Catholic Censorship and the Demise of Knowledge Production in Early Modern Italy

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Motivation

Italy's primacy in knowledge creation is undisputed in the 15th and 16th century

Overtaken by North and Western Europe in the following two centuries

The average number of publications per scholar in Italy dropped from

- 307 in 1470-1540 (297 in Europe)
- 114 in 1680-1750 (244 in Europe)

graph

Research question

The question we ask is:

Was the Roman Church censorship key in altering

the growth path of new ideas in Italy?

Our answer:

- Censorship reduced by 27% the average log publication per scholar in Italy.

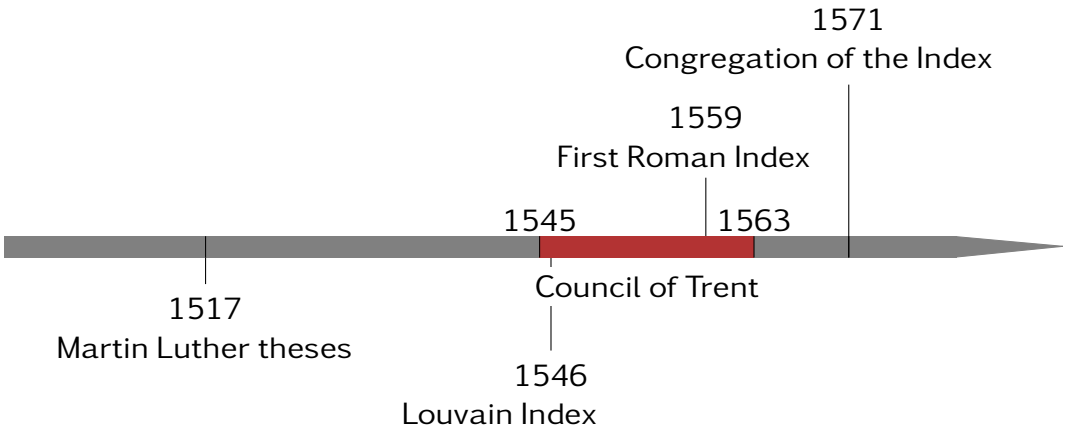
Related Literature

1. **Catholic Censorship and Economics**: Becker, Pino and Vidal-Robert (in progress), Eckelund , Hebert and Tollison (2004)
2. **Ideas and Knowledge diffusion:** De la Croix, Doepke, and Mokyr (2017), Mokyr (2016), Lucas (2008), Dittmar (2011), Dittmar and Seabold(2019)
3. **Religion and Economics**: Becker and Woessman (2009), Benabou, Ticchi and Vindigni (2015), Squicciarini (2017)
4. **Decline of Italy:** Landes(1999), Cipolla (2004)

What we do

1. Build a database of scholars' quality over the period 1400-1750
2. Document two features of authors censorship over the period
3. Build a parsimonious model of knowledge diffusion and censorship that rationalizes data
4. Estimate the model using the Method of Simulated Moments.
5. Run counterfactual experiment to asses the role of Church's censorship on the decline of knowledge production in early moder Italy

Historical background



Catholic censorship: *Index Librorum Prohibitorum*

Type of censorship:

- *Opera omnia*: all works
- Individual works indexed

Enforcement:

- Inquisition
- Bishops in the center-south
- Papal state threatening printers Grendler (1975)

Creation:

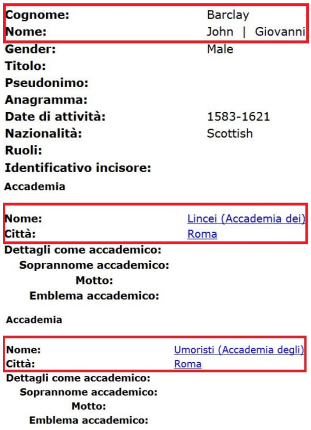
- Congregation of the Index
- Censoring iter often started by an external denounce

Data

The Sample

Database of scholars affiliated to an Italian institution over the period 1400-1750: **1762 authors (so far)**

1. Universities
   - Mazzetti (1847) + other institution specific data
2. Academies:
   - "Italian Academies 1525-1700", database by the British Library
   - Parodi (1983) for "La Crusca"



Cognome: Barclay
Nome: John | Giovanni
Gender: Male
Titolo:
Pseudonimo:
Anagramma:
Date di attività: 1583-1621
Nazionalità: Scottish
Ruoli:
Identificativo incisore:

Accademia

Nome: Lincei (Accademia dei)
Città: Roma
Dettagli come accademico:
Soprannome accademico:
Motto:
Emblema accademico:

Accademia

Nome: Umoristi (Accademia degli)
Città: Roma
Dettagli come accademico:
Soprannome accademico:
Motto:
Emblema accademico:

Data - Censorship

Identify whether his (or her) work was subject to censorship by the church

Source: De Bujanda and Richter (2002)

- Collection of Indexes of Forbidden Books
- Short life description to complement our data
- Censorship of Individual works or *Opera Omnia*

BARCLAY, John (1582-1621). (Pseud. ***Euformio Lusinius***). Né à Pont-à-Mousson. Fils de William Barclay. Écrivain. Poète satirique. Voyageur.

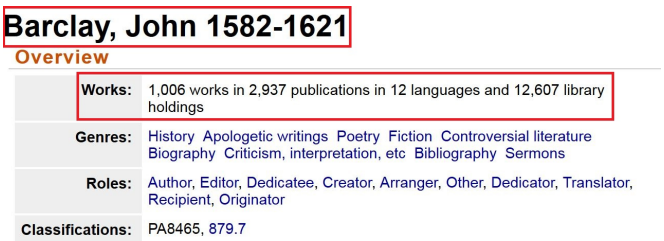
- ***Euphormionis Lusinini Satyricon, nunc primum recognitum, emendatum et variis in locis auctum.***
Paris, François Huby, pars prima 1605, in-12°, [252] p. Pars secunda, 1609, in-12°, [260] p. Paris, BN.
Decr. 13-12-1608.

Data - Quality of Scholars

We measure the "quality" of each scholar by the quantity of written output

Source: Worldcat search engine

- References to the collections of thousands of libraries around the world
- Scholar's Quality=Log Publications by and about him
- Keep if at least one publication

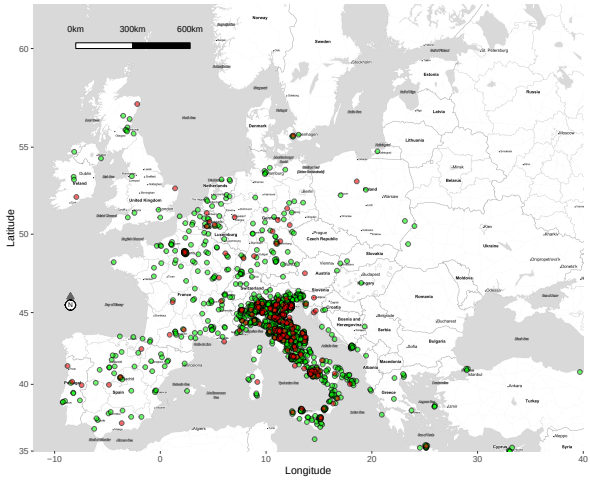


Barclay, John 1582-1621

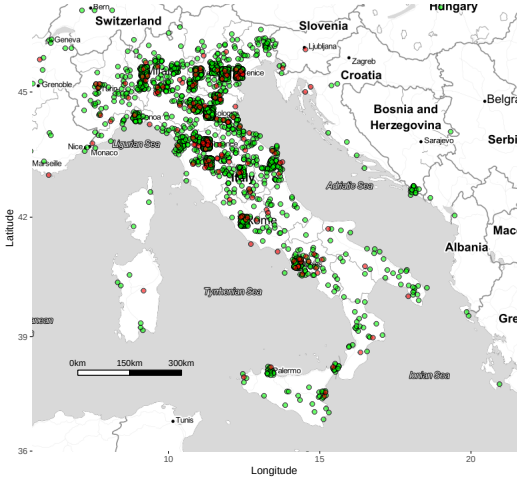
Overview

Works:	1,006 works in 2,937 publications in 12 languages and 12,607 library holdings
Genres:	History Apologetic writings Poetry Fiction Controversial literature Biography Criticism, interpretation, etc Bibliography Sermons
Roles:	Author, Editor, Dedicatee, Creator, Arranger, Other, Dedicator, Translator, Recipient, Originator
Classifications:	PA8465, 879.7

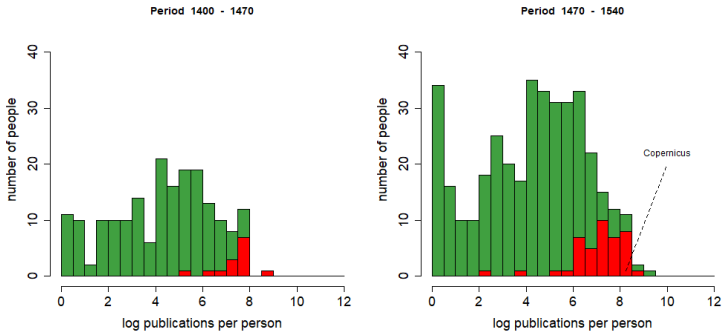
The Data in a Map - Europe



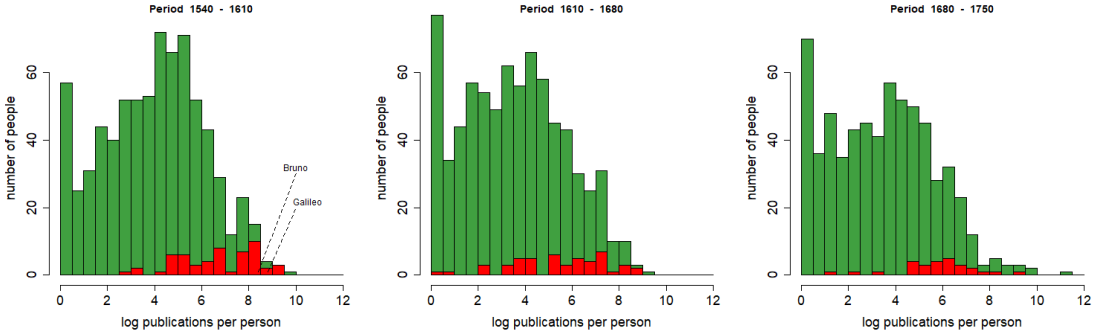
The Data in a Map - Italy



Two New Features of Authors Censorship - I



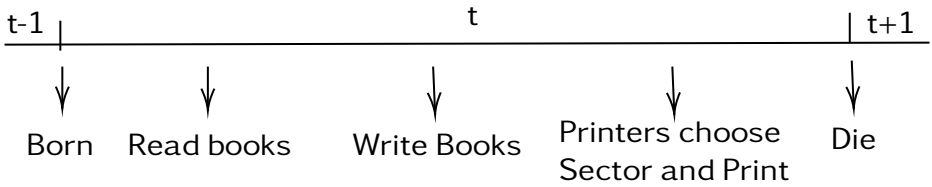
Two New Features of Authors Censorship - II



Theory

Theory

- Discrete time
- one generation of N authors alive at time
- Knowledge is embodied in books, transmitted to the next generation
- Agents learn from μ books during their life time
- Books can be **revolutionary** (R) or **compliant** (C)



Knowledge production

- Production using a book with irrelevance h_i is q_i.

$$q_i^j = (h_i^j)^{-\theta}, \quad \theta \in (0,1), j \in \{C, R\}$$

- In t, the **irrelevance** of book i of type j follows an exponential distribution

$$h_i^j \sim \exp(k^j), \quad \text{with } j \in \{C, R\} \text{ and } i \in \{1, .., N\}.$$

- The distribution of book quality follows a Fréchet distribution with scale parameter k^θ and shape parameter $1/\theta$
- Average book quality $\bar{q}^j$ by sector j:

$$E(q_i^j) = \int_0^\infty h_i^{-\theta}(k^j e^{-k^j h_i}) dh_i = (k^j)^\theta \Gamma(1-\theta)$$

Knowledge Accumulation

m_{t-1} is the **share** of **revolutionary books** that people read: depends on books printed in $t-1$

Since exp() satisfies the minimum stability postulate, the best books retained are again exp()

$$\hat{h}_i^C = \min\{h_1^C, .., h_{\lfloor(1-m_{t-1})\mu\rfloor}^C\} \sim \exp(k_{t-1}^C(1-m_{t-1})\mu) = \exp(b_t^C),$$
$$\hat{h}_i^R = \min\{h_1^R, .., h_{\lfloor m_{t-1}\mu\rfloor}^R\} \sim \exp(k_{t-1}^R m_{t-1}\mu) = \exp(b_t^R)$$

Combine inherited knowledge with a new idea $h_N^j \sim \exp(\nu b_t^j)$

New ideas kept if more productive: knowledge evolves as

$$k_t^C = (1+\nu)k_{t-1}^C(1-m_{t-1})\mu,$$
$$k_t^R = (1+\nu)k_{t-1}^R m_{t-1}\mu.$$

Occupational Choice and Censorship

The Church kicks in, imposing a rate of censorship of β

People will just meet $(1-\beta)\mu m_{t-1}$ revolutionary ideas

Over time we have

$$k_t^R = (1+\nu)\mu m_{t-1}(1-\beta)k_{t-1}^R$$
$$k_t^C = (1+\nu)\mu(1-m_{t-1})k_{t-1}^C$$

Printers meet one author, pick the best type j and print everyone belonging to her best book type.

Revolutionary ideas are weighted by α, the relative attractiveness of revolutionary books

$$m_t = \Pr\{q^C < \alpha q^R\} = \frac{b_t^R}{b_t^R + b_t^C \alpha^{-1/\theta}}$$

Equilibrium path

Definition

Given β, an equilibrium path is a sequence $\{m_t\}_{t\geq 0}$, describing the share of revolutionary books over time. It is such that:

- Each author of each generation write books whose quality and type is defined by the current state of knowledge.
- Each printer of each generation chooses her sector according to the most productive book presented by the first randomly met author.
- Each printer of each generation, once she chose her sector, prints all the authors she meets randomly.
- The probability of being exposed to revolutionary book in $t+1$ depends on the share of revolutionary titles written in t.
- The books printed in t embody the stock of compliant and revolutionary knowledge available to generation $t+1$.

Dynamics with exogenous β

Treating β as an exogenous parameter dynamics are described by:

Proposition

Given the initial condition $m_0 \in [0,1)$, we have

i) $\lim_{t\to\infty} m_t = 0$ *if* $m_0 < 1/(2-\beta)$ *(Compliant steady state),*

ii) $\lim_{t\to\infty} m_t = 1$ *if* $m_0 > 1/(2-\beta)$ *(Revolutionary steady state),*

iii) $\lim_{t\to\infty} m_t = m_0$ *if* $m_0 = 1/(2-\beta)$ *(Unstable steady state).*

Church's Rule of Thumb Behavior

What was the Church trading off? We do not know.
We make minimal assumptions. Lexicographic preferences over:

1. Convergence to 0 of m_t
2. Minimize β_t

Proposition

Given the initial condition $m_0 \in [0,1)$, the Church will choose a level of censorship β_t such that $\beta_t = \max\{2 - 1/m_t + \epsilon, 0\}$, with ϵ arbitrarily small. If $m_0 = 1$, it does not exist a rate of censorship $\beta_t \in [0,1]$ such that $\lim m_t = 0$.

Church's optimizing Behavior

Why did censorship kicked in so late, moving from virtually 0 to a considerable amount?

We assume:

1. Setting up the censoring institution was a fixed cost ψ
2. The church can **censor up to** $\bar{\beta}$

$$V(m_{t-1}) = \max[V^N(m_{t-1}), V^C(m_{t-1}) - \psi]$$

$$V^N(m_{t-1}) = u(1-m_t) + \delta V(m_t) \quad \text{s.t.} \quad m_t = f(m_{t-1}, 0)$$

$$V^C(m_{t-1}) = \max_{0 \le \beta_t \le \bar{\beta}} u(1-m_{t-1}) + \delta V^C(m_t) \quad \text{s.t.} \quad m_t = f(m_{t-1}, \beta_t)$$

$$f(m_{t-1}, \beta_t) = \frac{(1-\beta_t)m_{t-1}^2}{1 - m_{t-1}((\beta_t - 2)m_{t-1} + 2)}$$

Church's optimizing Behavior (cont.)

Trade off between censoring today paying ψ and waiting

No censorship if

- m_t is too low: *No need to censor*
- m_t is too high: *Too late to censor*

Windows of censorship emerge

- Censorship if it can change dramatically the dynamics
- Waiting one more period make censorship less attractive

Still possible to have censorship and converge to $m_t = 1$

Estimation

Estimation

Some parameters: taken from the literature + perfectly match moments

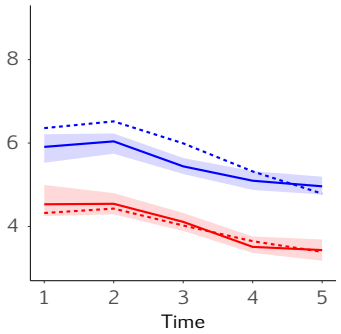
The rest is estimated down using the **simulated method of moments**

Table: Identification of Parameters

Calibrated Parameters		Value	Target
Discount Factor	δ	0.06	RBC literature
Fixed Cost of Censorship	ψ	$(3.48 - 3.49) \cdot 10^{-3}$	Censorship start
Estimated Parameters		**Value**	**Standard Errors**
Compliant knowledge in 1	k_1^C	$1.5 \cdot 10^2$	$1.02 \cdot 10^1$
Revolutionary knowledge in 1	k_1^R	$1.3 \cdot 10^3$	$1.04 \cdot 10^2$
Productivity of books	θ	0.35	0.015
Max Censorship	$\overline{\beta}$	0.18	0.016
Knowledge growth	$(1+\nu)\mu$	2.09	0.07
Price of revolutionary books	p	0.48	0.017

Model Fit

(a) Overall scholars quality: median, 75^{th} percentile



(b) % censored scholars

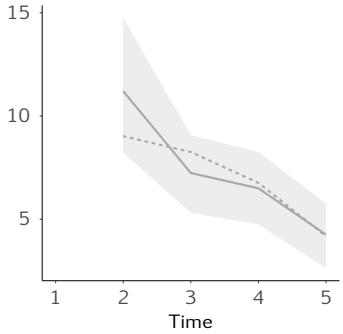
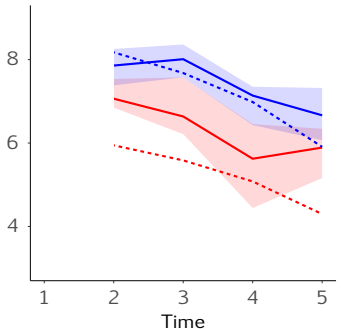


Figure: Data (solid), simulations (dashed)

Over-Identification

(a) Censored scholars
quality: median, 75^{th} percentile



(b) Non-censored scholars
quality: median, 75^{th} percentile

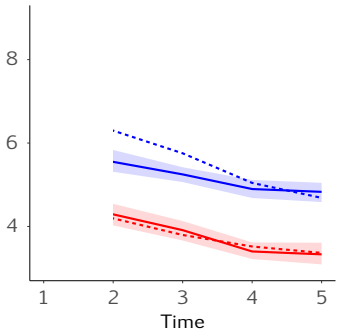
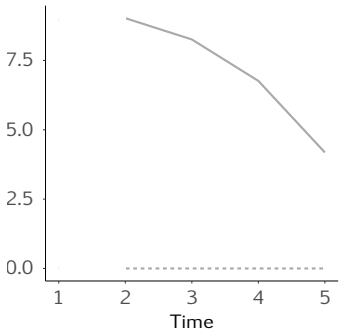


Figure: Data (solid), simulations (dashed)

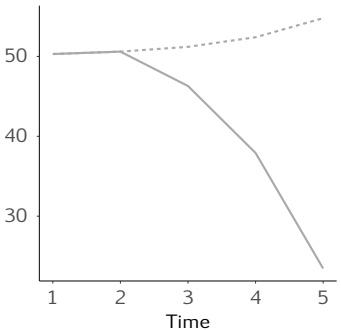
Counterfactual Experiments

Counterfactual Dynamics without Censorship

(a) % censored authors



(b) % revolutionary authors



(c) Overall, revolutionary compliant quality (averages)

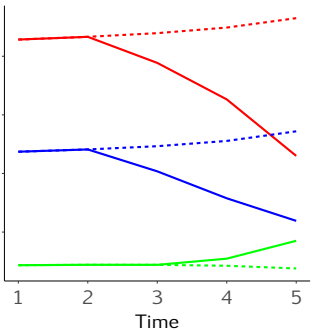


Figure: Baseline simulations (solid), simulations without cenosorship (dashed)

Results

From the counterfactual experiment we learn that

- Censorship reduced by 27% the average log publication per scholar in Italy in 1680-1750
- Half of this drop stems from the induced reallocation of talents towards compliant activities, while the other half arises from the direct effect of censorship on book availability.

Conclusion

What we did:

1. Build a database of scholars' quality over the period 1400-1750
2. Document two features of authors censorship over the period
3. Build a parsimonious model of knowledge diffusion and censorship and take it to the data
4. Run counterfactual experiment to asses the role of Church's censorship on the decline of knowledge production in early moder Italy
5. **Censorship reduced by 27% the average log publication per scholar in Italy**