Reading China: Predicting Policy Change with Machine Learning

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The views expressed here are those of the authors and do not represent the views of AEI, Bates White, or their other employees.
Predicting policy change: why?

- China’s industrialization: product of gov’t direction.
- Manipulated data and opaque system make prediction difficult.
Predicting policy change: why?

- China’s industrialization: product of gov’t direction.
- Manipulated data and opaque system make prediction difficult... until now.

Policy Change Index (PCI) for China:

- *leading* indicator of policy moves;
- quarterly, 1951 – present.
Predicting policy change: why?

Implications on current events:

- US-China trade fight;
- China’s capital flight and growth slowdown.
1. PCI for China

2. Implications on current events

3. Next steps
Predicting policy change: how?

Build a machine learning algorithm to

- “read” the *People's Daily*;
- detect structural changes in its priorities.

Official newspaper, 1946-present
Source of predictive power

The Leninist tradition:

- “[T]he whole task of the Communists is to be able to convince the backward elements.”
- Necessary “to transform the press... into a serious organ for the economic education of the mass of the population.”
Source of predictive power

The Leninist tradition, in Xi Jinping’s words:

• The media should “uphold the correct orientation of public opinion in all aspects and at all stages.”
Source of predictive power

- People's Daily: central to China’s propaganda system
- Propaganda often precedes policies.
- Detect changes in newspaper’s priorities
  ≈ Predict changes in gov’t policies
Source of predictive power

People's Daily: central to China’s propaganda system

+ Propaganda often precedes policies.

→ Detect changes in newspaper’s priorities ≈ Predict changes in gov’t policies

Machine learning
Method

An algorithm that classifies front-page articles by “reverse-engineering” the editor’s mind.
Method

Articles in previous 5 years

Model a front-page classifier

Test
Method

Articles in previous 5 years

Model a front-page classifier

Test

Articles in next quarter

“Forecast”
Method

Policy Change Index $\equiv$ Test performance $-$ "Forecast" performance

PCI $\gg 0 \Rightarrow$ Structural difference in the newspaper’s priorities
Method: modeling

Input

Textual data

Machine learning algorithm

Layers of neural networks

Output

Front page?

\( x \): each article as an observation.

\( f \): a complicated function.

\[ y = f(x) \]
Method: modeling

Input

Textual data

Machine learning algorithm

Layers of neural networks

Output

Front page?

\( \mathbf{x} \) : each article as an observation.

\( f \) : a complicated function.

\( y = f(\mathbf{x}) \)
Result: PCI
Result: PCI — with ground truth
Understanding substance of change

<table>
<thead>
<tr>
<th>Front page?</th>
<th>Classified on front page?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>false negatives</td>
</tr>
</tbody>
</table>

- Content of *mis*-classified articles has policy substance.
1. PCI for China

2. Implications on current events

3. Next steps
What does it mean for the US-China trade fight?
Result: PCI — with ground truth
Result: PCI — going forward
The 2018 Q1 uptick
The 2018 Q1 uptick

Error rate by topic

Topic

- anti-corruption
- environment
- foreign aff. & global news
- gov't accountability
- industrial policies
- migration & transportation
- nationalism & global stage
- party authority
- poverty
- science & technology
- support for agriculture
- trade & investment openness
The 2018 Q1 uptick represents:

• internally: strengthening party authority;
• externally: nationalism and global leadership;
• populist policies to boost political support.
The 2018 Q1 uptick represents:

- internally: strengthening party authority;
- externally: nationalism and global leadership;
- populist policies to boost political support.

⇒ Curb your enthusiasm for the trade talks.
Result: PCI — going forward

Not signaling major concessions
What does it mean for the Chinese economy?
Method

Policy Change Index \( = \) Test performance \(-\) “Forecast” performance

\( PCI \gg 0 \Rightarrow \) Structural difference in the newspaper’s priorities
Taking apart the PCI

Policy Change Index = Test performance

“Forecast” performance
Taking apart the PCI

Test performance

⇒ Clarity of the newspaper’s (current) priorities
⇒ Clarity of the government’s (current) policies
Test performance
Conflicting agendas

Dual-track reform, 1978 – 1993

• allowing private businesses and markets while
• maintaining state sector and central planning.

“Harmonious society,” 2005 –

• using populist policies to alleviate inequalities while
• (partially) maintaining economic reform
Conflicting agendas

Dual-track reform, 1978 – 1993

- allowing private businesses and markets while
- maintaining state sector and central planning.

“Harmonious society,” 2005 – present

- using populist policies to alleviate inequalities while
- (partially) maintaining economic reform

Xi Jinping’s agenda: “harmonious society” 2.0
Test performance

Dual-track reform

“Harmonious society”
Test performance & capital flight

Dual-track reform

“Harmonious society”

Accelerating capital flight
1. PCI for China
2. Implications on current events
3. Next steps
More on PCI-China

Two projects:

- text summarization — what words/sentences cause misclassification?
- regional and local PCIs for China, their development implications, etc. (joint w/ W. Cheung).
More PCIs

PCIs for other (ex-)Communist regimes, using:

- Soviet Union’s *Pravda*
- East Germany’s *Neues Deutschland*
- Cuba’s *Granma*
- North Korea’s *Rodong Sinmun*
- Vietnam’s *Nhân Dân*
More PCIs

PCIs for other (ex-)Communist regimes, using:

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- Vietnam’s *Nhân Dân*

Work in progress (joint w/ E. Melly)
Beyond PCIs

Applicability well beyond newspapers and page numbers.
Interested in DIY?

- Website: policychangeindex.com (newsletter sign-up)
- Source code: github.com/PSLmodels/PCI
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Questions?