

Are Scholars' Wages Correlated with their Human Capital?

David de la Croix Frédéric Docquier Alice Fabre Robert Stelter

IRES/LIDAM, UCLouvain Liser (Luxemburg) AMSE (Aix-Marseille) U. Basel

Throughout our project on premodern academia, we use a heuristic human capital index to measure each scholar's quality. This index is built by combining several statistics from individual Wikipedia and Worldcat pages. The question we address here is whether this measure is correlated with the actual wages professors received. This note is a technical appendix to our paper on the academic market (De la Croix et al. 2020) but also has an interest as a stand-alone publication.

There is considerable evidence that compensations for academic contracts went well beyond paid salaries.¹ They included payments from students, *prebends*,² and many forms of in-kind benefits. Yet, it is interesting to examine the relationship between scholars' human capital and existing data on monetary remunerations. Such remunerations have been used by Dittmar (2019) to show that professor salaries increased significantly relative to skilled wages after printing spread, with science professors benefiting from the largest salary increases. In the two sections below, we first review the available data on salaries, and argue that such data are imperfect proxies for the overall remuneration for academic services (i.e. a scholar's market value). Keeping in mind such limitations, we then document a positive correlation between monetary income and scholars' human capital.

1 DATA ON SALARIES: AVAILABILITY AND RELEVANCE

Data availability. – Few data are available on academic scholars' earnings during the Middle Ages and the Early Modern period, Italy being an exception. As early as the 13th century, the competition between Italian cities to attract students generated a demand for renowned academic scholars. This competition encouraged medieval Italian universities to pay high salaries to their faculty members in law and medicine (Verger 1998; Grendler 2002). Furthermore, the need to increase faculty member visibility encouraged Italian universities to publish rather comprehensive lists of professors. These records (*rotuli*) are still relatively well preserved today, and often document – even though not systematically – the salary received by ordinary professors. No such data are available for the myriad of extraordinary professors (Zanetti 1962). In early northern European universities (e.g. Oxford, Paris, or Louvain), the teaching of theology was predominant. Monetary payments came directly from fees paid by students, for which little information has been recorded, or from *prebends* (Verger 1998; Grendler 2002). Furthermore, clergymen were paid little or nothing for their teaching (Post 1932; Paquet 1958).

For the Early Modern period, data on scholars' remuneration remain scarce, even though wage payments by the community or the Prince became the norm in most universities. For the majority of universities, financial records are incomplete or non-existent. Information on wages appears occasionally in deliberations or in dispute settlements (through notarial or trial records, as in the case of French universities for example). In addition to Italian institutions, the universities of Ingolstadt and

1. For the University of Heidelberg, the amount of in-kind salaries are documented for many scholars.

2. A *prebend* is a stipend paid by a cathedral or collegiate church to a clergyman in its chapter.

Basel – for which detailed annual accounts exist for the periods 1472–1676 and 1460–1531, respectively – provide wage data (Rosen 1972; Schrottenberg 1978). In the national accounts documenting the revenues and expenditures of the University of Basel, there is a comprehensive list of salaries, as well as data on the share of expenditures for the university in total expenditures of the city over this period (Rosen 1972).

Relevance. – In addition to the loss/destruction of archives or the absence of systematic recording, the hybrid mode of professor remuneration challenges a systematic use and analysis of salaries. This concerns the definition of a “salary,” as well as direct comparisons between individuals and institutions. Professors were remunerated in a variety of ways:

- A) In monetary form as a fixed wage (like in Pavia for instance, see Zanetti (1962));
- B) Supplemented with fees from students for attending classes and/or taking the exam (for Edinburgh, see Rae (1895));
- C) In kind (rent, various expenses, grain, wine) (see Drüll (1991) for Heidelberg);
- D) In the form of privileges or benefits (see Nadal (1861) for Valence, Evans (1992) for Oxford);
- E) Reputation and prestige, which are difficult to quantify.

Friedrich Spanheim, a well-known theologian, for instance, was paid in guilder, wheat, and wine by the University of Heidelberg (Drüll 1991). In the Scottish system, the salary frequently constituted only a small part of the professor’s emoluments, as reported by Adam Smith (Smith 1776). The greater part came from the fees/dues of students, an incentive mechanism that seemed desirable to him. His regular income at Glasgow University (1751-1763) was estimated by John Rae to have been no more than £170 (£70 maximum for a fixed salary, £100 maximum in fees), plus the free use of a large manse on campus (Rae 1895). Adam Smith left his chair in Glasgow in 1763 to become the itinerant tutor of the young Duke of Buccleugh, with a wage of £300 per year, travel expenses abroad, and a pension of £300 per year for life thereafter. It was not uncommon for an academic career to be a stepping stone to a better paid career, or to be conducted with another parallel activity (lawyer or doctor) or public office. Reputation and prestige were then the best forms of remuneration. As Zanetti (1962) notes for the University of Pavia, it was prestige not fortune that the institution provided.

Another difficulty is the lack of continuity of payments. Wage payments were subject to the hazards of history (the black death, wars, etc.) so that it was not uncommon for payments to be interrupted. The University of Greifswald serves as an example for the unpleasant situation of scholars and universities during the Thirty Years’ War. It was mainly thanks to the commitment of the (remaining) scholars that academic life could be sustained. Already at the beginning of the war, when academic life was unaltered, salaries were not continuously paid. In the second part of the war, the situation deteriorated further (Langer 2011).

2 SALARIES AND HUMAN CAPITAL INDEX

We collected data on the wages paid to professors by some Italian universities (Florence, Padua, Pavia, Perugia, and Pisa), some universities north of the Alps (Basel, Ingolstadt, and Louvain), and, with much more fragmented and scarce data, some southern French universities (Aix, Bordeaux, Montpellier, and Valence). The data are expressed in the local currency and obtained from secondary sources compiled from archival material. We focus on the highest monetary wage of each professor i , and compute the correlation with our index of *notability or human capital* (q_i) within each institution. We split data in short periods of 50 years to mitigate the role of changing prices.

Figure 1 shows the correlation between q_i and salaries by 50-year period between 1350–1400 and 1750–1800. For each period, we select one university with a sufficient number of observations. The

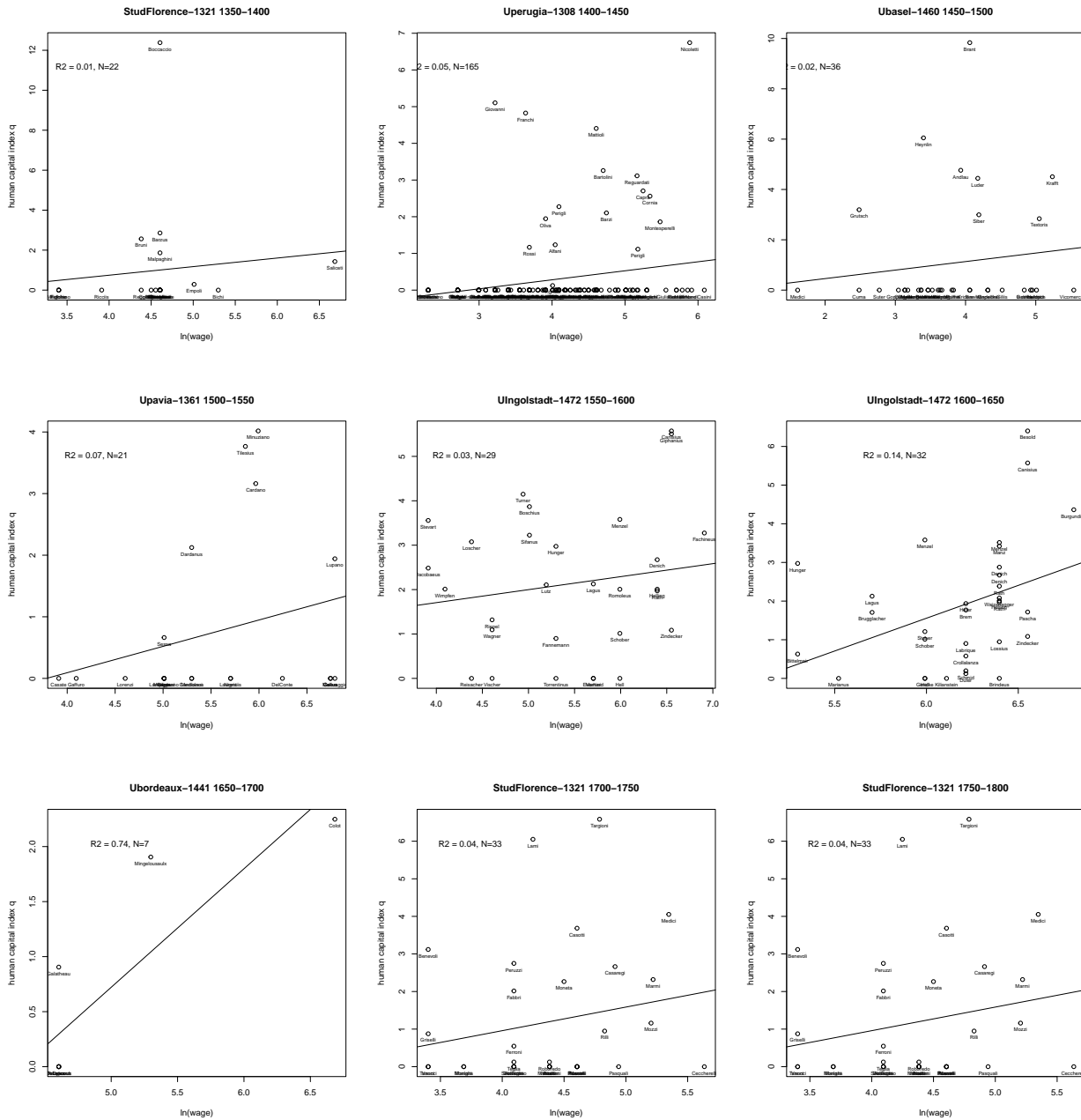


Figure 1: Correlation between monetary salary and q_i for selected universities and periods

University	Period	Obs*	lin. Corr.	Main sources
Uaix-1409	1550-1600	6	–	Belin (1896)
Uaix-1409	1600-1650	4	0.70	Belin (1896)
Ubordeaux-1441	1600-1650	2	–	Pery (1888)
Ubordeaux-1441	1650-1700	7	0.87	Pery (1888)
Ubordeaux-1441	1700-1750	5	0.53	Pery (1888)
Umontpellier-1289	1580-1630	7	0.62	Faucillon (1862)
Uvalence-1452	1500-1550	2	1.00	Nadal (1861)
Ubasel-1460	1450-1500	36	0.14	Rosen (1972)
Ubasel-1460	1500-1550	33	0.20	Rosen (1972)
UIngolstadt-1472	1450-1500	49	-0.17	Schrottenberg (1978)
UIngolstadt-1472	1500-1550	66	0.28	Schrottenberg (1978)
UIngolstadt-1472	1550-1600	29	0.17	Schrottenberg (1978)
UIngolstadt-1472	1600-1650	32	0.37	Schrottenberg (1978)
UIngolstadt-1472	1650-1700	19	0.24	Schrottenberg (1978)
Ulouvain-1425	1425-1450	31	0.50	Paquet (1958)
StudFlorence-1321	1350-1400	22	0.10	Gherardi (1881) and Prezziner (1810)
StudFlorence-1321	1400-1450	25	0.39	Gherardi (1881)
StudFlorence-1321	1700-1750	33	0.20	Prezziner (1810)
StudFlorence-1321	1750-1800	33	0.20	Prezziner (1810)
Upadua-1222	1650-1700	5	0.79	Casellato and Rea (2002)
				Facciolati (1757)
Upadua-1222	1700-1750	14	0.14	Casellato and Rea (2002); Facciolati (1757)
Upadua-1222	1750-1800	11	0.28	Casellato and Rea (2002); Facciolati (1757)
Upavia-1361	1350-1400	4	0.40	Fourquet (1976)
Upavia-1361	1400-1450	3	0.76	Quaresima (2021); Rosso (2012); Zanetti (1962)
Upavia-1361	1450-1500	19	0.20	Quaresima (2021); Rosso (2012); Zanetti (1962)
Upavia-1361	1500-1550	21	0.26	Fazzo (1998); Zanetti (1962)
Uperugia-1308	1400-1450	165	0.22	Quaresima (2021); Zucchini (2008)
Uperugia-1308	1450-1500	76	0.00	Zucchini (2008)
Uperugia-1308	1450-1500	32	0.10	Zucchini (2008)
Upisa-1343	1450-1500	10	0.37	Fabroni (1791); Pesenti (1984); Rosso (2012)

Note: *Number of professors with a known wage

Table 1: Observations, correlations, and sources of salary data

data for other universities with at least some wage data are summarized by period in Table 1, which lists our main data sources.

All panels in Figure 1 show a positive correlation between the recorded monetary salary and the human capital index. This finding is consistent with human capital theory. We identify one exception (the University of Ingolstadt in 1450–1500) with a slightly negative correlation. In some cases, the sample is too small to be conclusive, as documented in Tab. 1. Another challenge arises from the high share of scholars who did not leave a footprint in Wikipedia or Worldcat. The University of Perugia (faculty of law and medicine), before printing, exemplifies such a situation. Despite these limitations, the correlation remains positive, even if not highly significant.

In sum, the available wage data are too fragmented to be included in a systematic econometric analysis spanning centuries and the whole European area, like in De la Croix et al. (2020). In addition, wage data are very likely not representative for the universe of European universities before 1800 and have limited relevance, as explained above. Another issue related to the use of wage data arises due to the timing of information. While our human capital index is an ex-post indicator, salaries were likely linked to scholars' historical notability and seniority. Thus, individuals' earning capacities changed over their life-cycle.

3 FINAL THOUGHTS

Data on professor salaries are available for some premodern universities. Such data are imperfect proxies for a scholar's market value. Still, we document a positive correlation between such salaries and scholars' human capital measured by their publications.

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Homepage: <https://perso.uclouvain.be/david.delacroix/uthc.html>

Twitter: <https://twitter.com/UTHCerc>

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

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REFERENCES

- Belin, Ferdinand. 1896. *Histoire de l'ancienne université de provence, ou histoire de la fameuse univesité d'aix: période. 1409-1679*. Paris: A. Picard et fils.
- Casellato, Sandra, and Luciana Sitran Rea. 2002. *Professori e scienziati a Padova nel settecento*. Treviso: Antilia.
- De la Croix, David, Frédéric Docquier, Alice Fabre, and Robert Stelter. 2020. The Academic Market and the Rise of Universities in Medieval and Early Modern Europe (1000-1800). CEPR Discussion Paper No. DP14509. <https://cepr.org/publications/dp14509>.
- Dittmar, Jeremiah. 2019. The economic origins of modern science: technology, institutions, and markets. London School of Economics.
- Drüll, Dagmar. 1991. *Heidelberger gelehrtenlexikon: 1652–1802*. Berlin, Heidelberg: Springer Berlin Heidelberg.

- Evans, T.A.R. 1992. *College estates and university finances 1350–1500, the history of the university of Oxford*. Chap. 15. Oxford: Oxford University Press.
- Fabroni, Angelo. 1791. *Historiae academiae pisanae*. Bologna: Forni.
- Facciolati, Jacopo. 1757. *Fasti gymnasii Patavini Jacobi Facciolati studio atque opera collecti: fasti gymnasii patavini jacobi facciolati opera collecti ab anno 1517 quo restitutae scholae sunt ad 1756*. Vol. 1. typis Seminarii.
- Faucillon, M. 1862. *Les professeurs de droit civil et canonique de la faculté de Montpellier*. Montpellier: Académie des Sciences.
- Fazzo, Silvia. 1998. Ruoli delle scuole pubbliche a milano nel cinquecento (1518-1563). *Rivista di Storia della Filosofia* (1984-) 53 (4): 799–819.
- Fourquet, Émile. 1976. *Les hommes célèbres et les personnalités marquantes de Franche-Comté: du IVe siècle à nos jours*. Laffitte.
- Gherardi, Alessandro. 1881. *Statuti dell'università e studio fiorentino dell'anno MCCCLXXXVII*. Vol. 9. Forni editore.
- Grendler, Paul F. 2002. *The Universities of the Italian Renaissance*. Baltimore: JHU Press. <https://doi.org/10.2307/3738338>.
- Langer, Herbert. 2011. Die universität Greifswald im dreißigjährigen krieg. *Militär und Gesellschaft in der frühen Neuzeit* 15 (1): 72–97.
- Nadal, Joseph Cyprien. 1861. *Histoire de l'université de Valence, et des autres établissements d'instruction de cette ville, etc*. Valence: Impr. E. Marc Aurel.
- Paquet, Jacques. 1958. *Salaires et prébendes des professeurs de l'université de Louvain au XVe siècle*. Léopoldville: Editions de l'Université.
- Pery, Guillaume Marie Auguste Georges. 1888. *Histoire de la faculté de médecine de Bordeaux et de l'enseignement médical dans cette ville 1441-1888*. Paris: O. Doin.
- Pesenti, Tiziana. 1984. *Professori e promotori di medicina nello studio di Padova dal 1405 al 1509*. Trieste: Lint.
- Post, Gaines. 1932. Masters' salaries and student-fees in the medieval universities. *Speculum* 7 (2): 181–198.
- Prezziner, Giovanni. 1810. *Storia del pubblico studio e delle società scientifiche e letterarie di Firenze*. Firenze: Carli.
- Quaresima, Giulio. 2021. Onomasticon. prosopografia dell'università degli studi di Perugia. <https://onomasticon.unipg.it/onomasticon/home.do>.
- Rae, John. 1895. *Life of Adam Smith*. Macmillan & Company. <https://doi.org/10.2307/2552414>.
- Rosen, Josef. 1972. *Die universität Basel im staatshaushalt 1460 bis 1535: die gehälter der dozenten*. Werner & Bischoff.
- Rosso, Paolo. 2012. Professori, studenti e nationes. *Almum Studium Papiense. Storia dell'Università di Pavia* Vol. I, Dalle origini all'età spagnola (Tomo I, Origini e fondazione dello Studium generale): 383–414.
- Schrottenberg, Hubertus von. 1978. *Wissenschaftsfinanzierung (professorenbesoldung) und das problem der vermögensselbstverwaltung an der universität Ingolstadt (1472-1676)*. Munich: LMU.

- Smith, Adam. 1776. *An inquiry into the nature and causes of the wealth of nations*. London: printed for W. Strahan; / T. Cadell, 1776. <https://doi.org/10.1093/oseo/instance.00043218>.
- Verger, Jacques. 1998. *Les gens de savoir en Europe à la fin du moyen âge*. Paris: Presses universitaires de France.
- Zanetti, Dante. 1962. A l'université de Pavie au XVe siècle : les salaires des professeurs. *Annales ESC* 17 (3): 421–433.
- Zucchini, Stefania. 2008. *Universita e dottori nell'economia del comune di Perugia: i registri dei conservatori della moneta (secoli 14.-15.)* Deputazione di storia patria per l'Umbria.