Can digital ICT foster political mobilization and advance political freedom? (The Economist 2007, Diamond 2012)
Motivation

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- Spread information, foster communication and coordination
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- Spread information, foster communication and coordination
- Ability to reach large audiences, decentralized, open-access
Mobile phones: forefront of the political battleground
Motivation

- Mobile phones: forefront of the political battleground

**Activists** (Mozambique 2010)

**Government** (Ukraine 2014)
Africa

Reasons for grievance and high rates of political exclusion

Continent with fastest adoption of mobile phone technology (2012: 700 million users)

Unique, novel and detailed geo-referenced micro-data 1998-2012 for all of Africa

Licensed data on mobile phone coverage 2G/3G/4G

Big data on protests (GDELT)

Additional small data sets on protests (ACLED, SCAD)

Auxiliary geographical, economic and social data at 55 X 55 km level
**Contribution**

- Africa

  Theater of some of most spectacular episodes of political mobilization
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- Investigate how country-level economic shocks affect incidence of protests as a function of local mobile phone coverage:
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Next steps/limitations
- Agnostic on welfare consequences
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- Reporting effect?
- Mechanisms
Media

- Information provision fosters civic political participation (Gerber et al. 2009, Gentzkow et al. 2011)


- Political disaffection (Bauernschuster et al., 2014, Gentzkow 2006, Olken 2009)


- Economic and social empowerment (Acker 2010, Acker and Mbiti 2010)
Media

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- Poor economic conditions associated to great mobilization (Campante and Chor 2012, 2014, DiPasquale and Glaeser 1998)
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Insurgency, conflict and mobile phones (Pierskalla and Hollenbach 2013, Shapiro and Weidmann 2012)
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- Analysis run on cell X year
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Manacorda & Tesei (2015) Liberation technology March 2015
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- Link cell and protest data at level of cell assuming population uniformly distributed within cells
2G Diffusion, 1998-2012

1998
Spread of mobile phone technology across the continent (% pop. in reach of signal)
Data: Political mobilization

- Global Database on Events, Location and Tone (GDELT 1.0, Leetaru and Schrodt 2013)
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  - Example of automated coding
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Focus on Protests ("civilian demonstrations and other collective actions carried out as a sign of protest against a target")

Precise day (atomistic)

Events de-duplicated

Automated geo-referencing: cities/landmarks from GeoNames Gazetteer

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Manacorda & Tesei (2015)
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Cairo, 2011

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  - Coverage increases exponentially over time
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Manacorda & Tesei (2015)  Liberation technology  March 2015  16 / 47
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## Descriptive Statistics. Protests - micro data

<table>
<thead>
<tr>
<th></th>
<th>Number obs.</th>
<th>Fraction</th>
<th>Number of sources</th>
<th>Number of Articles</th>
<th>Number of days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GDELT (1998-2012)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrations</td>
<td>48,871</td>
<td>62.31</td>
<td>4.12</td>
<td>21.06</td>
<td>1.50</td>
</tr>
<tr>
<td>Riots</td>
<td>12,961</td>
<td>16.53</td>
<td>3.79</td>
<td>19.28</td>
<td>1.29</td>
</tr>
<tr>
<td>Strikes</td>
<td>6,731</td>
<td>8.58</td>
<td>2.41</td>
<td>11.83</td>
<td>1.21</td>
</tr>
<tr>
<td>Others</td>
<td>9,869</td>
<td>12.58</td>
<td>4.19</td>
<td>21.77</td>
<td>1.35</td>
</tr>
<tr>
<td>Total</td>
<td>78,432</td>
<td>100</td>
<td>3.92</td>
<td>20.06</td>
<td>1.41</td>
</tr>
<tr>
<td><strong>ACLED (1998-2012)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9,152</td>
<td>100</td>
<td></td>
<td></td>
<td>1.21</td>
</tr>
<tr>
<td><strong>SCAD (1998-2011)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrations</td>
<td>5,621</td>
<td>25.31</td>
<td></td>
<td></td>
<td>2.64</td>
</tr>
<tr>
<td>Riots</td>
<td>16,585</td>
<td>74.69</td>
<td></td>
<td></td>
<td>3.11</td>
</tr>
<tr>
<td>Total</td>
<td>22,206</td>
<td>100</td>
<td></td>
<td></td>
<td>2.84</td>
</tr>
</tbody>
</table>
### Descriptive Statistics. Main variables - cell level

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population (1000s)</strong></td>
<td>84.32</td>
<td>266.78</td>
<td>0</td>
<td>12,860</td>
</tr>
<tr>
<td><strong>Mobile Phone 2G Coverage (%)</strong></td>
<td>0.43</td>
<td>0.42</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Mobile Phone 3G Coverage (%)</strong></td>
<td>0.02</td>
<td>0.09</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Protests per 100,000 pop. – GDELT</strong></td>
<td>0.58</td>
<td>6.56</td>
<td>0</td>
<td>10,000</td>
</tr>
<tr>
<td><strong>Protests per 100,000 pop. – ACELD</strong></td>
<td>0.07</td>
<td>0.642</td>
<td>0</td>
<td>1,146.13</td>
</tr>
<tr>
<td><strong>Protests per 100,000 pop. – SCAD</strong></td>
<td>0.17</td>
<td>4.76</td>
<td>0</td>
<td>10,166.5</td>
</tr>
</tbody>
</table>
Protests per capita - GDELT (logs, net of country and time effects)
Protests per capita - GDELT, ACLED, SCAD (logs, net of country and time effects)

Correlation GDELT/ACLED/SCAD

Manacorda & Tesei (2015)
Protests per capita and mobile phone coverage across countries

Manacorda & Tesei (2015)
Protests per capita - GDELT vs ACLED - within country variation

Correlation GDELT/ACLED

Coeff: 1.870565533638 ; Robust SE: .0074356370605528 ; t= 251.567626953125

Manacorda & Tesei (2015)
Protests per capita - GDELT vs SCAD - within country variation

Correlation GDELT/SCAD

Coefficient: 0.8585557341575623; Robust SE: 0.0051747374236584; t = 165.9129028320313

Manacorda & Tesei (2015) Liberation technology March 2015 23 / 47
Descriptive Statistics. Main variables by cells

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Per Capita Income (USD 2005)</strong></td>
<td>2,299.0</td>
<td>2,707.2</td>
<td>208.7</td>
<td>15,300.6</td>
</tr>
<tr>
<td><strong>Border Distance (100 km)</strong></td>
<td>1.73</td>
<td>1.47</td>
<td>0</td>
<td>10.54</td>
</tr>
<tr>
<td><strong>Capital Distance (100 km)</strong></td>
<td>3.57</td>
<td>3.35</td>
<td>0.04</td>
<td>19.48</td>
</tr>
<tr>
<td><strong>Travel Time nearest city pop. ≥ 20K (hours)</strong></td>
<td>4.42</td>
<td>3.77</td>
<td>0.16</td>
<td>106.9</td>
</tr>
<tr>
<td><strong>Travel Time nearest city pop. ≥ 50K (hours)</strong></td>
<td>4.21</td>
<td>3.69</td>
<td>0</td>
<td>102.2</td>
</tr>
<tr>
<td><strong>Coast (dummy)</strong></td>
<td>0.15</td>
<td>0.36</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Primary Roads (100 km)</strong></td>
<td>0.87</td>
<td>0.99</td>
<td>0</td>
<td>5.22</td>
</tr>
<tr>
<td><strong>Primary Roads Paved (100 km)</strong></td>
<td>0.49</td>
<td>0.72</td>
<td>0</td>
<td>4.66</td>
</tr>
<tr>
<td><strong>Primary Roads Good Conditions (100 km)</strong></td>
<td>0.26</td>
<td>0.49</td>
<td>0</td>
<td>3.80</td>
</tr>
<tr>
<td><strong>Secondary Roads (100 km)</strong></td>
<td>1.42</td>
<td>1.10</td>
<td>0</td>
<td>6.40</td>
</tr>
<tr>
<td><strong>Electricity Network (100 km)</strong></td>
<td>0.86</td>
<td>1.18</td>
<td>0</td>
<td>7.55</td>
</tr>
<tr>
<td><strong>Infant Mortality Rate (1,000)</strong></td>
<td>8.91</td>
<td>3.71</td>
<td>1</td>
<td>20.31</td>
</tr>
<tr>
<td><strong>Mountain (%)</strong></td>
<td>0.23</td>
<td>0.32</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Forest (%)</strong></td>
<td>0.23</td>
<td>0.25</td>
<td>0</td>
<td>1</td>
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<tr>
<td><strong>Irrigated (%)</strong></td>
<td>0.08</td>
<td>0.17</td>
<td>0</td>
<td>0.87</td>
</tr>
<tr>
<td><strong>Diamonds (dummy)</strong></td>
<td>0.03</td>
<td>0.18</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Minerals (dummy)</strong></td>
<td>0.22</td>
<td>0.42</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Oil (dummy)</strong></td>
<td>0.13</td>
<td>0.33</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Temperature (Celsius degrees)</strong></td>
<td>23.12</td>
<td>4.25</td>
<td>4.06</td>
<td>31.41</td>
</tr>
<tr>
<td><strong>Precipitation (mm.)</strong></td>
<td>876.2</td>
<td>487.5</td>
<td>69.39</td>
<td>3,296.4</td>
</tr>
<tr>
<td><strong>Drought (n. of years)</strong></td>
<td>1.44</td>
<td>1.25</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td><strong>Distance from drought (100 km)</strong></td>
<td>1.74</td>
<td>0.56</td>
<td>0</td>
<td>4.56</td>
</tr>
<tr>
<td><strong>Flashrate (per Km² per year)</strong></td>
<td>17.32</td>
<td>13.80</td>
<td>0</td>
<td>163.1</td>
</tr>
<tr>
<td><strong>Country GDP growth (%)</strong></td>
<td>0.049</td>
<td>0.041</td>
<td>-0.33</td>
<td>0.63</td>
</tr>
</tbody>
</table>
Lower opportunity cost and greater grievances during recessions

Manacorda & Tesei (2015)
Specification and identification

- Cell-level regressions:

\[ Y_{gct} = \beta_0 + \beta_1 \text{Cov}_{gct} + \beta_2 \text{Cov}_{gct} \times \Delta \ln GDP_{ct} + d_{gc} + d_{ct} + X'_{gc} \beta_{ct} + \epsilon_{gct} \]

- \( g \): Cell
- \( c \): Country
- \( t \): Time

- \( Y_{gct} \): \( \log(\text{protests/pop}+1) \)
- \( \text{Cov}_{gct} \): Fraction cell area with mobile phone coverage
- \( \Delta \ln GDP_{ct} \): country-level growth rate in GDP
- \( d_{gc} \): cell FE
- \( d_{ct} \): country X time FE
- \( X_{gc} \): baseline covariates (restrict \( \beta_{ct} = \beta_c t \))
 specification and identification

- cell-level regressions:

\[ Y_{gct} = \beta_0 + \beta_1 Cov_{gct} + \beta_2 Cov_{gct} \times \Delta \ln GDP_{ct} + d_{gc} + d_{ct} + X'_{gc} \beta_{ct} + \epsilon_{gct} \]

- \( g \): Cell
- \( c \): Country
- \( t \): Time

- \( Y_{gct} \): log(protests/pop+1)
- \( Cov_{gct} \): Fraction cell area with mobile phone coverage
- \( \Delta \ln GDP_{ct} \): country-level growth rate in GDP
- \( d_{gc} \): cell FE
- \( d_{ct} \): country X time FE
- \( X_{gc} \): baseline covariates (restrict \( \beta_{ct} = \beta_c t \))

- Diff-in-diff within countries (pooled)
- Weighted by cell population
- SE clustered by cell/region/country
Table 1. Baseline Regressions

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage</td>
<td>0.019</td>
<td>0.105***</td>
<td>0.001</td>
<td>0.089***</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.024)</td>
<td>(0.016)</td>
<td>(0.024)</td>
</tr>
<tr>
<td>Coverage * ΔlnGDP</td>
<td>-1.649***</td>
<td></td>
<td>-1.712***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.339)</td>
<td></td>
<td>(0.342)</td>
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</tr>
<tr>
<td>Cell characteristics</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Observations</td>
<td>155,194</td>
<td>155,194</td>
<td>155,194</td>
<td>155,194</td>
</tr>
</tbody>
</table>

Dependent variable is the log (protests per 100,000 population + 1). All specifications are weighted by cell population and include Cell FE, as well as Country*Year FE. Columns (3) and (4) interact a country-specific linear trend with the baseline cell-specific characteristics. These include: Average cell population over the period in classes of 50,000 population; Border distance; Capital distance; Travel time to nearest large city (20K, 50K population); Primary Roads (total; paved; good conditions); Secondary Roads; Electricity network; Infant mortality rate; Share of land: mountain, forest, irrigated; Oil fields; Diamond fields; Mines; Average temperature and precipitation; Years of drought; distance from the closest cell undergoing drought. Standard errors in parenthesis are Huber robust and clustered at the cell level. * Significantly different from zero at the 90% level, ** 95% level, *** 99% level.
### Table 1B. Baseline Regressions (ACLED and SCAD)

<table>
<thead>
<tr>
<th></th>
<th>Log Protest per 100,000 pop. (ACLED)</th>
<th></th>
<th></th>
<th></th>
<th>Log Protest per 100,000 pop. (SCAD)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
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<td>(5)</td>
<td>(6)</td>
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<td>(8)</td>
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<tr>
<td>Coverage</td>
<td>0.009</td>
<td>0.030**</td>
<td>-0.001</td>
<td>0.019</td>
<td>0.014</td>
<td>0.041*</td>
<td>0.025</td>
<td>0.052**</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.013)</td>
<td>(0.006)</td>
<td>(0.014)</td>
<td>(0.015)</td>
<td>(0.021)</td>
<td>(0.017)</td>
<td>(0.023)</td>
</tr>
<tr>
<td>Coverage * ΔlnGDP</td>
<td>-0.408*</td>
<td>-0.385*</td>
<td></td>
<td>-0.513*</td>
<td>-0.513*</td>
<td></td>
<td>-0.513*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.222)</td>
<td>(0.226)</td>
<td></td>
<td>(0.272)</td>
<td>(0.276)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell characteristics</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>155,194</td>
<td>155,194</td>
<td>155,194</td>
<td>155,194</td>
<td>144,857</td>
<td>144,857</td>
<td>144,857</td>
<td>144,857</td>
</tr>
</tbody>
</table>
5 p.p. fall in GDP growth associated to increase in yearly protest/days per capita differential between areas with and without coverage of 8%
5 p.p. fall in GDP growth associated to increase in yearly protest/days per capita differential between areas with and without coverage of 8%

Similar effects with and without large set of controls
5 p.p. fall in GDP growth associated to increase in yearly protest/days per capita differential between areas with and without coverage of 8%

Similar effects with and without large set of controls

Similar effects in GDELT, ACLED and SCAD
### Table 3. Additional Regressions

<table>
<thead>
<tr>
<th></th>
<th>Exclude capital (1)</th>
<th>Below/Above 0 (2)</th>
<th>3G (3)</th>
<th>2G and 3G (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coverage</strong></td>
<td>0.051** (0.023)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.091*** (0.024)</td>
<td></td>
</tr>
<tr>
<td><strong>Coverage * ΔlnGDP</strong></td>
<td>-0.941*** (0.314)</td>
<td></td>
<td></td>
<td>-1.732*** (0.338)</td>
</tr>
<tr>
<td><strong>Coverage 3G</strong></td>
<td></td>
<td>0.493*** (0.190)</td>
<td>0.497*** (0.188)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coverage 3G * ΔlnGDP</strong></td>
<td></td>
<td>-0.092 (0.257)</td>
<td>-0.065 (0.240)</td>
<td></td>
</tr>
<tr>
<td><strong>Coverage * ΔlnGDP</strong> ≤ 0</td>
<td></td>
<td>-2.190*** (0.651)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coverage * ΔlnGDP</strong> ≥ 0</td>
<td></td>
<td>-0.814*** (0.245)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coverage * I(ΔlnGDP ≥ 0)</strong></td>
<td></td>
<td>-0.001*** (0.000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cell characteristics</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td><strong>Observations</strong></td>
<td>154,504</td>
<td>155,194</td>
<td>155,194</td>
<td>155,194</td>
</tr>
</tbody>
</table>

See footnote Table 1
Stronger in - but not driven by - capital cities
Magnitude of effects

- Stronger in - but not driven by - capital cities
Magnitude of effects

- Stronger in - but not driven by - capital cities
- Asymmetric effect: largely associated to recessions
Magnitude of effects

- Stronger in - but not driven by - capital cities
- Asymmetric effect: largely associated to recessions
- Effect of 3G at low levels of growth but interaction not significant
Estimates by country

Manacorda & Tesei (2015)

Liberation technology

March 2015

Page 32
# Country Covariates

## Economic Characteristics

<table>
<thead>
<tr>
<th>Source</th>
<th>Coverage Years</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnGDP</td>
<td>World Bank 1998-2012</td>
<td>6.470</td>
<td>0.988</td>
</tr>
<tr>
<td>Gini Index</td>
<td>World Bank Different years (max 5)</td>
<td>42.27</td>
<td>7.82</td>
</tr>
</tbody>
</table>

## Education Characteristics

<table>
<thead>
<tr>
<th>Source</th>
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<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy Rate</td>
<td>World Bank 2000, 2005, 2010</td>
<td>59.92</td>
<td>16.81</td>
</tr>
</tbody>
</table>

## Business Characteristics

<table>
<thead>
<tr>
<th>Source</th>
<th>Coverage Years</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days start business</td>
<td>World Bank Different years (max 3)</td>
<td>22.97</td>
<td>15.02</td>
</tr>
<tr>
<td>Ease business</td>
<td>World Bank 2012</td>
<td>143</td>
<td>39.58</td>
</tr>
</tbody>
</table>

## Institutional Characteristics

<table>
<thead>
<tr>
<th>Source</th>
<th>Coverage Years</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polity2</td>
<td>Polity IV (Marshall and Gurr) 1998-2012</td>
<td>1.063</td>
<td>4.244</td>
</tr>
</tbody>
</table>
### Table 2. Country Covariates

<table>
<thead>
<tr>
<th></th>
<th>Economy (1)</th>
<th>Education (2)</th>
<th>Business (3)</th>
<th>Institutions (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gini Index</strong></td>
<td>-0.045</td>
<td>-0.109</td>
<td>-0.070</td>
<td>-0.214*</td>
</tr>
<tr>
<td></td>
<td>(0.103)</td>
<td>(0.101)</td>
<td>(0.095)</td>
<td>(0.108)</td>
</tr>
<tr>
<td><strong>lnGDP</strong></td>
<td>0.320</td>
<td>0.441</td>
<td>0.434</td>
<td>0.534</td>
</tr>
<tr>
<td></td>
<td>(0.243)</td>
<td>(0.315)</td>
<td>(0.353)</td>
<td>(0.331)</td>
</tr>
<tr>
<td><strong>Literacy Rate</strong></td>
<td>-0.019</td>
<td>-0.043</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.034)</td>
<td>(0.038)</td>
<td></td>
</tr>
<tr>
<td><strong>Secondary Education</strong></td>
<td>0.028</td>
<td>0.002</td>
<td>-0.023</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.054)</td>
<td>(0.051)</td>
<td></td>
</tr>
<tr>
<td><strong>Tertiary Education</strong></td>
<td>-0.356***</td>
<td>-0.426***</td>
<td>-0.476***</td>
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</tr>
<tr>
<td></td>
<td>(0.104)</td>
<td>(0.098)</td>
<td>(0.093)</td>
<td></td>
</tr>
<tr>
<td><strong>Days start business</strong></td>
<td>-0.128**</td>
<td></td>
<td>-0.213***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.050)</td>
<td></td>
<td>(0.059)</td>
<td></td>
</tr>
<tr>
<td><strong>Ease business</strong></td>
<td>-0.009</td>
<td>0.021</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Polity2</strong></td>
<td></td>
<td></td>
<td></td>
<td>0.183*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.102)</td>
</tr>
<tr>
<td><strong>Polity2 sq.</strong></td>
<td></td>
<td></td>
<td></td>
<td>0.072*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.035)</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
</tbody>
</table>

Dependent variable: estimated coefficient of $Coverage \times \Delta lnGDP$. Regressions weighted by the inverse of square of standard error.
Responsiveness to mobile phone coverage is higher in:

- Countries with greater fraction of highly educated individuals: a 1 s.d. rise in fraction of pop. with tertiary education (3.45) increases the interaction coefficient by 1.5, roughly a doubling of the effect.
- Countries with more red tape: a 1 s.d. in the number of days to open an activity (15) increases the interaction coefficient by 3, roughly two times the effect.
- In weak autocratic countries (u-shaped, min at Polity2 score -1.3), a 1 s.d. increase (fall) in polity score (4.24) from pure autocracies (democracies) roughly doubles the effect.
Responsiveness to mobile phone coverage is higher in:

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Responsiveness to mobile phone coverage is higher in:

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- Countries with greater fraction of highly educated individuals: a 1 s.d. rise in fraction of pop. with tertiary education (3.45) increases the interaction coefficient by 1.5, roughly a doubling of the effect

- Countries with more red tape: a 1 s.d. in the number of days to open an activity (15) increases the interaction coefficient by 3, roughly two times the effect

- In weak autocratic countries (u-shaped, min at Polity2 score -1.3), a 1 s.d. increase (fall) in polity score (4.24) from pure autocracies (democracies) roughly doubles the effect
Coverage possibly endogenous
Coverage possibly endogenous

Demand and supply determinants of coverage in Sub-Saharan Africa (Acker and Mbiti 2012, Buys et al 2009: 

- Population
- Income
- Competition
- Electricity grid
- Installation and maintenance costs: accessibility (elevation, slope, distance from main road, distance from the nearest large city)

Likely not excludable

Coverage possibly endogenous

Demand and supply determinants of coverage in Sub-Saharan Africa (Acker and Mbiti 2012, Buys et al 2009:

- Population
- Income
- Competition
- Electricity grid
- Installation and maintenance costs: accessibility (elevation, slope, distance from main road, distance from the nearest large city)

Likely not excludable
Instrumentation

- Coverage possibly endogenous

- Demand and supply determinants of coverage in Sub-Saharan Africa (Acker and Mbiti 2012, Buys et al 2009):
  - Population
  - Income
  - Competition
  - Electricity grid
  - Installation and maintenance costs: accessibility (elevation, slope, distance from main road, distance from the nearest large city)

- Likely not excludable

Flash density in Africa

Manacorda & Tesei (2015)
Instrumentation

- Instrument $Cov_{gct}$ by $Z_{gct}$

$$Z_{gct} = F_{gc} \times Cov_{ct}$$

- $F_{gc} =$ average cell flash density
- $Cov_{ct} =$ continent-wide trend in coverage
Instrumentation

- Instrument $Cov_{gc_t}$ by $Z_{gc_t}$

$$Z_{gc_t} = F_{gc} \times Cov_{ct}$$

- $F_{gc}$ = average cell flash density
- $Cov_{ct}$ = continent-wide trend in coverage

$$Cov_{gc_t} = \delta_0 + \delta_1 Z_{gc_t} + \delta_2 Z_{gc_t} \times \Delta \ln GDP_{ct} + d_{gc} + d_{ct} + X'_{gc} \delta_{ct} + e_{gc_t}$$
Instrumentation

- Instrument $Cov_{gct}$ by $Z_{gct}$

\[ Z_{gct} = F_{gc} \times Cov_{ct} \]

- $F_{gc}$ = average cell flash density
- $Cov_t$ = continent-wide trend in coverage

\[ Cov_{gct} = \delta_0 + \delta_1 Z_{gct} + \delta_2 Z_{gct} \times \Delta \ln GDP_{ct} + d_{gc} + d_{ct} + X'_{gc} \delta_{ct} + e_{gct} \]

\[ Cov_{gct} \times \Delta \ln GDP_{ct} = \gamma_0 + \gamma_1 Z_{gct} + \gamma_2 Z_{gct} \times \Delta \ln GDP_{ct} + d_{gc} + d_{ct} + X'_{gc} \gamma_{ct} + v_{gct} \]
<table>
<thead>
<tr>
<th></th>
<th>Cov(_{gct})</th>
<th>Cov(_{gct})</th>
<th>Cov(<em>{gct}) ∗ ΔlnGDP(</em>{ct})</th>
<th>Cov(_{gct})</th>
<th>Cov(_{gct})</th>
<th>Cov(<em>{gct}) ∗ ΔlnGDP(</em>{ct})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td><strong>Flashrate</strong></td>
<td>-0.002</td>
<td>-0.002</td>
<td>0.000*</td>
<td>-0.004**</td>
<td>-0.005***</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.000)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.000)</td>
</tr>
<tr>
<td><strong>Flashrate ∗ ΔlnGDP</strong></td>
<td>0.006</td>
<td>-0.005**</td>
<td>0.012</td>
<td>-0.006**</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.002)</td>
<td>(0.008)</td>
<td>(0.003)</td>
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<tr>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>F-statistic</td>
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<td>1.25</td>
<td>3.08</td>
<td>4.54</td>
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<td>3.90</td>
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<td>159,194</td>
<td>159,194</td>
<td>159,194</td>
<td>159,194</td>
</tr>
</tbody>
</table>

Dependent variable is 2G/3G percentage coverage in the cell. The explanatory variable is the average cell flash density interacted by the continent-wide trend in coverage. All specifications include Cell FE, as well as Country*Year FE. Columns (4)-(6) interact a country-specific linear trend with the baseline cell-specific characteristics. These include: Average cell population over the period in classes of 50,000 population; Border distance; Capital distance; Travel time to nearest large city (20K, 50K population); Primary Roads (total; paved; good conditions); Secondary Roads; Electricity network; Infant mortality rate; Share of land: mountain, forest, irrigated; Oil fields; Diamond fields; Mines; Average temperature and precipitation; Years of drought; distance from the closest cell undergoing drought. Standard errors in parenthesis are Huber robust and clustered at the cell level. * Significantly different from zero at the 90% level, ** 95% level, *** 99% level.
Magnitude of effects

- Predicts a differential expansion of coverage in cells 1 s.d. of flash rates (13.79) apart of 5.5 p.p. over entire period
### Table 5. Instrumental Variable Regressions

<table>
<thead>
<tr>
<th></th>
<th>GDELT</th>
<th>ACLED</th>
<th>SCAD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Coverage</td>
<td>-0.441</td>
<td>0.215</td>
<td>-0.272</td>
</tr>
<tr>
<td></td>
<td>(0.431)</td>
<td>(0.380)</td>
<td>(0.227)</td>
</tr>
<tr>
<td>Coverage $\times$ ΔlnGDP</td>
<td>-7.480***</td>
<td>-3.106**</td>
<td>0.300</td>
</tr>
<tr>
<td></td>
<td>(2.819)</td>
<td>(1.593)</td>
<td>(2.207)</td>
</tr>
<tr>
<td>A-R p-value</td>
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<td>[0.05]</td>
<td>[0.94]</td>
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<tr>
<td>Cell characteristics</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>155,194</td>
<td>155,194</td>
<td>144,857</td>
</tr>
</tbody>
</table>

Dependent variable is the log (protests per 100,000 population + 1). The endogenous variable Coverage is instrumented by $F_{gc} \times Cov_t$, where $F_{gc}$ is the average cell flash density and $Cov_t$ is the continent-wide trend in coverage. In square brackets are reported the p-values based on the Anderson-Rubin test of statistical significance. A key property of the test is that it is robust to weak instruments. The version of the test we implement is robust to heteroskedasticity and arbitrary within-cell correlation of the residuals (Andrews and Stock, 2005). All specifications include Cell FE and Country*Year FE. All columns interact a country-specific linear trend with the baseline cell-specific characteristics. These include: Border distance; Capital distance; Travel time to nearest large city (20K, 50K, 100K, 500K); Primary Roads (total; paved; good conditions); Secondary Roads; Infant mortality rate; Share of land: mountain, forest, irrigated; Oil fields; Diamond fields; Mines; Ethno-linguistic fragmentation. Standard errors in parenthesis are Huber robust and clustered at the cell level. * Significantly different from zero at the 90% level, ** 95% level, *** 99% level.
Magnitude of effects

- IV estimates roughly 5 times OLS

Seems to suggest coverage negatively associated to protests, possibly due to measurement error.
Magnitude of effects

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Magnitude of effects

- IV estimates roughly 5 times OLS
- Seems to suggest coverage negatively associated to protests, possibly due to omitted variables
- Measurement error
We use unique data on protest and mobile phone coverage to show previously undocumented causal effect of mobile phone technology on political mobilization.

In line with economic theory, we find a negative relation between economic growth and the level of protest.

Political mobilization magnified by mobile phone availability.

If anything OLS underestimated.

Strong support for mobile activism argument.

Ongoing work:
- Channels: information, coordination? Returns to participation? Empowerment? Increasing reporting?
- Validate instrument: placebo tests.
### Table 3B. Additional Regressions (ACLED and SCAD)

<table>
<thead>
<tr>
<th></th>
<th>Log Protest per 100,000 (ACLED)</th>
<th>Log Protest per 100,000 (SCAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exclude capital</td>
<td>Below/Above 0</td>
</tr>
<tr>
<td>Coverage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Coverage * ΔlnGDP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.209*</td>
<td>-0.391*</td>
</tr>
<tr>
<td></td>
<td>(0.114)</td>
<td>(0.220)</td>
</tr>
<tr>
<td>Coverage 3G</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.012</td>
<td>0.019</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Coverage 3G * ΔlnGDP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.500***</td>
<td>-0.494***</td>
</tr>
<tr>
<td></td>
<td>(0.162)</td>
<td>(0.158)</td>
</tr>
<tr>
<td>Coverage * ΔlnGDP</td>
<td>&lt;0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.485</td>
<td>-0.494***</td>
</tr>
<tr>
<td></td>
<td>(0.657)</td>
<td>(0.158)</td>
</tr>
<tr>
<td>Coverage * ΔlnGDP</td>
<td>≥0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.175*</td>
<td>-0.919</td>
</tr>
<tr>
<td></td>
<td>(0.103)</td>
<td>(0.927)</td>
</tr>
<tr>
<td>Coverage * I(ΔlnGDP ≥ 0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.000***</td>
<td>-0.919</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.927)</td>
</tr>
<tr>
<td>Cell characteristics</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>154,504</td>
<td>155,194</td>
</tr>
</tbody>
</table>

See footnote Table 1
GDELT: a big data history of life, the universe and everything

The Global Data on Events, Location and Tone promises to be the ultimate big database - and an amazing tool for data journalists. But what is it?

• Download the data
• More data journalism and data visualisations from the Guardian

Everybody is searching for bigger and bigger data: how about this? A comprehensive list of every event in human history.

It matters because historians have long feared that we live in a digital dark ages - where our history will have vanished when future generations try to look back on these electronic decades.
BAGHDAD. Iraqi leaders criticized Turkey on Monday for bombing Kurdish militants in northern Iraq with airstrikes that they said had left at least one woman dead.

BAGHDAD. Iraqi leaders criticized Turkey on Monday for bombing Kurdish militants in northern Iraq with airstrikes that they said had left at least one woman dead.


- **First event:**
Example of Automated Coding (from Schrodt, 2013)

**BAGHDAD.** Iraqi leaders *criticized* Turkey on Monday for bombing Kurdish militants in northern Iraq with airstrikes that they said had left at least one woman dead.


- **First event:**
  - Event Code: 111 (DEMAND: Criticize or denounce)
Example of Automated Coding (from Schrodt, 2013)

BAGHDAD. Iraqi leaders criticized Turkey on Monday for bombing Kurdish militants in northern Iraq with airstrikes that they said had left at least one woman dead.


- **First event:**
  - Event Code: 111 (DEMAND: Criticize or denounce)
  - Source: IRQ
  - Target: TUR

- **Second event:**
  - Event Code: 195 (ASSAULT: Conduct suicide, car, or other non-military bombing)
  - Source: TUR
  - Target: IRQKRD

Manacorda & Tesei (2015)
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  - Source: TUR
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Auxiliary data:

- Grids of 0.5 x 0.5 decimal degree resolution (from PRIOGRID). Approximately 55 x 55 kilometres at the equator. **10,409 cells**
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  - Border and capital distance (PRIORGRID, 2000)
  - Travel time to nearest large city (20K, 50K) (Harvest Choice/IFPRI, 2000)
  - Share of mountains (UNEP, 2002), forests (Globcover, 2009), irrigated land (FAO, 2000)
  - Infant mortality rate (SEDAC, 2000)
  - Oilfields (PRIO, 2007), diamond fields (PRIO, 2005)
  - Primary roads, secondary roads (ADB/AICD, 2008)
  - Electricity transmission network (ADB/AICD, 2008)
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