

Socioeconomic Drivers of the Spread of the Tunisian Revolution

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Abstract

Tunisia's revolution spread rapidly. Beginning in a small town far from the capital, riots and protests soon engulfed more than half of Tunisia's delegations, culminating in the removal of Tunisia's president on the 29th day of the riots. This analysis examines the impact of geographic and socioeconomic factors on the onset and spread of political violence during the 29 days of rioting. We find that the spread of political violence was not driven by geographic proximity – indeed, political violence was significantly less likely in delegations that had a nearby neighbor that had already experienced rioting – but instead by socioeconomic proximity. Further, we provide quantitative evidence that university graduates and access to broadcasting news sources played a leading role in both the onset *and* spread of Tunisia's rioting.

Keywords:

Tunisia, Revolution,

1. Introduction

The Tunisian revolution started in a small town of Sidi Bou Zid, far from the capital in the west of the country, on 17 December 2010. A young man, 26-year-old Mohamed Bouazizi, set himself on fire to protest against economic hardship and police mistreatment. Only a few days after Bouazizi's self-immolation, unrest began spreading to neighboring towns and areas. Within a month, this unrest had manifested in riots throughout the country, including in the capital, Tunis. This spontaneous movement, apparently without leadership, led to the fall of what was believed to be one of the most stable regimes in the region.¹ And the "success" of the Tunisian revolution was a catalyst for the movements that removed the leaders of Libya and Egypt.

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¹According to the Fund for Peace's 2010 Failed States Index, Tunisia was ranked the most stable country in North Africa. Tunisia was 6th overall among the 18 countries of the Middle East North Africa region included in the ranking – being surpassed only by Oman, Qatar, United Arab Emirates, Bahrain, and Kuwait (<http://ffp.statesindex.org>).

This paper explores the spread of political violence in Tunisia during the 29-day period from Bouazizi's self-immolation to the fall of Tunisia's political regime. For the purpose of this analysis, we use a very broad definition of political violence to include any type of resistance, either violent or non-violent, against the Tunisian government. This broad definition is largely a consequence of available data chronicling the events during this tumultuous periods; the pictures, videos, and reports from social media that we use to document the timing of the spread of political violence do not always offer a clear and consistent characterization of the specific events unfolding.

The factors driving the spread of political violence during this period are not well understood. Political violence did not spread between neighboring villages, but rather, made "geographic leaps," often spreading to a village in a different governorate before spreading to other villages in that same governorate.

Qualitative evidence suggests that social and economic factors may have driven the revolution's spread. First, the prevalence of unemployed youth in the riots – the majority of young demonstrators were unemployed graduates of higher education or vocational training programs – suggests that the disenfranchisement experienced by these youth may have played a key role. Second, access to technology, and in particular, wireless technology has been implicated as a key catalyst. Young blogger and cyber activists recorded and reported the events and exposed them on social networks (e.g., blogs, Facebook pages, twitter feeds, etc.) while government-controlled media simply did not cover the riots (Ghannam 2012, Honwana 2011). Third, Tunisian civil society is believed to have played a leading role – both lawyers as well as local and regional unions of Tunisian General Labour Union (UGTT) helped to form a national coalition against the regime.

Understanding the factors that influenced the spread of the Tunisian revolution is the focus of this paper. By studying the onset of political violence within a single country, we are able to examine whether socioeconomic similarity between areas affected the spread of political violence – thus, we examine the role of socioeconomic factors in both the onset and the spread of political violence. As mentioned above, a well examination of the uprising of a revolution is a mid/ long term multi-factorial analysis which incorporates a political, social, societal and economic examinations. However, in the scope of this empirical research we are focusing on the socio-economic factors that may have generated the spread of the Tunisian revolution.

2. Political violence: Socioeconomic Drivers and Contagion

This paper is related to three fields of existing research. The first explores the socioeconomic drivers of political violence. Cross-country regressions have provided robust correlational evidence that the risk of political violence is increased in countries with poverty, slow growth, dependence upon primary commodity exports increase, and low secondary school attainment (e.g., Collier and Hoeffler 2004, Fearon and Laitin 2003); further, there is evidence that economic shocks can induce political violence (Miguel, Satyanath and Sergenti 2004, Besley and Persson 2008, Bazzi and Blattman 2013). Studies of subnational political violence have found similar results for socioeconomic factors using either sub-national administrative units (e.g., Rustad, Buhaug,

Falch and Gates 2011, Zhukov 2012) or geospatial grids (e.g., Buhaug and Rod 2006, Raleigh and Hegre 2009) as the unit of analysis.

The second strain focuses on the spread, or contagion, of political violence.² This literature focuses on understanding the spatiotemporal correlation of political violence within and across countries. The early research in this field focused primarily on political violence in the United States including lynching (Tolnay, Deane and Beck 1996) and anti-apartheid protests (Soule 1997), among others.³ A more recent literature has extended this political violence of contagion literature to a variety of developing countries (e.g., Townsley, Johnson and Ratcliffe 2008, Weidmann and Ward 2010)

The third, which is most similar to the analysis in this paper, explores how socio-economic factors influence the contagion of political violence.⁴ This literature examines whether the similarity of different individuals or areas – “social proximity” – affects the spread of violence. In one example from research in the United States, Myers (2000) demonstrated that similarity in media access influenced the spread of the 1964-1971 race riots. Research in developing countries has similarly demonstrated the influence that a diverse range of socioeconomic factors, including ethnic linkages, state capacity, and road connectivity can have on the spread of political violence (e.g., Buhaug and Gleditsch 2008, Braithwaite 2010, Zhukov 2012).

3. Modeling the Onset and Spread of Political Violence

Our empirical approach focuses on explaining the timing of spread of political violence during the Tunisian revolution. This approach, which follows Strang and Tuma (1993) and Myers (2000), models political violence in Tunisia as

$$R_{i,t} = \alpha X_i + \sum_{j \neq i} \{ \beta R_{j,t-1} + \gamma g(Z_i, Z_j) \} + \epsilon_{i,t} \quad (1)$$

where i indexes the the geographic unit of analysis, Tunisia’s 264 administrative delegations; t indexes the number of days since the first riots in Sidi Bou Zid ($t \in [1, 29]$);⁵ and

$$R_{i,t} = \begin{cases} 1 & \text{if riots began in delegation } i \text{ by time } t \\ 0 & \text{otherwise.} \end{cases} \quad (2)$$

Equation 1 has three types of covariates in addition to the error term, $\epsilon_{i,t}$.⁶ The first, X_i , are delegation-specific geographic and socioeconomic characteristics; Myers

²There is a much broader literature looking at social contagion more generally (e.g., Burt 1987); this discussion focuses on political violence given the focus of our paper.

³Strang and Soule (1998) provide a review of this early literature.

⁴This strain of the literature developed from Strang and Tuma (1993) who examines the importance of “social proximity” in the contagion of innovation.

⁵The first day of political violence in Sidi Bou Zid – December 17, 2010 – is $t = 1$. The day that the Tunisian president fled the country – January 14, 2011 – is $t = 29$.

⁶Both Strang and Tuma (1993) and Myers (2000) include “susceptibility” as a fourth type of covariate – we do not include a comparable term.

(2000) refers to these as “intrinsic characteristics”. The second, $R_{j,t-1}$, is the number of delegations that have experienced political violence by time t ; this term is identical to Myers (2000) long-term “infectiousness” measure.

The third covariate, $g(Z_i, Z_j)$ is our measure of what Strang and Tuma (1993) and Myers (2000) call “social proximity”. In our analysis, we focus on a specific type of social proximity and define

$$g(Z_i, Z_j) = \|X_i - X_j\| \cdot |R_{j,t-1} = 1| \quad (3)$$

where $\|X_i - X_j\|$ is the *normalized* difference between delegation i and j and $|R_{j,t-1} = 1|$ is an indicator for whether delegation j already experienced political violence. Specifically it normalizes the difference of each variable to be $[0, 1]$ by dividing the difference by the maximum value of each variable.

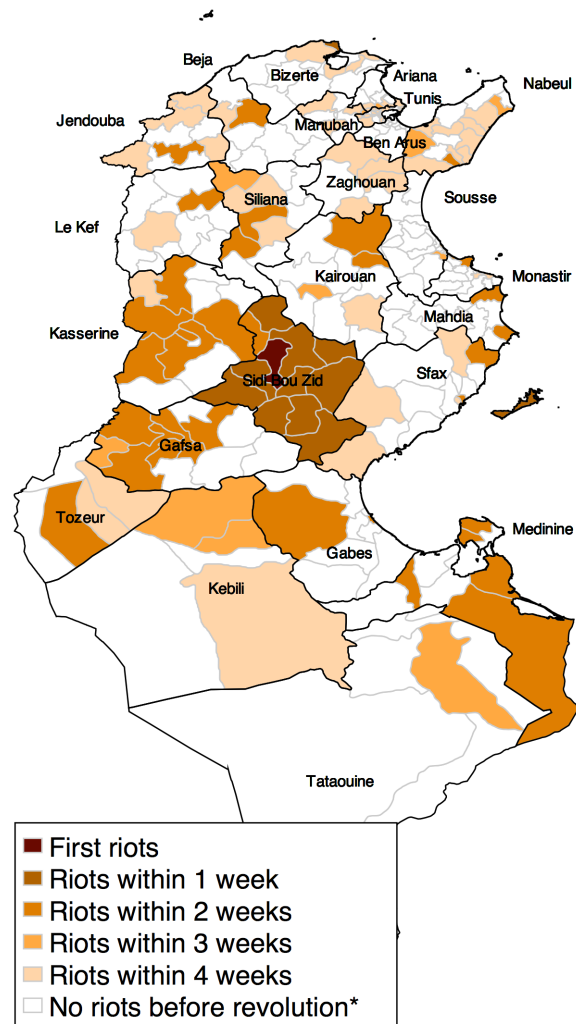
Hazard

4. Data

Our analysis employs two different datasets. The first is a novel dataset that records the first day of political violence in each of Tunisia’s 264 delegations – these data are displayed in Figure 1. For sake of reliability and complementarity, these dates were identified from two sources. The first is an independent blog, *Nawaat*, which archived the events, videos, pictures, statements, denunciations, and reports from the revolution according to minutes reported by local and international non-governmental organizations, local and regional unions of Tunisian General Labour Union and civil society.⁷ The second was an official investigation of the events leading to the removal of Ben Ali’s regime, which was based on statements and testimony of the heads of the state, police, and army officials Belkhouja and Cheikhrouhou (2013). This investigation *per se* is the first which has listed the victims of the Tunisian revolution by date and place. Is considered as political violence in our dataset, every gathering group or peaceful demonstration which had been oppressed or led to a confrontation with police.

⁷Nawaat is an independent collective blog founded in 2004 available at www.nawaat.org.

Fig. 1. Timing of Tunisian Riots



The second is delegation-level data on socioeconomic characteristics from the 2004 census data. The 2004 census provides data on demographic structure, educational access, educational achievement, unemployment, access to public services, asset ownership, and migration patterns. These data are available separately for rural and urban areas of each delegation when appropriate.

Table 1. Summary Statistics

Control Variables		Mean	SD	N =	
Delegation Control Variables	log(Total # of Delegations Rioting)	3.18	1.34	7511	
	Employment	% of Males with No Education	0.11	0.08	7511
		% of Males with Primary Education	0.18	0.10	7511
		% of Males with Secondary Education	0.18	0.09	7511
		% of Males with University Education	0.16	0.09	7511
	Demographic	% Illiterate	0.37	0.05	7511
		% with Primary Education	0.31	0.08	7511
		% with Secondary Education	0.06	0.05	7511
		log(Total Population)	10.37	0.61	7511
	Wealth	% Urban	0.58	0.35	7511
		% Owning a Car	0.18	0.10	7511
	Communication	% with Piped Water	0.79	0.23	7511
		% Owning a Computer	0.05	0.06	7511
		% Owning a Mobile Phone	0.42	0.14	7511
		% Owning a Satellite	0.42	0.19	7511
		% Owning a TV	0.88	0.08	7511
Delegation "Minimum Distance" Variables	Geographic Distance	0.52	0.56	7511	
	Employment	% of Males with No Education	0.37	0.26	7511
		% of Males with Primary Education	0.57	0.16	7511
		% of Males with Secondary Education	0.48	0.20	7511
		% of Males with University Education	0.40	0.25	7511
	Demographic	% Illiterate	0.65	0.13	7511
		% with Primary Education	0.62	0.13	7511
		% with Secondary Education	0.55	0.24	7511
		log(Total Population)	0.87	0.04	7511
	Wealth	% Urban	0.25	0.23	7511
		% Owning a Car	0.62	0.23	7511
	Communication	% with Piped Water	0.44	0.18	7511
		% Owning a Computer	0.61	0.25	7511
		% Owning a Mobile Phone	0.58	0.15	7511
		% Owning a Satellite	0.51	0.17	7511
		% Owning a TV	0.80	0.07	7511

The summary statistics of the key variables used are provided in Table 1. The total number of observations reflects the panel structure of the data used – each of the 259 delegations with available data is studied across the 29 days from the first riots to the removal of the president ($29 \times 259 = 7,511$).⁸

5. Results

We first examine the relationship between the timing of the onset of political violence and delegation-specific characteristics in Table 2. This table reports estimates of Equation (1) which uses the 29 day panel of the 259 delegations with available data to examine the correlates of the onset of political violence. Positive point estimates in this table indicate that delegations with a larger value for a given variable were more likely to riot sooner.

Three key findings emerge from Table 2. First, as seen in column (5) which includes all covariates and governate fixed effects, the delegations with the largest percentage of university graduates were the earliest to riot. Second, delegations with more satellites – which were the primary means through which information about the riots were disseminated, since Tunisian stations would not cover it – were more likely to riot earlier. Third, as demonstrated by the positive point estimate on the number of delegations that have already experienced rioting, the probability of all delegations rioting increased over time as more and more delegations rioted.

⁸Our analysis uses data for only 259 unique delegations as (1) the 2004 census data only reports on 263 unique delegations, (2) Douz North and South in the Kabilia governorate were indistinguishable in our conflict data, and (3) the available geospatial data with the geographic centroid for each delegation – used for calculating geographic distances – excluded an additional three delegations.

Table 2. Correlates of the Timing of Riots

		(1)	(2)	(3)	(4)	(5)
log(# of delegations that experienced rioting)		0.09*** (0.00)	0.09*** (0.01)	0.09*** (0.01)	0.09*** (0.01)	0.09*** (0.01)
Unemployment	% of Males with No Education	0.73** (0.36)	0.09 (0.35)	-0.07 (0.36)	-0.05 (0.37)	0.03 (0.30)
	% of Males with Primary Education	-2.30*** (0.66)	-1.89*** (0.65)	-1.92*** (0.62)	-1.79*** (0.59)	-0.44 (0.53)
	% of Males with Secondary Education	1.82*** (0.67)	1.63** (0.71)	1.69** (0.67)	1.61** (0.64)	0.07 (0.56)
	% of Males with University Education	0.37 (0.25)	0.57** (0.24)	0.53** (0.23)	0.46** (0.23)	0.31 (0.24)
Demographic	% with Primary Education		-1.77*** (0.49)	-0.74 (0.55)	-0.70 (0.56)	-0.40 (0.59)
	% with Secondary Education		0.19 (0.40)	0.96** (0.46)	0.29 (0.58)	-0.37 (0.53)
	% with University Education		-0.85* (0.49)	0.66 (0.79)	3.36*** (1.14)	3.55*** (1.14)
	log(Total Population)		0.10*** (0.03)	0.10*** (0.02)	0.09*** (0.03)	0.06** (0.03)
	% Urban		-0.03 (0.09)	0.03 (0.09)	0.02 (0.09)	0.02 (0.09)
Wealth	% Owning a Car			-0.60* (0.33)	-0.49 (0.35)	-1.68*** (0.41)
	% with Piped Water			-0.44*** (0.14)	-0.42*** (0.14)	-0.10 (0.14)
Communication	% Owning a Computer				-3.56*** (1.07)	-1.73* (1.05)
	% Owning a Mobile Phone				0.38 (0.35)	0.38 (0.34)
	% Owning a Satellite				0.46** (0.19)	0.51** (0.23)
	% Owning a TV				-0.34 (0.37)	0.65 (0.46)
Governorate Fixed Effects?		No	No	No	No	Yes
R ²		0.12	0.18	0.20	0.22	0.37
N =		7511	7511	7511	7511	7511

Notes: This table reports estimates of Equation (2) using OLS with delegation-specific clustering. Point estimates obtained using a probit are analogous, but OLS results are reported as they allow for clustering. * indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 3, which estimates the role of both geographic and socioeconomic proximity using Equation (3), reports the two key results of this paper. First, new rioting was significantly less likely in delegations that had neighbors that had already rioted. This is demonstrated by the positive point estimate on geographic distance – i.e., new rioting was more likely in delegations that were farther from delegations that already had rioting. The second is that similarity of delegations along two key socioeconomic factors – i.e., the percentage of the population with university education and the percentage of the population with satellites – significantly predicted the onset of rioting. The importance of university graduates in these riots is highlighted by the significant, positive point estimate on unemployment among university graduates.

Table 3: Proximity and the Timing of Riots

		(1)	(2)	(3)	(4)	(5)	
log(# of delegations that experienced rioting)		0.16*** (0.02)	0.14*** (0.02)	0.16*** (0.02)	0.16*** (0.02)	0.15*** (0.02)	
Geographic distance		0.13*** (0.02)	0.11*** (0.03)	0.11*** (0.03)	0.11*** (0.03)	0.12*** (0.03)	
"Distance" to most similar delegation that already rioted	Unemployment	% of Males with No Education	-0.07 (0.14)	-0.03 (0.13)	-0.02 (0.14)	-0.07 (0.14)	-0.09 (0.14)
		% of Males with Primary Education	-0.20 (0.27)	-0.09 (0.27)	-0.18 (0.27)	-0.14 (0.26)	-0.16 (0.26)
		% of Males with Secondary Education	0.24 (0.19)	-0.05 (0.19)	0.06 (0.20)	0.10 (0.20)	0.14 (0.19)
		% of Males with University Education	0.19 (0.13)	0.29** (0.12)	0.33*** (0.12)	0.25* (0.13)	0.25** (0.13)
	Demographic	% with Primary Education		0.23* (0.13)	0.23 (0.14)	-0.05 (0.18)	-0.05 (0.17)
		% with Secondary Education		-0.58*** (0.16)	-0.47*** (0.14)	-0.65*** (0.20)	-0.65*** (0.21)
		% with University Education		-0.15** (0.07)	0.22 (0.16)	0.69*** (0.20)	0.69*** (0.20)
		Total Population		-1.74*** (0.46)	-1.79*** (0.45)	-1.84*** (0.46)	-1.82*** (0.45)
		% Urban		0.61*** (0.10)	0.53*** (0.12)	0.31*** (0.11)	0.28*** (0.10)
	Wealth	% Owning a Car			-0.33*** (0.10)	-0.03 (0.15)	-0.05 (0.15)
		% with Piped Water			-0.05 (0.11)	-0.11 (0.15)	-0.12 (0.14)
	Communication	% Owning a Computer				-0.70*** (0.20)	-0.68*** (0.20)
		% Owning a Mobile Phone				0.20 (0.16)	0.23 (0.16)
		% Owning a Satellite				0.40** (0.19)	0.35* (0.18)
		% Owning a TV				0.34 (0.29)	0.40 (0.28)
	Employment controls?		Yes	Yes	Yes	Yes	Yes
	Demographic controls?		No	Yes	Yes	Yes	Yes
	Wealth controls?		No	No	Yes	Yes	Yes
	Communication controls?		No	No	No	Yes	Yes
	Governorate fixed effects?		No	No	No	No	Yes
R ²		0.12	0.16	0.19	0.24	0.40	
N =		7511	7511	7511	7511	7511	

Notes: This table reports estimates of Equation (3) using OLS with delegation-specific clustering. Point estimates obtained using a probit are analogous, but OLS results are reported as they allow for clustering. Each column contains the same covariates as the corresponding column in Table 2 in addition to the specified proximity measures. * indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

6. Conclusion and Discussion

Understanding the factors that influenced the spread of riots within and across countries of the Middle East during 2010-2011 is of significant academic and policy interest. This paper provides three key insights into this question by using quantitative data on the timing of rioting and socioeconomic conditions to systematically study the onset and spread of rioting in Tunisia. First, it provides quantitative evidence that the spread was not driven by geography. Second, it provides evidence that university graduates, and unemployment among these individuals, had a systematic role in the onset of these riots. Third, it shows that access to satellite technology and not mobile phones played a key role in both the timing and the spread of the rioting. While this does not imply that mobile phones did not play a significant role in the onset of rioting (e.g., through mobile phone based social media), it provides evidence of the value that the independent information provided by satellite news sources can have on the willingness of a population to contest their government.

References

- Bazzi, S., Blattman, C., 2013. Commodities and conflict .
- Belkhouja, A., Cheikhrouhou, T., 2013. Technical Report. L'enquête Apollonia.
- Besley, T.J., Persson, T., 2008. The Incidence of Civil War: Theory and Evidence. Technical Report. National Bureau of Economic Research Working Paper.
- Braithwaite, A., 2010. Resisting infection: How state capacity conditions conflict contagion. *Journal of Peace Research* 47, 311–319.
- Buhaug, H., Gleditsch, K.S., 2008. Contagion or confusion? why conflicts cluster in space. *International Studies Quarterly* 52, 215–233.
- Buhaug, H., Rod, J.K., 2006. Local determinants of african civil wars, 1970-2001. *Political Geography* .
- Burt, R.S., 1987. Social contagion and innovation: Cohesions versus structural equivalence. *American Journal of Sociology* 92, 1287–1335.
- Collier, P., Hoeffler, A., 2004. Greed and grievance in civil war. *Oxford Economic Papers* .
- Fearon, J.D., Laitin, D.D., 2003. Ethnicity, insurgency, and civil war. *American Political Science Review* .
- Ghannam, J., 2012. Digital Media in the Arab World One Year After the Revolutions. Technical Report. Center for International Media Assistance.
- Honwana, A., 2011. Youth and the Tunisian Revolution. Technical Report. Conflict Prevention and Peace Forum.

- Miguel, E., Satyanath, S., Sergenti, E., 2004. Economic shocks and civil conflict: An instrumental variables approach. *Journal of Political Economy* 112(4).
- Myers, D.J., 2000. The diffusion of collective violence: Infectiousness, susceptibility, and mass media networks. *American Journal of Sociology* 106, 173–208.
- Raleigh, C., Hegre, H., 2009. Population size, concentration, and civil war: a geographically disaggregated analysis. *Political Geography* .
- Rustad, S.C.A., Buhaug, H., Falch, Å., Gates, S., 2011. All conflict is local: Modeling sub-national variation in civil conflict risk. *Conflict Management and Peace Sciences* .
- Soule, S.A., 1997. The student divestment movement in the united states and tactical diffusion: The shantytown protest. *Social Forces* 75, 855–82.
- Strang, D., Soule, S.A., 1998. Diffusion in organizations and social movements: From hybrid corn to poison pills. *Annual Review of Sociology* 24, 265–290.
- Strang, D., Tuma, N.B., 1993. Spatial and temporal heterogeneity in diffusion. *American Journal of Sociology* 99, 614–639.
- Tolnay, S.E., Deane, G., Beck, E.M., 1996. Vicarious violence: Spatial effects on southern lynchings, 1890-1919. *American Journal of Sociology* 102, 788–815.
- Townsley, M., Johnson, S.D., Ratcliffe, J.H., 2008. Space time dynamics of insurgent activity in iraq. *Security Journal* 21.
- Weidmann, N.B., Ward, M.D., 2010. Predicting conflict in space and time. *Journal of Conflict Resolution* .
- Zhukov, Y.M., 2012. Roads and the diffusion of insurgent violence: The logistics of conflict in russia's north caucasus. *Political Geography* .