

68,000 European university professors and academicians: human capital, mobility, families, and religion from 1000 CE to 1800 CE

David de la Croix
UCLouvain & CEPR

University of Wageningen, March 2024



European Research Council
Established by the European Commission

Motivation

- Human capital, Knowledge creation and diffusion are key for development
- What about the premodern period? Was human capital key for Europe take off?
- Most of it came from Scholars teaching at Medieval and Early Modern Universities or members of Academies
- Data collection on scholars and literati over the period 1000–1800, Europe
- Look at the data through the lens of economic models
- No 100% clean natural experiments to unravel causality, history not that generous

Team: Mara Vitale, Matthew Curtis, Chiara Zanardello, Filippo Manfredini, Rossana Scebba and RA's to encode data manually
+ occasional external collaborators (Fabre, Stelter)

Universities



Universities: emergence during the Middle Ages. Teach Arts (incl. sciences), Theology, Law, Medicine

Handwritten lecture notes of George Licton
who studied in Louvain in 1467

Key features of universities

Many are bottom-up. Recognized *ex post* by a charter (e.g. Papal Bull)

Variety of subjects are taught

Diplomas follow exams. Given by institutions (hence by community of masters)
Some dose of meritocracy (*disputatio*, exams)

Very unique feature: they are *persona ficta* (≈ legal persons/corporations)
Origin: Roman law (*universitas, societas*) + Theology (church as *corpus mysticum* of Christ) + Canon law

In corporations, professors act collectively. + one can leave a corporation.
The institution persists beyond the existence of its members (universities more persistent than States)

Academies

Academies: informal clubs becoming formal institutions after 1650.
Mostly arts & sciences (+ applied) – Meetings, publications, letters, prizes



First meeting of the
academy in
Copenhagen

Data collection: where we stand

Data collected from 604 secondary sources (example next slide)

<https://shiny-lidam.sipr.ucl.ac.be/scholars/>

- list of relevant institutions: universities (from Frijhoff 1996), scientific academies (McLlland), Italian Renaissance academies (British Library), language academies → 379 institutions
- 68000 Scholars and Literati
- >82500 Activities, each activity representing the presence of a scholar in one institution

Originality of the database

- Teachers, not students
- European scope
- Measure of the quality (human capital) of the scholars from VIAF

Introduction
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Database
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Human capital
oooooooo

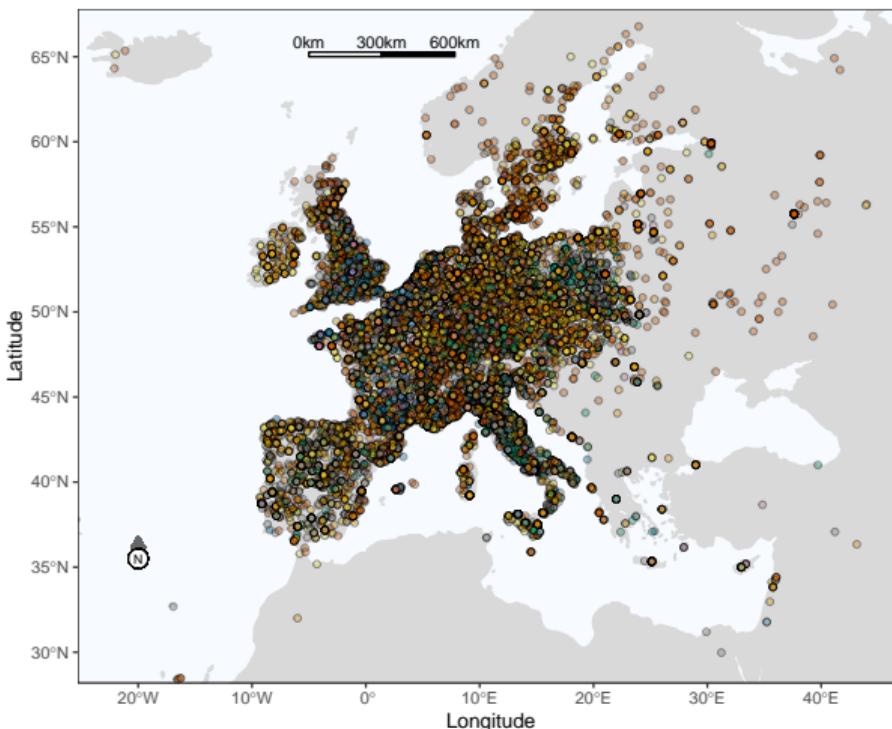
Mobility
ooooo

Families
oooo

Women
ooo

Network
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Geographical coverage



Places of birth:

Matching three different types of sources

Secondary source on members of a university/academy → field, dates, type of membership, place of birth

Biographical dictionaries (Treccani, Allgemeine Deutsche Biographie, etc.) → vital dates, places of death/birth

VIAF (Virtual International Authority File) page → publications

ANNALES
DES
PROFESSEURS

DE
ACADEMIES ET UNIVERSITÉS ALSACIENNES
1628-1871 (Strasburg)
PAR
OSCAR BERGER-LEVRAULT



NANCY
IMPRIMERIE BERGER-LEVRAULT ET C°
—
1892

ALUMNI CANTABRIGIENSES
A BIOGRAPHICAL LIST OF ALL KNOWN STUDENTS, GRADUATES,
AND HOLDERS OF OFFICE AT THE UNIVERSITY OF CAMBRIDGE,
FROM THE EARLIEST TIMES TO 1900

COMPILED BY
JOHN VENN, Sc.D., F.R.S., F.S.A.,
PROFESSOR OF MATHEMATICS AND
ECONOMICS OF AGRICULTURE

PART I
FROM THE EARLIEST TIMES TO 1720
VOLUME IV
SAAL-ZEUNGLIUS
WITH AN APPENDIX
CONTAINING ADDITIONAL INFORMATION
RELATIVE TO PREVIOUS VOLUMES

CAMBRIDGE
AT THE UNIVERSITY PRESS
1947

TREMELLUS, Emmanuel, Ferrariensis.

Natus 1510.
Denatus (Sedan.) 9 Octobr. 1580.

Dagmar Drüll

HEIDELBERGER
GELEHRTELEXIKON
1386-1651

Digitized by Springer

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Académies et Universités alsaciennes.

Hebreæ Lingue Professor, LUCCA, 1511.

Hebreæ Lingue Professor, 1542-1547.

Hebreæ Lingue Professor, Cambridge, 1549-1553.

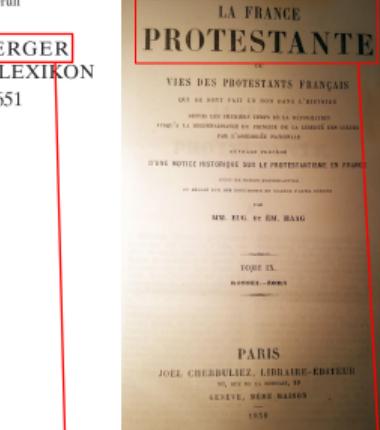
Hebreæ Lingue Professor in Universitate Heidelbergensi.

Hebreæ Lingue Professor in Academia Sedanensi.

TREMILLUS TREMYLL, — (senior). Pens. at PETERHOUSE, in 1581. Probably Richard, s. and h. of Richard, of Bedfordshire. Of Wrawby, Lincs. Married Helen, dau. of William Thorley, of Northamptonshire. Probably brother of Henry (1580) and of James (above). *(Essex Pedigrees, 608.)*

TREMELLUS, JOHN EMMANUEL. Hebrew lecturer, 1550-3. A Jew. D. at Ferrara, 1510. Studied at Padua between 1530 and 1540. Converted to Christianity by Cardinal Pole, his godfather, 1540. Teacher of Hebrew at Lucca, where he imbibed the opinions of the reformers chiefly through the influence of Peter Martyr. Came to England; resided with Archbishop Cranmer at Lambeth Palace, 1547. Preb. of Carlisle, 1552. Left England on the accession of Queen Mary, 1553. Head of the gymnasium at Hornbach, 1559. Imprisoned for his Calvinistic views; released, 1560. Professor of Old Testament studies at Heidelberg, 1561. D.D. (Heidelberg), 1561. Sent to England as Envoy of the Elector; resided with Archbishop Parker, c. 1565. Expelled from Heidelberg, 1576. Appointed teacher of Hebrew at Sedan. Translated the Bible from Hebrew and Syriac into Latin. Author, miscellaneous. Died at Sedan, Oct. 9, 1580. (*Cooper*, I. 425; *D.N.B.*)

TREMLETT, GEORGE. Adm. sizar (age 17) at SIDNEY, Dec. 21,



Tremellius (Tremmel), Immanuel

1561-1577 Theol. Fak.

1561-1577 Altes Testament; 1561-1575 Hebräische Sprache

* 1510 Ferrara (im Ghetto)

† 9. Okt. 1580 Sedan
mosaisch, seit 1540 kath., seit 1541 ref.

○ 1544 Elisabeth N.N., Witwe

K 1 T, 1 Stief-T, 1 S: Immanuel T., s. Toepek
2 (1886) S. 26, Hundsnurscher (1996)
S. 45

18 — TRÉ

de Jean Troussay et d'Aude Stevon.
TRÉMELLUS (EMMANUEL) Ferrariensis, né à
Ferrare, vers 1510, et mort à Sedan,
le 9 oct. 1580.

Tremellius quitta la religion juive dans laquelle il était né, pour embrasser la religion catholique, et celle-ci pour se faire protestant. Après sa conversion, il se retira à Lucques, où il enseigna quelque temps la langue hébraïque, mais la crainte de l'inquisition finit par le chasser d'Italie, ainsi que Pierre Martyr et d'autres italiens, partisans secrets de la Réforme. Il s'établit d'abord à Strasbourg, où il donna des leçons d'hébreu. Plus tard, il passa en Angleterre et y resta jusqu'à la mort d'Edouard. Chassé de nouveau par Marie la sanginaire, il retourna en Allemagne en 1553, et fut placé comme professeur d'hébreu dans l'école de Hornbach. Quelque temps après, l'électeur palatin Frédéric III l'appela à Heidelberg. En 1560, nous le trouvons à Metz, où il s'était marié pendant un premier séjour qu'il avait fait dans cette ville avant de se rendre à Strasbourg. S'il est vrai qu'il y fut arrêté par ordre du maréchal de Vielleville sous le règne de François II, sa détention fut de courte durée, puisqu'il fut un des députés (1) que les Protestants de Metz envoyèrent en Cour, aussi tôt après la mort de ce prince, pour demander à la reine régnante la liberté du culte, le rappel des bannis et la délivrance de Guillaume Palisseau, prisonnier à Auxerre. Les deux dernières demandes furent accordées; quant à la première, il fut répondu que les protestants Réformés n'auraient ni temple ni lieu d'exercice quelconque à Metz, qu'ils n'y tiendraient aucune assemblée sous peine de mort, mais que Senneffier leur assignerait un lieu hors de la ville pour y faire leurs prêches. Il est probable que Tremellius ne tarda pas à renoncer à Heidelberg, d'où, quelques années plus tard, il fut appelé à Sedan par le duc de Bouillon pour y remplir une chaire d'hébreu qu'il occupa jus-

L'autre se nommait Didier Jacob.

Measuring Publications from VIAF

VIAF
Virtual International Authority File

Search

Select Field:

Select Index:

Search Terms:

Trémellius, Emmanuel, 1510-1580

Tremellius, Immanuel, 1510-1580.

Tremellius, Immanuel

Immanuel Tremellius italienischer Exulant und reformierter Theologe

טראמליוס, עמנואל

Tremellius, Immanuel (1510-1581).

Tremellio, Emanuele, 1510-1580

Emmanuel Tremellius

VIAF ID: 56619788 (Personal)

Permalink: <http://viaf.org/viaf/56619788>

Preferred Forms

4xx's: Alternate Name Forms (63)

5xx's: Related Names (29)

Works

Biblia sacra des Oudē ende Nieuwē Testamēts ofte De gantsche Heylige Schrift vervattende het beschrevene woort Godes:



Biblia sacra, sive Testamentum Vetus, ab Im. Tremellio et Fr. Junio ex Hebræo Latinè redditum, et Testamentum Novum, à Theod. Beza è Græco in Latinum versum



Bibliorum pars secunda, id est libri historici



Bijbel.



Catéchisme de l'Eglise de Genève.



Christianæ Katechesis Hebraicis literis mandata / Emanuel Tremelius. - Londini, [1820].



Jesu Christi domini nostri Novum Testamentum



Libri Apocryphi



Nieuwe Testament. Ofte, het Nieuwe verbondt onses Heeren Jesu Christi



Praelectiones doctiss. in Epistolam D. P. ad Ephesios... D. Martini Buceri, habitæ Cantabrigiae... anno MDL et LI, ex ore preelegentis collectae et nunc primum in lucem editæ diligentia Immanuelis Tremelii,....



Proverbiorvm Solomonis regis Israel, liber carmine elegiaco redditus:



Psalmi Davidis



Rudimenta Hebraicae linguae : accurata methodo et brevitate conscripta : eorundem rudimentorum praxis quae vivæ vocis loco esse possit



Señer hinnuk behiré yah



Testamenti Veteris Biblia Sacra, sive Libri canonici priscae Judæorum ecclesiae a Deo traditi



Testamentvm Novvm



Biblia sacra, sive Testamentum Vetus, ab Im. Tremellio et Fr. Junio ex Hebræo Latinè redditum, et Testamentum Novum, à Theod. Beza è Græco in Latinum versum



Bibliorum pars secunda, id est libri historici



Bijbel.



Catéchisme de l'Eglise de Genève.



Showing 1 to 10 of 25 entries

Previous 1 2 3 Next

Selected Co-authors

Countries and Regions of Publication (8)

Publication Statistics

Selected Publishers (13)

About

Record Views

History of VIAF ID:56619788 (35)



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Human capital index of a scholar i : q_i

Combine 6 measures of production & notoriety through PCA

| | |
|----------------------------------|-------|
| No. characters of Wikipedia page | 0.39 |
| No. languages Wikipedia | 0.35 |
| No. of alternative names in VIAF | 0.42 |
| No. of countries in VIAF | 0.44 |
| No. of publishers in VIAF | 0.42 |
| No. of titles in VIAF | 0.43 |
| No. Eigenvalues > 1 | 1 |
| % variance explained by 1st PC | 81.8% |

Normalization: no VIAF, no WIKI $\rightarrow q_i = 0$

Human capital index

Seen from the point of view of today

Includes both output and citations

Measurement errors, mitigated by combining 6 variables

Bias: printed press, non academic works

Intensive margin: stationary over time (Kant not publishing more than Aquinas or Galileo)

For obscure scholars $q_i = 0$ (no VIAF, no Wiki)

Tomb of Bonandrea de Bonandreis,
lectured on canon law at Bologna in
1321-22 – no publication from him
survived →



Gothic house built by Antoine de Dorne,
← lectured on law at Valence 1520-1551 – no
publication from him survived

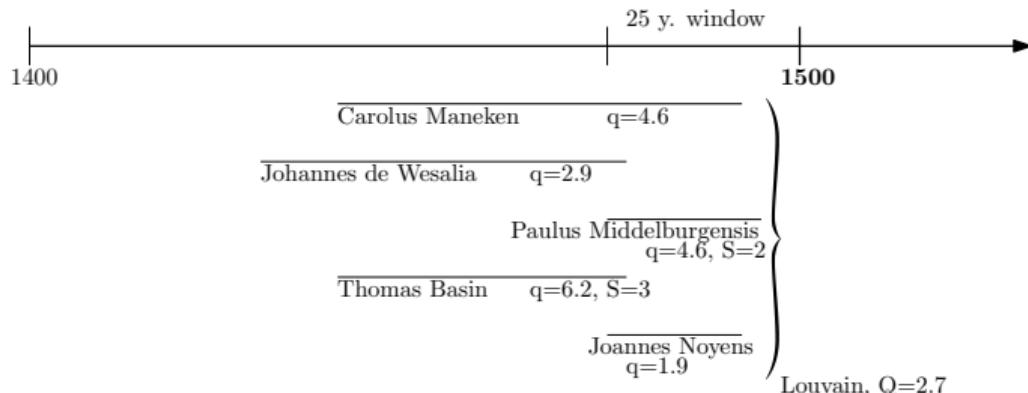
Ranking of top scholars

| Ranking | Scholar | Index (q_i) |
|---------|--|-----------------|
| 1 | François-Marie Arouet de Voltaire (many academies) | 12.27 |
| 2 | Martin Luther (U. Wittenberg) | 12.23 |
| 3 | Thomas Aquinas (U. Paris) | 12.12 |
| 4 | Jean-Jacques Rousseau (A. Lyon) | 11.93 |
| 5 | Immanuel Kant (U. Königsberg) | 10.85 |
| ... | | |
| 8 | Desiderius Erasmus (U. Cambridge, Louvain) | 11.59 |
| ... | | |
| 59 | Hugo de Groot (A. Mersenne) | 10.49 |
| ... | | |
| 85 | Christian Huygens (many academies) | 10.13 |
| ... | | |
| 157 | Antoni van Leeuwenhoek (Royal Society) | 9.64 |
| ... | | |
| 260 | Hermann Boerhaave (U. Leiden + academies) | 9.13 |

Notability index Q_k

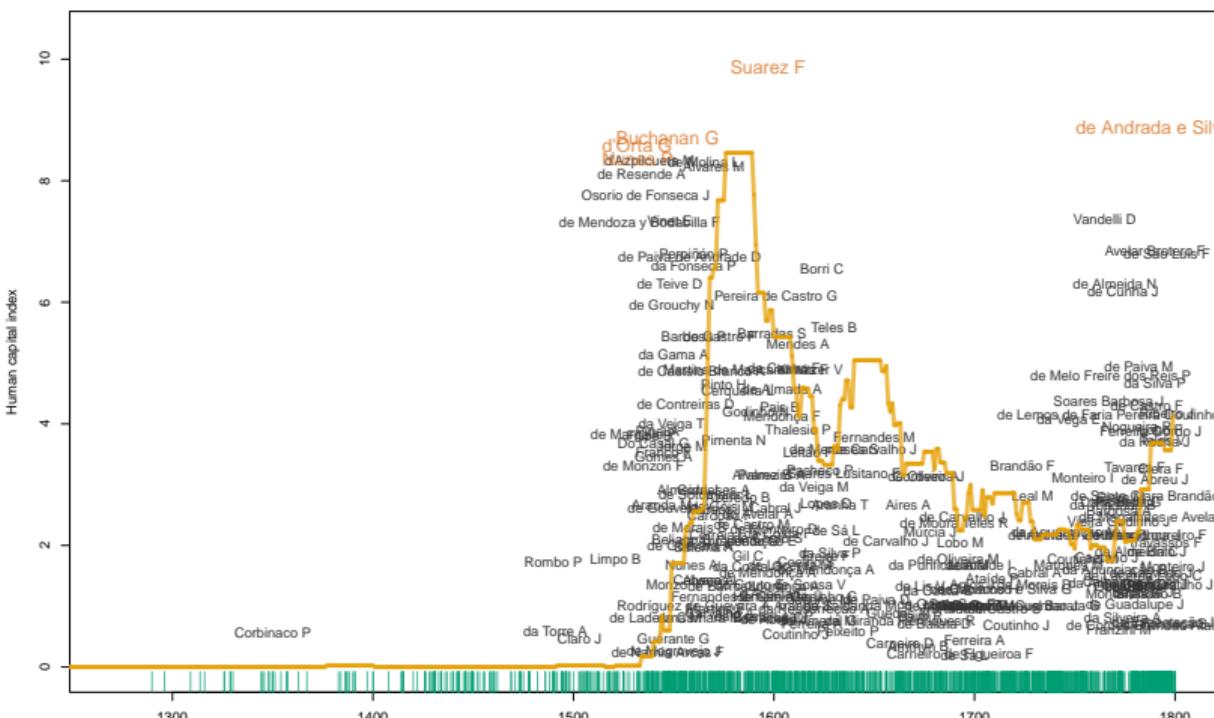
At time t , the notability Q_{kt} of a university k aggregates the q_i of the top 5 persons who were active at any point $\in [t - 25, t[$

$$Q_{kt} = \sqrt{\sum_{i=1}^5 \frac{1}{5} \left(\frac{q_i}{S_i} \right)^2}$$

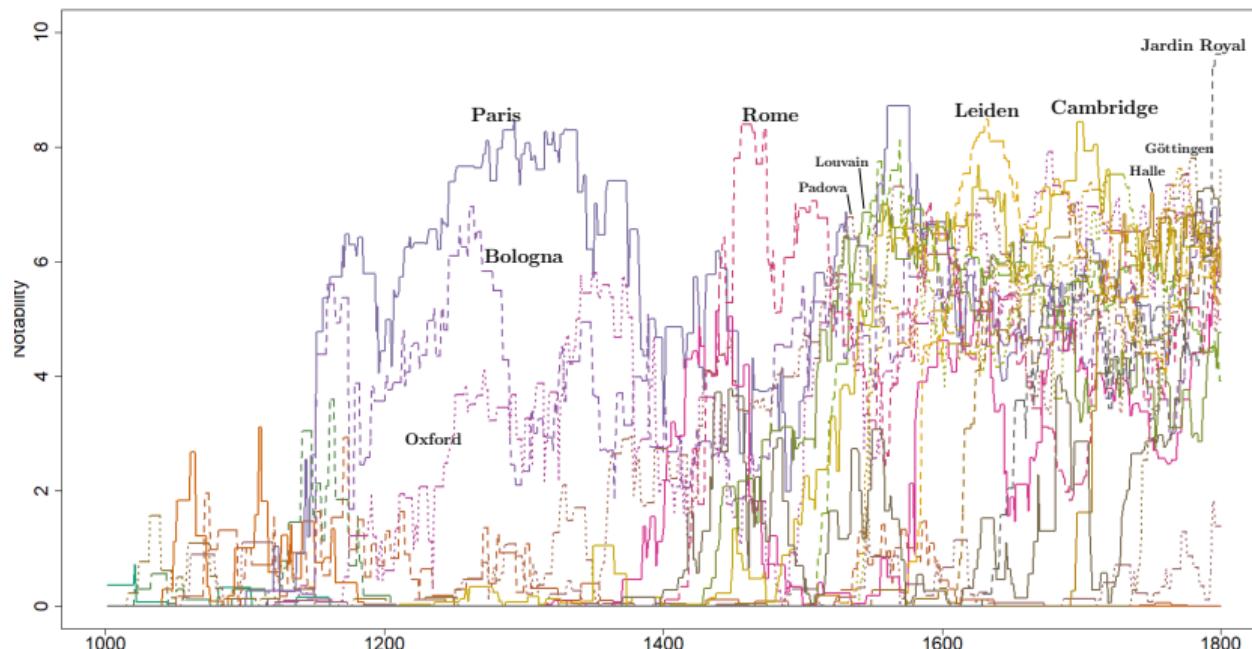


This measure is not sensitive to how many obscure scholars work at k

Notability index Q_k for Coimbra

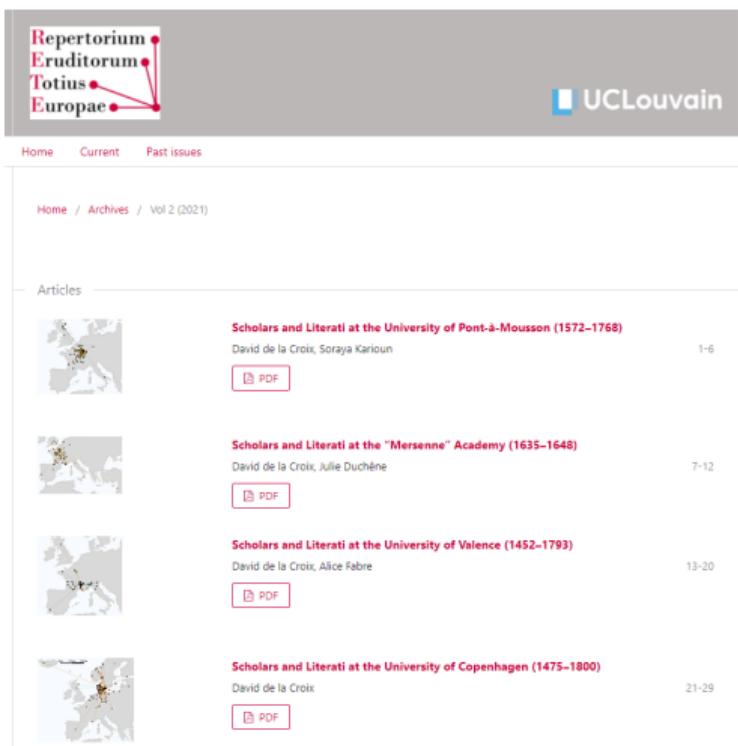


Notability index Q_k



Descriptive papers

When data collection completed for one institution we produce a data sheet



The screenshot shows a digital publication page from the **Repertorium Eruditorum**. At the top right is the **UCLouvain** logo. Below the header are navigation links: Home, Current, and Past issues. Under the Home link, there's a breadcrumb trail: Home / Archives / Vol 2 (2021). The main content area is titled "Articles". It lists four articles with small thumbnail images:

- Scholars and Literati at the University of Pont-à-Mousson (1572–1768)**
David de la Croix, Soraya Karouni
[PDF](#) (link icon)
1-6
- Scholars and Literati at the "Mersenne" Academy (1635–1648)**
David de la Croix, Julie Duchêne
[PDF](#) (link icon)
7-12
- Scholars and Literati at the University of Valence (1452–1793)**
David de la Croix, Alice Fabre
[PDF](#) (link icon)
13-20
- Scholars and Literati at the University of Copenhagen (1475–1800)**
David de la Croix
[PDF](#) (link icon)
21-29

Last one (nb 78): Scholars and Literati at the University of Prague (1348–1800) by Anna Maria Gkopi & Robert Stelter

Integrated market

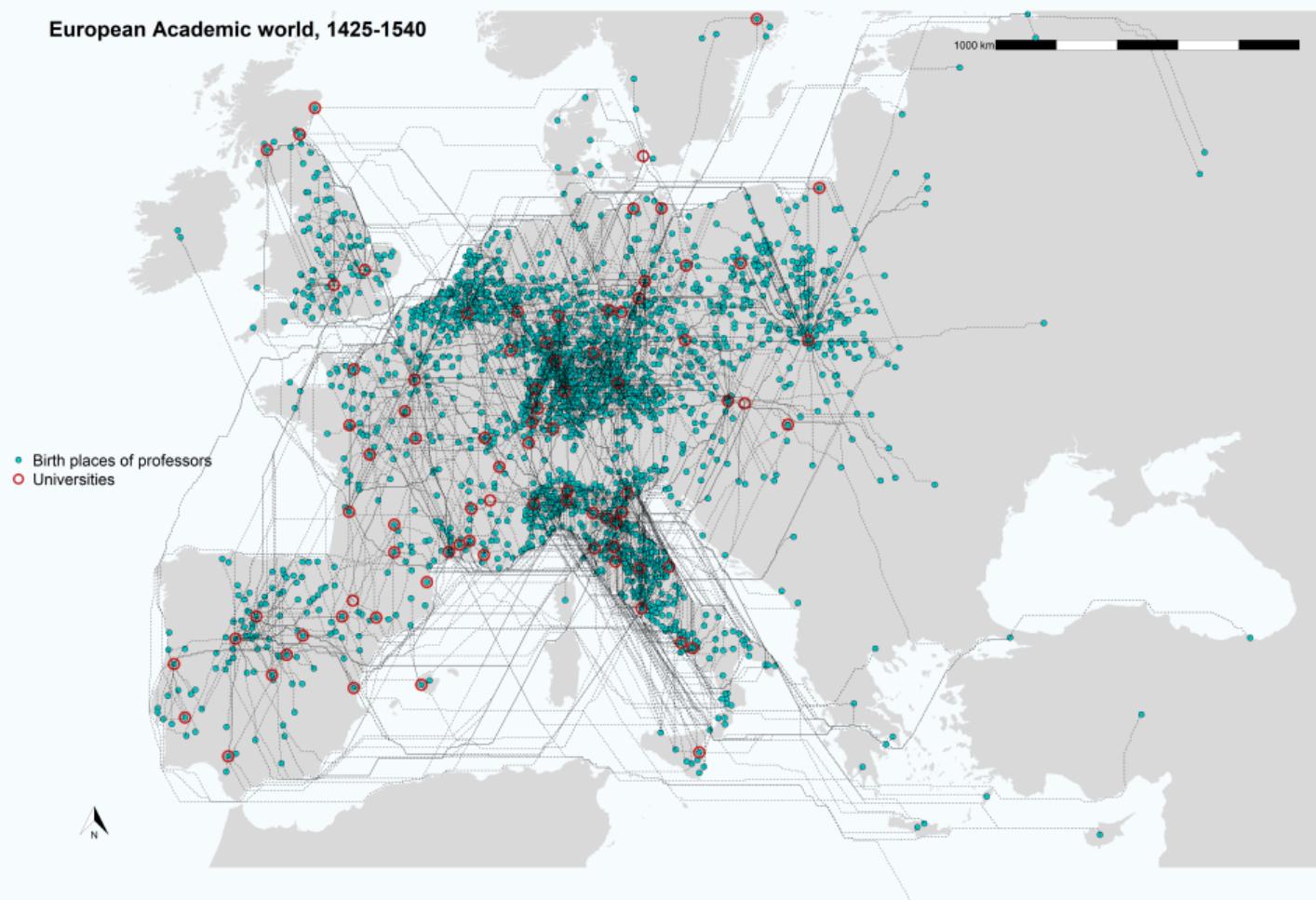
Was there an **integrated** academic market since the Middle Ages? Did it matter ?

Should help to sustain a market:

- Political fragmentation of Europe preventing strong control from the top.
- Intellectual unity (use of latin).
- *licentia ubique docendi*, right to teach anywhere with a doctoral degree

Would allow to harness together universities and UTHC (upper tail human capital)

European Academic world, 1425-1540



How to see traces of markets ?

No wage data (only in Italy)

Markets imply universities compete for the best people

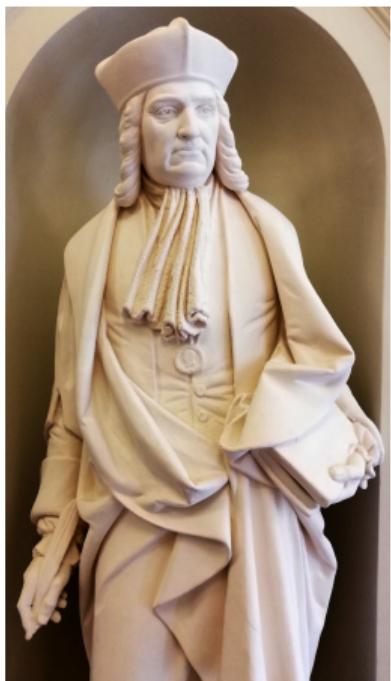
Develop a discrete choice model where scholars i choose employer (university) k

→ look for positive selection: utility of high q_i scholars less sensitive to cost of distance

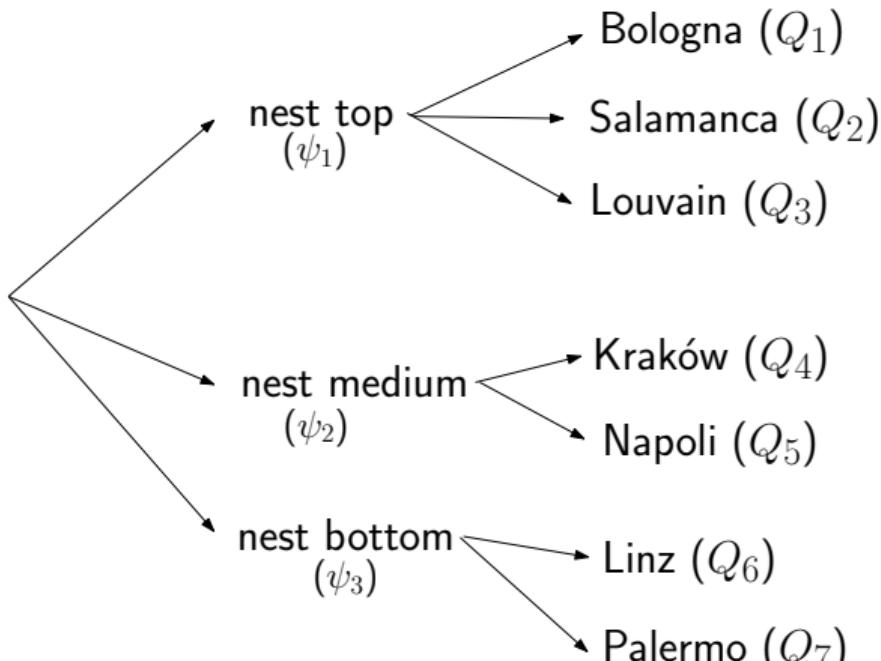
→ look for positive sorting: utility of high q_i scholars particularly sensitive to notoriety Q_k of the place

Use nested logit model to mitigate endogeneity concerns (q_i might depend on chosen k)

Methodology: nested multinomial logit



scholar with q_i



Results

The probability for a scholar to go to university k decreases with

- distance from birth

increases with

- notability of k (Q_k)
- interaction $q_i \times Q_k \rightarrow$ positive sorting

High quality scholars are attracted by notable places and agglomerate there

Simulating agglomeration gains from the market shows large effect during the Scientific Revolution but not later.

- ▷ More in: de la Croix, Docquier, Fabre, Stelter, The Academic Market and the Rise of Universities in Medieval and Early Modern Europe (1000-1800), *Journal of the European Economic Association*, 2023

Nepotism vs Intergenerational transmission of human capital

▷ de la Croix and Goñi, Nepotism vs. Intergenerational Transmission of Human Capital in Academia (1088-1800), CEPR Discussion Paper 15159

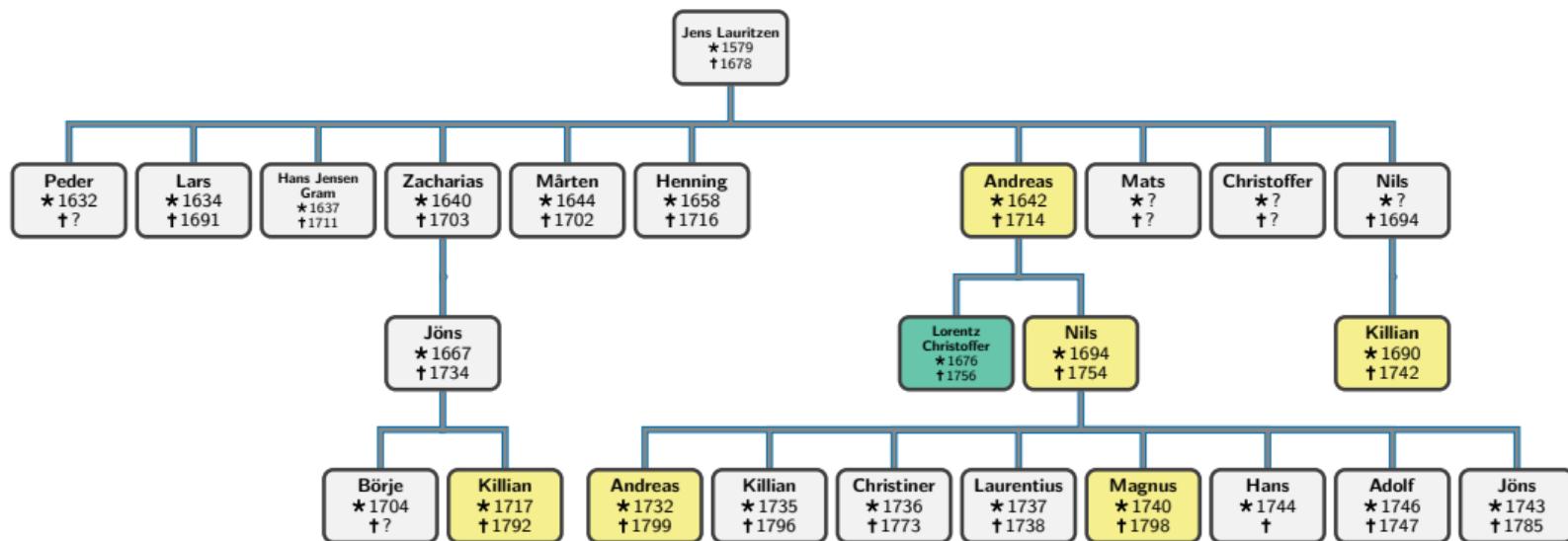
Father-son pairs – common in academia: Bernoullis, Eulers, Cassinis, Bartholin

In our dataset we found c. 1900 father-son(s) in same institution (university or academy)

Question: Did fathers secure jobs for their son ahead of better qualified candidates (nepotism) ?

or talent was scarce and scholars' sons inherited big endowments of human capital ?

The Stobaeus family. Professors at Lund (yellow squares) & members of Academy in Stockholm (green)



A structural model

Children's human capital: $h_t = \beta h_{t-1} + u_t$,

where β : intergenerational elasticity of human capital.

Consider the universe of families $i \in \mathbb{I}$.

Selection into being a scholar depends of human capital: $h_{t-1} > \tau$

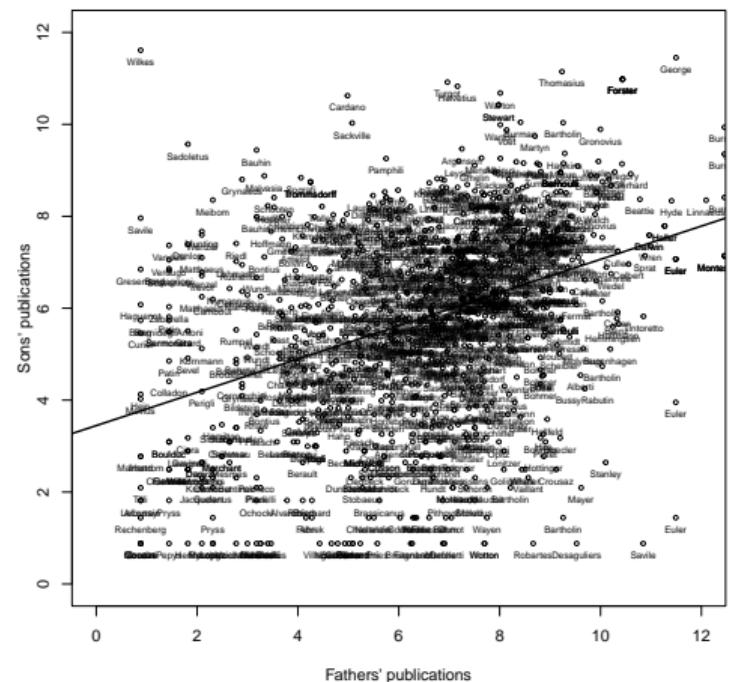
Nepotism: selection criterion is weaker for the sons of scholars: $h_t > \tau - \nu$

The set \mathbb{P} s.t. father and son are scholars: $\mathbb{P} = \{i \mid h_{t-1} > \tau, h_t > \tau - \nu\} \subset \mathbb{I}$

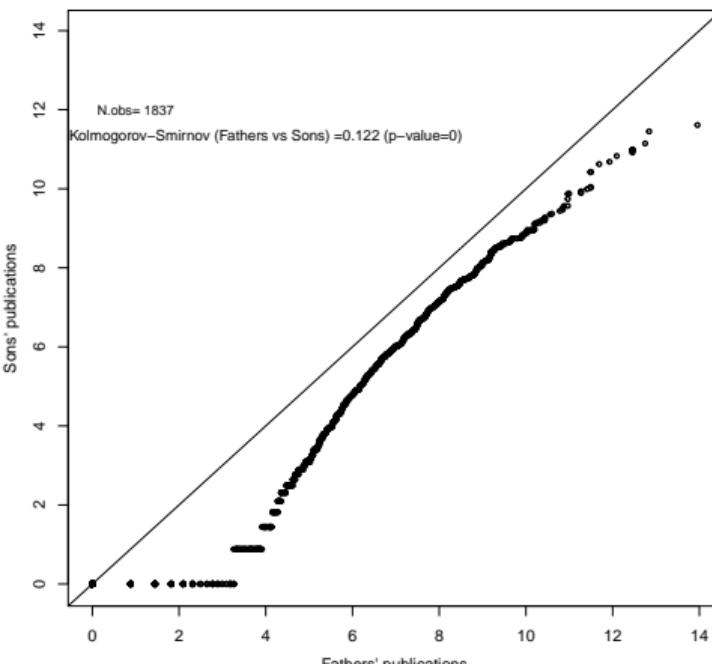
Share of nepotic sons: $\gamma = F_h(\tau \mid h_{i,t+1} \geq \tau - \nu)$

Parameters are identified by SMM, fitting a series of key moments

Father-son correlation



Parent-child distributional differences



Main results

- High rate of transmission of human capital (≈ 0.63)
- 18.8% scholars' sons are nepotic scholars.
- Nepotism decreases during Scientific Revolution and Enlightenment.
- Nepotism more prevalent in stagnant fields/context.
- → meritocracy developed in the 16-18th centuries.

120 women appear in our database

▷ de la Croix and Vitale, Women in European Academia before 1800 - Religion, Marriage, and Human Capital, *European Review of Economic History*, 2023

Who are they, what can we learn from them?

| Status | Number of women |
|-----------------------------|-----------------|
| Married Women with Children | 46 |
| Married Childless Women | 29 |
| Never Married Women | 19 |
| Unknown marital status | 26 |
| Total | 120 |

Predominantly in Catholic institutions

Introduction
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Database
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Human capital
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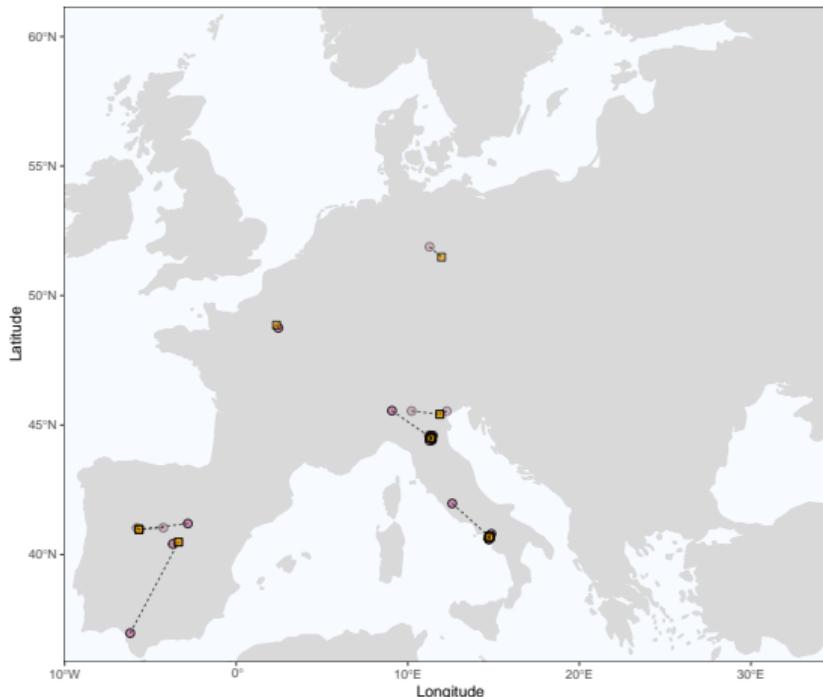
Mobility
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Families
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Women
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Network
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Women in universities



Introduction
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Database
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Human capital
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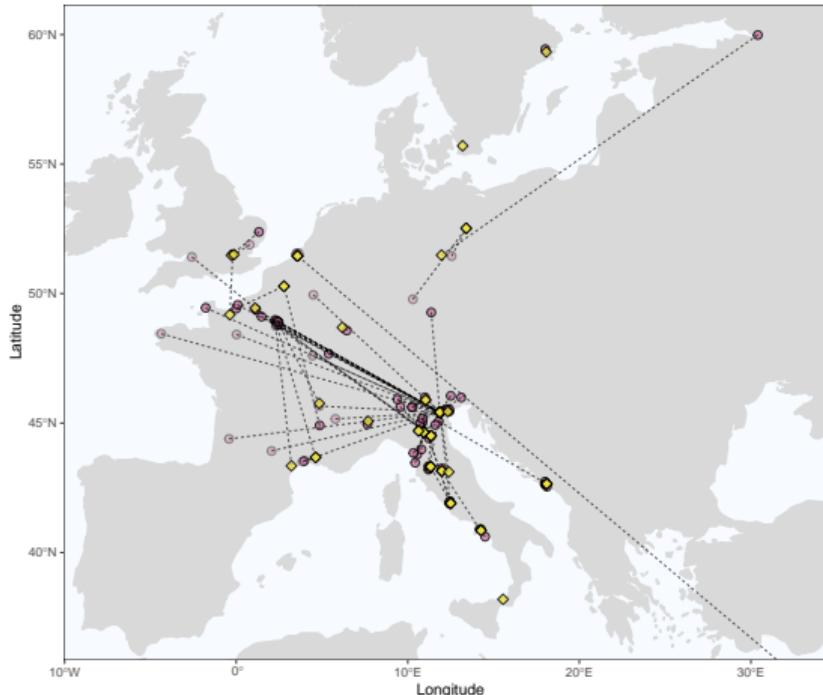
Mobility
ooooo

Families
oooo

Women
○○●○

Network
oooooooooooooooooooo

Women in academies



Why are Protestant places more conservative w.r.t women?

Protestant social norms for women were not too different from Catholic norms.

The substantial difference was in the formal centralization of decision making.

The Catholic Church could control women's participation in public space – and it could also make exceptions, which allowed these notable women to emerge.

Women in Protestant communities were subject to the will of their husbands and fathers, under peer pressure – difficult for women to achieve visibility in public space.

→ most convincing difference is the capacity of Catholic institutions to tolerate exceptions.

Network: Affiliation Matrix

The database is like a large Affiliation Matrix (aka, Incidence Matrix, or individual-by-group matrix)

$A_{67880 \times 380}$

| | | Leiden | Cambridge | Louvain |
|------------|----------------|--------|-----------|---------|
| | <i>Erasmus</i> | 0 | 1 | 1 |
| <i>A =</i> | <i>Lipsius</i> | 1 | 0 | 1 |
| | <i>Clusius</i> | 1 | 0 | 0 |
| | <i>Bucer</i> | 0 | 1 | 0 |

allows to build two classes of networks

Networks: beautiful graphs, way to look at the data (& compute some metrics), analyze how knowledge flows through the network

Two types of network (1)

Network of universities: adjacency matrix $G = A'A$, how Leiden, Cambridge and Louvain are connected through the mobility of professors.

▷ de la Croix and Morault, Winners and Losers from the Protestant Reformation: An Analysis of the Network of European Universities IRES Discussion Paper 2020-029

| | <i>Leiden</i> | <i>Cambridge</i> | <i>Louvain</i> |
|------------------|---------------|------------------|----------------|
| <i>Leiden</i> | 2 | 0 | 1 |
| <i>Cambridge</i> | 0 | 2 | 1 |
| <i>Louvain</i> | 1 | 1 | 2 |

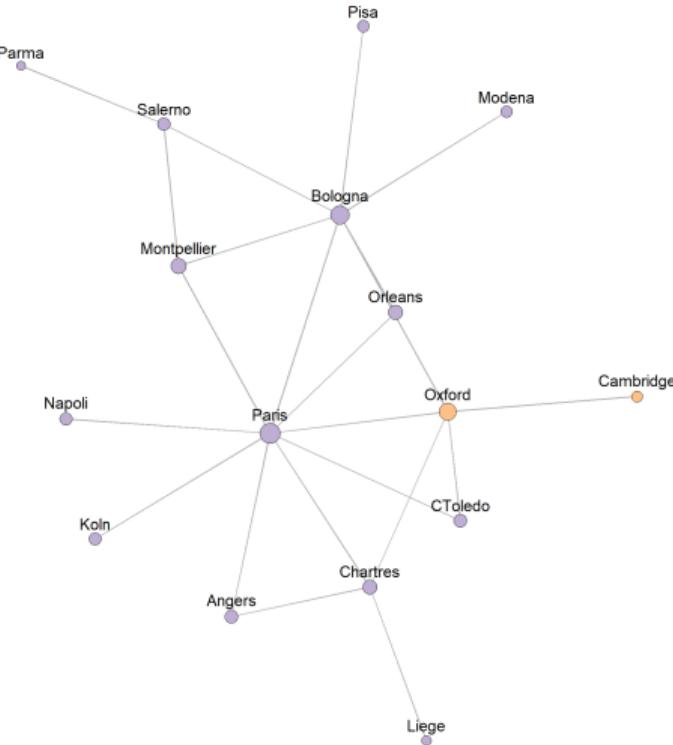
Network 1000-1199

Positioning of universities by Fruchterman-Reingold force-directed algorithm.

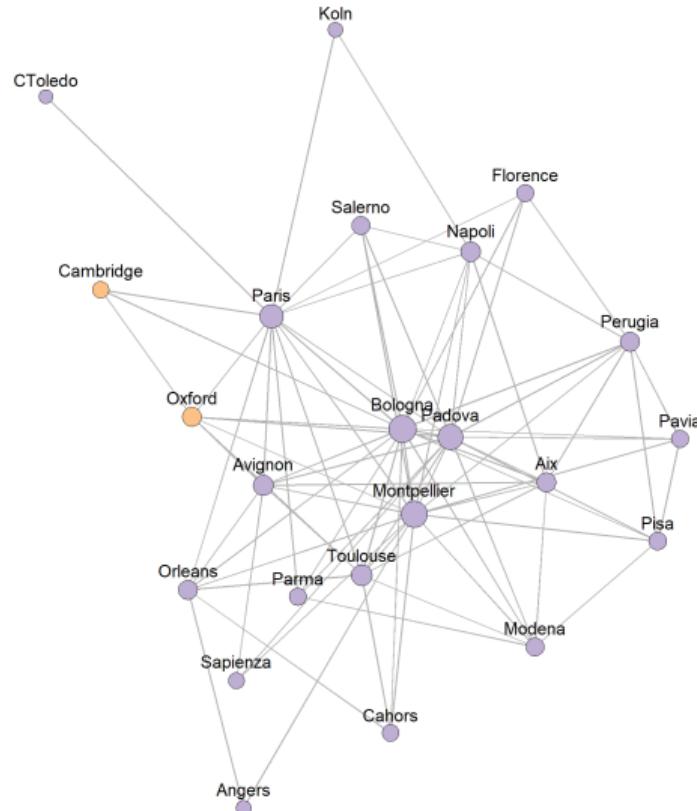
Groups universities more closely together when they are linked to each other.

Only show big component.

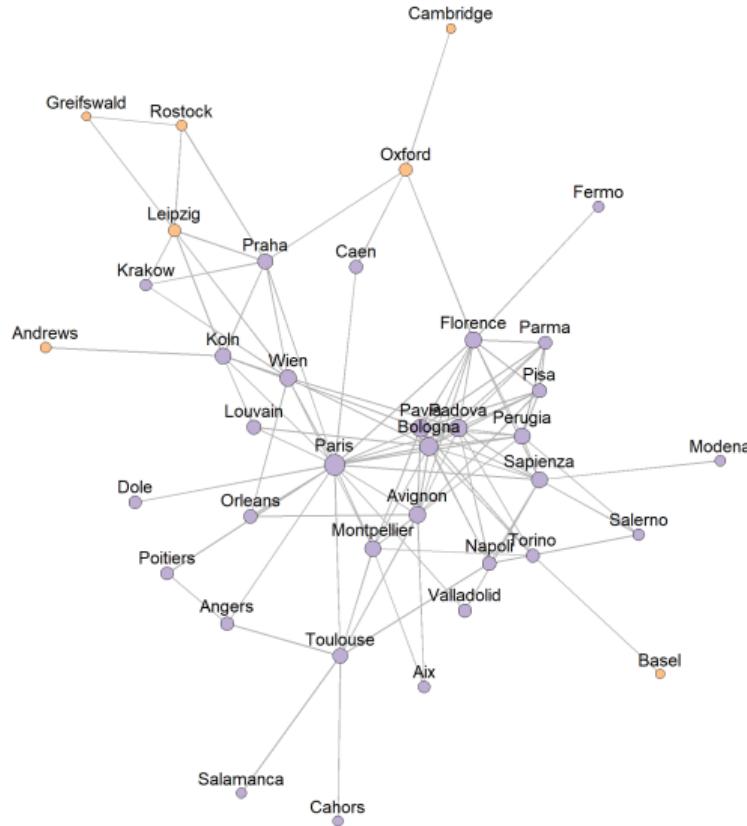
Size of circle proportional to closeness centrality (reachability).



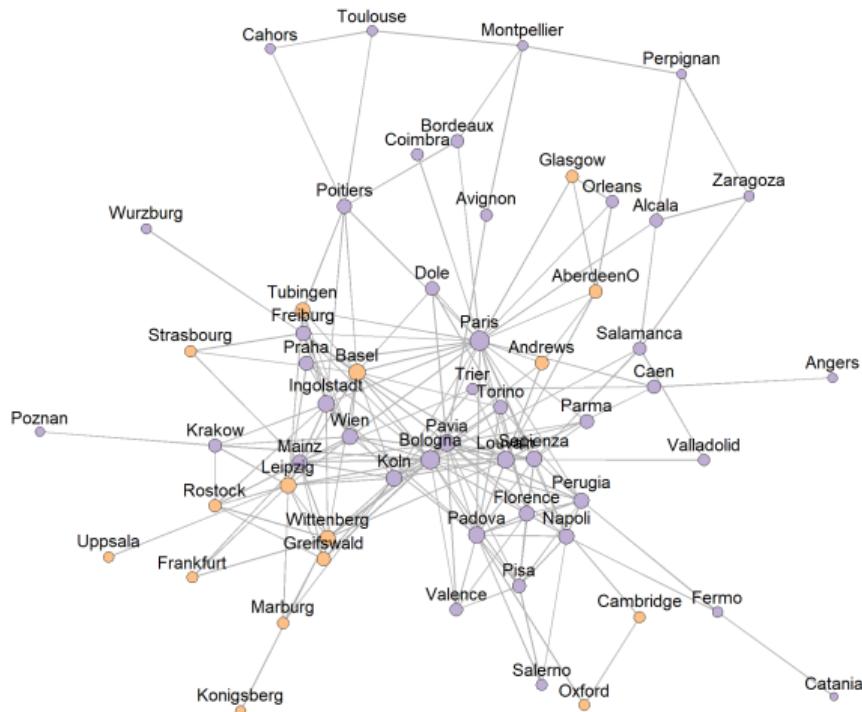
Network 1200-1347



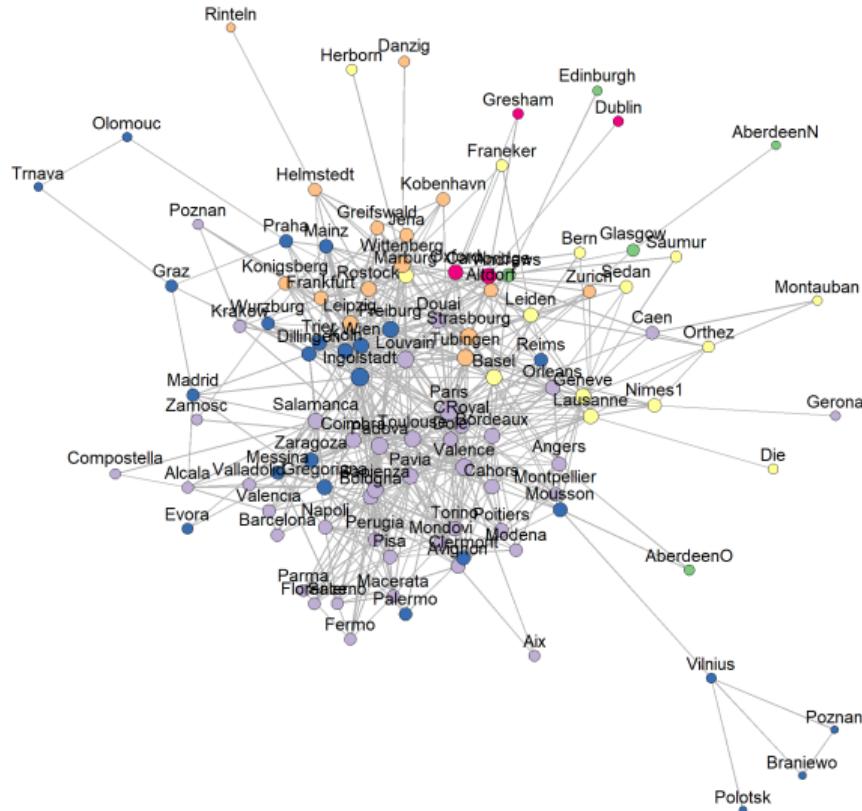
Network 1348-1449



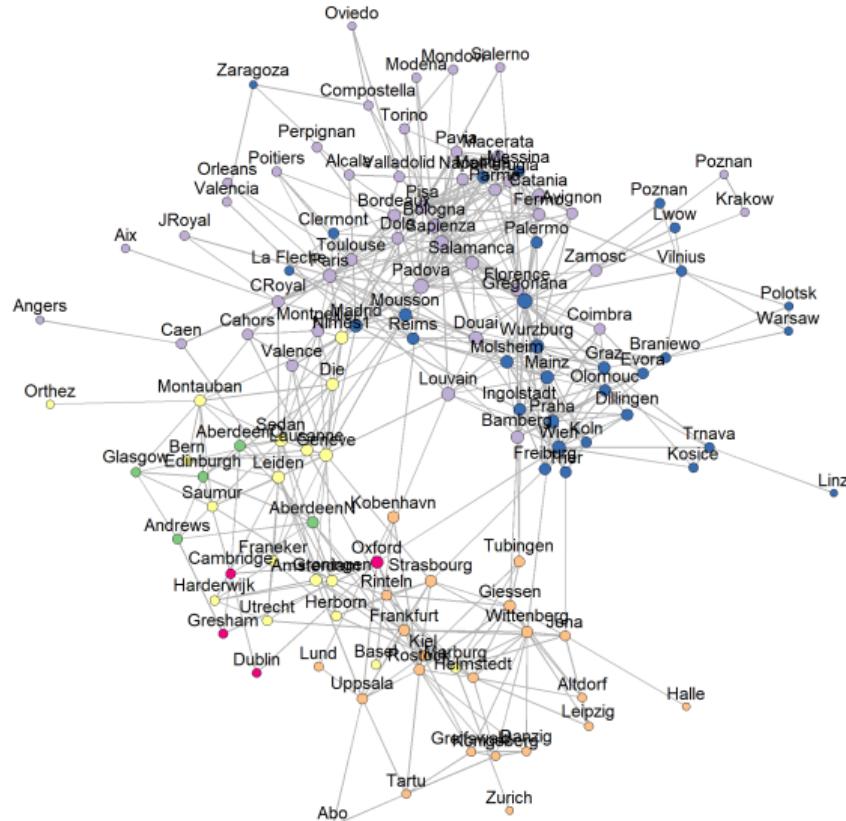
Network 1450-1522



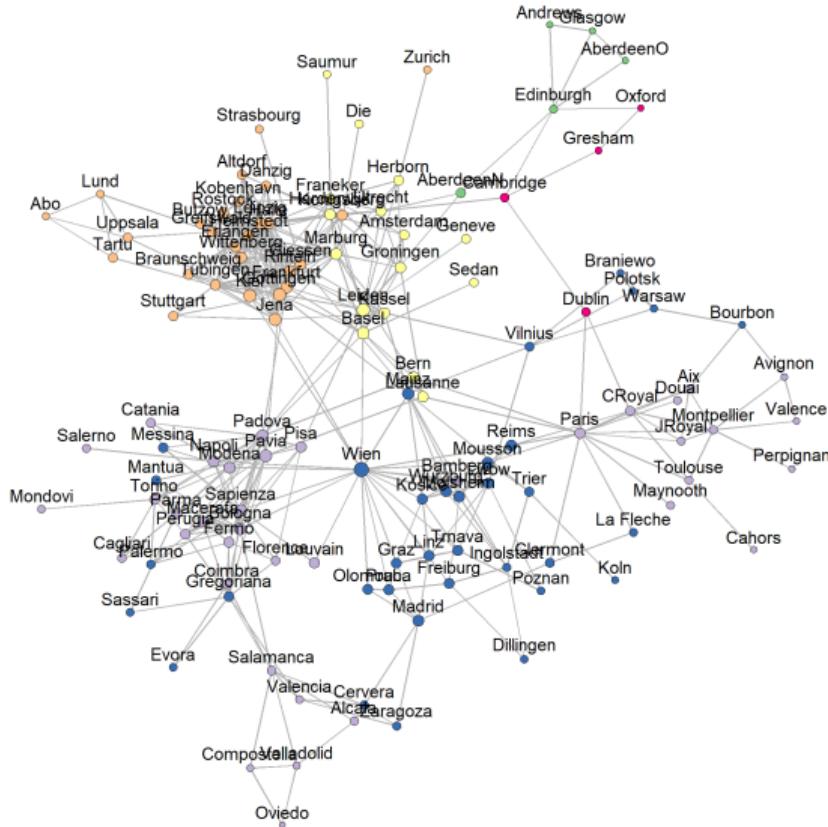
Network 1523-1597



Network 1598-1684



Network 1685-1793



Main Results

The Protestant Reformation deeply affected the shape of the network of universities.

- Religion became a strong determinant of network structure, even when controlling for geography & culture (vernacular languages)
- Sharp clear-cut divide between Protestant and Catholic universities
- The Reformation & Counter-reformation were detrimental to all universities, on average

Two types of network (2)

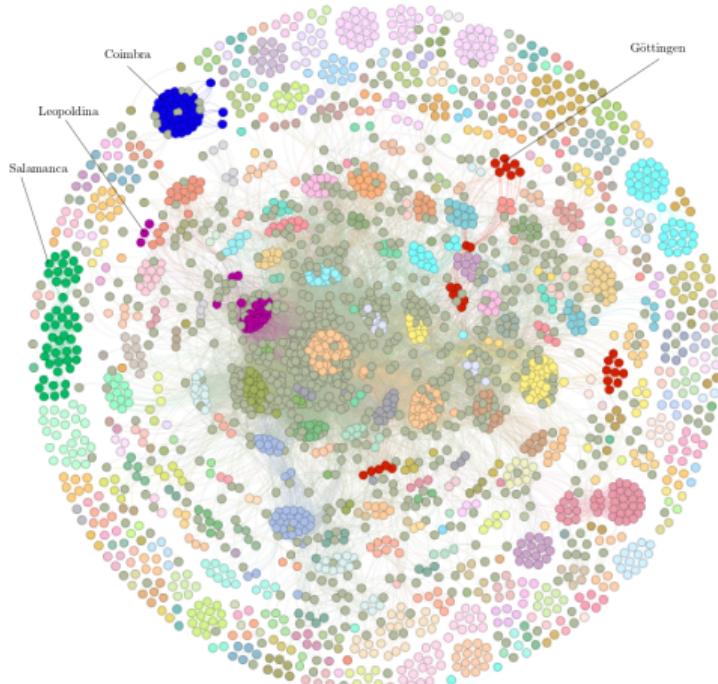
Network of scholars: adjacency matrix $G = AA'$, how professors are connected by sharing a common employer

▷ future paper with Rossana Scebba, Chiara Zanardello

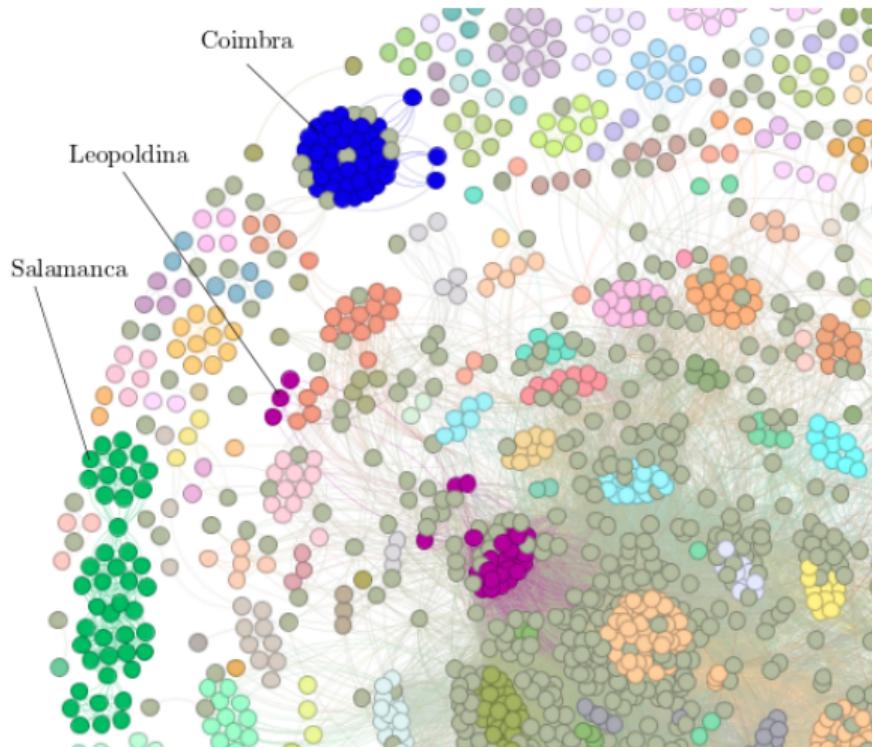
| | <i>Erasmus</i> | <i>Lipsius</i> | <i>Clusius</i> | <i>Bucer</i> |
|----------------|----------------|----------------|----------------|--------------|
| <i>Erasmus</i> | 2 | 1 | 0 | 1 |
| <i>Lipsius</i> | 1 | 2 | 1 | 0 |
| <i>Clusius</i> | 0 | 1 | 1 | 0 |
| <i>Bucer</i> | 1 | 0 | 0 | 1 |

Issues: time dimension, field dimension

Network of scholars in 1776



Network of scholars in 1776 - zoom



Conclusion

key aspects of pre-modern European academia which were complementary with growth:

- market for talent, mobility, agglomeration
- room for meritocracy when needed
- negative role of religions
- when universities became breathless, academies kicked in