions or choosing better leaders. In the larger picture, greater Internet use may in the long run only facilitate greater unrest and instability.

Appendix

Table 3 lists the African nations included in this study. The analysis includes all African

Algeria	Congo, Dem. Rep	Guinea	Mauritania	Sierra Leone
Angola	Congo Republic	Guinea-Bissau	Mauritius	South Africa
Benin	Cote d'Ivoire	Kenya	Morocco	Sudan
Botswana	Egypt	Lesotho	Mozambique	Swaziland
Burkina Faso	Eritrea	Liberia	Namibia	Togo
Burundi	Ethiopia	Libya	Niger	Tunisia
Cameroon	Gabon	Madagascar	Nigeria	Uganda
Central African Rep.	The Gambia	Malawi	Rwanda	Uganda
Chad	Ghana	Mali	Senegal	Zambia

Table 3: Nations Included in the Study

nations for which data is available; five island/ partially island nations are omitted (Cape Verde, Equatorial Guinea, the Seychelles, the Comoros, Sao Tome and Principe) as well as Zimbabwe, Somalia, and Djibouti which each lacked data on a control variable. Since the sample exists only through 2008, South Sudan (which obtained its independence in January 2011) is not considered a separate national unit over the time period of study.

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