The Impact of Social Media on Social Unrest in the Arab Spring

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Prepared By:
Taylor Dewey, Juliane Kaden,
Miriam Marks, Shun Matsushima, and Beijing Zhu

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STANFORD UNIVERSITY
PREFACE

This report investigates the impact of social media upon social unrest during the Arab Spring and is designed to test the common hypothesis that Facebook, Twitter and other social media outlets had a significant impact on the outbreak of protests in the MENA region. The authors provide a qualitative framework that reviews the rise of social media, considers the political and socioeconomic conditions in MENA countries, and draws from the social sciences literature on social movement theory. The report then provides case studies of countries in which social unrest was particularly pronounced: Bahrain, Egypt, Jordan, Morocco, Syria, Tunisia, and Yemen. These case studies focus on protesters’ use of social media, how social movement theory explains the role of social media, or other traditional methods of mobilization in these countries, governments’ use of social media to monitor and counter activists, and the role of social media in influencing international policy. The authors then develop two quantitative models, one to explore the correlation between protest activity and social media usage at the individual level, and the other to provide a forecast of the likelihood of social unrest given a certain set of country-level factors.

The report presents several main findings. First, exogenous political and economic shocks served as the necessary underlying drivers of social unrest; without grievances, individuals would have no cause for protest. Second, the authors did not find a consistent correlation between social media use and successful mass protest, suggesting social media is a useful but not sufficient tool for protest. However, the analysis also indicates that Internet communities can serve similar functions as civil society organizations, particularly in countries where government repression prohibits certain political groups. Because membership in civil society is more highly correlated with protest activity, the ability of social media to offer a sort of virtual civil society platform likely further boosted participation in protests during the Arab Spring. Finally, social media boosted international attention to local events by facilitating reporting from places traditional media has limited access to and by providing a bottom-up, decentralized process for generating news stories. We end on a cautionary note, warning of the increased use of social media by authoritarian governments to repress opposition movements and stymie democratization.

This report was prepared by six Stanford graduate students: five in the International Policy Studies Program and one in the Public Policy Program. This paper was completed over the course of six months and is the capstone project for both programs. The authors welcome comments and questions directed to melloram@stanford.edu.
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<table>
<thead>
<tr>
<th>AB</th>
<th>Arab Barometer</th>
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<tr>
<td>DIA</td>
<td>Defense Intelligence Agency</td>
</tr>
<tr>
<td>EWS</td>
<td>Early Warning System</td>
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<tr>
<td>IAF</td>
<td>Islamic Action Front</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>MB</td>
<td>Muslim Brotherhood</td>
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<tr>
<td>MENA</td>
<td>Middle East and North Africa</td>
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<td>SEA</td>
<td>Syrian Electronic Army</td>
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<td>USG</td>
<td>United States Government</td>
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EXECUTIVE SUMMARY

Social unrest began in Tunisia on December 17, 2010 and quickly spread to countries across the Middle East and North Africa (MENA), most noticeably in Bahrain, Egypt, Jordan, Morocco, Syria, and Yemen. In several of these countries, demonstrations evolved into revolutions resulting in the overthrow of longstanding autocratic governments. In other countries, social unrest peaked and waned, either suppressed by the government or softened by promises of democratic reform. These events, now known collectively as the Arab Spring, have dramatically changed MENA as its countries rebuild governments or turn to new paths of democratization.

These instances of social unrest have been interlaced with a technological and digital revolution, in which the Arab world has increasingly been opened to various forms of social media. In the last few years, Internet penetration rates, social media activity, and mobile phone usage have increased enormously in urban areas. This has raised the question of whether the proliferation of social media facilitated or otherwise played a role in enabling the Arab Spring.

The potential effects of social media are manifold: social media may have facilitated the dialogue amongst a network of activists who were then able to instigate calls for reform; social media may also have directly helped in protesters’ ability to organize and coordinate their activities. In quickly disseminating information, social media played an important role in attracting both national and international attention to protesters’ plight and subsequently swaying international opinion and policy. At the same time, social media also allowed for greater government efforts to monitor organizers’ online activities, coordinate the suppression of these endeavors, and thwart protesters’ goals.

This paper therefore seeks to determine the impact of social media upon the social unrest of the Arab Spring. We first explore the political and socioeconomic trends across the MENA region in the years leading up to the Arab Spring of 2011. Our analysis is divided into both qualitative and quantitative portions. Qualitatively, we provide case studies of countries in which social unrest was particularly pronounced: Bahrain, Egypt, Jordan, Morocco, Syria, Tunisia, and Yemen. Social science literature is then utilized to lay the foundation for understanding traditional methods of social mobilization as well as how social media fits into this framework. We round out our qualitative research with observations of governments’ concurrent utilization of social media to monitor and counter activists, and the role of social media in influencing international policy.

Next we develop two quantitative models. The first explores the correlation between protest activity and social media activity at the individual level, using a survey dataset from the Arab World. The second provides a forecast of the likelihood of social unrest given a certain set of
country-level factors. The report concludes with a discussion of our results and policy recommendations.

Our key findings include:

- Destabilizing political and socioeconomic issues, in particular the rising price of food, were critical underlying causes of social unrest.

- There is no consistent correlation between social media use and successful mass protest, suggesting social media is a useful but not necessary tool for mobilizing protest activity during the Arab Spring.

- Internet communities serve similar functions as civil society groups, particularly in countries where government repression prohibits the meeting of certain political groups. Since membership in civil society is highly correlated with protest activity, social media’s ability to offer membership in virtual civil society groups likely boosted participation in protests during the Arab Spring.

- Social media increased international attention to local events in MENA by facilitating reporting from places to which traditional media has limited access, and by providing a bottom-up, decentralized process for generating news stories.

- Governments increasingly use social media to repress the activities of protesters and stymie democratic movements. Thus the impact of social media upon social unrest may be both positive and negative, in that it is used both to facilitate and suppress unrest.

Our findings suggest that social media has been a useful tool in the hands of Arab Spring protesters, though not by any means a primary cause of protests. We believe that some limited policy options exist insofar as the USG seeks to drive democratic social change in other countries. Several policies might further an environment by which citizens elsewhere could utilize the maximum potential of social media to demand greater government accountability: the USG could request that social media sites postpone planned upgrades or maintenance that may cause service interruptions during periods of particularly high protest activity; the USG could provide technologies to circumvent Internet censorship; the USG could work above all to expand Internet penetration in order to increase the number of people with access to social media.
ACKNOWLEDGEMENTS

This project would not have been possible without the support of the Defense Intelligence Agency. We greatly appreciate the willingness of the DIA and, in particular, our contact Lieutenant Commander Eugene Lee to involve us in researching this important and timely project.

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Mark Tessler of the University of Michigan kindly offered to assist with analysis of the preliminary Second Wave of the Arab Barometer survey results. While the time horizon of our project did not allow for this, we are confident that this more recent data will be invaluable to advancing research on the current topic.

Lastly, we are immensely grateful to our course instructor Joe Nation and teaching assistant Russell Ganzi, who provided valuable perspectives and guidance throughout our research, editing, and presentation processes.
I. INTRODUCTION

On December 17, 2010, Mohammed Bouazizi set himself on fire after a policewoman confiscated his produce cart and publically humiliated him.¹ His self-immolation immediately sparked local riots in his small town of Sidi Bouzid, Tunisia. Within weeks of his act, social unrest had spread from Tunisia to countries across the MENA region, most noticeably in Bahrain, Egypt, Jordan, Morocco, Syria, and Yemen. In several of these countries, demonstrations grew tremendously in magnitude and succeeded in overthrowing autocratic governments: protests in Tunisia eventually led to the collapse of President Zine al-Abidine bin Ali’s 23-year regime, while protests in Egypt brought about the resignation of President Hosni Mubarak. Yemeni President Ali Abdullah Saleh recently agreed to step down after 33 years in power. In other countries, social unrest peaked and waned, either suppressed by the government or softened by promises of democratic reform. These events, now known collectively as the Arab Spring, have dramatically changed MENA as its countries rebuild governments or turn to new paths of democratization.

These instances of social unrest have been interlaced with a technological and digital revolution, in which the Arab world has increasingly been opened to various forms of social media. In the last few years, Internet penetration rates, social media activity, and mobile phone usage have increased enormously in urban areas. This has raised the question of whether the proliferation of social media facilitated or otherwise played a role in enabling the Arab Spring.

The potential effects of social media are manifold: social media may have facilitated the dialogue amongst a network of activists who were then able to instigate calls for reform; social media may also have directly helped in protesters’ ability to organize and coordinate their activities. In quickly disseminating not only information but sensational pictures and video clips, social media played an important role in attracting both national and international attention to protesters’ plights and subsequently swaying international opinion and policy. At the same time, social media also allowed for greater government efforts to monitor organizers’ online activities, coordinate the suppression of these endeavors, and thwart protesters’ goals.

This paper seeks to determine the impact of social media upon the social unrest of the Arab Spring. We consider protesters’ use of social media, governments’ concurrent utilization of social media to monitor and counter activists, and the role of social media in influencing international policy. Our paper begins with a background on the rise of social media and an overview of the Arab Spring. Next, we review the social sciences literature on social movement

theory and organization, and analyze the impact of social media during the 2009 Green Revolution in Iran.

Our analysis is divided into both qualitative and quantitative portions. Qualitatively, we provide case studies of countries in which social unrest was particularly pronounced: Bahrain, Egypt, Jordan, Morocco, Syria, Tunisia, and Yemen. Next we develop two quantitative models, one to explore the possible correlation between protest activity and social media activity, and the other to provide a forecast of the likelihood of social unrest given a certain set of preexisting factors. The report concludes with a discussion of our results and policy recommendations.
II. BACKGROUND

2.1 The Rise of Social Media

The tremendous expansion of the Internet during the 21st century, as well as the development and spread of sophisticated mobile phone technology, has enabled and promoted the unprecedented growth of social media, generally considered to be any web-based or mobile communications technology that allows the creation and exchange of user-generated content. Scholars have classified social media into six categories: open-source, collaborative projects, blogs and micro-blogs, content communities, social networking sites, virtual game worlds, and virtual social worlds. In this project we focus on the social media that was most commonly used in the Arab Spring – namely blogs, social networking sites, and content communities.

**Facebook** is the largest and most ubiquitous social networking website on the Internet today. Developed in 2003, Facebook has since expanded significantly; the company opened its international headquarters in 2008 with an active user base of 100 million, and now boasts a user base of 845 million as of December 2011. More than 75 percent of these users are located outside the US. Facebook users can create personal, group, and event pages and then post photos, videos, and text entries to other pages as well as chat in real-time, exchange private messages, and share longer notes with other users.

**Twitter**, launched in 2006, is a popular social networking and micro-blogging service by which users can send and receive text-based posts of up to 140 characters, known informally as “tweets.” While it was launched several years ago, Twitter has expanded most rapidly in recent months; as of August 2011 Twitter generated over 200 million tweets a day, up from 65 million the year before.

**YouTube** is currently the largest online content community, allowing its users to watch and share originally created videos. Since its launch in November 2005, YouTube had reached over 700 billion playbacks by 2010, with 70 percent of its traffic coming from outside the United States. Every day, more than 3 billion videos are viewed and 8 years worth of video content uploaded.

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3 Ibid.
Blogs first emerged in 1998-1999 with the creation of Open Diary, LiveJournal, and blogger.com. By 2004, blogging had become relatively mainstream in American politics and news. With growing Internet penetration and usage around the world, blogs soon sprung up elsewhere. The Arab blogosphere has gained increasing political relevance since 2005, when blogs first had a discernible impact in influencing the rise of Egypt’s Kefaya movement, political protests in Bahrain, the Cedar Revolution in Lebanon, anti-corruption campaigns in Libya, and the 2006 Parliamentary elections in Kuwait. There have since been countless instances of Arab governments censoring, arresting, and even torturing anti-regime bloggers.

2.2 The Arab Spring

While social media may have played a role in facilitating the events of the Arab Spring, we emphasize here that this widespread social unrest was and continues to be rooted in a broader set of economic, social, and political factors.

2.2.1 Political Background

Every Arab country that experienced a significant degree of popular protest was governed by an authoritarian regime. Many of these governments lacked free and fair elections, and various restrictions were imposed on formation of political parties. As a result, these countries had few if any institutional mechanisms designed to identify, take up, and respond to popular demands. Because nondemocratic governments lack appropriate feedback mechanisms that could warn them of the depth and characteristics of popular discontent, they are frequently incapable of identifying and addressing social unrest in a timely manner.

Furthermore, authoritarian governments often lack transparency and demonstrate little respect for principles such as the rule of law and civil rights. Detentions and arrests without due process, torture, phony trials, disappearances, and police brutality have been common across MENA. Past instances of political opposition and mass protest were quashed or simply brushed aside by authoritarian rulers, as in the 2000-2001 Damascus Spring in Syria, the 2005 Kefaya movement in Egypt, and the massive 2005 Bahrain protests. Similarly, the lack of government transparency and stringent media censorship worked to suppress people’s demand for reforms. Over time, this led many Arab governments to face what Habermas called a “legitimation crisis,” losing the trust and respect that are essential for effective governing. This slow erosion of regime legitimacy is certainly a factor to consider in explaining citizens’ willingness to decisively oppose their autocracies in the Arab Spring.

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Equally important was the blatant corruption and cronyism of many MENA governments.\textsuperscript{9} For example, more than half of commercial elites in Tunisia had close relations with former President bin Ali.\textsuperscript{10} In Egypt, President Mubarak and his family were alleged to have accumulated between $40 billion and $70 billion, and a number of businessmen close to Mubarak’s son Gamal had reportedly made more than $1 billion each.\textsuperscript{11} Public outrage at such wanton corruption and nepotism was a major factor fueling popular protests in countries such as Tunisia, Syria, and Yemen.

2.2.2 Socioeconomic Background

Countries in the MENA region are most readily classified into two categories: those with plentiful natural resources – namely oil – and those without. A significant body of the political science literature suggests that countries with large oil exports are able to reinforce authoritarian regime structures by using the vast monetary windfall to satisfy citizens’ concerns.\textsuperscript{12} While it is valuable to note that the wealthy Gulf states of Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates have successfully avoided any significant degree of social unrest, they have not been completely insulated from the effects of the global economic crisis that began in 2008. Indeed, one can observe some common themes throughout the region: stagnant growth (with exceptions of Qatar and the UAE), high inflation, rising unemployment, and heavy government subsidies. These destabilizing factors, many argue, made the social unrest of the Arab Spring inevitable. Indeed, the global financial meltdown of 2008 may partly explain the timing of the Arab Spring.

Several MENA countries saw a rapid decline in GDP growth in the years leading up to the Arab Spring, a phenomenon that was likely a repercussion of the 2008 global financial crisis. Figure 1 highlights the changes in GDP growth for several countries that experienced protests during the Arab spring. For example, real GDP growth in Bahrain fell from 8.4 to 1.2 percent between 2007 and 2010. Egypt had enjoyed steady economic growth under the economic reforms put in place by the Mubarak regime but experienced a sharp economic contraction after 2008 due to the drying up of foreign investments. Both the decline of tourism and falling oil prices resulted in similar trends across other MENA countries, and the economic repercussions quickly fueled popular discontent as they noticeably affected everyday life in the form of rising food prices, unemployment, and higher costs of living.

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In tandem with these difficult economic conditions is the larger demographic trend of a “youth bulge.” Between 1950 and 2010, nearly every country in the MENA region experienced a noticeable decline in infant mortality rates in conjunction with rising fertility rates. The result has been a number of populations with disproportionately large numbers of youth.\textsuperscript{13} In February 2011, for example, nearly two thirds of the Egyptian population was under the age of 35.\textsuperscript{14}

Partly due to the modernization policies of some authoritarian regimes, an increasing number of youth were enrolling in higher education, particularly at the university level. College enrollment tripled in Tunisia, quadrupled in Egypt and grew tenfold in Libya. However, the absolute increase in wealth and number of jobs failed to keep up with the rapid population growth and resulted in higher relative unemployment and a larger number of disaffected, educated young people without jobs and with little opportunity to accumulate wealth.\textsuperscript{15} The hyper-urbanization has also worsened economic conditions especially in cities. The rapidly expanding, sprawling slums in large city areas and a deprivation of government services have helped to foment discontent towards the government among city dwellers.\textsuperscript{16}

This high unemployment, especially among the region’s youth was essentially a byproduct of stagnant growth: while 60 percent of the population in MENA is under the age of 30, regimes have done little to address youth unemployment, which ranges from 15 to 30 percent across the region. In 2011, Yemen’s unemployment rates reached 40 percent due to low growth and

\textsuperscript{13} Both the United Nations General Assembly and the World Bank deem a “youth” as a person between the ages of 15 and 24.
\textsuperscript{15} Ibid.
expanding population. In Egypt, despite relatively strong macroeconomic indicators, employment failed to keep up with the number of new job force entrants, which was growing at 4 percent per year. This led to double-digit unemployment rates and widespread dissatisfaction among Egypt’s large youth population, who would later be at the forefront of demonstrations.¹⁷

Inflation, in particular rising food prices, also catalyzed discontent in a number of countries. By January 2011, year-on-year inflation had reached more than 6 percent in Jordan, bringing thousands into the streets to demand lower prices. “Jordan is not only for the rich,” read one protester’s sign, “bread is a red line. Beware of our starvation and fury.”¹⁸ In many MENA countries, food prices were kept low by substantial government subsidies; but as the global economic downturn strained public finances, many regimes were forced to cut spending by reducing subsidies, and threatening the livelihood of their citizens.

III. LITERATURE REVIEW

3.1 Social Movement Theory

Social movement theories provide a helpful framework for understanding how individuals mobilize themselves in order to overcome collective action problems and for explaining individual variation in movement participation. Using these theories, we hope to draw conclusions about the causal mechanisms that drove individuals in particular MENA countries to engage in different degrees of protest participation during the Arab Spring. Social movement theory also provides further context to the impact social media had as a method of facilitation.

Political struggle can take three different forms, identified by Charles Tilly as protest, collective action, and contention. Protests are generally an expression of popular consciousness that are manifested in “street politics”; collective action occurs when a population has a shared interest and coordinates action on behalf of that interest; contention involves “claim-making,” in which a party demands certain actions that would affect multiple parties’ interests. Social movement theory often posits that communities with dense network ties are more likely to experience collective action than those with sparser ties. On the individual level, those recruited to participate in social movements are likely to possess more social ties to those already in the movement. Strong social ties (close interpersonal ties such as family) or dense social ties (referring to a high number of ties) in networks often facilitate an initial request to participate in a social movement and then smooth the way to participation by lessening the uncertainty of mobilization; indeed, a strong predictor of participation in a neighborhood organization is when one resides in the same area as one’s close friends or relatives, providing the strong and dense network ties that encourage and facilitate participation.

McAdam and Paulsen posit that, although the strength of social ties strongly influences recruitment on the individual level, weak social ties can be effective in communicating and spreading the message of a social movement across diffuse networks. This suggests that an effective network structure would have dense networks of weak ties to outside entities in addition to strong interpersonal ties within those groups.

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21 Ibid, 20.
23 Ibid 19, 644.
24 Ibid 19, 655.
While participants in social movements are often recruited through preexisting social ties, McAdam and Paulsen argue that additional context is necessary to better determine the nature of individuals’ interpersonal social ties to the movement. Such context illuminates whether it is the presence of a tie to the movement, the number of ties, or the strength of the tie that matters most. Additional relevant contexts to consider are individuals’ affiliation with multiple organizational or familial networks simultaneously, for these could prove conflicting in individuals’ decisions of whether to participate in a given social movement. McAdam and Paulsen emphasize the importance of considering the manner in which social ties can both lead to increased and decreased activism. They further argue that individuals’ large variety of relationships are all crucial elements of the context surrounding why those who had social ties to the movement chose to participate, and what the effect of ties to parents, peers, and others had on the decision. In general, pre-existing organizational affiliation has been found to be a critical structural factor linked to participation in social movements, as membership in organizations facilitates the formation of increased interpersonal ties, and thus individuals belonging to certain groups are more frequently targeted for recruitment by movement organizers over unaffiliated individuals.

McAdam, Tarrow, and Tilly try to discern which “mechanisms” cause social movements to form and argue that if certain mechanisms are proven to operate in similar ways across diverse settings, they are more likely to be important causal factors in the trajectory of social movements in general. Mechanisms such as bargaining and “boundary deactivation,” which is the diminishment of boundaries between local communities and national political networks, can help fuel an upward shift in scale (upward scale shift implies an increased number of participants and/or a shift from the local to national level) as the process of bargaining between government officials and movement leaders can foster new ties and mutual understanding.

Another key mechanism in the formation of social movements is the nature of the conversations in which individuals engage during coalition formation. The authors identify the use of “compartmentalizing mechanisms” as a means by which organizers foster connections to a broader range of identities. This is easily accomplished by focusing on a narrow scope of identities shared by many, such as that of ‘youth,’ and by limiting the proposed timeframe of the coalition in order to alleviate concerns that participants are entering a constraining long-term agreement. “Conflation mechanisms” are used in a similar manner to establish a broad base of

27 Ibid 19, 645-6.
28 Ibid 19, 644.
30 Ibid 22, 311-312.
31 Ibid 22, 317.
support through focusing on the “lowest common denominator” by playing up common identities while downplaying differences.\textsuperscript{33}

In turning to social media and its effectiveness as a medium for social movement mobilization, there is a mixed review on whether it has had a negative or positive impact. Melissa Lerner highlights the negative effects attributed to Internet use by some social movement theorists: the Internet’s provision of information alone does not produce sufficient social capital and community ties for sustained social movement activity geared towards democratization. Rather, increased access to online information by the public, combined with the often unregulated ability to publish a wide variety of information, can actually lead to an oversupply of confusing, inaccurate and distracting information. In addition, the replacement of real-world, face-to-face communication decreases solidarity and consensus-building that is critical to social movements.\textsuperscript{34} However, she argues that the combination of web-based organizing and social movements, in which members participate both online and in the real world, can be very effective.\textsuperscript{35} Also, in a politically repressive climate, cyberspace can facilitate alternate avenues for expression that reduce some of the risks of public activism and can also provide otherwise unavailable information to encourage dissident sentiments or anti-government action.\textsuperscript{36}

Marc Lynch posits that the effect of “new media”—including both satellite television and Internet-based social media—is growing as increased numbers of people in the Middle East gain access to and develop proficiency in utilizing information technologies. This in turn is creating a new public sphere in which citizens are able to overcome authoritarian states’ monopolization of information and fundamentally challenge state control.\textsuperscript{37} In the shorter-term, he argues that new media encourage collective action by reducing transaction costs, creating “informational cascades,” increasing the costs of repression, and producing scale and diffusion effects.\textsuperscript{38} However, he acknowledges the conflicting arguments addressing the effect of new media on the emergence of protests and highlights the importance of other context including the role of older media such as Al-Jazeera in contributing to the development of the uprisings, as well as fundamental political and economic issues.\textsuperscript{39}

Lynch contends that new media reduce the traditional transaction costs of organizing by reducing communication barriers, providing automatic higher visibility for small-scale protests, linking like-minded individuals, and providing a venue to discuss political ideas that could otherwise

\textsuperscript{33} Ibid 22, 318-9.
\textsuperscript{34} Lerner, Melissa. “Connecting the Actual with the Virtual: The Internet and Social Movement Theory in the Muslim World—The Cases of Iran and Egypt.” \textit{Journal of Muslim Minority Affairs} 30 no. 4 (2010): 557.
\textsuperscript{35} Ibid, 557.
\textsuperscript{36} Ibid, 558-60.
\textsuperscript{38} Ibid. 304.
\textsuperscript{39} Ibid, 303.
entail risks if voiced publicly in authoritarian states. Along these lines, the expression of beliefs online can empower individuals who would normally not speak out against a regime in public for fear of reprisal. Lynch argues that these informational cascades, which can occur nationally and beyond borders, were witnessed within both Egypt and Tunisia with the spread of anti-government protests from a small number of people to the broader public, who had been sympathetic to the message and then were empowered to join. Transnationally, the spread of protests from Tunisia to Egypt could have been influenced by perceptions regarding the possibility of successful political change after the removal of bin Ali in Tunisia.

Lynch also argues that the publicity by new media of violent repression at popular protests raises the cost of repression by authoritarian states insofar as it can provoke international attention and fuel local resentment. New information technologies have also helped develop a more unified Arab political space, which has created a greater diffusion of ideas and contributed to the adoption of similar language and protest methods among demonstrators. Though Lynch sees new media as an influential factor in demonstrations in the short-term, he suggests that continued research is needed in order to map the causal mechanisms of new media’s impact on contentious politics and to determine the broader effect of these technologies upon society in the longer-term.

3.2 The Role of Social Media in the Green Revolution

It is useful here to briefly analyze the role of social media in the Green Revolution, an event that provides valuable historical perspective as the most recent instance of mass mobilization facilitated by social media in the MENA region. As the world watched the unfolding events of the “Green Movement” in Iran, the extent to which information could be rapidly disseminated by social media grew increasingly apparent. Evolving forms of social media, such as the relatively new Twitter, played their first role as facilitators of tremendous social unrest.

The Green Movement erupted soon after the tenth presidential election of June 12, 2009. The incumbent President Mahmoud Ahmadinejad received 62 percent of the popular vote, while his opponent, the reformist Mir-Hossein Mousavi, received only 33 percent. Almost as soon as the results were publicly disclosed, wired and networked supporters of Mousavi began to cry foul play, questioning the integrity of the election via social media. The Green Movement was born with the slogan: “Where is my vote?”

The Green Revolution saw hundreds of thousands of Iranians protesting in the streets of Tehran against the ostensibly fraudulent election of Ahmadinejad. The most iconic event of the Green

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40 Ibid, 304.
41 Ibid, 305.
42 Ibid, 305.
Revolution captured via social media is a video of the death of 26 year-old Neda Agha-Soltan, who was hit by a stray bullet as she stood outside her car.\textsuperscript{44} The video of her death was posted on Facebook and YouTube and deemed “heartbreaking”\textsuperscript{45} by President Obama, rocking the Western world and increasing support for the protesters from diaspora Iranians and other sympathetic governments.

Social media were widely used during the events of the Green Revolution. The spread and popularity of social media in Iran was at least partially a by-product of the extensive and rapidly increasing penetration of the Internet and cell phones in Iran. Larry Diamond has dubbed such tools “liberation technologies,” which he defines as “any form of information and communication technology (ICT) that can expand political, social, and economic freedom.”\textsuperscript{46} Diamond explains that, prior to the disputed election in Iran, the country’s online public sphere had grown rapidly “as evidenced by its more than 60,000 routinely updated blogs exploring a wide range of social, cultural, religious, and political issues; the explosion of Facebook to encompass an estimated 600,000 Persian-language users; and the growing utilization of the Internet by news organizations, civic groups, political parties, and candidates.”\textsuperscript{47} Internet users in Iran increased from close to zero in 1999 to 27.9 million in 2009.\textsuperscript{48} There are currently approximately 36.5 million Internet users in Iran,\textsuperscript{49} nearly half the population of the country. Soon after it was allowed in the country, Facebook became the 15th most popular website in Iran, and it is currently the 12th most popular website there.\textsuperscript{50} Approximately half of all Iranians have a cell phone.\textsuperscript{51} In 2010, Iran accounted for 0.41 percent of all tweets on Twitter, the 20th largest percentage of Tweets in any country.\textsuperscript{52}

In the wake of the Green Revolution, numerous pundits were quick to claim the importance of social media, particularly Twitter, in facilitating mass protests. Mark Pfeifle argues that, “without Twitter the people of Iran would not have felt empowered and confident to stand up for freedom and democracy.”\textsuperscript{53} Lev Grossman claims that Twitter is “practically ideal for a mass protest

\begin{flushright}
\textsuperscript{44}“Death Video Woman Targeted by Militia.” BBC News. http://news.bbc.co.uk/2/hi/middle_east/8113552.stm
\textsuperscript{47}Ibid, 79.
\end{flushright}
movement.” However, others claimed that the effect of Twitter upon the protests of the Green Movement was vastly overrated. Golnaz Esfandari sums up the other argument most succinctly by saying, “simply put: there was no Twitter Revolution inside Iran.” Joel Schectman also cautions that, despite all of the hype, “most of the organizing happened the old-fashioned way.”

It may be that the Western media overplayed the value of Twitter because of the ease with which many English tweets from Iran could be used as primary news sources. Furthermore, the vast increase of Twitter users registered in Iran was often shown as evidence of its purported effectiveness. Data gathered by Sysomos, a company that tracks Internet usage, reveals that in mid-May 2009 there were 8,654 Twitter accounts in Iran, a number that increased to 19,235 by late June. However, this increase was based upon Twitter users’ stated location, and during the summer of 2009, many Twitter users outside Iran changed this location to Tehran in order to show solidarity with the protesting Iranians.

Without hesitation, the regime began to censor websites, slow Internet connectivity, and disable cellular networks in order to prevent communication via SMS. This was easily done because the Iranian National Guard, firmly behind Ahmadinejad, owned the main Internet service provider. However, this censorship was less than perfect and protesters still managed to transmit their messages via YouTube, blogs, Facebook, Twitter, and SMS.

Iran may have attempted to suppress social media, but news of the demonstrations and the violent crackdowns against protesters still managed to reach international audiences through social media routed through proxy servers. Iranians’ access to social media was especially important to Western observers who relied upon primary source reporting via social media outlets in order to understand what was happening on the streets of Tehran. Many major news networks and policymakers also received their information from these citizen sources. Realizing this, the US State Department asked Twitter to delay an upgrade that would have brought down the service for a short time because the rest of the world was relying so heavily upon it for news from Iran.

While the Iranian government moved to censor and suppress access to social media by protesters, they simultaneously realized it was a potent weapon for their own counter-

revolutionary means. Evgeny Morozov, who believes that social media actually helps dictators more than it does protesters, suggests that, “The Iranian government and its hard-line supporters used mobile and Internet technology all too astutely against the protesters. Gleaning information from Facebook, they sent ‘threatening messages’ to Iranians living abroad, text-messaged Iranians to stay home and avoid the protests, and urged ‘pious Iranians’ to fight back online.”

Iranian reformist politicians such as Mousavi relied heavily upon social media and websites to disseminate their messages. Mousavi, who famously said that, “every Iranian is a media outlet,” posted interviews with civil society leaders and famous Iranian actors who endorsed his candidacy online. Mousavi’s supporters posted videos and photos of protests that frequently discredited the dis-information campaign of Ahmadinejad and his supporters.

While some skeptics claim that the role of social media during the Green Revolution has been overestimated, we maintain that without social media in Iran, the movement would likely not have been as large or well-organized, and its coverage in international media not nearly as extensive. The Green Revolution serves as an interesting and informative case study not only because it was a precursor to the Arab Spring, and because its participants protested many of the same issues, but because both movements utilized social media extensively.

But most valuable in the case of the Green Revolution is our ability to examine the results of the revolution more than two years after the large-scale instances of social unrest took place. Unfortunately, little has changed on the ground in Iran. Again, whether the communication of this message was impactful is subject to debate; however, the lack of any substantial democratic change within Iran suggests that the spread of a message did not necessarily translate into tangible democratization.

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IV. QUALITATIVE FINDINGS

The methodological portion of our paper is comprised of both qualitative and quantitative analyses. The qualitative portion examines the role of social media in social unrest at the country level in a series of case studies. We have two quantitative portions: the first examines the impact of social media on individuals’ protest activity, and the second develops an Early Warning System (EWS) model for predicting unrest.

4.1 Country-level Case Studies

In each of the following qualitative case studies, we ask:
1) How did organizers utilize social media?
2) How does social movement theory explain the role of social media, or other more traditional methods, in mobilizing protesters?
3) How did governments make use of social media in response to opposition movements?
4) What was the role of social media in influencing international opinion and policy?

We chose to examine seven Arab countries that experienced significant social unrest, as measured by the size and scope of protests: Tunisia, Egypt, Yemen, Jordan, Bahrain, Syria, Tunisia, and Morocco. We chose case studies based upon countries that experienced sustained protests over several weeks with at least several thousand participants. Table 1 below provides a brief overview of when protests began in each country, the largest protest, and the principal organizers of the demonstrations. Case studies are ordered chronologically by the first significant outbreaks of social unrest.

Table 1: Overview of Protests in Seven Arab Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>First Large-scale, Organized Protest</th>
<th>Largest Protest</th>
<th>Date of Largest</th>
<th>City</th>
<th>Principal organizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tunisia</td>
<td>Monday, Dec 27</td>
<td>1,000s</td>
<td>Tuesday, Jan 11</td>
<td>Tunis</td>
<td>Trade union activists</td>
</tr>
<tr>
<td>Egypt</td>
<td>Tuesday, Jan 25</td>
<td>100,000s</td>
<td>Tuesday, Feb 8</td>
<td>Cairo</td>
<td>Muslim Brotherhood</td>
</tr>
<tr>
<td>Yemen</td>
<td>Thursday, Jan 27</td>
<td>20,000</td>
<td>Friday, Mar 18</td>
<td>Sana’a</td>
<td>al-Islah (MB)</td>
</tr>
<tr>
<td>Jordan</td>
<td>Friday, Jan 28</td>
<td>7,000-10,000</td>
<td>Friday, Feb 25</td>
<td>Amman</td>
<td>Islamic Action Front (MB)</td>
</tr>
<tr>
<td>Bahrain</td>
<td>Monday, Feb 14</td>
<td>10,000s</td>
<td>Tuesday, Feb 22</td>
<td>Manama</td>
<td>al-Wefaq, al-Waad</td>
</tr>
<tr>
<td>Syria</td>
<td>Thursday, Feb 17</td>
<td>10,000s</td>
<td>Friday, April 22</td>
<td>Damascus</td>
<td>Syrian Revolution activists</td>
</tr>
<tr>
<td>Morocco</td>
<td>Sunday, Feb 20</td>
<td>10,000</td>
<td>Sunday, March 20</td>
<td>Casablanca</td>
<td>Feb 20 Movement</td>
</tr>
</tbody>
</table>

Sources: Al Jazeera, The Guardian, CNN
4.1.1 Tunisia

Protests in Tunisia began in mid-December 2010, marking the unofficial beginning of the Arab Spring. After the December 17 self-immolation of street vendor Mohammed Bouazizi in Sidi Bouzid, young protestors flooded the streets of the city in order to protest the country’s rapidly rising youth unemployment and corruption among members of the elite. The protests quickly escalated into violence and spread across the country to capital city Tunis by December 27. President Zine al-Abidine bin Ali initially delivered strong messages against the unrest, claiming, “the law will be applied in all firmness.”62 However, by mid-January the protests could no longer be contained, and bin Ali ended his two-decade rule by fleeing to Saudi Arabia.63

While local protests began in Sidi Bouzid immediately after Bouazizi was taken to a medical facility, YouTube and Facebook played a large role in mobilizing Tunisian educated youth. Videos of Bouazizi’s suicide quickly appeared online and sparked the first demonstrations. Later, videos of police clashes with rioters fueled the country’s anger. Apart from organizational purposes, social media sites also served the important role of information provider. As one activist stated, “Protestors took to the streets with a rock in one hand, a cell phone in the other.”64 Past protests in Tunisia have rarely been able to grow because the state-owned media tightly controls the news. However, as more and more videos of protests appeared online, they were eventually picked up by international media such as Al Jazeera and disseminated worldwide.

Tunisian activists focused on “breaking the media blackout” and spreading a constant stream of information. This allowed videos to eventually reach sites like YouTube, which was banned by the government. Twitter hash-tags evolved from #Bouazizi to #sidibouzid to #tunisia.65 The majority of Tunisians, fearing repercussions, did not actively participate on Facebook or Twitter—sharing or “liking”—until bin Ali’s departure appeared imminent and definite. However, with one of the highest levels of Internet penetration in the MENA region (roughly 30%), citizens were able to follow the news provided by “a solid core of activists.”66 These included bloggers Messou T7Essou and Ben Mhenni, whose blog is named “A Tunisian Girl.”67

In March 2011, Reporters Without Borders awarded the 2011 Netizen Prize to the popular

63 Kirkpatrick, David. “Tunisia Leader Flees and Prime Minister Claims Power.”
65 Ibid.
66 Ibid.
Tunisian blog Nawaat.org. In May of the same year, the blog received the 11th annual Index on Censorship Media Award, supported by Google.68

The Tunisian government’s attempts to block social media sites were largely unsuccessful. However, authorities did manage to arrest prominent bloggers and online activists. The government also hacked into Facebook and email accounts in order to block their access to sites and prevent their obtaining of usernames and passwords. Phishing attempts backfired when protesters learned of government actions and produced slogans such as “Free from 404.” The Tunisian government soon became victim itself to a hacking organization called Anonymous.69

While social media was an important tool in mobilizing protesters in Tunisia, a range of civil society groups including trade unions, education unions, human rights groups and opposition groups, were clearly instrumental in organizing their members to demonstrate against the regime.70 The involvement of these groups resulted in the mobilization of a large swath of Tunisian society including students, teachers, journalists, human rights activists, trade unionists and opposition politicians.71 This is a striking example of the power of civil society groups to increase participation in broader social movements.

4.1.2 Egypt

On June 6, 2010, 28 year-old Khaled Saeed was brutally beaten to death by police after circulating a video showing Egyptian police divvying the remains of a drug bust.72 Police claimed that Saeed had choked to death, but photos of Saeed’s beaten body soon surfaced online, sparking public backlash against police corruption and torture. It also led to the creation of Facebook group “We Are All Khaled Saeed,” moderated by 30 year-old Google executive and cyber-activist Wael Ghonim.73

By 2011, the “We Are All Khaled Saeed” page had attracted more than 400,000 members, who rallied around their common frustration with abuses of power by authorities under Egypt’s

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69 Ibid.
71 Ibid.
73 Ibid.
emergency rule, ongoing since 1967. The group page continued to depict other similar abuses—wrongful arrests, torture and government corruption.\textsuperscript{74}

On January 18, 2011, graduate student Asmaa Mahfouz posted a 4 minute- and 36 second-long video to both Facebook and YouTube in which she called for her fellow Egyptians to participate in protests against the government. Specifically, she stated that she would go alone to protest in Tahrir Square; when she and several others made their way to this location, the internal security services immediately surrounded them and quietly evicted them from the area. She then posted a second video, announcing her intention to return to the square on January 25\textsuperscript{th}, an Egyptian national holiday, to protest once again. Around this time, a prominent Egyptian youth group, the April 6 Movement, contacted the then-anonymous administrator of “We Are All Khaled Saeed” asking for “marketing help” with a campaign—protests on January 25\textsuperscript{th}, which would mark the official beginning of the Egypt uprisings.\textsuperscript{75}

The linkage of these two online groups—“We Are All Khaled Saeed” and the 6 April Movement—demonstrates the utility of social media in bridging the two communities. McAdam and Paulsen also highlight organizational membership as an important structural factor linked to participation in social movements,\textsuperscript{76} and Facebook communities arguably serve as organizations to their members. The members of these online communities, which could be considered online organizations, therefore were more easily accessed and mobilized by protest organizers, as stipulated by social movement theory. Given that networks of close friends frequently use Facebook, it is also likely for these friend networks to join Facebook pages, or organizations, in tandem. The strong interpersonal ties among networks of friends on Facebook therefore provide the influence upon recruitment that McAdam and Paulsen stress is important to social movements.\textsuperscript{77}

During protests, Ghonim provided detailed accounts of events via his Twitter account, which had more than 200,000 followers. Social media became some of the main tools for organizing demonstrations and sharing real-time news. In some occasions, these tools were used to fool the police, from planting false rumors to staging “field tests.” Before each protest (most scheduled for Tuesdays and Fridays in order to conserve energy), groups would provide a false lead online and gather at another location.\textsuperscript{78} The government retaliated by shutting down Internet access. Google Inc., Ghonim’s employer, responded by creating Speak2Tweet, an application that allowed voice messages to be posted to Twitter.\textsuperscript{79}

\textsuperscript{76} Ibid 19, 640-667.
\textsuperscript{77} Ibid 19, 640-667.
\textsuperscript{78} Ibid. 10
\textsuperscript{79} Ibid. 9
Ghonim was jailed soon after the January 25th protests, and during his two-week incarceration he was interrogated to provide information about his Facebook campaign, which authorities believed was backed by foreign powers. Following his release, 148,700 people signed a Facebook campaign to appoint Ghonim as the spokesman for Egypt’s democracy movement. Ghonim’s use of social media not only propelled him to international hero status but also afforded him credibility among the protesters, many of which were his age. His role in mobilizing the Egyptian youth is evident. “This is my first day at the protests,” one participant said, “the moment I saw Ghonim on TV last night I knew I had to get down to Tahrir and stand with the Egyptian people.”

4.1.3 Yemen

In January 2011, major street protests materialized in the Yemeni capital of Sana’a. Protesters opposed changes to the constitution and complained about the state of the economy, plagued by high unemployment rates. However, protests grew larger by late January and took on an increasingly pointed tone of criticism toward President Ali Abdullah Saleh, who had ruled Yemen for over three decades. Many demonstrators began to openly call for new leadership in Yemen. Tawakel Karman, one prominent female leader of the opposition in Yemen who would eventually share a Noble Peace Prize for her efforts, called for a “Day of Rage” similar to protests in Tunisia and Egypt. Two other movements protesting the Saleh regime, including a powerful tribal confederation and the weaker formal opposition parties, joined the protests shortly after. In February, the leaders of two leading tribal groups, the Hashid-dominated National Solidarity Council and the Baqil tribe, said they would send their members to join the protests against Saleh.

Facebook pages set up to advertise protests in early February were largely composed of university students and numbered only in the few hundreds. Yemen has the lowest levels of Internet penetration in the entire MENA region, at 1.8 percent of the population, and thus

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81 Ibid.
84 Fattah, 82.
participation in online events did not accurately reflect activity on the ground. Protest numbers have remained high in part because Friday prayers functioned as a convenient rallying point for anti-Saleh protesters to organize.\textsuperscript{88} The government reacted violently and used the military to suppress the demonstrations. Videos of this repression appeared on YouTube and Facebook, increasing national outrage and bringing international condemnation.

The mobilization of the youth movement in Yemen, which has made some use of social media, has reignited a broader struggle in the country between tribal forces, opposition parties, and sectarian Houthis demanding change from the ruling regime.\textsuperscript{89,90} These tribal and opposition groups have very dense, solid networks of constituents who are primarily organized by traditional means and not social media. The major role of such tribal and organizational affiliations in the ongoing Yemeni protests demonstrates the importance of pre-existing organizational, or in this case, tribal, membership stipulated in social movement theory to bolster participation in social movements.\textsuperscript{91}

4.1.4 Jordan

Protests in Jordan began in January 2011 and were largely initiated by trade union activists as well as the Islamic Action Front (IAF), one of the largest opposition groups in Jordan and a branch of the Muslim Brotherhood (MB). On 14 January, calls for protest by a popular trade union leader led to a turnout of approximately 8,000 Jordanians in Amman and other cities to protest high food and fuel prices.\textsuperscript{92} On 28 January, after Friday prayers, 3,500 opposition activists from different groups including MB members, trade unions, and leftist organizations gathered on the streets of Amman to call for government reforms.\textsuperscript{93} The largest mass demonstration gathered on Friday, February 25\textsuperscript{th} when the IAF led 10,000 people from 19 other political parties in the central streets of Amman.\textsuperscript{94} A series of protests followed,\textsuperscript{95} mainly in the capital, in which protesters clashed with government forces.

\textsuperscript{90} http://articles.cnn.com/2011-03-10/world/yemen.youth.protests_1_yemen-mohammed-abulahoum-sana-a?_s=PM:WORLD
\textsuperscript{91} Ibid 19, 640-667.
In April 2011, a prominent IAF leader appeared frequently on television and in print media to bolster support for further protest against the Jordanian government. The 24 March Movement—consisting of Islamists, leftists and independents—on the other hand has often used Facebook to call for protests.

Given the diversity of these protest groups, social movement organizers are likely using the conflation mechanisms described by McAdam, Tarrow, and Tilly, which require establishing a wide base that consists of diverse elements by focusing on the lowest common denominator that is of interest to all parties. Since much of the frustration that galvanized people to join the protests initially was linked to economic conditions and rising costs for staple items, the IAF linked this near-universal discontent to a call for political reforms, one of their main goals. They therefore focused on highlighting the economic problems in the country, a message that resonated with a diverse number of constituencies, and emphasized that political reform was key to fixing these economic problems. As a result, by emphasizing economic issues, they were able to establish a broad base of support for mobilization in support of reform, despite differences among the diverse groups of protesters.

4.1.5 Bahrain

Anti-government protests in Bahrain were rooted in local factors, namely discrimination against the Shia majority, roughly 70 percent of the population, by the Sunni monarchical regime in areas such as education, employment and housing. Tens of thousands of Shia protesters flooded the Pearl Roundabout in mid-February, demanding greater political rights, democratic reform, constitutional monarchy, and removal of the al-Khalifa family, in power since the 18th century.

As a wealthy Gulf state with high Internet penetration and extensive mobile phone usage, Bahrain saw widespread use of social media by organizers. These channels played an especially large role in rallying the country’s middle class. News of police brutality, for example, was

100 Ibid.
relayed quickly; what began as relatively peaceful protests quickly escalated into a national movement after authorities issued a raid on protesters’ camps in Pearl Roundabout during the night. With the help of Facebook, YouTube and Twitter, the Internet was soon flooded with video footage of civilians being tear-gassed, beaten, shot at, or in some cases killed. The government’s raid at The Pearl had killed four protestors, and both pictures and videos quickly emerged to show the brutal injuries sustained by protesters, inspiring even more to join the efforts. Social media was also used to advance global awareness, but in the case of Bahrain international intervention and media attention were very limited.

The Bahraini government quickly learned to use social media in its own favor. After GCC troops brutally quelled the uprisings, the government launched a campaign to find and arrest prominent protest leaders. The Facebook page “Together to Unmask the Shia Traitors” posted a list of those wanted, complete with photos and videos, calling for Bahrainis to identify and report protesters for arrest. Information soon began to appear on wall posts, and names of those arrested were “checked off” on Facebook. According to Al Jazeera, state agencies used social media sites to “solicit information from the public.” Other Facebook pages acted as “virtual lynch mobs” that served to humiliate anti-government activists. One of these was called “Against Ayat al-Qurmezi”, named after a 20 year-old girl who had participated in protests at Pearl Roundabout. The page garnered hundreds of defamatory posts calling for her arrest, torture, and death. Ayat was later captured, and, after three months of torture, appeared on state TV to apologize for her actions.

In Bahrain, the adeptness of the government at using social media sites to track down dissidents highlights the ways in which social media can be a double-edged sword. Protestors utilized Facebook in order to reach wide audiences and transmit information at rapid speeds. The government similarly capitalized on this feature to locate targets more quickly than would have been possible with traditional media. The case of Bahrain has since become a cautionary tale for other social media activists.

4.1.6 Syria

Syria presents a unique case in the analysis of Arab Spring movements in that its opposition has continued for nearly a year, with little progress made against the al-Assad regime, and rising casualty counts in the face of brutal repression by military forces. Social unrest in Syria initially failed to materialize, despite calls for protests on social media. In early February 2011, Syrian

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104 Ibid.
105 Ibid.
opposition groups created a Facebook page that called for protests across the country on February 4-5. More than 16,000 Facebook members expressed support, but the demonstrations – planned entirely on Facebook – did not take place, and on February 9, Al Jazeera dubbed Syria a “kingdom of silence”.

However, the opposition movement picked up momentum in March, during which a Facebook page called “The Syrian Revolution 2011” was created to provide updates on the protests. Although it is unclear exactly how people were mobilized in the series of protests that took place after March, various Facebook pages seem to have played a role in calling for the protest and communicating the timing of these protests. Other social media, including YouTube and Twitter, have played some part in fueling public outrage by disseminating information to those who fell victim to the government’s crackdown. They were also useful in delivering eyewitness accounts of the protests and instilling a sense of national cohesion among the protestors. In addition to a core group of cyber activists, the Syrian protests are also organized in large part by the Local Coordinating Committees, which provide information via their website and social media outlets regarding violence occurring against protesters in the country.

Funerals and prayer gatherings have been key events at which movement organizers in Syria mobilize people to protest, in the absence of widespread Internet access and social media usage. Indeed, Syrian activists have routinely held protests after Friday prayers since the beginning of the opposition movement. Protests are often organized in secret with trusted people letting one another know during face-to-face meetings, or if possible using Facebook, Skype, or other social media sites. Fliers are also sometimes discreetly distributed to trusted individuals to advertise protests given the pervasive security force presence, and organizers also appeal to neighbors to take part in protests and strikes.

One Syrian activist acknowledged that demonstrations are difficult to organize in areas where people do not know each other and, perhaps as a result, do not trust each other. This highlights

113 Ibid.
114 Ibid.
115 Ibid.
a key element of social movement theory: the importance of strong, interpersonal social ties, as well as dense social ties in networks, as a means of facilitating individuals’ participation in protests by decreasing the uncertainty of mobilization. Particularly in Syria, where government repression of protests has proven to be unrelentingly brutal, protesting is a risky act that can easily result in death. As a result, protesters’ social ties are of great importance. Minority groups often have greater levels of interpersonal trust; for example, neighborhoods with refugees from the Golan Heights and areas with a concentration of Kurdish residents are often the sites of many large protests.

As McAdam and Paulsen highlight, a strong predictor of participation in a neighborhood organization is when one resides in the same area as one’s close friends or relatives, providing the strong and dense network ties that encourage and facilitate participation. It makes sense then that areas experiencing fewer protests are unable to galvanize people on the ground because of weaker social ties. In addition to this, context regarding individuals’ multiple, simultaneous social ties can also be relevant in their decision to engage in protests, since the nature of these ties can provide sometimes conflicting influences on whether or not the individual should participate in the movement. For example, in some of the neighborhoods in Syria, individuals may have social ties to the protesters, but could also have business affiliations with regime circles that could discourage their participation.

4.1.7 Morocco

In the past, protests in Morocco have not been uncommon. However since inheriting the throne in 1999, King Mohammed VI had taken a few incremental steps towards political freedom, making him popular among older generations that had experienced Moroccan rule under the previous “tyrant” King Hassan II. Consequently, the majority of protestors were dissatisfied and unemployed youths, demanding a British-style monarchy with only ceremonial powers. Although these changes were not necessarily as radical as the regime overthrows proposed in Tunisia or Egypt, the calls to action nevertheless raised concerns and prompted a quick government response.

The primary organizer of the protests was a youth group called the February 20th Movement, which used YouTube and Facebook as its primary means of communication. One of its first

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116 Ibid 19, 644.
117 Ibid. 101
118 Ibid 19, 644.
120 Ibid.
posts was a YouTube video that featured several young Moroccans explaining their reasons for joining protests to pursue democratic reform; their reasons included more opportunities for equality, education and employment.\(^{122}\) The topic gained some traction on Twitter and Facebook, and the Feb 20 Movement page attracted nearly 1,000 members. Protests began in Casablanca and Rabat on February 20\(^{th}\). Compared to other MENA regions, demonstrations were relatively peaceful. More than 30,000 citizens took to the streets of capital city Rabat to call for political reform, but the crowd quickly dwindled, leaving only a few hundred by evening with little need for police intervention.\(^{123}\)

The Moroccan government chose to communicate with the Feb 20 Movement via social media, sometimes as a preemptive measure. Three days before the scheduled protests, the Minister of Youth and Sports responded to the campaign with a widely read Facebook post calling for dialogue instead of violence. In his post the Minister also blamed foreign actors for orchestrating the unrests as a way to weaken the country.\(^{124}\) Pro-government organizations launched social media campaigns urging citizens to stay home. Rumors that the protests were cancelled also began appearing online.\(^{125}\) Although the movement in Morocco has not reached levels seen in other areas, small-scale demonstrations have continued with the help of social media organizers. Despite a relatively widespread use of social media – there are some 4 million Facebook accounts in a population of 35 million – and Internet penetration amongst roughly half of the population,\(^{126}\) the future of the movement remains uncertain.

\section*{4.2 Social Media in the International Realm}

The Arab Spring is notably characterized by the fact that social unrest in any given country was never an isolated event, and the first protests in Tunisia quickly crossed the national border and initiated a chain reaction of similar activities throughout the MENA region. In this section we focus upon the role of social media in enabling social unrest to ricochet from one country to another. In particular, we ask whether social media achieved anything that could not have been achieved by more traditional means of communication – TV, newspapers, radio, etc. Here we address two different channels by which social media has helped social unrest to spill over

\begin{enumerate}[\footnotesize]
\item 123 Abend, Lisa. “Protests in Morocco: Just Don’t Call it a Revolution.” \textit{Time}. http://www.time.com/time/world/article/0,8599,2052901,00.html.
\item 125 Ibid, 26
\end{enumerate}
beyond the national border by examining (1) the people-to-people aspect and (2) people-to-
international media aspect.

First, social media may have been instrumental in initiating a chain reaction of events by
widening and strengthening direct lines of international communication between individuals
across borders. While in the pre-social media era, stories of revolution and social unrest in
neighboring countries crossed borders via traditional media such as TV, newspaper, and radio,
the emergence of social media has tremendously accelerated the speed with which information
can travel. Just as in any other form of new ICT, the communication capabilities of social media
have not only enabled the transfer of information to occur at a faster pace and cheaper cost, but
they have significantly reduced the constraints of national borders in their ability to contain
information by providing means for an individual in one country to communicate with another in
a different country on a virtual platform. The stories of simmering discontent towards the
repressive regime and inspiring success in overthrowing such regime have reached directly to
individual readers across the region to play an important role in encouraging neighbors to follow
on and participate in political action\footnote{Murphy, Dan. “Inspired by Tunisia, Egypt's Protests Appear Unprecedented.” \textit{The Christian Science Monitor}. January 12, 2012.}. A quote by an activist in Cairo saying, “We use Facebook to schedule protests, Twitter to coordinate, and YouTube to tell the world” illustrates the international aspect of how social media was used\footnote{Howard, Philip. “The Arab Spring’s Cascading Effects.” <http://www.miller-mccune.com/politics/the-cascading-effects-of-the-arab-spring-28575/>}.

A recent study by Washington University\footnote{Howard, Philip, et al. “Opening Closed Regimes: What Was the Role of Social Media During the Arab Spring?” University of Washington Department of Communication (2011).} suggests that Twitter played a key role in
immediately spreading news across international borders and provides empirical support. The
paper follows the rhythm of tweets during and after the uprisings in Tunisia and Egypt to
examine the relationship between conversations in the digital world and what actually happened
on the ground. Forty percent of tweets in Tunisia recorded between January 14 and March 16
that used the hashtag #sidibouzid, one of the most prominent hashtags during the revolution,
came from outside the country. In this 40 percent, 8 percent were from neighboring MENA
countries, while 32 percent were from other countries. As another example, on January 14\textsuperscript{th} when bin Ali resigned, 2,200 tweets pertaining to his resignation were found to be from the MENA
countries of Bahrain, Egypt, Morocco, and Yemen. Tweets followed a similar pattern in Egypt:
in the week before Mubarak resigned, the rate of tweets about the political crisis in Egypt soared
from 2,300 to 230,000 per day. But many of these tweets came from abroad, as evidenced by the
fact that tweets about Egypt dwindled to a mere 3,400 per day in the weeks following the end of
Although the study depicts the power of Twitter and similar social media channels to rapidly disseminate information and connect individuals around the world, one should not overestimate its impact. There are few indications that these particular tweets played a role in actually bringing people to the street, much less overthrowing the regime. A more important question asks the degree of influence that these “outside tweeters” had in organizing protests and demonstrations domestically in respective countries or to what extent the autocratic leaders of Arab countries heed international opinion and the popular opinion expressed in social media circles.

A second important role of social media was its facilitation of spreading information from those on the ground in areas of social unrest to international media outlets, such as Al-Jazeera. Indeed, many international media outlets were quick to seize upon the potential of social media. Newspapers and TV stations have utilized videos, photos, and other primary source information highlighted in social networks in order to obtain information for their own media coverage. Valuable eyewitness reports on Twitter and blogs also played an important role in providing traditional media with more accurate and up-to-date information about local events. This in turn broadened the opportunities for protestors to actively influence the international narrative of the Arab Spring through influential media without being passively reduced to sound bytes.

This mutual complementarity of two different types of media was particularly important because traditional media reporters were often sensitive targets: they were denied access to dangerous areas or, once allowed in areas of social unrest, occasionally harassed, injured, or even killed. For example, when the on the ground reporting became increasingly difficult after Al-Jazeera office in Cairo was assaulted and its reporters were arrested it had to heavily depend on information coming through social media such as Facebook, YouTube and blogs. According to an interview conducted by Aouragh and Alexander with one of the local activists, international media frequently looked for their hashtag and made contact with them through Twitter\textsuperscript{131}. In another instance, CNN reporter Anderson Cooper was punched in the face at a pro-Mubarak rally in Cairo, the news of which was immediately tweeted to social media channels\textsuperscript{132}. Reliance upon social media avoided such risks by allowing those at ease on the ground to essentially cover stories that would be hazardous to explore or that may have gone unnoticed because of the


limited access by traditional media. Such news stories were then distributed across the world via established international news services.

Previously, the traditional media monopolized the role of defining “news-worthiness” and many events ended up not gathering public attention because they were not deemed newsworthy or because their calculated costs of publishing were higher than the expected profits such news might garner through viewer interest. However, the advent of social media has enabled the transformation of such structure into a decentralized, “open-source” system. Many news items are now first published or discussed in social media circles, where they eventually gather enough public attention to warrant adoption and publication by traditional news sources.

As the examples suggest, social media was undeniably a tool that was used to allow news and discussions to traverse national borders. Yet the significance of its impact in bringing people to the streets and triggering a cataclysmic chain reaction of social unrest throughout the region remains difficult to quantify. Given the generally low Internet penetration rate in the region and greater accessibility to the more traditional media like cable TV, it is not too difficult to believe that the marginal impact of the use of social media was still limited in spilling over the unrest across national border.

However, it is also true that social media brought non-negligible change to the mode of international communication that would have been difficult by traditional means of communication. As briefly discussed, social media has brought changes, both quantitative and qualitative, in two major channels: (1) increasing the volume and decreasing the cost of international people-to-people communication and (2) changing the pattern of people-to-international media communication by (a) allowing story to be reported from the places where the traditional media has limited access and (b) paving the way for a bottom-up and decentralized process of news formation.

4.3 The Double-Edged Nature of Social Media

While many political theorists and pundits have proclaimed the ability of social media to facilitate political opposition and ultimately regime change during the Arab Spring, it is essential to remember that social media is only a tool and it can also be used for nefarious purposes.

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Social media is not inherently good, and not only used as a liberation technology. Authoritarian governments, often mocked for their inability to understand and confront a new technology, are increasingly realizing the potential that social media has for state repression. U.S. presidents from Reagan to Obama have argued that “the long-term survival of authoritarian states depends on their ability to control the flow of ideas and information within and across their borders.” Examples abound from Egypt, Iran and Syria (to mention just a few Arab countries) where the authoritarian governments attempted, with varying degrees of success, to use social media against the revolutionaries in an effort to control the flow of ideas and information.

Symantec, an Internet security company, published a report that claimed the proliferation of Malware, or malicious code, “may be exceeding that of legitimate software applications.” Online identity theft and “cyberwarfare” are new threats posed by the Internet, and hackers use Malware and other means against unaware and unprotected users of social media. However, arguably more dangerous than rogue hackers out to steal your identity, are authoritarian regimes that can utilize social media as a tool for increased repression and reprisals against protestors. In these increasingly prevalent situations, social media becomes a potent instrument that impedes democratic change.

This dark side of social media directly contrasts the optimistic contention that such liberating technologies will be a force for democracy. Evgeny Morozov, author of *Net Delusion: the Dark Side of Internet Freedom*, and Malcolm Gladwell, a well known contributor to the New Yorker, are a couple of the major proponents of this position. Germane to this research, there have been well-documented cases of Arab governments using social media as a tool to strike back at protestors and anti-regime activists. Most disturbingly, the authoritarian regimes appear on a steep learning curve, and their repressive techniques are getting better and more effective.

The government of Iran quickly learned the dangerous effectiveness of social media at attracting international attention and sympathy for the protestors. Iran, just as it set the example for other social movements to follow with social media, was an example for other authoritarian regimes to learn from and improve upon. Before the disputed elections in Iran, the country was already known for its dismal record of Internet freedom. The well-known OpenNet Initiative published a report in June of 2009 that said, “The Islamic Republic of Iran continues to expand and consolidate its technical filtering system, which is among the most extensive in the world.”

Tellingly, Iran unblocked Facebook prior to and during the height of the election protests, a move that many believed was made to use Facebook photos to identify protestors and arrest

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them. This was easier for authorities in Iran to do because Iran did not allow the secure version of Facebook, but only the unsecure one.

Egypt, while still inept in the minds of techno savvy revolutionaries, improved upon the practices instituted by the Iranian government. The government security services used Facebook and other social networking sites to identify protestors to arrest or threaten. Extensive files were kept on dissident bloggers and online activists, but ultimately such precautions and tactics proved incapable of preserving the Mubarak regime.

Most significantly, The Syrian government has, and is currently making substantial use of the Internet for repression and pro-regime propaganda, “Sophisticated Web surveillance of the anti-government movement has led to arrests, while pro-government hackers use the Internet to attack activists and their cause…the Syrian government has turned the Internet into another battleground.”139 Syria is the first country to openly host a group of pro-regime hackers on a government run website. The Syrian Electronic Army (SEA) openly conducts Distributed Denial of Service attacks against the United States, Israel, and other nations within the Arab League who have spoken out against the regime, and even popular Arabic news outlets like Al-Jazeera.

In conclusion, while it may be the case that social media was a useful tool that facilitated the Arab Spring, it is essential to understand that it is a tool that can be used just as well for repression as it can for the promotion of democracy or regime change. We are entering a new era, in which social media has the potential to influence the course of nations to either become more democratic or more entrenched autocracies. 2012 has the potential to bring unprecedented leadership changes, “A third of the world’s nations will be holding local, state, or national elections; a number of Arab Spring countries will be putting their democratic aspirations into action.”140 Hopefully social media will be a tool for democracy promotion during this period of global transition, and the lessons learned from autocratic regimes about the double-edged nature of this tool will be forgotten.

4.4 Conclusions: Lessons from the Case Studies

Our analysis of events in seven MENA countries indicate the presence of several general themes:

• Protesters have been motivated by similar political grievances.
• Protesters generally have had the same socioeconomic concerns over high unemployment and rising costs of living.
• Activists have made great use of social media in organizing themselves, planning protests, and spreading information both in their countries and around the world.
• Social movement theories demonstrate not only the ways in which traditional mechanisms of mobilizing protesters were used successfully during the Arab Spring, but also how social media bolstered some of these traditional mechanisms to create a strong force for driving and mobilizing collective action in a variety of political environments.
• Social media successfully garnered significant international attention to protest movements within countries.

The individual heterogeneity of protest movements in each country suggests that further generalization should be made with caution. While social media demonstrably facilitated organizers’ abilities to organize themselves, particularly in regimes in which censorship and arrest of dissidents are common, this online organization did not necessarily translate to direct action. Furthermore, direct action did not necessarily translate to political change. The country-level case studies show that any presumed correlation between high social media usage and successful mass protest is far too simple. Protests in Yemen were not orchestrated through social media, and the wealthy countries of the Gulf in which social media usage is very high did not even witness the rise of large-scale social unrest. Social media appears to be a useful but not necessary tool for the organization and implementation of protest movements.
V. QUANTITATIVE METHODS

Our quantitative methodology is comprised of two portions. The first uses individuals’ protest activity as the main unit of analysis and endeavors to explain which socioeconomic factors are most important in explaining the decision to protest. Most importantly, to test the hypotheses of social media impact and the theories posited by social movement theory, it examines both the effects of Internet usage and membership in civil society upon protest behavior. The second model operates in a larger scope and uses macro-level indicators to predict the occurrence of social unrest in a given country.

5.1 The Impact of Social Media on Protest Activity

5.1.1 Background and Hypothesis

The previous case studies have examined to what extent social media facilitated protesters’ ability to organize mass protests during the Arab Spring. The examples suggest that social media certainly helped the organization of protests, for they not only provided useful forums in which activists could form political opinions but also allowed activists to easily disseminate specific logistical information about an upcoming demonstration. This was necessary for core groups of activists to amass initial support for protest attendance.

Both the literature on social movement theory and the case studies also reveal that strong social ties were very important in protest participation. While we cannot measure tribal affiliations or family ties, civil society is also a ready site for the formation of important social linkages. Members of civil society organizations – such as political parties (The Muslim Brotherhood), trade union members, and youth movements – were the primary initial organizers of and consistent participants in protests. Our econometric model allows us to assess the quantitative importance of civil society in protest activity.

Still, in order for social unrest to manifest on a large scale, it is not enough for anti-regime sentiment merely to be expressed by a core group of activists. The success of social unrest, as evidenced by the momentous changes of the Arab Spring, requires a turnout of tremendous magnitude on the street. Because a successful protest depends upon the participation of many individuals, we also seek to quantify the extent to which social media usage might have gone above and beyond the realm of civil society; that is, we ask whether citizens unaffiliated with civil society groups turned to social media as a place to form social ties.

Thus, while we hypothesize that social media did play an instrumental role in activists’ ability to form virtual communities, we choose now to investigate whether social media had more far-reaching effects. Specifically, was social media responsible for drawing people into the streets?
5.1.2 Descriptive Statistics

Using micro-level survey data, our model allows us to examine whether individuals’ protest behavior is a function of civil society and/or social media usage, controlling for a number of general socioeconomic characteristics. Our data is obtained from the First Wave of the Arab Barometer (AB) survey project, which conducted face-to-face interviews with representative national samples of people living in Jordan, Palestine (Gaza and the West Bank), Algeria, Morocco, Kuwait, Lebanon, and Yemen from 2006-2008.

Among the survey questions, respondents are asked whether they have attended a protest in the past three years, how often they use the Internet, and whether they are members of civil society. These are our key variables under consideration – a correlation between Internet use or civil society and protest activity would imply that these factors did play a role in establishing the social ties that induced protesters to participate.

Because we do not have more detailed data for social media consumption, we employ Internet usage as a very rough proxy variable for all forms of media previously discussed: Facebook, YouTube, Twitter, and the blogosphere. We acknowledge that such social media sites as Twitter and Facebook were either nonexistent or not yet immensely popular in the years prior to and including 2006, 2007, and 2008. However, other means of online organization – such as blogs and more primitive instant messaging capabilities – were already quite popular and playing a role in shaping political discourse. According to Marc Lynch, politically active Arab bloggers had exhibited a “discernible impact” upon opposition, anti-corruption, and other political movements in Egypt, Bahrain, Lebanon, Kuwait, and Libya by 2007. Thus, while the forms of social media available to Arabs in the years 2006-2008 were not necessarily those utilized by the rest of the world, the tools for forming virtual communities were undoubtedly still in place at that time.

Our dependent variable examines survey respondents’ participation in demonstrations or protest marches over the past three years (which, given the dates over which the survey was administered, spans protest participation in the years 2003-2008). Table 2 provides respondents’ answer to the question of participation in protests. We realize that the protest variable is somewhat problematic in that it includes protest activity as early as 2003, when Internet penetration was quite low. Thus, the time at which an individual protested might precede his or her survey response by up to 3 years. This is by no means ideal for our empirical tests, but we unfortunately do not have any more precise data on individuals’ protest activity. Several other surveys with data in the Arab world inquire after individuals’ inclination to protest, which we deem less useful than our current choice of variable.

\[141\] Ibid, 6
Our two independent variables of interest are respondents’ Internet usage and their membership in civil society. We first provide an overview of respondents’ Internet usage to see whether respondents who have participated in protests are those active in online communities.

Figure 2 below provides a chart of respondents’ Internet usage, using all respondents of the AB survey. At the time of the survey, roughly 60 percent of Arab respondents did not use the Internet at all, while more than 25 percent of respondents used the Internet at least once a week if not more. The percent of respondents who reported that they did not use the Internet by country is provided in Table 3, and reveals great cross-country heterogeneity. For example, 78 percent of Jordanian respondents reported that they did not use the Internet at the time of the survey, while a mere 20 percent of respondents in Kuwait answered similarly.

**Table 3: Cross-country Internet Usage**

<table>
<thead>
<tr>
<th>Country</th>
<th>Percent that do not use the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jordan</td>
<td>78%</td>
</tr>
<tr>
<td>Palestine</td>
<td>76%</td>
</tr>
<tr>
<td>Algeria</td>
<td>33%</td>
</tr>
<tr>
<td>Morocco</td>
<td>69%</td>
</tr>
<tr>
<td>Kuwait</td>
<td>20%</td>
</tr>
<tr>
<td>Yemen</td>
<td>69%</td>
</tr>
</tbody>
</table>

Source: AB, First Wave
Next we examine the importance of civil society in establishing the strong social ties that facilitate protest mobilization. Table 4 below reports individuals’ responses concerning their membership in civil society; the AB survey question asks whether a respondent is a member of any organization or formal group.\textsuperscript{142} Once again there is noticeable cross-country heterogeneity in civil society membership, with the lowest reported levels in Jordan and the highest in Yemen. While an in-depth explanation is beyond the scope of this analysis, one explanation for this variation concerns the different treatment that civil society groups receive at the hands of various Arab governments.

### Table 4: Civil Society in Six Arab Countries

<table>
<thead>
<tr>
<th>Are you a member of any organization or formal groups?</th>
<th>Jordan (N=1130)</th>
<th>Palestine (N=1265)</th>
<th>Algeria (N=1283)</th>
<th>Morocco (N=1272)</th>
<th>Kuwait (N=730)</th>
<th>Yemen (N=1107)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6%</td>
<td>22%</td>
<td>21%</td>
<td>13%</td>
<td>20%</td>
<td>29%</td>
</tr>
<tr>
<td>No</td>
<td>94%</td>
<td>78%</td>
<td>79%</td>
<td>87%</td>
<td>80%</td>
<td>71%</td>
</tr>
</tbody>
</table>

Source: Arab Barometer, First Wave

#### 5.1.3 Quantitative Model

We use a binomial logistic regression model with a dichotomous (or “dummy”) dependent variable equal to 0 if respondents have not participated in protest activity and equal to 1 otherwise (this includes the answers of participating in a protest “once” or “more than once”). Logistic models are used to predict the probability of the occurrence of an event by quantifying the effect of some set of independent variables upon a dependent variable that must take either the values of 0 or 1 (see Appendix A for more detail). Such a model is enormously advantageous to the current topic because it quantifies the effect of predictor variables upon our single dependent variable.; in our case, we know whether the event happened and can therefore determine which factors are most responsible for causing the event to occur. In this case, we measure which factors are most significant in explaining individuals’ decision to protest.

Our first key independent variable represents Internet usage, equal to 1 if respondents do not use the Internet and increasing with frequency of use to 5, which represents daily or almost daily use.

\textsuperscript{142} The survey then provides the following elaboration, “Political parties, living cooperatives or local societies, religious organizations, sport and entertainment clubs, cultural organizations, associations or workers’ unions, farmer unions, professional unions or associations economic organizations or associations, entrepreneurial organizations, parent-teacher associations, or other voluntary organizations.”
We use a second dummy variable to indicate membership in civil society, equal to 1 if the individual is a member of a civil organization and equal to 0 otherwise. Again, because civil society creates the strong social ties considered very important in protest mobilization, we postulate that civil society will have a significant effect upon individuals’ decision to protest.

The remaining variables are controls for age, gender, education, and income. We restrict age in the years 18-65, assuming that the very aged do not attend protest marches for physical reasons. Education reports the highest level of education that an individual has attained, ranging from 0 (illiterate) to 7 (university education or above). The income rankings are deciles, increasing with higher income. We run the regression model separately for each country.

5.1.4 Results and Discussion

Table 5 provides the results of the logistic regressions, reported as odds ratios. An odds ratio is a measure of effect size and compares the odds of an event occurring in one group to the odds of the same event occurring in another group. Thus, for example, it appears that protesters in Jordan are more than twice as likely to be male, while the odds that Palestinian protesters are men versus women are more than 3 to 1. An odds ratio close to 1 indicates that a variable has little explanatory power.

Table 4: Odds Ratios for Logistic Regression

<table>
<thead>
<tr>
<th>Dependent variable: attended a protest</th>
<th>Jordan</th>
<th>Palestine</th>
<th>Algeria</th>
<th>Kuwait</th>
<th>Yemen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.988</td>
<td>0.984**</td>
<td>1.001</td>
<td>0.994</td>
<td>1.002</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.006)</td>
<td>(0.011)</td>
<td>(0.010)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Gender</td>
<td>2.132***</td>
<td>3.238***</td>
<td>1.379</td>
<td>1.176</td>
<td>1.775**</td>
</tr>
<tr>
<td></td>
<td>(0.491)</td>
<td>(0.494)</td>
<td>(0.307)</td>
<td>(0.294)</td>
<td>(0.403)</td>
</tr>
<tr>
<td>Highest level of education</td>
<td>1.211**</td>
<td>1.061</td>
<td>1.120</td>
<td>1.260***</td>
<td>0.981</td>
</tr>
<tr>
<td></td>
<td>(0.107)</td>
<td>(0.066)</td>
<td>(0.087)</td>
<td>(0.107)</td>
<td>(0.086)</td>
</tr>
<tr>
<td>Income decile</td>
<td>1.066</td>
<td>1.008</td>
<td>1.067*</td>
<td>1.078</td>
<td>1.074*</td>
</tr>
<tr>
<td></td>
<td>(0.046)</td>
<td>(0.028)</td>
<td>(0.040)</td>
<td>(0.050)</td>
<td>(0.042)</td>
</tr>
<tr>
<td>Civil society</td>
<td>2.143**</td>
<td>2.202***</td>
<td>2.460***</td>
<td>1.139</td>
<td>0.979</td>
</tr>
<tr>
<td></td>
<td>(0.686)</td>
<td>(0.374)</td>
<td>(0.545)</td>
<td>(0.359)</td>
<td>(0.227)</td>
</tr>
<tr>
<td>Internet</td>
<td>1.255***</td>
<td>1.150**</td>
<td>1.217***</td>
<td>1.249***</td>
<td>1.186**</td>
</tr>
<tr>
<td></td>
<td>(0.093)</td>
<td>(0.066)</td>
<td>(0.093)</td>
<td>(0.103)</td>
<td>(0.100)</td>
</tr>
<tr>
<td>Observations</td>
<td>938</td>
<td>1002</td>
<td>560</td>
<td>317</td>
<td>431</td>
</tr>
</tbody>
</table>

Standard errors in parentheses
*** p<0.01, **p<0.05, *p<0.1
These results confirm our initial hypotheses: both civil society indicators and Internet usage play a statistically significant role in explaining individuals’ protest activity. In several countries, other factors such as gender, age, and education also have explanatory power, but Internet usage is persistently significant in each country. Still, it is important to note that the magnitude of the odds ratios for civil society in Jordan, Palestine, and Algeria are much larger than the odds ratios for Internet, suggesting that civil society had a larger impact in those countries.

Because odds ratios are not particularly intuitive, Table 6 provides predicted probabilities for whether individuals protested based upon whether they are members of civil society and how often they use the Internet, holding the other variables constant at the mean. That is, each table entry provides the probability that a respondent participated in a protest given that he or she was either a member of a formal group or used the Internet, other variables held constant. As shown in the table, membership in civil society always increases the probability that a respondent protested, and the same is true of daily Internet usage.

Table 5: Predicted probabilities of having protested

<table>
<thead>
<tr>
<th></th>
<th>Jordan</th>
<th>Palestine</th>
<th>Algeria</th>
<th>Kuwait</th>
<th>Yemen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Member of civil society?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0.09</td>
<td>0.28</td>
<td>0.13</td>
<td>0.33</td>
<td>0.31</td>
</tr>
<tr>
<td>Yes</td>
<td>0.25</td>
<td>0.55</td>
<td>0.33</td>
<td>0.45</td>
<td>0.36</td>
</tr>
<tr>
<td><strong>Uses the Internet...</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>0.08</td>
<td>0.27</td>
<td>0.12</td>
<td>0.27</td>
<td>0.27</td>
</tr>
<tr>
<td>Daily</td>
<td>0.26</td>
<td>0.49</td>
<td>0.31</td>
<td>0.57</td>
<td>0.47</td>
</tr>
</tbody>
</table>

For example, the probability that respondents in Jordan protested if they were not members of civil society was approximately 0.09; this probability increased to 0.25 percent if they were members of civil society, all else equal. Respondents had a 7.7 percent probability of having protested if they never used the Internet, and this probability increased to 26.4 percent if they used the Internet daily. Probability increases were similarly quite large in the other four countries, with the exception of Yemen regarding the effect of membership in civil society; Yemeni respondents were 31.1 percent likely to have protested if they were not members of civil society and 36.1 percent likely to have protested if they were. In general, it appears as though Internet use accounted for greater increases in the probability of having protested in Kuwait and Yemen only; in other countries, Internet usage and membership in civil society had roughly the same effects in increasing protest probability.

Given the significance of both Internet usage and civil society, we next create an interaction variable for these two variables. This quantifies the effect of simultaneous membership in civil society with Internet usage upon protest activity; that is, the insertion of the interaction variable
in the model allows us to examine whether social media essentially amplifies the strong social ties developed in civil society. Table 7 below provides a second set of odds ratios for the new set of logistic regressions.

The new interaction variable greatly changes the results of the model, removing much of the explanatory power from the Internet usage variable. This suggests that at least in Palestine, Algeria Kuwait, and Yemen, the Internet more potent tool in predicting protest activity when those who are part of civil society groups utilize it. From a social movement theory perspective, this suggests that the combination of strong social ties reinforced with virtual social ties is the strongest motivating factor in bringing about protest activity.

Table 6: Odds Ratios for Logistic Regressions, Interaction Variable

<table>
<thead>
<tr>
<th>Dependent variable: attended a protest</th>
<th>Jordan</th>
<th>Palestine</th>
<th>Algeria</th>
<th>Kuwait</th>
<th>Yemen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>0.988</td>
<td>0.984**</td>
<td>0.993</td>
<td>0.964***</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.006)</td>
<td>(0.010)</td>
<td>(0.008)</td>
<td>(0.013)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>2.133***</td>
<td>3.245***</td>
<td>1.276</td>
<td>1.207</td>
<td>1.857***</td>
</tr>
<tr>
<td></td>
<td>(0.491)</td>
<td>(0.496)</td>
<td>(0.324)</td>
<td>(0.222)</td>
<td>(0.428)</td>
</tr>
<tr>
<td><strong>Highest level of education</strong></td>
<td>1.212**</td>
<td>1.061</td>
<td>1.285***</td>
<td>0.928</td>
<td>1.013</td>
</tr>
<tr>
<td></td>
<td>(0.107)</td>
<td>(0.066)</td>
<td>(0.111)</td>
<td>(0.061)</td>
<td>(0.091)</td>
</tr>
<tr>
<td><strong>Income decile</strong></td>
<td>1.066</td>
<td>1.009</td>
<td>1.065</td>
<td>1.024</td>
<td>1.075*</td>
</tr>
<tr>
<td></td>
<td>(0.046)</td>
<td>(0.028)</td>
<td>(0.050)</td>
<td>(0.034)</td>
<td>(0.043)</td>
</tr>
<tr>
<td><strong>Civil society</strong></td>
<td>2.019</td>
<td>1.484</td>
<td>1.059*</td>
<td>4.387***</td>
<td>0.364**</td>
</tr>
<tr>
<td></td>
<td>(1.267)</td>
<td>(0.428)</td>
<td>(0.093)</td>
<td>(1.651)</td>
<td>(0.149)</td>
</tr>
<tr>
<td><strong>Internet</strong></td>
<td>1.251***</td>
<td>1.078</td>
<td>1.160*</td>
<td>1.038</td>
<td>0.891</td>
</tr>
<tr>
<td></td>
<td>(0.100)</td>
<td>(0.074)</td>
<td>(0.101)</td>
<td>(0.064)</td>
<td>(0.118)</td>
</tr>
<tr>
<td><strong>Civil society * Internet</strong></td>
<td>1.021</td>
<td>1.201*</td>
<td>2.002**</td>
<td>0.786**</td>
<td>1.658***</td>
</tr>
<tr>
<td></td>
<td>(0.189)</td>
<td>(0.130)</td>
<td>(0.695)</td>
<td>(0.094)</td>
<td>(0.234)</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>938</td>
<td>1002</td>
<td>560</td>
<td>317</td>
<td>431</td>
</tr>
</tbody>
</table>

Note that civil society remains statistically significant in both Kuwait and Yemen. Conceptually, this implies that the Internet is an important tool for civil society members, but that membership in civil society sans Internet is still a significant predictor in having protested. This further reflects the notion that strong social ties are best formed in physical groups rather than virtual forums. Social media cannot substitute for a local society, political party, or religious group.
Using the odds ratios above, it is possible to calculate a more specific set of predicted probabilities. Table 8 below provides the probabilities that respondents had protested, given that they were members in civil society, categorized by whether or not they use the Internet.

**Table 7: Predicted probability of having protested, given membership in civil society**

<table>
<thead>
<tr>
<th></th>
<th>Jordan</th>
<th>Palestine</th>
<th>Algeria</th>
<th>Kuwait</th>
<th>Yemen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never uses Internet</td>
<td>0.16</td>
<td>0.42</td>
<td>0.21</td>
<td>0.06</td>
<td>0.23</td>
</tr>
<tr>
<td>Uses Internet daily</td>
<td>0.41</td>
<td>0.71</td>
<td>0.51</td>
<td>0.71</td>
<td>0.63</td>
</tr>
</tbody>
</table>

In the hands of civil society members, the Internet has enormous effects upon protest probability. In Jordan, Palestine, Algeria, and Yemen, daily Internet usage by civil society members more than doubled the probability that these individuals had protested. In Kuwait, daily Internet access multiplied this probability more than tenfold. This trend may be due to the prevalence of Internet usage in Kuwait; because most responders were Internet users to some extent, the marginal difference between those who never used the Internet and those with daily Internet is particularly large. In every other country, in which a more substantial percent of respondents never used the Internet (see Table 3), the effect of daily Internet usage in allowing members of civil society to mobilize themselves in protests is substantial. Figure 3 shows this graphically.

**Figure 3: Protest Probability among Members of Civil Society by Internet Usage**

Source: Authors' calculations, AB First Wave
For good measure, we similarly calculate predicted probabilities for respondents who are not members of civil society. What is the probability that non-members protested, given different usages of the Internet? Table 9 reveals that the probability increases are not nearly as great as they were for members of civil society, and overall probabilities are lower than in the previous Table 8. For whatever reason, the probability even decreased in Yemen – a country with strong tribal ties and little Internet penetration.

Table 8: Predicted probability of having protested, given NO membership in civil society

<table>
<thead>
<tr>
<th></th>
<th>Jordan</th>
<th>Palestine</th>
<th>Algeria</th>
<th>Kuwait</th>
<th>Yemen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never uses Internet</td>
<td>0.07</td>
<td>0.11</td>
<td>0.31</td>
<td>0.44</td>
<td>0.30</td>
</tr>
<tr>
<td>Uses Internet daily</td>
<td>0.21</td>
<td>0.22</td>
<td>0.54</td>
<td>0.52</td>
<td>0.25</td>
</tr>
</tbody>
</table>

5.1.4 Discussion of Results

Our results provide strong evidence that the probability of having protested increases markedly both with being a member of civil society and using the Internet, but most importantly by being a member of civil society who uses the Internet. As suggested by social movement theorists, then, it appears likely that Internet communities can serve somewhat of – but not entirely – the same function as civil societies in that they connect individuals by virtue of sharing a common interest. However, the Internet functions best as a platform to connect those individuals already united by ties developed in civil society groups. These individuals can discuss common socioeconomic grievances and political concerns in online communities in the same way that they might do so at physical meetings of political organizations. Unfortunately, particularly in countries where government censorship prohibits the meeting of certain political groups, the Internet may provide the only location, if virtual, at which participants can “meet” and communicate.

Several caveats must be addressed. The first is the selection of countries available in the survey, which we acknowledge is not necessarily representative of all MENA countries. We regrettably did not have data for countries in which the Arab Spring was most pronounced: Tunisia, Egypt, Bahrain, and Morocco. The second caveat is that we use the Internet as a proxy for all forms of social media, but again we maintain that the nature of our dependent variable makes this assumption not at all problematic. Assume that respondents were using the Internet to watch movies; in this case, our predicted probabilities would underestimate the true potential of the Internet in providing a sort of virtual forum for organization.

It is also important to remember that many civil society groups are prohibited or regarded suspiciously by their governments. Thus, citizens in such controversial political groups as the
Muslim Brotherhood may have been hesitant to report their civil society affiliations on the survey. If civil society membership is underreported, and if we assume that controversially political groups would have been most likely to mobilize during the Arab Spring, our results again underestimate the true importance of civil society in protest activity.

Social movement theorists rightly acknowledge that virtual communication is no substitute for the social relationships that arise from direct, in-person interaction. Indeed, our model attempts to quantify the extent to which social media can strengthen social ties as much as in-person, physical interaction is able to do. These effects vary by country but are also likely highly dependent on the person in question. The power of social media to elicit strong ties may also depend upon the degree to which individuals operate in a repressed versus open political environment, the particular cause over which they connect, and any other number of factors.

Lastly, we must bear in mind that the First Wave of the Arab Barometer was conducted in 2006-2008, when the Internet was a somewhat newer phenomenon. Regardless, the findings of our model are by no means irrelevant in suggesting that increased social media availability contributes both to activists’ ability to organize themselves as well as other citizens’ ability to participate. Further research will benefit from the use of the Second Wave of the Arab Barometer survey, conducted from 2010 to 2011 in a larger sample of countries: Jordan, Palestine, Lebanon, Egypt, Sudan, Algeria, Morocco, Yemen, Saudi Arabia, Kuwait, Mauritania, Syria, and Iraq. The results of this survey are not yet publically available.

The conclusions arising from this model are only tentative and demand much further analysis. But the results obtained do imply that the rapidly increasing rates of Internet penetration in MENA – and consequent availability of social media – did bolster existing popular engagement with anti-regime sentiments and consequent participation in protests. Social media can best facilitate protest participation when it builds upon existent social ties, such as those created in civil society groups.

5.2 Can We Predict Social Unrest?

Social unrest at the country level, though a product of numerous individual actions, is determined to some extent by contributing macro-level factors such as overall economic performance, demographic make-up, political regime type, and degree of freedom of expression. Economic analysis of financial crises has made use of so-called Early Warning System (EWS) models, with the aim of identifying economic weaknesses and vulnerabilities among markets and ultimately anticipating such events. The aim of this part of our analysis is to apply a tentative EWS to the incidence of crisis during the Arab Spring, using macro-level factors.
Using annual data from 1990 to July 2011 for a sample of 12 countries across the MENA region, the empirical results indicate that none of the social media variables are significant in predicting the incidence of social unrest. Rather, the specific indicator of food prices appears to have played a role; social unrest is significantly predicted by increases in the cost of food.

The insignificance of social media variables in our model by no means indicates conclusively that social media were not influential in facilitating exchange and organization of the events observed during the Arab Spring. Alternative explanations and research directions are put forward in Section d) Limitations below.

5.2.1 Data and Descriptive Statistics

Our analysis relies upon annual data from 1990 to July 2011 for a sample of 12 countries across the MENA region.\textsuperscript{143} We purposely excluded several MENA states from our analysis that displayed significantly different historical trajectories and would have tilted the econometric analysis by introducing outliers.\textsuperscript{144}

The data used in our analysis was derived from a variety of different sources as presented in Table 10 below and further elaborated upon in Appendix A. We use a measure of political unrest as the dependent variable, and we approximate the size of this unrest by measuring it in an examination of all news in major world publications (in English) between January 1990 and January 2012. This data was sourced from a LexisNexis Academic search of all news between January 1990 and January 2011 containing occurrences of the terms demonstration, mob, protest, riot, strike, unrest, or violence and their plural forms. This count of instances of unrest will hereafter be referred to interchangeably as the number of riots, political unrest, the count of news stories, or the news count.

The number of news sources covered by LexisNexis can vary between time periods as news outlets move in and out of the data base. We are assuming that this occurs at random to rule out any systematic measurement error problems.\textsuperscript{145}

Table 9 \textbf{Error! Reference source not found.} lists the variables used as inputs in our model. All have been put forward in the recent academic publications and media to have varying degree of influence on the extent of protest activities. By controlling for these variables and at the same time including variables that approximate the degree of social media usage across the countries

\textsuperscript{143} Algeria, Bahrain, Egypt, Islamic Republic of Iran, Jordan, Morocco, Oman, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, Republic of Yemen

\textsuperscript{144} Kuwait, Lebanon, Libya, Qatar, Mauritania, and Sudan were excluded for the purposes of this analysis.

\textsuperscript{145} If systematic measurement error problems were present, this would indicate that part of the error term of our econometric specification is correlated with one or more of our independent variables. This could be overcome by including instrumental variables unrelated to political unrest, but causally related to the dependent variables used. In this analysis we are assuming randomness partly for reasons of model simplicity, partly due to data constraints.
included in our study, we arrive at an indication to the relative power social media had on the level of protests.

**Table 9: Independent Variables**

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicator</th>
<th>Description</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Political Indicators</td>
<td>Regime type</td>
<td>Regime types for degree of authoritarianism (e.g. violent, repressive, ‘laissez faire’)</td>
<td>Systemic Peace - POLITY™ IV PROJECT: Political Regime Characteristics and Transitions, 1800-2010 Dataset</td>
</tr>
<tr>
<td>2. Economic Indicators</td>
<td>Real GDP growth</td>
<td></td>
<td>International Monetary Fund, World Economic Outlook Database, September 2011</td>
</tr>
<tr>
<td></td>
<td>Inflation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Domestic Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Domestic Saving</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public Debt</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current Account</td>
<td>Economic statistical data</td>
<td>Heritage Index (<a href="http://www.heritage.org/index/default">http://www.heritage.org/index/default</a>)</td>
</tr>
<tr>
<td></td>
<td>Food prices</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corruption</td>
<td></td>
<td>Corruption Perception Index Transparency International</td>
</tr>
<tr>
<td></td>
<td>Internet penetration</td>
<td>% Population connected to internet &amp; regularly using net facilities</td>
<td>Internet World Statistics (<a href="http://www.internetworldstats.com/middle.htm">http://www.internetworldstats.com/middle.htm</a>)</td>
</tr>
<tr>
<td></td>
<td>Social Media penetration</td>
<td>% Population with Facebook user accounts</td>
<td>Internet World Statistics (<a href="http://www.internetworldstats.com/middle.htm">http://www.internetworldstats.com/middle.htm</a>)</td>
</tr>
<tr>
<td></td>
<td>Cell phone penetration</td>
<td># Cell phone users in country, % of population with access to cell phone technology</td>
<td>CIA (<a href="https://www.cia.gov/library/publications/the-world-factbook/fields/2177.html">https://www.cia.gov/library/publications/the-world-factbook/fields/2177.html</a>)</td>
</tr>
<tr>
<td>5. Cultural variables</td>
<td>Strength of religion</td>
<td>Not included in econometric model due to data incompleteness.</td>
<td>World Values Survey Databank</td>
</tr>
<tr>
<td></td>
<td>Socio-economic indicator</td>
<td>(Youth) unemployment; demographic data</td>
<td><a href="http://www.tradingeconomics.com">http://www.tradingeconomics.com</a>, <a href="http://laborsta.ilo.org">http://laborsta.ilo.org</a></td>
</tr>
</tbody>
</table>
According to the descriptive statistics provided in Table C-1 (Appendix C), there are approximately 2,816 news stories per country related to social unrest every year. However, this figure masks considerable heterogeneity between countries and years of observation.

The following variables are quite striking: GDP growth rates are relatively low at 3 percent annual growth; inflation rates average 5 percent across the region; unemployment rates are similarly high throughout MENA and average 11 percent, whereas the youth unemployment rate is 26 percent with a youth labor participation rate of 30 percent. The food price index was equal to roughly 205 on average, with a minimum of 90 in 2002 and a maximum of 228 in 2011.

There are an estimated 68 million Internet users, and between 2000 and 2011 the region witnessed an impressive Internet usage growth rate of approximately 1,648 percent. As of December 2011, 28.3 percent of the population has regular Internet. Facebook has an average penetration rate of 18 percent (or 10.27 percent, excluding more affluent and oil-rich countries such as Saudi Arabia and United Arab Emirates).

5.2.2 Econometric Model

We analyze the data from two different model perspectives: a multinomial logistic (logit) regression model and a random-coefficients regression model.\textsuperscript{146}

The former relies on a binary specification between tranquil periods – when economic, political, and social fundamentals are largely stable – and post-crisis/recovery periods, when variables go through an adjustment process before reaching a more sustainable level. We make this distinction by utilizing a multinomial logistical regression model with three types of regimes: a tranquil regime, a pre-crisis regime, and a post-crisis/recovery regime.\textsuperscript{147} We deem this procedure to be applicable to capture pre-revolution settings as well as contagion effects throughout the region.

Secondly, we are testing for the role of a set of economic and social/cultural variables and indicators in times of social unrest, as previously outlined.

\textsuperscript{146} For more information on model specifications, please refer to Appendix A.

\textsuperscript{147} A multinomial logit (MNL) model, also known as multinomial logistic regression, is a regression model used in statistics, economics, and genetics, which generalize logistic regression by allowing more than two discrete outcomes. The model is used to predict the probabilities of the different possible outcomes of a categorically distributed dependent variable, given a set of independent variables. An important feature of logit models is their non-linearity, i.e. the independent variables are modeled to have a non-linear effect onto the dependent variable. Given social unrest is more than likely not to be a linear function of the independent variable matrix, this is an attractive property of the model.
Overall unrest is measured as the total number of news related to unrest in a specific country reported in major international publications yearly. To account for relative country size we divide the total number of news reports by population size. We arrive at a binary specification by classifying each country/year pairing into crisis (# news reports/population size >120 occurrences annually) or tranquil period (# crisis/population size < 120 occurrences annually). This specification is, by its very nature, somewhat arbitrary. To account for this potentially influencing the model results, we employ our second specification in the form of a Random-coefficients regression model relying on generalized least squares.

The random-coefficients regression model employs the total number of news reports in relation to population size as the dependent variable. Social media data were not included in this specification as historical data on Facebook and Internet penetration rates would have been necessary to perform a meaningful panel data analysis. In absence of this historical data, we perform a standard regression analysis for years 2010 and 2011.

Both models rely on a selection of the indicators previously described. Some indicators were dropped from the econometric analysis due to issues of multicollinearity.

5.2.3 Discussion of Results

If social media was a primary cause of protest during the Arab Spring, we would expect to see a relation between the occurrence of crisis (# total number of news on unrest reported) and Internet and/or Facebook penetration rates across the MENA region.

Before presenting and discussing estimation results for various specifications of our models, it is instructive to start by looking at some nonparametric evidence to check whether independent variables and political unrest appear correlated at all. Figure 4 below plots the count of news stories per capita and Facebook user account penetration as well as Internet penetration rates for average data in the years 2010-2011.

Figure 4 indicates that higher protest activity indeed coincides with spikes in Facebook penetration rates. However, turning to the parametric evidence, the coefficient in our multinominal logistic regression is insignificant for both Internet penetration and Facebook penetration rates.
Various specifications and both econometric models outlined in Appendix A do not show clear trends in causation of social unrest. In fact, the only statistically significant variable for the occurrence of social unrest in our model appears to be the price of food.

This makes sense from a theoretical economic perspective. Assume two households are net consumers of food and differ only in their respective levels of income. If food is a normal good (that is, if the demand for food is increasing in income), the impact of a price change on welfare will be felt comparatively more by the poorer of those two households, who devotes a higher share of its budget to food consumption. With a large enough increase in the price of food, the welfare loss incurred by the poor may threaten their very subsistence, which in turn may push them toward desperate measures. Autocratic regimes, like all political systems, need to provide a limited amount of public goods; indeed, food and fuel subsidies are remarkably high across the MENA region – over 10 percent of GDP in Egypt this past year. Thus, the failure of governments to reliably provide public goods might very well trigger unrest and increase dissatisfaction with the regime.

Throughout history, riots appear to have frequently broken out as an ostensible consequence of high food prices in areas with high concentration of poor households. Since the turn of the millennium, the world has experienced two major food crises. The first took place in 2008, when food prices increased by 51 percent between January 2007 and March 2008. This rise in food prices was associated with food riots in several developing and emerging countries across Africa, Asia, Europe, and the Americas. The second food crisis began at the end of 2010 and saw food prices increase by 40 percent between January 2010 and February 2011.

Figure 5 below tracks the food price index with the count of news stories about social unrest in MENA in the period 1990-2011. Although it is not possible to assert that food prices caused the Arab Spring, this correlation does raise the question of whether food prices contribute to political unrest. While the food price index certainly increases substantially in the years after the global financial crisis of 2008, the count of news stories increases to a far greater extent. This may simply reflect the enormous magnitude of the Arab Spring, but it likely also reflects the ability of the Internet and social media to relay news more quickly and instantaneously, creating a higher volume of news.

Figure 5: Food Prices vs. Count of News Stories on Unrest

Source: Authors’ calculations, UN FAO

We are aware that neither our model nor our data are perfect. The indicators chosen might omit more powerful explanatory variables; data sources are incomplete at best; and historical data on the rise of social media are an ongoing process. Furthermore, due to the relatively recent emergence of social media, historical data will likely lag behind an accurate assessment of the effects of social media.

In spite of non-significance in our model specifications, social media might still have been an important factor in facilitating protests and building momentum. Even though Facebook penetration for instance is not significant, we do see on average higher occurrence of unrest in countries with higher Facebook penetration rates. It would be instructive to perform a similar analysis when historical data on penetration rates and post-unrest data are available.
VI. CONCLUSIONS AND POLICY RECOMMENDATIONS

6.1 Conclusion

Qualitative research of the various factors influencing social unrest in MENA, as well as quantitative findings to support this research, suggests that social media was a useful facilitative tool but by no means a cause of the Arab Spring. The country-level case studies indicate that there is no consistent correlation between social media use and successful mass protest. For instance, Yemen has seen significant levels of protest that may have initially been sparked by young social media users but were then likely sustained and increased by local tribal community leaders and networks with their own non-internet methods of organizing social activity. Conversely, several wealthy countries in the Gulf with high levels of social media use had few if any incidences of large-scale social unrest. Therefore, we conclude that social media on its own has been a useful but not sufficient tool for the organization and implementation of protest movements.

Analysis of events in seven MENA countries also highlights the importance of the destabilizing political and socioeconomic issues shared by these countries. Most were governed by authoritarian regimes that provided people with few opportunities to voice their concerns, participate in political parties, or vote in free and fair elections. Stagnant growth, high inflation, rising unemployment, and heavy government subsidies also characterized many of the countries in the MENA region. These destabilizing factors likely contributed to the social unrest of the Arab Spring.

Social media played a distinctive role in two separate ways that we believe are particularly salient to our policy recommendations. First, it served to boost international attention to particular events by facilitating reporting from places where the traditional media has limited access to, and by providing a bottom-up, decentralized process for generating news stories. Second, the positive use of social media by many protesters during the Arab Spring to discuss ideas and plan protest activities is being increasingly countered by its use by governments eager to repress the activities of protesters and stymie democratic movements. We will address recommendations to attempt to stem the negative use of this tool, and promote its positive function for protest organizers in the next section.

The individual-level quantitative model strengthens the conclusion drawn by social media theory that membership in civil society is a predictor of individuals’ protest activity. The model shows that protest participants are reliably either members of civil society, users of the Internet, or both. It is quite possible that Internet communities serve a parallel function as civil societies in that they connect individuals on the grounds of sharing a common interest, particularly in countries where government repression prohibits the meeting of certain political groups. Social media
therefore enables activists to connect in the same way as they would via membership in civil organizations, boosting participation in protests during the Arab Spring.

The EWS model underscores the importance of the underlying economic conditions in fueling social unrest. Higher protest activity coincided with spikes in Facebook penetration rates, but was not statistically significant suggesting the overall effect of social media as a macro-level predictor of the Arab Spring is minimal. Our models do not show clear trends in the causes of social unrest; the only statistically significant variable for the occurrence of social unrest was the price of food.

To conclude, we believe that destabilizing political and socioeconomic issues were critical to driving to social unrest and that social media served as a useful tool in mobilizing demonstrators, though was not a primary cause of the Arab Spring. However, social media’s ability to offer membership in virtual civil society groups we believe boosted participation in protests, highlighting the importance the tool played in facilitating social unrest. Social media also increased international attention to local events in MENA, which may have raised morale and increased pressure on local governments. Though, we warn of the increased exploitation of social media by governments to repress the activities of protesters fighting for change, underscoring the double-edged nature of the role social media can play.

6.2 Policy Recommendations

Based upon our findings that the impact of social media during the course of the Arab Spring was limited, there seems to be very little meaningful policy options that the U.S. government can pursue in influencing or assisting the social change in the other countries. However, given the great potential of social media to be an effective tool in facilitating social unrest by quantitatively and qualitatively changing how people interact, share information and organize themselves, we believe that the following policies can help to create an environment that would elicit the maximum potential of social media in bringing about social unrest that would be aligned with U.S. interests.

Recommendation 1: Request that social media sites postpone planned upgrades or maintenance that may cause service interruptions during periods of particularly high protest activity.

Because social media facilitates the spread of information, is a tool for organization of unrest, and makes it harder for regimes to oppress their people with impunity, the U.S. Government (USG) should request that social media websites maintain service during periods of protest activity. As discussed in section 3.2, there is precedent for the US to request continuation of
social media services during a period of social unrest. The U.S. Department of State made the controversial decision to request Twitter to remain online and postpone scheduled maintenance during the height of protest activity in Iran. Maintaining the services of social media during periods of unrest is important because the USG uses these platforms for dissemination of information. The USG also heavily utilizes social media for open-source intelligence collection during social unrest.

However, the USG must avoid seeming to exert too much control over social media sites as even a slight perception of overt U.S. influence might result in a fall in U.S. popularity and appeal abroad. Unfortunately, regimes try to discredit bloggers and dissidents by labeling them puppets of the U.S. or as American spies. If authoritarian regimes were able to accuse activists as subversive agents of an “imperialist” America, and they managed to link American influence to social media sites themselves, this policy could result in significant and damaging blowback. Thus, this policy recommendation should be implemented with care.

**Recommendation 2: Provide technologies to circumvent Internet censorship.**

Where social media were used extensively to mobilize and organize protests, authoritarian governments often responded by shutting down or restricting access to social media. Although there is much debate on the effectiveness of these restrictions, such disruptions certainly did not help the population to achieve their goal. Therefore, the USG should attempt to minimize the disruption of communication by investing in mechanisms and tools to circumvent such censorship. This will become increasingly necessary because authoritarian regimes remaining in MENA, such as Syria and its Syrian Electronic Army (discussed in the double edged nature of social media section), are becoming more adept at censorship and cyberwarfare.

So far the U.S. has been strong on rhetoric that opposes Internet censorship and cyberwarfare, but weak on proliferation of the means to effectively circumvent it. Secretary of State Hillary Clinton is a strong advocate for Internet freedom. At a recent Conference on Internet Freedom in the Netherlands she made her support clear by advocating open Internet, She explains that certain rights are inalienable and should be protected both online and in person.

“This is an urgent task. It is most urgent, of course, for those around the world whose words are now censored, who are imprisoned because of what they or others have written online, who are blocked from accessing entire categories of internet content, or who are

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being tracked by governments seeking to keep them from connecting with one another.”

While the Obama administration is “leading a global effort to deploy “shadow” Internet and mobile phone systems that dissidents can use to undermine repressive governments that seek to silence them by censoring or shutting down telecommunications networks,” we should do more. Secretary Clinton and the State Department have thus far proven reluctant to provide censorship circumvention tools on a large scale- likely because some states may perceive this as a challenge to their sovereignty. Increasingly prevalent are those, such as Senator Lugar, who push the State Department to provide censorship circumvention technology to citizens combating censorship. Lugar voiced his support of Secretary Clinton’s Internet freedom agenda, but has “expressed concern that the State Department has not been moving quickly enough to contract out the funding Congress appropriated for developing tools to counter Internet censorship.”

However, even if circumvention tools were more available, it is not obvious that people would use them. A recent report from the Berkman Center for Internet and Society concedes that minimal usage of such circumvention tools, “at most (and likely far fewer than) 3 percent of Internet users in countries that engage in substantial filtering use circumvention tools once a month or more.”

Despite possible diplomatic concerns and the apparent lack of use of such tools currently, the U.S. should promote and provide tools to circumvent Internet censorship to those struggling against authoritarian regimes, such as Syria, that are committing egregious human rights violations against their own people.

**Recommendation 3: Accelerate the effort to expand Internet access in order to increase the number of people with access to social media.**

In order for the U.S. to expand the access to the virtual platforms for sharing information, stimulating discussions and organizing political movement, it is meaningful that the USG divert greater efforts in expanding the Internet connectivity throughout the world. As we have seen in

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many countries across MENA, the low Internet penetration rate could potentially have been one of the factors that explains why the social media’s role in affecting the course of social unrest was much less pronounced than some has expected. Hence, it makes sense to strengthen its effort to enhance communications infrastructure through its foreign assistance, such that people worldwide would gain better and cheaper access to the Internet. This can include efforts such as providing technical assistance for developing IT system or providing computers to LDCs. These efforts may not bear fruits immediately but patient and firm effort to expand the number of people connected to Internet, especially in those countries that have authoritarian regime, can help prepare an environment that would tap the latent strength of the social media in bringing social changes.

However, merely having the infrastructure to connect to the Internet is not sufficient in mobilizing its full potential. In reality, there are many repressive government that extend their control over the Internet through means such as monitoring, filtering and in the worst case through outright censorship. Hence, as the USG has been repeatedly reiterating, it should continue to strengthen its effort to achieve greater Internet Freedom. This could include efforts such as taking initiatives in strengthening the existing international normative frameworks like International Telecommunication Union (ITU) that sets standards on global Internet Freedom.
Appendices

Appendix A – Empirical models
This appendix provides an overview of our quantitative models reliant on the panel data assembled as per above data description.

Multinomial logit model

A multinomial logit (MNL) model, also known as multinomial logistic regression, is a regression model used in statistics, economics, and genetics, which generalize logistic regression by allowing more than two discrete outcomes. The model is used to predict the probabilities of the different possible outcomes of a categorically distributed dependent variable, given a set of independent variables.

Model assumptions:
The MNL model assumes that data are case specific, i.e. each independent variable has a single value for each case. The dependent variable cannot be perfectly predicted from the independent variables for any case. As with other types of regression, there is no need for the independent variables to be statistically independent from each other; however, collinearity is assumed to be relatively low. In light of this last assumption, we needed to drop some variables from the originally outlined list of independent variables. High correlation between several variables might make differentiation between the impacts of these variables increasingly difficult.

EWS models

Early Warning Systems customarily used to predict financial crisis fall into two broad categories. They either extract early signals from a range of indicators or they use logit or probit models for their analysis.

The leading indicator approach

The leading indicators approach considers vulnerability indicators and transforms them into binary signals: if a given indicator crosses a critical threshold, it is said to send a signal. A lower threshold implies more signals over time, but will also result in more “false alarms”.

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Whilst clearly instructive, this approach is not without problems. It entails a considerable loss of information in treating all crisis episodes essentially the same. Further, there is no conclusive ranking methodology of scenarios in case multiple indicators reach the critical threshold.

**The discrete-dependent-variable approach (logit and probit)**

In statistics, logistic regression (sometimes called the logistic model or logit model) is used for prediction of the probability of occurrence of an event by fitting data to a logistic function. It is a generalized linear model used for binomial regression. Like other forms of regression analysis, it makes use of one or more predictor variables that may be either numerical or categorical.

A probit model is a type of regression where the dependent variable can only take two values. A probit model is a popular specification for an ordinal or a binary response model that employs a probit link function. This model is most often estimated using standard maximum likelihood procedure, such an estimation being called a probit regression.

**Basic set up**

We have N countries \( i=\{1,2,N\} \) that we observe during T periods \( t=\{1,2,T\} \). For each country and each month we observe the binary dependent variable \( Y \):

\[
Y = \begin{cases} 
1 & \text{with probability } \Pr(Y = 1) = P \\
0 & \text{with probability } \Pr(Y = 0) = 1 - P 
\end{cases}
\]

We want to explain the crisis index \( Y \) by a set of K independent variables \( X \). Hence \( X \) is a KN \times T \) matrix of observations. The aim of the model is to estimate the effect of the indicators \( X \) on the probability \( P \) of experiencing a crisis \( Y \). We denote \( \gamma \) as the vector of K marginal effects:

\[
\gamma = \frac{dP}{dX}
\]

**The logit model**

In probit and logit models the probability of a crisis is a non-linear function of the indicators:

\[
\Pr(Y = 1) = F(X\beta)
\]

Using a logistic distribution defines the logit model:

---

\[
\Pr(Y = 1) = F(X\beta) = \frac{e^{X\beta}}{1+ e^{X\beta}}
\]

In the logit model the effect of the indicators on the odds is then defined as:

\[
\Omega = (Y=1|X) = \frac{P}{1-P} = e^{X\beta}
\]

The effect of the indicators on the odds ratio, given two realizations of X, e.g. X1 and X0, is:

\[
\Omega = (Y=1| X1) / \Omega = (Y=1| X0) = e^{(X1-X0)\beta}
\]

The odds ratio shows how the odds of observing Y=1 change when X moves from X1 to X0.

An important feature of logit models is their non-linearity, i.e. the independent variables are modeled to have a non-linear effect onto the dependent variable. Given social unrest is more than likely not to be a linear function of the independent variable matrix, this is an attractive property of the model.

To evaluate the performance of EWS models, one ideally would like to compare the predicted probability of a crisis obtained from the EWS model with the actual probability. Since the latter is not directly observable, we need to compare the predicted probability with the actual occurrence of crises. As the predicted probability is a continuous variable, a necessary step consists in defining a probability level above which the predicted probability signals most reliably that a crisis is about to occur. Invariably, the choice of this “optimal” threshold level involves a trade off: A lower threshold triggers more signals but also raises the number of wrong signals\(^{158}\); a higher threshold reduces the number of wrong signals, but at the expense of increasing the number of missing crisis signals.\(^{159}\)

Random-Coefficients regression model (RCR)

The RCR model is a two-stage model, which admits both individual-level and population-level effects. It is known to be robust\(^{160}\) against data that are not missing completely at random. Let y be a trait measured at n time points in m individuals, yielding m time series of n measurements each: \(y_{ij}\) (i = 1, ..., n; j = 1, ..., m). Note that some \(y_{ij}\) may be missing. Let us denote by \(y_j\) the time series of observations for the jth participant. Population level effects, i.e., covariates which are assumed to affect the trait y in the same manner for all subjects, are

\(^{158}\) Introducing a, what the statistics literature refers to, Type 2 error.

\(^{159}\) Introducing a Type 1 error – i.e., the absence of signal when a crisis actually did occur.

\(^{160}\) Robustness in a statistical sense means that estimators are not unduly affected by small departures from model assumptions.
modeled by \( C \), an \( n \times p \) matrix of regressors. The \( j \)th participant's values for these \( p \) covariates are given by a \( p \times 1 \) data vector, \( \xi_j \) (\( j = 1, \ldots, m \)).

Individual-level effects, that is the effects of covariates which may impact each subject differently, are modeled by a family of \( q \times 1 \) data vectors, \( \zeta_j \) (\( j = 1, \ldots, m \)), consisting of the subjects observed values for the \( q \) individual level covariates, and \( n \times q \) matrices of regressors, \( B_j \). Thus, there are different matrices of regressors (\( B_j \)) for each individual. An example of an individual level effect would be a linear dependence of a trait on age with slope and intercept values that vary from individual to individual. The conditional expected value of the time series is then a sum of the population level and individual level effects:

\[
E(y_j | \xi_j, \zeta_j) = C \xi_j + B_j \zeta_j.
\]

We make a homoscedasticity assumption in that we assume that the conditional variance of the time series, \( V = \text{Var}(y_j | \xi_j, \zeta_j) \), depends on the individual only through the number of, and time between, observations.\(^{161}\) We assume further that observations, while being correlated within individuals, are independent between individuals and that the distribution of the conditional time series is multivariate normal. The RCR modeling framework assumes that the individual level parameters, i.e., those coefficients of the individual level regressor matrices \( B_j \), which are variable, are drawn from a joint multivariate normal distribution.

\(^{161}\) In statistics, a sequence or a vector of random variables is homoscedastic if all random variables in the sequence or vector have the same finite variance. This is also known as homogeneity of variance. The assumption of homoscedasticity simplifies mathematical and computational treatment.
### Appendix B – Indicators and Data Sources

#### Table B-1: Independent Variables

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicator</th>
<th>Detailed Description</th>
<th>Source</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Political Indicators</td>
<td>Regime type</td>
<td>Regime Type estimates the degree of authoritarianism in a country. Sourced from a comprehensive dataset containing annual, cross-national, time-series, and polity-case formats coding democratic and autocratic “patterns of authority” and regime changes in all independent countries with total population greater than 500,000 in 2010.</td>
<td>Systemic Peace - POLITY™ IV PROJECT: Political Regime Characteristics and Transitions, 1800-2010 Dataset</td>
<td>All countries display high levels of autocracy and low levels of democracy.</td>
</tr>
<tr>
<td>2. Economic Indicators</td>
<td>Real GDP growth</td>
<td>Annual percentages of constant price GDP are year-to-year changes; the base year is country-specific. Values are based upon GDP in national currency converted to U.S. dollars using market exchange rates (yearly average).</td>
<td>International Monetary Fund, World Economic Outlook Database, September 2011; Heritage Index; UN FAO; International Labor Organization</td>
<td>GDP growth rates are relatively low at 3 percent annual growth on average.</td>
</tr>
<tr>
<td></td>
<td>Inflation</td>
<td>Annual percentages of average consumer prices are year-to-year changes.</td>
<td></td>
<td>Inflation rates average 5 percent across the region.</td>
</tr>
<tr>
<td></td>
<td>Domestic Investment</td>
<td>Expressed as a ratio of total investment in current local currency and GDP in current local currency. Investment or gross capital formation is measured by the total value of the gross fixed capital formation and changes in inventories and acquisitions less disposals of valuables for a unit or sector.</td>
<td></td>
<td>Used as background data to determine economic position of individual countries. Not included in final econometric specification.</td>
</tr>
<tr>
<td></td>
<td>Gross National Saving</td>
<td>Expressed as a ratio of gross national savings in current local currency and GDP in current local currency. Gross national saving is gross disposable income minus final consumption expenditure after accounting for pension funds. For many countries, the estimates of national saving are built up from national accounts data on gross domestic investment and from balance of payments-based data on net foreign investment.</td>
<td></td>
<td>Used as background data to determine economic position of individual countries. Not included in final econometric specification.</td>
</tr>
<tr>
<td>Type</td>
<td>Indicator</td>
<td>Detailed Description</td>
<td>Source</td>
<td>Findings</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Current</td>
<td>Account</td>
<td>Current account is all transactions other than those in financial and capital items. The major classifications are goods and services, income, and current transfers. The focus of the BOP is on transactions (between an economy and the rest of the world) in goods, services, and income.</td>
<td>Descriptive statistics show that a higher current account deficit could be associated with higher probability of social unrest. All countries that experienced social unrest during the Arab Spring had significant current account deficits (see figure 5 below).</td>
<td></td>
</tr>
</tbody>
</table>
| Economic   | Freedom            | Economic freedom as defined by the Heritage Foundation, is the fundamental right of every human to control his or her own labor and property. In an economically free society, individuals are free to work, produce, consume, and invest in any way they please, with that freedom both protected by the state and unconstrained by the state. In economically free societies, governments allow labor, capital and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself. Ten components of economic freedom are measured; assigning a grade in each using a scale from 0 to 100, where 100 represents the maximum freedom. The 10 economic freedoms are grouped into four broad categories or pillars of economic freedom:  
  - Rule of Law (property rights, freedom from corruption);  
  - Limited Government (fiscal freedom, government spending);  
  - Regulatory Efficiency (business freedom, labor freedom, monetary freedom); and  
  - Open Markets (trade freedom, investment freedom, financial freedom). Each of the freedoms within these four broad categories is individually scored | Heritage Index (http://www.heritage.org/index/default) | Used as background data. Not included in final econometric specification due to lack of precision in the data. |
<table>
<thead>
<tr>
<th>Type</th>
<th>Indicator</th>
<th>Detailed Description</th>
<th>Source</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Food prices</td>
<td>The food prices used as the variables of interest are the FAO’s food price index. The FAO’s food price index is a monthly indicator of the price of food worldwide that covers five food groups (meat, dairy, cereals, oils and fats, and sugar) representing 55 commodities. To come up with an aggregate food price index, the FAO takes the average of the five food groups and weights them using group-specific export shares for the period 2002-2004.</td>
<td>UN FAO (<a href="http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en">http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en</a>)</td>
<td>The food price index was equal to roughly 205 on average, with a minimum of 90 in 2002 and a maximum of 228 in 2011.</td>
</tr>
</tbody>
</table>

3. Social Indicators

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicator</th>
<th>Detailed Description</th>
<th>Source</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Civil Society Index (CSI)</td>
<td>Civil society is playing an increasingly important role in governance and development around the world. In most countries, however, knowledge about the state and shape of civil society is limited, and there are few opportunities for civil society stakeholders to come together to discuss and reflect on the current state of civil society and the challenges it is facing. The index used is a participatory needs assessment and action-planning tool for civil society around the world. Due to missing granularity of the data and significant gaps in data availability, the series was not used in our analysis. However, individual data points informed our qualitative discussion.</td>
<td><a href="http://civicus.org">http://civicus.org</a></td>
<td>Used as background data. Due to lack of granularity not included in final econometric specification</td>
</tr>
</tbody>
</table>

4. Social Media Indicators

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicator</th>
<th>Detailed Description</th>
<th>Source</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Corruption</td>
<td>First launched in 1995, Transparency International's Corruption Perceptions Index (CPI) has been widely credited with putting the issue of corruption on the international policy agenda. The CPI ranks almost 200 countries by their perceived levels of corruption, as determined by expert assessments and opinion surveys.</td>
<td>Corruption Perception Index Transparency International</td>
<td>Due to missing granularity of the data and significant gaps in data availability, the series was not used in our analysis. However, individual data points informed our qualitative discussion.</td>
</tr>
<tr>
<td>Type</td>
<td>Indicator</td>
<td>Detailed Description</td>
<td>Source</td>
<td>Findings</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Freedom of Press</td>
<td></td>
<td>The Press Freedom Index is an annual ranking of countries compiled and published by Reporters Without Borders based upon the organization's assessment of their press freedom records. A smaller score in the index corresponds to greater freedom of the press. The 2011-2012 index was published on 25 January 2012. Unlike indexes from previous years, the 2011-2012 index allowed for negative scores and has a wider overall spread of scores (-10 to 142, with previous years having 0 to 115.5). The survey asks questions about direct attacks on journalists and the media as well as other indirect sources of pressure against the free press. Reporters Without Borders is careful to note that the index only deals with press freedom, and does not measure the quality of journalism. Due to the nature of the survey's methodology based on individual perceptions, there are often wide contrasts in a country's ranking from year to year.</td>
<td>Reporters without borders (<a href="http://en.rsf.org/press-freedom-index-2011-2012,1043.html">http://en.rsf.org/press-freedom-index-2011-2012,1043.html</a>)</td>
<td>The Arab uprisings and the measures taken by governments to control news and information in response to the uprisings had a major impact on the ranking of countries in the Middle East and Northern Africa. From Morocco to Bahrain and Yemen, few countries were spared by this wave of pro-democracy uprisings, which prompted major crackdowns. Some predators of press freedom fell from power, but others remain in place. The transitions that have begun are not necessarily leading towards more pluralism and most of the changes in the rankings have been downward ones. The freedoms that have been won are fragile and could easily be swept away.</td>
</tr>
</tbody>
</table>
| Internet penetration | % Population connected to internet & regularly using net facilities. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Internet World Statistics (http://www.internetworldstats.com/middle.htm) | In the Middle East, there are an estimated 68,553,666 Internet users, and between 2000 and 2011 the region witnessed an impressive Internet usage growth rate of 1,648.2%. Overall,  
  - 216,258,843 population estimate for the Middle East in 2011  
  - 77,020,995 |
<table>
<thead>
<tr>
<th>Type</th>
<th>Indicator</th>
<th>Detailed Description</th>
<th>Source</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type</td>
<td>Source</td>
<td>Findings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indicator</td>
<td>World Values Survey Databank</td>
<td>Not included in econometric model due to data incompleteness.</td>
<td></td>
</tr>
<tr>
<td>5. Cultural variables</td>
<td>Strength of religion</td>
<td>The World Value Survey (WVS) is a large-scale, cross-national and longitudinal survey research program. About 102 countries/regions with altogether 423,084 respondents participated in the six waves conducted up to now: 1981-1984, 1989-1993, 1994-1999, 1999-2004, 2005-2006, and 2008-2010. Some indication as to the strength of religion could be gathered, but data was not used in empirical analysis due to incompleteness. We deem this as not being of significant importance due to the relative homogeneity among the MENA countries. Some responses, however, have informed our qualitative analysis.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|                   | Socio-economic indicator            | (Youth) unemployment; demographic data  
Unemployment rate can be defined by either the national definition, the ILO harmonized definition, or the OECD harmonized definition. The OECD harmonized unemployment rate gives the number of unemployed persons as a percentage of the labor force (the total number of people employed plus unemployed). [OECD Main Economic Indicators, OECD, monthly] As defined by the International Labour Organization, unemployed workers are those who are currently not working but are willing and able to work for pay, currently available to work, and have | http://www.tradingeconomics.com, http://laborsta.ilo.org Kabbani, N., and E. Kothari. 2005. “Youth employment in the MENA Region: A situational assessment.” Washington, DC: World Bank SP Discussion Paper 534. | Unemployment rates are high throughout MENA and average 11 percent, whereas the youth unemployment rate is 26 percent with a youth labor participation rate of 30 percent. |
<table>
<thead>
<tr>
<th>Type</th>
<th>Indicator</th>
<th>Detailed Description</th>
<th>Source</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>actively searched for work.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C – Descriptive and Empirical Results

Figure C-1: Current Account Position (countries in order of relative magnitude of unrest as measured by total news per capita count)

Source: Authors’ calculations, IMF Statistical Database
Table C-1: Descriptive Statistics, 1990 - 2011

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>(Std. Dev.)</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count of News Stories</td>
<td>2816.36</td>
<td>1672.10</td>
<td>198</td>
</tr>
<tr>
<td>Count of News Stories per capita</td>
<td>104.86</td>
<td>37.65</td>
<td>198</td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP growth rate at constant prices</td>
<td>2.98</td>
<td>0.45</td>
<td>197</td>
</tr>
<tr>
<td>Domestic Investment</td>
<td>28.1</td>
<td>2.56</td>
<td>198</td>
</tr>
<tr>
<td>Domestic Savings</td>
<td>28.18</td>
<td>4.02</td>
<td>198</td>
</tr>
<tr>
<td>Inflation</td>
<td>5.16</td>
<td>1.02</td>
<td>197</td>
</tr>
<tr>
<td>Unemployment</td>
<td>10.91</td>
<td>0.58</td>
<td>152</td>
</tr>
<tr>
<td>Current Account</td>
<td>7.12</td>
<td>6.60</td>
<td>198</td>
</tr>
<tr>
<td>Corruption</td>
<td>36.9</td>
<td>2.58</td>
<td>104</td>
</tr>
<tr>
<td>Food Prices</td>
<td>204.52</td>
<td>6.66</td>
<td>198</td>
</tr>
<tr>
<td>Youth Unemployment Rate (in%)</td>
<td>25.96</td>
<td>0.92</td>
<td>79</td>
</tr>
<tr>
<td>Youth Participation Rate (in%)</td>
<td>30.23</td>
<td>1.75</td>
<td>198</td>
</tr>
<tr>
<td>Cell phone Penetration (% population)</td>
<td>105.33</td>
<td>8.07</td>
<td>18</td>
</tr>
<tr>
<td>Internet Penetration (% population)</td>
<td>28.3</td>
<td>2.88</td>
<td>18</td>
</tr>
<tr>
<td>Facebook Penetration (% population)</td>
<td>17.76</td>
<td>2.68</td>
<td>18</td>
</tr>
</tbody>
</table>

Note: All price figures are in real terms.
Table C-2: GLS Estimation Results for the Determinants of Political Unrest, 1990-2011

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth rate</td>
<td>-3.169</td>
<td>-3.064</td>
<td>-3.805</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.17)</td>
<td>(2.17)</td>
<td>(2.42)</td>
<td></td>
</tr>
<tr>
<td>Current Account</td>
<td>-3.22</td>
<td>-2.477</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5.81)</td>
<td>(7.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Prices</td>
<td>0.470**</td>
<td>0.487***</td>
<td>0.541***</td>
<td>0.411***</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.15)</td>
<td>(0.14)</td>
<td>(0.12)</td>
</tr>
<tr>
<td>Youth Participation Rate</td>
<td>0.161</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.77)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>197</td>
<td>197</td>
<td>197</td>
<td>198</td>
</tr>
</tbody>
</table>

Note: Standard errors in parentheses; the symbols ***, **, and * respectively denote statistical significance at the 1, 5, and 10 percent levels. p<0.05, ** p<0.01, *** p<0.001