

**Enlightenment Ideals and Belief in
Science in the Run-up to the Industrial
Revolution: A Textual Analysis**

Discussion by Ran Abramitzky

This is a terrific project!

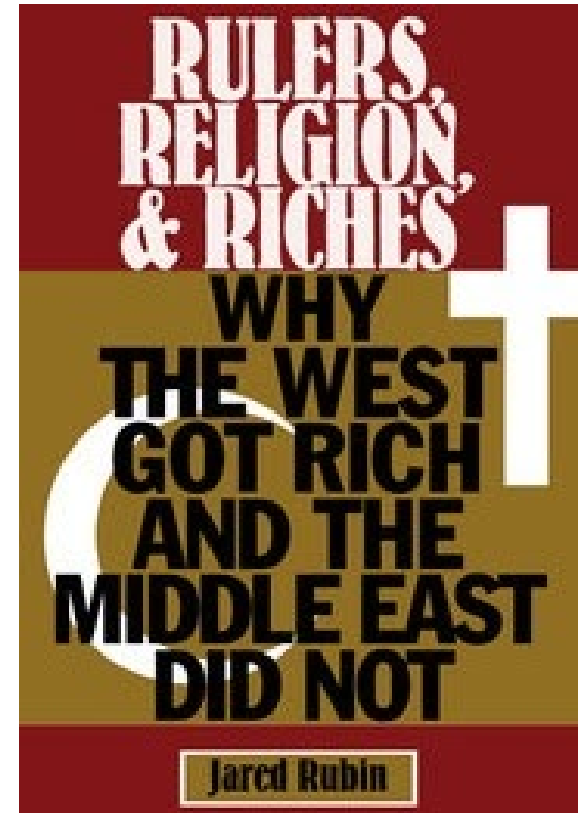
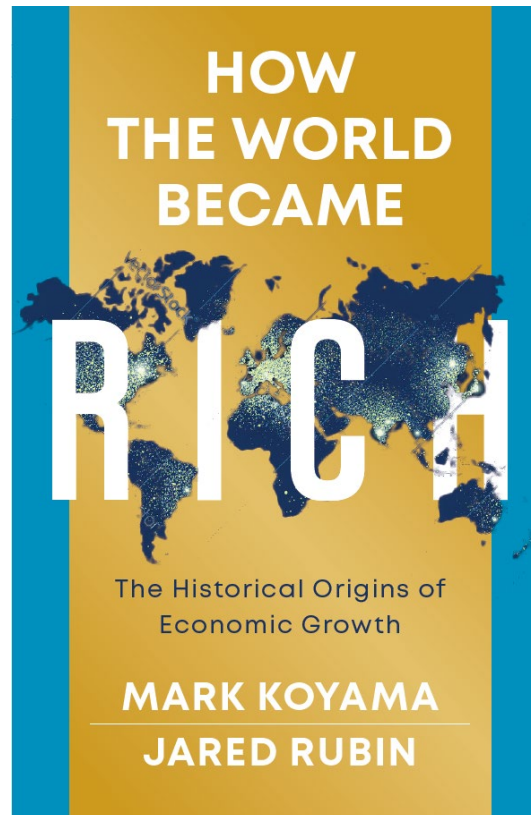
- **Addressing big questions in economic history**
 - The cultural roots of the Industrial Revolution
- **Using an impressively large textual dataset and natural language processing methods**
 - 173,031 works printed in England 1500 -1900
- **Employing “words as data” approach**
 - Exciting recent development in econ history

Full disclosure

- **I love the author and the inspiration to project**
 - My academic son inspired by my academic father
- **Jared Rubin is my first graduate advisee**
 - I think the world of him
- **Joel Mokyr is my dear advisor and mentor**
 - One of the most important economic historians



Exhibit A of “you should pursue your interest”



Big questions in econ history

- Why did the west grow rich and the rest of the world didn't?
- Why did the Industrial Revolution and the sustained economic growth that followed:
 1. occur in 18th century and not some other time?
 2. happen in Europe/England and not elsewhere?
- Why didn't industrialization make the whole world rich?, i.e. what caused "great divergence"?
- Why are some countries rich and others poor?



Bigger or smaller questions?

- Tradeoff between nailing a smaller question and being more speculative on a bigger question
- Trend towards nailing smaller questions
- Econ history still allows both...

How to use qualitative information?

- If you want to answer a big question, can't rely on just quantitative data and clean identification
- Defer to amazing experts (Mokyr) who read more than us
- Benefit: deep qualitative and nuanced knowledge
- Cost: Believing without data is against economists' DNA

Words as data in recent econ history

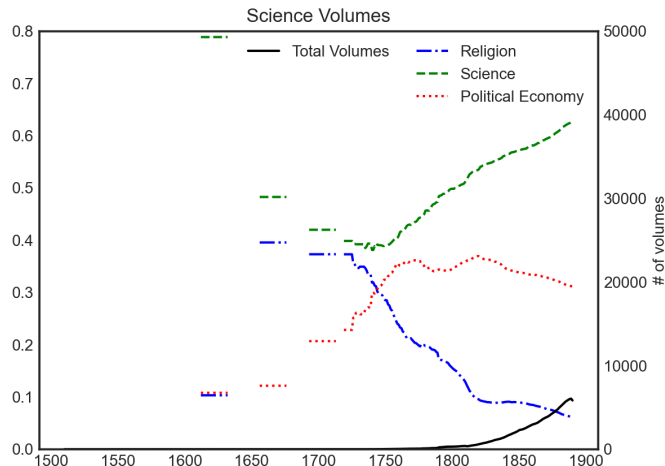
- **“How does scientific progress affect cultural changes? A digital text analysis,”** Giorcelli et al. (*JEG* 2022)
 - The diffusion of “Darwinian” terms in the text of eight million volumes from Google books
- **“Structural Transformation and Value Change: The British Abolitionist Movement,”** Figueroa and Fouka (2023)
 - Analyze all articles mentioning slavery that were published between 1787 and 1833 from the British Newspaper Archive
- **“Computational analysis of 140 years of US political speeches reveals more positive but increasingly polarized framing of immigration,”** (our *PNAS* paper 2022)

Contributions

- **Big contribution is turning words into data on a big question while respecting deep expert historians**
- **First to link cultural change embedded in language to one of the most important episodes in economic history: Britain's industrialization**
- **First to test Mokyr's "big think" econ history of role of progress-oriented culture in the Industrial Revolution**
 - Did the language of science become more progress-oriented in the period leading to the IR?

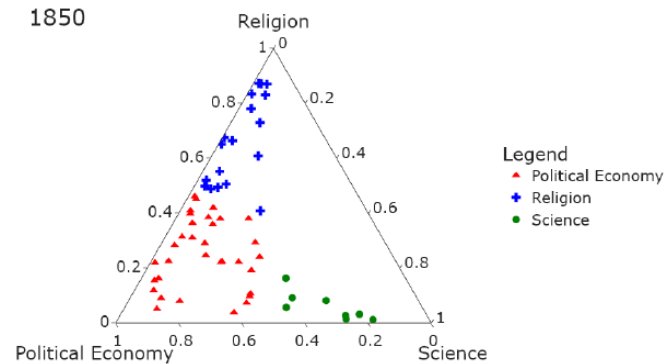
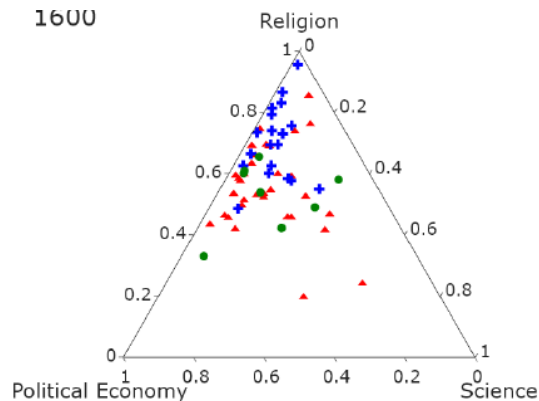
Even basic findings are fascinating

A decline in religious content in scientific volumes



My colleague seminar story...

By 1850, little overlap in scientific and religious works



Clarify concepts

- How exactly do you define “science”? Do you consider “science” and “technology” as the same thing?
- Why would scientific texts reflect values? Shouldn't they sound objective?
- Clarify what Mokyr means by “progressive” – not progressive ideas but rather that people start to believe that technology should be used to improve economic well being
 - Look in text for his “propositional” and “prescriptive” knowledge
- Technical books and articles would not include any of the terms in the “progress” vocabulary, but they were still driven by their trust in progress

Give more details about dataset

- Is there a bias in the digitized books? Or the surviving books?
- Who wrote the books? Who read them? Who was buying them? How many of these books were circulating?
- What do you do with books that are not religious, PE, or scientific?
- What's the average length of each volume? Distribution of volumes by category? How many of the volumes are small pamphlets? Does the dataset include scientific journals?

Open black box of linguistic tools

- ML approach is clever but hard to follow
- Give examples by category. What are books that are 50% science and 50% political economy?
- Could you validate that expert historians would agree with the classification of the LDA method?
- Could you add simpler analysis: of the authors; of the topics and the sentiment using volume titles and subtitles?

- **Overall, a terrific project by terrific scholars!**