

Measuring Social Unrest Using Media Reports

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Abstract

We present a new index of social unrest based on counts of relevant media reports. The index consists of individual monthly time series for 130 countries, available with almost no lag, and can be easily and transparently replicated. Spikes in the index identify major events, which correspond very closely to event timelines from external sources for four major regional waves of social unrest. We show that the cross-sectional distribution of the index can be simply and precisely characterized, and that social unrest is associated with a 3 percentage point increase in the frequency of social unrest domestically and a 1 percent increase in neighbors in the next six months. Despite this, social unrest is not a better predictor of future social unrest than the country average rate.

1 Introduction

Social unrest is a major social issue in many countries across the world. During just the second half of 2019, major protests or other forms of disorder occurred locations as diverse as Bolivia, Chile, France, Hong Kong, India, Iraq, and Lebanon. Such unrest has a natural connection to economic questions, as economic factors may contribute to social unrest. For example, increases in taxes and fuel prices were important triggers for recent protests in Lebanon and Iran respectively. Moreover, disruption stemming from social unrest can have economic consequences, potentially interrupting trade and dissuading investment.

Of course, answering questions about the relationship between social unrest and economic or financial outcomes necessitates data on social unrest. Without knowing, at the very least, where and when major social unrest events have occurred, it is hard to make progress on such issues. Yet data on social unrest are largely unsatisfactory. There is – as far as we know – no transparent, high-frequency, timely indicator of social unrest with broad and consistent coverage across countries and periods. This paper is an attempt to fill that gap.

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We introduce a new measure of social unrest, as measured by media reports, which we term the Reported Social Unrest Index (RSUI).¹ Coverage is broad: we provide data on [130] countries from January 1985 to [January 2020]. Measurement criteria are consistent and transparent: we use the same set of sources and search terms throughout, and any country-specific adjustments are reported and justified. The index is high-frequency and timely: data are available for each month with only a few days lag. This makes the index useful not only for research but also for contemporaneous monitoring of cross-country social unrest episodes.

In this paper, we detail how we construct the RSUI and how large movements can be used to identify major events. By comparing our results to several case studies of major, well-known social unrest episodes, we argue that the index and the coded events reflect respected narrative descriptions of real events, and are not simply the product of media fads or biases. We also analyze the statistical properties of the index, and show three key properties of the index, all of which are essential context for future work. First, that the units of the RSUI have a natural interpretation, consistent across and within countries: that a one percent increase in the index reduces the fraction of higher observations by approximately two percent. Second, that social unrest events are typically associated with around a three percentage point increase in the probability of social unrest in the same country and a one percentage point increase in neighboring countries during the next six months. Third, that despite this correlation, past social unrest is not a good predictor of future unrest, which we interpret as reflecting the fact that social unrest is a low-probability event driven by disparate factors.

The next section discusses related economic literature. Section 3 outlines the calculation of the RSUI and how we identify major social unrest events from it. Section 4 discusses the internal and external consistency of our measures. And section 5 investigates the properties of the time-series and cross-country variation of this index.

2 Related Literature

Our work contributes to the rapidly growing literature on text search methods using newspaper archives. Initially, this literature focused on measuring economic policy uncertainty. The seminal paper is by Baker, Bloom and Davis (2016), who construct an index of economic policy uncertainty (EPU) for 12 major economies using newspaper archives back to 1985. They show that the EPU is associated with lower investment and employment, and higher stock price volatility. Similarly, Ahir et al. (2018) construct a World Uncertainty Index (WUI) for 143 individual countries on a quarterly basis from 1996 onwards. Their index measures the frequency of the word “uncertainty” in the quarterly Economist Intelligence Unit country reports. And in a country-specific setting, Jirasavetakul and Spilimbergo (2018) develop a news-based economic policy uncertainty (EPU) index for Turkey. The index measures the frequency of news articles about economic policy uncertainty

¹Early versions of the RSUI, covering initially only seven countries in the Middle East and North Africa and later the whole of the Middle East and Central Asia, featured in the IMF’s *Regional Economic Outlook* in April and October 2019.

and, as we do, uses Factiva as the primary source.

Other authors use text-based indices proxy for sentiment in financial markets, geopolitical tensions and corruption. Manela and Moreira (2017) calculate a text-based measure of uncertainty starting in 1890 using front-page articles of the Wall Street Journal and show that periods when their index is high are followed by periods of above average stock returns. To examine the effects that media sentiment has on equity prices, Fraiberger et al. (2018) create a daily news-based sentiment index for 25 advanced and emerging economies between 1991 and 2015. They restrict their sample to articles published by Reuters in English, and develop an algorithm which quantifies tone, counting the number of positive and negative words within financial, political and economic texts. Caldara and Iacoviello (2018) construct a monthly measure of geopolitical risk based on a set of newspaper articles covering geopolitical tensions since 1985. Like us, these authors use an algorithm which counts the frequency of articles that refer to geopolitical risks in leading newspapers published in the US, UK and Canada, although in their case ProQuest Historical Newspapers and ProQuest News stream are the primary sources. Finally, Hlatshwayo et al. (2018) construct a cross-country news-based flow indexes of corruption and anti-corruption by reviewing 665 million international news articles provided by Factiva. They show that shocks in the corruption index are associated to negative impacts on asset prices and economic activity.

Clearly, our work is closely related to other measures of social unrest. There are three main alternatives to our approach: the Cross-National Time-Series Data (CNTSD) database by Banks and Wilson (2020); the Armed Conflict Location and Event Database (ACLED); and the Mass Mobilization in Autocracies Database (MMAD) by Weidmann and Rød (2013, 2019) are alternatives to measure social unrest worldwide. The temporal and spatial coverage of the CNTSD is comprehensive – it provides annual time series data since 1815 covering 200 countries for the number of riots and anti-government demonstrations. Yet despite its wide usage, the CNTSD suffers from three significant drawbacks. First, it is at annual frequency and is typically updated with a lag of at least a year. Second, it identifies only a small number of events per year so the marginal impact of a new event can be substantial. Third, the results can be somewhat hard to interrogate, with the relationship between increases in the CNTSD series and events on the ground not always compelling (see Appendix [Z] for further illustration of this point).

The ACLED is a high-quality source with monthly observations. Within sub-Saharan Africa, coverage is broad and begins in the late-1990s. Coverage elsewhere, though, is rather limited. Finally, the MMAD has information about individual protest events generated by a combined machine learning and human coding process from three newswire agencies: The Associated Press, the Agence France-Presse and BBC Monitoring. However, it covers only a few countries from 2005 to 2012.

Several articles have used the CNTSD and the MMAD to proxy for social unrest in cross-country statistical analysis of political and economic phenomena, and a few articles exploited ACLED more granular data in the context of Sub-Saharan Africa. The political science literature used these data extensively to study social unrest and related political issues in a cross-country setting

—see for example, Jazayeri’s (2015) analysis of the impact of identity-based political inequality on protest in MENA using CNTSD, or Ciocan and Wüest (2016) for an application of the MMAD to analysis of media censorship in MENA countries during the Arab Uprisings of 2011. The economics literature tended to use CTSD more frequently for cross-country econometric analysis of long-run issues – see for example, Acemoglu et al. (2019), who use this data to explore the relationship between democracy and economic growth, or Barro’s (1991) classic paper on economic growth where variables from this dataset are used as controls for political instability. Some more recent studies look at higher frequency economic phenomena, such as Ponticelli and Voth’s (2019) empirical analysis on budget cuts and to social unrest in Europe. The political science and economics literature also worked with ACLED focusing on Sub-Saharan Africa and benefiting from its detailed coverage —see for example, Harari and Ferrara (2018), and Ali et al. (2019).

3 The Reported Social Unrest Index

In this section we explain how the RSUI is created and a method for coding peaks into major events. We discuss how concerns for robustness influence the design of the methodology and report basic properties of the index.

3.1 Data

The primary source is Dow Jones’ Factiva news aggregator. We restrict our sample to printed articles published by major English-language newspapers and networks in the USA, UK, and Canada. Specifically: the ABC Network, the BBC, the CBS Network, the Canadian Broadcasting Corp, the NBC Network, the Los Angeles Times, the Financial Times, the Boston Globe, the Globe and Mail, the New York Times, the Telegraph U.K., the Times U.K., the Chicago Tribune, the Telegraph, the Guardian U.K., the Wall Street Journal, the Washington Post and the Economist. This is a very similar set of sources to [Caldera and Iacoviello (2018)].

This choice of sources is motivated by several factors. First, this produces a very large sample over a long period of time, with our headline measure of relevant articles rising from around 7,000 per month in 1985 to over 20,000 between 2000 and the present, totaling over 7 million articles (see Figure 1). Second, by selecting well-known sources, we can be completely transparent about the possible biases in our sources. Of course, no sources are entirely free of bias, but these sources are ones that a large set of users is familiar with, and so can caveat the results as they see fit. This not true about either less well-known sources or newer media, such as Twitter or Facebook, where one cannot easily understand the likely biases of individual commenters. This latter group of sources suffer from further challenges, as it is difficult to know how to account for changes in penetration and composition or the role of bots, trolls, and other nefarious actors. Similarly, by limiting our sample to only foreign news media, we hope to avoid the most nakedly political sources, as within-country publications might have specific agenda which influence their reporting of civil unrest.

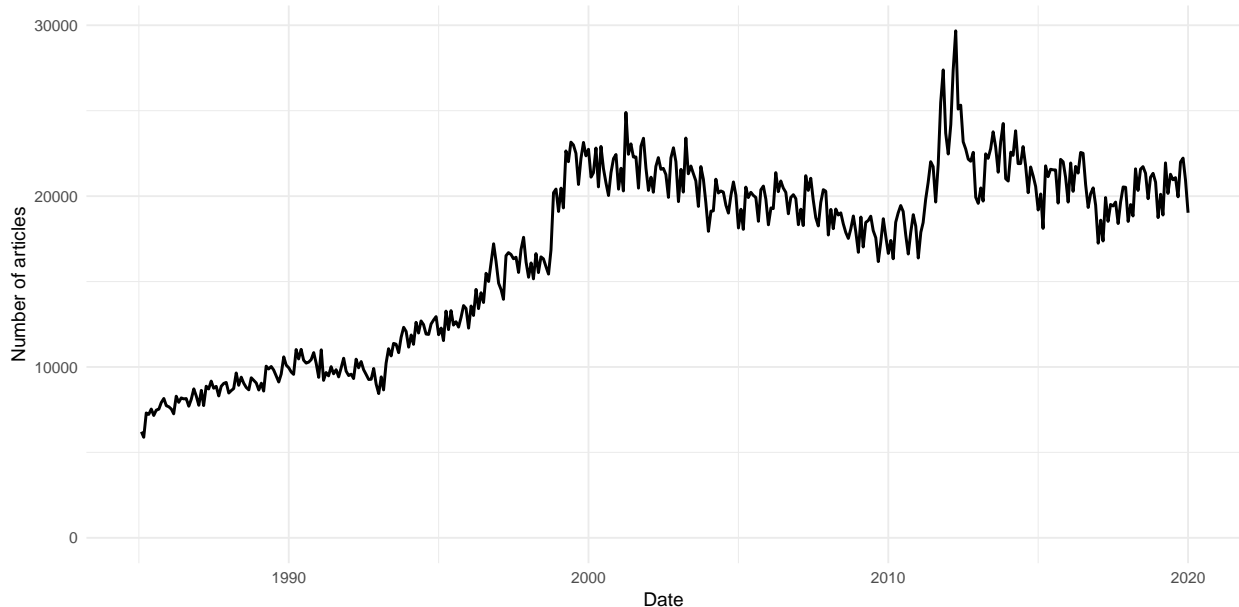


Figure 1: Number of contemporary articles per month, z_t

Nevertheless, in Section [x] we also provide further robustness checks, examining possible impact of these arguments for a selection of Middle Eastern countries, including using: different English-language sources, alternate search terms, and French and Arabic language media. And when constructing the RSUI from the raw data, we also take account of how possible media bias might be mitigated by the specific details of the design of the index design, discussed further below.

Using these sources, we collect three monthly article counts:

- x_{it} : Number of articles about social unrest in country i at period t
- y_{it} : Number of contemporary articles in country i at period t
- z_t : Number of contemporary articles in period t

Our sample includes the 130 countries with at least one million inhabitants and 200 social unrest articles (i.e. $\sum_t x_{it} \geq 200$).

The search criteria defining these three series vary principally in the text strings which must match in order for an article to be counted (see Table 1). This is most involved for x_{it} , which has both inclusive and exclusive requirements. The inclusive requirements aim to pick up specific events related to civil unrest events, including protests, riots, major demonstrations, and other forms of unrest. The exclusive requirements aim to prevent false positives. These are either country-specific (more on this in Section 3.4), or aim to prevent matches from mis-use of search terms,² or articles related to commemorations of past unrest episodes.³ As the series y_{it} and z_t will be used principally

²For example, excluding “protestant” which, despite having etymological roots in common with “protest”, is now reserved for a specific religious meaning. We similarly omit the word “demonstration” given its multiple meanings.

³We take the list of terms from Caldera and Iacoviello (2018)

to normalize the article count, we follow Jirasavetakul and Spilimbergo (2018) and add a further filter: that articles include the common and neutral term “today”.⁴

	x_{it}	y_{it}	z_t
Must include	Country name AND (“protest*” OR “riot*” OR “revolution” OR (“civil” or “domestic”) within 10 words of “unrest”)	Country Name AND “today”	“today”
Must exclude	Country-specific terms OR “vote of protest” OR “protest vote” OR “protestant*” OR “anniversary” OR “war” OR “memorial” OR “movie”		
Location tag	Country i	Country i	
Subject tag	Domestic Politics Or Civil Unrest		
Word count	100+	100+	100+

Table 1: Article search Criteria

We also add restrictions on location, subject, and word count on the articles. The first two of these are implemented via category tags provided by Factiva. The location tag helps to screen some articles about civil unrest directed *at* a given country rather than *in* a given country, such as foreign-policy protests. However, this is not always successful (see section 3.4 below).

Table 2 presents key summary statistics of the data and Figure 2 shows the cross-country distributions of articles. The cross-country distribution is highly skewed. For example, although the median country is featured in an average of 116 articles per month, the average across countries is 350. The within-country skew is also very large, with the median country attaining a peak of almost 900 articles per month. In general, the relative volatility of the social unrest series x_{it} is much greater than the the country total count y_{it} . For example, the median country has a average of 3 social unrest articles per month, but a maximum of 75. this suggests that there is considerable scope for large movements in the data which sharply discriminate between different observations.

3.2 Constructing the Index

From the raw article counts, we create two indices:

$$RSUI_{it}^A = \frac{x_{it}}{\frac{1}{12} \sum_{j=1}^{12} z_{t-j}} \times \frac{100}{\bar{x}_i / \bar{z}} \qquad RSUI_{it}^B = \frac{x_{it}}{\frac{1}{12} \sum_{j=1}^{12} y_{i,t-j}}$$

Where \bar{x}_i and \bar{z} are the time series average averages of x_{it} and z_t respectively. We call these, unsurprisingly, the A index and the B index. These two indices have complementary strengths

⁴This is very slightly inconsistent: we include the words “today” in the normalizers y_{it} and z_t but not in the main article count x_{it} . Yet both the obvious alternatives are worse. As blank search strings are not valid Factiva search queries, we cannot omit “today” from the normalizers. And social unrest articles are sufficiently few that we cannot omit those which happen report on unrest in the preceding few days. Given a menu of flawed choices, we choose to be approximately right rather than precisely wrong.

	Median	Mean	10th percentile	90th percentile
<i>Social unrest articles, x_{it}</i>				
Within-country mean	3	8	1	21
Within-country max	74	181	18	434
<i>Contemporaneous country articles, y_{it}</i>				
Within-country mean	117	355	23	797
Within-country max	918	2045	257	4745

Table 2: Monthly article counts, summary statistics

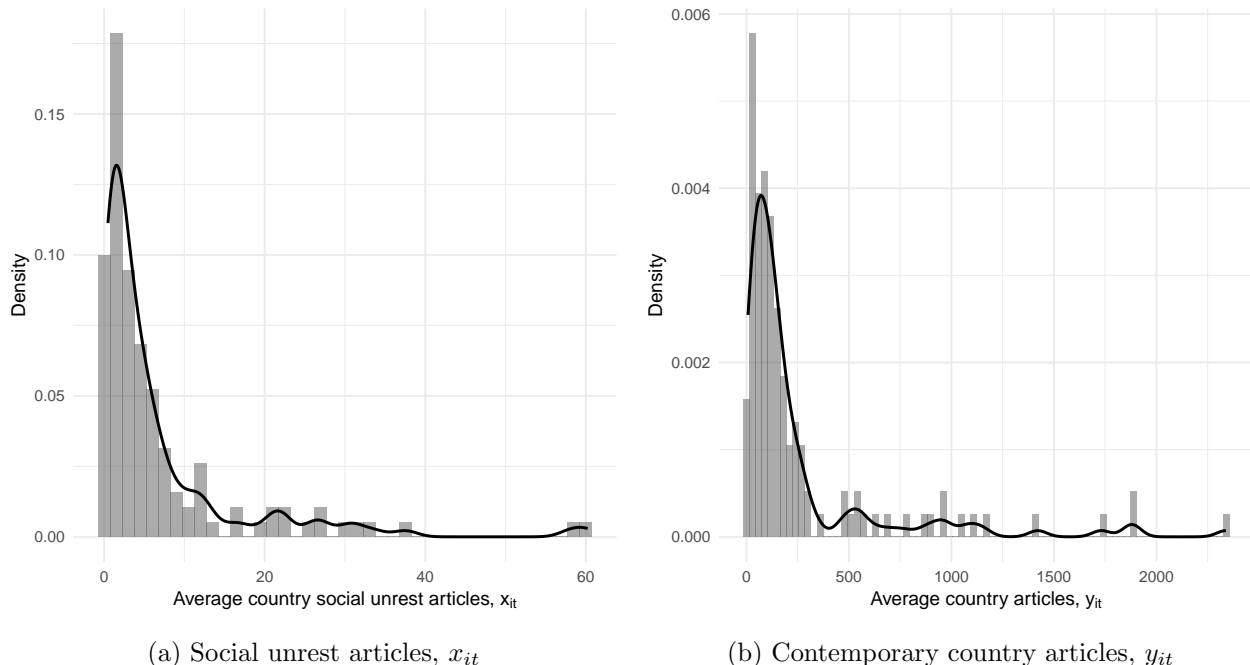


Figure 2: Cross-country average monthly article counts

and weaknesses. The advantage of the B index over the A index is that it has naturally interpretable units – it is the share of contemporary articles in a given country about social unrest. In contrast, the A index uses the fraction of all articles which are about unrest in country i . This makes cross-country comparisons difficult using the A index, as a given country may receive more coverage from our sources on average for reasons unrelated to social unrest. For example, because it is larger, nearer, or have common historical or cultural ties. To emphasize this point, we define the A index as being rebased to have mean 100. Of course, scaling by average total country coverage should correct for this, as average interest in country i affects both numerator and denominator. Indeed, this is exactly what we do when constructing the B index. Yet this fail, as we discuss next.

The B index suffers from two flaws which mean that we chose the A index as our primary measure. First, many countries have very little coverage outside of social unrest events. And so the denominator $\frac{1}{12} \sum_{j=1}^{12} z_{i,t-j}$ is often very close to zero, vastly amplifying any noise in the numerator, x_{it} . Second, coverage of a given country is often endogenous to social unrest or recent social unrest.

Coverage of a given country in general will likely respond to social unrest, as journalists follow up on the consequences of major unrest. While the one-period lag in the denominator (as j runs from 1 to 12 not 0 to 11) can help address contemporaneous endogeneity, this is insufficient for major events where interest may run high for several months.

In contrast, the A index suffers from neither of these drawbacks, and so we use it as our headline measure, presented as an index scaled to a mean of 100 within each country. However, because this measure contains no useful cross-country information, we will also use the B index as a filter for false positives when coding event in Section 3.3.

Figure 3 shows the A and B measures for a sample of six Middle Eastern countries during and after the Arab Uprisings of 2011, scaled to average to 100 over the whole sample. This illustrates two important points. First, that the behavior of the index appears to be characterized by large intermittent spikes. This motivates our secondary characterization of the series in terms of major unrest events in the next section. Looking forward slightly, this Figure includes the events and labels that we derive using the methodology in Section 3.3. The purpose at this point is not yet to explain the event coding in detail but instead simply to use a well-known episode of unrest to introduce the series and discuss the relative merits of the A and B indices.⁵

Second, that this Figure highlights the endogeneity problem for the B index, that it appears to understate the persistence of social unrest. Major spikes in the A index during 2011 and early 2012, such as the Tahrir Square protests in Egypt and the Tunisian Parliamentary elections of 2011 are almost invisible when using the B index. This difference is entirely due to short-term changes in the divisor of the B index. Because coverage of the country as a whole also rises following social unrest events, the denominator series y_{it} increases, pulling down the B index and resulting in its failure to capture secondary unrest events. This means that the B index will badly mis-state the persistence and predictability of social unrest events, meaning that that it is not suitable as a primary measure of social unrest. Accordingly, all subsequent charts and references to *the* RSUI indicate the A index only.

3.3 Events

We define a social unrest event as a period i in a country t matching three criteria:

1. The A index is a local peak: $RSUI_{it}^A > \max(RSUI_{i,t-1}^A, RSUI_{i,t+1}^A)$.
2. The A index satisfies at least one of the following extremum criteria:
 - (a) $RSUI_{it}^A$ is in the top 2% of observations for country i ;
 - (b) $RSUI_{it}^A$ exceeds the mean for country i by at least four times the standard deviation for country i ;

⁵Readers wanting to see further examples may be interested in the compendium of other interesting cases in Appendix [Z].

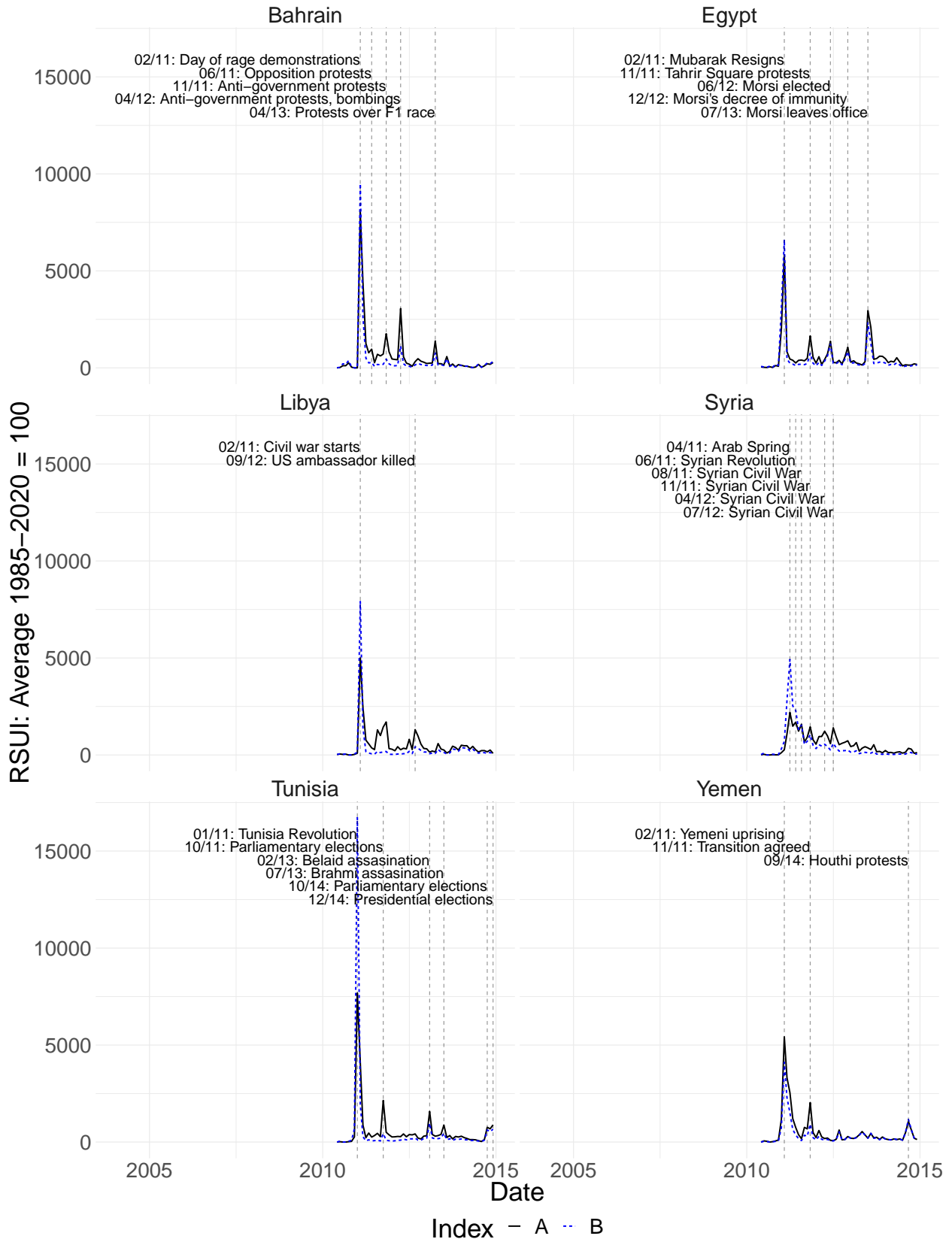


Figure 3: Arab uprisings, June 2010 - December 2014: Major events identified from RSUI event coding

(c) $RSUI_{it}^A$ exceeds the rolling twenty-year mean for country i by at least four times the rolling twenty-year standard deviation for country i .

3. The B index exceeds 0.1, $RSUI_{it}^B > 0.1$

Each of these criteria aims to select or exclude particular types of events. The first two conditions aim to select unusually high values of the RSUI relative to the distribution of within-country outcomes. By including both percentile and an standard deviation threshold we aim to ensure that the event coding is robust to cross-country variation in distribution of the A index. The inclusion of part c) addresses the possibility of changing media focus over time and means that we still identify events consistently even if a given level of unrest in a given country becomes more or less interesting to our sources over time.⁶ The design of conditions 1 and 2 also strips out much cross-country variation in media bias when coding events. Because they are entirely relative measures, they will identify exactly the same set of events whether the outlets we use are highly focused on a given country or pay it little attention.

Because they depend on the full distribution of within-country outcomes, conditions 1 and 2 work well when there are at least a few major social unrest events within a country. However, in some countries, social unrest is very rare. Yet in these cases condition 2 will still select at least 2 percent of observations as candidate events. Thus we add condition 3, which leverages the natural units of the B index to impose a very small amount of cross-country information. This is a sufficiently weak restriction that major events are still identified despite the flaws in the B index, yet still acts to filter out false positives which would otherwise be produced in countries with very little social unrest.

Of course, the specifics of how series and events are computed are somewhat arbitrary. To a large extent this is inevitable; there is no way to pick thresholds and measures for extreme points which is not arbitrary. So rather than seeking to defend these choices *a priori*, we instead justify them by their results. We turn to this in section 4, where we carefully assess the index and events against authoritative external sources for three major episodes of protest.

This methodology identifies some 622 monthly events, summarized in Figure 4, which shows the fraction of countries with social unrest events by region. One can clearly see several regional waves of protest. In the late 1980s, a number of events in South and Central America and the Caribbean drive the spike in events in the Western Hemisphere, including: the democratic transition in 1986 in Guatemala, attacks on voters in the Haitian elections of 1987, the Chilean Plebiscite of 1988, the 1989 Paraguayan Coup d'état, and the 1990 Nicaraguan elections which ended the Somoza regime. The fall of communism is reflected in an increase in the European series in the early 1990s due to events in Bulgaria, Czechoslovakia, Germany, Poland, Romania, and the Baltic countries.⁷

⁶This has an important impact early in the sample where major world events (e.g. end of Apartheid, fall of the Iron Curtain) show as smaller peaks in the A index than much less dramatic later events. This is consistent with globalization increasing demand for foreign news as consumers become more aware of and more connected to overseas events.

⁷That such a momentous event triggers such a small increase relative to the Western Hemisphere is simply because there are many more countries in Europe that meet the population and search requirements than in the Western

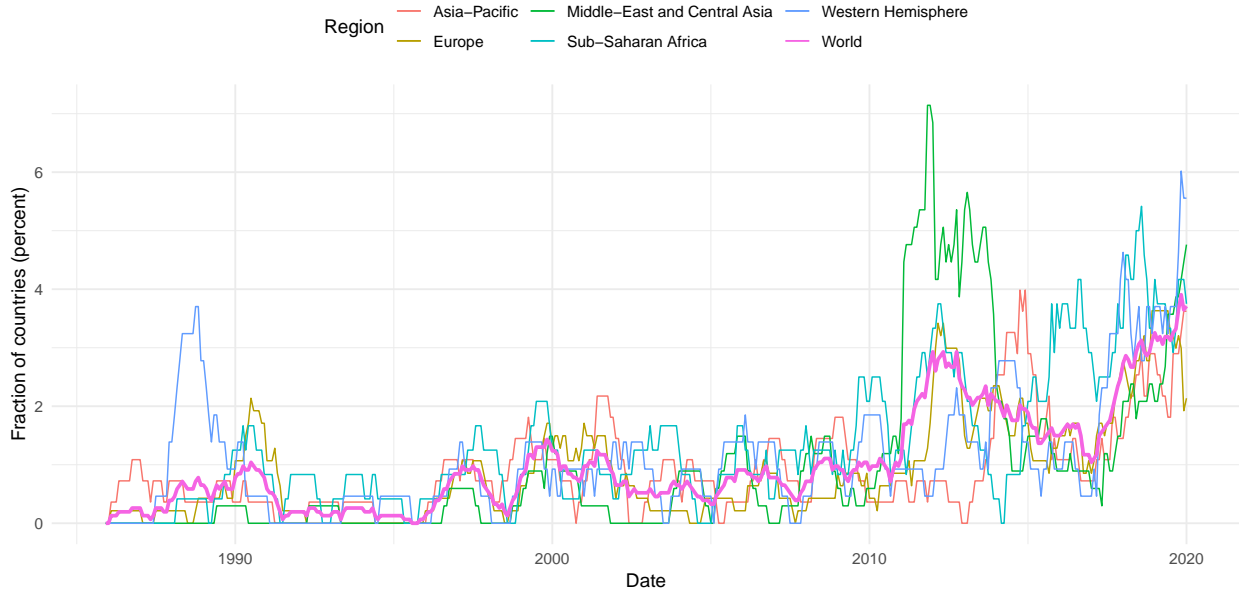


Figure 4: Fraction of countries with social unrest events, 12 month moving average

The largest recent wave of events is in the Arab Uprisings of 2011, which are clearly seen, driven by events across almost the whole Middle East (shown for six countries with event labels in Figure 3), as well as a simultaneous wave of anti-austerity protests in Europe. More recent protests in Bolivia, Chile, Colombia, Ecuador, and Peru contribute to a spike in unrest events in late 2019 and early 2020.

3.4 Event Screening

Other studies using measures of media attention often run extensive checks on the matching articles that they generate (see, for example [Bloom et al. 2016]). This provides a valuable screen to assess the validity of the results. Instead of checking every month for every country by hand, we check only the events identified using the methodology of the preceding section. For each event, we check the matching articles in Factiva to 1) to verify that events are not egregiously mis-identified, and 2) generate a label for each event. While the event dates are coded systematically, the labels are purely descriptive, aiming to a little narrative color to large movements in the RSUI. Note in particular that the label descriptions do not endorse a particular interpretation of historical events.

Mis-identified events do occur, for five main reasons. First, because events relating to a given country occur elsewhere. For instance, January 2019 protests in Greece over the name of North Macedonia are labeled as occurring in the latter. Second, because past social unrest events may be relevant context to a current event and therefore much-mentioned. For example, elections in Armenia in September 2018 followed mass protests in April. Accordingly, articles in September 2018 mention these protests even though they are not contemporaneous. Third, because the gen-

Hemisphere (39 vs. 19).

eral search terms match certain country-specific features. For example, many Iranian institutions include the phrase “Islamic Revolution”, and so match the civil unrest search term “revolution”. Fourth, sometimes alternate usages of the search terms pollute the results. For example, elections in Denmark in 1987 for “Tax protest” parties. And fifth, due to occasional diplomatic events or disputes. One such example was a diplomatic dispute in June 2014 between the Slovenian and Croatian governments over the possible entry of a Croatian patrol boat into Slovenian waters, where diplomatic interactions are described as “protest”.

We identify some [98] events where factors other than civil unrest account for all or almost all the social unrest articles counted (see Table 3) and follow a two-step strategy to address mis-identified events. We start by making the smallest country-specific changes we can to the search criteria to exclude articles related to reduce mis-identification. However, this is not always possible. For example, removing references to specific past unrest events will suppress the earlier event. So in some cases, we flag mis-labeled events by hand less than one-third of the mis-identified events) and exclude them from the set of event individually (see Table 3).

	Total	Removed by search adjustment	Removed by hand
Passed human screening	569		
Failed human screening	98	69	29
<i>Of which:</i>			
Wrong country	33	26	7
Past events	22	11	11
Country-Specific	18	16	2
Incorrect usage	13	7	6
Diplomatic	11	9	2
Possible future event	1		1

Table 3: Results of event screening

4 Assessing the Index

Many of the choices we make in defining the index and events in the preceding section are to a greater or lesser extent arbitrary. Justifying these choices is a key objective of this paper. This justification rest on relies on two exercises.

First, we show that the resultant index and event listing that agrees almost exactly with authoritative narrative sources for four episodes of major unrest in diverse locations and times: the Arab Uprisings of 2011, protests against President Maduro in Venezuela in 2015-2019, the protests against and eventual impeachment of President Park of Korea during 2016-2017, and the color revolutions of the 2000s. This exercise is the acid test for our work and is something of an end-run around questions of bias or coverage or language or other details. It shows that despite the many critiques one might make of it, our approach seems to work; it provides timely and accurate identification of major events in diverse countries and times. In case this evidence is insufficient, we also

provide several further narrative sources and tests in appendix [V].

Second, we show that the results are not sensitive to the particular choices we make. We vary language, sources, and search terms and –where applicable – get very similar results for a subset of Middle Eastern Countries since 2011. We interpret this as evidence that using media reports to identify social unrest is relatively forgiving; major events are sufficiently stark and obvious that they are revealed no matter the precise details of the methodology used to identify them.

One exercise that we do not put a lot of weight on is comparing to alternate measures, such as the Cross-National Time-Series Database (CNTSD, Banks [yyyy]) or The Armed Conflict Location & Event Data Project (ACLED, [ref]). This is because comparison to these alternatives is a relative test, and cannot distinguish between shortcomings of our measures and those of the alternatives themselves. For example, do differences with the CNTSD simply reflect the small number of sources used in that measure? And do differences with ACLED simply reflect an emphasis on conflict? In contrast, the tests we value are absolute ones. Our measure matches authoritative, external reports of social unrest and it is not unduly sensitive to small changes.⁸

4.1 External Validity

We compare the index and our event coding to four major waves of protest about which we have alternative authoritative sources. In the main text we necessarily have to summarize these sources’ descriptions. To permit the skeptical reader to check our interpretation, Appendix E.1 provides full verbatim descriptions of these events from the primary sources.

The four episodes discussed below represent a wide diversity of circumstance. They vary widely by location and time period; some are country-specific and others are region-wide; the types of government vary widely from vibrant democracies to more repressive regimes; and some result in major political changes and others do not. Yet across all of them, the index and the implied events match up very closely with alternate narrative sources.

4.1.1 The Arab Uprisings of 2011

For the Arab Uprisings of 2011, we take as our primary external source [Worth (2016)]. This book is a comprehensive summary of the events and causes of the Arab Uprisings between June 2010 and December 2014, and is used as an overview reference on several college syllabuses.⁹ Most relevant for our purposes, this source includes an extended timeline with daily events in six countries: Bahrain, Egypt, Libya, Syria, Tunisia, and Yemen.

The downside of using [Worth (2016)] as our point of external comparison is that it is not peer-reviewed. This is not by design. Despite a wide political science literature on the Arab Spring, finding a single authoritative peer-reviewed summary timeline or event listing is very hard. We could not find one. The reasons for this are beyond the scope of the current paper, but might be that academic study of the Arab Uprisings by political scientists focuses on individual episodes

⁸That said, we still report comparisons to the relevant CNTS and ACLED series in Appendix [Q].

⁹[References]

rather than a comprehensive history. In Appendix D.1, we also present the details of country timelines for a slightly different set of Middle Eastern countries during January 1999 to June 2019 assembled by the United States Institute of Peace and find broad agreement between their list of events and ours.

The events identified in Worth (2016) are shown as the vertical lines in Figure 5, along with summary descriptions.¹⁰ The period and countries is identical to those in Figure 3, which includes the RSUI event codings; the two can thus be directly compared.

The most striking aspect of Figure 5, that the cross-country timing of the initial round of protest almost exactly coincides with the initial spikes in the RSUI early 2011. The first outbreak of unrest during the Arab Uprisings were protests in Tunisia following the self-immolation on 17 December 2010 and subsequent death on 4 January 2011 of Mohamed Bouazizi. This is reflected in the large spike in the RSUI and corresponding RSUI-implied event in January 2011.¹¹ Prior to this there are no RSUI-implied events in any of these six countries.

The first RSUI-implied event of the Arab Uprisings in Egypt is dated to February 2011. This again agrees almost identically with the external timeline, which dates the start of protests to the last week of January and extending through February 2011. Similarly, the RSUI dates the start of the Arab uprisings for Bahrain, Libya, and Yemen to February, consistent with Worth’s timing of February or very late January. And in Syria, the RSUI first picks up sharply in March, also consistent with the Worth timing. Overall, the index and event coding match the cross-country order of the start of the Arab Uprisings exactly, and the timing very closely.

Worth’s timeline following the initial outbreak of unrest also lines up very closely with the index and implied events. For instance, the major turning points of the Egyptian revolution all show as index spikes and satisfy event definitions, albeit sometimes with a one-month lag when event occur in the second half of a month. This includes running battles for control of Tahrir Square in November 2011, the election of Muhammed Morsi and subsequent unrest in June 2012, the collapse in November 2012 of the constituent assembly to draft a new constitution following President Morsi’s decree of personal immunity, and Morsi’s eventual overthrow in July 2013. In Libya, Tunisia, and Yemen the major post-revolutionary events are similarly identified by the RSUI.

There are only two major difference between the RSUI events and the Worth timeline, both of which are easily explained. The first is that the RSUI distinguishes separately the assassinations of Tunisian politicians Chokri Belaid and Mohamed Brahmi, which Worth mentions together only following the death of the latter. The second major difference is for Bahrain in April 2012 when a bomb blast injured several policemen and the Bahrain Grand Prix was subject to domestic protest. These are arguably both major unrest events and so their inclusion does not seem unreasonable.

¹⁰A full description of the timeline with events recorded at daily frequency is reported in Table 9.

¹¹Because the RSUI is at a monthly frequency, and because new coverage is inherently at least a little backward-looking – events happening a few days prior may still be “news” – social unrest which begins in the second half of the month is sometime reflected in a sharp pick-up in news coverage at the start of the next month. In other words, our identification of events cannot be more precise than the frequency of the data.

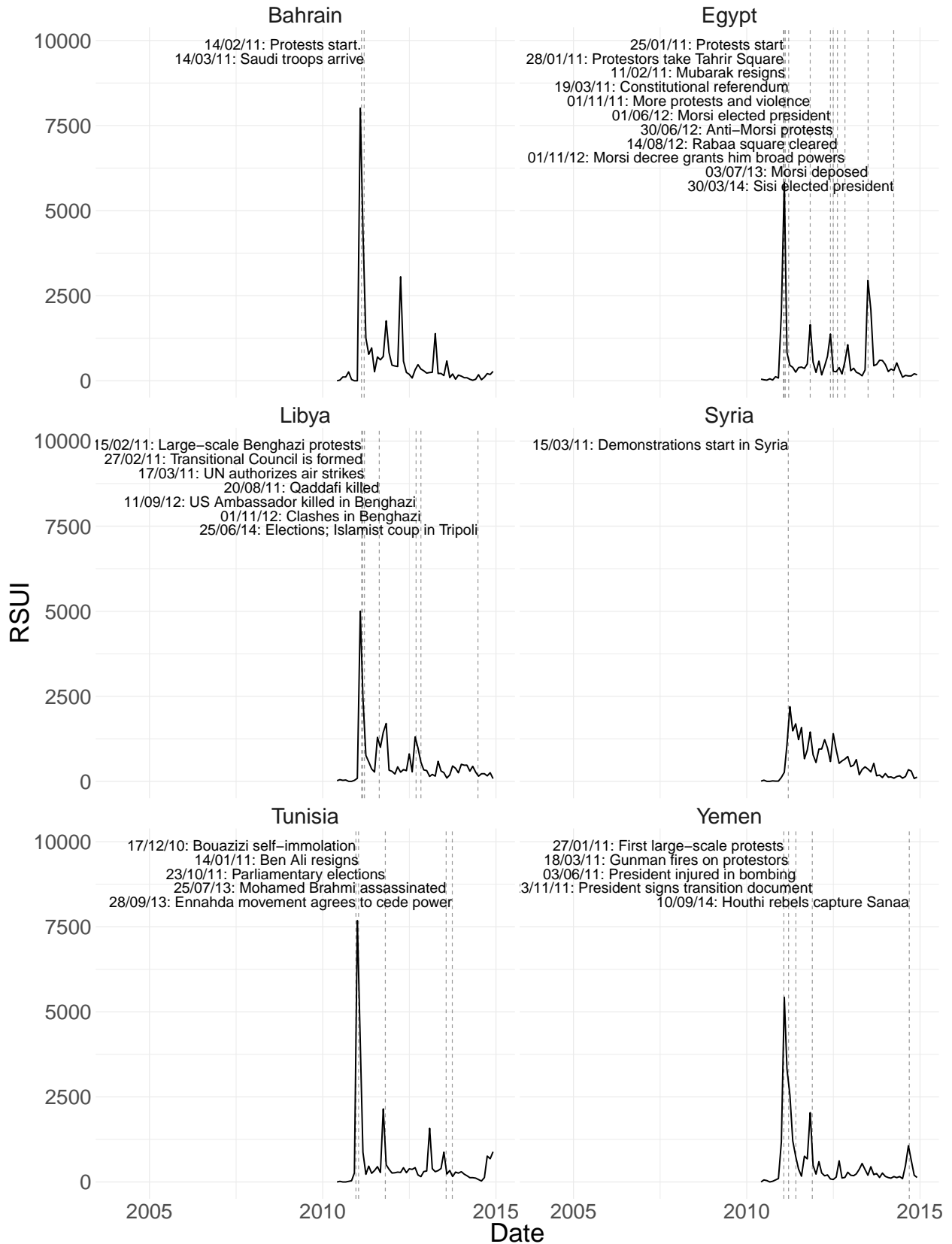


Figure 5: Arab uprisings, June 2010 - December 2014: Countries with major events identified by Worth (2016)

4.1.2 Venezuela 2014-2019

Following the election of President Maduro in April 2013, Venezuela experienced several major waves of protests as opposition forces – led by Juan Guaido – attempted to oust him from office. We use [Guttierrez (2017)] and [Briceño-Ruiz (2019)] as alternate narrative sources for this period. Both sources are published in a peer-reviewed Latin American political science journal. Between them, these papers document the major events events during 2013-2019, several of which include to major social unrest events.

The first peak in the RSUI in this period corresponds to the first major wave of Anti-Maduro protests in February 2014. At the time, it was not obvious that the the new President had the full support of a government dominated by supporters of the previous president, Hugo Chavez, and these protests – coded as an RSUI event – were a serious threat to Maduro’s presidency. This is verified by the alternate narrative sources, which date major protests to February 2014 as well.

During 2015 and 2016, the RSUI remains at lower levels, with no implied events, and a small peak around the opposition’s parliamentary victories in late 2015. This also agrees with the narrative source. The events they record between mid-2014 and mid-2016 are all important political events, but no major protests or other civil disruptions. This changes in April 2017, when the RSUI picks up sharply and remains elevated until August. This agrees almost exactly with the description in [Briceño-Ruiz (2019)] who reports “a new wave of protests from April to August 2017”. That the RSUI can pick up an elevated period of protest such as this suggests that media “protest fatigue” is not a major source of bias in the index.

The final series of spikes for the RSUI in this period is in January 2019, when a constitutional crisis resulted in a power struggle and widespread protests, prompting a humanitarian crisis. These events are reflected both in the narrative descriptions and in RSUI-implied event for January 2019. The narrative source stop at this point. However, it is worth noting a further successful event identification of the RSUI in May of the same year, when a failed military uprising is reflected in another RSUI peak and an associated event.

Overall, the events in Venezuela line up very closely with those described in two peer-reviewed articles which include narrative descriptions of this period.

4.1.3 Korea 2016-2017

The third narrative case study we look at are the protests surrounding the impeachment of President Park, often known as the “Candlelight revolution”. In late October 2016, reports emerged of abuse of power by one of the President’s aides. This, and subsequent revelations, led to mass protests during November 2016. These events are documented in Kim (2017), a peer-reviewed article in a political science journal. This is reflects in the RSUI, which picks up sharply in November, a month coded as an RSUI even (see Figure ??).

Protests continued through late 2016 (identified by Kim (2017) as reaching their “heights” in December”) before easing when the President was suspended by Parliament for 180 days. This suspension corresponded with an easing in tensions while the Korean Constitutional Court heard

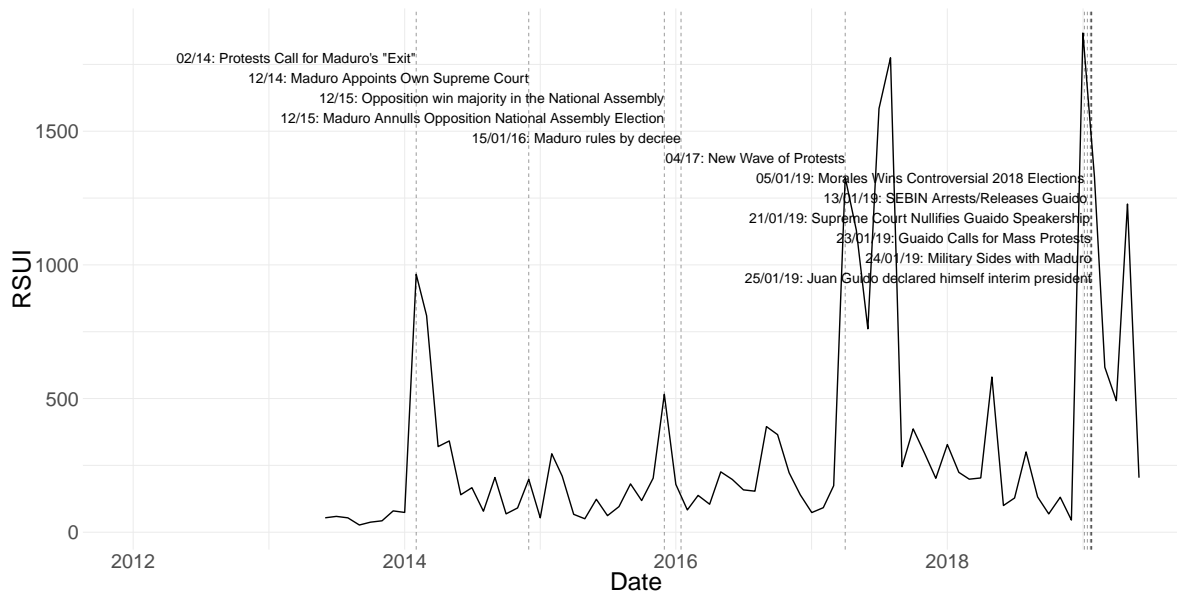


Figure 6: Venezuela: Major events identified by Gutierrez (2017) and Briceño-Ruiz (2019), January 2013-June 2019

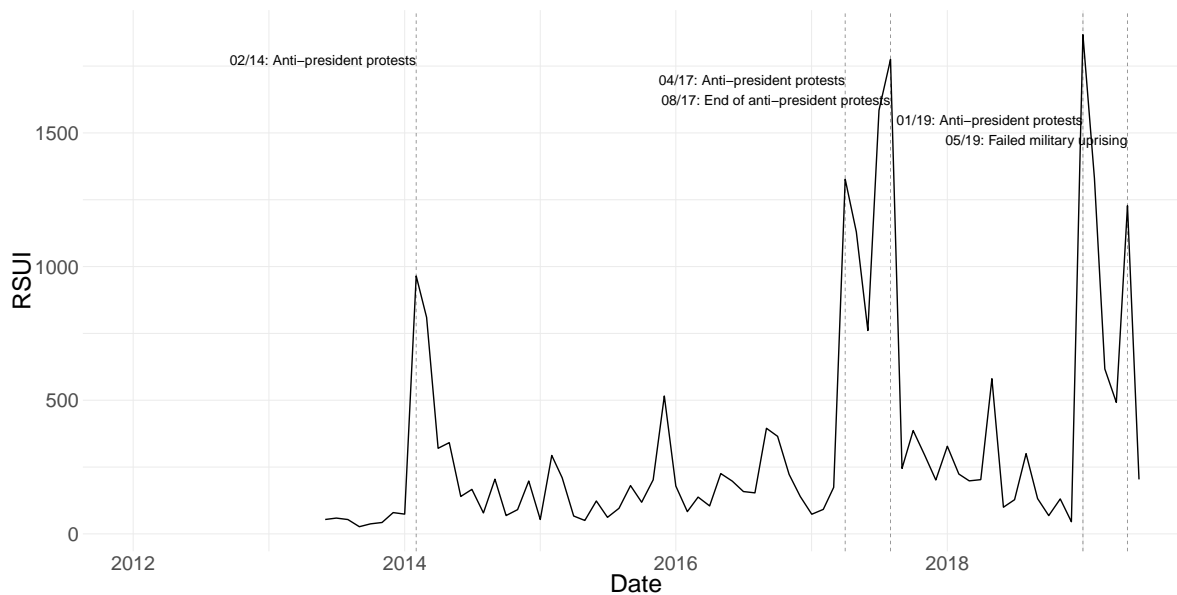


Figure 7: Venezuela: Major events identified from RSUI event coding, January 2013-June 2019

argument and evidence. However, the verdict in March 2017 corresponded with further large protests, resulting in three deaths. This event is also coded as an RUI event.

The subsequent elections in May 2017 are also reflected in an increase in the RSUI. However, this is not coded as an RSUI event, as it fails our event screening criteria. There are no contemporaneous reports of protest or other forms of social unrest in this month. Instead, matching articles include mention of prior protests as context for the current elections. Thus, there is no RUI event recorded despite the local spike.

4.1.4 Color Revolutions

The color revolutions were a series of non-violent mass participation pro-democracy movements in former communist countries during the early 2000s resulting in the displacement of previous, often long-standing rulers. The term “color revolutions” refers to the fact that many protests were associated with particular colors, such as orange in Ukraine.¹²

Our external source for comparison is [Tucker (2007)], a peer-reviewed publication of the American Political Science Association, which focuses on the four most prominent color revolutions: Serbia’s “Bulldozer revolution” in early 2000; Georgia’s 2003 “Rose revolution”; the 2004 “Orange revolution” in Ukraine; and the 2005 “Tulip revolution” in Kyrgyz Republic. In comparing these four episodes, Tucker provides a narrative description of each with key events listed by day.

Figures 10 and 11 present the RSUI and event coding for these countries during 2000-2005. In all four cases, the event coding identifies exactly the month of each of the four color revolutions. Secondary events following the main revolutionary episodes are also associated with spikes in the RSUI in Georgia and Kyrgyz Republic, in both cases delayed elections. That the event coding is somewhat conservative here is a manifestation of the trade-off between false positives and false negatives. Identifying more minor follow-up events would come at the cost of introducing erroneous events at other times in the sample.

4.2 Internal Validity

In this section we report several results from several alternative measures of the RSUI, where we vary a number of parameters which define the RSUI, including language, sources, and search terms.

4.2.1 Sensitivity to language

To examine the hypothesis that regional and country-specific media might have different biases or could identify major social unrest events faster than western leading English-language media outlets, we recalculate the RSUI for a subset of Middle Eastern and North African countries using searches in French and Arabic. Arabic is, of course, the predominant language in the region and French – due to lengthy historical and cultural connections – is widely spoken in several countries.

¹²There is no official definition of this term and it is also sometimes applied to a much wider set of events, includes the Lebanese “Cedar” revolution of 2005 and Armenia’s “Velvet” revolution of 2018 (not to be confused with the 1989 Velvet revolution which marked the end of Communist rule in Czechoslovakia).

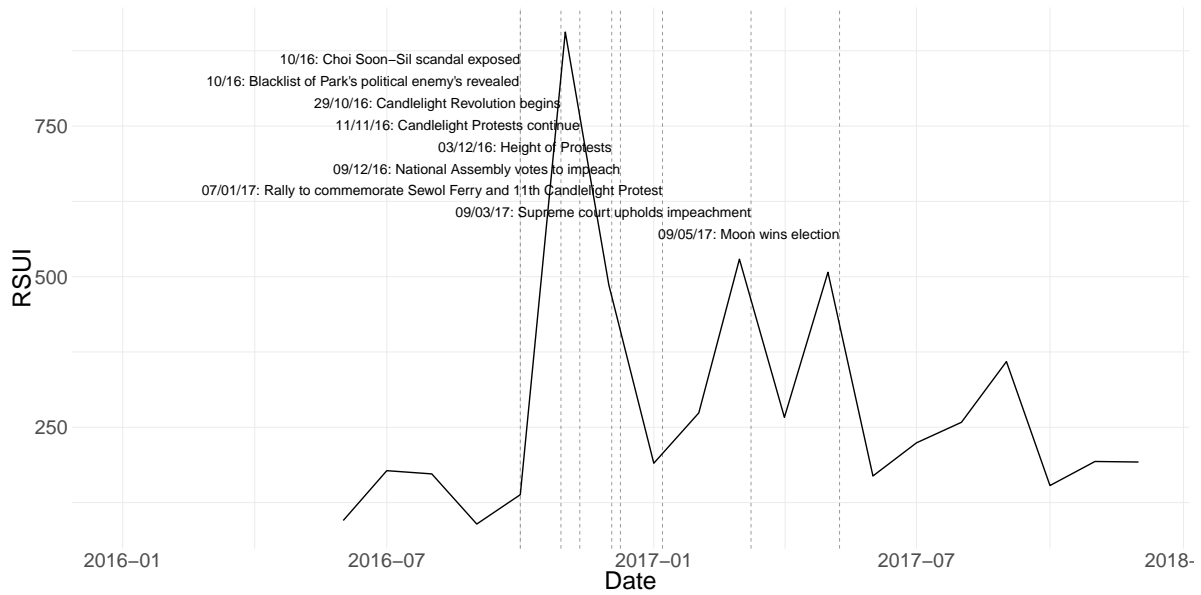


Figure 8: Korea: Major events identified by Kim (2017), June 2016-December 2017

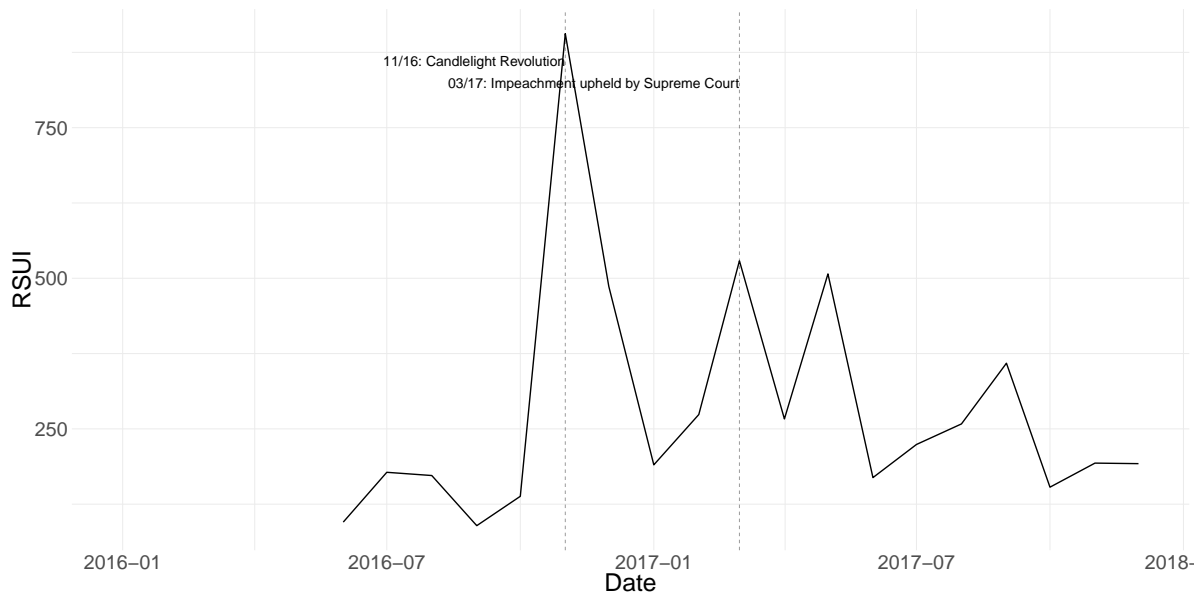


Figure 9: Korea: Major events identified from RSUI event coding, June 2016-December 2017

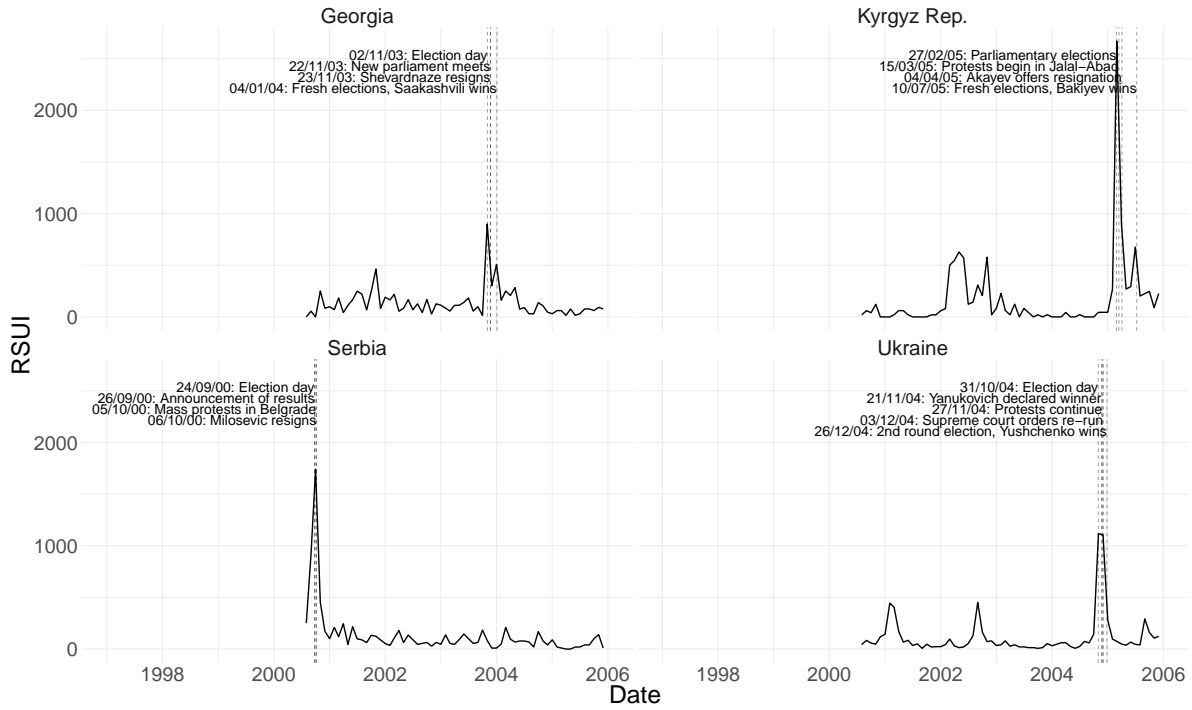


Figure 10: Color Revolutions: Major events identified by Tucker (2007), August 2000-December 2005

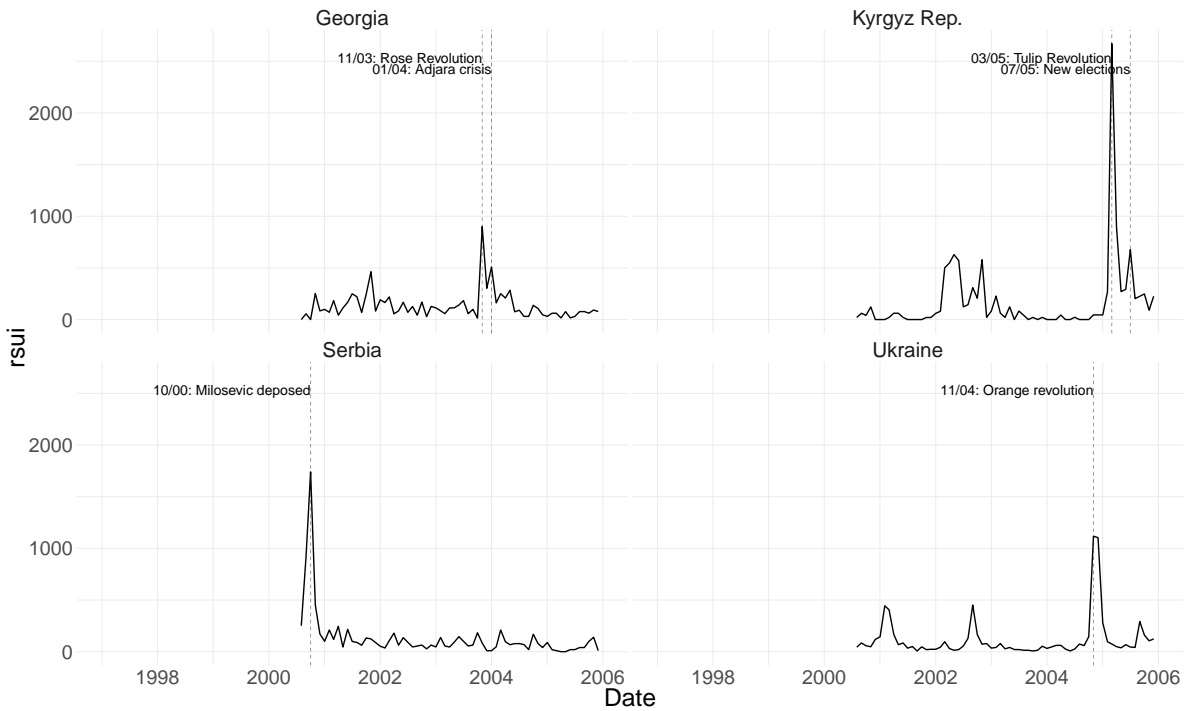


Figure 11: Color Revolutions: Major events identified from RSUI event coding, August 2000-December 2005

Naturally, this requires a different set of sources. For French, we used leading newspaper as well as newswire agencies in French: Le Figaro, Le Monde, Libération, Agence France Presse, Reuters, The Associated Press and The Canadian Press.

In Arabic, restricting our sample to only well-known international news sources did not provide enough wide enough coverage to through Factiva to generate useful indices, with only a handful of articles available from major Arabic-language publications and a very low match rate to social unrest terms.¹³ We therefore cast a much wider net when defining our Arabic sources, allowing all search hits from all sources. This increases the number of articles available but the cost of a more varied set of sources, including news websites, blogs and less well-regarded outlets.

The French and Arabic search terms are reported in Table [X] in Appendix [Y].

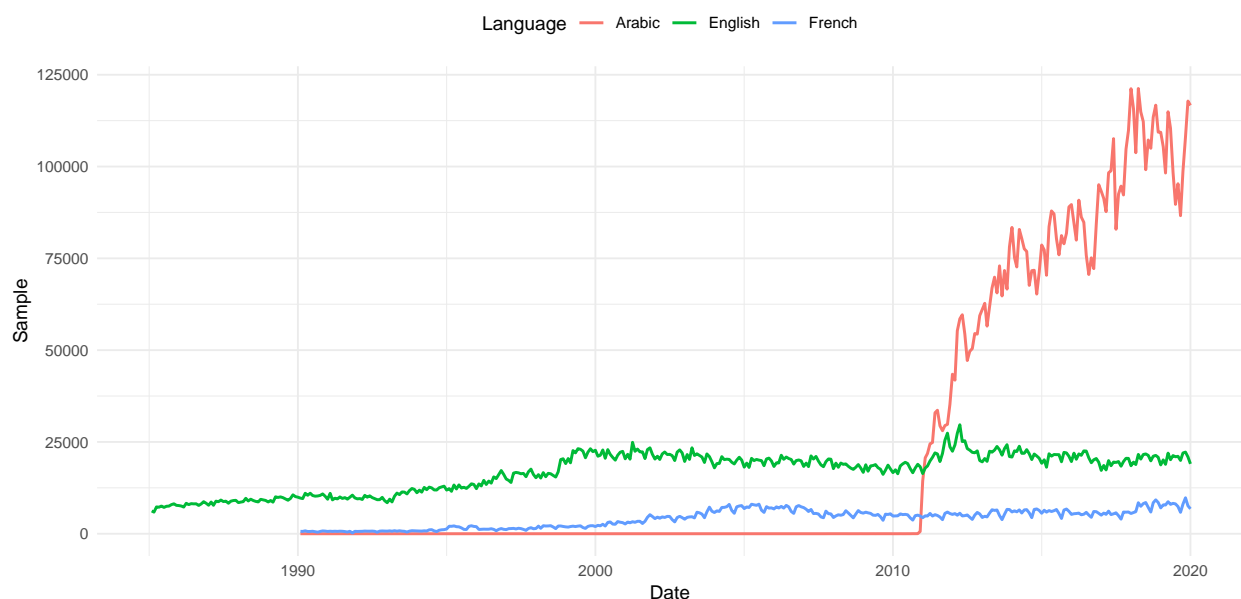


Figure 12: Number of contemporary articles per month, z_t , by language

Figure 12 reports the coverage of three datasets by language as measured by the number of contemporary articles, z_t , from which a key difficulty is immediately apparent: French language coverage is limited throughout and Arabic language content grows rapidly following 2011.

Figure 13 presents the A index for six Middle Eastern and North African countries where French is either widely spoken or with close historical or cultural ties to France. The major spikes are in exactly the same months for Algeria, Lebanon, Syria and Tunisia. For Morocco there is some disagreement, but this is mostly during relatively quiet periods; major events such as the Arab Spring and the Hirak Rif protests of late 2016 and early 2017 show up clearly in both languages. Mauritania shows some differences but this is likely a function of the very small number of articles in French, with on average less than one article per month.

¹³This could be a property of the sources – that reporting on unrest is either uninteresting or dangerous for publishers. Or it could be that text-matching methods which work well in English simply do not translate well to Arabic.

Figure 15 presents the A index for the six largest Arabic-speaking countries for both English- and Arabic-language sources. The Arabic-language sources do a poor job of distinguishing between countries. For example, Sudan and Saudi Arabia show large spikes in early 2011 despite very limited unrest at those times (and, in the case of Sudan, a much smaller response during the overthrow of the government in April 2019). Even within countries, the timing is inconsistent with the narrative evidence presented in the preceding section, dating the start of the uprising in Egypt to November 2010 – clearly too early to be plausible.

There may be several reasons why the Arabic-language index struggles to distinguish country-specific unrest events. One factor could be the common language itself, with the result close cultural connections meaning that Arabic-language sources have an inherently more pan-Arabic outlook, reporting the Uprisings as a single common occurrence rather than as a series of country-specific events. The difficulty in matching social unrest articles also undoubtedly plays a role, with the peak in November 2010 a result of just 18 matching social unrest articles (versus a February 2011 English-language peak of some 1600 articles). This means that a few incorrect matches can have an outsize impact on the index.

Overall, the comparison across languages suggests either that our headline series agrees well (with French) or that there are more fundamental limits imposed by availability of sources (in Arabic).

4.2.2 Sensitivity to search terms

We also explore how our results vary with the choice of search term, for two reasons. First, we want to check that our headline search is not sensitive to small changes to the search terms. Second, as a means of understanding what other issues might be associated with social unrest events.

To this end, we conduct four extra searches, all derivatives of the headline search for x_{it} (see Table 4). The first two are extensions of the headline search, adding extra matches on related terms: one using a broader set of descriptions, including those related to potentially more violent outcomes (the “Expanded” search); and one which also admits a wider description of social tension rate than just unrest (the “Tension” search). The second set of extra searches are restrictions of the headline search, highlighting two of the key factors often cited as a driver of protest during the Arab Uprisings of 2011: economic underperformance, and alienation of youth.¹⁴

We conduct these searches for a sub-sample of 19 Middle East and North African countries during the sample period. The results are presented in table 5, which shows the distribution of important correlation statistics of the different measures (and Figure ?? presents the alternate indices for the same countries as in Figure 15). Given our focus on major unrest events, our preferred measure is the overlap of the largest observations, which we limit to 2%, but we also present standard correlation coefficients. The overlap for the extension searches is very high, with three quarters of countries having at least 85% of observations in common in the top 2%.

¹⁴Other episodes of unrest may have other putative drivers. We focus on this episode simply because it is a widespread regional episode with potentially common drivers.

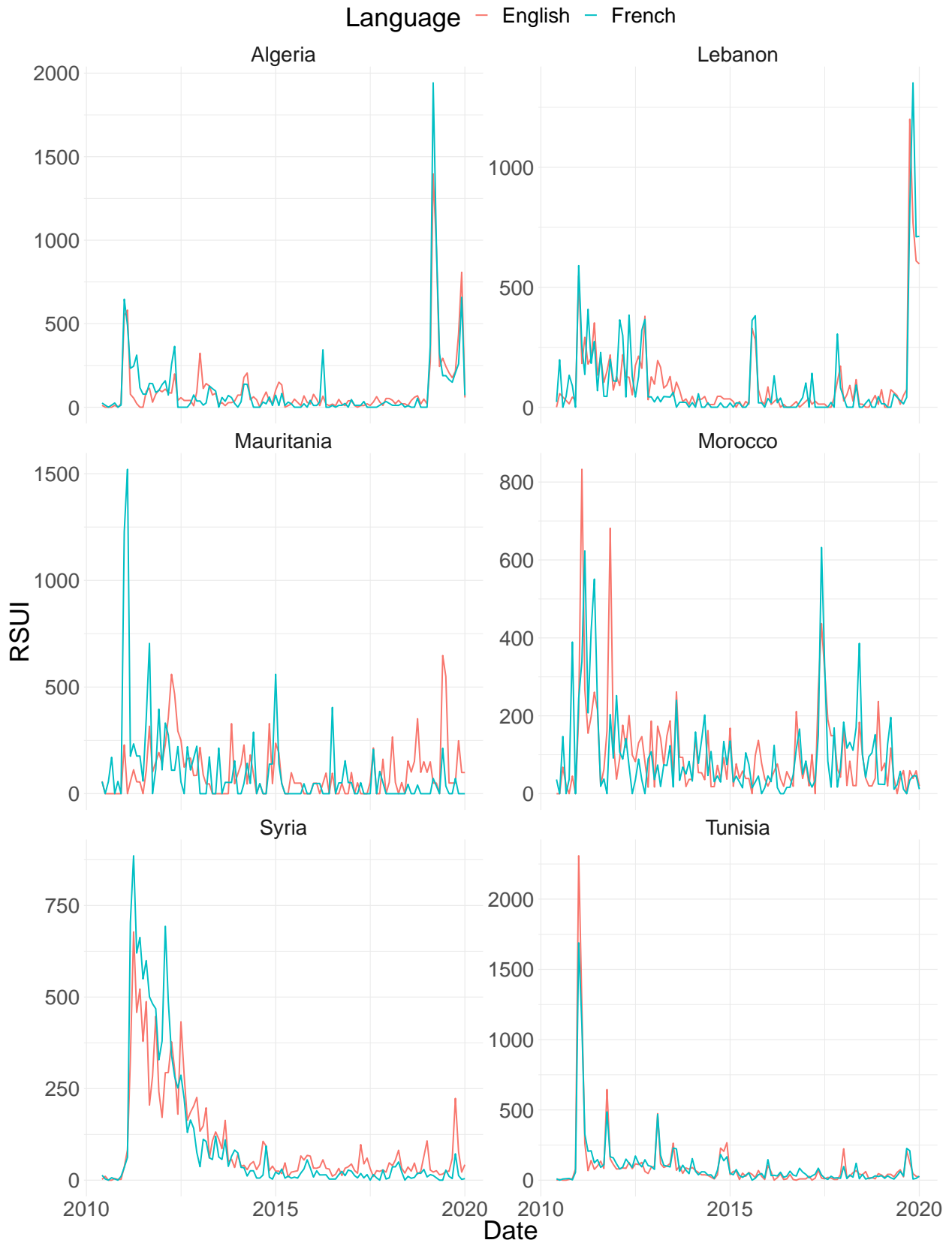


Figure 13: RSUI, June 2010 - present: Select Middle Eastern Countries with French widely spoken, by language

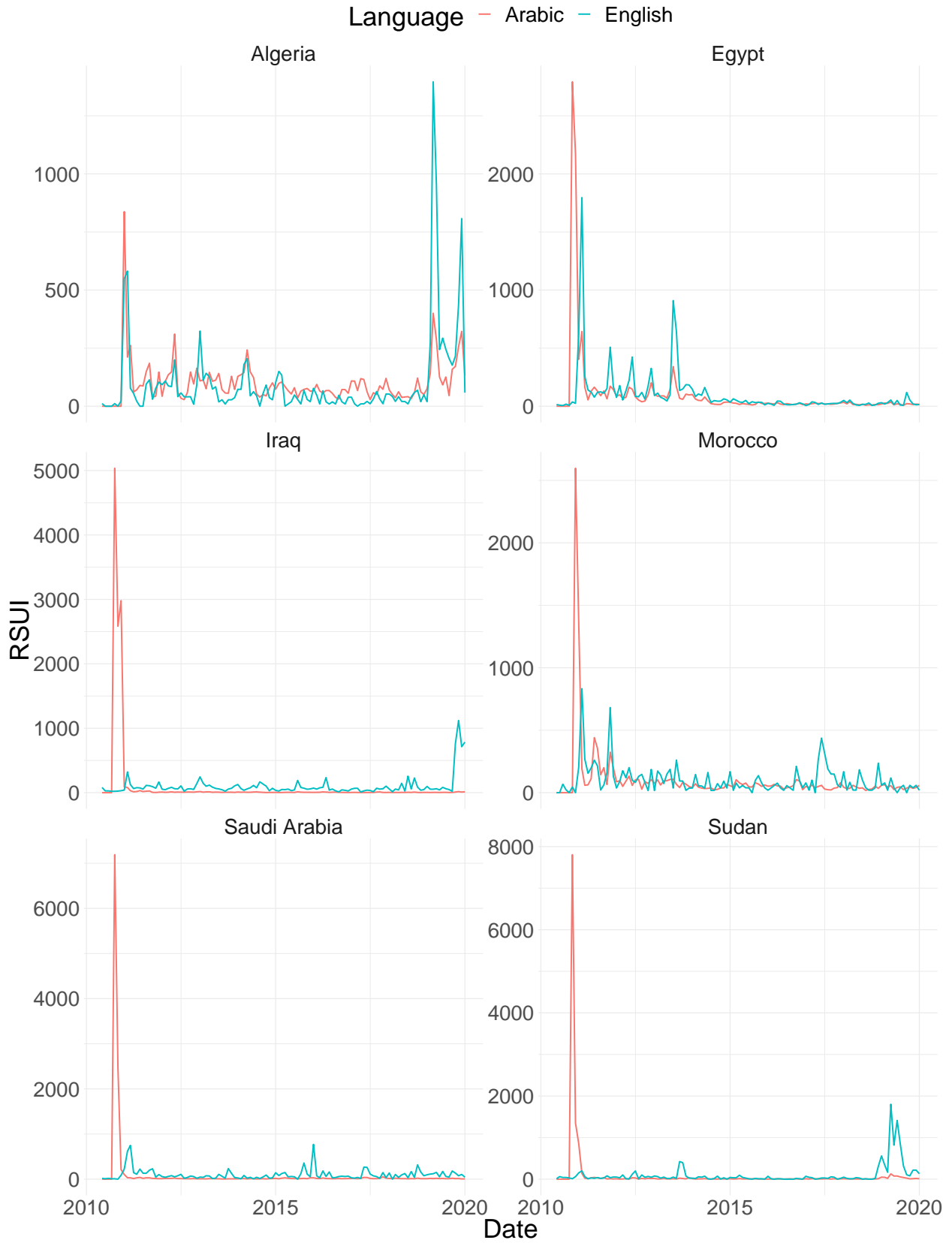


Figure 14: RSUI, June 2010 - present: Largest six Arabic-speaking countries, by language

This suggests that the headline index is not driven by specific or spurious matches related to the particular search terms we include but is instead broad-based indicator of the underlying discussion.

The searches restricted to include results driven by economic outcomes or youth activities also shine some light on the potential drivers of protest. In general, the largest observations of the RSUI tend to include just two key economic terms with notable frequency; in the median country, nearly four-fifths (79%) of the largest headline matches also included a economic term, and the agreement is over half (55%) in fully ninety percent of countries. While we cannot conclude that economic factors necessarily drove protest, this does mean that they were at least a common simultaneous topic of discussion. In contrast, terms related to young people come up much less frequently, with a common fraction of top matches in median country of only 45%.

Name	Type	Terms
Expanded	Extension	“attack” OR “conflict*” OR “strike” OR “police*”
Tension	Extension	“attack” OR “conflict*” OR “strike” OR “police*” OR “social” within 10 words of “tension”
Economic	Restriction	“econom*” OR “unemployment”
Youth	Restriction	“youth”

Note: Alternate searches for x_{it} . All searches are derivatives of the headline search. Those labeled “Extension” include OR operators for the extra search terms, so return extra matches which may include terms listed. Those labeled “Restriction” append the listed terms using an AND operator, so return only those headline matches which also include the terms listed.

Table 4: Alternate search terms

Statistic	Search modification	N	Median	10%	25%
Overlap of top 2%	Expanded	19	0.92	0.69	0.87
Overlap of top 2%	Tension	19	0.92	0.69	0.87
Overlap of top 2%	Economic	19	0.79	0.55	0.66
Overlap of top 2%	Youth	19	0.45	0.23	0.33
Pearson correl	Expanded	19	0.91	0.73	0.76
Pearson correl	Tension	19	0.91	0.73	0.76
Pearson correl	Economic	19	0.84	0.57	0.71
Pearson correl	Youth	19	0.69	0.45	0.60
Spearman correl	Expanded	19	0.83	0.64	0.79
Spearman correl	Tension	19	0.83	0.64	0.79
Spearman correl	Economic	19	0.70	0.52	0.59
Spearman correl	Youth	19	0.54	0.35	0.42

Table 5: Within-country correlations with baseline, varying search terms

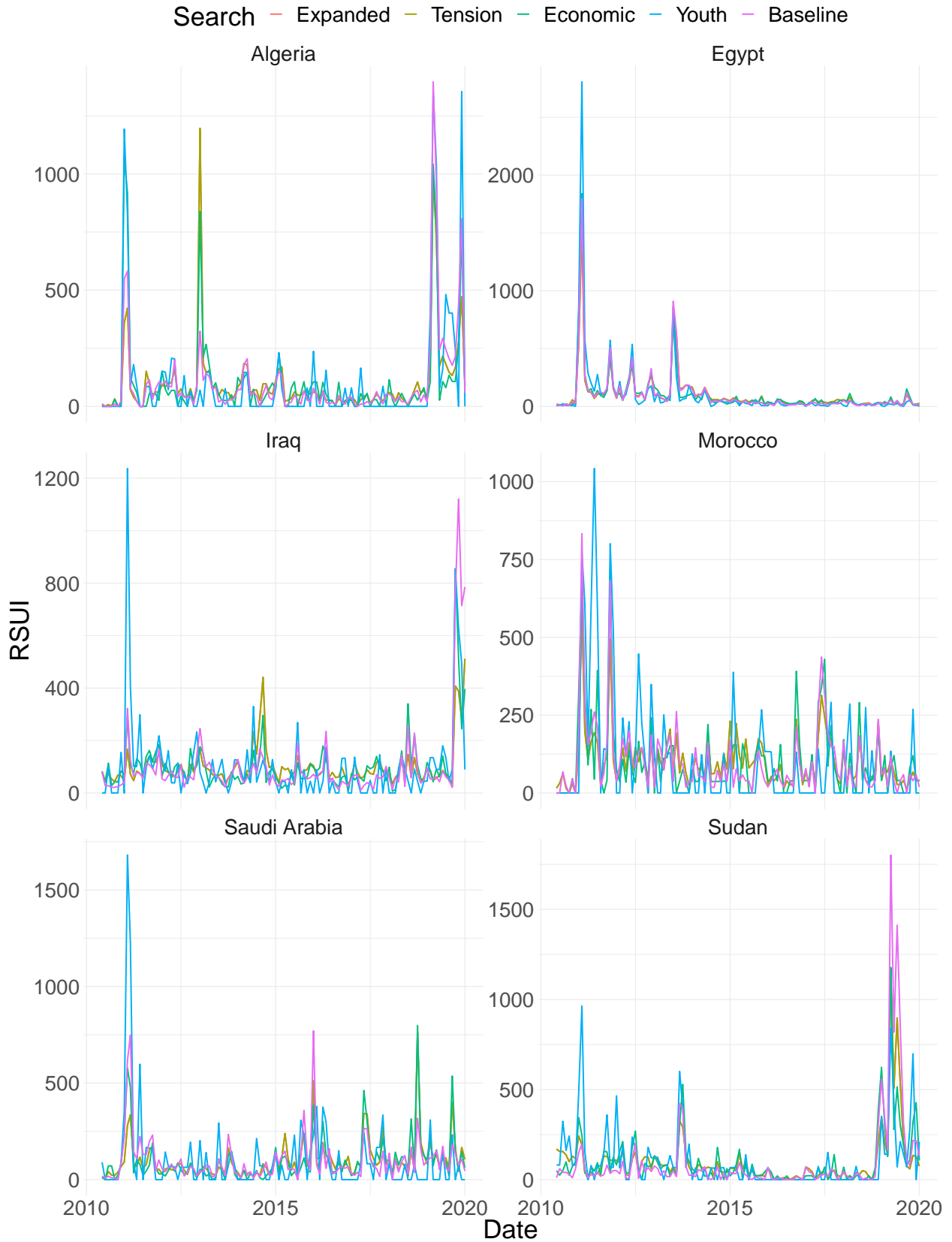


Figure 15: RSUI, June 2010 - present: Largest six Arabic-speaking countries, by search term

5 Statistical Properties of the Index

In this section we discuss the statistical properties of the index. These are useful both for understanding how to interpret the index, as well as for understanding the temporal and spatial correlation of major unrest events and their predictability.

5.1 Cross-sectional distribution

We start by proposing a functional form for the cross-sectional distribution of the RSUI index. We assume that for values in excess of some cutoff \bar{m} , the full sample $RSUI_{it}^A$ can be described by:

$$\mathbb{P}(RSUI_{it}^A < M) = F(M) \quad \text{for } M \geq \bar{m}$$

Where:

$$F(M) = 1 - (a(M - \bar{m}) + 1)^{-b}$$

We think of \bar{m} as a filter for noise; below this threshold there is no meaningful information in the index. An appealing property of this distribution is that the fraction of observations above M is proportionate to $M - \bar{m} + 1/a$. That is:

$$\log(1 - F(M)) = -b \log a - b \log (M - \bar{m} + 1/a)$$

In other words, if $\bar{m} - 1/a$ is small, then a one percent increase in M above the threshold \bar{m} implies a b percent decrease in the number of observations at least this large. If this describes the data well then this provides a meaningful interpretation of changes in the A index.

We estimate this density by maximum likelihood, and report the point estimates and standard errors in Table 6 with $\bar{m} = 200$. Both parameters are sharply identified by the data, with small standard errors. And, as shown in Figure 16, the fitted and empirical distributions match very closely.

a	b
0.003	2.071
(0.000155)	(0.0763)

Table 6: Full-sample maximum-likelihood estimation of cross sectional density, N=6945, $\bar{m} = 200$. Standard errors in parentheses.

Appendix G provides further robustness checks, showing that 1) estimates for the parameters of the cross-sectional distribution are unaffected by the choice of the cutoff \bar{m} and that 2) within-country estimates of the parameters are not significantly different from the aggregate estimates.

These results give a useful interpretation of large observations of the headline index. Imagine one wishes to compare two observations in the upper tail of the distribution, say M_1 and M_2 with $M_1 < M_2$ and that both are large relative to $\bar{m} - 1/a \simeq 130$. Then we can compare them using a simple rule of thumb: that if M_2 is $x\%$ larger than M_1 then there usually will be approximately

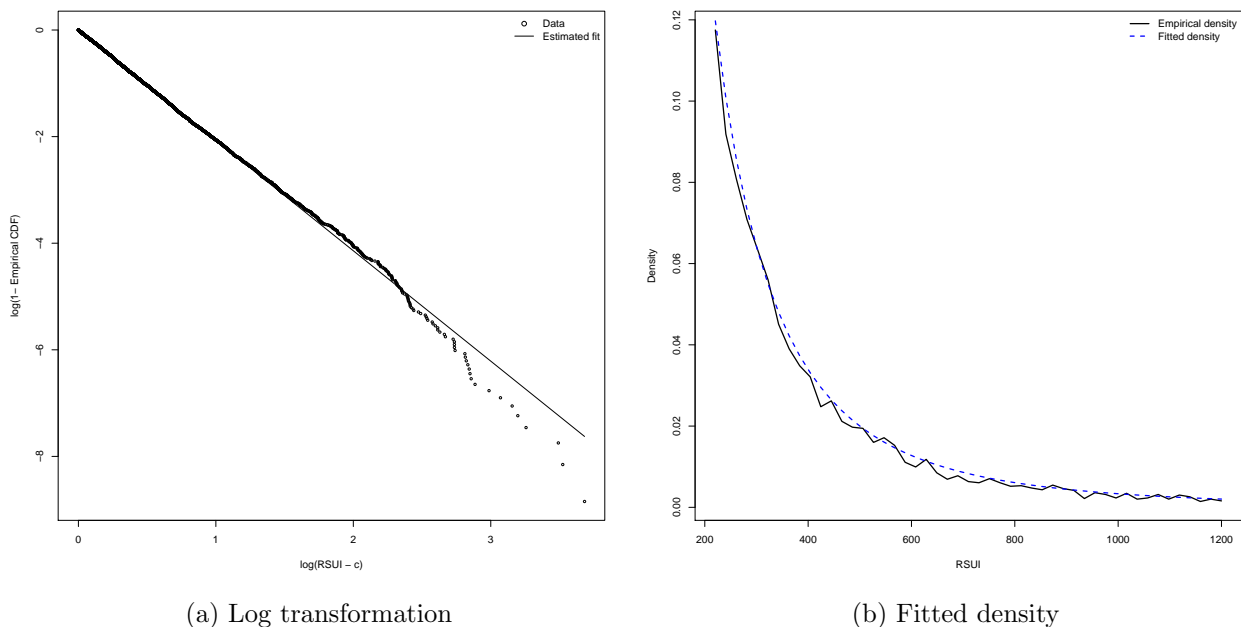


Figure 16: Cross-sectional RSUI density, empirical and estimated, $\bar{m} = 200$

2x% fewer observations larger than M_2 than M_1 (using here that $b \simeq 2$). This rule of thumb holds both within individual countries, and across the sample as a whole.

5.2 Correlation of unrest events in time and space

At first glance, social unrest appears to be correlated across both space and time, with regional waves of unrest – such as the Arab Uprisings, or recent protests in Latin America – appearing to be a relatively common phenomenon. Yet isolated unrest can and does occur. For instance, mass protests in Korea during 2016 leading to the impeachment of President Park Guen-hye, and recent protests in France over public spending and pensions are not part of regional waves of unrest. So, to what extent is social unrest a correlated phenomenon? Our aim in this section is examine this question, and document the conditional correlations of social unrest both in time in space. Note that our aim here is purely descriptive. Notions of causality – such as whether protests beget more protest or simply reflect persistent underlying drivers – are beyond the scope of this paper.

To analyze the dynamic and spatial correlations in social unrest we define:

$$s_{i,t} = \text{Months since last unrest event in country } i$$

$$u_{i,t} = \text{Months since last unrest event in neighbors of country } i$$

Neighboring countries are defined as those which share borders. Figure 17 shows the distribution of the times since social unrest events. As individual countries often have several neighbors, the time since neighboring country events is typically smaller, averaging 32 months versus 60 months

for own-country events.

We can then create indicators for these times, dividing them into K distinct intervals $(t_0, t_1]$, $(t_1, t_2]$, \dots , $(t_{K-1}, t_K]$:

$$S_{i,t}^k = s_{i,t} \in (t_{k-1}, t_k] \qquad U_{i,t}^k = u_{i,t} \in (t_{k-1}, t_k]$$

Then we estimate the following panel regression:

$$event_{i,t} = \alpha_i + \eta_t + \sum_{k \in \mathcal{K}} \beta_k^d S_{i,t}^k + \sum_{k \in \mathcal{K}} \beta_k^n U_{i,t}^k + e_{it} \tag{1}$$

where $event_{i,t}$ is an indicator for an unrest event and α_i and η_t are country and time fixed effects. Using this framework, we can interpret β^d and β^n as the incremental probability of an unrest event conditional on there being either a *domestic* or *neighboring* event during the last $(t_{k-1}, t_k]$ months.

Table 7 presents the results of this exercise. The first column simply estimates the conditional average the unrest event indicator over the full sample, a little over one percent of months feature an unrest event. In column (2) we restrict estimation to the sub-sample where there has been at least one prior unrest event, resulting in an increase in the unconditional average event probability to nearly two percent. This specification is relevant null model for specifications (3) through (5) – note the same sample size as in (2) – as this specification can only be estimated on observations with at least one prior event.

Specifications (3) through (5) estimate the probability of a social unrest event within a country conditional on one occurring previously. As shown in specification (3), this probability rises sharply but briefly during the months following a social unrest event, rising by nearly four percent immediately following an unrest event.¹⁵ This both statistically significant and quantitatively large, representing a quadrupling of the rate over that in times far from past unrest events.¹⁶ This impact decays slowly over the next nearly two years.

Of course, these effects may simply reflect selection, as countries with higher rates of average unrest will constitute a larger fraction of observations, particularly in the periods immediately after an event. We therefore correct for this in specification (4), which includes country fixed effects and, along with specification (8) represents the headline results in this section. These figures thus represent the marginal increase in the conditional probability of unrest over a county’s own average rate. Although the immediate increase falls to around 3.5 percent, this still represents a meaningful increase, with an approximate tripling over the sample average. However, accounting for average effects results in a much less persistent response, with no statistically discernible impact at horizons longer than six months. Specification (5) includes time fixed effects, which account for correlated average global variation in event probabilities, and which looks little different from specification

¹⁵Part 1 of the definition of an event requires that the RSUI attain a local peak, and thus there are no consecutive unrest events. As a result, months immediately following an unrest event are dropped from the sample.

¹⁶The constant term 0.013 is less than one quarter of $0.014 + 0.043 \simeq 0.057$, the recurrence rate of 2-3 months after an unrest event.

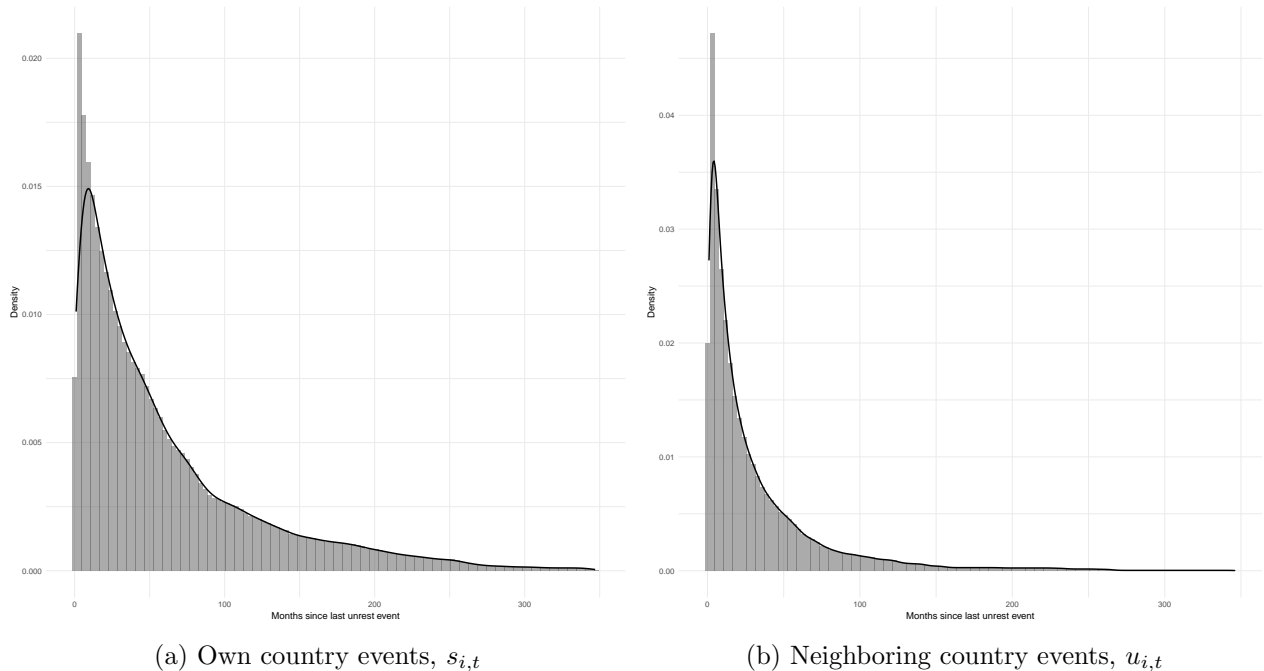


Figure 17: Distribution of time since last event

(4).

Specification (6) performs a similar exercise but using time after neighboring-country events only. In this case, time fixed effects make little sense, as they will absorb any variation in neighboring countries which is correlated with global trends. The effect of neighboring-country events on the probability of social unrest is smaller, at around half the own-country effect, but still statistically significant. However, this effect seems to be slightly longer-lasting than the effect of purely domestic events. Specification (7) is identical to (6) except restricted to the sub-sample used for specification (8).

Along with specification (4), specification (8) is the other headline estimate. It reports estimates for the full specification in equation (1). This broadly confirms the findings of the separate regressions: within-country unrest is associated with an approximate tripling of the rate of social unrest in the short term, but the effect is insignificant after 6 months; unrest events in neighboring countries are associated with roughly a doubling of the rate of unrest and there is some evidence that this might be more persistent.

The fit of the regressions is in general fairly poor, with a naive R^2 is no better than five percent.¹⁷ In causal settings this might be a sign of mis-specification and thus a concern. But in a purely descriptive context this is not relevant. Instead, it simply means that there is considerable variation in the realized outcomes beyond the averages conditional on time since last event.¹⁸ Moreover, the Akaike information criterion also suggests that the richer models are valid. For

¹⁷As is customary in panel regressions, the R^2 and adjusted R^2 are computed using data after fixed effects are taken out. The naive R^2 does not account for this.

¹⁸We return to this theme when discussing predictability in the next section

Table 7: Conditional probabilities of social unrest.

	Dependent variable: Social unrest event							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Event, last 2-3 months			0.043*** (0.007)	0.035*** (0.007)	0.032*** (0.007)			0.035*** (0.009)
Event, last 4-6 months			0.029*** (0.005)	0.021*** (0.006)	0.019*** (0.006)			0.020*** (0.006)
Event, last 7-9 months			0.014** (0.005)	0.006 (0.006)	0.004 (0.006)			0.005 (0.006)
Event, last 10-12 months			0.009* (0.005)	0.002 (0.005)	-0.0001 (0.005)			0.001 (0.005)
Event, last 13-24 months			0.005** (0.002)	-0.002 (0.002)	-0.002 (0.003)			-0.003 (0.003)
Event, last 25-48 months			0.002 (0.002)	-0.003 (0.002)	-0.002 (0.002)			-0.003 (0.003)
Event, last 49-60 months			0.006** (0.003)	0.002 (0.003)	0.003 (0.003)			0.005 (0.004)
Neighbor event, last 2-3 months						0.017*** (0.003)	0.015*** (0.004)	0.014*** (0.004)
Neighbor event, last 4-6 months						0.008*** (0.003)	0.006 (0.004)	0.005 (0.004)
Neighbor event, last 7-9 months						0.009*** (0.003)	0.007 (0.004)	0.006 (0.004)
Neighbor event, last 10-12 months						0.007** (0.003)	0.006 (0.005)	0.006 (0.005)
Neighbor event, last 13-24 months						0.008*** (0.002)	0.009** (0.004)	0.008*** (0.003)
Neighbor event, last 25-48 months						0.001 (0.002)	-0.001 (0.003)	-0.0005 (0.003)
Neighbor event, last 49-60 months						0.003 (0.003)	0.006 (0.006)	0.006 (0.005)
Constant	0.012*** (0.001)	0.019*** (0.001)	0.013*** (0.001)					
Fixed effects	None	None	None	Country	Twoways	Country	Country	Country
Normalized AIC	-1.605	-1.146	-1.152	-1.157	-1.175	-1.401	-1.116	-1.119
Naive R2	0.012	0.019	0.025	0.029	0.047	0.021	0.029	0.032
Observations	53,170	26,944	26,944	26,944	26,944	31,316	19,712	19,712
R ²			0.006	0.004	0.003	0.002	0.001	0.005
Adjusted R ²			0.006	-0.001	-0.017	-0.002	-0.005	-0.001

Note:

*p<0.1; **p<0.05; ***p<0.01
Double-clustered standard errors shown in parenthesis.

example, specifications (2) through (5) show a decline in the AIC and hence an improvement in the fit beyond that expected purely through the inclusion of extra parameters.¹⁹ Likewise, for specification (8) relative to (7).

Overall, the results of the panel regression exercise suggest that there is considerable spatial and temporal correlation of social unrest. Although social unrest is rare, occurring usually in around 1.3 percent of countries per month, this rate typically triples following an event in the same country, and doubles following one in a neighboring country. Nevertheless, these effects are short-lived, decaying to half a percent or less within 9 months.

5.3 Predictability

In the previous section we discussed whether social unrest was more likely *after* a social unrest event in the same or a neighboring country. Here, we turn to a related but complementary question: can we reliably predict outbreaks of social unrest *before* they occur? Of course, many factors may potentially predict social unrest including economic, financial, or other social variables. We leave investigation of these questions for other authors and instead ask a more limited question: can the RSUI itself predict social unrest?

Figure 18 illustrated the main point of this section and highlights its comparison with the previous one. The left-hand panel shows the conditional average of the RSUI index around an event. Unsurprisingly, the average RSUI spikes dramatically in the month of the event and declines slowly thereafter. This is essentially the same phenomenon described in the preceding section, just presented a little differently. Yet the RSUI displays a moderate increase (around 174 index points) in the period prior to the event. This raises a natural question: can such an increase be used to reliably predict social unrest?

The right-hand panel suggests not. It shows the mean RSUI conditioned observing increases of at least this magnitude (i.e. 174 index points). This has essentially no predictive power for social unrest events; the RSUI declines sharply back towards its long-run average in the subsequent months. In other words, while almost all social unrest events are preceded by moderate increases in the RSUI, moderate increases in the RSUI are usually followed by a swift regression to the mean.

We investigate this issue more formally by estimating lasso regressions for the index and events. A lasso (least absolute shrinkage and selection operator) regression is a simple machine learning algorithm which selects a model to minimize the out-of-sample forecast error. In this case, we use cross-validation for the out-of-sample exercise and estimate separately for each country:

$$v_{i,t+h} = \sum_{j=1}^M \beta_i^j v_{i,t-j}$$

Where $M = 18$, $h = 1, \dots, 24$ and v_{it} is either the RSUI or event indicator for country i in period t . This approach therefore calculates the best country- and horizon-specific predictive model for the

¹⁹The normalized AIC is divided by the sample size. We can only compare model fit when estimated on the same data, i.e. specifications (2) through (5) with each other, and specifications (7) and (8).

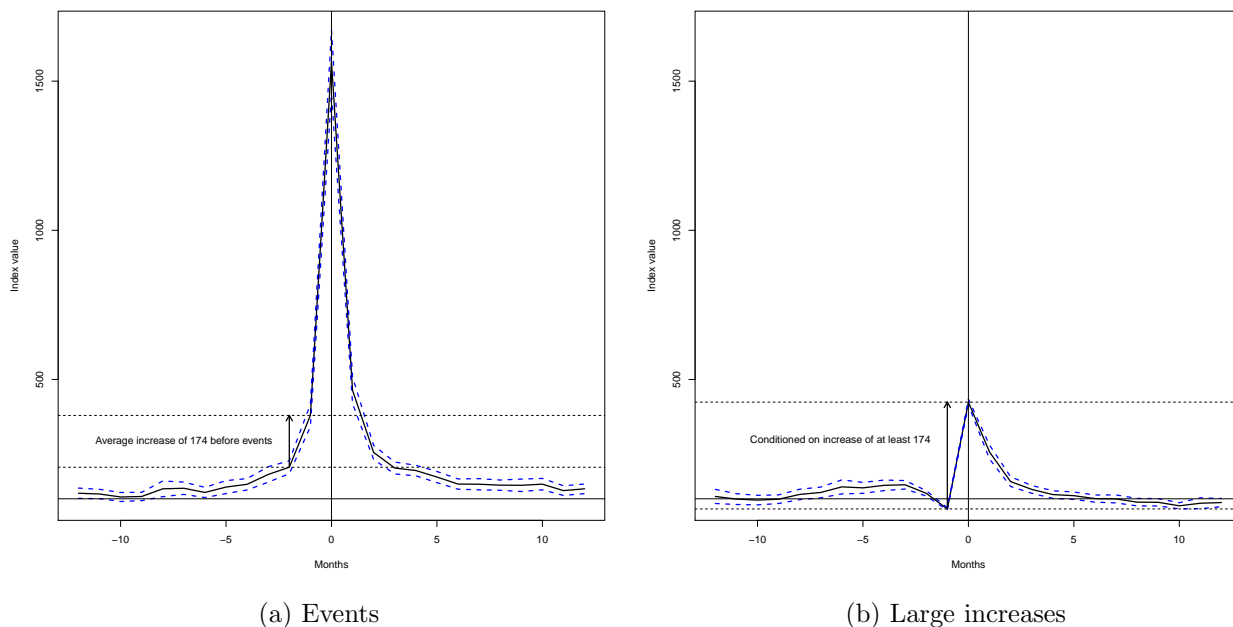


Figure 18: Mean RSUI around events and large increases

RSUI using up to a year-and-a-half of prior outcomes data. The purpose of using a cross-validated lasso is to try to estimate the most reliably informative predictive model.

For each country-horizon predictive model we compute three measures of predictability: the Granger-Newbold measure, which is the fraction of variance of the outcome explained by the forecast, analogous to the R^2 ; the Theil uncertainty statistic, which is less than one when the forecast is better than the long-run average; and the [Diebold & Kilian (2001)] statistic which measures predictability relative to the long-run error variance.

Table 8 compiles these measures by selecting the most predictive horizon for each country and then taking the cross-country average. Despite choosing the most successful predictions for each country, the predictability of each series is low. Indeed, the lasso regression typically selects at most only one lag of the RSUI when predicting future values of the index, and typically at very short lags. Likewise, the Granger-Newbold statistic shows that the best forecast explains barely three percent of the variation in outcomes.²⁰ The Theil measure implies that the best forecast is little better than guessing the long-run average (which would produce a score of 1). Figure 19 presents the average and country-specific results by horizon for two measures. For RSUI events, predictability is even lower, with almost all country-horizon pairs selecting zero lags, i.e. the best predictive model in almost all cases actually is identically the country average.

How should we interpret this lack of predictability, particularly in the light of the regression results of the previous section? To start with, note that these are not inconsistent. Just because two variables are correlated does not mean that either is a good predictor of the other. Social unrest

²⁰Not coincidentally very close to the R^2 of the regressions in the preceding section.

	Index	Events
Number of non-zero coefficients	1.03	0.02
Horizon of most non-zero coefficients	1.50	1.03
Granger-Newbold predictability	0.03	0.00
Theil U-statistic	0.92	1.00
Diebold-Kilian predictability	0.11	0.05

Table 8: Measures of predictability of index and events. Maximum within countries, then averaged across countries

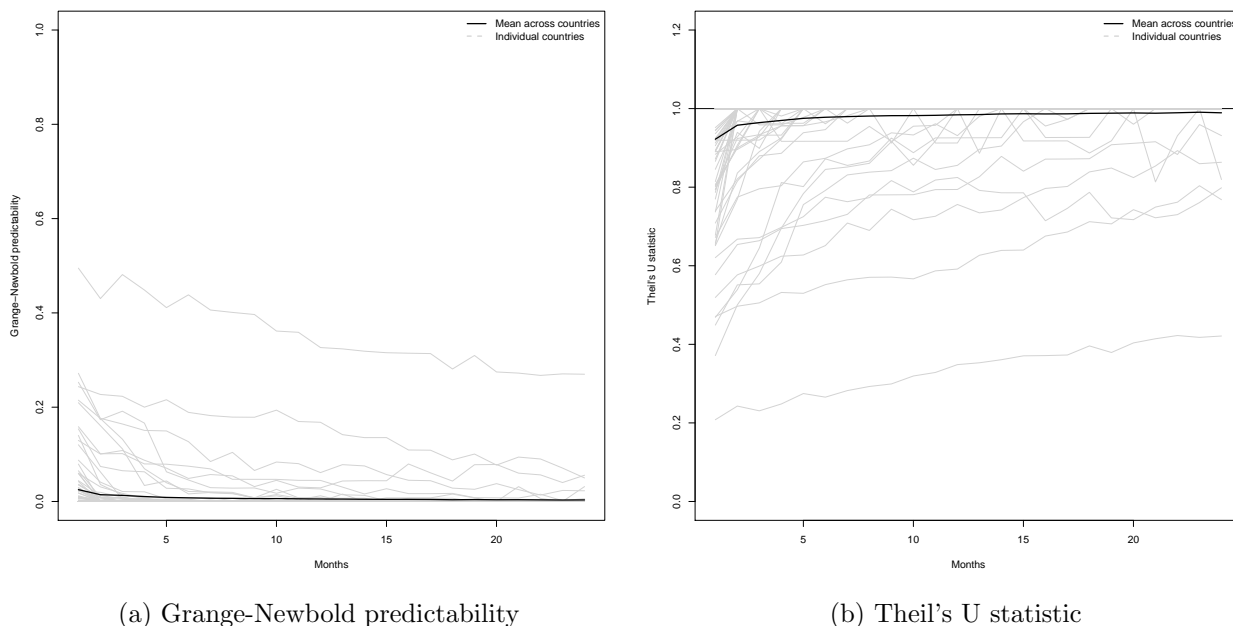


Figure 19: Measures of predictability of the RSUI series

indicates a higher *probability* of future unrest, but social unrest is sufficiently rare and driven by so many other factors that using past social unrest to predict future unrest results in such a small improvement in forecasting power as to be statistically useless. To make the point differently, the probability of winning a lottery rises conditional on buying a ticket. But if lottery wins are sufficiently rare, holding a lottery will not be a reliable predictor of winning.

A more constructive interpretation of these results is that social unrest likely happens for incredibly varied reasons, and can be triggered by seemingly minor events (e.g. increased subway fares). The rareness of events, combined with this apparent susceptibility to triggers, make individual social unrest events simply very hard to predict. As a result, average effects (however sharply identified) explain little of the variation in outcomes. Thus we can make statements both about average impacts (as in the preceding section) but still struggle to predict individual events.

6 Conclusions and possible applications

This paper does three things. First, it introduces a novel method for measuring and monitoring social unrest using article counts from international press, and presented a way of coding sharp spikes in the index into events. Second, we have shown that the events and the index correlate well with independent narrative courses during three diverse case studies. We also showed that the index is robust to choice of language, sources, and search terms. From this evidence, we conclude that the index and events likely measure realized social unrest rather than simply variation in media interest over time. Third, we provide some basic statistical analysis essential for interpreting the index, concluding that: the log of the index is proportional to its percentile rank in both within- and cross-country distributions; that social unrest is temporally and spatially correlated – social unrest raises the average probability of further unrest over the next six months by about three percentage points in the same country and about one percentage points in neighbors; but that that social unrest is not itself a reliable predictor of future social unrest.

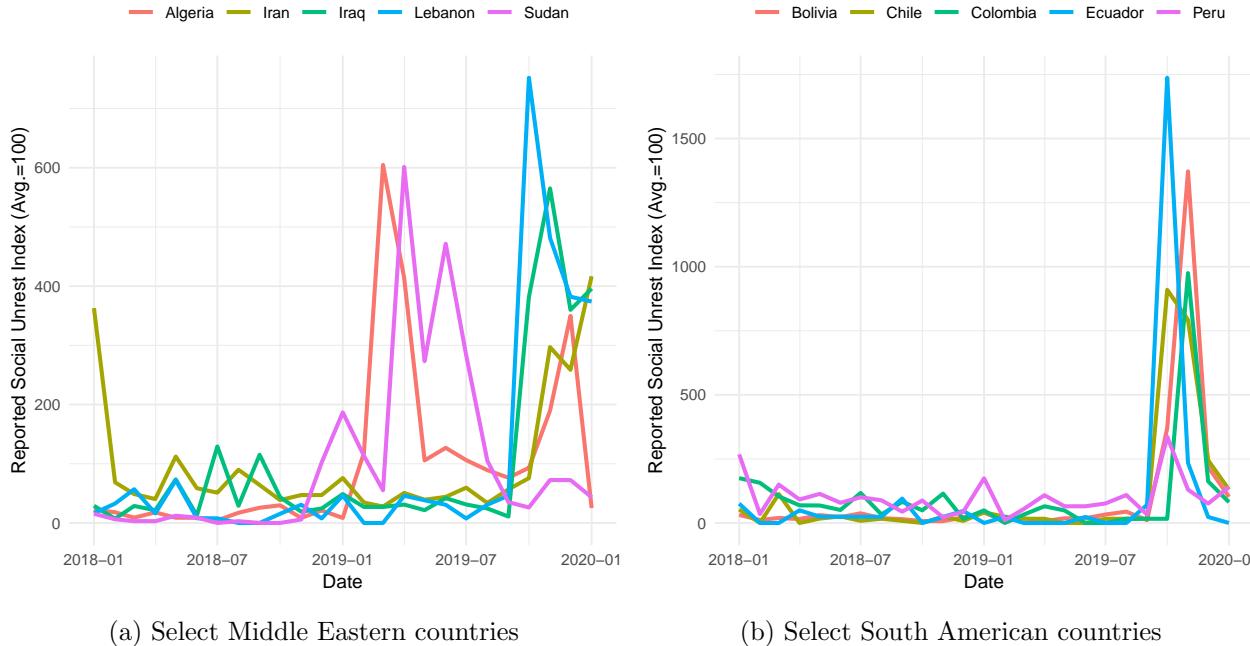


Figure 20: RSUI January 2018 - present

These results have two main applications: providing reliable monitoring of social unrest; and in research on the causes and consequences of social unrest. To illustrate this first point, Figure 20 presents the [latest] RSUI data for select Middle Eastern and South American countries, indexed to 100 within the time periods presented. In both cases, the RSUI provides a timely, high-frequency data source for summarizing the timing and relative importance of episodes of social unrest. In particular, the timing and frequency of unrest across the two regions is very clearly differentiated. The timing of social unrest events is weakly correlated across the Middle Eastern countries, with sporadic outbursts throughout 2019, and some countries showing multiple unrest events (Algeria,

Iran). This contrasts with recent protests in South America, which shows up as a single regional outburst from October 2019 onwards.

As for future research, the RSUI and the event listing – which are both freely available online – provide a rich battery of documented examples against which theories about the economic (and non-economic) causes and consequences of social unrest can be tested. The global coverage and monthly frequency of the RSUI data provide the granularity to investigate important issues such as: the impact of unrest on financial markets and investment; the disruption to trade due to unrest; and the effect of corruption, governance, or poverty on unrest. A key challenge in all these areas is the issue of endogeneity: if social unrest and economic performance might each affect the other, or are jointly determined by a third factor. The analysis presented here suggests some ways of solving this problem. In particular, the results presented here on predictability and spillovers suggest that the exact timing of social unrest is a near-random event and that regional waves of unrest might be a useful instrument for domestic unrest.²¹ We leave these questions to future work.

²¹See Acemoglu (2019) for an example of this strategy when studying democratization, instrumented by regional waves.

References

[tbc]

A Further robustness checks

A.1 Alternate languages

[Here: French & Arabic terms table]

A.2 Comparison to other measures

[To add: ACLED and CNTS comparison charts]

B Adjustments to search terms

TBC: Table with listing of which searches are modified

C Further examples

To add: charts on interesting countries with labeled events. Possibly: Bangladesh, Korea, Philippines, Thailand, Burkina Faso, Burundi, Zimbabwe, Albania, France, Spain, Portugal, Romania, Jorda, Lebanon, Brazil, Ecuador, Haiti, Panama, Peru,

D Other narrative approaches

D.1 Middle East, 1999-2019

To add: discussion.

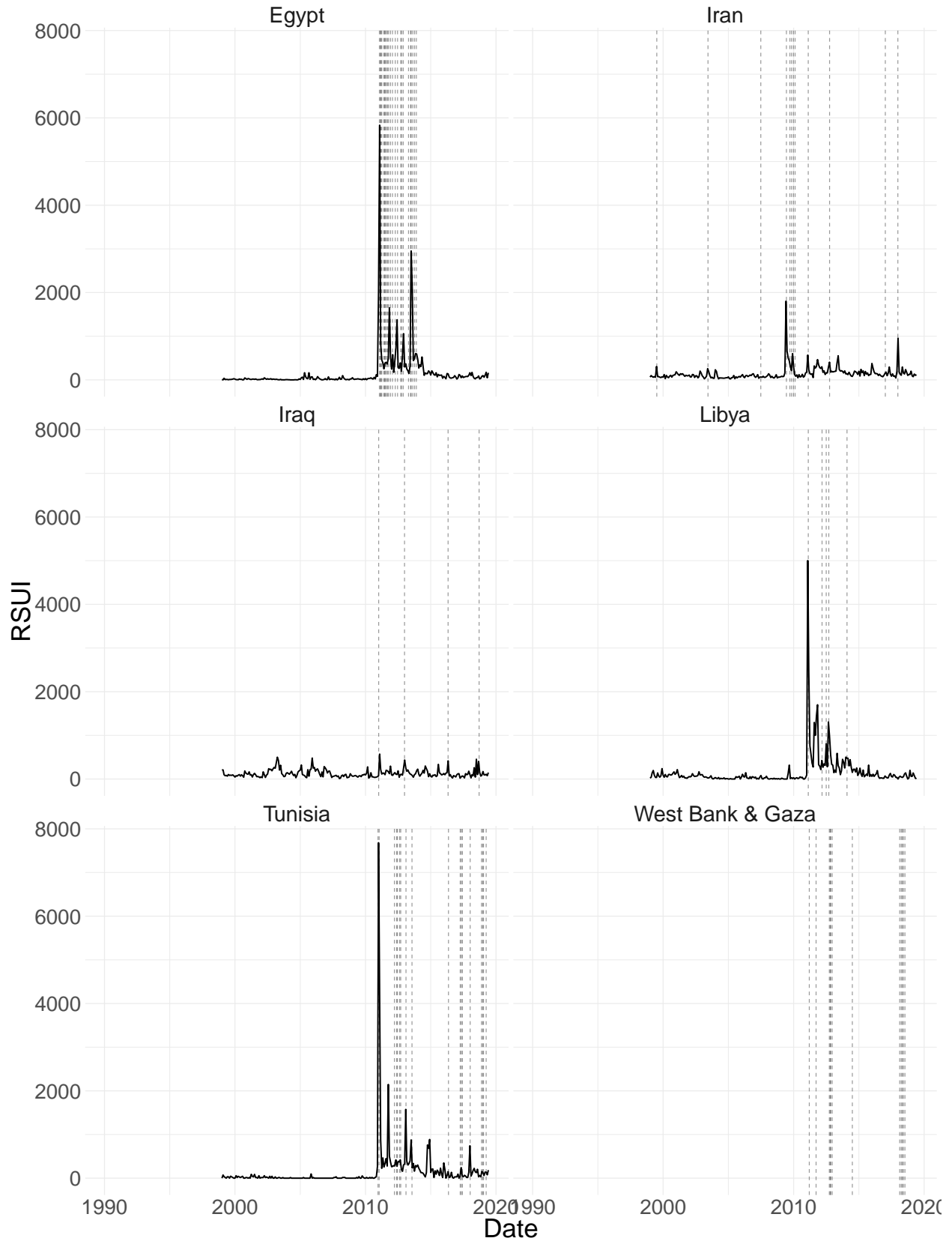


Figure 21: Middle East, January 1999 - June 2019: Major events identified by USIP

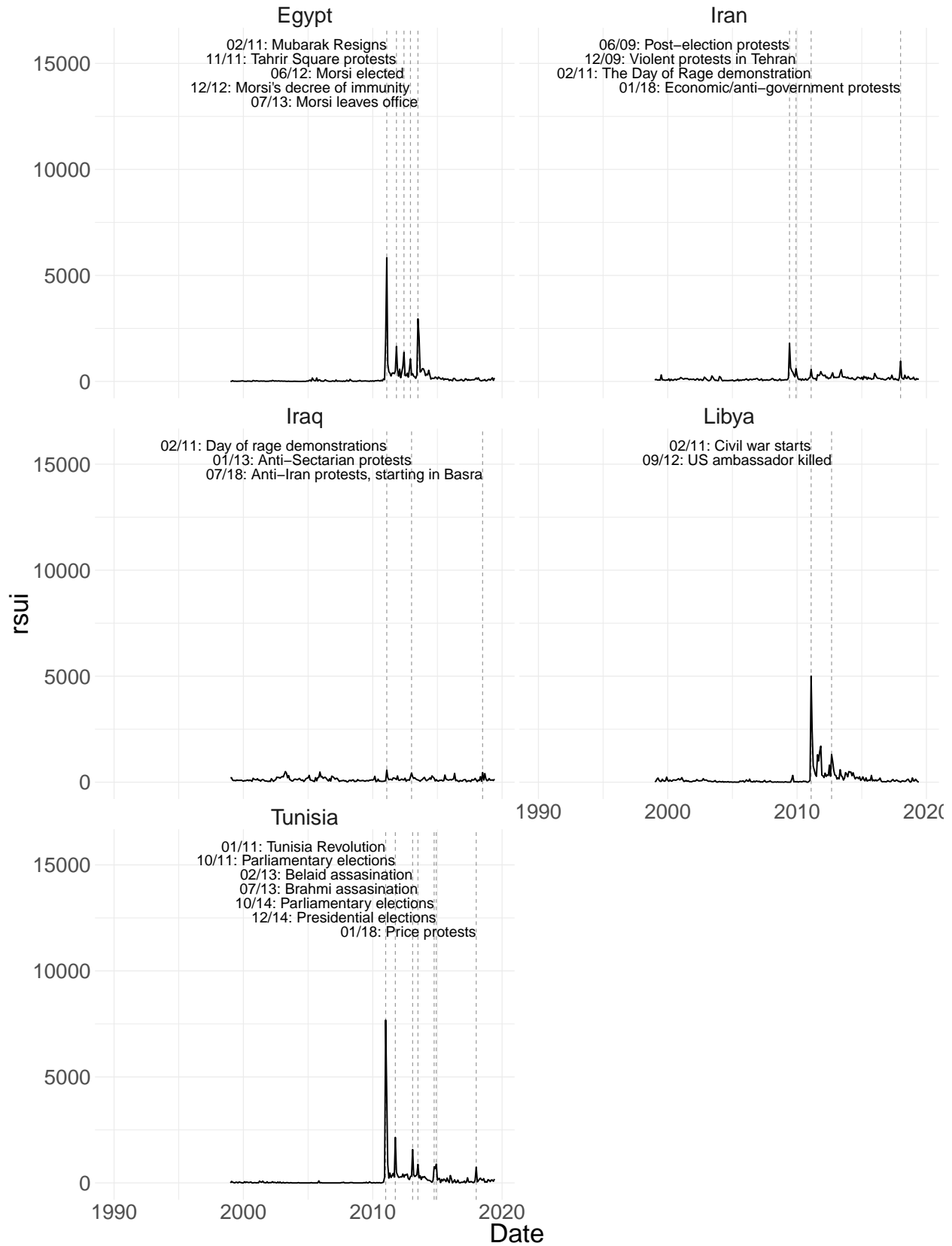


Figure 22: Middle East, January 1999 - June 2019: Major events identified from RSUI event coding

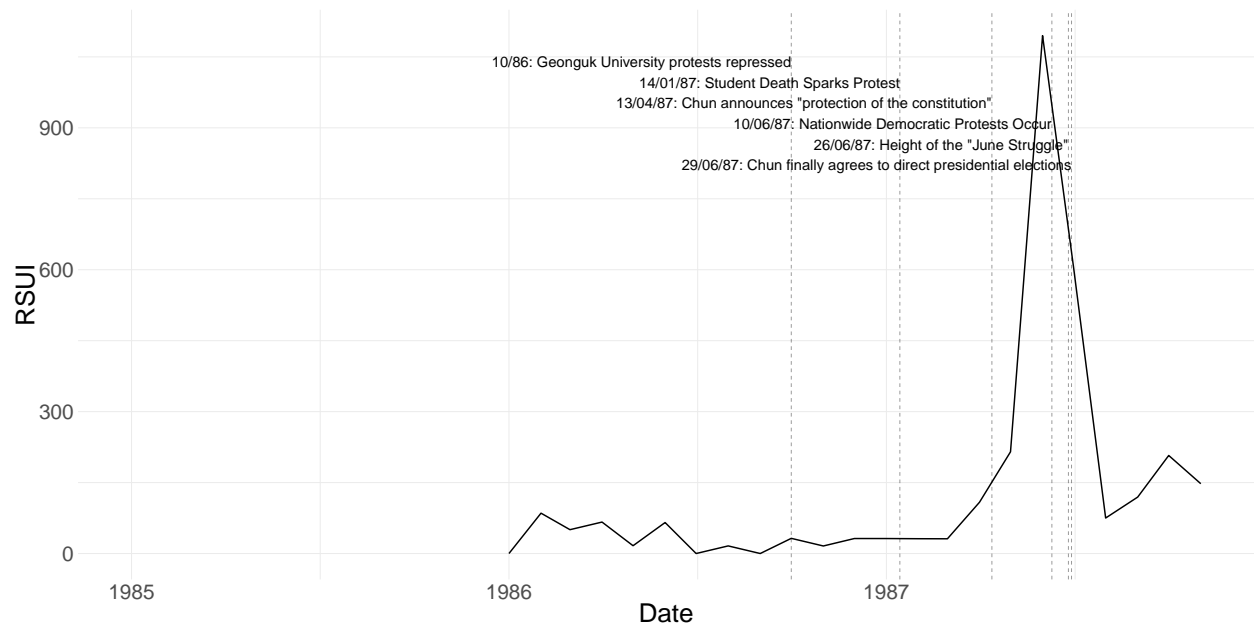


Figure 23: Korea, January 1986 - November 1987: Major events identified by Choe (2012)

D.2 Korea, 1986-1987

To add: discussion.

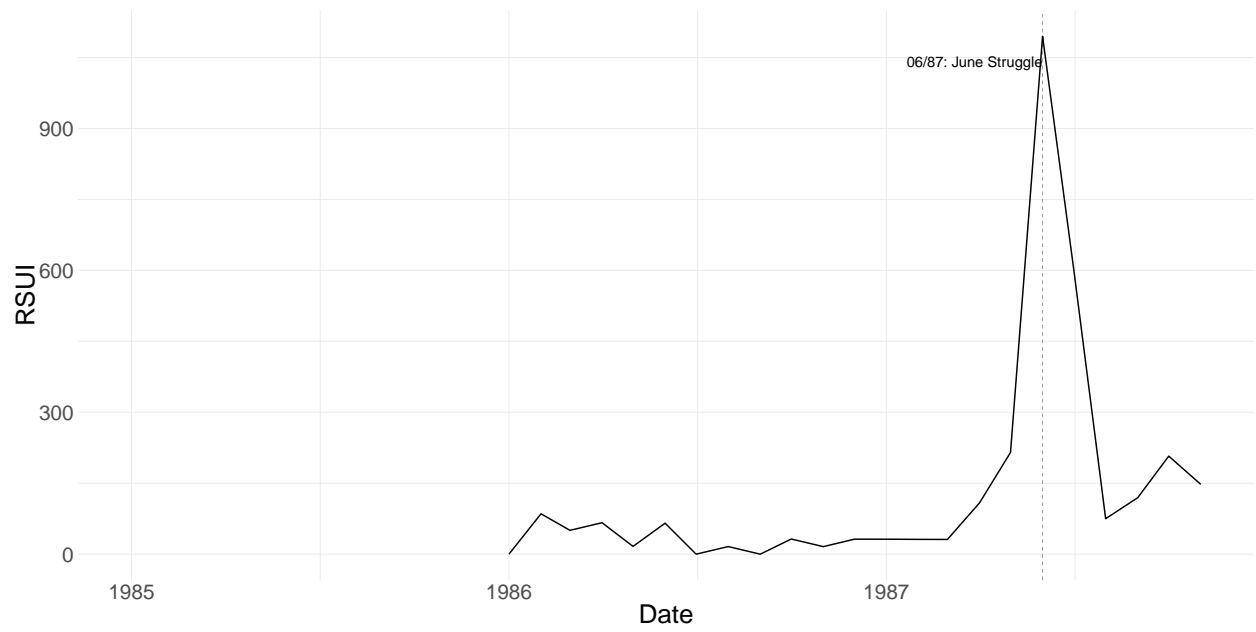


Figure 24: Korea, January 1986 - November 1987: Major events identified from RSUI event coding

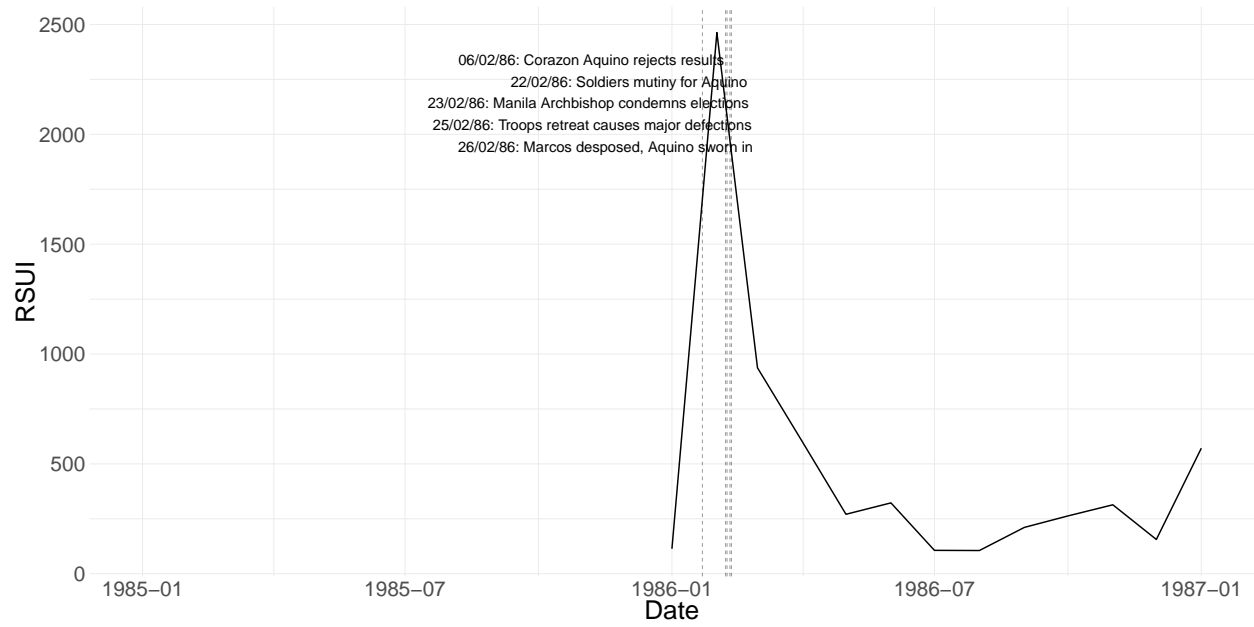


Figure 25: Philippines, January 1986 - January 1987: Major events identified by USIP

D.3 Philippines, 1999-2019

To add: discussion.

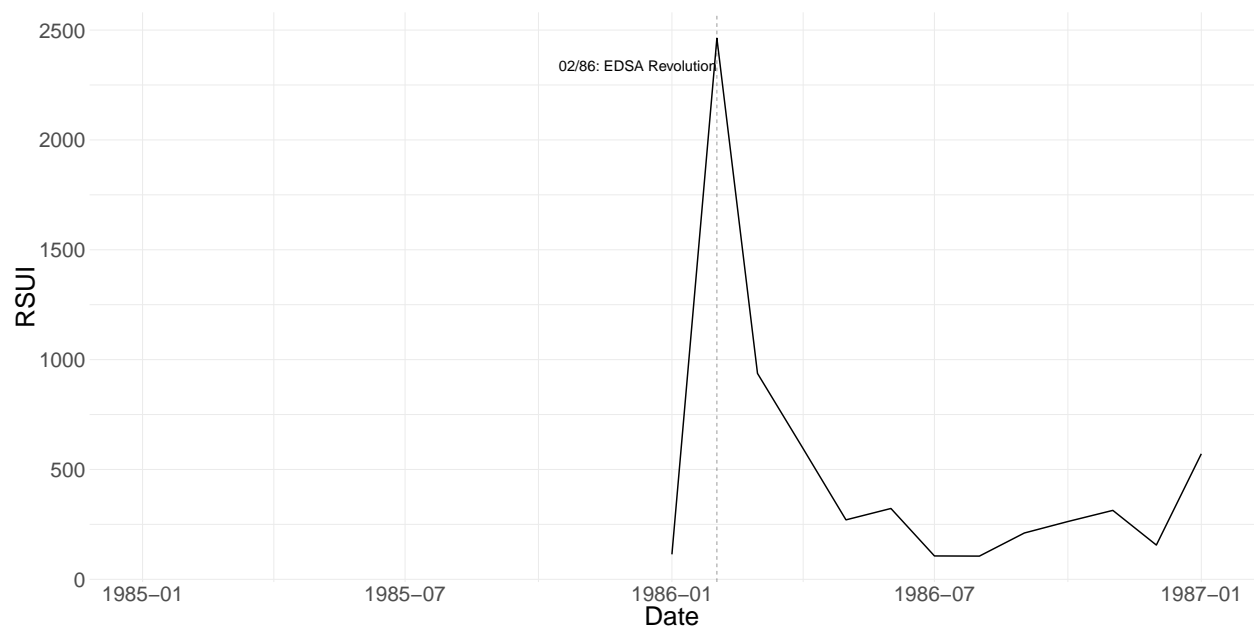


Figure 26: Philippines, January 1986 - January 1987: Major events identified from RSUI event coding

D.3.1 The End of Apartheid

The final test case for the RSUI is the end of the Apartheid regime in South Africa. For this episode we compare our approach to two in-depth analyses. One is a peer-reviewed article from a political science journal, [Klopp & Zuern] (2007), who provide a narrative account of the democratization of South Africa with a daily record of major events. The other, [Waldmeir (1997)], is a book-length journalistic account of the transition away from Apartheid based on interviews with major figures involved and which provides a monthly timeline of major events.

The end of Apartheid was a unpredictable and fast-moving event, and so the two external sources identify a large number of major events in this period. For the sake of transparency Figure 27 includes all those mentioned by the two external sources. Many events are important, but principally political rather than describing actual unrest. We therefore highlight with asterisks descriptions which are more plausibly described as social unrest. Nevertheless, by including all the events in our sources we allow the reader to assess for themselves whether this distinction is reasonable, and to form their own opinion on whether non-unrest events are being (wrongly) reflected in the index.

We interpret Figure 27 as convincing evidence that the RSUI reflects well the narrative histories of [Waldmeir] and [Klopp & Zuern]. The highest two peaks of the index match the two events which bookend the period, both of which were accompanied by massive public demonstrations: the release of Nelson Mandela in February 1990 and the first non-racial elections in late March 1994 (again, triggering a peak in April due to the monthly frequency). Likewise, key intermediate events which prompted or were due to unrest are also reflected by peaks in the RSUI, including: the deaths of 17 protesters at Sebokeng in March 1990; the breakdown of multi-party talks (CODESA) and mass ANC demonstrations starting in June 1992; the Bisho Massacre in September 1992; and the assassination of Chris Hani (the head of the ANC's armed wing) in April 1993.

The large number of events in these sources also provides an opportunity for several falsifications checks. A number of undoubtedly important but entirely political (i.e. not social unrest) events barely register on the RSUI. These include: the start of multi-party talks in December 1990, the Record of Understanding which restarted negotiations following the failure of CODESA; and agreements on the constitution and governance prior to the 1994 election.

Figure 28 presents the same period with RSUI-implied events overlaid. This again highlights that the event coding is accurate but a little conservative – identifying arguably the most important events of the period to the correct month, but only identifying three events.

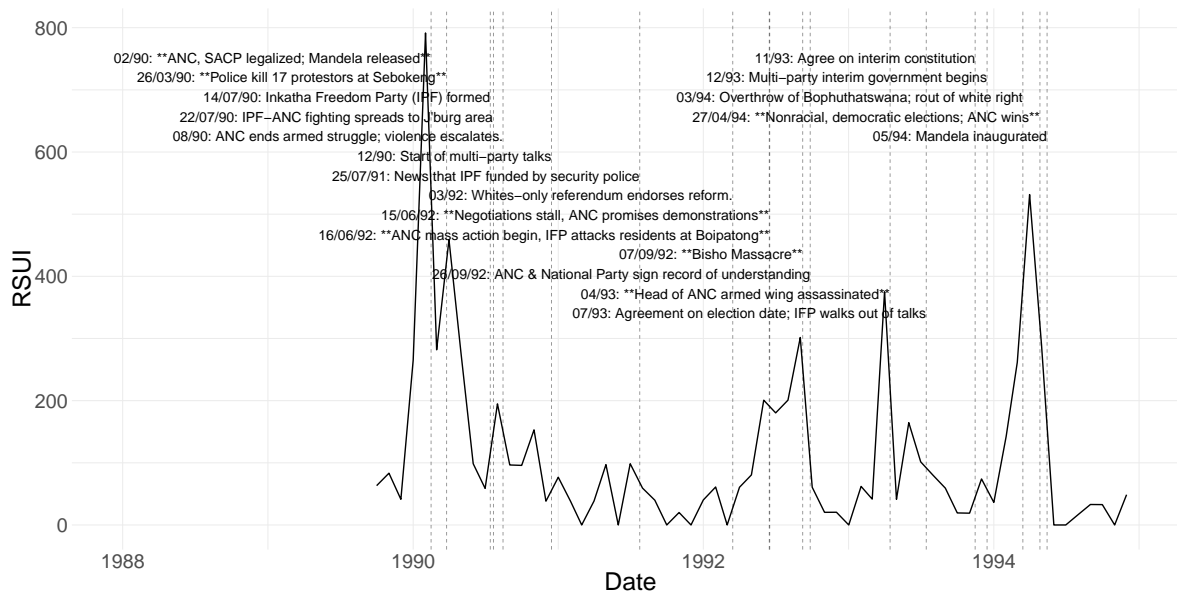


Figure 27: South Africa: Major events identified by Waldmeir (1997) and Klopp & Zuern (2007), October 1989-December 1994. Asterisks denote likely unrest events.

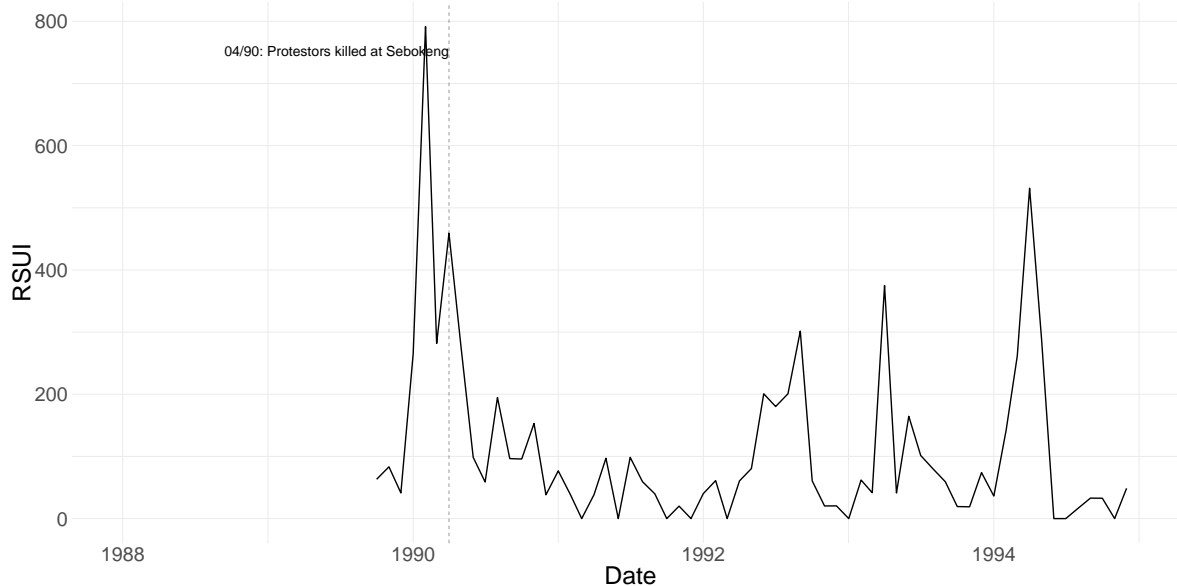


Figure 28: South Africa: Major events identified from RSUI event coding, October 1989-December 1994

E Full event listings

E.1 External events

E.1.1 Arab Uprisings

Country	Date	Description
Bahrain	2011-02-14	Protests start in Bahrain.
Bahrain	2011-03-14	Saudi Arabia sends armored columns into Bahrain. Security forces crush the uprising, carrying out mass arrests within a few days. Bahrain's king declares martial law. The monument in Pearl Square, the uprising's heart, is razed.
Egypt	2011-01-25	Egyptian protests start.
Egypt	2011-01-28	Egypt's Friday of Anger. Protestors battle police and win control of Tahrir Square in Cairo. Similar battles in other cities across Egypt.
Egypt	2011-02-11	Egypt's President, Hosni Mubarak, steps down. The Supreme Council of the Armed Forces takes power, promising a transition to civilian authority.
Egypt	2011-03-19	Egypt's first post revolutionary vote, on a constitutional referendum that could lead to early elections, ends in triumph for the Muslim Brotherhood and hints at rising polarization between Islamist and secularist camps.
Egypt	2011-11-01	There are more protests and violence in Egypt after the ruling military council moves to ensure it will play a dominant role even after civilian government is elected.
Egypt	2012-06-01	Muhammed Morsi of the Muslim Brotherhood is elected president of Egypt, narrowly defeating an ally of former president Hosni Mubarak.
Egypt	2012-06-30	There are huge protests across Egypt against President Muhammed Morsi. A pro-Islamist sit-in begins in Rabaa Square in Cairo.
Egypt	2012-08-14	Egyptian security forces clear the two main Islamist protest encampments, killing about a thousand people and arresting thousands more. Within weeks, most of the Muslim Brotherhood is jailed.
Egypt	2012-11-01	The Egyptian president Muhammed Morsi issues a decree temporarily granting himself broad powers above any court as the guardian of the revolution. Large-scale protests begin.
Egypt	2013-07-03	The Egyptian military deposes President Muhammed Morsi and puts him under arrest in an unknown location. Islamist protests expand and confrontation with police begin, with dozens shot and killed.
Egypt	2014-03-30	Abdel Fattah al Sisi is elected Egypt's president.

Libya	2011-02-15	Libya's first large-scale protests occur in the eastern city of Benghazi. A police crackdown leads to violent confrontations across Libya.
Libya	2011-02-27	Libya's National Transitional Council is formed. Two weeks later, France recognizes it as Libya's legitimate government; other countries follow.
Libya	2011-03-17	The United Nations Security Council authorizes military action in Libya. Air strikes begin immediately, with NATO in command.
Libya	2011-08-20	Muammar al Qaddafi, Libya's ruler for forty-two years, is captured and killed by rebels while trying to flee from the coastal city of Sirte.
Libya	2012-09-11	U.S. Ambassador to Libya, J. Christopher Stevens is killed in an attack on American compound in Benghazi following violent protests over an American
Libya	2012-11-01	Amid rising lawlessness in Libyan, nine people are killed in clashes between the military and Islamist militia fighters in Benghazi.
Libya	2014-06-25	Libyan elections are marked by low turnout, and are followed by clashes between followers of outgoing and incoming parliaments. Islamists carry out a coup in Tripoli.
Syria	2011-03-15	Demonstrations start in Syria, triggered by police mistreatment of teenagers arrested in the southern town of Daraa for writing anti-government graffiti. Protests spread quickly and are met with mass arrests and shootings.
Tunisia	2010-12-17	Mohamed Bouazizi sets himself on fire in Sidi Bouzid, Tunisia. Protests start and spread across Tunisia.
Tunisia	2011-01-14	Tunisia's president, Zine El Abidine Ben Ali, capitulates in the face of rising protests and flees the country with his inner circle.
Tunisia	2011-10-23	Tunisia holds parliamentary elections, the first to take place since the uprising. Ennanda, the Islamist party led by Rached Ghannouchi, wins a plurality and subsequently forms a coalition government
Tunisia	2013-07-25	In Tunis, Mohamed Brahmi is assassinated, making him the second opposition leader to be killed in five months. Protests against the Islamist-led government intensify.
Tunisia	2013-09-28	The Tunisian crisis eases as the Islamist Ennahda movement agrees to cede power to an independent caretaker government. Dialogue on a new constitution begins.
Yemen	2011-01-27	The first large-scale protests in Yemen take place.

Yemen	2011-03-18	Gunman aligned with Yemen's government open fire on protestors in the capital, killing at least fifty-two and prompting top military officers to defect. President Ali Abdullah Saleh signals soon afterward that he may step down before the year's end. Much of the country falls out of the government's control.
Yemen	2011-06-03	The Yemeni President Ali Abdullah Saleh is seriously injured by a bombing in the mosque of his compound. He is flown to Saudi Arabia for treatment, leaving the country rudderless.
Yemen	2011-11-23	After months of evasive maneuvering, the Yemeni president Ali Abd-uleh Saleh flies to Riyadh, Saudi Araia, to sign a transition document brokered by Arab and American diplomats.
Yemen	2014-09-10	In Yemen, the Houthi rebels, now in league with the former Yemeni president Ali Abdullah Saleh, capture Sanaa, becoming the country's de facto rulers.

Table 9: Verbatim descriptions of Arab Uprising events from Worth (2016)

E.1.2 Venezuela

Date	Source	Description
Feb 2014	Briceno-Ruiz	Between February and April, street protests occur supporting the Exit, a proposal pushed by Leopoldo Lopez, Antonio Ledezma, and Maria Corina Mochado to oust the regime. Protests are brutally suppressed.
Dec 2014	Briceno-Ruiz	Maduro calls extraordinary session of the National Assembly during recess to appoint his own judges, which would have been appointed by the National Assembly in 2016.
Dec 2015	Gutierrez	Maduro and Chavismo suffer significant electoral defeat when the opposition obtains the necessary majority in the National Assembly.
Dec 2015	Briceno-Ruiz	Vacation is suspended in the Supreme Court to hear a case against the results of the National Assembly election, which holds Opposition in contempt.
2016-01-15	Gutierrez	Maduro begins governing using an illegal decree of economic emergency, which has not been approved by the National Assembly.
Apr 2017	Briceno-Ruiz	A new wave of protests occurs from April to August 2017, and which are repressed violently by government. Torture, arbitrary arrests and human rights violations of young leaders occurs.
2019-01-05	Briceno-Ruiz	Condemning Maduro for usurping controversial May 2018 elections, the National Assembly declares Juan Guaido National Assembly president for the 2019 period.
2019-01-13	Briceno-Ruiz	Guaido is arrested and then released by members of the Bolivarian Intelligence Service (SEBIN), in a police raid, after which he is freed. A muddled explanation from the Minister of Information says it is carried out by rogue elements.
2019-01-21	Briceno-Ruiz	The Supreme Court, controlled by Maduro, declares Guaido's appointment null, and all acts that arrive from it void.
2019-01-23	Briceno-Ruiz	Guaido calls for a huge protest on January 23, a symbolic day for Venezuelans marking when former dictator Marcos Peres Jimenez was overthrown in 1958.
2019-01-24	Briceno-Ruiz	The high military commander, controlled by Chavismo, gives his unconditional support to Maduro.
2019-01-25	Briceno-Ruiz	In a public appearance in front of 1,000 Venezuelans in Caracas, Guaido declares himself interim president of Venezuela. Mass protests begin.

Table 10: Verbatim descriptions of Venezuelan events 2013-2019 from Gutierrez (2017) and Briceño-Ruiz (2019)

E.1.3 Color Revolutions

Country	Date	Description
Serbia	2000-09-24	Incumbent president Slobodan Milosevic scheduled early presidential elections for September 24, 2000, assuming that he will easily win.
Serbia	2000-09-26	The Yugoslav Election Commission announces that [rival] Kostunica has gained the most support with 48.2 percent of the vote, and in a second round run-off will face Milosevic.
Serbia	2000-10-05	Opposition leaders call for a total blockade of all institutions in Serbia, and over 200,000 people take to the streets of Belgrade....Over half a million people march on Belgrade and quickly seized control of major government institutions.
Serbia	2000-10-06	The following day, Milosevic resigns.
Georgia	2003-11-02	Following the November 2, 2003, Georgian parliamentary elections, small-scale protests begin in Tbilisi as various reports of fraud begin to accumulate.
Georgia	2003-11-22	These protests come to a head as Shevardnaze tries to address the inaugural session of the newly elected parliament.
Georgia	2003-11-23	After originally claiming that he would not step down, Shevardnaze resigns the following day.
Georgia	2004-01-04	New presidential elections are set for January 4, 2004, which Saakashvili wins with 96 percent of the vote in an essentially uncontested election.
Ukraine	2004-10-31	On October 31, 2004, Viktor Yanukovich, the officially anointed successor to the regime of outgoing president Leonid Kuchma, and opposition leader Viktor Yushchenko, receive 39.3 percent and 39.9 percent of the vote, respectively.
Ukraine	2004-11-21	As neither surpass the 50 percent threshold necessary for a first-round victory, the two advance to a November 21 run-off. After reports of voter fraud, the Central Election Commission declares Yanukovich the winner by a 49.5 percent to 46.6 percent margin.
Ukraine	2004-11-27	Over the following weeks, the protests continue in Kiev despite frigid conditions.
Ukraine	2004-12-03	The crisis is resolved peacefully through existing institutions following a parliamentary resolution declaring the results invalid. Ukraine's Supreme Court on December 3 [...] declares the second round election results to be invalid and orders that the round be run again on December 26.
Ukraine	2004-12-26	The second round features over 12,000 international observers, and Yushchenko wins with 52.0 percent to 44.2 percent.

Kyrgyz Rep.	2005-02-27	The February 27 and March 13, 2005, parliamentary elections follow a change in the composition of the Kyrgyz Parliament and the election rules used to select members for that body.
Kyrgyz Rep.	2005-03-15	Protests begin in the southern Kyrgyz city of Jalalabad demanding Akaev's ouster, and over the next week spread to other parts of the country including Talas and Osh. These protests culminate two weeks later with 30,000 protesters converging in the main square of Bishkek.
Kyrgyz Rep.	2005-04-04	Akayev eventually agrees to resign.
Kyrgyz Rep.	2005-07-10	Kurmabek Bakiyev is elected president with over 88 percent of the vote, but the fraudulently-elected parliament is allowed to continue to operate without elections as a part of negotiations between the various opposition groups.

Table 11: Verbatim descriptions of Color Revolutions from Tucker (20007)

E.1.4 Korea

Date	Source	Description
Oct 2016	Kim	A scandal exposes that Choi, personal confidante of Park, has been conspiring with the president to amass a fortune, shape national policy and secure positions for her friends and relatives.
Oct 2016	Kim	Blacklist is discovered and published by Hankook Ilbo showing that the Park Administration targeted creative professionals who were seen as anti-government. The blacklist includes over 9,000 visual artists, writers, film directors, and others critical of the Sewol Ferry sinking.
2016-10-29	Kim	Beginning on October 29th, weekly anti-Park protests are held on an enormous scale for 17 consecutive weeks,
2016-11-11	Kim	Candlelight protest held on November 12, 2015.
2016-12-03	Kim	At protest height on December 3rd, the total estimate of people who join the protests on a single day exceeds 2.3 million people across the country - 1.6 million in Seoul alone.
2016-12-09	Kim	After weeks of debate, on December 9th the South Korean National Assembly votes to pass an impeachment bill, holding that the President has violated her oath of office as well as core tenets of the Constitution and laws governing the operation of the presidency.
2017-01-07	Kim	Parents and relatives of the Sewol victims are prominently involved in the Candlelight protests in Seoul and elsewhere. They carry a banner with images of victims at a rally to commemorate the 1000-day anniversary of the ferry sinking.
2017-03-09	Kim	Constitutional Court justices appear on national television, ruling 8-0 to uphold the National Assembly vote on impeachment.
2017-05-09	Kim	In snap election held on May 9th, liberal Moon Jae-in wins by a landslide, taking 41 percent of the vote, and begins his term.

Table 12: Verbatim descriptions of Korean events 2016-2017 from Kim (2017)

E.1.5 Korea 1987

Date	Source	Description
Oct 1986	Choe	After protests at Geonguk University in October 1986, the Chun government harshly suppresses the protesting students and claims they are supporters of the communist North Korean regime.
1987-01-14	Choe	Many Korean citizens participate in a protest condemning the Chun regime for killing Park Jong Chul, a student activist, under torture.
1987-04-13	Choe	The Chun government announces Protection of the Constitution, revoking promise and prohibiting any discussion of constitutional revision, a peaceful government transfer under the provisions of the present constitution, or the enforcement of the presidential election by the end of 1987.
1987-06-10	Choe	Nationwide democratic movement known as June Struggle begins, and more than 400,000 participate despite the Chun government mobilizing 60,000 police to suppress the rallies.
1987-06-26	Choe	More than 1,400,000 people in all parts of country join the democratic movements under the slogan of 'Cancellation of the April 13 Announcement of the Protection of the Constitution and Constitutional Revision of Direct Presidential Elections'.
1987-06-29	Choe	The Chun government makes a democratic declaration and agrees to constitutional revision for direct presidential elections.

Table 13: Verbatim descriptions of Korean events 2016-2017 from Kim (2017)

E.1.6 Philippines 1987

Date	Source	Description
1986-02-06	Schock	Widow of Benigno, Corazon Aquino, responding to the fraudulent declaration of electoral victory for Marcos by the Batasang Pambansa (national assembly), led a rally of over two million people, proclaiming victory for herself and the people against Marcos.
1986-02-22	Schock	Defense Minister Jaun Ponce Enrile leads two battalions of soldiers in a mutiny, barricading two military camps in Quezon City. He is joined by General Fidel Ramos, and they announce their withdrawal of support from Marcos for Aquino.
1986-02-23	Schock	Manila Archbishop Jamie Cardinal Sin condemns the election as fraudulent, declaring that the regime has lost its moral authority to govern, and urging people to nonviolently resist the Marcos dictatorship. In response, hundreds of thousands assemble near military camps.
1986-02-25	Schock	Marcos orders two battalions to the military camps to put down the mutiny, but as the tanks approach civilians form human barricades. The loyalist troops retreat in the face of mass unarmed civilians led by priests and nuns, which sparks nationwide defections.
1986-02-26	Schock	Corazon Auino is sworn in as president and Marcos is escorted to Honalulu by the US military.

Table 14: Verbatim descriptions of Korean events 2016-2017 from Kim (2017)

E.1.7 End of Apartheid

Date	Source	Description
Feb 1990	Waldmeir	de Klerk legalizes the ANC and SACP and releases Mandela.
1990-03-26	Klopp & Zuern	In a protest in Sebokeng, the police fire upon a crowd, killing seventeen unarmed protestors and injuring over 400. The ANC responds by suspending prenegotiation talks.
1990-07-14	Klopp & Zuern	Inkatha's leader Mangosuthu Bethuelezi announces that Inkatha will become a national political party open to all races: the Inkatha Freedom Party (IPF).
1990-07-22	Klopp & Zuern	Fighting between Inkatha and the ANC, which has become endemic in KwaZulu-Natal, spreads to the Johannesburg area.
Aug 1990	Waldmeir	ANC announces it is suspending armed struggle; violence escalates.
Dec 1990	Waldmeir	Start of formal multi-party talks, the Convention for a Democratic South Africa (CODESA).
1991-07-25	Klopp & Zuern	The Weekly Mail breaks Inkathagate, revealing a state-supported security police operation that funded Inkatha in its violent campaign against the ANC.
Mar 1992	Waldmeir	Whites-only referendum endorses reform.
1992-06-15	Klopp & Zuern	When multiparty negotiations at the Convention for a Democratic South Africa (CODESA) reach a deadlock, the ANC responds to the statement with a promise to demonstrate.
1992-06-16	Klopp & Zuern	After ANC mass action begins, IFP supporters attack residents at Boipatong.
1992-09-07	Klopp & Zuern	After another massacre in Bisho, de Klerk, who had been employing the continuing violence as a positioning strategy, recognized the pending threat of a complete breakdown of negotiations.
1992-09-26	Klopp & Zuern	The ANC and the National Party sign the crucial Record of Understanding on September 26, 1992, effectively marginalizing the IFP.
Apr 1993	Waldmeir	Chris Hani (head of ANC armed-wing) assassinated.
Jul 1993	Waldmeir	Agreement reached on election date, but IFP walks out of talks.
Nov 1993	Waldmeir	Agreement on an interim constitution.
Dec 1993	Waldmeir	Transitional Executive Council, the multi-party interim government, begins to operate.
Mar 1994	Waldmeir	Overthrow of Bophuthatswana (a Bantuland), rout of the white right.
1994-04-27	Klopp & Zuern	South Africa holds its first nonracial, democratic elections, with ANC the victor.
May 1994	Waldmeir	Mandela is inaugurated. Government of National Unity formed.

Table 15: Verbatim descriptions of South African events 1990-1994 from Klopp & Zuern (2007) (daily) and Waldmeir (1997) (monthly)

E.1.8 USIP Middle East Timelines

Country	Date	Description
Iran	1999-07-08	Students demonstrated at Tehran University after reformist Salaam newspaper was closed by the judiciary. Protests continued for six days. More than 1,000 students were arrested.
Iran	2003-06-10	Students led protests against raising university fees and privatization of universities that grew into wider pro-democracy demands. They also condemned President Khatami for failing to support them.
Iran	2007-06-27	Protests erupted after the government imposed fuel rationing.
Iran	2009-06-13	The opposition Green Movement launched the most serious challenge to the theocracy since the revolution. Millions turned out on the streets of several Iranian cities for the next two weeks with banners declaring Where is my vote?
Iran	2009-09-18	On Qods Day (or Jerusalem Day), thousands demonstrated across Iran in support of opposition candidate Mousavi. A dominant slogan became, No to Gaza and Lebanon. I will give my life for Iran, rejecting the governments support of Palestinian and Lebanese militancy. Qods Day marks the last Friday of the month of Ramadan, which Ayatollah Khamenei had dedicated as a day of solidarity with the Palestinian people
Iran	2009-11-04	On the anniversary of the U.S. Embassy takeover, tens of thousands of protesters gathered across major cities. Instead of chanting Death to America, protestors chanted, Death to the dictator, a reference to Irans supreme leader.
Iran	2009-12-27	Commemorations on Ashoura, the holiest day for Shiites, turned into violent anti-government protests.
Iran	2010-02-11	Both pro-government forces and members of the opposition movement turned out onto the streets on the anniversary of the revolution. But security forces prevented the opposition from mass protests, marking the success of a crackdown against the Green Movement.
Iran	2011-02-14	The first mass anti-government demonstrations in a year took place following uprisings throughout the Arab world. Violent clashes with security forces reportedly left two dead. Opposition groups reported that 1,500 people were detained, but authorities said only 150 were detained.
Iran	2012-10-03	Iranian riot police broke up demonstrations at a major bazaar in Tehran. Protestors blamed President Ahmadinejad for the plummeting value of the rial. The bazaar closed for three days, due to the demonstrations.

Iran	2017-01-10	More than 2 million people reportedly participated in former President Rafsanjanis funeral procession, including top political figures. Some mourners took the opportunity to protest by chanting pro-opposition slogans so loudly that state television played music during the broadcast to drown the sound out.
Iran	2017-12-27	The Girls of Revolution Street protest movement against the mandatory hijab began. Female protesters recorded videos of themselves without a hijab, or waving their hijabs on street corners and other public places.
Tunisia	2010-12-17	Mohammed Bouazizi, a street vendor, set himself on fire to protest government corruption, igniting growing protests throughout the month.
Tunisia	2011-01-18	Protests escalated and spread nationwide. Police killed hundreds in confrontations.
Tunisia		Every Sunday, people protested nationwide for further reforms. (15)
Tunisia		Every Sunday, people protested nationwide for further reforms. (15)
Tunisia	2012-03-20	On the 56th anniversary of Tunisias independence from France, thousands marched in Tunis to call for a civil state. March 25
Tunisia	2012-05-20	Thousands rallied in Kairouan in support of Ansar al Sharia, a hardline Islamist group.
Tunisia	2012-06-12	In Tunis, Salafis rioted, protesting an art exhibit that they found offensive. One man was killed, 62 policemen were injured, and 160 protesters were arrested. A curfew was imposed.
Tunisia	2012-08-13	In Tunis, thousands protested a constitutional article that would lower womens status. Aug. 22
Tunisia	2012-09-12	Tunisians protested an anti-Islam film in front of the U.S. Embassy in Tunis. Salafis later stormed the compound and started fires inside the embassy.
Tunisia	2013-02-07	Protests erupted after leftist opposition leader Chokri Belaid was assassinated. Prime Minister Jebali promised to restructure the Islamist-dominated government. He threatened to quit if his party did not support his plan to install a cabinet of technocrats. Jebali eventually resigned. Feb. 25
Tunisia	2013-07-25	Secular politician Mohamed Brahmi was assassinated, sparking large-scale protests.
Tunisia	2016-05-11	Police carried out raids in Ettadamen, a Tunis suburb, and the southern town of Tataouine. Tunisian authorities said four police were killed when a suspected Islamist militant detonated a suicide-bomb belt during a raid in Tataouine. Four militants were killed in the raids. On the following day, Tataouine residents demonstrated against terrorism.

Tunisia	2017-04-05	Employees of oil companies in Tataouine went on strike after 24 workers were laid off by Winstar, a Canadian company. Unemployed youth and other residents joined the protest to demand the creation of thousands of jobs and investment in a regional development fund. Hundreds of people started a sit-in between the main road and oil fields. Talks initially failed, but the Tunisian General Labour Union (UGTT) eventually joined the demonstration and facilitated another round of negotiations. The government and private companies accepted most of the protesters demands, and the sit-in ended on June 16.
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Tunisia	2018-01-08	Tunisians protested price hikes on common goods and clashed with police in more than a dozen cities and towns. At least one person was killed and almost 800 people were arrested after five nights of protests. On January 14, government officials promised reforms, including an increase in government aid to needy families. Protests resumed after two days of calm in the capital.

Tunisia	2018-11-22	Some 650,000 civil servants went on strike to protest mounting inflation and the governments refusal to raise wages. Thousands demonstrated nationwide. The prime minister had been under pressure from international lenders who threatened to stop financing Tunisias economy if the government did not tackle its large budget deficit. In November, nearly 750 protests, mainly over the economic situation, were held across Tunisia.
Tunisia	2018-12-24	Abderrazak Zorgui, a 32-year-old journalist, set himself on fire in the western city of Kasserine to denounce joblessness and desperate economic conditions He livestreamed the self-immolation on YouTube. His death ignited three days of protests that spread to several cities, including Tunis. In the eight years since the 2011 Jasmine Revolution, more than 300 Tunisians set themselves on fire to protest, according to Chaima Bouhlel, former president of Al-Bawsala, a Tunisian watchdog group. Another 2,000 made failed attempts in a reflection of the challenges facing Tunisias fragile democracy.
Tunisia	2019-01-17	The UGTT, the countrys largest union of 670,000 public servants, staged a massive strike to challenge the governments refusal to raise civil servant wages. The protesters gathered outside UGTT headquarters and Habib Bourghiba Avenue in Tunis and shouted many of the same slogans used in the 2011 revolution. The one-day strike affected ports, schools, hospitals, state media, and government offices.
Tunisia	2019-04-01	The government approved a 6.5 percent raise in minimum wages for industrial and agricultural workers to placate discontent. The move came two days after large demonstrations in Sidi Bouzid to protest deteriorating economic conditions.
Iraq	2011-01-05	Shia cleric Moqtada al-Sadr returned to Iraq after three years of voluntary exile in Iran. In his first public statement, al-Sadr urged his followers to resist the occupiers of Iraq. On February 25, a Day of Rage swept the country as tens of thousands of Iraqis protested the newly elected government. Some 23 people were killed.
Iraq	2012-12-28	Massive protests spread throughout Iraq in Fallujah, Ramadi, and Anbar province, all Sunni-majority areas. Tens of thousands of Sunnis demonstrated against the Shia-dominated government of Maliki.

Iraq		(15) The Sunni insurgency intensified across Iraq. Sectarian violence, kidnappings, and bombings escalated levels not seen since 2006 and 2007. On April 8, Baghdadi announced the absorption of the al Qaida-backed Nusra Front in Syria. He said the combined group would be known as the Islamic State in Iraq and Syria (ISIS). But the leader of the Nusra Front, Julani, rejected the merger and instead declared allegiance to al-Qaida. In April 2013, the Hawija regions anger at the government exploded after the Iraqi Army attacked Sunni protestors exercising what they considered civil disobedience. Up to 200 civilians were killed and at least 150 were injured. Such incidents fueled the surge of ISIS in the area the following year. By June 2014, ISIS had seized Hawija and much of southern Kirkurk, often with help from disaffected local residents. On July 21, 2013, ISIS launched its second 12-month campaign, Soldiers Harvest, on Iraqi security forces and to capture territory. On July 22, ISIS attacked Abu Ghraib prison freeing between 500 and 1000 inmates, including senior al-Qaida leaders and other militants.
Iraq	2016-04-30	Supporters of al- Sadr broke into the Green Zone and stormed Parliament. Protesters demanded a new government to fight corruption after weeks of political gridlock and turmoil because parties insisted on appointing ministers along sectarian lines.
Iraq	2018-09-15	
Egypt	2011-01-25	Organized on Facebook for a Day of Revolution on Jan. 25, tens of thousands of protesters nationwide called for President Hosni Mubaraks resignation. The government shut down the internet and blocked cell phone networks. Police killed hundreds of protesters over the next few weeks.
Egypt	2011-02-25	Organized on Facebook for a Day of Revolution on Jan. 25, tens of thousands of protesters nationwide called for President Hosni Mubaraks resignation. The government shut down the internet and blocked cell phone networks. Police killed hundreds of protesters over the next few weeks. Feb. 25-26 Protesters in Tahrir Square called for Prime Minister Ahmed Shafiqs resignation, Mubaraks prosecution and faster reform. Police beat and forced them from the square. The SCAF later apologized for the brutality.
Egypt	2011-03-04	Hundreds of protesters attacked the State Security Investigations headquarters in various cities and looked through documents.
Egypt	2011-04-01	In Tahrir Square, thousands demonstrated to demand Mubaraks prosecution and faster reform.

Egypt	2011-05-27	In Tahrir Square, 100,000 people protested on a Second Day of Rage. The new government allowed the first free passage out of the Gaza Strip, a policy change from Mubaraks administration.
Egypt	2011-06-26	After the trial of the former interior minister was postponed, police and thousands of protesters clashed in Tahrir Square, the most intense violence since the initial uprising. The army intervened on June 29.
Egypt	2011-07-01	Protesters called for faster reforms in Tahrir Square on a Friday of Retribution.
Egypt	2011-08-08	Dozens of Mubarak-era officials were charged with murder for their role in the January protests. Tens of thousands protested in Tahrir Square against the SCAF. The army forcibly cleared the square on August 1.
Egypt	2011-09-09	Protests against the SCAF took place every Friday in Tahrir Square for several weeks.
Egypt	2011-10-09	Protests against the SCAF took place every Friday in Tahrir Square for several weeks.
Egypt	2011-12-01	Prominent activist Alaa Abd al-Fattah was arrested and charged with inciting violence against the military. Thousands in Tahrir Square protested his arrest. The government announced the release of 334 political prisoners after a letter by al Fattah was published. Nov. 18-29
Egypt	2012-01-27	Tens of thousands rallied in Tahrir Square and called for SCAF to transfer power to a civilian government. After the final round of elections on January 3, the Muslim Brotherhood won 47 percent of parliamentary seats and Salafi Islamist parties took 27 percent of seats.
Egypt	2012-04-12	Parliament passed a bill to bar former top Mubarak officials from running for office for 10 years. The next day, tens of thousands of Islamists protested against the candidacies of Mubarak-era officials. The election commission barred candidates
Egypt	2012-06-16	The Tamarod (Rebel) movement issued a statement giving Morsi until 5 p.m. the following day to resign or risk facing complete civil disobedience. Before the June 30 protests, Tamarod had reportedly collected up to 22 million signatures for its petition demanding early elections. Several ministers resigned as demonstrations continued nationwide. General el-Sissi called the Morsi government to resolve the political crisis within 48 hours or face military intervention. The Salafi al-Nour Party called for early elections.

Egypt	2012-09-11	Thousands of Egyptians protested against an anti-Islam film, and some breached the walls of the U.S. Embassy in Cairo. They destroyed an American flag. President Obama expressed concern over the government's response to the situation in Cairo in a phone call with President Morsi. On the following day, Morsi explicitly denounced violent demonstrations and pledged to protect American citizens and property. Sept. 14-15
Egypt	2012-10-11	The constitutional assembly unveiled a new draft constitution that gave religion a more prominent role in the legislative and judicial process. Liberal and secular groups protested the insertion of Islam. Some ultra-conservative Salafis also rejected the document, arguing that it did not adequately enshrine Islamic law.
Egypt	2012-11-22	President Morsi issued a controversial decree exempting himself from judicial supervision and shielding the Constituent Assembly and Shura Council from dissolution by court order. The opposition condemned the moves and organized protests. Several of Morsi's 21 advisors resigned.
Egypt	2013-04-19	Thousands of Morsi supporters protested on April 19, calling for the ouster of Mubarak-era officials from judicial posts. Justice Minister Ahmed Mekki resigned ahead of a cabinet reshuffle. He had reportedly threatened to quit in November 2012 after Morsi adopted expansive powers.
Egypt	2013-06-17	President Morsi appointed 17 new provincial governors, including seven Islamists. The most controversial appointee was the governor of Luxor, Adel al Khayat. He was a former member of the Islamist group Gamaa Islamiya, which claimed responsibility for killing 62 people, mostly foreign tourists, in 1997. The appointments led to protests in several governorates, clashes between Brotherhood supporters and opponents. Al Khayat announced his resignation on June 23. June 30
Egypt	2013-07-01	The Tamarod (Rebel) movement issued a statement giving Morsi until 5 p.m. the following day to resign or risk facing complete civil disobedience. Before the June 30 protests, Tamarod had reportedly collected up to 22 million signatures for its petition demanding early elections. The Egyptian military also issued an ultimatum. Several ministers resigned as demonstrations continued nationwide. General el-Sissi called the Morsi government to resolve the political crisis within 48 hours or face military intervention July 5

Egypt	2013-08-16	The Brotherhood called for a march of anger to protest the military coup and crackdowns on sit-ins. Hundreds of Morsi supporters gathered at a mosque in Cairo's Ramses square after Friday prayers. Clashes with security forces and armed local residents left at least 173 dead including eight police officers. More than 1,300 were reportedly injured. Protestors barricaded themselves in al Fatah mosque. The next day, security forces cleared people out after gunmen reportedly shot down at them from a minaret.
Egypt	2013-10-06	At least 53 people were killed and 200 were injured in clashes between Morsi supporters and security forces on the 40th anniversary of Egypt's 1973 attack on Israel. Authorities detained more than 400 people reportedly involved in the violence.
Egypt	2013-11-24	The government issued a new law banning unauthorized public gatherings of more than 10 people. Demonstrators would risk spending seven years in prison for using violence or one year for covering their faces or protesting outside of a place of worship. Participants would be fined up to \$1,500 dollars. The Freedom and Justice Party condemned the new law. The Brotherhood continued to organize large anti-coup demonstrations across Egypt. Secular groups like the April 6 Youth Movement and human rights groups also criticized the new law.
Libya	2011-02-15	In Benghazi, a small rally demanded the release of a human-rights lawyer and condemned a prison massacre. The civil protest grew into a large anti-Qaddafi demonstration. Police and government forcibly tried to quash it.
Libya	2012-03-06	Despite protests against them, leaders of eastern oil-rich Cyrenaica, including Benghazi, declared the province to be semi-autonomous. On March 7, NTC Chairman Jalil vowed to use force if necessary to prevent Cyrenaica from becoming autonomous.
Libya	2012-07-01	Protesters stormed Benghazi's election headquarters and burned ballots after the eastern third of Libya was denied its request for one-third of assembly seats.
Libya	2012-09-11	Heavily armed Islamic militants attacked the U.S. consulate in Benghazi, killing Ambassador Chris Stevens, three members of his staff and 10 Libyan security guards. For the next three days, Libyans protested the killing of American diplomatic staff in major Libyan cities. Libyan officials blamed al Qaeda-linked militants for the attack.

Libya	2014-02-03	Islamist lawmakers in the GNC extended the assembly's mandate beyond February 7, when it was due to expire. Some members wanted to give a special assembly time to draft a new constitution. Secular militias from Zintan threatened to attack Tripoli in response. Thousands protested the extension, calling for new elections or a different political body to replace the GNC in the meantime
West Bank & Gaza	2011-03-15	Tens of thousands of Palestinians in Gaza and the West Bank took to the streets to call for unity among political factions. Hamas police used violence to disperse protests in Gaza.
West Bank & Gaza	2011-09-21	Thousands of Palestinians rallied across the West Bank to support the bid for statehood at the United Nations. More than 20 were injured in clashes between youths and Israeli soldiers in Ramallah.
West Bank & Gaza	2012-09-26	At least 500 protesters in Gaza called for the overthrow of Hamas after a three-year-old boy died in a fire during a power outage.
West Bank & Gaza	2012-10-23	Palestinian Authority employees in ministry offices, schools and clinics went on strike to protest cutbacks in services. Employees of the U.N. agency for Palestinian refugees also went on strike to protest cuts and the layoff of 130 workers. Qatar's emir arrived in Gaza with a \$250 million aid package and became the first head of state to visit the blockaded territory since 2006.
West Bank & Gaza	2012-11-02	President Abbas appeared to make a symbolic concession to Israel during a television interview. He said that he had no right to live in Safed, the town from which his family fled during the 1948 war. His comments seemed to negate the Palestinian refugees' claim to a right of return. Abbas retracted his remark after it sparked large protests in Gaza. He later clarified in another interview that he would personally give up living in Safed, but that he was not forfeiting the Palestinian right of return.
West Bank & Gaza	2012-12-14	Hamas held rallies across West Bank cities with the permission of the Palestinian Authority for the first time in five years. Dec. 19
West Bank & Gaza	2014-07-02	Mohamed Abu Khdeir, a 16-year-old Palestinian from Jerusalem, was abducted near his home and burned to death by Israeli extremists seeking revenge for the deaths of three Israeli teens. Violent protests ensued. Militant groups in Gaza fired rockets in the following days.

- West Bank & Gaza 2018-02-16 A bomb attached to a Palestinian flag and placed along the Gaza border during Friday protests injured four Israeli soldiers. Israel responded with tank fire on a Palestinian observation post and then launched airstrikes on six targets. Hamas responded with rockets from Gaza. Israel retaliated once again with more tank fire and a second wave of airstrikes on 18 Hamas targets.
- West Bank & Gaza 2018-03-30 Tens of thousands of Gazans began six weeks of Friday protests called the Great March of Return at the border fence with Israel. Initially led by independent activists, the demonstrations were co-opted by Hamas. Demonstrators threw Molotov cocktails, launched stones with slings, burned tires, or sought to breach the fence. Israel responded with live fire, killing more than 100 Palestinians and wounding thousands. For the rest of 2018, protests at the fence persisted with fluctuating intensity. They flared up in May, during the opening of the U.S. Embassy in Jerusalem on May 14 and subsequently persisted with varying levels of intensity.
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West Bank & Gaza	2018-07-13	Protests along Gazas border with Israel turned violent. Palestinians threw grenades and other explosive objects at the fence and Israeli troops responded with tear gas and live fire. On the following day, Hamas fired more than 200 projectiles, including rockets and mortars, into Israel. Israeli jets targeted dozens of Hamas military targets in what Prime Minister Netanyahu described as Israels biggest attack on the group since 2014.
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Table 16: USIP timeline of events in the Middle East

E.2 RSUI-inferred events

F Comparison with other measures

G Robustness of Statistical Properties

Figures 29 and 30 show the

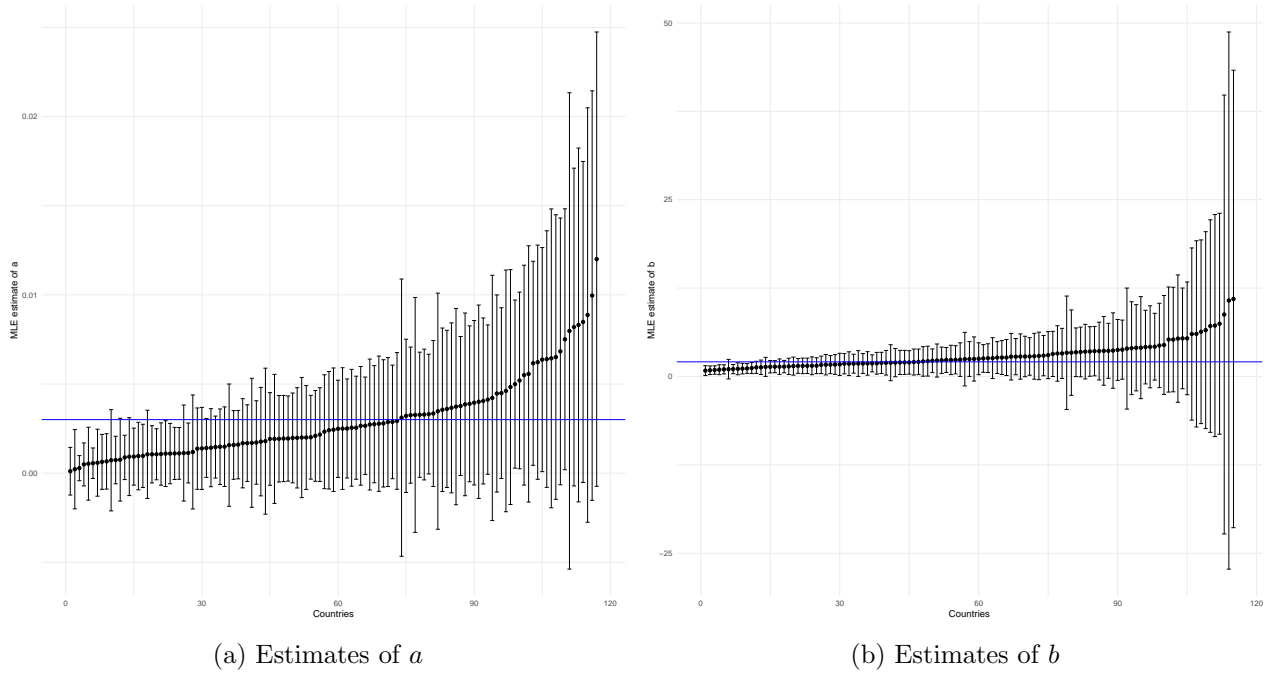


Figure 29: Country-specific parameter estimates. Some countries omitted due to MLE convergence failures.

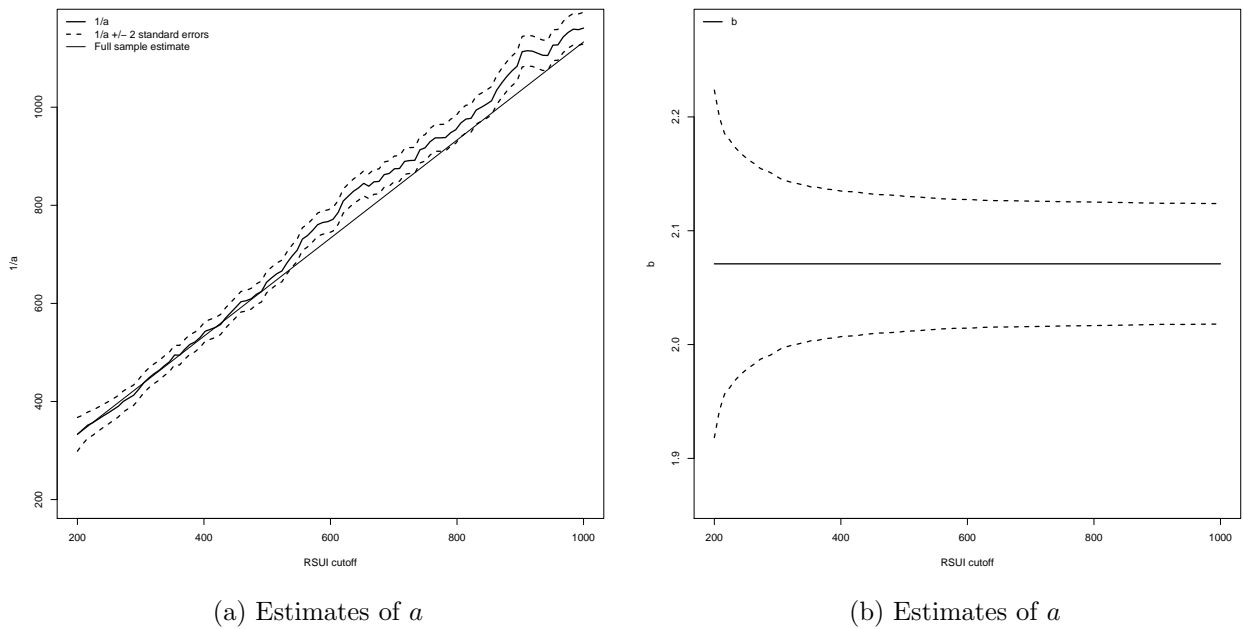


Figure 30: Parameter estimates with changing threshold cutoffs