

Academic Human Capital in European Countries and Regions, 1200–1793

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Abstract

We present new annual time-series data on academic human capital across Europe from 1200 to 1793, constructed by aggregating individual-level measures at three geographic scales: cities, present-day countries (as of 2025), and historically informed macro-regions. Individual human capital is derived from a composite index of publication outcomes, based on data from the *Repertorium Eruditorum Totius Europae* (RETE) database. The macro-regional classifications are designed to reflect historically coherent entities, offering a more relevant perspective than modern national boundaries. This framework allows us to document key patterns, including the Little Divergence in academic human capital between Northern and Southern Europe, the effect of the Black Death and the Thirty Years' War on academic human capital, the respective contributions of academies and universities, regional inequality across Catholic and Protestant areas of the Holy Roman Empire, and the distinctiveness of the Scottish Enlightenment.

Keywords: human capital, universities, academies, preindustrial Europe, long-run growth, Little Divergence

JEL codes: N33, O47, I23

1 Introduction

The systematic collection and analysis of macroeconomic data for Medieval and Early Modern Europe is still in its infancy. A fundamental contribution was made by Maddison (2007), who provided pioneering cross-country estimates of population and GDP per capita over long historical horizons. Building on his work, the inauguration of the Maddison Project aimed to refine these historical national accounts (Bolt and van Zanden 2025). Similarly, scholars such as Fouquet and Broadberry (2015) have constructed annual GDP per capita series for several European countries, thereby improving the temporal resolution and accuracy of long-run economic comparisons. More recently, the focus has changed to using large-scale data from online libraries, encyclopedias, and catalogs to produce macroeconomic estimates, marking a new phase of cliometric research (Chaney 2020; Koch, Stojkoski, and Hidalgo 2024; Boerner et al. 2025).

A big part of the debate about preindustrial growth hinges on the possibility to measure the production factors. In preindustrial economic history, human capital has often been overlooked, primarily due to a lack of sufficient data. This paper fills this gap by providing new microdata on upper-tail human capital in the preindustrial period. We introduce a novel data source that can underpin future analyses of the long-run dynamics and the economic role of human capital in preindustrial economies. A key contribution of this paper is that data on academic human capital, aggregated by modern-day country (as of 2026), city, and historically relevant macro-region, are made publicly available; the full list of available files is provided in [Appendix E](#).

Theories such as Galor (2011) view long-run development as a discrete sequence of growth regimes, with human capital playing a central role only in the final stage. This stylization is analytically useful as it distills the journey of humanity into a finite number of stages, but it understates the role of human capital before the Industrial Revolution. In fact, human capital accumulation was already underway in the preindustrial era—as documented by a growing cohort of scholars, including Boucekkine, De la Croix, and Licandro (2002), Squicciarini and Voigtländer (2015), and de Pleijt (2018).

Over the past decade, contributors to RETE, the *Repertorium Eruditorum Totius Europae*, have systematically recorded individual-level data on library footprints for the entire population of university professors and members of scientific academies across Medieval and Early Modern Europe. In this paper, we develop an index of academic human capital based on scholars’ productivity and other meaningful attributes, exploiting the new elements introduced in the most recent update of the Virtual International Authority File (VIAF). We aggregate these data by city, country, and macro-region. Macro-regions are defined based on

different historical academic traditions, ethnolinguistic divisions, religious affiliations, and political boundaries. By using this regional structure we document several salient patterns discussed in the literature: the Little Divergence between Northern and Southern Europe; the impact of two major negative shocks, namely the Black Death and the Thirty Years’ War; the respective roles and complementarities of universities and academies; regional disparities within the Holy Roman Empire; and the intellectual distinctiveness of the Scottish Enlightenment. That our data reveals such patterns suggests that academic human capital may have played a meaningful role in shaping these historical outcomes. A more systematic exploration of these relationships is left to future research.

Most existing time series data on human capital rely on macro-level proxies—such as literacy rates (Cressy 1977; Boucekine, de la Croix, and Peeters 2007), average years of schooling (de Pleijt 2018), heaping indexes (A’Hearn, Baten, and Crayen 2009), skill premium (Lindert et al. 2002; van Zanden 2009), and book production (Baten and van Zanden 2008; Buringh and van Zanden 2009)—which, although valuable, offer only coarse approximations of the central tendency of an underlying distribution. By contrast, our dataset is constructed from individual-level observations; in fact, universities and academies are among the few educational institutions for which an identifiable set of individuals can be reliably reconstructed over the entire preindustrial period. This granularity increases the framework’s versatility and opens up new research questions on the cross-sectional distribution of preindustrial human capital. Therefore, RETE represents the first attempt to provide micro-level data on preindustrial human capital, offering a degree of detail that, to the best of our knowledge, is unprecedented.

We focus on the interval from 1200 to 1793, covering the institutional consolidation of medieval universities up to the outbreak of the French Revolution. However, our original dataset spans the period from 1000, when monastic and cathedral schools dominated the academic landscape, to 1800. In fact, the French Revolution marked a decisive break in the history of higher education: the revolutionary Convention abolished all universities and academies in France, a policy that was subsequently exported to neighboring regions through military conquest. To avoid conflating structural trends with the effects of this exceptional political upheaval, we exclude the period 1793–1800 from our analysis.

Unlike the top-down approach which consists in going from an encyclopedia or database to disaggregated data, our strategy is bottom-up: we begin with specialized secondary sources on universities and academies and aggregate the information from the ground up. This method helps reduce the selection bias inherent in encyclopedic compilations (de la Croix and Licandro 2015; Laouenan et al. 2022; Serafinelli and Tabellini 2022; Koch, Stojkoski, and Hidalgo 2024). In contrast to authors who start from library catalogues (Chaney 2020),

our approach offers the additional advantage of clearly defining a universe—academia—from which a large, coherent sample is drawn. We focus primarily on scholars, deliberately excluding lovers, poets and preachers (although occasionally some academy members fall into these categories).

Our dataset captures a substantial share of highly skilled individuals who were involved in producing propositional knowledge, including theologians, lawyers, humanists, physicians, and scientists. Although some doctrines from this period—such as Aristotelian physics—are now regarded as obsolete, these scholars laid the foundations of modern thought. Additionally, they were instrumental in training professionals who were essential to early modern society, such as parish priests, notaries, schoolteachers, doctors, and astronomers. By including members of academies, we also incorporate those who applied new intellectual frameworks from the Scientific Revolution and Enlightenment.

The *Repertorium Eruditorum Totius Europae* relies on a large and diverse set of secondary sources. References are available for each individual observation on the project’s website at <https://perso.uclouvain.be/david.delacroix/menushiny.html>. The dataset is still expanding as new sources are analyzed daily, but version 1.1—containing 88,000 scholars, 375 institutions, and 684 sources—already provides a sound approximation of academic human capital in Medieval and Early Modern Europe.

In the next section we introduce our measure of human capital, derived from data on university scholars and academicians. In [Section 3](#) we outline our aggregation strategy and the levels of geographical resolution. Next, in [Section 4](#) we present the macro-regional classification that serves as the primary analytical framework. Then, in [Section 5](#) we document the main empirical patterns revealed by the data. Finally, in [Section 6](#) we present our concluding remarks and directions for future research.

2 Measuring Individual Human Capital

Measuring human capital presents inherent challenges due to its intangible nature (Hanushek [1996](#); Abraham and Mallatt [2022](#)). This difficulty is amplified when attempting to quantify the human capital of scholars, particularly in premodern historical contexts. While wages are a standard proxy in labor markets, there are major limitations to this approach in our case. Salary data are often scarce, incomplete, or entirely missing. Compensation varied widely—ranging from student payments and in-kind benefits (e.g., rent, wine, and grain (Drüll [1991](#))) to fixed salaries vulnerable to external shocks. Theology professors, in particular, were often unpaid and instead received prebends (a type of benefice or stipend associated with duties in a cathedral or collegiate church) outside the university (Post [1932](#); Paquet [1958](#)). We

elaborate on these challenges and our wage dataset in de la Croix et al. (2024a).

As an alternative, we measure human capital by individual notability as observed today in three contemporary sources, VIAF¹, Wikipedia, and Wikidata. VIAF contains a broad array of bibliometric indicators of scholarly output and impact, incorporating both authored works and secondary literature about the individual. Wikipedia complements this measure by highlighting forms of “service to society,” such as becoming an ambassador, pope, or saint. Initially proposed by de la Croix et al. (2024b) using WorldCat Identities (now defunct) and Wikipedia, this approach was later extended to VIAF by Curtis and de la Croix (2023). In this paper, we further improve the measure by incorporating on new information from the latest update VIAF, in particular that concerning the timing of publications. We also incorporate into the analysis data drawn from Wikidata. Wikidata is a knowledge base run by the Wikimedia Foundation that stores structured data (facts) about people, places, works, and concepts. It acts as a central hub across Wikipedia and other projects. For us, it presents two advantages. It includes some authors present in national biographies (such as Treccani) who are not present in Wikipedia or VIAF. It also lists “occupations,” allowing to better account for public services and offices undertaken besides academia.

Among all Wikipedia editions, the English-language version is the oldest, largest, and most widely accessed.² Its accuracy compares favorably with more traditional encyclopedias (Giles 2005). However, Wikipedia is created by volunteer editors, a self-selected population. The existence, length, and content of articles about a historical person will be shaped by which editors are interested in that individual. There are often concerns that coverage may be biased towards English-speaking individuals. One way to address this bias is including other language editions.³ Including, for example, the French edition increases the coverage of less notable French individuals (Laouenan et al. 2022).⁴ Another source of regional bias is historiographic: the quality and accessibility of the source material available to editors may vary by the region and period (De Courson, Thouzeau, and Baumard 2023).⁵

To combine the information provided by VIAF, Wikipedia, and Wikidata into one mea-

1. “The VIAF (Virtual International Authority File) combines multiple name authority files into a single OCLC-hosted name authority service. The goal of the service is to lower the cost and increase the utility of library authority files by matching and linking widely-used authority files and making that information available on the Web.” From <https://viaf.org/>.

2. https://en.wikipedia.org/wiki/List_of_Wikipedias

3. This also leads to a male bias, a Western bias, and an interest in technical and academic subjects (Yu et al. 2016). While an important limitation of Wikipedia data, these biases are less relevant here as we are explicitly interested in European academics, who in this period are overwhelmingly male (de la Croix and Vitale 2023).

4. However, depending on the application, this does not always appear to be necessary Koch, Stojkoski, and Hidalgo (2024).

5. Depending on the application, inclusion of time and location fixed effects may help improve analyses based on wikipedia data (Serafinelli and Tabellini 2022).

sure, we compute the first principal component of the following indicators:

1. the number of characters of the longest Wikipedia page across all languages (ranging from a minimum of 60 to 261,408); a correction for different languages length was performed, using the length of the Gospel according to Saint Mark in different languages; we have also assumed that having no Wikipedia page is the same as having a very short page of 60 characters, which is a meaningful normalization;
2. the number of languages in which a Wikipedia page exists (ranging from a minimum of 1 to 219);
3. the number of publication countries in VIAF (ranging from 0 to 82);
4. the number of different publishers recorded in VIAF (ranging from 0 to 33);
5. the number of titles in VIAF (ranging from 0 to 788);
6. the number of coauthors in VIAF (ranging from 0 to 43); we do not believe the list of coauthors are all actual coauthors, but rather names appearing on the publication, such as censor, dedicatee etc;
7. the number of publications with ISBN number (ranging from 0 to 2784); this reflects the recent importance of the publications as ISBN numbers (International Standard Book Numbers) were invented in 1966 and formally implemented in 1970;
8. the number of publications before 1900 (ranging from 0 to 10708); this sums the publications by decade indicated in the histogram provided by VIAF; remark publications and titles are two different measures in VIAF;
9. the number of publications after 1900 (ranging from 0 to 7307) from the same histogram;
10. the number of external identities in Wikidata, taking into account references in encyclopedia other than Wikipedia (ranging from 0 to 327);
11. the number of occupations in Wikidata, taking into account public services/offices undertaken besides academia (ranging from 0 to 24).

One advantage of combining multiple variables to construct the Human Capital Index, q_i , is that it helps to mitigate distortions inherent in any single source. For instance, including Wikipedia data can offset the bias whereby affiliation with a prestigious institution increases the likelihood of titles appearing in VIAF regardless of individual merit.

A conceptual issue in measuring human capital is the highly skewed distribution of the indicators discussed above. These measures have fat tails due to the presence of “superstars”—scholars with far more publications and much longer Wikipedia pages than their peers. Consider François Arouet de Voltaire (1694–1778), a towering Enlightenment figure, elected

to the Académie française in 1746 and a lifelong advocate of reason, civil liberties, and free speech. Voltaire has 396 recorded titles, and his longest Wikipedia page contains 120,896 normalized characters. Compare this with Charles Batteux (1713–1780), a respected but less famous Enlightenment thinker. A member of the Académie française (elected 1754) and professor at the Royal College (now Collège de France), Batteux also advanced Enlightenment ideals through his commentaries on classical philosophy, especially Aristotle. Yet he has only 54 recorded titles, and his longest Wikipedia page contains 5,645 normalized characters. Is it plausible that Voltaire’s human capital was over ten times greater than Batteux’s?

This is related to the economic theory of superstars (Rosen 1981), where rewards are modeled as a convex production function of talent, disproportionately favoring top performers. If we treat publications or Wikipedia length as rewards and talent as human capital, this implies that human capital should be a concave function of these metrics: small differences in human capital may yield large disparities in observable output, particularly at the top. Conversely, modest increases in skill at lower levels may not translate into proportionate gains in visibility or productivity.

We thus interpret the variables from Wikipedia, VIAF, and Wikidata as reward-based measures that are heavily skewed towards the upper tail of the distribution. We apply a concave transformation to all variables, namely the inverse hyperbolic sine (asinh), before conducting the principal component analysis. We interpret such transformation as the inverse of a production function spanning from a space of cognitive and behavioral skills to a space of outputs; where by “outputs” we mean the dimensions of the PCA. Such a transformation enables to easily deal with scholars without any bibliographic information, unlike e.g. the logarithmic operator.

A second conceptual issue is the following. We measure human capital as a life-cycle invariant variable: an index built from scholarly output summed over an entire lifetime. This is shown in Figure 1. The left panel represents the standard notion of human capital, as defined by Becker (1964). When the scholar dies, their human capital is lost and goes to zero. The middle panel represents the number of surviving publications (net of the depreciation due to poor archival work or natural disasters), some of which are published when the scholar is still alive, while others are postmortem publications. They are produced by human capital but with a delay, and some publications are printed only after death. The area under the curve in the right panel shows our empirical object: the cumulative stock of surviving publications. For illustrative purposes, we assume that q_i is built using only one dimension, i.e. surviving publications, so that the area under the curve equals $\text{sinh}(q_i)$.

Hence, in technical terms, what we label human capital index is a transformation of the cumulative outputs produced during lifetime and beyond. In a historical setting like

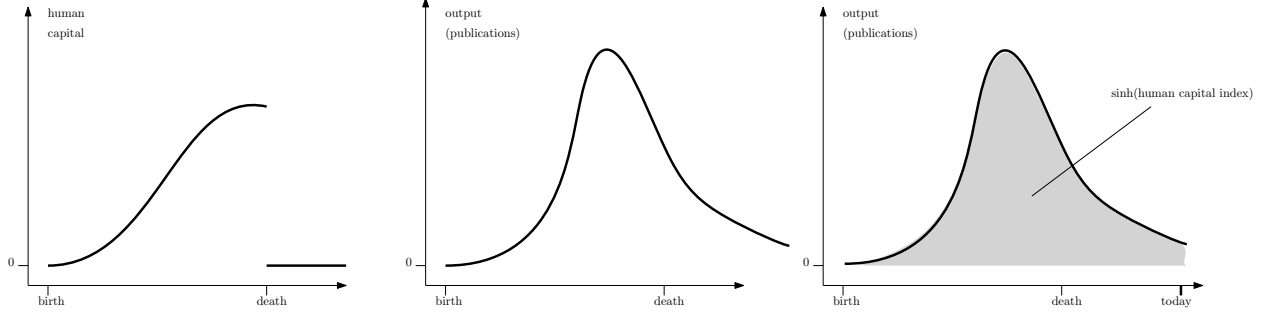


Figure 1: From human capital to publications, and to the human capital index.

ours, allowing for age variation creates severe measurement challenges. Constructing an age-varying measure would require reliable information on the timing of first editions, which in turn would require a much richer integration of library records than VIAF currently provides. The problem is even more acute for medieval scholars, for whom dating individual manuscripts is often difficult or impossible. Moreover, a time-varying index would force us to allocate posthumous visibility to particular career stages and to impose largely untestable assumptions about the depreciation of scholarly skills. Dropping the posthumous component would discard a substantial share of the available information, especially for earlier scholars.

Going back to the PCA analysis, Table 1 presents the loadings of the first two principal components derived from the transformed variables. Following the common eigenvalue-greater-than-one heuristic, only the first component qualifies as statistically relevant: it has an eigenvalue of 8.49 and explains 77% of the total variance. In this component, all the measures drawn from Wikipedia and VIAF enter positively with relatively similar loadings of around 0.3. We interpret this component as a summary index of a scholar’s human capital and use it throughout the analysis. Despite its lower eigenvalue (0.91) and modest explanatory power (8%), the second component reveals an interesting pattern. It loads negatively on indicators related to recent international reach and digital visibility, such as the number of Wikipedia language editions and ISBN counts. We return to this component later.

On the basis of the first principal component, we can compute our Human Capital Index q_i , as:

$$\begin{aligned}
 q_i = & -1.38 + 0.31 \text{ LengthWikiN} + 0.29 \text{ NWikiLanguage} + 0.36 \text{ countries} \\
 & + 0.36 \text{ publishers} + 0.36 \text{ titles} + 0.35 \text{ coauthors} \\
 & + 0.27 \text{ isbn} + 0.36 \text{ pubbef1900} + 0.33 \text{ pubaft1900} \\
 & + 0.3 (\text{nidentities}) + 0.3 \text{ noccupations}
 \end{aligned} \tag{1}$$

Variable (in asinh)	PC1 (q_i)	PC2 (p_i)
Wikipedia: No. characters of longest page ($LengthWikiN$)	0.29	-0.02
Wikipedia: No. pages in different languages ($NWikiLanguage$)	0.26	-0.46
VIAF: No. publication countries ($countries$)	0.32	0.04
VIAF: No. different publishers ($publishers$)	0.32	0.24
VIAF: No. titles ($titles$)	0.33	0.20
VIAF: No. coauthors ($coauthors$)	0.32	0.27
VIAF: No. isbn ($isbn$)	0.23	-0.66
VIAF: No. publications before 1900 ($pubbef1900$)	0.32	0.18
VIAF: No. publications after 1900 ($pubaft1900$)	0.29	-0.34
Wikidata: No. of identities / external ids ($nidentities$)	0.32	0.17
Wikidata: No. of occupations ($noccupations$)	0.30	0.10
Eigenvalue	8.49	0.91
Proportion of Variance explained	0.77	0.08

Note: all variables transformed with inverse hyperbolic sine

Table 1: First two principal components of the indicators

In this equation, the constant term was chosen to give $q_i = 0$ for someone with neither a Wikipedia page, nor a VIAF page, nor a Wikidata page.

To discuss further the merits and drawbacks of using q_i , let us consider the scholars at the top of the distribution. Table 2 provides the list. All periods and many regions of Europe are represented. Different types of institutions are also present (Universities, Renaissance academies, Scientific academies). The scholar with the all-time highest human capital is Martin Luther, professor at the university of Wittenberg. He was not a scientist like Galileo Galilei, Isaac Newton, or Carl Linnaeus, but it is fair to recognize that he profoundly influenced institutional changes in Europe (Becker et al. 2020). Next comes François Arouet de Voltaire, the prolific French philosopher, member of many academies in the 18th century. At the third place, we find Thomas Aquinas, the medieval theologian, professor at the Universities of Paris and Naples. The first scientist is René Descartes, who was a member of the informal Mersenne academy in Paris.

In the list of Table 2, there are some scholars who only have a weak link to our selected institutions. Jean-Jacques Rousseau is only weakly attached to the Academy of Sciences and Arts of Dijon. Jeremy Bentham is weakly attached to the university of Oxford (student, but teacher?). Further below, the famous French poet François Villon, ranked 76th, received a master from the University of Paris, so he could have taught in principle, but probably never did. There are also some who were actual teachers but are better known, at least nowadays, for non-scholarly reasons: François Rabelais, known for his novels, was also a physician who

#	name	institution	q_i	#	name	institution	q_i
1	Luther	U. Wittenberg	19.64	35	Jefferson	A. Edinburgh	16.85
2	Voltaire	15 academies	19.21	36	Swedenborg	A. Stockholm	16.81
3	Rousseau	A. Dijon	19.01	37	Llull	U. Paris	16.67
4	Aquinas	U. Paris	18.83	38	Schelling	U. Jena	16.65
5	von Schiller	U. Jena	18.81	39	Fichte	U. Jena	16.60
6	Kant	U. Königsberg	18.67	40	de Groot	A. Mersenne	16.59
7	Swift	A. Dublin	18.61	41	Rameau	A. Dijon	16.55
8	Diderot	A. Prussia	18.42	42	Kepler	A. Lincei	16.53
9	Erasmus	U. Louvain	18.39	43	Melanchthon	U. Wittenberg	16.50
10	Machiavelli	A. Plato	18.32	44	da Fianza	U. Paris	16.47
11	Descartes	A. Mersenne	18.27	45	Rabelais	U. Montpellier	16.45
12	von Leibniz	4 academies	18.22	46	Hohenheim	U. Basel	16.45
13	La Fontaine	A. Française	17.85	47	Euler	8 academies	16.39
14	Lessing	A. Prussia	17.79	48	Wieland	A. Prussia	16.39
15	Calvin	U. Genève	17.78	49	Copernicus	U. Sapienza	16.37
16	Boccaccio	U. Florence	17.76	50	Wesley	U. Oxford	16.31
17	Petrarca	U. Florence	17.76	51	de Quevedo	A. Oziosi	16.29
18	Perrault	A. Française	17.71	52	Bentham	U. Oxford	16.28
19	Franklin	12 academies	17.70	53	de Cusa	U. Cologne	16.26
20	Linnaeus	U. Uppsana	17.68	54	Bruno	7 universities	16.26
21	Montesquieu	6 academies	17.50	55	Berkeley	U. Dublin	16.24
22	A. Humboldt	3 academies	17.44	56	Holberg	U. Copenhagen	16.24
23	Goldoni	A. Rovereto	17.40	57	Abélard	U. Paris	16.23
24	Hume	U. Edinburgh	17.38	58	Tasso	U. Ferrara	16.23
25	Locke	U. Oxford	17.36	59	Pope	A. Spalding	16.20
26	Newton	U. Cambridge	17.34	60	Burke	A. Edinburgh	16.20
27	Racine	A. Française	17.33	61	F. Humboldt	A. Erfurt	16.17
28	Pascal	A. Mersenne	17.30	62	Alberti	A. Plato	16.16
29	Galilei	U. Padua	17.30	63	d'Alembert	12 academies	16.15
30	Bacon	U. Cambridge	17.21	64	Cook	Royal Society	16.12
31	Corneille	A. Française	17.06				
32	Hobbes	A. Mersenne	16.98				
33	Smith	U. Glasgow	16.96	27645	Roero Di Piea	A. Turin	0.17
34	von Herder	A. Prussia	16.90	27646	Ortiz	U. Vilnius	0.17

Note: q_i computed from Equation (1). Only main institution is reported

Table 2: Top 64 academic scholars with their human capital index q_i

taught at Montpellier; Friedrich von Schiller, a German poet and professor at the University of Jena, also falls into this category.

Our ranking of human capital is very much in line with other rankings in the recently published databases of Schich et al. (2014) and Yu et al. (2016) which use recent data on the scientific impact and the influence of scholars. All three are built from a contemporary point of view. Some scholars gained recognition through postmortem publications, while others may have been highly esteemed in life, yet their work did not survive and they are now entirely forgotten.

A related question concerns the relation between longevity and our q_i . Regressing q_i against longevity in logs with decade fixed effect, we find a positive and statistically significant correlation (2.18694 (SE: 0.07679)). This may reflect both a mechanical effect (longer life implies more time to write and publish) and an incentive effect à la Ben-Porath (1967) (longer life implies higher return to investment in human capital). The non-stationary nature of longevity over the long run certainly increases our estimates of q_i for the most recent scholars.

One final remark before moving to the second principal component. The human capital index we built is based on digitally-native sources, Wikipedia and VIAF, which are regularly updated. Wikipedia pages can change every day based on the work of those who collaborate to the project. VIAF is periodically altered as well, for example whenever a new library joins the system.

As reported above, the second principal component loads negatively on indicators related to recent digital visibility (Wikipedia, ISBN, and publications after 1900) relative to the other measures which enter positively. With this component we can build a Faded Fame Index p_i . Scholars with a high p_i are those with a large number of titles and many publishers and publications before 1900, but no Wikipedia page, no publications after 1900, and no ISBN. They did a lot but were forgotten. We further explore this index in Appendix B.

3 Aggregation

Aggregating human capital involves grouping universities and academies into defined sets for which we compute totals. We propose three main approaches to aggregating our individual-level data. First, by city of activity, allowing users to further aggregate data as needed. Second, by grouping institutions according to present-day national borders. Third, we offer alternative aggregations, called macro-regions, based on qualitative historical information about former states and their associated systems of higher education (see Section 4). For each of these aggregation levels, we provide four types of data.

- Total human capital in universities. We sum individual human capital based on individuals’ affiliations. In cases with missing end dates for affiliations, human capital is conservatively attributed only to the starting year to avoid over-counting. In each year, multiple affiliations across different universities are accounted for by attributing an equal share of the individual human capital to each institution. Individuals affiliated with both a university and an academy in the same year have their human capital attributed solely to the university. As a result, the human capital associated with academies is drawn from scholars exclusively affiliated with them.
- Number of universities. The list of universities, along with their respective years of establishment and closure, is based on Frijhoff (1996), with the addition of some other higher education institutions. See Appendix D for details.
- Additional human capital in academies. We sum the human capital of the scholars who only belong to academies. In the case of multiple affiliations to multiple academies, we allocate individual human capital across institutions with equal shares.
- Number of academies. The list of academies is based on The British Library (2021) for Renaissance universities and McClellan (1985) for the scientific academies of the 17th and 18th centuries. See Appendix D for details.

Our measure of human capital captures, by design, the upper-tail of the distribution. This should be seen as a complement to methods of measuring human capital at other parts of the distribution. For example, signature-based measures of literacy and age-heaping based measures of numeracy estimate basic levels of education (A’Hearn, Baten, and Crayen 2009; Baten and Hippe 2018), per-capita book consumption estimates advanced literacy skills (Baten and van Zanden 2008; Buringh and van Zanden 2009; de Pleijt and van Zanden 2016), and historical occupational wages estimate skill premia (Williamson and Lindert 1980; Goldin and Katz 1999; Baten and Blum 2011). For a detailed time-series comparison between q_i and several other measures of human capital, see Appendix A.

4 Definition of the Macro-Regions

To facilitate historical analysis, we complement modern country-based aggregation with an alternative classification into 18 macro-regions, shown in Figure 2. These are defined to reflect long-term institutional, linguistic, religious, and political commonalities, offering a more coherent framework for studying the development of academic human capital between 1200 and 1793. To ensure meaningful cross-regional comparisons, the boundaries of each macro-region are held constant over time. This approach facilitates the tracing of long-run

patterns of continuity and divergence and avoids the complications arising from time-varying borders.

This macro-regional approach enables more meaningful comparisons of academic human capital across time and space, accounting for historically embedded patterns of governance, religion, and institutional development. It also avoids the pitfalls of imposing present-day national categories on premodern dynamics. We briefly describe them here, while more details are given in Appendix C

The delineation begins with the geopolitical situation in the aftermath of the Peace of Westphalia (1648), which ushered in a relatively stable territorial order in Europe. We define macro-regions by grouping modern administrative units (primarily NUTS-2 and NUTS-3 regions in their 2016 edition) into larger, historically coherent territories. For areas like Ukraine and Belarus, where the NUTS system does not apply, we rely on equivalent oblast-level units taken from [Natural Earth \(2023\)](#). We also used academic traditions, institutional typologies, linguistic boundaries, and religious affiliations to guide the grouping.

Several contrasting cases illustrate the relevance of this approach. In the British Isles, we distinguish Scotland from the “English Realms” (England, Wales, and Ireland). This reflects not only political autonomy but also clear institutional and religious differences. Scottish universities were Presbyterian after the Reformation. They were early adopters of Enlightenment ideals, offering broad curricula in science and philosophy (Mokyr 2005, p. 311; Wood 2006, pp. 191-194). By contrast, English and Irish universities were Anglican, and have traditionally been portrayed as more conservative institutions,⁶ retaining a strong emphasis on the liberal arts and theology well into the eighteenth century (Schmitt 1983, p. 40). The development of external academies, such as the Royal Society in London, partly compensated for this delay in university reform (Hunter 1989).

In the Iberian Peninsula, we distinguish between Levante and Castilla, which align roughly with the historic territories of the Crowns of Castile and Aragon, respectively. This division reflects differences in language, academic institutions, and patterns of state centralization. While Spain had many universities, it had relatively few scientific academies, in contrast to Northern Europe. Though small in institutional numbers, Portugal maintained a distinct political and linguistic identity and is treated as a separate region (Disney 2009).

France is divided into Francia and Occitania, following the historic langue d’oïl/langue d’oc boundary. This line reflects deep cultural differences, which were reinforced during the Reformation. Francia, in the North, was more integrated into centralized Catholic struc-

6. This view, supported by historians such as Hill (1965), Westfall (1980, 1971), and Mokyr (2002, 2010), has been challenged by Feingold (1984) and more recently by Koschnick (2025), who question both the degree of conservatism and universities’ role during the Scientific Revolution.

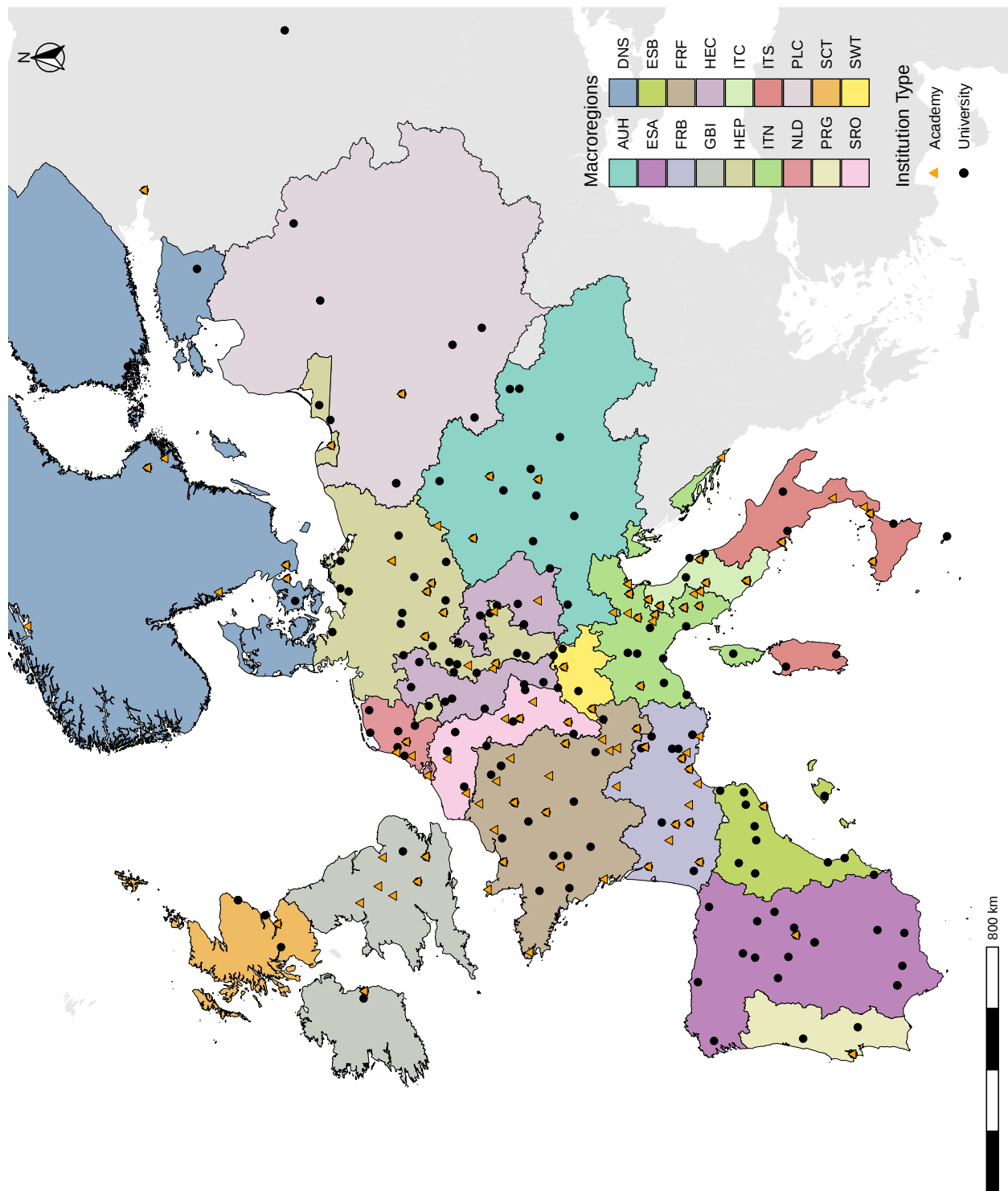


Figure 2: Macro-regions

tures, while Occitania had more Protestant sympathies and a more fragmented institutional landscape (Félice 1853). This divide also mirrors Grendler (2004)’s typology of southern versus northern European universities: Occitania resembled the Italian and Spanish model with a focus on law and medicine, whereas Francia leaned toward theology and the arts.

Italy is split into Northern, Central, and Southern regions. Southern Italy largely corresponds to the territories of the Spanish-controlled Kingdoms of Naples, Sicily, and Sardinia. Central Italy aligns with the Papal States, where universities like Bologna and Rome were under strong ecclesiastical influence. Northern Italy was more politically fragmented and culturally diverse, with institutions like the University of Padua operating under relatively autonomous republics. The North played a leading role in fostering scientific academies and Renaissance scholarship (Maylender 1930), while the South remained more centralized and doctrinal.

The Holy Roman Empire is divided into Evangelical Germania (the Protestant north) and Tridentine Germania (the Catholic south and center). This split captures the long-term impact of the Reformation and Counter-Reformation on academic structures. Protestant territories founded numerous new institutions, often closely tied to local rulers and reform movements (Hammerstein 1996). Catholic regions, by contrast, relied heavily on the Jesuits and emphasized doctrinal control. This division is critical for understanding the confessional foundations of early modern knowledge regimes.

Other important macro-regions include the the Netherlands, which emerged as a major intellectual and commercial hub in the seventeenth century, with Calvinist-leaning universities and a strong academic network; the Lotharingian corridor, a transitional region between France and Germany with dense academic activity and historical ties to the house of Burgundy and, later, the Spanish Habsburgs; and the Austrian Habsburg Lands, where university development followed a more centralized Catholic pattern, with strong Jesuit involvement (Grendler 2019) and a late shift towards Enlightenment reforms under Maria Theresa.

We also identify Poland-Lithuania as a macro-region, encompassing a wide range of universities and academies in a decentralized but academically dynamic context, and with a strong Jesuit presence. Switzerland is treated as a distinct unit, with its patchwork of Protestant and Catholic cantons, each supporting their own academic institutions or relying on foreign universities (Zurbuchen 2011; Neumann 2014). Finally, we group the Kingdoms of Denmark-Norway and Sweden under Scandinavia, reflecting their shared Lutheran orientation and monarchical structures, which shaped a relatively homogeneous academic environment.

The presence on Wikipedia, VIAF, and Wikidata of our regions varies. Table 3 gives the

percentage of scholars by region having a Wikipedia page and a VIAF page. The highest percentages are obtained in Protestant regions such as in Scotland, the Netherlands, Scandinavia, and Evangelical Germania. English Realms is an exception, but the universities in this region include a very large number of short-term fellows whose footprints in libraries are small.

Region	No. scholars	% with Wikipedia	% with VIAF	% with Wikidata
Scotland	1092	53.57	54.4	56.23
English Realms	16881	27.84	29.6	30.85
the Netherlands	2139	52.5	81.77	67.88
Scandinavia	2563	72.38	80.34	75.58
Evangelical Germania	8871	65.48	82.01	77.75
Tridentine Germania	7583	22.83	50.36	38.57
Poland-Lithuania	3730	18.28	36.01	26.76
Austrian Habsburg Lands	3865	25.05	39.79	35.99
Lotharingian corridor	3952	19.71	36.61	28.09
Switzerland	918	40.31	72.22	60.02
Francia	12144	32.35	39.78	35.78
Occitania	5028	21	31.5	25.5
Southern Italy	2272	17.3	25.66	22.23
Central Italy	11278	16.26	25.74	21.35
Northern Italy	13851	20.24	31.23	27.39
Castilla	2222	12.11	17.33	14.54
Levante	4129	13.59	18.29	16.64
Portugal	2215	15.17	25.28	18.37
All	104733	28.44	39.54	35.17

Table 3: Percentage of activities by region having a Wikipedia page and a VIAF page

When we observe that fewer academic scholars have a Wikipedia page or a VIAF record, such as for example in Levante, Southern Italy, or Portugal, at least four explanations are possible.

First, scholars in that region may in fact be less productive, having written fewer works and attracted less attention.

Second, the quality and depth of the secondary sources used to construct our database may be higher for that region, so that we capture more minor scholars who held lower positions or were active only briefly. In that case, the share of scholars with a VIAF link is inversely related to the source quality.

Third, some regions may be simply less inclined to produce Wikipedia entries, or their libraries may maintain only partial catalogues of works. This can misleadingly suggest that

scholars from that region were less active. Such biases may also appear from the way data are transmitted from the central bibliographic agencies of each country to VIAF. The quality and completeness of the information available in VIAF ultimately depend on the capacity of national libraries to maintain, update, and regularly transmit their authority files. Since VIAF ingests data exclusively through these central institutions—rather than from individual libraries—any gaps, delays, or uneven coverage at the national level are directly propagated into VIAF’s clustering process. This results in cross-country discrepancies, particularly for lesser-known individuals or for figures who are only marginally represented in their respective national catalogues. Including Wikidata helps to mitigate this bias, as it relies on a variety of sources independent from VIAF.

Fourth, there may be a compositional effect over time. If a region contributes relatively more authors from before the advent of printing, and if manuscripts are underrepresented in VIAF, then that region will systematically show lower VIAF coverage. Unlike the first three biases, this is a bias that we can measure by computing Table 3 on early modern data only (after 1517 for example) and comparing with the table on the full sample. For example, for Northern Italy, the number of observations drops from 13,874 to 10,343 when we exclude the medieval scholars. This barely increases the Wikipedia coverage (from 20.2% to 22.04%). The VIAF coverage increases a bit more (from 31.15% to 35.06%) but this is far from enough to explain the gap between Northern Italy and the Netherlands for example.

5 Reviewing Some Established Facts

In this section, we highlight key patterns previously discussed in the literature that are observable in the human capital data. To facilitate meaningful cross-regional comparisons, we normalize aggregate human capital for each macro-region by the corresponding urban population in the same year. This approach captures the intensity of human capital rather than its absolute scale. Total urban population serves as a proxy for the overall size of the economy, so the index measures the degree to which the productive sector relies on human capital.

$$i_{m,t} = \frac{\sum_{i \in I_{m,t}} q_i}{\sum_{c \in C_m} p_{t,c}} \quad (2)$$

In Equation (2), the numerator represents total human capital; it is the sum of the human capital of all the scholars, i , who are affiliated to an institution located in the macro-region, m , at time t , belonging to the set $I_{m,t}$. Unless stated otherwise, the human capital used to construct the index is the one related to both universities and academies. The denominator is the total urban population—the sum of the population of every city, c , at time, t , belonging

to the same macroregion, contained in the set C_m .

Urban population estimates are drawn from Buringh (2021), which provides one observation per century prior to 1500 and one every fifty years thereafter. Approximation errors in the coordinates may leave some cities unassigned. Before conducting the analysis, we perform a fuzzy matching procedure based on the Jaro–Winkler string distance⁷ between the city names in Buringh (2021) and those in our database. For matched cities, we replace Buringh’s coordinates with our own. If the geographic distance between Buringh’s coordinates and ours exceeds 10 km, the replacement is carried out only when the city names match exactly, that is, when the Jaro–Winkler distance equals zero. To construct a yearly series, these observations are interpolated using a natural cubic spline. Urban population is expressed in thousands, so that an index of 1 corresponds to one scholar with unit human capital per thousand urban inhabitants; equivalently, an urban population of 18,340 inhabitants corresponds to Martin Luther (see Table 2).

Variation in total human capital over time can reflect changes either in the average number of affiliated scholars (quantity) or in their average human capital (quality). The concave transformation outlined in Section 2 limits the influence of extreme values in quality, ensuring that changes in total human capital are largely driven by shifts in institutional size rather than by a few exceptionally productive individuals. An individual contributes to the total stock of human capital only during the period in which they hold an institutional affiliation—for example, Luther was affiliated with the University of Wittenberg from 1508 to 1546, so his impact is confined to those 38 years.⁸ Consequently, the long-run trends we observe over centuries cannot be attributed to a narrow group of superstars. This approach reinforces the conservativeness of our measure and highlights that the trends reported reflect broad evolutions rather than the outsized influence of a niche of exceptional scholars.

5.1 The Little Divergence

A notable economic divergence emerged in Europe prior to 1800: the sustained economic ascent of northwestern regions over their southern counterparts. This phenomenon, often termed the “Little Divergence,” is empirically observed across various socioeconomic indicators, including real GDP per capita (Maddison 2007), urbanization rates (De Vries 1984; Bairoch, Batou, and Chevre 1988; Buringh 2021), book production (Baten and van Zanden 2008; Buringh and van Zanden 2009), and quality of institutions (Hough and Grier 2015; Henriques and Palma 2023), among others. While the precise causes remain a subject of

7. To do so, we use the package by Van der Loo (2014) in R

8. Moreover, Luther accounts for around only 6, 5, and 3 % of total human capital in Evangelical Germania respectively in 1508, 1517 and 1546

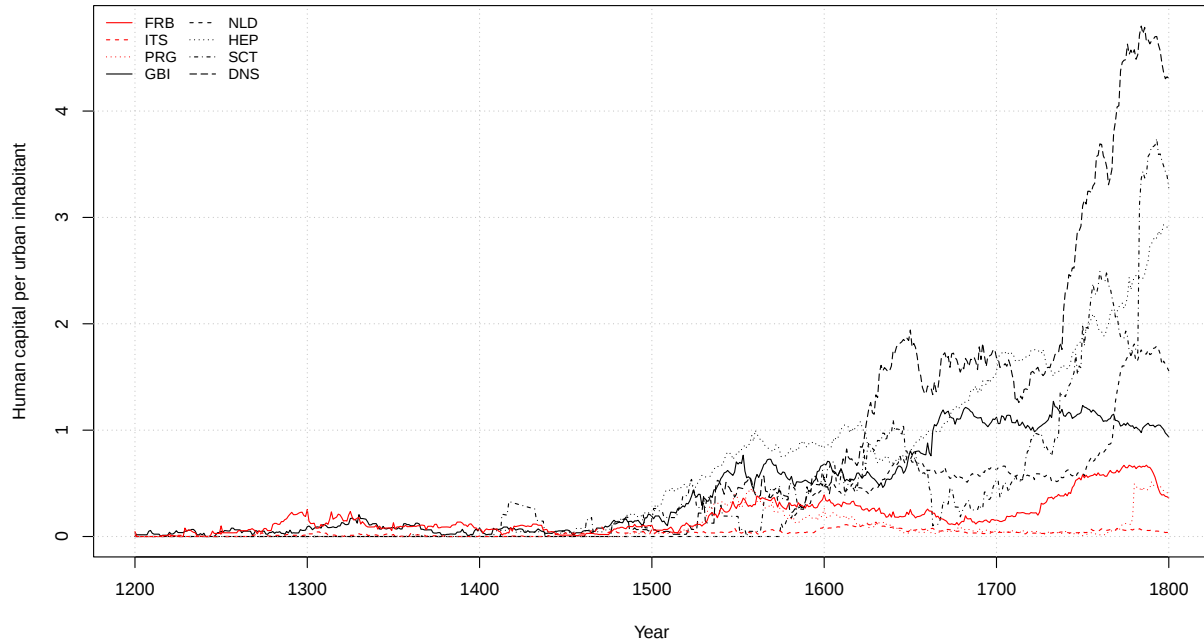


Figure 3: The Little Divergence in academic human capital, as measured by human capital of academies and universities per urban population. Black lines: Northern Europe (the English Realms (GBI), the the Netherlands (NLD), Evangelical Germania (HEP), Scotland (SCT), and Scandinavia (DNS)). Red lines: Southern Europe (Occitania (FRB), Southern Italy (ITS), and Portugal (PRG)).

scholarly debate, de Pleijt and van Zanden (2016) propose that human capital, proxied by book consumption, significantly accounts for a substantial portion of this divergence, a claim that contrasts with findings by Acemoglu, Johnson, and Robinson (2005).

Figure 3 exhibits the average human capital per urban inhabitant for some representative macro-regions of the North and South of Europe. Starting in 1500, the English Realms, Scotland, Evangelical Germania, the the Netherlands and Scandinavia witnessed a remarkable increase in the human capital per urban inhabitant. Conversely, the southern regions of Occitania, Southern Italy, Portugal stagnated.

From the perspective of human capital, this shift had a twofold manifestation. In Southern Europe—particularly on the Italian Peninsula—it was associated with the cultural and intellectual Renaissance movement. Conversely, in Northern Europe it materialized with the Northern Renaissance, which was concomitant with the Reformation. While different in nature, these movements both coincided with a resurgence of human capital, which, in Northern Europe, proved to be quantitatively more substantial and persistent. In fact, the decline of the Renaissance brought Italy back to stagnation. Conversely, the Northern Re-

naissance marked a period of sustained prosperity for Northwestern Europe, elevating it above the Southern and Central regions in terms of human capital. For example, during the 16th century, Scandinavia—and notably Sweden—began a trajectory that would make it one of the most literate regions in Europe on the eve of industrialization, earning it the epithet of the “impoverished sophisticate” (Sandberg 1979).

A recently revived strand of the literature has emphasized the importance of the Counter-Reformation in explaining the lag of the South in knowledge production. Becker, Pino, and Vidal-Robert (2021), Drelichman, Vidal-Robert, and Voth (2021), Cabello (2022), Dewitte et al. (2022), and Blasutto and de la Croix (2023) suggest that the institutional and religious constraints imposed by the Counter-Reformation curtailed intellectual innovation and the accumulation of human capital in Southern Europe and the Spanish Low Countries, reinforcing the divergence in long-term economic and scientific development between the North and the South.

In terms of academic human capital, Portugal had a very different path compared to Spain. The arrival of the Jesuits around 1540, as part of a broader project of evangelization and cultural control over the colonial territories, marked an initial, albeit temporary, phase of growth. A renewed impetus came in the mid-eighteenth century with the reform program of the Marquis of Pombal—which also included the expulsion of the Jesuits—aimed at reorganizing educational institutions along more modern lines and improving their overall quality (Maxwell 1995; Vitale 2022; de la Croix, Gualandris, and Vitale 2023).

The 17th century was characterized by numerous conflicts and plague outbreaks. Both the the Netherlands and Evangelical Germania suffered a brief decline, most likely due to the Thirty Years’ War (1618–1648) and the Dutch War of Independence from the Habsburgs (1568–1648). The English Realms’ human capital reached its peak in this period, coinciding with the Educational Revolution (Stone 1964), before the Stuart Restoration ushered in a long period of stagnation in tertiary education.⁹ This trend is particularly notable as it occurs while English GDP per capita was beginning its sustained rise (Broadberry et al. 2015, p. 204). This phenomenon cannot be attributed to a demographic boom in Ireland as urban population evolved at approximately the same pace throughout the period between 1400 and 1800. Some authors linked the subsequent stagnation to a phenomenon of *elite overproduction* (Curtis 1962; Stone 1965; Goldstone 1991), others to the rise of competing institutions. The end of the English Interregnum was marked by legislation restoring Anglican primacy, notably the Act of Uniformity (1662) and the Test Acts (1670s), which restricted university

9. The Educational Revolution aligns with data on grammar school foundations (Boucekkine, de la Croix, and Peeters 2007, fig. 1), while the subsequent decline is evident in the average tertiary education (de Pleijt 2018, fig. 4) and matriculation rates to universities and the Inns of Court (Stone 1964, p. 69; 1974).

access to members of the Church of England. This exclusion prompted the establishment of Dissenting Academies (Parker 1914; [Queen Mary Centre for Religion and Literature in English](#)), intellectual centers run by nonconformists who refused to adhere to the Book of Common Prayer. Some scholars have argued that Dissenters, and in particular the Puritans, played a pivotal role in the Scientific Revolution (Merton 1938), suggesting that their departure and the broader Great Migration that followed Interregnum may have contributed to the decline in human-capital formation in England. Yet, regarding the ability of dissenting academies to divert a substantial portion of students, Shapiro (1971, p. 80) observes that “the thirty or so founded between 1662 and the turn of the century do not seem to have made a substantial contribution.” Similarly, Scottish universities did not expand significantly until the early eighteenth century, limiting their competitive effect (Gascoigne 1990). It remains an open question what justified the drop in human capital, which is also coupled with a decline in the matriculations at Oxford and Cambridge (Koschnick 2025, Fig. A.8).

Similar trends can be spotted using alternative macro-level measures of human capital. By 1600, Great Britain and the the Netherlands were the Western European regions with the highest literacy rates, while Ireland, Poland and Spain had the lowest rates (Buringh and van Zanden 2009, tab. 9). Moreover, the relatively comparable literacy rates in the the Netherlands and English Realms during the 17th century were matched by their academic systems, with human capital per urban inhabitant remaining broadly similar until the 1650s. The Thirty Years’ War marked the beginning of English predominance in academic human capital relative to the the Netherlands, a position that was reversed in the second half of the 18th century. A slightly different gradient appears in per capita consumption of printed books (Buringh and van Zanden 2009, tab. 4), where the the Netherlands is at a systematically higher level than the English Realms after the 1550s.

5.2 The Black Death and the Thirty Years’ War

Two events are particularly relevant for analyzing human capital-intensity: the Black Death and the Thirty Years’ War. Both constitute large, well-documented shocks that had lasting negative consequences, including substantial disruptions to universities and the broader academic market. Other events, such as the Italian plague of 1629–1631 (Alfani 2013, pp. 426–427), were found to have exerted a negative effect on human capital.¹⁰ However, as far as the academic market is concerned, the Black Death and the Thirty Years’ War seem to

10. Alfani and Percoco (2019) found that mortality was high also among skilled workers, thus it was thus not anymore a “plague of the poor” (Alfani and Percoco 2019, p. 1183), hitting only the most disadvantaged social classes. Our series for academic human capital in Northern Italy start declining as early as in 1600—around 30 years before the outbreak of the plague.

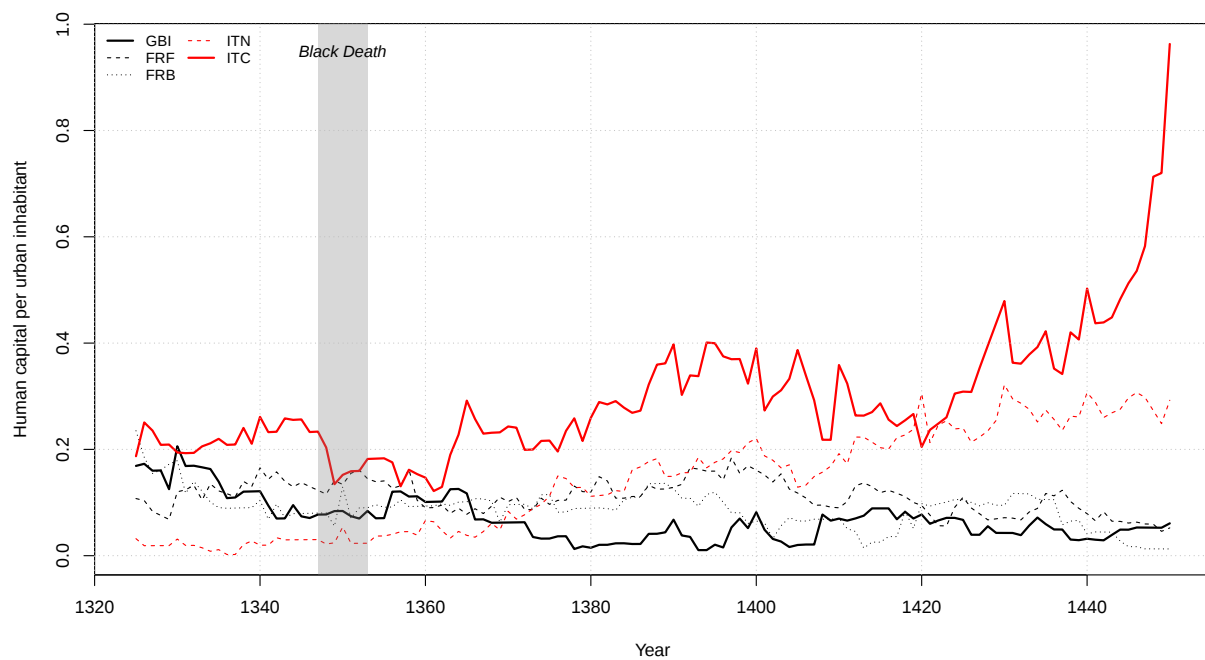


Figure 4: The Black Death. Black lines: macro-regions following the Parisian model (the English Realms (GBI), Francia (FRF) and Occitania (FRB)), red lines: macro-regions following the Bolognese model (Northern Italy (ITN) and Central Italy (ITC)).

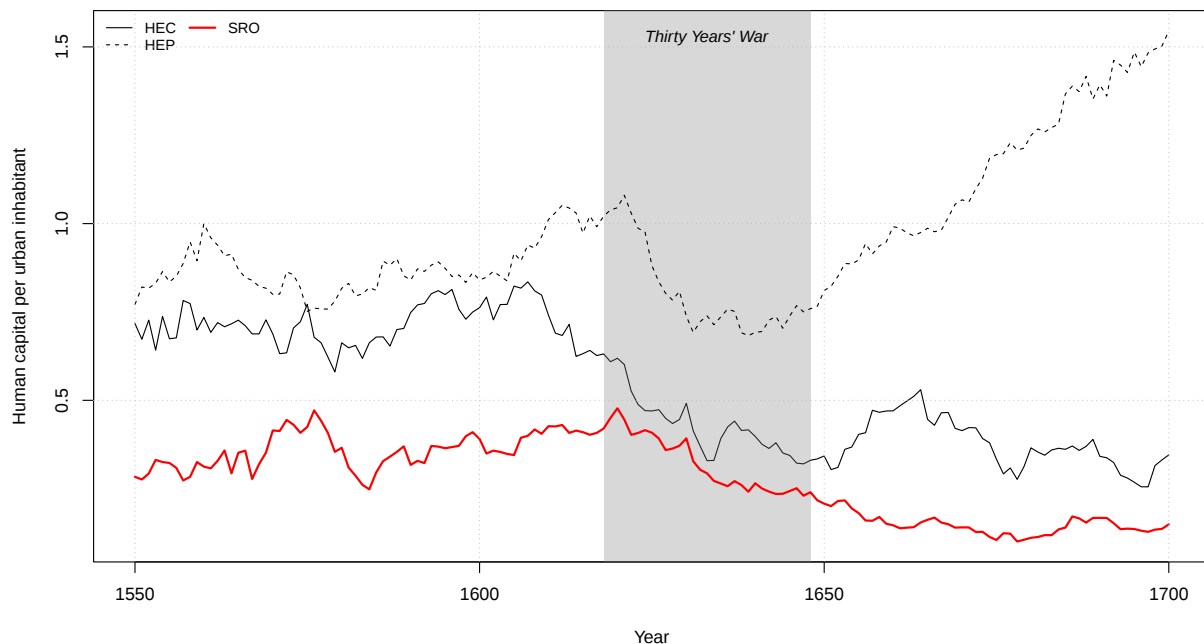


Figure 5: The Thirty Years' War in Tridentine Germania (HEC), Evangelical Germania (HEP) and the Lotharingian corridor (SRO)

be the two main negative shocks.

Around 1348, Europe was struck by one of the most devastating pandemics in recorded history. The plague is traditionally believed to have arrived via Genoese ships retreating from the Mongol siege of the commercial outpost of Caffa (in present-day Crimea) (Jedwab, Johnson, and Koyama 2022). The Sicilian port of Messina was the first to be infected and from there the pathogen spread all over Europe. Jedwab, Johnson, and Koyama (2024, p. 5) noted that the cities that were hit first were the ones who suffered the highest death tolls. Interestingly, they find that having a university was not associated with a faster demographic recovery.

Campbell (1931) remains the first major monograph dedicated to this question, pioneering the study of the Black Death's impact on European higher education. The most immediate and intuitive consequence was the death of scholars and students. Despite the scale of demographic loss, Oxford, for instance, appears not to have contracted significantly in size (Brockliss 2016, p. 33), perhaps thanks to the students and faculty's young age.¹¹ In the decades that followed, however, we observe that human capital per urban inhabitant

11. In European universities, some students were as young as 14 years old (Ridder-Symoens 1996, pp. 285-286), and to become eligible to teach, they typically needed to graduate—a process that generally required between 8 and 12 years of study (Ridder-Symoens 1996, pp. 360-361).

declined considerably in the English Realms, as [Figure 4](#) shows.

The immediate post-plague labor shortage may have led individuals at the margin to forego higher education, resulting in an immediate decline in university enrollments (a short-run effect) and in a subsequent contraction in the pool of qualified teachers (a long-run effect). Nevertheless, the sharp rise in land-labor ratios and real wages increased the demand for human capital-intensive goods, like books (Baten and van Zanden [2008](#), fig. 1; Dittmar [2011](#), pp. 1139, 1156), generated growing interest for tertiary education, and contributed to rising urbanization rates (Buringh [2021](#)). As the supply of qualified instructors failed to keep pace with this rising demand, universities and grammar schools increasingly resorted to hiring underqualified academics, potentially accounting for the widely observed qualitative decline in instruction. Conversely, Courtenay ([1980](#)) attributes the decrease to the limited ability to replace grammar school teachers—mostly clergy—who suffered disproportionately high mortality. While both theories offer an account of this persistent deterioration, they lack the support of modern quantitative methods and continue to be debated.

Conversely, Grendler ([2002](#), p. 7-8) reports that, starting with about 17 professors in 1351, the University of Bologna grew steadily through the 1440s, when the faculty stabilized at about 85-110 members. Available evidence on the effect of the plague on the quality of Southern European universities is extremely scattered and scarce. Nonetheless, we note a striking increase in human capital intensity both in Northern Italy and Central Italy. One possible explanation is that teaching at Bologna focused primarily on law and medicine. In the aftermath of the Black Death, demand for both disciplines likely increased: legal studies were vital for regulating urban life and enforcing public health measures, while medicine was central to managing health crises and searching for effective treatments. This made both fields strategically important for the university and for society more broadly. To maintain and strengthen teaching quality, especially after the demographic impact of the Black Death, the university actively sought to attract new professors, likely expanding its international network of scholars. Another possible explanation is that several Italian universities—particularly in the North—temporarily relocated to avoid the plague. Such relocations may have contributed to maintaining, or even improving, the quality of human capital at these institutions.

On the whole, universities across Europe responded unevenly to the pandemic. Although the Black Death disrupted academic life in nearly all macro-regions, institutions shaped by the Parisian tradition (centered around theology and philosophy) experienced a sharper decline, whereas those following the “Bologna model” (centered around law and medicine) proved more resilient. The plague impacted almost all the macro-regions and here we assumed that the demography of each of them was affected equally.

The Thirty Years’ War (1618–1648) was a protracted and devastating conflict that engulfed much of continental Europe. Like the Black Death, it had profound demographic and institutional consequences. Among its many effects, the war led to the closure or disruption of numerous universities (Stelter, de la Croix, and Myrskylä 2021). Using matriculation data, Hotson (2018, Fig. 4.5, 4.13) shows that Reformed universities of Calvinist tradition—notably Heidelberg, Duisburg, and Basle—were among the hardest hit. Notwithstanding several aborted attempts to reopen it, the University of Heidelberg remained closed from 1622 to 1652 (Hotson 2018, pp. 143-144). In contrast, some Catholic and Lutheran institutions also experienced increases in matriculations, likely due to their safer locations or confessional alignments. Overall, the war severely disrupted international academic networks, deepened religious polarization, and led to forced displacement of students and scholars to neighboring macro-regions.

Figure 5 illustrates the evolution of human capital across the three regions of Evangelical Germania, Tridentine Germania, and the Lotharingian corridor in the period 1550-1700. All regions experienced an initial decline, yet their trajectories diverged notably as the conflict progressed. While both Tridentine Germania and especially the Lotharingian corridor entered a period of prolonged stagnation around the war’s midpoint, Evangelical Germania underwent a marked recovery. In the subsequent centuries, both Tridentine Germania and Evangelical Germania reached primacy at the European level.

5.3 Universities vs. Academies

From around 1500, the first academies emerged in European cities. The first wave stems from the Humanistic Revolution, mostly in Italy (Maylender 1930). The second wave, from around 1650, stems from the Scientific Revolution (McClellan 1985; Applebaum 2003). In contrast to universities, whose mission was primarily educational, academies were chiefly devoted to research. From a data standpoint, a key distinction between the two concerns the attribution of scholarly affiliation. University professors were typically salaried educators, often subject to requirements such as celibacy and residency on campus. Academicians, by contrast, were not obliged to teach and were generally not subject to such constraints. This institutional divergence had important geographic implications. Universities had a clearly defined local sphere of influence tied to their physical location. Academies, however, operated within more diffuse and networked structures. It was common for them to include “corresponding members”—scholars who contributed to academic discussions via epistolary exchange without residing near or ever visiting the academy’s headquarters. These correspondence networks played a central role in shaping the so-called Republic of Letters (Mokyr

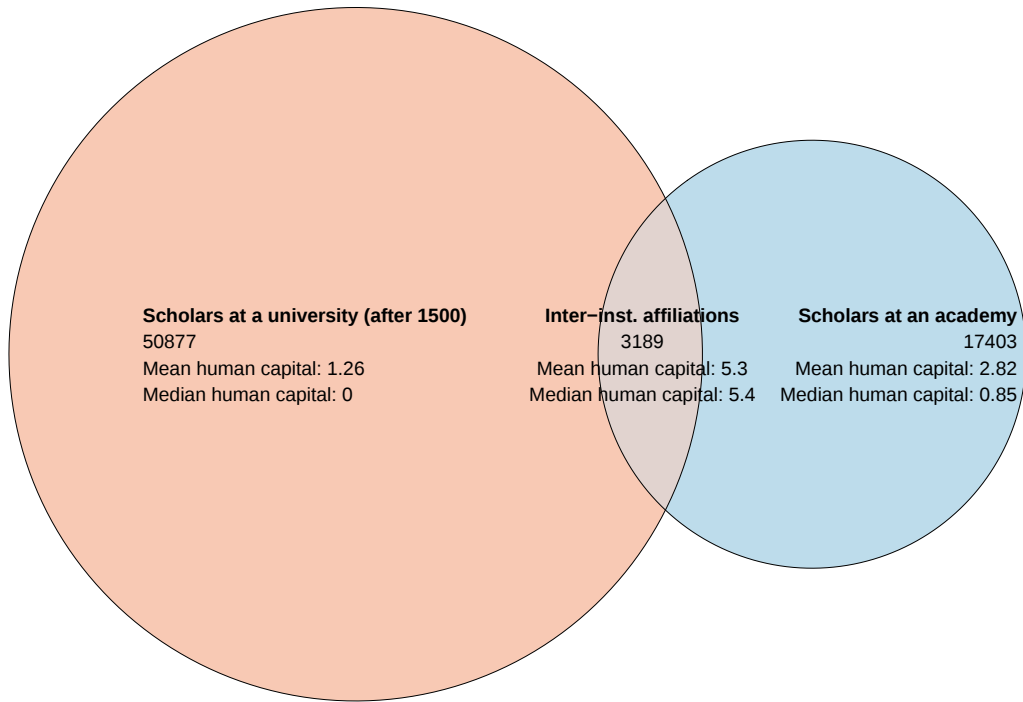


Figure 6: Venn diagram of scholars by type of affiliation

2010, 2016; Zanardello 2024; Cervellati et al. 2025). While available data do not always allow us to distinguish between resident and corresponding members, anecdotal evidence suggests that several academicians visited their affiliated institutions very rarely.

Figure 6 is a Venn diagram that shows the extent of joint membership of universities and academies. It also shows that scholars affiliated exclusively with academies had more than twice the level of human capital, on average, than those affiliated exclusively with universities after 1500. Several mechanisms could account for this difference: we focus on two in particular.

Firstly, given their research-oriented mission, academicians primarily engaged in scholarly production rather than teaching. This likely contributed to a greater number of published works (both in terms of titles and editions), which is directly reflected in our human capital index. In contrast, teaching activities do not directly factor into the construction of this index.

Secondly, the practice of appointing corresponding members—often prestigious scholars from outside the local area—allowed academies to extend their intellectual reach and institutional prestige at minimal cost. This contributed to a broader geographic footprint for academies relative to universities. Although inter-institutional affiliations constitute a minority of the overall sample, these scholars exhibit markedly higher human capital. On

average, their human capital index is almost twice as big as that of scholars affiliated only with academies, and around four times greater than that of university-only scholars. These disparities are even more pronounced at the median: the median scholar affiliated only with a university has no bibliometric information (no VIAF, Wikipedia, or Wikidata link), and therefore a human capital index of zero.

Figure 7 displays the relationship between total European human capital produced by universities and by academies after 1600. The outputs of the two types of institution appear to be at least partially complementary. Their aggregate human capital levels tend to move in the same direction over time. Zanardello (2024) provides evidence that the establishment of academies spurred growth in existing universities, suggesting a positive spillover effect.

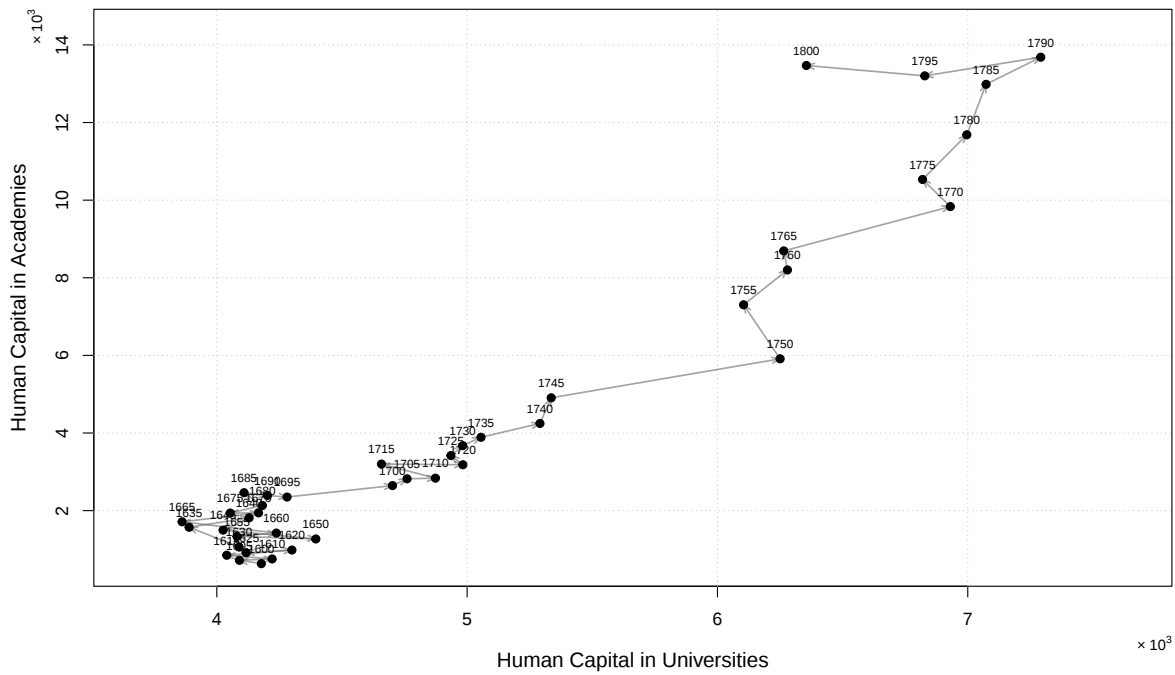


Figure 7: Scatter plot of the total human capital produced in universities and academies after 1600.

The role of academies is particularly visible when comparing Francia to Occitania. Figure 8a and Figure 8b display the human capital series first for universities and then for the sum of universities and academies. Academies located in Francia, and especially in Paris,¹² played a substantial role in raising the region's human capital-intensity. The post-1500 rise

12. According to our data, until 1750 the academies located in Paris contributed to more than half of the total human capital supplied by academies in Francia.

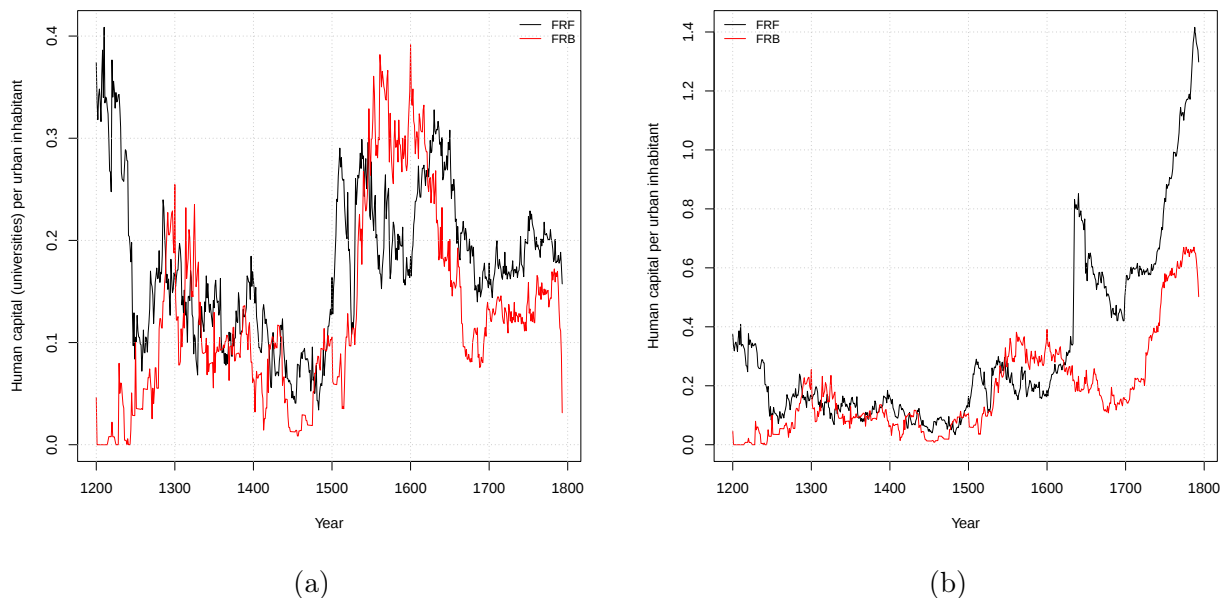


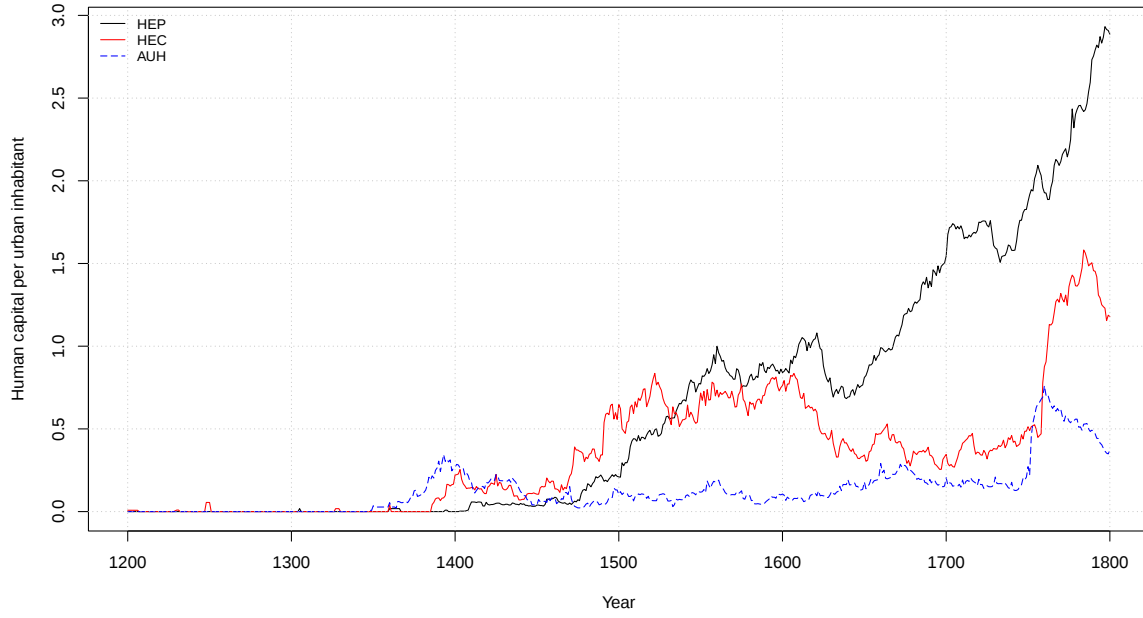
Figure 8: Human capital produced in universities per urban inhabitant (8a) and human capital produced in universities and academies per urban inhabitant (8b) in Francia (FRF) and Occitania (FRB)

of Northern French institutions in Figure 8b was driven by scholars who never taught at a university. The relatively high levels of human capital experienced by Occitania between the 13th and 14th centuries gradually waned. From 1600 the series starts to diverge. While the northern region of Francia seems to be tied to the trends of the English Realms and the Netherlands, Occitania stagnates, as do most other Southern European regions. When looking at universities alone, this divergence appears modest; the inclusion of academies, however, reveals a much wider gap.

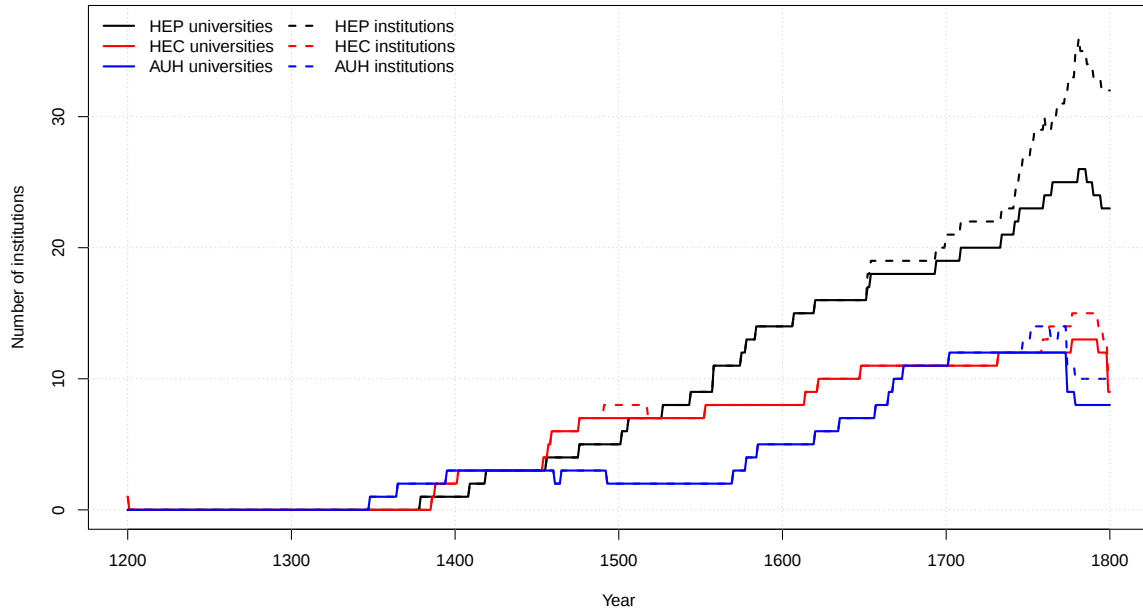
5.4 Heterogeneity in Germania and the Habsburg Lands

The religious separation of the Holy Roman Empire allows us to identify a pattern long debated in economic history: the relative performance of Protestant versus Catholic regions (Weber 1930; Becker and Woessmann 2009; Becker, Pfaff, and Rubin 2016; de la Croix and Morault 2025). Between 1200 and 1793, we find that Tridentine Germania and Evangelical Germania substantially diverged in human capital per urban inhabitant. The series is shown in Figure 9a.

The Reformation spurred the creation of new institutions dedicated to training clergy in Lutheran doctrine. For instance, the founding charter of the University of Giessen (1607)



(a)



(b)

Figure 9: Human capital per urban population for Evangelical Germania (HEP), Tridentine Germania (HEC) and the Austrian Habsburg Lands (AUH) (Figure 9a) and number of active universities (solid lines) and universities and academies (dashed lines) (Figure 9b).

explicitly identifies this as its main purpose. Similar aims motivated the foundation of universities such as Marburg (1527), Königsberg (1544), and Jena (1558), among others. However, Protestant cities were on average more populous than the Catholic ones and the normalization by the size of the urban population allows to account for that. Several big protestant cities had small institutions, e.g. Gdańsk, which deflate our index considerably.

The principle of “*cuius regio, eius religio*,”¹³ enshrined in the Peace of Augsburg (1555), inaugurated a wave of foundations of “Regal Universities,” established by local rulers to reinforce the prestige and autonomy of their territories (Ridder-Symoens 1996, pp. 140-141). As shown in Figure 9b, the number of universities in Protestant regions more than doubled between the mid-1500s and the mid-1600.

While before 1600 Tridentine Germania was more human capital-intensive than Evangelical Germania, after then the situation reversed. The performance of the Austrian Habsburg Lands was overall stationary until the mid-1700s, when the first academies were founded and caused a rise in the index. Such rise brought the region at a higher level, albeit still remaining peripheral in knowledge production if compared to the Northern part of the Holy Roman Empire. Similarly, the foundation of the Bavarian Academy of Sciences in 1759 inaugurated a period of glory for Tridentine Germania.

Our index unveils a significant divergence in human capital intensity between Catholic and Protestant regions. While Evangelical Germania seems to have been more resilient than Tridentine Germania in the aftermath of the Thirty Years’ War, the subsequent glory experienced by the academies in Catholic cities alleviated the divide between the two.

5.5 The Scottish Enlightenment

The Scottish Enlightenment was a period of intense intellectual and cultural development in 18th-century Scotland, spanning approximately 1700 to 1793. It was one of the most influential movements in European history, laying foundations for modern economics, philosophy, sociology, and science. Scottish universities like Edinburgh, Glasgow, and Aberdeen, which had previously been second order, started to focus on critical thinking, empiricism, practical reason, and moral philosophy (Broadie 2001). Hume, Smith, and Reid were the leading figures. Herman (2007) defends the view that the Scottish Enlightenment transformed Scotland into a cultural powerhouse and changed the trajectory of Western thought.

Figure 10 shows the evolution of human capital intensity in Scotland, the English Realms, the the Netherlands, and Scandinavia. It shows that Scotland was modest until very late in our period, when it overtook the Netherlands and Scandinavia and caught up with the

13. Latin for “whose realm, his religion,” granting rulers the right to determine the official religion of their territory.

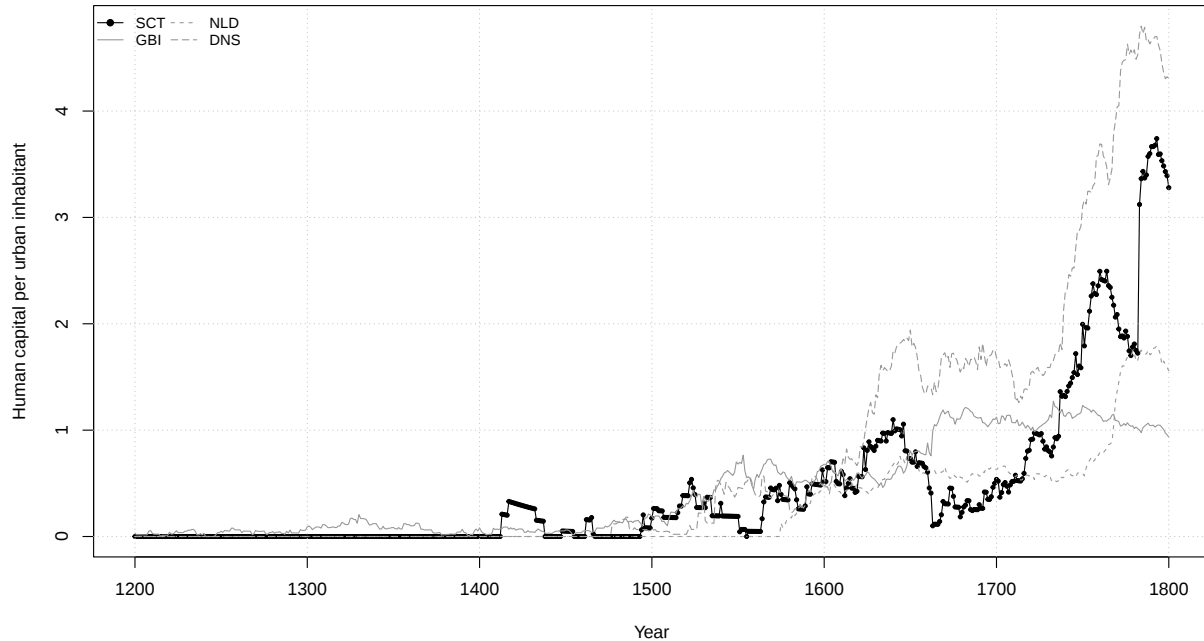


Figure 10: Human capital in Scotland (SCT) compared to other Northern European macro-regions (English Realms (GBI), the the Netherlands (NLD), and Scandinavia (DNS))

English Realms. The time series include here both universities and academies. Academies were important in all four of the plotted regions during this period; for example, The Royal Society of Edinburgh was the institutional heart of scientific and intellectual exchange in the city during the later stages of the Enlightenment.

6 Conclusions

We have presented new data on the evolution of academic human capital in preindustrial Europe based on systematic individual-level data and historically-grounded regional classifications. The patterns we have uncovered point to persistent and meaningful differences in the distribution, organization, and development of scholarly activity across space and time. These regularities suggest that academic human capital might have been not merely a byproduct of broader economic or political transformations but an organized and historically contingent phenomenon worthy of independent analysis.

Crucially, the patterns identified here open a wide range of research directions. Future work could investigate the causal role of academic human capital in regional divergence, examine its responsiveness to institutional and demographic shocks, and explore its interactions

with confessional polarization and the process of modern European political integration. The distinct trajectories of universities and academies invite further studies on their respective functions in knowledge production and diffusion. Lastly, the granular temporal and spatial resolution of our dataset provides a unique empirical foundation for embedding elite human capital more firmly into macroeconomic models of long-run growth.

By illuminating these pathways, our findings encourage a reappraisal of human capital’s historical role, not only as an outcome of development, but as a potential engine of divergence and transformation in its own right.

Acknowledgements

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A Our HCI vs. Other Measures of Human Capital

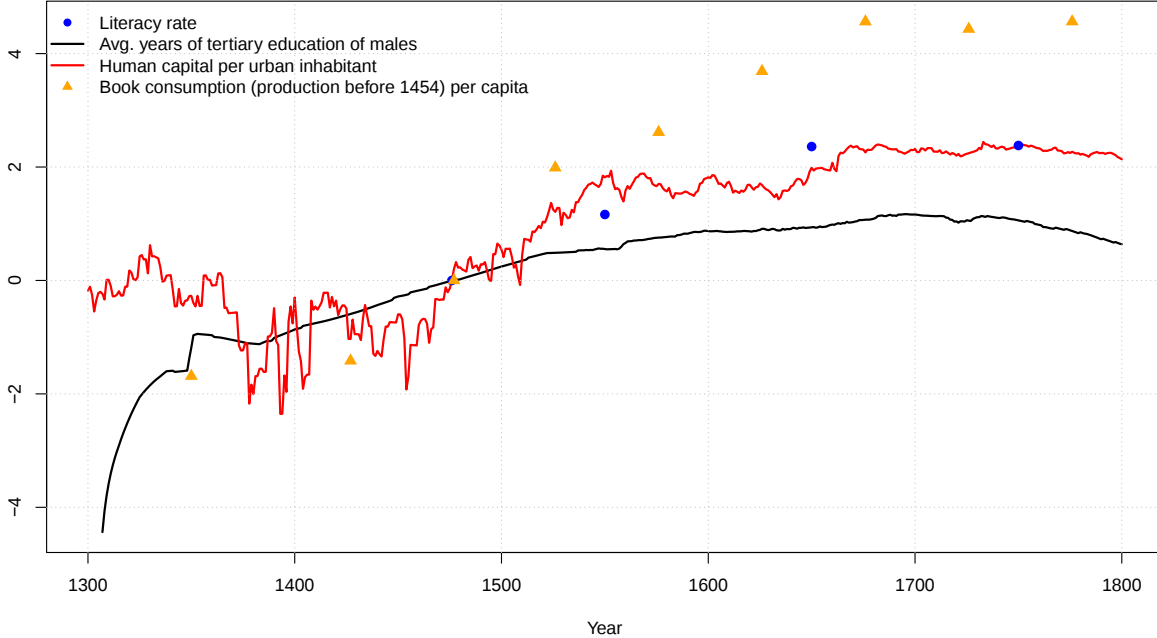


Figure 11: Human capital per urban inhabitant from this study compared with other measures of human capital in Great Britain and Ireland. All indices are in log scale and normalized to 0 in 1476. The literacy rate (blue dots) and book consumption per capita (orange triangles) are taken from Buringh and van Zanden (2009). They refer to book consumption Great Britain (England, Wales, and Scotland) after 1454, and to book production in Great Britain and Ireland before then. Average years of tertiary education of males in England (black line) are taken from de Pleijt (2018) and the data were sent by private correspondence.

B Faded Fame Index

Unlike the human capital index q_i , the faded fame index p_i loads negatively on some of the indicators. To interpret it here, we take the average instead of the sum, and therefore do not normalize it by the urban population. This allows us to determine where and when p_i is typically positive or negative.

Figure 12 shows average p_i of scholars in academies and universities over time. The overall trend is decreasing, which is unsurprising as p_i loads negatively on indicators related to more contemporary measures of notability. Scholars active only in academies have higher p_i than those in universities.

Figure 13 shows the average p_i of scholars in academies and universities over the entire time period by macro-region. The faded fame index p_i is particularly low in the the Nether-

lands, Evangelical Germania, and Scandinavia, perhaps related to their growth in the later years of the period studied.

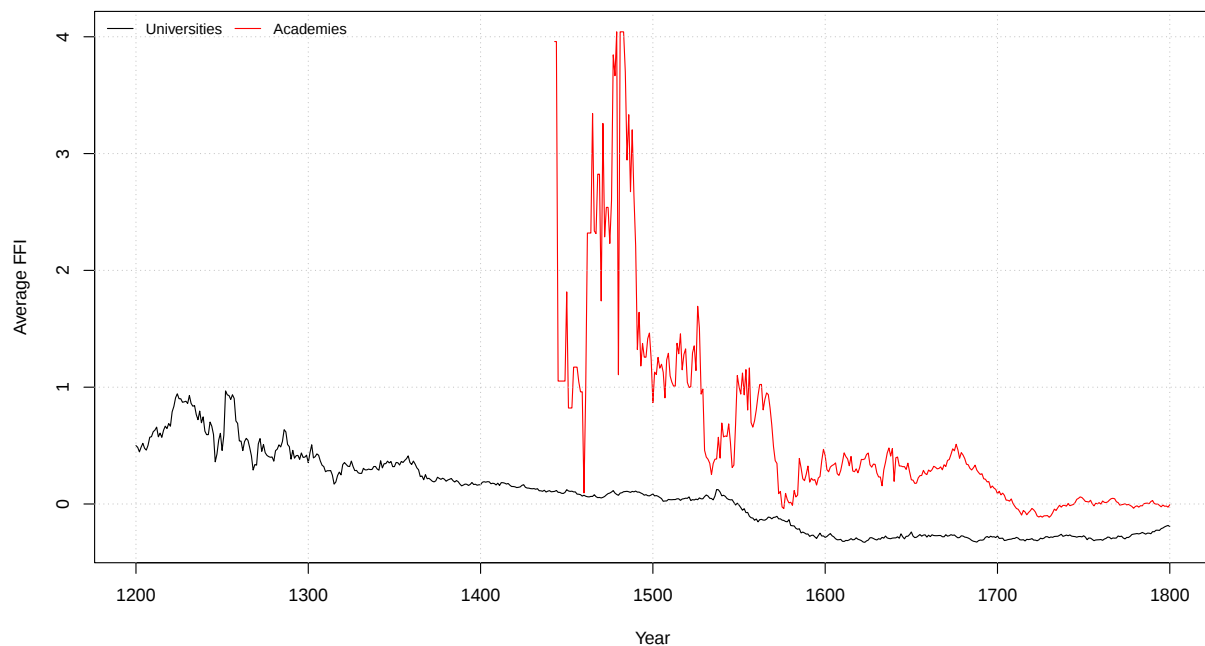


Figure 12: Average p_i over time

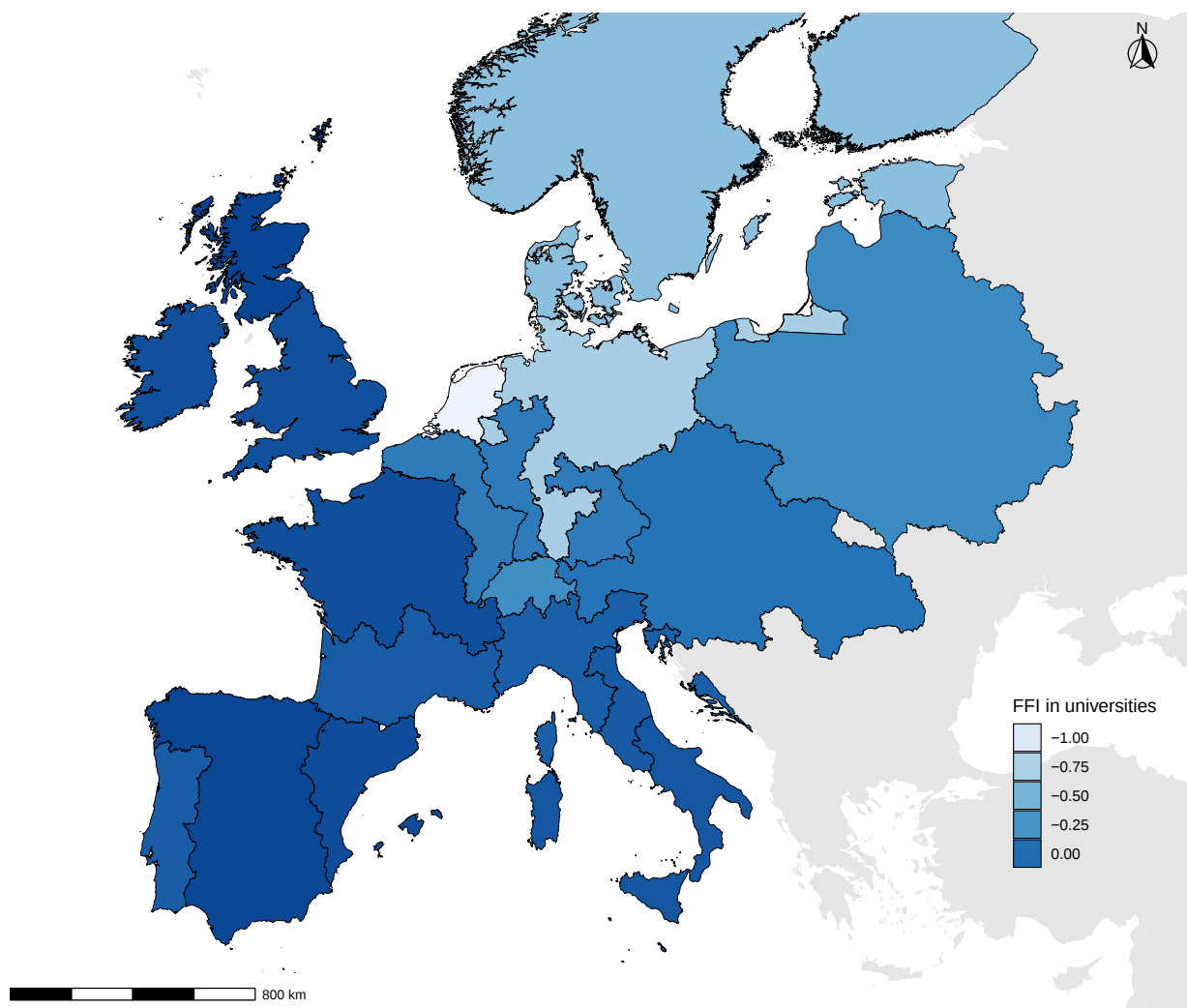


Figure 13: Average p_i in universities by macro-region

C Definition of the Macro-Regions

In addition to using current country borders, we propose an alternative way to aggregate individual universities. We divided Europe into 18 macro-regions. The resulting map is shown in Figure 2. Given the broad historical period under consideration, the boundaries of these regions do not correspond precisely to those of present-day states or historical political entities at any point in time. They suffer from the same issue as the one we face when using modern day countries: the constancy of the borders through time. Nonetheless, our division is more historically relevant than that of modern-day countries. This division was also chosen to facilitate the analysis and interpretation of the data we collected.

To build our reference map, we took 1648 Europe as a starting point—the year of the Peace of Westphalia. This treaty, which ended thirty years of armed conflict across Europe, led to a general redefinition of borders and ushered in a period of relative political and territorial stability in the following decades.

The shape of the regions is constructed by assembling different territorial entities at the NUTS2 and NUTS3 level in their 2026 edition. NUTS stands for the *Nomenclature of Territorial Units for Statistics*, a standardized system of territorial division regulated by the European Union. The NUTS2 level corresponds to administrative units such as the Italian *Regioni* or the Belgian *Provinces*. In some cases, it was necessary to disaggregate to the NUTS3 level to more precisely define borders—for example, Perpignan is included in Castilla rather than Occitania, and Jena belongs to Evangelical Germania instead of Tridentine Germania. Since our region of interest includes parts of present-day Belarus and Ukraine, where no NUTS classification exists, we used their administrative division at the oblast level from [Natural Earth \(2023\)](#).

The English Realms and Scotland. A first significant case is that of the United Kingdom, where a clear distinction emerges between Scotland and, on the other hand, England and Ireland. We call the latter the “English Realms,” as the Kingdoms of Ireland and England were held in personal union by the Kings of England for most of the period. Scotland hosted five institutions (four universities and one academy), while the rest of the country—including Ireland—had four universities (including the Gresham College in London) and six academies. The differences were not only quantitative but also qualitative, concerning the educations on offer. Scottish universities stood out for a more modern and diversified curriculum that systematically included natural sciences, medicine, and moral philosophy. By contrast, universities in England and Ireland maintained a strong focus on the liberal arts (rhetoric, logic, moral philosophy, and theology) well into the eighteenth century, with limited specialization and a marginal presence of scientific or professional disciplines such as medicine and law (Rüegg 2003). Moreover, until the late eighteenth century, distinct faculties in the modern sense did not exist (Brockliss 2016, p. 23). From the late seventeenth century onward, the limited attention paid by universities to scientific disciplines was progressively offset by the development of external academies, such as the Royal Society (founded in 1660), which played a crucial role in the promotion of modern science in England (Hunter 1989).

Levante and Castilla. In Spain, although there was a relatively high number of universities, scientific academies remained few and highly centralized. The scarcity of such academies reflects the Spanish state’s tendency to directly oversee scientific and cultural institutions, while the universities remained tied to traditional structures and did not encourage

the formation of autonomous academic networks. It was only in the late eighteenth century that local academies began to emerge, though they lacked the stability and recognition of their European counterparts (Clément 1994). The universities are mainly concentrated in the territories of the Crown of Castile (Levante), which constitute the first macro-region, and in those of the Crown of Aragon (Castilla). Levante is a term (from Latin *levare*, “to rise”), referring to the eastern coast of Spain. The decision to divide Spain into two macro-regions is also based on linguistic grounds: in a large part of the territories belonging to the Crown of Aragon the official language was Catalan. This second macro-region largely corresponds to the historical area of Catalan language diffusion (Moran and Ocerinjauregui 2004).

The University of Perpignan became part of the Kingdom of France following the Treaty of the Pyrenees (1659); however, Catalan continued to be spoken in those territories. As Marley (1999) notes, it was not until the 19th–20th centuries that the process of Francization was completed and extended to the entire population.¹⁴

Portugal. We decided to treat neighboring Portugal separately, even though it had a relatively small number of institutions and its human capital was not particularly significant. This choice is justified by the fact that Portugal maintained substantial continuity as an independent kingdom throughout the period, with only a brief interlude between 1580 and 1640 when it was part of the Iberian Union under Spanish Habsburg rule (Disney 2009). Therefore, Portugal is characterized by its distinct political and linguistic independence from the rest of the Iberian Peninsula.

Francia and Occitania. For France, we took into account the historical linguistic line that divides the country in two. This line helped us more precisely define the boundaries of the two regions we considered, while also ensuring a good balance in terms of the institutions present in each. We call the Northern part “Francia” (early medieval core of the Frankish kingdom) and the Southern part “Occitania.” During the period under consideration, the North was more densely populated, economically integrated with the monarchy and traditional institutions, and remained largely Catholic. Paris, in particular, was one of the main centers of the Catholic League (Holt 1995). In contrast, the South of France, more rural and characterized by greater local autonomy, was more receptive to the ideas of the Reformation. Numerous urban centers and members of the local nobility embraced Protestantism, and cities such as La Rochelle, Montauban, Nîmes, Castres, and Alès became genuine Huguenot strongholds (Félice 1853). In terms of universities, our divide also fits well with Grendler (2004) view that universities in the North of Europe (including North of France) differed greatly from those in the South in their teaching and organization. In general, during the first period of their existence and throughout the Renaissance, Italian, Spanish and Occitan universities favored the teaching of law and medicine, while northern universities favored the teaching of theology and the arts.

Northern Italy, Central Italy, and Southern Italy. The Italian peninsula underwent continuous and profound changes throughout the period under consideration. Pre-

14. As Marley (1999, p. 158) observes, Catalan—a language already standardized and widely used during Catalonia’s golden age (1276–1344)—gradually lost its status following the union with the Crown of Castile (1412) and the subsequent rise of Castilian, leading to a situation of diglossia among the ruling classes. After the Treaty of the Pyrenees (1659), the Catalan-speaking regions annexed to France (Roussillon, Conflent, and Cerdagne) underwent a process of Francization, which began with the elites, gradually extended to the middle classes, and finally encompassed the entire population during the 19th and 20th centuries.

cisely due to its complexity and the variety of sociopolitical situations, the Italian peninsula witnessed the emergence of numerous academic institutions. Alongside the universities—established to meet the growing need for a competent ruling class driven by the demographic expansion of urban centers—literary and scientific academies flourished, especially in the early stages, and for a long time remained an almost exclusively Italian phenomenon (Maylender 1930). In this context, the decision to divide the peninsula into macro-regions required particular attention on our part.

A first major macro-region historically corresponds to the territories of the Kingdom of Naples, the Kingdom of Sicily, and the Kingdom of Sardinia (Southern Italy). The combination of these domains granted the Spanish monarchy a position of predominance over approximately half of today’s Italian territory.¹⁵

A second macro-region corresponds to the territories of the Papal States (Central Italy). The universities in this area played a significant role in the cultural development of Europe, particularly in the fields of theology and law. Among them, the University of Bologna stands out as one of the earliest and most important centers for legal studies, over which the papacy exercised strong influence (de la Croix and Vitale 2021), particularly in the appointment of professors and the direction of doctrinal teaching. Similarly, the University of Perugia was closely tied to the Roman Curia (Manfredini and Vitale 2024). The University of Rome “La Sapienza,” founded in 1303 by Boniface VIII, was under direct papal control from the outset: its professors were appointed or approved by the Curia, and the university served as a privileged center for the training of clergy and ecclesiastical jurists.

A third region includes Northern Italy and Tuscany (Northern Italy). Here, the landscape appears fragmented, marked by a pronounced cultural, social, and political heterogeneity. In this area, we have included the Republic of Venice with part of its possessions in Istria and Dalmatia. The independence and autonomy of the Venetian Republic from the major European powers—which succeeded in asserting their control elsewhere—are also reflected in the only university that developed in these northeastern regions: the University of Padua. The university distinguished itself by its relative autonomy, which attracted numerous intellectuals, especially during the Renaissance. The region of Nice was assigned to Northern Italy because it remained under Piedmontese rule and institutional influence until its cession to France following the Treaties of Plombières (1858).

The division into three macro-regions proves particularly useful for analyzing the emergence and development of universities and intellectual academies in light of the cultural and political differences. In the south, Spanish rule was marked by a centralized and generally restrictive policy; in the Papal States, moral and ideological control was especially pervasive; while the north functioned as a crossroads of exchange, serving both as a gateway for new ideas and a channel for the transmission of erudite traditions from the past.

The the Netherlands. In the vast territory of north-central Europe, we identified several macro-regions. One such area corresponds to the Dutch Republic, a territorial entity formed as a confederation of seven states that existed from 1579 to 1795. In this region, as many as seven universities and four scientific academies were established. Although not all of

15. The Kingdoms of Naples (1504–1713), Sicily (1500–1713), and Sardinia (1516–1713), as well as the Duchy of Milan (1535–1706) and the State of the Presidi (1557–1707) along the Tuscan Maremma coast, were under the direct control of the Spanish Crown.

them enjoyed long-lasting success—the University of Nijmegen, for instance, was founded in 1655 and closed already in 1672—these institutions nevertheless served as important centers for the production and dissemination of knowledge, attracting prominent European scholars. Indeed, the seventeenth century was the golden age of Dutch history: despite the ongoing war of independence against Spain, the Republic launched an ambitious colonial and commercial expansion, which would later be curtailed by a series of conflicts with England, marking the beginning of a rapid decline. Another distinctive feature of this group of universities is their confessional affiliation with Protestantism, particularly its Calvinist branch. Finally, we opted for the label “Netherlands”; even though the modern state of the Netherlands only emerged in the 19th century, the term Netherlands (or its Latin form *Nederlandia*) was used earlier to refer to the northern part of the Low Countries.

The Lotharingian corridor. The adjacent macro-region includes the territories of the Spanish Netherlands, the present-day French region of Nord-Pas-de-Calais, Eastern Lorraine, Alsace, Franche-Comté, and the southern part of the province of Limburg. The aim of this delineation was to reconstruct the middle zone between France and Germany, often contested or bridging both powers, and which belonged to the old kingdom of Lotharingia. It also corresponds to the so-called Spanish Road—the overland route established by the Spanish monarchy during the reign of Philip II (1556–1598) to transfer troops and military supplies from Spain to the Low Countries through Habsburg-controlled territories, particularly during the Eighty Years’ War (1568–1648). This logistical corridor was essential for maintaining communication with the northern dominions while avoiding the risks posed by English and Dutch naval control. In addition to their shared Catholic background, numerous academic connections can also be observed among the universities of the macro-region, which we have therefore chosen to analyze as a single unit. We have also included Maastricht and the southern part of the province of Limburg in this macro-region, since in the period under consideration their political context was defined by the condominium between the Principauté de Liège and the United Provinces. Moreover, their strong Catholic identity links them much more closely to the Lotharingian sphere than to the Calvinist world of the Dutch Republic.

Switzerland. The territories of modern Switzerland form one of the macro-regions analyzed here. Their academic landscape in 1650—the cartographic reference year—was sufficiently rich to capture regional Swiss dynamics with confidence. Seventeenth-century Switzerland housed only one fully fledged university with *ius promovendi* (right to confer degrees): Basel (founded 1460). Around it grew a web of confessionally defined schools—most notably the Academy of Lausanne in the Reformed cantons and Jesuit colleges in the Catholic ones. Protestant institutions trained clergy and canton officials, whereas Catholic elites were typically educated abroad in Jesuit colleges in Italy or southern Germany (Zurbuchen 2011). These establishments were largely cantonal in scope and modest in international reach, though Basel produced scholars of European stature. External models nonetheless shaped them: German-speaking cantons gravitated toward Wittenberg and Heidelberg, while the French-speaking *Pays de Vaud* echoed the French Calvinist emphasis on theology, law, and eloquence (Neumann 2014). The central Alpine cantons (Uri, Schwyz, Obwalden) founded no institutions of their own, entrusting elite education to religious colleges elsewhere.

Evangelical Germania and Tridentine Germania. In the case of the Holy Roman Empire, the decision to divide the territory into two macro-regions reflects the need to

capture the deep interrelation between political structure, confessional affiliation, and the organization of knowledge. The Empire was a fragmented reality, composed of a multitude of autonomous political entities—both secular and ecclesiastical—that exercised full sovereignty over educational matters. In this context, universities were founded and supported as instruments of local power and confessional control (Hammerstein 1996), especially in the wake of the Reformation and Counter-Reformation. Our division reflects this configuration, distinguishing a northern region—including, among others, the lands of Hesse, Thuringia, Saxony, Mecklenburg and some territories of Baden-Württemberg and Bavaria—where the universities had become predominantly Protestant by the mid-sixteenth century, and a central-southern region dominated by Catholicism, though home to both Catholic and Protestant institutions. The regions of Gdańsk (Danzig) and Kaliningrad (Königsberg) were also assigned to the Protestant group, reflecting their historically strong Lutheran confession, German linguistic profile, and close integration into the northern German cultural and academic sphere. In this part of the Holy Roman Empire, there were indeed territories with a mixed confessional composition, where urban centers tended to be predominantly Protestant while the countryside remained largely Catholic. The universities followed this pattern as well.¹⁶ This geographical dichotomy mirrors the logic of the confessional principalities that emerged during the sixteenth and seventeenth centuries, in which the religious identity of rulers translated into coherent educational policies, supported by reforms, funding, and direct oversight. In the Protestant region, Evangelical Germania, the early adoption of the Reformation led to more direct control of academic institutions by local rulers, while in the mixed region the presence of religious orders—especially the Jesuits—strongly shaped the character of Catholic universities (Hammerstein 1996). This evolution was also driven on the Protestant side by the role of Martin Luther, who—supported by his own sovereign—explicitly tied his teachings to specific territories within the Empire, reinforcing the broader trend toward the territorialization of both religion and education. His appeal to princes to found and supervise schools and universities consolidated the long-term jurisdiction of secular authorities over educational matters, a practice that soon extended to Catholic territories as well. Universities, as privileged sites of intellectual inquiry and scientific debate, held a position of considerable importance in the construction of political legitimacy and prestige. Often seen as the pride and joy of a prince, they were promoted, reformed, and supported at the initiative of the courts, which recognized their strategic value. The support of the ruler was crucial: academic reforms depended on it, and a lack of political interest could lead to rapid decline, as seen after 1700 in Heidelberg, Freiburg, and Wittenberg. The link between power and knowledge, therefore, was not only ideological or confessional, but also profoundly institutional.

The label “Tridentine” refers to the Council of Trent (1545–1563), the driving force behind the Catholic Counter-Reformation, and evokes a Catholic identity marked by the Jesuits, Baroque piety, and Roman orthodoxy.

The Austrian Habsburg Lands. A further macro-region considered brings together eleven universities located in territories historically linked to the Habsburg monarchy: Austria (Vienna, Graz, Innsbruck, Linz, Salzburg), Bohemia and Moravia (Prague, Olomouc),

16. Some universities in this northern zone had originally been founded as Catholic institutions—such as Erfurt (1379), Leipzig (1409), Wittenberg (1502), Rostock (1419), and Greifswald (1456)—but shifted to Protestant control during the Reformation. Others, like Marburg (1527) and Jena (1558), were established directly as Protestant universities.

Silesia and Slovakia (Trnava), Hungary (Budapest), and Bavaria (Ingolstadt). These lands were bound together by the political and cultural influence of the Habsburg Crown and by an early process of confessional centralization, particularly through Jesuit activity (Grendler 2019). Although marked by regional diversity, the universities were largely shaped by elites of German cultural orientation aligned with Habsburg policies. Institutions such as Olomouc and Graz became strongholds of Catholic education, while Vienna emerged as a center of university reform already under Maria Theresa, anticipating state models of higher education. Despite their specific contexts, these universities shared a curriculum centered on the liberal arts and theology, with limited inclusion of scientific disciplines until the reforms of the late eighteenth century.

Poland-Lithuania. Another identified macro-region includes nine universities and two academies active in the territories of the Polish-Lithuanian Commonwealth, which until the end of the eighteenth century constituted an autonomous political entity with a culturally complex structure. The identified institutions are mainly distributed across present-day Poland (Kraków, Poznań, Warsaw, Wrocław, Braniewo), Lithuania (Vilnius), and Western Ukraine (Lwów, Polotsk). Among these, the University of Kraków (founded in 1364, refounded in 1400) played a leading role as a center for the teaching of liberal arts and theology, establishing itself as one of the main universities of Central Europe. Vilnius, founded by the Jesuits in 1579, represents the educational expansion of the Society towards the east, while other centers such as Braniewo and Polotsk attest to the strong Catholic influence and the educational role of Jesuit missions in border territories (Grendler 2019). The university landscape in the region is characterized by a strong confessional component and an early penetration of Jesuit schooling networks, albeit within a decentralized political context and with limited curricular centralization compared to Western European models. We included Königsberg in Evangelical Germania instead of Poland-Lithuania despite the Duchy of Prussia being, for a while, fiefdom of the Polish-Lithuanian Commonwealth. Königsberg was a major German cultural center and the Duchy was held in personal union by the Electors of Brandenburg. On the other hand, we include Royal Prussia in Poland-Lithuania as it was fully integrated into the Commonwealth.

Scandinavia. Finally, the macro-region that includes the Kingdom of Denmark-Norway and the Kingdom of Sweden (Scandinavia) has been defined to group universities and territories that, following the Protestant Reformation, were part of a political-cultural context closely linked to the Scandinavian monarchies. Despite local differences and specific policies of their sovereigns, these universities played a central role in the education of state officials and clergy, establishing a strong connection between the academic world and monarchical power. Turku (Åbo), the easternmost node of this network, also extended Swedish cultural and academic influence to the shores of the Baltic Sea. We exclude the lands held by Scandinavian monarchs in the Holy Roman Empire, such as Swedish Pomerania and Danish Schwelstig-Holstein, as they remained culturally integrated with their Low German neighbors.

D Institutions by Macro-Regions

Name	Start	End	Place	Univ.	Acad
English Realms					
University of Oxford	1200		Oxford	1	0
University of Cambridge	1209		Cambridge	1	0
University of Dublin	1592		Dublin	1	0
Gresham College	1596		London	1	0
St Patrick's College, Maynooth	1795		Maynooth	1	0
Oxford Philosophical Society	1651	1690	Oxford	0	1
Royal Society of London	1660		London	0	1
Royal Dublin Society	1683		Dublin	0	1
Society of Antiquaries of London	1707		London	0	1
Philosophical Society	1710	1770	Spalding	0	1
Botanical Society	1721	1726	London	0	1
Lunar Society of Birmingham	1766	1791	Birmingham	0	1
Literary and philosophical society	1781		Manchester	0	1
Derby Philosophical Society	1783	1858	Derby	0	1
Royal Irish Academy	1785		Dublin	0	1
The Linnean Society of London	1788		London	0	1
Scotland					
University of St Andrews	1411		Saint Andrews	1	0
University of Glasgow	1451		Glasgow	1	0
University of Aberdeen (King's College)	1495		Aberdeen	1	0
University of Edinburgh	1582		Edinburgh	1	0
University of Aberdeen (Marischal)	1593		Aberdeen	1	0
Royal Society of Edinburgh	1731		Edinburgh	0	1
Castilla					
University of Palencia	1208	1264	Palencia	1	0
University of Salamanca	1218		Salamanca	1	0
University of Valladolid	1280		Valladolid	1	0
University of Sigüenza	1489	1807	Sigüenza	1	0
University of Alcalá	1499		Alcalá de Henares	1	0
Casa de la Contratación	1503	1717	Sevilla	1	0
University of Sevilla	1505		Sevilla	1	0
University of Toledo	1521	1807	Toledo	1	0
University of Santiago de C.	1526		Santiago de Compostela	1	0
University of Granada	1531		Granada	1	0
University of Oñate	1540	1807	Oñate	1	0
University of Baeza	1542	1807	Baeza	1	0
University of Osuna	1548	1807	Osuna	1	0
University of Saint Catherine	1555	1807	Burgo de Osma	1	0
Imperial College of Madrid	1560	1767	Madrid	1	0
University of Oviedo	1574		Oviedo	1	0
University of Ávila	1576	1787	Ávila	1	0
School of Mathematics	1582	1625	Madrid	1	0
Royal Spanish Academy	1713		Madrid	0	1

Name	Start	End	Place	Univ.	Acad
Levante					
University of Lérida	1300	1717	Lérida	1	0
Majorcan cartographic school	1330	1600	Palma	1	0
University of Perpignan	1350	1793	Perpignan	1	0
University of Huesca	1354		Huesca	1	0
University of Barcelona	1450	1714	Barcelona	1	0
University of Zaragoza	1474		Zaragoza	1	0
University of Mallorca	1483	1718	Palma	1	0
University of Valencia	1500		Valencia	1	0
Belen College	1544	1767	Barcelona	1	0
University of Gandia	1547	1767	Gandia	1	0
University of Orihuela	1552	1807	Orihuela	1	0
University of Gerona	1587	1717	Gerona	1	0
University of Vich	1599	1713	Vic	1	0
University of Cervera	1714	1821	Cervera	1	0
Royal Academy of Sciences and Arts	1764		Barcelona	0	1
Portugal					
University of Coimbra	1290		Coimbra	1	0
Armazém da Guiné e Índia	1509	1755	Lisboa	1	0
College of Saint Antony	1553	1759	Lisboa	1	0
University of Évora	1558	1759	Évora	1	0
Royal Academy of Sciences of Lisbon	1783		Lisboa	0	1
Francia					
Cathedral School of Chartres	1000	1190	Chartres	1	0
Cathedral School of Reims	1000	1190	Reims	1	0
Cluny Abbey	1000	1200	Cluny	1	0
Abbey of Our Lady of Bec	1034	1790	Bec-Hellouin	1	0
Cathedral School of Laon	1050	1190	Laon	1	0
University of Paris	1200	1793	Paris	1	0
University of Orléans	1235	1793	Orléans	1	0
University of Angers	1250	1793	Angers	1	0
University of Grenoble	1339	1565	Grenoble	1	0
University of Poitiers	1431	1793	Poitiers	1	0
University of Caen	1432	1793	Caen	1	0
Ducal University of Brittany	1460	1793	Nantes	1	0
University of Bourges	1464	1793	Bourges	1	0
Collège Royal	1530		Paris	1	0
University of Reims	1548	1793	Reims	1	0
Clermont College	1563	1763	Paris	1	0
Academy of Saumur	1596	1685	Saumur	1	0
Academy of Sedan	1599	1681	Sedan	1	0
Henri IV College of La Flèche	1603	1763	La Flèche	1	0
College of the Mount	1609	1763	Caen	1	0

Name	Start	End	Place	Univ.	Acad
Royal College of the Dauphin	1622	1763	Grenoble	1	0
Royal Garden	1635	1793	Paris	1	0
University of Dijon	1722	1792	Dijon	1	0
University of Rennes	1735	1793	Rennes	1	0
French Academy	1635	1793	Paris	0	1
Académie Mersenne	1635	1648	Paris	0	1
Montmor Academy	1653	1664	Paris	0	1
Academy of physics of Caen	1662	1672	Caen	0	1
Academy of inscriptions	1663	1793	Paris	0	1
French Academy of Sciences	1666	1793	Paris	0	1
Academy of Soissons	1674	1793	Soissons	0	1
Academy of Villefranche	1677	1793	Villefranche-sur-Saône	0	1
Academy of Angers	1685	1793	Angers	0	1
Academy of Lyon	1700	1790	Lyon	0	1
Academy of Caen	1705	1793	Caen	0	1
Academy of Dijon	1725	1793	Dijon	0	1
French Academy of Médecine	1731	1793	Paris	0	1
Academy of Belles-Lettres	1732	1793	La Rochelle	0	1
Academy of Rouen	1744	1793	Rouen	0	1
Academy of Auxerre	1749	1772	Auxerre	0	1
Academy of Amiens	1750	1793	Amiens	0	1
Royal Naval Academy of France	1752	1793	Brest	0	1
Academy of Châlons-sur-Marne	1753	1793	Châlons-en-Champagne	0	1
Academic Society	1755	1793	Cherbourg	0	1
French Academy of Agriculture	1761	1793	Paris	0	1
Academy of the Dauphiné	1780	1793	Grenoble	0	1
Academy of Orléans	1781	1793	Orléans	0	1
Society of Emulation of the Ain	1783	1793	Bourg-en-Bresse	0	1
Society of Observers of Man	1799	1804	Paris	0	1
Occitania					
University of Toulouse	1229	1793	Toulouse	1	0
University of Montpellier	1289	1793	Montpellier	1	0
University of Avignon	1303	1793	Avignon	1	0
University of Cahors	1332	1751	Cahors	1	0
University of Aix	1409	1793	Aix-en-Provence	1	0
University of Bordeaux	1441	1793	Bordeaux	1	0
University of Valence	1452	1793	Valence	1	0
University of Nîmes	1539	1663	Nîmes	1	0
College of Tournon	1548	1626	Tournon	1	0
University of Orthez	1566	1620	Orthez	1	0
University of Orange	1583	1793	Orange	1	0
University of Montauban	1598	1659	Montauban	1	0
University of Die	1601	1684	Die	1	0
Royal College Bourbon	1603	1763	Aix-en-Provence	1	0
University of Nîmes	1634	1795	Nîmes	1	0

Name	Start	End	Place	Univ.	Acad
University of Pau	1722	1793	Pau	1	0
Academy of Castres	1648	1670	Castres	0	1
Academy of Arles	1666	1791	Arles	0	1
Academy of Nîmes	1682	1793	Nîmes	0	1
Academy of Montpellier	1706	1793	Montpellier	0	1
Academy of Bordeaux	1712	1793	Bordeaux	0	1
Academy of Pau	1718	1793	Pau	0	1
Academy of Béziers	1723	1793	Béziers	0	1
Academy of Marseille	1726	1793	Marseille	0	1
Academy of Toulouse	1729	1793	Toulouse	0	1
Academy of Fine Letters	1741	1793	Montauban	0	1
Society of Clermont-Ferrand	1747	1793	Clermont-Ferrand	0	1
Academic Society of Agen	1776	1793	Agen	0	1
Academic and Patriotic Society	1784	1793	Valence	0	1
Northern Italy					
University of Modena	1175		Modena	1	0
University of Padua	1222		Padova	1	0
University of Siena	1246		Siena	1	0
University of Florence	1321		Firenze	1	0
University of Pisa	1343		Pisa	1	0
University of Pavia	1361		Pavia	1	0
University of Torino	1404		Torino	1	0
University of Parma	1412		Parma	1	0
University of Genoa	1471		Genova	1	0
College of Brera	1556		Milano	1	0
University of Nice	1559	1720	Nice	1	0
University of Mondovi	1560	1719	Mondovi	1	0
University of Mantua	1625	1771	Mantova	1	0
University of Corte	1765	1768	Corte	1	0
Neoplatonic Florentine Academy	1462	1523	Firenze	0	1
Aldina Academy	1494	1515	Venezia	0	1
Academy of the Intronati	1525		Siena	0	1
Accademia Fiorentina	1540	1783	Firenze	0	1
Academy of the Burning Ones	1540	1545	Padova	0	1
Academy of Domenico Venier	1548	1550	Venezia	0	1
Academy of Concord	1550	1560	Dubrovnik	0	1
Academy of Elevati	1557	1559	Padova	0	1
Venetian Academy	1557	1561	Venezia	0	1
Academy of the Invaghiti	1562	1738	Mantova	0	1
Academy of Animosi	1573	1576	Padova	0	1
Accademia della Crusca	1583		Firenze	0	1
Venetian Academy (Second Academy)	1594	1608	Venezia	0	1
Academy of Ricovrati	1599		Padova	0	1
Academy of the Unknown	1626	1661	Venezia	0	1
Academy of Cimento	1657	1667	Firenze	0	1

Name	Start	End	Place	Univ.	Acad
Academy of Dissonanti	1680		Modena	0	1
Virgilian Academy of Sciences	1686	1797	Mantova	0	1
Academy of Fisiocratici	1690		Siena	0	1
Academy of Botany	1717	1783	Firenze	0	1
Academy of Cortona	1727		Cortona	0	1
Academy of the Planomaci	1740	1772	Venezia	0	1
Academy of the Hypochondriacs	1746	1784	Reggio Emilia	0	1
Royal Academy of Georgofili	1753		Firenze	0	1
Botanical Society of Cortona	1754		Cortona	0	1
Private Society of Turin	1757		Torino	0	1
Academy of Filopatria	1782	1791	Torino	0	1
Italian Society of Sciences	1782	1796	Verona	0	1
Rangonian Academy	1783	1796	Modena	0	1
Academy of Arezzo	1787		Arezzo	0	1
Central Italy					
University of Bologna	1088		Bologna	1	0
Sapienza University of Rome	1303		Roma	1	0
University of Perugia	1308		Perugia	1	0
University of Ferrara	1391		Ferrara	1	0
University of Macerata	1540		Macerata	1	0
Pontifical Gregorian University	1556		Roma	1	0
University of Ancona	1562	1739	Ancona	1	0
University of Fermo	1585		Fermo	1	0
University of Urbino	1671		Urbino	1	0
Pomponio's Accademia Romana	1457	1466	Roma	0	1
Academy of the Wine-growers	1530	1538	Roma	0	1
Academy of Virtue	1532	1545	Roma	0	1
Academi of Elevati	1540	1541	Ferrara	0	1
Academy of Sdegnati	1541	1545	Roma	0	1
Bocchian Academy	1546	1562	Bologna	0	1
Academy of Filareti	1554	1563	Ferrara	0	1
Academy of the Insensati	1561	1725	Perugia	0	1
Vatican Nights Academy	1562	1565	Roma	0	1
Academy of the Confused	1570	1575	Bologna	0	1
Academy of Catenati	1574		Macerata	0	1
Academy of Gelati	1588	1799	Bologna	0	1
Nights Academy	1590	1663	Bologna	0	1
Parthenian Academy	1594	1639	Roma	0	1
Lincean Academy	1603	1630	Roma	0	1
Academy of the Humorists	1603	1670	Roma	0	1
Academy of the Traccia	1665	1667	Bologna	0	1
Academy of Physics and Mathematics	1677	1698	Roma	0	1
Academy of Dogmi	1694	1695	Roma	0	1
Academy of Sciences of Bologna	1714	1804	Bologna	0	1

Name	Start	End	Place	Univ.	Acad
Southern Italy					
University of Naples Federico II	1224		Napoli	1	0
University of Salerno	1231	1811	Salerno	1	0
University of Catania	1444		Catania	1	0
University of Messina	1548	1678	Messina	1	0
University of Palermo	1578		Palermo	1	0
Jesuit College of Malta	1592		Valletta	1	0
University of Cagliari	1606		Cagliari	1	0
University of Sassari	1617		Sassari	1	0
University of Altamura	1748	1799	Altamura	1	0
Pontanian Academy	1443	1542	Napoli	0	1
Martiranian Academy	1530	1555	Napoli	0	1
Academy of Incogniti	1546	1548	Napoli	0	1
Academy of Svegliati (Awake)	1560	1593	Napoli	0	1
Academy of the Idle	1611	1673	Napoli	0	1
Academy of Investiganti	1650	1737	Napoli	0	1
Boreliana Academy	1673	1720	Palmi	0	1
Palermitan Academy	1718		Palermo	0	1
Peloritan Academy of the Perilous	1728		Messina	0	1
Academy of the Cratilid Fishermen	1756	1784	Cosenza	0	1
Royal Academy of Sciences	1778		Napoli	0	1
the Netherlands					
Leiden University	1575		Leiden	1	0
University of Franeker	1585	1811	Franeker	1	0
University of Groningen	1612		Groningen	1	0
Athenaeum Illustre of Amsterdam	1632	1877	Amsterdam	1	0
Utrecht University	1636		Utrecht	1	0
University of Harderwijk	1647	1811	Harderwijk	1	0
Nijmegen University	1655	1679	Nijmegen	1	0
Holland Society of Sciences	1752	1804	Haarlem	0	1
Royal Zeeland Scientific Society	1769		Vlissingen	0	1
Batavian Society for Experim. Philosophy	1769		Rotterdam	0	1
Utrecht Society of Arts and Sciences	1773		Utrecht	0	1
Teylers Second Society	1778		Haarlem	0	1
Lotharingian corridor					
Cathedral School of Liège	1000	1230	Liège	1	0
University of Dole	1422	1691	Dole	1	0
University of Louvain	1425	1797	Leuven	1	0
University of Strasbourg	1523	1792	Strasbourg	1	0
Jesuit College of Louvain	1542	1773	Leuven	1	0
University of Douai	1559	1793	Douai	1	0
University of Pont-à-Mousson	1572	1768	Pont-à-Mousson	1	0
University of Molsheim	1617	1792	Molsheim	1	0

Name	Start	End	Place	Univ.	Acad
University of Besaçon	1691	1793	Besançon	1	0
University of Nancy	1768	1793	Nancy	1	0
Gymnasium of the Vosges	1500	1520	Saint-Dié	0	1
Royal Academy of Arras	1737	1793	Arras	0	1
Royal Society of Sciences of Nancy	1750	1793	Nancy	0	1
Academy of Sciences of Besançon	1752	1793	Besançon	0	1
Royal Society of Sciences and Arts	1757	1793	Metz	0	1
Imperial and Royal Academy of Science	1772	1794	Bruxelles	0	1
Switzerland					
Saint Gallen Abbey	1000	1076	St Gallen	1	0
University of Basel	1460		Basel	1	0
Collegium Carolinum	1525		Zurich	1	0
University of Bern	1528		Bern	1	0
University of Lausanne	1537		Lausanne	1	0
University of Genève	1559		Genève	1	0
Society of Natural Scientists	1746		Zürich	0	1
Society of Physical Sciences	1783	1790	Lausanne	0	1
Evangelical Germania					
Leipzig University	1409		Leipzig	1	0
University of Rostock	1419		Rostock	1	0
University of Greifswald	1456		Greifswald	1	0
University of Tübingen	1476		Tübingen	1	0
University of Wittenberg	1502	1813	Wittenberg	1	0
Viadrina European University	1506	1811	Frankfurt Oder	1	0
University of Marburg	1527		Marburg	1	0
University of Königsberg	1544		Kaliningrad	1	0
University of Jena	1558		Jena	1	0
Academic Gymnasium Danzig	1558		Gdańsk	1	0
University of Helmstedt	1575	1809	Helmstedt	1	0
University of Altdorf	1578	1809	Altdorf	1	0
Herborn Academy	1584	1817	Herborn	1	0
University of Giessen	1607		Giessen	1	0
University of Rinteln	1620	1809	Rinteln	1	0
University of Kiel	1652		Kiel	1	0
University of Halle	1694	1817	Halle	1	0
Carolinum	1709	1785	Kassel	1	0
University of Göttingen	1734		Göttingen	1	0
University of Erlangen	1742		Erlangen	1	0
University of Technology	1745		Braunschweig	1	0
University of Butzow	1760	1789	Butzow	1	0
University of Mining and Technology	1765		Freiberg	1	0
Academy of Sciences Leopoldina	1652		Halle	0	1
Royal Prussian Academy of Sciences	1700		Berlin	0	1
Danzig Research Society	1743	1936	Gdańsk	0	1

Name	Start	End	Place	Univ.	Acad
Academy of Sciences and Humanities	1752		Göttingen	0	1
Jablonowski Society of Sciences	1768		Leipzig	0	1
Society of Friends of Natural Science	1773		Berlin	0	1
Patriotic Society of Hesse-Homburg	1775	1781	Bad-Homburg	0	1
Upper Lusatian Society of Sciences	1779		Görlitz	0	1
Society of Friends of Natural Science	1779		Halle	0	1
Karl's High School	1781	1794	Stuttgart	1	0
Societas Physica	1793	1850	Jena	0	1
Tridentine Germania					
Reichenau Abbey	1000	1200	Insel-Reichenau	1	0
University of Erfurt	1379	1816	Erfurt	1	0
Heidelberg University	1386		Heidelberg	1	0
University of Cologne	1388	1798	Köln	1	0
University of Würzburg	1402		Würzburg	1	0
University of Trier	1454	1798	Trier	1	0
University of Freiburg	1457		Freiburg-im-Breisgau	1	0
University of Ingolstadt	1459	1800	Ingolstadt	1	0
University of Mainz	1476	1792	Mainz	1	0
University of Dillingen	1553	1803	Dillingen	1	0
University of Paderbon	1614	1818	Paderborn	1	0
University of Münster	1622		Münster	1	0
University of Bamberg	1648	1803	Bamberg	1	0
University of Duisburg	1654	1804	Duisburg	1	0
University of Fulda	1732	1803	Fulda	1	0
University of Bonn	1777	1798	Bonn	1	0
Rhenan Literary Sodality	1491	1517	Heidelberg	0	1
Cosmographical Society	1747	1760	Nürnberg	0	1
Academy of Sciences of Mainz	1754		Erfurt	0	1
Bavarian Academy of Sciences	1759		München	0	1
Palatine Academy of Sciences	1763	1795	Mannheim	0	1
Austrian Habsburg Lands					
University of Prague	1348		Praha	1	0
University of Vienna	1365		Wien	1	0
University of Buda	1395	1460	Budapest	1	0
University of Bratislava	1465	1492	Bratislava	1	0
University of Olomouc	1570	1778	Olomouc	1	0
College of Brno	1578	1773	Brno	1	0
University of Graz	1585		Graz	1	0
University of Salzburg	1620	1810	Salzburg	1	0
University of Trnava	1635		Trnava	1	0
University of Kassa	1657	1773	Košice	1	0
Evangelical College of Prešov	1665		Prešov	1	0
University of Innsbruck	1668		Innsbruck	1	0
Jesuit College of Linz	1674	1773	Linz	1	0

Name	Start	End	Place	Univ.	Acad
Leopoldina University of Breslau	1702		Wroclaw	1	0
The Society of Anonymous Scholars	1747	1751	Olomouc	0	1
Pressburg Society of Friends	1752	1763	Bratislava	0	1
Academy of Agiati	1752		Rovereto	0	1
Royal Bohemian Society of Sciences	1769		Praha	0	1
Poland-Lithuania					
Jagiellonian University	1364		Kraków	1	0
Lubrański Academy	1519	1780	Poznań	1	0
Jesuit College of Braniewo	1568	1773	Braniewo	1	0
University of Vilnius	1578	1831	Vilnius	1	0
Jesuit College in Polotsk	1580	1820	Polotsk	1	0
Zamojski Academy	1594	1784	Zamość	1	0
Jesuit College of Warsaw	1598	1773	Warsaw	1	0
Jesuit College of Poznań	1611	1780	Poznań	1	0
University of Lwow	1661	1803	Lwow	1	0
Collegium Nobilium (Warsaw)	1740	1832	Warsaw	1	0
Society of Friends of Sciences	1800	1832	Warsaw	0	1
Scandinavia					
University of Copenhagen	1475		København	1	0
Uppsala University	1477		Uppsala	1	0
Sorø Academy	1586		Sorø	1	0
University of Tartu	1632	1710	Tartu	1	0
Åbo Akademi University	1640	1828	Turku	1	0
University of Lund	1666		Lund	1	0
Royal Society of Sciences in Uppsala	1710		Uppsala	0	1
Royal Swedish Academy of Sciences	1739		Stockholm	0	1
Royal Danish Science Society	1742		Kobenhavn	0	1
Cosmographic Society	1758	1824	Uppsala	0	1
Royal Norwegian Society of Sciences	1766		Trondheim	0	1
Royal Society of Arts and Sciences	1778		Göteborg	0	1
Royal Physiographic Society in Lund	1778		Lund	0	1

E Files available for download

Available from: <https://perso.uclouvain.be/david.delacroix/appendix/cdmv-macrodata.zip>

Shapefiles:

macroregions-shapefile.dbf
macroregions-shapefile.prj
macroregions-shapefile.shp
macroregions-shapefile.shx

Time-series data:

total-human-capital-universities-by-city.csv
number-of-universities-by-city.csv
total-human-capital-academies-by-city.csv
urban-population-by-city-interpolated.csv
number-of-academies-by-city.csv
total-human-capital-universities-by-macro-region.csv
number-of-universities-by-macro-region.csv
total-human-capital-academies-by-macro-region.csv
number-of-academies-by-macro-region.csv
urban-population-by-macro-region-interpolated.csv
total-human-capital-universities-by-country.csv
number-of-universities-by-country.csv
total-human-capital-academies-by-country.csv
number-of-academies-by-country.csv
urban-population-by-country-interpolated.csv