Reverse-Engineering Censorship in China¹

Gary King²

Institute for Quantitative Social Science Harvard University

(Talk at IARPA seminar on "Science, Intelligence, and Security", Virginia Tech Research Center, 11/16/2015)

²GaryKing.org

¹Based on joint work with Jennifer Pan and Margaret Roberts

Papers

An Observational Study:

How Censorship in China Allows Government Criticism but Silences Collective Expression (APSR)

Experimental and Participatory Studies:

Reverse Engineering Chinese Censorship (Science)

- Methods:
 - General Purpose Computer-Assisted Clustering and Conceptualization (PNAS)
 - A Method of Automated Nonparametric Content Analysis for Social Science (AJPS)
 - Computer-Assisted Keyword and Document Set Discovery from Unstructured Text

Copies at GaryKing.org

• The largest selective suppression of human expression in history:

- The largest selective suppression of human expression in history:
 - implemented manually (within a few hours of posting),

- The largest selective suppression of human expression in history:
 - implemented manually (within a few hours of posting),
 - by \approx 200,000 workers,

- The largest selective suppression of human expression in history:
 - implemented manually (within a few hours of posting),
 - by $\approx 200,000$ workers,
 - located in government and inside social media firms

- The largest selective suppression of human expression in history:
 - implemented manually (within a few hours of posting),
 - by $\approx 200,000$ workers,
 - located in government and inside social media firms
- A huge censorship organization:

- The largest selective suppression of human expression in history:
 - implemented manually (within a few hours of posting),
 - by $\approx 200,000$ workers,
 - located in government and inside social media firms
- A huge censorship organization:
 - (obviously) designed to suppress information

- The largest selective suppression of human expression in history:
 - implemented manually (within a few hours of posting),
 - by $\approx 200,000$ workers,
 - located in government and inside social media firms
- A huge censorship organization:
 - (obviously) designed to suppress information
 - (paradoxically) very revealing about the goals, intentions, and actions of the Chinese leadership

Chinese Social Media: Fractured over 1,400+ sites



• Everyone knows the Goal:

Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies

Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state
 - Stop collective action

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state,
 its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Policies that generate dissent (& interest of leaders)

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Policies that generate dissent (& interest of leaders)
 - Government action outside the Internet

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Policies that generate dissent (& interest of leaders)
 - Government action outside the Internet
 - Dissidents to be arrested; peace treaties to sign; emerging scandals

- Everyone knows the Goal:
 Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Policies that generate dissent (& interest of leaders)
 - Government action outside the Internet
 - Dissidents to be arrested; peace treaties to sign; emerging scandals
 - Disagreements between central and local leaders

- Everyone knows the Goal:
 - Stop criticism, protest, & collective action about the state, its leaders, and their policies Wrong
- What Could be the Goal?
 - Stop criticism of the state Wrong
 - Stop collective action Right
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Policies that generate dissent (& interest of leaders)
 - Government action outside the Internet
 - Dissidents to be arrested; peace treaties to sign; emerging scandals
 - Disagreements between central and local leaders
- \rightsquigarrow A big prize, but payable only if we have the goals right

Monitor 85 content areas over 6 months

- Monitor 85 content areas over 6 months
- Ownload each social media post, the instant it appears

- Monitor 85 content areas over 6 months
- Ownload each social media post, the instant it appears
- Revisit each later to check if it was censored (carefully, from computers all over the world)

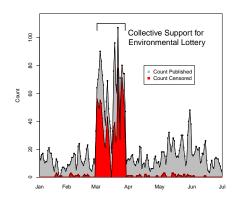
- Monitor 85 content areas over 6 months
- Ownload each social media post, the instant it appears
- Revisit each later to check if it was censored (carefully, from computers all over the world)
- Repeat 11,382,221 times

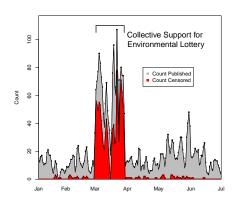
Our Observational Research Design: 5 Steps

- Monitor 85 content areas over 6 months
- Ownload each social media post, the instant it appears
- Revisit each later to check if it was censored (carefully, from computers all over the world)
- Repeat 11,382,221 times
- Analyze with new methods of computer-assisted text analysis

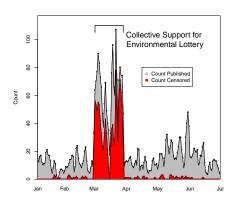
Censorship is not Ambiguous: BBS Error Page



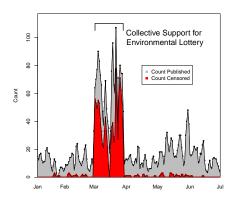




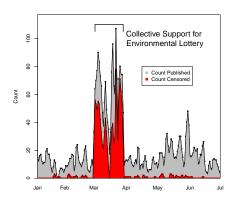
 Found 87 volume bursts in our 85 topic areas



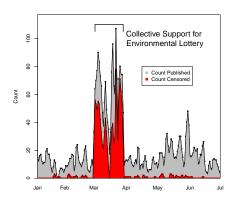
- Found 87 volume bursts in our 85 topic areas
- Identified real world event associated with each burst



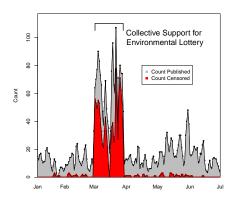
- Found 87 volume bursts in our 85 topic areas
- Identified real world event associated with each burst



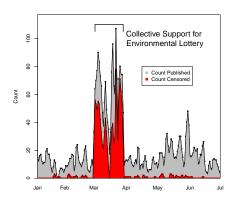
- Found 87 volume bursts in our 85 topic areas
- Identified real world event associated with each burst



- Found 87 volume bursts in our 85 topic areas
- Identified real world event associated with each burst



- Found 87 volume bursts in our 85 topic areas
- Identified real world event associated with each burst



- Found 87 volume bursts in our 85 topic areas
- Identified real world event associated with each burst

Event classification (each category can be +, -, or neutral comments about the state)

Collective Action Potential

- Collective Action Potential
- 2 Criticism of censors

- Collective Action Potential
- 2 Criticism of censors
- Pornography

- Collective Action Potential
- 2 Criticism of censors
- Pornography
- Other) News

- Collective Action Potential
- Criticism of censors
- Open Pornography
- Other) News
- Government Policies

- Collective Action Potential
 Constitution
- Criticism of censors
- Open Pornography
- Other) News
- Government Policies

- Collective Action Potential CENSONED
- Criticism of censors CENSURED
- Pornography
- Other) News
- Government Policies

- Collective Action Potential CENSONED
- 2 Criticism of censors CENSURED
- Pornography CENSORED
- Other) News
- Government Policies

Event classification (each category can be +, -, or neutral comments about the state)

- Collective Action Potential CENSORED
- Criticism of censors CENSURED
- Pornography CENSORED
- (Other) News

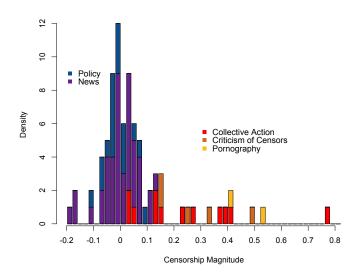


Government Policies

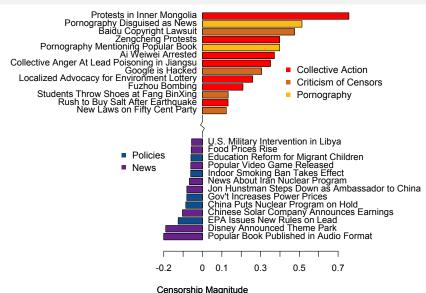
- Collective Action Potential CENSORED
- Criticism of censors CENSURED
- Pornography CENSORED
- (Other) News
- Government Policies



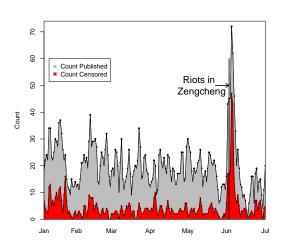
What Types of Events Are Censored?



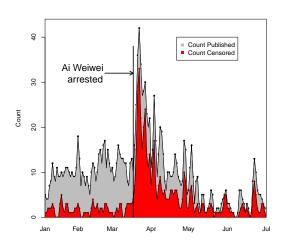
What Types of Events Are Censored?



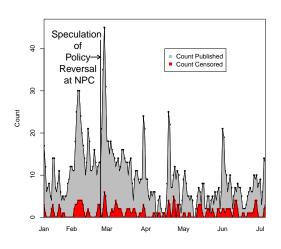
Censoring Collective Action: Riots in Zencheng



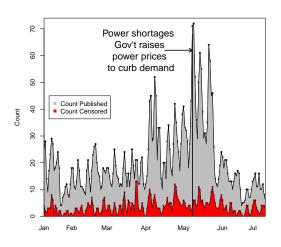
Censoring Collective Action: Ai Weiwei's Arrest



Low Censorship on Policy: One Child



Low Censorship on News: Power Prices



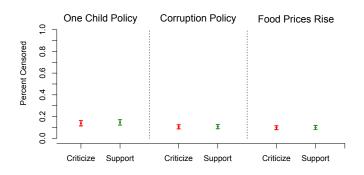
Uncensored: Non-Collective Action Posts

Uncensored: Non-Collective Action Posts

Regardless of whether Supportive or Critical

Uncensored: Non-Collective Action Posts

Regardless of whether Supportive or Critical



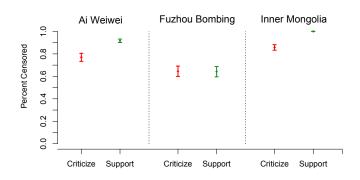
Censored: Collective Action Posts

Censored: Collective Action Posts

Regardless of whether Supportive or Critical

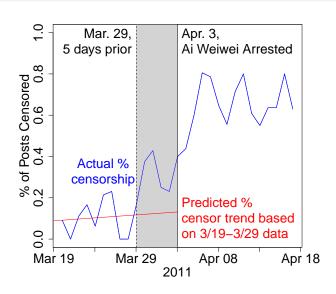
Censored: Collective Action Posts

Regardless of whether Supportive or Critical

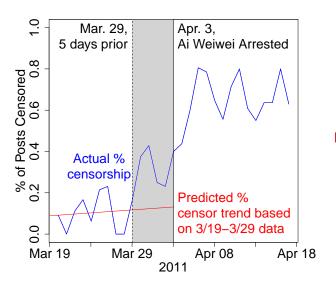


Predicting Ai Weiwei's Arrest

Predicting Ai Weiwei's Arrest

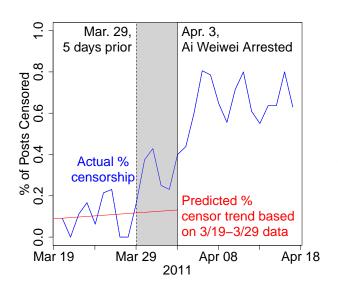


Predicting Ai Weiwei's Arrest

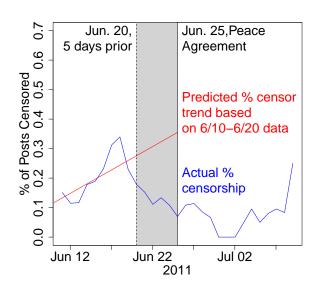


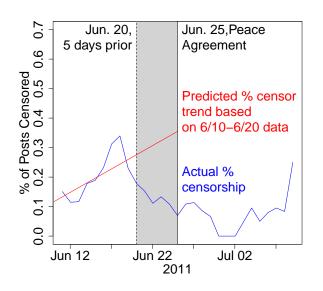
Placebo Test:

Predicting Ai Weiwei's Arrest

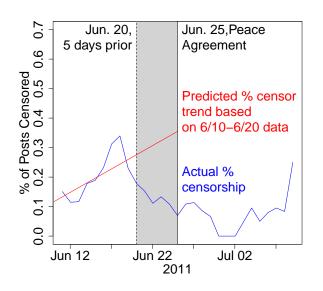


Placebo Test: Most extreme of all effects

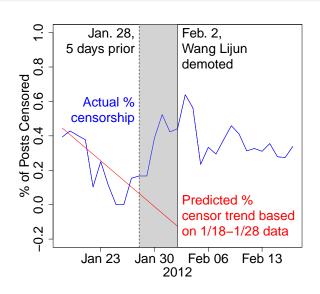


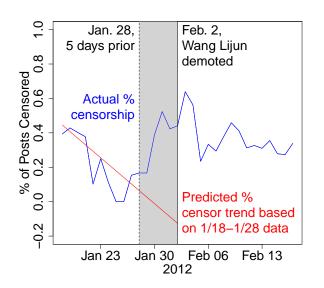


Placebo Test:

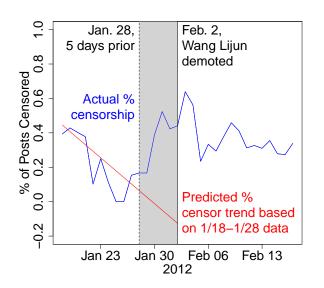


Placebo Test: Most extreme of all effects





Placebo Test:



Placebo Test: Most extreme of all effects

Randomized Experiment (for causal inferences)

Randomized Experiment (for causal inferences)

- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)

- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)

- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)
 - Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)

- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)
 - Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)
 - Submitted posts randomly assigned to type
- Participatory Study (for descriptive inferences)

- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)
 - Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)
 - Submitted posts randomly assigned to type
 - Checked on censorship (from computers in many countries)
- Participatory Study (for descriptive inferences)

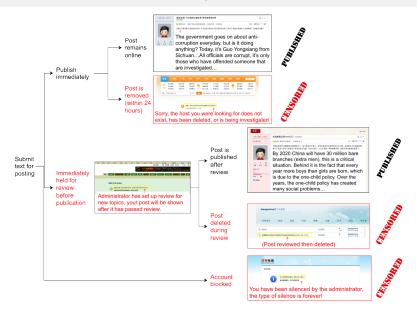
- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)
 - Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)
 - Submitted posts randomly assigned to type
 - Checked on censorship (from computers in many countries)
- Participatory Study (for descriptive inferences)
 - Current method of learning how they censor: ask (carefully!)

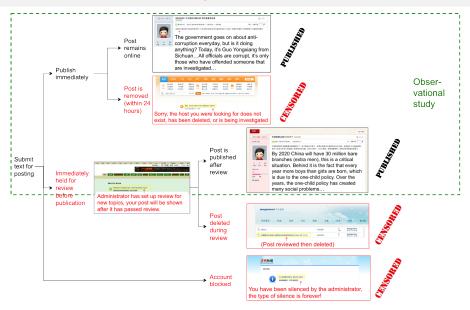
- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)
 - Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)
 - Submitted posts randomly assigned to type
 - Checked on censorship (from computers in many countries)
- Participatory Study (for descriptive inferences)
 - Current method of learning how they censor: ask (carefully!)
 - Our goal: change our sources' incentives

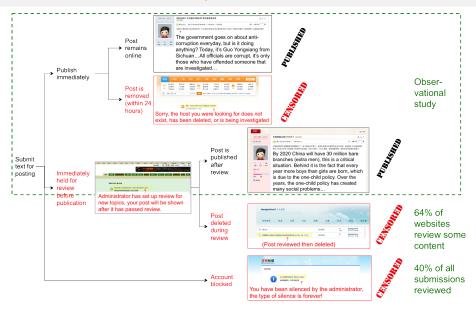
- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)
 - Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)
 - Submitted posts randomly assigned to type
 - Checked on censorship (from computers in many countries)
- Participatory Study (for descriptive inferences)
 - Current method of learning how they censor: ask (carefully!)
 - Our goal: change our sources' incentives
 - Procedure: create our own social media website in China

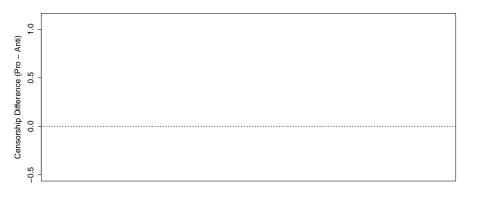
- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)
 - Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)
 - Submitted posts randomly assigned to type
 - Checked on censorship (from computers in many countries)
- Participatory Study (for descriptive inferences)
 - Current method of learning how they censor: ask (carefully!)
 - Our goal: change our sources' incentives
 - Procedure: create our own social media website in China
 - Bought URL; contracted with firms for servers & software; posted and censored ourselves

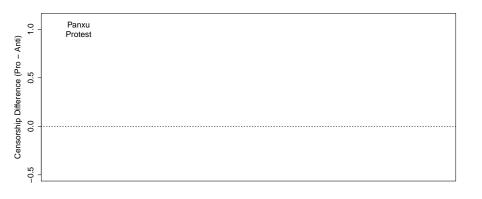
- Randomized Experiment (for causal inferences)
 - Selected 100 top social media sites (\sim 87% of blogs, >500M Users, geographically diverse)
 - Created 2 accounts on each (from inside China all over the country)
 - Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)
 - Submitted posts randomly assigned to type
 - Checked on censorship (from computers in many countries)
- Participatory Study (for descriptive inferences)
 - Current method of learning how they censor: ask (carefully!)
 - Our goal: change our sources' incentives
 - Procedure: create our own social media website in China
 - Bought URL; contracted with firms for servers & software; posted and censored ourselves
 - To learn: we tried every software option, read the documentation, and called customer support(!)



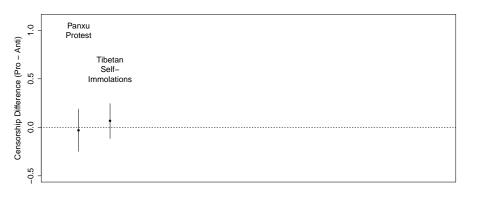


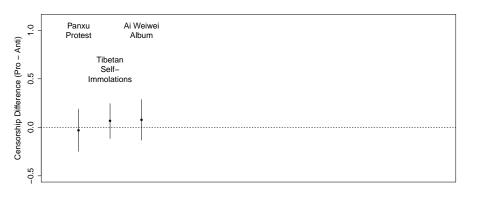


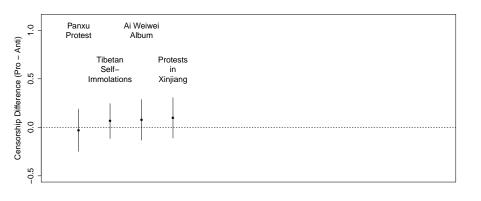


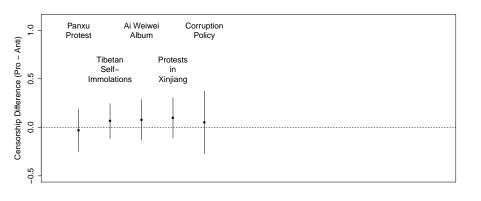


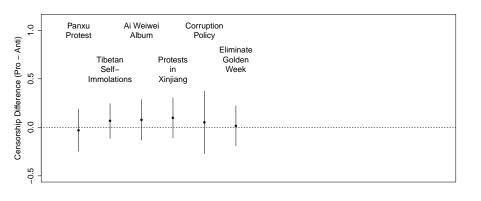


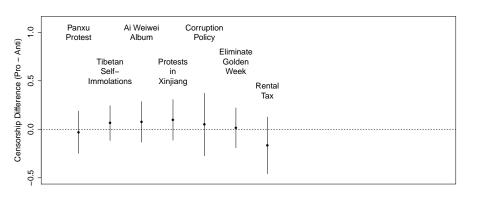


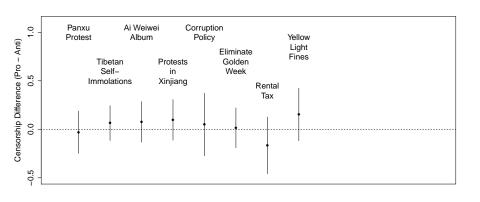


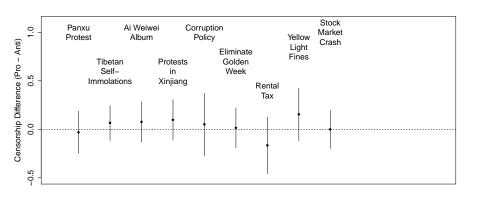


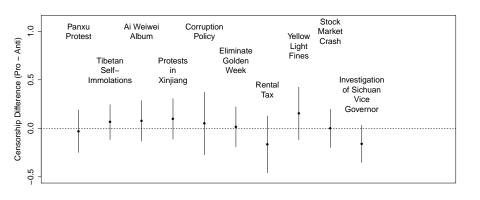


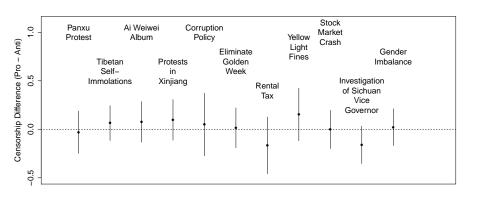


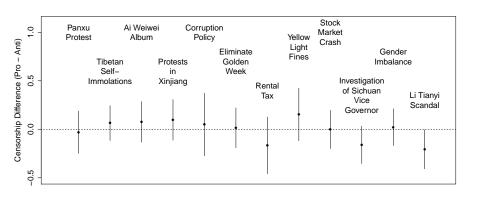


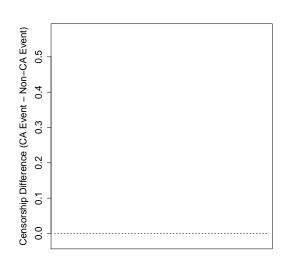


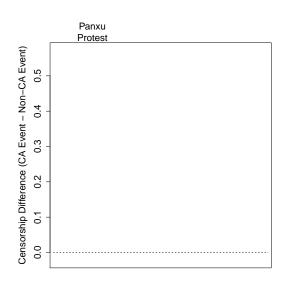


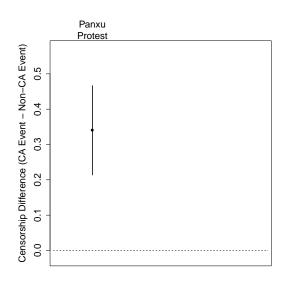


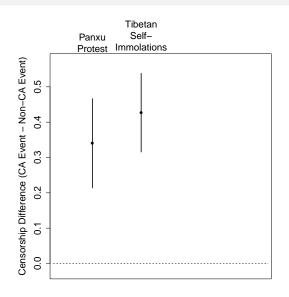


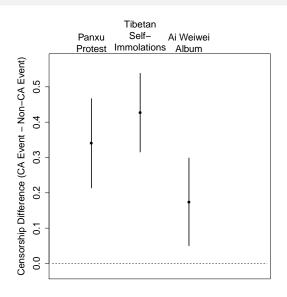


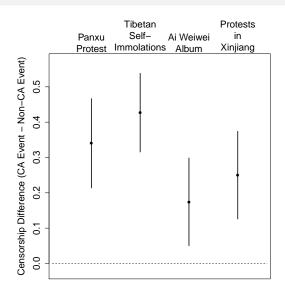












• The Chinese people:

- The Chinese people:
 - Individually free, Collectively in Chains

- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):

- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):
 - Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.

- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):
 - Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.
 - Predicts state actions when other sources are silent

- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):
 - Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.
 - Predicts state actions when other sources are silent
 - Applicable to other countries

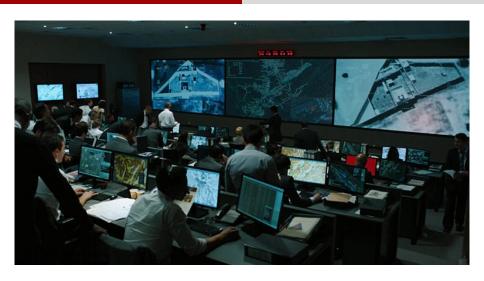
- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):
 - Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.
 - Predicts state actions when other sources are silent
 - Applicable to other countries
- New statistical methods widely applicable beyond China:

- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):
 - Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.
 - Predicts state actions when other sources are silent
 - Applicable to other countries
- New statistical methods widely applicable beyond China:
 - Following conversations when people try to evade authorities, use language creatively, achieve political purposes, etc.

- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):
 - Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.
 - Predicts state actions when other sources are silent
 - Applicable to other countries
- New statistical methods widely applicable beyond China:
 - Following conversations when people try to evade authorities, use language creatively, achieve political purposes, etc.
 - Understanding or predicting action on the ground

- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):
 - Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.
 - Predicts state actions when other sources are silent
 - Applicable to other countries
- New statistical methods widely applicable beyond China:
 - Following conversations when people try to evade authorities, use language creatively, achieve political purposes, etc.
 - Understanding or predicting action on the ground
 - Understanding large volumes of text in any language

- The Chinese people:
 - Individually free, Collectively in Chains
- Social Media (analyzed the right way):
 - Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.
 - Predicts state actions when other sources are silent
 - Applicable to other countries
- New statistical methods widely applicable beyond China:
 - Following conversations when people try to evade authorities, use language creatively, achieve political purposes, etc.
 - Understanding or predicting action on the ground
 - Understanding large volumes of text in any language
 - Applications to brand monitoring, intelligence analysis, sentiment analysis, investments, news, advertising, etc.



For more information: Gary King King@Harvard.edu



For more information: Gary King King@Harvard.edu