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Agar Brugiavini

Italian Academics and External Activities: An Ineffective Reform?



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Italian Academics and External Activities: An Ineffective Reform?*

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Abstract

We investigate the impact of a reform introduced in Italy in 2010 (Law 240/2010, known as the Gelmini reform) that aimed to liberalise external economic activities for academics, whose pay had been effectively frozen for the previous seven years. The reform partially liberalised remunerated external activities while simultaneously restructuring university governance to expand institutional autonomy and strengthen central assessment of academic performance. Using administrative data from a representative sample of Italian academics, we compute both extensive (participation) and intensive (incidence relative to salary) margins of external activities. Our main finding is that the reform did not alter the behaviour of Italian academics. Among the possible explanations, we suggest the substantial leeway to restrict academics' remunerated external activities enjoyed by universities' administration under the new governance framework and the interpretations in the Court of Auditors, which also restricted the range of permissible activities.

*The data used in this paper are property of the Italian Social Security Institute (INPS) and are accessible by researchers at the INPS premises through the [VisitInps program](#). The publication of this article was made possible through sponsorships and charitable donations supporting the 'VisitINPS Scholars' program. To access data for replication purposes, researchers should contact the INPS Research department (dcstudiericerche@inps.it). The findings and conclusions expressed are solely those of the author and do not represent the views of INPS or the European Union. This project is also part of the Research on Administrative Data (RAD) Initiative at the Competence Centre on Microeconomic Evaluation (CC-ME) of the Joint Research Centre (JRC).

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1 Introduction

The focus of this paper is the trade-off academics face between engaging in academic activities, and pursuing remunerated external activities in the commercial open market.

We do so by exploiting a policy change that occurred in 2010, when the Italian government introduced substantial changes to the existing legislative framework for the university sector as determined by an earlier Act of Parliament (“DPR 382/1982”). This reform partially liberalised remunerated external activities for Italian academics by removing the requirement to obtain an authorization from their academic institutions before undertaking such activities. The reform also expanded university autonomy, while strengthening the central oversight of academic performance¹. To enhance university accountability, periodic research assessment exercises (VQR) were introduced for the first time through the establishment of a national evaluation agency (ANVUR) [Bratti et al., 2021, ANVUR, 2017]. A tenure track system was introduced for the first time for assistant professors, while academic promotions to associate or full professorial rank were made conditional on possessing a national qualification (*Abilitazione Scientifica Nazionale - ASN*) awarded through a nationwide evaluation process [Ministero dell’Università e della Ricerca, 2026].

This comprehensive reform was implemented during a period of fiscal consolidation following the 2008 sovereign debt crisis. The whole of the Italian public sector was subject to a three-year hiring freeze (2008-2011)², and the university sector in particular experienced substantial funding cuts³. As a consequence of these measures, the number of academic staff (full, associate, and assistant professors) declined from 62,768 in 2008 to 53,793 in 2017⁴.

¹Capano et al. 2016 speak of “steering at a distance”, as an example of New Public Management application to the Italian educational system.

²The hiring freeze introduced by the law 133/2008 consisted of cap to the admissible turn-over: in 2009-2010-2011 the maximal admissible hiring was 20% of retirements, then raised to 50% in 2012. A subsequent law 1/2009 strengthened the restriction, prohibiting any hiring in universities whose labour costs exceeded 90% of government funding.

³Central government funding for universities (FFO, *Fondo di Finanziamento Ordinario*) was progressively reduced by several hundred million euros over time (-39 in 2009, -119 in 2010, -198 in 2011, -276 in 2012, and -314 in 2013 and thereafter). These cuts were further intensified by Law 135/2012, which increased previous reductions (-300 in 2012, -421 in 2013, -538 in 2014, -631 in 2015, and -667 in 2016 and thereafter).

⁴Data obtained from the Ministry of University’s [website](#).

Academic staff pay was affected as well. As in all the public administrations, salaries were frozen from 2010 to 2016 (including seniority and inflation adjustments). When combined with persistent uncertainty over future funding and the historical comparatively low level of academic pay in Italy⁵, these financial constraints may have suggested to the Ministry of University that it could be sensible to allow academics greater access to alternative sources of income, in order to mitigate dissatisfaction within the profession, and possibly the temptation to leave it altogether.

Thanks to a research program managed by INPS (the Italian Social Security Institute), we obtained access to administrative data on earnings for a representative sample (13%) of Italian academics, observed during their entire working life. We could identify different sources of earnings, and we can therefore measure whether the introduction of the reform modified actual behaviour with respect to external activities. We find negligible effects, as if the reform did not change the incentives to time allocation between teaching, research, administration and external activities. The fraction of academics involved remained below 10% and the incidence of earnings from external activities persisted below 30%.

Our analysis of administrative data reveals that the widening of academics' outside options had at best a negligible impact on their external activities. Several explanations may justify this finding. First, institutional conflicts and legal inconsistencies may have played a role, insofar as central government deregulation may have been offset by universities utilising their autonomy by re-instating the constraints removed by the very legislation that had also relaxed the same constraints. On the supply side, academics may have responded also by increasing their effort towards research activities in response to the enhanced importance of measurable research performance for career progression and institutional funding. Indeed, Checchi et al. 2021 show that Italian academics' research

⁵Official data on academic salaries in Italy for the period under consideration are not available. Torrisi 2016, which provides the closest temporal evidence (with data referring to 2013), ranks Italian average gross salaries for full professors as 8th among European countries (after the UK, Ireland, Belgium, the Netherlands, and the Nordic countries) and 10th in the case of associate professors. INOMICS 2015 places Italian academic salaries between those of France and Spain, well below those observed in Germany, the UK, and especially the United States. More recently, Civera et al. 2023 report average gross (net) salaries of \$88,327 (€57,178) for full professors and €60,354 (€40,988) for associate professors, levels that are substantially lower than those in the UK and Germany and broadly in line with French values.

effort increases as the promotion process becomes more objectively based on observable variables such as bibliometric indicators: these two tendencies may simply have cancelled each other out. A third plausible explanation is pure and simple *inertia*: the limited response we find may reflect the pre-existing balance of research and external work for Italian academics.

We contribute to the literature in two main respects. First, we provide evidence on the role of externally remunerated activities for Italian academics, considering both the extensive and intensive margins. Contrary to commonplace perceptions, such activities involve fewer than 5% of the academic workforce. Unfortunately, due to restriction on data availability, we can only perform our analysis at aggregate level, and so we lack detailed information on the individuals who self-select into external activities, and in particular we are unable to identify their individual research track records.⁶

Second, we show that Italian academics appear to be relatively insensitive to monetary incentives. This finding suggests a long-standing continuity in the academic profession. Historically, at the beginning of the twentieth century, much of academia consisted of rentiers: only chair holders (roughly equivalent to today’s full professors) received a salary, and so prior to being appointed to a chair they were carrying out research on a low-pay, or even voluntary basis as appointed “assistants” [Giglioli, 1979]. In the early 1980s, the profession expanded substantially following DPR (Presidential Decree) 382/1980, which reformed hiring procedures and led to a massive intake of new academics.

The paper is organized as follows. In the next Section we provide the institutional framework of the reform. In Section 3 we present our data and in Section 4 our main results. Section 5 concludes.

⁶Such individual-level data are held by the Ministry of University and Research. However, we are not authorised to access them and link them to the INPS’s archive. We are also not allowed to link individuals to their research track records as measured by institutional databases or standard bibliometric sources. We are also unable to identify the relative importance of external activities in different disciplinary areas, as INPS does not hold information on researchers’ academic sector.

2 The Legal Framework

The employment relationship of university professors in Italy is not governed by a contract, but directly by law and regulations. Neither the law nor the regulations define working hours, nor do they specify how much time professors must devote to each of the various activities they are required to perform (teaching, research, administrative duties, dissemination and public engagement).

University professors enjoy broad autonomy in the use of their time: their sole obligation is the provision of 350 hours per year (250 for part-time professors) to teaching and student services. They may choose to focus more on research or on managerial roles (such as head of department, programme director, dean and so on), or on more intensive teaching activity beyond the mandatory minimum.

Regardless of how they allocate their academic working time, university professors may also engage in external activities, including remunerated ones. Not all external activities, however, are compatible with the position of university professor. The Act of Parliament we consider here, Legge 240/2010 (the so-called "*Gelmini reform*", after Minister of Education, University and Research, Mariastella Gelmini under whose watch the Act was approved) establishes that the position of professor is incompatible with the exercise of commerce and industry, while allowing academics who have opted for a part-time regime to undertake freelance professional activity and self-employment.

The Gelmini reform, in essence, liberalised certain activities that had previously been prohibited for full-time professors and in this paper we focus on the two significant innovations introduced which regulated external activities. First, full-time professors were permitted to undertake remunerated activities, such as evaluation and refereeing, occasional lectures and seminars, scientific collaboration and consultancy, scientific and cultural communication and dissemination, publishing and editorial activities. Second, subject to the university's authorisation, they were allowed to undertake teaching, research, and managerial functions at public or private non-profit institutions, provided that no conflicts of interest arose with their home university and that such external ac-

tivities did not affect their teaching, scientific, and managerial duties at the university. This changed the previous regulatory framework (Article 11 of DPR 382/1980), which made the full-time status was incompatible with any professional or external consultancy activity and with any remunerated position. But did these changes introduced by the Gelmini reform change the manner in which Italian academics allocate their time and effort? This is what we aim to ascertain here.

The apparent clarity of the Gelmini reform notwithstanding, the new rules for external activities it introduced were beset from the start by much legal uncertainty and have generated endless implementation problems. In the first place, there was the issue of reconciling this special regime with the general discipline applicable to all public employees, contained in DL (Legislative Decree) 165/2001, which preceded the reform by almost ten years. Its Article 53 had already softened the strict prohibitions set by previous legislation, allowing public employees to perform remunerated external activities subject to authorisation by their administration, and even allowing certain activities (among them collaboration with newspapers or the economic exploitation of intellectual works) to be carried out without such prior authorisation. The Gelmini reform went further and widened these provisions, in particular by including paid consultancy among the permitted activities. These disparate rules kept fuzzy the boundary between activities requiring authorisation and those not requiring it.

The ambiguous interpretation was compounded by the statutory role given to university regulations by Article 53, which explicitly entrusted universities with defining criteria and procedures for granting authorisation. This has resulted in significant differences across institutions in actual practice regarding the precise delineation of activities that academics may carry out freely, those that are prohibited, and those subject to authorisation.⁷

The interpretation of this framework, particularly with respect to consultancy, is offered

⁷As also recognized by the National Anti-Corruption Authority and the Ministry of Universities, “each university has exercised its regulatory authority with regard to the incompatibility regime applicable to academic staff, consequently identifying permitted cases and incompatible cases that differ radically from one institution to another, thereby undermining the necessary uniform application of rules (...) laid down by State law” (see MIUR Guidance Act of 14 May 2018, p. 17, and Update to the 2017 National Anti-Corruption Plan, p. 71).

by the Court of Auditors (*Corte dei Conti*), the body responsible for establishing the liability of public administrators and officials, including university professors, in matters concerning the management of public resources. In its case law, this Court has adopted an extremely restrictive interpretation of consultancy activities⁸.

The tussle between courts and legislator remains open, as evidenced, for example, by the recent DL (Decree-Law) 44/2023. This specifies that consultancy activities are “extra-institutional activities carried out for private or public bodies or for reasons of justice, provided that they are performed without subordination and in the absence of an organisation of means and personnel specifically arranged for their execution”.⁹

3 The Data

Thanks to the Visitinps programme, we obtained access to the administrative archives of the Italian national social security agency (INPS-Istituto Nazionale per la Previdenza Sociale). We made use of the Archivio Estratti Conto (EC hereafter), which contains the working records of a randomly selected sample of the entire working population. This is given by those born in four fixed dates in each month, and contains 13% of the entire population. It includes individuals born in 1950 or later, who therefore were at least 60 in the reform year, and it thus excludes older workers at the end of their careers.¹⁰

We identified university employees by selecting those whose employer is coded as “univer-

⁸According to the judges, consultancy does not substantially differ from scientific collaboration; therefore, when it concerns the resolution of concrete cases, it should be classified as professional activity, which is prohibited for full-time professors (see, *inter alia*, Court of Auditors, First Appeal Section, 17 March 2017, no. 80; Jurisdictional Section of Umbria, 17 June 2019, no. 40; Jurisdictional Section of Emilia-Romagna, 6 November 2017, no. 214; *idem*, 14 April 2015, no. 37), or, at most, when it is of an occasional nature, subject to authorisation (Court of Auditors, Jurisdictional Section of Calabria, 14 October 2020, no. 351; *idem*, 23 November 2020, nos. 388 and 396).

⁹This innovation, however, does not appear to have altered the view of the Court of Auditors, which continues to interpret consultancy in a restrictive manner, considering permissible not any form of external consultancy, but only consultancy of a scientific nature and of an occasional character (among the most recent decisions, Court of Auditors, First Appeal Section, 24 October 2025, no. 154; Second Appeal Section, 20 May 2025, no. 112).

¹⁰Another archive, the Pubblici Uniemens, contains the population of employees who pay into the public pension fund (INPDAP-Istituto Nazionale di Previdenza e assistenza per i Dipendenti dell’Amministrazione Pubblica). This, however, is available since 2014 and therefore is useless for our purposes, as the reform took place in 2010.

sity". This matching protocol allowed us to identify 83 universities out of the 96 which existed in 2013 [ANVUR, 2014]. Thus our sample is constituted by all the workers who contributed their payroll tax, for at least one year between 2000 and 2021, implying that they were employed by a university¹¹. Different external activities are differently codified depending on the type of contract, the frequency of the activity and/or the existence of professional pension funds.¹²

The final sample contains approximately 13,000 individuals in the reform year, representing a random sample of personnel in Italian universities. This is described in detail in Table 1.¹³ The coverage of our sample improves over time: the reason for the gradual increase in sample size is age coverage: the EC sample includes only individuals born in 1950 or later, as shown in more detail in Table 2.

Data on earnings is reported in Table 1. All values are in euros, adjusted by the consumer price index in 2010. As previously mentioned, the real median salary remained approximately constant over the period 2010-2017, around €33,000. Earnings from external activities also appear broadly stable throughout the sample period, with a median between €7,000 and €8,000 per year in 2010 prices. However, when considering the upper tail of the distribution (specifically at the 90th percentile) earnings from external activities far exceed the corresponding decile threshold for salaries.¹⁴

While the prohibition of external consultancy without prior authorization applies to the entire Italian public administration, our focus is on academic staff. It is therefore necessary to disentangle the university workforce in order to restrict the analysis to professors.

¹¹Dependent employees are identified according to the code assigned to the contribution (variable TIPO_CONTRIBUTO coded with 103, 105, 130, I10 or I11).

¹²Freelance consultancy is identified either by contributions to a different pension fund (*gestione separata*) or by the type of contract (the type of contribution reports a specific code: TIPO_CONTRIBUTO="OBB"). Occasional self-employment is coded as "Attività da libero professionista" or "Libero professionista" in the variable TIPO_RAPP_CONTR. Regular professional activity is coded similarly, while professional earnings are obtained by summing the variables VOL_AFFARI and RETRIBUZIONE.

¹³The representativeness of this sample can be assessed by comparing it with the universe of public employment in the university sector. According to ANVUR (2014), total university staff amounted to 121,373 individuals in 2008 (63,753 professors and 58,620 non-academic staff) and declined to 106,630 in 2013 (53,459 professors and 53,171 non-academic staff).

¹⁴We trimmed the data on salaries at 99.75 percentiles and we also excluded any salary lower than 100 euro. We also excluded 21 yearly observations where the earnings from external activities exceeded by 200 times the yearly salary.

Table 1: Distribution of real earnings of university employees

Year	Salary (2010 prices)					External pay (2010 prices)				
	p10	p50	p90	sd	obs>0	p10	p50	p90	sd	%
2000	10,847	26,075	57,750	20,003	8,430	933	7,219	48,563	200,670	7.7
2001	7,599	27,495	59,887	21,624	9,012	1,428	8,832	51,098	231,455	9.5
2002	4,699	26,788	59,899	22,453	9,392	1,181	7,218	55,339	172,066	8.8
2003	4,470	27,499	61,609	22,508	9,694	881	6,820	80,151	241,297	6.9
2004	10,666	28,231	63,321	22,333	9,964	1,070	7,195	64,402	202,629	8.3
2005	20,055	30,466	66,758	22,085	10,923	1,052	6,709	50,705	187,828	11.2
2006	20,394	30,927	68,946	22,439	11,439	945	7,163	53,717	244,989	11.3
2007	21,236	31,835	69,944	23,030	11,787	816	7,107	65,484	284,389	10.7
2008	18,577	31,370	71,466	23,789	12,299	1,009	8,211	63,928	274,993	11.2
2009	22,298	32,601	74,264	23,544	12,441	959	7,044	92,929	241,447	8.9
2010	22,921	33,758	76,932	24,077	12,621	1,000	8,624	92,147	306,106	8.4
2011	22,264	33,008	74,229	23,609	12,810	895	7,772	95,837	284,998	8.9
2012	21,514	32,336	71,497	22,601	13,135	873	7,908	98,722	311,850	8.8
2013	21,636	32,615	72,085	22,692	13,085	874	8,126	123,954	284,913	8.4
2014	21,766	33,016	72,613	22,760	13,156	827	7,542	132,743	302,441	8.2
2015	21,671	33,468	73,990	23,191	13,280	880	7,643	135,571	295,304	8.5
2016	21,840	33,842	74,324	23,496	13,379	901	8,291	152,272	298,659	8.1
2017	21,592	33,763	73,635	23,418	13,472	803	8,280	142,958	314,705	8.2
2018	22,103	34,644	74,081	23,580	13,647	909	7,969	143,561	275,660	8.4
2019	21,750	34,911	76,507	24,687	13,792	868	7,295	114,451	305,022	8.8
2020	22,070	35,814	78,559	24,630	13,839	815	6,521	115,773	301,733	8.8
2021	17,922	31,269	76,395	25,343	13,565	711	6,784	108,783	281,565	9.2

Note: The Table reports the 10th, 50th (median), and the 90th percentile of the earnings reported by workers recorded as university employees in INPS EC archive with positive values for either salary (left hand side of the table) or external revenues (right hand side). External revenues are censored at the bottom (100, in order to avoid negative values) and at the top (at the 99.75 percentile, to remove of values exceeding 5 million euro). The last column is the percentage of those in the payroll who report positive earnings from external activities.

Since information on academic rank is not available in the INPS EC data, we rely on the distribution of salaries to proxy different academic positions. By inspecting the salary distribution in the most recent years, we identify income thresholds, based on the official salary scales, which were set at national level, and depended exclusively on tenure. Specifically, we identified three cut-off levels, at 30,000, 45,000, and 70,000 (all at 2010 prices), and allocated individuals to the four categories, according to the band into which their pay would fell.¹⁵ In the allocation to the four groups we took five year moving averages, to smooth out possible short periods of low or zero contribution due to parental

¹⁵These thresholds were defined by examining salary distributions in a small number of large universities. For instance, at the University of Milan in 2020, the median gross annual salary was 38,840 for non-tenure-track assistant professors (RTD-A), 44,927 for tenure-track assistant professors (RTD-B), 53,386 for associate professors, and 79,055 for full professors. There is substantial overlap across academic ranks: the 10th – 90th percentile range spans 26,235-50,852 for RTD-A positions, 33,086-71,496 for RTD-B positions, 42,956-76,244 for associate professors, and 58,627-108,469 for full professors.

or sick leave, or unpaid leave periods. This classification is imprecise for (at least) two reasons: first the official salary scales of the ranks overlap, so that an associate professor with a long tenure, may earn more than a young full professor with limited university seniority in Italy. Second, associate and full professors may choose to work part-time, with corresponding reduction in pay¹⁶, and so, some part-time full professors may be classified as associate professors. Nevertheless, our main interest being in changes in individual incentives to engage in external activities, rather than comparisons across ranks, this is not a main drawback.

Table 2 reports our imputation to ranks based on the salary cut-off thresholds, and compares it with the administrative data from the Ministry of University. The numbers are roughly consistent, with the exception of the number of full professors whose numbers are underestimated. This is due to the exclusion from our sample of individuals born before 1950, who tended to be overwhelmingly full professors through the period. The number of associate professors, who are much less affected by the age cut-off, appears remarkably similar across the two data sources, lending support to the validity of our salary-based thresholds for assigning academic ranks.

The revenues distribution from external activities is very skewed: the population mean is small, and external activities are concentrated in a small group of academics: the mean among academics who engage in external activities far exceed the mean salaries (see Table A2 in the Appendix).

¹⁶Italian associate and full professors may choose every two years whether to work full time at the full salary rate (*regime di tempo pieno*) or to opt for part-time employment (*regime di tempo definito*), which entails reduced teaching and administrative duties in exchange for a salary reduction of approximately 1500 per month. Since we do not observe individual regime choices in our data, the group classified as “associate professors” may therefore include a fraction of full professors who have opted for part-time status, as well the group of “assistant professors” may include associate professors under part-time status. The main advantage of choosing part-time worked hours is the absence of controls on external activities. Evidence consistent with this interpretation can be found in Table A2, which reports mean revenues from external activities at current prices: revenues earned by (full-time) full professors are significantly lower than those of associate professors (who may include part-time full professors) and even of assistant professors (who may include part-time associate professors).

Table 2: Comparison of INPS archives and Ministry of University administrative data

Year	INPS EC data					Ministry of University Administrative Data				
	Non-Teach.	Assist.	Assoc.	Full	Total	Non-Teach.	Ass.	Assoc.	Full	Total
2000	38,310	14,014	8,646	3,878	64,848	50,965*	19,692	17,247	15,028	102,932
%	59.1	21.6	13.3	6.0		49.5	19.1	16.8	14.6	
2005	42,933	21,702	12,372	6,616	83,623	53,295	21,999	18,963	19,273	113,530
%	51.3	26.0	14.8	7.9		46.9	19.4	16.7	17.0	
2010	42,112	26,835	16,676	10,752	96,375	53,569	24,934	16,956	15,851	111,310
%	43.7	27.8	17.3	11.2		48.1	22.4	15.2	14.2	
2015	42,766	27,831	19,231	11,414	101,242	51,039	22,052	20,048	12,877	106,016
%	42.2	27.5	19.0	11.3		48.1	20.8	18.9	12.2	
2020	44,606	25,520	22,516	13,102	105,744	47,974	18,684	23,150	14,168	103,976
%	42.2	24.1	21.3	12.4		46.1	18.0	22.3	13.6	

Note: the INPS EC data are taken to the population by dividing by 48/365 (number of fixed dates over the entire year). The data of the Ministry of University are taken from ANVUR 2014 (years 2000, 2005, 2010), ANVUR 2016 (year 2015) and from the ANVUR [dashboard](#) (year 2020). *2004 data.

4 Empirical Analysis

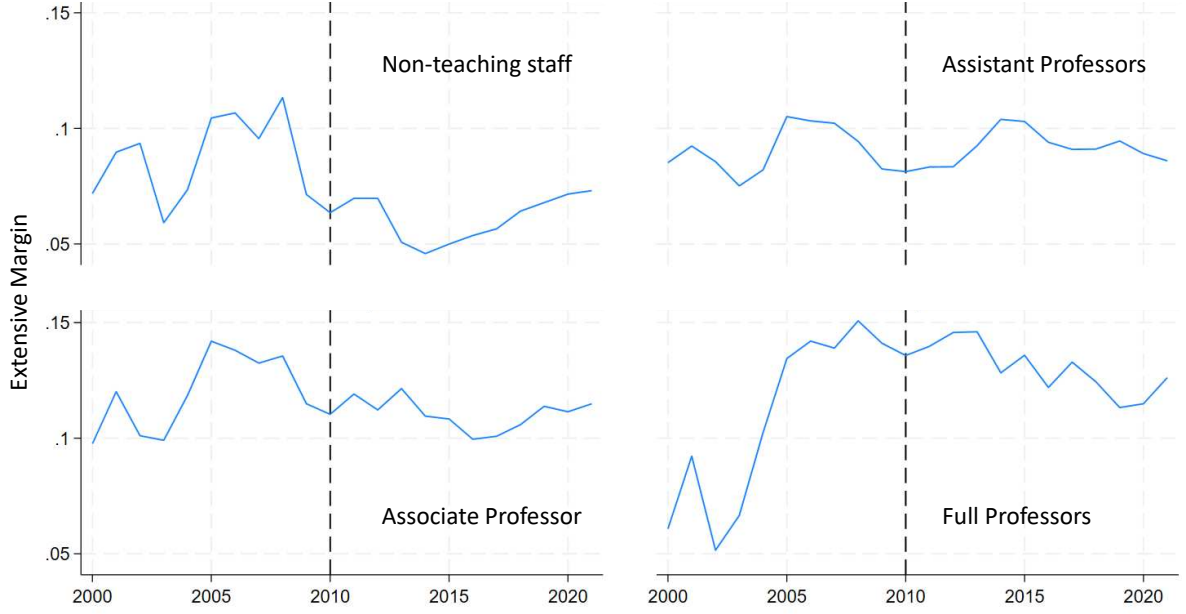
We capture the extent of external activities undertaken by Italian academics, with two indicators, disaggregated by academic rank. The first, which we label *extensive margin*, is the proportion of academics engaged in external consultancy. The second, the *intensive margin*, is the share of earnings from external activities relative to salary income. The raw data for these indicators is plotted in Figures 1 and 2.¹⁷ Visual inspection does not suggest any uniform pattern of academics’ behaviour following the 2010 reform: “non-teaching” staff seem to reduce substantially their external activities, and the pre-reform increasing trend for associate, and more so for full professors could likely be due to the change in age composition of the sample. *Prima facie*, the Gelmini reform does not obviously expand participation in external activities.¹⁸

Table 3 reports the average values of both indicators, the percentage of academics who receive any external income, on the left, and the share of external activities earnings on total earnings, both in the entire period (the third column in each half), and in the decade preceding and the decade following the reform, disaggregated by academic rank.

¹⁷Table A3 in the Appendix reports yearly means, distinguishing between occasional and permanent external activities.

¹⁸Table A4 in the Appendix reports the mean intensive margin by academic rank for the entire population, as well as the mean share of earnings from external activities conditional on academics engaging in such activities. When focusing on this restricted sample, an increase over time is observed only for associate professors.

Figure 1: Extensive margin: Share of academics with external income by rank



Note: In each panel the vertical axis measures the proportion of the total academics in each rank whom are levied payroll tax in the corresponding year on the horizontal axis.

Table 3: Extensive and intensive margins, before and after the Gelmini reform

	Extensive margin			Intensive margin		
	2000-2010	2011-2021	2000-2021	2000-2010	2011-2021	2000-2021
Non-teaching staff	7.7	5.5	6.5	35.7	16.9	26.1
Assistant professors	10.8	10.0	10.4	25.4	28.0	26.9
Associate professors	12.7	11.3	11.8	22.1	29.0	26.4
Full professors	11.6	13.2	12.6	2.7	3.0	2.9
All Employees	9.5	8.7	9.1	28.2	20.6	24.0

Note: Share of employees who engage in external activities (left), and share of income they earn (right) by rank, on the rows, and by period, the columns: the pre- and post-reform, followed by the entire periods. Data are as a percentage of the total population in the rank in the period.

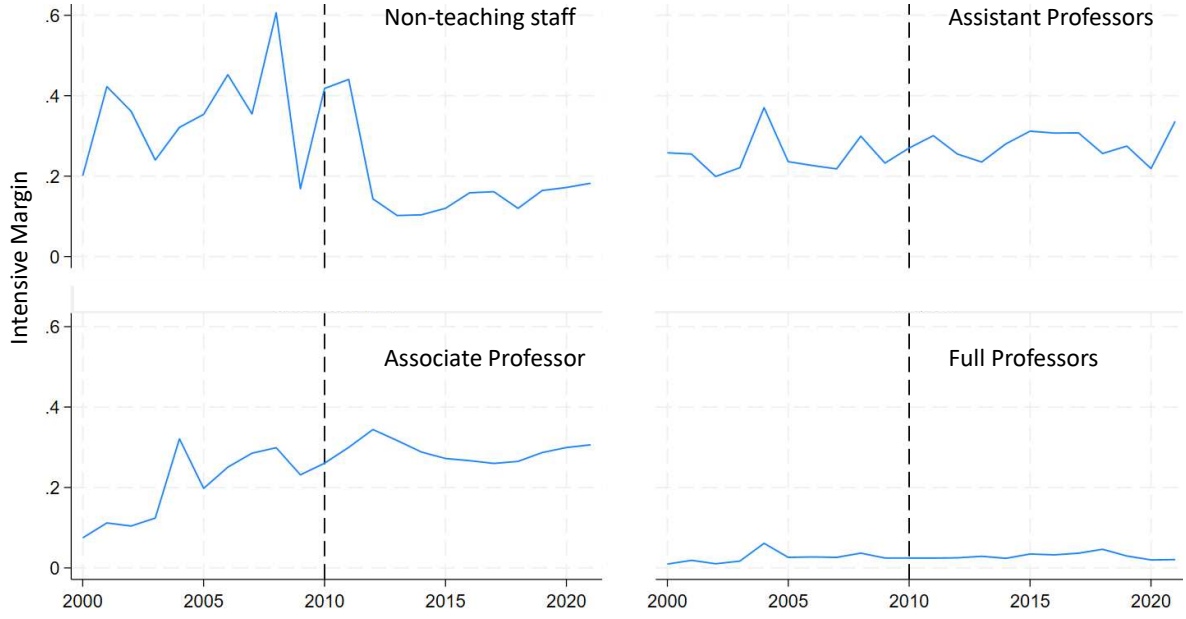
These percentages are the average of the trends reported in Figures 1 and 2.

We adopt two complementary strategies to assess the potential effects of the Gelmini reform on both the extensive and intensive margins. We begin with an event-study design, comparing periods before and after the reform and tracing the dynamic response of the outcomes over time.

$$Y_{it} = \alpha_i + \sum_{k \neq -1} \beta_k D_{it}^k + \delta_t + \varepsilon_{it}, \quad (1)$$

where Y_{it} is the outcome for individual i in year t , α_i are individual fixed effects, D_{it}^k

Figure 2: Intensive margin: Share of external income on total income by rank



Note: Analogously to Figure 1, in each panel the vertical axis measures the proportion of the income earned by academics in each rank from external activities in the corresponding year on the horizontal axis.

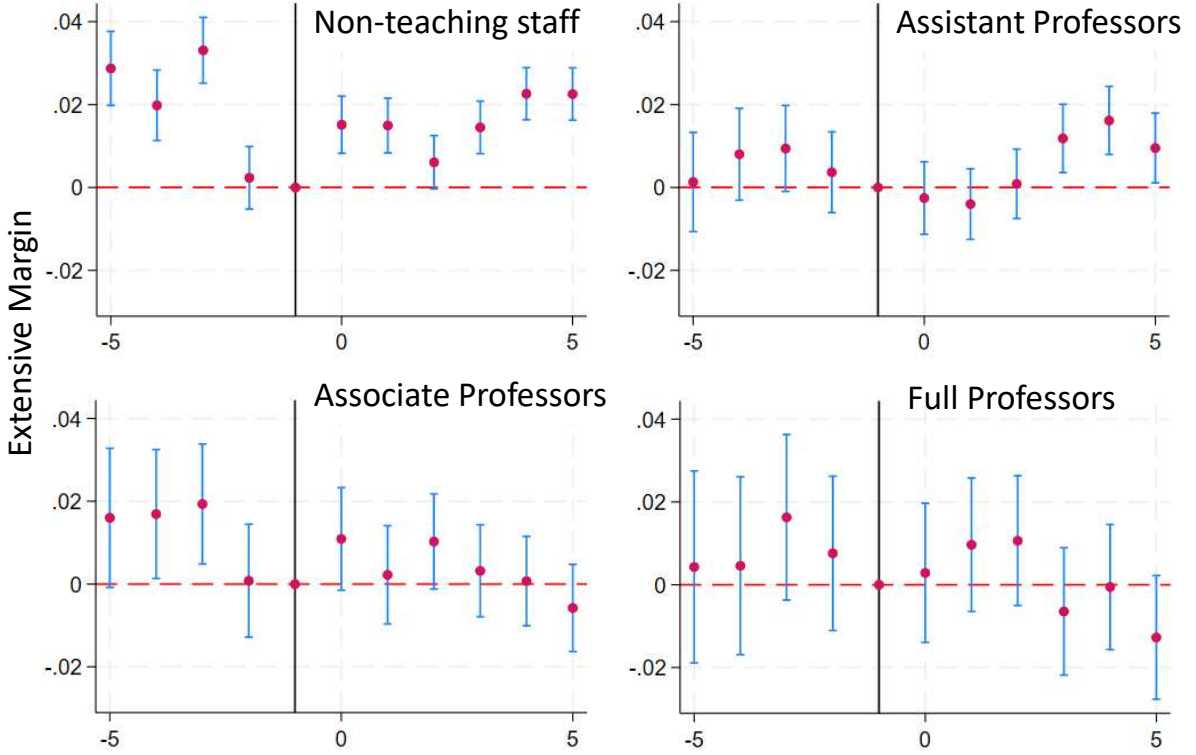
are event-time dummies (k years from 2010), and δ_t are year fixed effects. We normalize $\beta_{-1} = 0$ to identify treatment effects relative to the pre-reform year. The pre-reform coefficients (β_k for $k < -1$) test for pre-trends, while post-reform coefficients ($k \geq 0$) capture the reform's dynamic impact.

We then estimate a pre-post specification with individual fixed effects, which allows us to control for time-invariant unobserved heterogeneity. In the absence of a credible control group unaffected by the reform, the individual fixed effects specification accounts for time-invariant individual characteristics while absorbing contemporaneous university and labor market trends with the constant and the time dummies.

The results of the event study are presented in Figures 3 and 4. Both figures plot the estimated year fixed effects, controlling for seniority in the occupation.¹⁹ Focusing on the extensive margin, in Figure 3 we observe a positive increase of a few percentage points in the share of academics engaged in external consultancy among assistant professors. No

¹⁹Since the age composition change over time due to the cap in birth-year in the EC sample, we have created a proxy for seniority taking the difference from the current date and the date of the first pension contribution. Due to the declining trend of our dependent variable, the corresponding coefficient is always estimated as negative.

Figure 3: Event study: The extensive margin



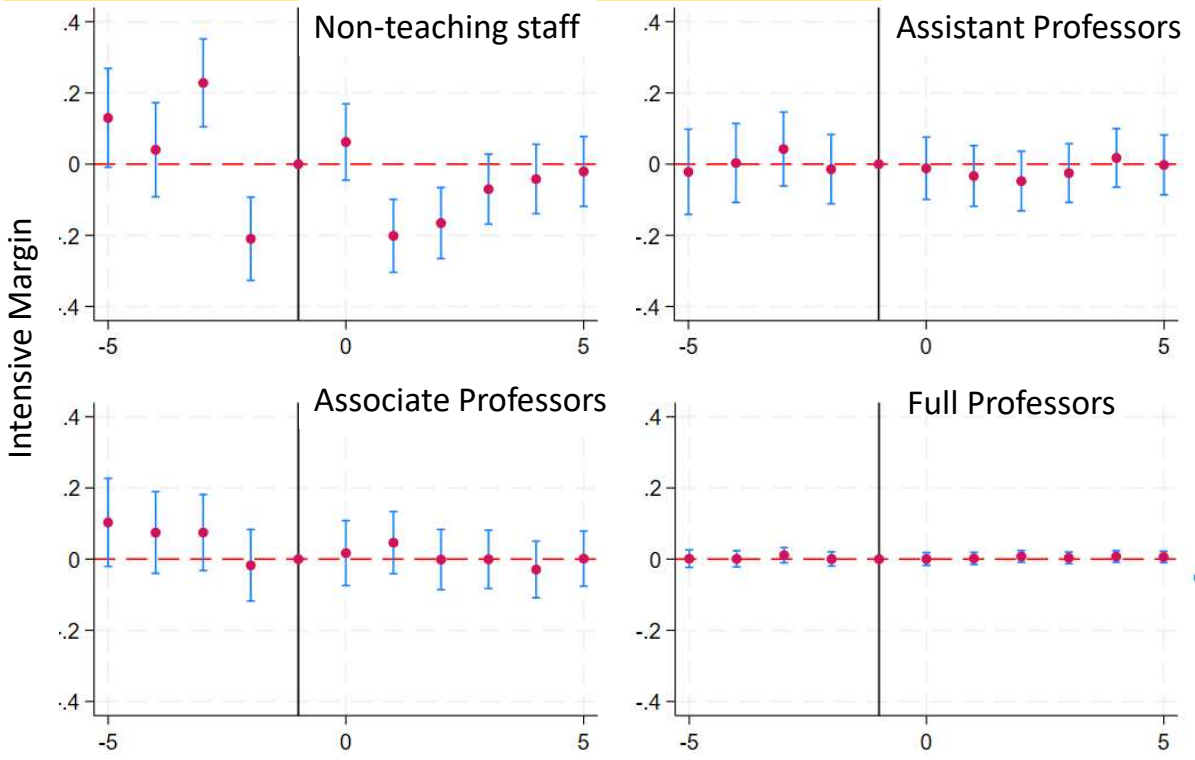
Note: Event study: The height of the red dots on vertical axis is the value of coefficient β_k in (1), where the outcome variable Y_{it} is a dummy variable denoting the undertaking of external activity. The blue bar is the confidence interval at 5%. The year of the Gelmini reform is year 0. Each panel is one group of academics.

significant effect is detected for the other two ranks of the academic ladder.²⁰ Turning to the intensive margin, Figure 4 suggests a temporary negative impact for assistant professors, while no discernible change emerges for associate and full professors. Overall, the Gelmini reform appears not to have modified incentives for the core faculty, while producing only limited effects concentrated at the initial stages of the academic career.

However, the event-study estimates are affected by some noise, especially in the heterogeneous group of non-teaching staff. To partially address this issue, we estimate the average effect over the decade following the reform while controlling for individual heterogeneity. The methodology underlying this specification is intended to account for idiosyncratic differences across academics in research potential, preferences for leisure, responsiveness to monetary incentives, liquidity constraints, and so on, thus leaving as the estimated

²⁰We ignore the effects onto non-teaching staff since they were not the target of the reform. The south-east quadrant also controls for the rank of the academics.

Figure 4: Event study: The intensive margin



Note: Event study: analogously to Figure 3, the height of the red dots on vertical axis is the value of coefficient β_k in (1), where the outcome variable Y_{it} is the share of income obtained external activity. The blue bar is the confidence interval at 5%. The year of the Gelmini reform is year 0. Each panel is one group of academics.

effect the role played by the reform, and other observable variables.

In formal terms we estimate the following equation:

$$Y_{it} = \alpha_i + \beta \text{Post}_{2010} + \varepsilon_{it} \quad (2)$$

where Y_{it} is the relevant outcome, α_i is an individual fixed effect (controlling for observable and unobservable heterogeneity), Post_{2010} is a step-dummy variable, equal to one after the year 2010 and ε_{it} is white noise. The outcome can either be a dummy variable which takes value 1 if academic i receives external activity earnings in year t and 0 otherwise; this regression is estimated as a linear probability model, and it captures the diffusion of external activity (extensive margin). But the dependent variable can be the share in academic i 's earnings in year t obtained from external activities; in this case the OLS estimate provides a measure of the intensive margin. Finally we can consider a third

Table 4: Overall effect. (I) Aggregate

Variable	External Y/N	Share of pay	log of pay
Post 2010	-0.035*** [0.0009]	-0.140*** [0.010]	-0.112*** [0.018]
Constant	0.110*** [0.0006]	0.321*** [0.017]	9.072*** [0.011]
Observations	269,128	265,162	24,429
R^2	0.46	0.4	0.77

Note: The first row reports the estimates for the coefficient β in (2) for the entire sample. The first column is the extensive margin, namely the share of academics who engage in external activities. The next two the intensive margin, computed as the share of income from external activities over the total income, and the logged value of the external income. Individual fixed effects included. Statistical significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

specification, where the dependent variable are academic i 's (log) earnings from external activities (in euros, 2010 prices); in such a case the sample is restricted to academics who obtain positive earnings from external activities in specific years (since log of zero earnings are missing observations).

The estimates obtained are presented in Tables 4 and 5. The first column in Table 4 reports a linear probability model for engagement in external activities. The second focuses on the intensive margin, reporting an OLS regressing the incidence of earnings from external activities on salary income. The final column restricts the sample to academics who undertake external activities and examines whether their earnings from external activities increased or declined after the reform.

In Table 4, we report the regressions for the entire sample of all university employees: over the decade following the reform, we observe a fall of 3.5 percentage points in the number of academics undertaking external activities. Despite the large share of academics with no external revenues, we still find a significant reduction in average incidence of earnings from external activities in the order of 14 percentage points. Even if we restrict to employees with external activities, we record a decrease of 11 percentage points over the second decade.

When we disaggregate by academic rank, Table 5, the reduction in the number of academics who engage in external activities is confirmed, with the possible exception of for full professors, who essentially do not change their behaviour on average. The intensive

Table 5: Overall effect. (II) By academic rank

Variable	Non-teaching staff		Assistant profesors		Associate profesors		Full profesors	
	External Y/N	Share of pay	External Y/N	Share of pay	External Y/N	Share of pay	External Y/N	Share of pay
Post 2010	-0.031*** [0.001]	-0.183*** [0.019]	-0.017*** [0.002]	0.038* [0.019]	-0.008*** [0.002]	0.077*** [0.019]	-0.005 [0.003]	-0.004 [0.003]
Constant	0.089*** [0.000]	0.354*** [0.013]	0.101*** [0.001]	0.247 [0.013]	0.119*** [0.002]	0.215*** [0.014]	0.129*** [0.002]	0.031*** [0.002]
Observ.	123,987	122,333	68,500	68,312	47,184	47,020	27,386	27,332
R^2	0.52	0.31	0.59	0.67	0.58	0.73	0.53	0.45

Note: The table reports the results for the regressions in the first two columns of Table 4. for the four subsamples which partition the whole sample into different academic ranks. As in Table 4, the first row reports the estimates for the coefficient β in (2). For each rank, the first column is the extensive margin, and the second the intensive margin, computed as the share of income from external activities over the total income. Individual fixed effects included. Statistical significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

margin, the share of income obtained from external activities, presents substantial heterogeneity. The coefficients in the “Share of pay” columns suggest that the corresponding negative coefficient obtain by the aggregate regression reported in Table 4 is likely due to the non-teaching staff: post-docs, and research assistants and fellows. whose external activities the Gelmini reform did in fact restrict. Their share of income was reduced, whereas that of assistant and associate professors increased. Full professors’ behaviour was again unchanged.

5 Discussion and Conclusions

Our results suggest that the reform introduced in Italian universities in 2010 was largely ineffective in modifying academics’ attitudes toward external activities.

The negative effect shown in Table 4, is likely to be due to the sharp reduction evidenced in the extent of external activities undertaken by non-teaching staff, such as post-docs and research assistants, whose opportunities where indeed more tightly regulated by the Gelmini reform.²¹

While our data suggest that external activities are highly asymmetrically distributed, being confined to fewer than 10% of academics, and, moreover highly concentrated within

²¹The original article 22 (subsequently modified) modified the regulation of post-doc positions (assegni di ricerca) which were then abolished in 2023, being replaced by temporary contract (contratti di ricerca).

this subset, with 2.4% of those earning more from these external activities than from the salary paid to them by their employer.²² Of course, while a strong asymmetry in distribution does not imply strong asymmetry in response, as it could well be that everyone respond by increasing their external activities by a tiny amount, it is important to understand these details. The reason is that to the extent that those who might be able to make the most of the of any widening of the potential for external work may well be those who also have the highest academic potential, and the difference in the externality bestowed on society by different extent of these two alternatives ought to be a consideration in the cost-benefit analysis of policy initiatives in this area.

One could think of two, not necessarily alternative, reasons why a uniformly weak response might be the academics' response to the Gelmini reform. The first might be that academics have relatively inflexible preferences: some like to spend all their time doing abstract research, some want a certain balance, but the relaxing of a constraint does not affect their behaviour. The second possible explanation points to institutional conflict among regulatory authorities. While the Gelmini reform favoured a degree of liberalisation for university employees' external activities, both several individual universities and the Court of Auditors (*Corte dei Conti*) were not. Among the other innovations introduced by the Gelmini reform there was the establishment of a link between a university's research prowess and a component of its governmental funding. Fearing a reduction in research effort, many universities may have responded by restricting external activity opportunities through internal approval procedures. By the same token, the Court of Auditors appeared to have backed-up the restrictive effort exerted by individual universities, repeatedly offering restrictive interpretations that limited academic's opportunities.²³

This is an important point, and this paper makes it clear that a wholly aggregated study is

²²Disaggregating by positions, the fraction of academics with earnings from external activities exceeding salaries is 3.0% among non-teaching, 2.4% among assistant professors, 2.1% among associate professors and 0.5% among full professors.

²³See for example the wording of the DL 44/2023 law: "The first sentence of paragraph 10 of Article 6 of Law No. 240 of 30 December 2010, with specific reference to consultancy activities, shall be interpreted as meaning that full-time professors and researchers are permitted to carry out extra-institutional activities performed for private parties or public bodies, or for reasons of justice, provided that such activities are carried out without a relationship of subordination and in the absence of an organization of means and personnel specifically arranged for their performance."

insufficient to draw robust conclusions on what is undoubtedly an important phenomenon. The so called brain-drain is an important phenomenon, which has induced successive governments to incur very substantial cost, in the guise of tax-discounts for returning high skill jobs (see Bassetto and Ippedico 2023 for a detailed analysis of costs and effectiveness of these schemes). Further work in this area might, for example indicate whether a more open attitude to external activities, or, by the same argument, more explicit recognition of research success, might in fact contribute to reversing the outward migration of highly productive academics attracted by better salary conditions abroad [Nascia et al., 2021]. However, while the payroll data made available by the Visitinps programme has made this research possible, Italy still lags behind the openness to availability of administrative data for research shown by other OECD and EU countries (see Berton and Paruolo 2026 for a recent overview of administrative data access in EU Member States). One obvious avenue where better availability of data would permit rapid progress in this area is the aforementioned role of heterogeneity. Do variables such as family structure and overall income, both of which are not in the payroll record but would be known from tax record, matter for academics' choices? Similarly, are research and external activities substitutes or complements? Stylised facts and anecdotal evidence both suggest that academic disciplines face different opportunities for external consultancy. These may matter for the design of pay scales and other incentives linked to output. Matching of payroll records and the discipline and the publicly available individual research records would without doubt provide tools the better to understand the behaviour of academics in Italy.

References

- ANVUR. Rapporto sullo stato del sistema universitario e della ricerca 2013. Technical report, ANVUR, Rome, 2014.
- ANVUR. Rapporto biennale sullo stato del sistema universitario e della ricerca 2016. Technical report, ANVUR, Rome, 2016.
- ANVUR. Evaluation of research quality 2011-2014 (vqr 2011-2014). final report, first part: Statistics and summary results. Technical report, ANVUR, Rome, 2017.
- Jacopo Bassetto and Giuseppe Ippedico. Can tax incentives bring brains back? Returnees tax schemes and high-skilled migration in Italy. *Review of Economics and Statistics*, 2023. Forthcoming. Also as CESifo Working Paper Series 10271.
- Fabio Berton and Paolo Paruolo, editors. *Data-Driven Learning in the EU: From Administrative Sources to Public Value*. Professional Practice in Governance and Public Organizations. Springer Cham, 2026. ISBN 978-3-031-99031-1. Open Access.
- Massimiliano Bratti, Cicero Tindaro, Enrico Lippo, Carmela Anna Nappi, and Matteo Turri. The effect of research evaluation exercises on research output: fifteen years of evidence from Italy. *Politica economica*, 37(1):13–42, 2021.
- Giliberto Capano, Marino Regini, and Matteo Turri. *Changing Governance in Universities*. Palgrave-MacMillan, 2016.
- Daniele Checchi, Gianni De Fraja, and Stefano Verzillo. Incentives and careers in academia: Theory and empirical analysis. *The Review of Economics and Statistics*, 103(4):786–802, 2021.
- Alice Civera, Erik E Lehmann, Michele Meoli, and Stefano Paleari. The attractiveness of European higher education systems: A comparative analysis of faculty remuneration and career paths. 2023.
- Pier Paolo Giglioli. *Baroni e burocrati. Il ceto accademico italiano*. Il Mulino, Bologna, 1979.

INOMICS. Inomics 2015 salary report, 2015. Accessed: 2026-03-04.

Ministero dell'Università e della Ricerca. Abilitazione scientifica nazionale (ASN), 2026.

URL <https://abilitazione.mur.gov.it/public/>. Pagina web ufficiale con procedure e normativa.

Leopoldo Nascia, Mario Pianta, and Thomas Zacharewicz. Staying or leaving? Patterns and determinants of Italian researchers' migration. *Science and Public Policy*, 48(2): 200–211, 2021.

Benedetto Torrisi. Asymmetric salary and uniformity of academic positions at universities in the EU28. *Open Access Library Journal*, 3:e3198, 2016.

A Appendix

Table A1: Nominal salary boundaries defining academic positions

Year	Minimal gross salaries			Maximal gross salaries		
	Assistant	Associate	Full	Assistant	Associate	Full
2000	24498	36743	57195	36735	57143	167423
2001	25156	37724	58732	37723	58678	171756
2002	25763	38642	60113	38635	60033	219132
2003	26395	39592	61610	39584	61532	214999
2004	26920	40423	62870	40363	62784	214521
2005	27379	41069	63898	41036	63842	201317
2006	27937	41886	65167	41882	65105	218479
2007	28406	42632	66295	42568	66223	243383
2008	29338	44008	68441	43983	68383	240967
2009	29541	44322	68945	44308	68903	245626
2010	30001	45007	70028	44999	69998	251399
2011	30811	46238	71897	46174	71890	258116
2012	31742	47661	74089	47596	74013	247983
2013	32103	48159	74954	48134	74792	252603
2014	32161	48244	75054	48217	75034	251002
2015	32252	48394	75278	48362	75250	251030
2016	32218	48348	75181	48314	75150	250121
2017	32665	49001	76219	48988	76213	249038
2018	33000	49490	77007	49486	76977	247985
2019	33186	49783	77435	49768	77418	259280
2020	33121	49684	77300	49672	77217	279842
2021	33769	50657	78827	50642	78693	273071

Table A2: Nominal mean salaries and earnings from external consultancies

Year	Mean gross salaries			Mean earnings from external activities				Mean earnings among academics undertaking activities				
	Non-teach	Assistant	Associate	Full	Non-teach	Assistant	Associate	Full	Non-teach	Assistant	Associate	Full
2000	16355	27793	42547	67808	1472	6844	2706	567	20480	80341	27721	9322
2001	17480	30332	45285	74221	2063	7330	4364	1357	22993	79349	36323	14712
2002	16503	31713	47737	78920	2317	5408	4603	825	24770	63144	45539	15991
2003	16842	31424	47906	78730	1506	6520	5367	1168	25441	86780	54158	17545
2004	18118	31237	48505	79557	1939	6123	7331	1732	26395	74605	61853	16902
2005	21083	33710	51457	83020	2214	6923	9556	2061	21190	65861	67306	15329
2006	21512	34283	52297	84231	2181	7576	11506	2091	20441	73364	83339	14724
2007	22458	34579	52649	87227	2460	7481	14296	2116	25730	73159	108000	15222
2008	21188	34678	53361	88507	2443	8461	15230	2858	21550	89620	112000	18956
2009	23430	35732	54931	90030	1603	8020	12100	2118	22437	97247	105000	15011
2010	24645	37486	58167	93223	1370	8532	14628	2209	21558	105000	133000	16266
2011	24407	37345	57911	94125	1638	8847	16798	2225	23480	106000	141000	15920
2012	24630	37699	57745	93009	1661	9387	19220	2215	23805	113000	171000	15201
2013	25359	38489	58211	94734	1614	8833	18146	2544	31811	95471	149000	17415
2014	25507	39014	59013	95041	1560	10819	16727	2188	34017	104000	153000	17050
2015	25307	39933	59705	96124	1452	11828	15345	2947	29065	115000	142000	21682
2016	25392	39654	59079	96205	1867	11009	15411	3006	34804	117000	155000	24646
2017	25582	39272	58621	96565	2032	12241	15323	2856	35928	135000	152000	21484
2018	25841	39973	58899	97075	1991	10023	15367	3766	31007	110000	145000	30266
2019	26150	41967	62227	100656	2055	11278	16986	2443	30264	119000	149000	21569
2020	26618	43102	62639	100412	2455	9359	18245	1883	34287	105000	164000	16385
2021	25479	37606	59775	100556	3011	11109	15958	1942	41209	129000	139000	15391

Table A3: Extensive margin: incidence of university employees undertaking external activities

Extensive margin - occasional external activity						Extensive margin - permanent external activity				
Year	Non-teaching	Assistant	Associate	Full		Year	Non-teaching	Assistant	Associate	Full
2000	0.072	0.085	0.098	0.061		2000	0.012	0.021	0.011	0.000
2001	0.090	0.092	0.120	0.092		2001	0.013	0.022	0.012	0.000
2002	0.094	0.086	0.101	0.052		2002	0.012	0.022	0.013	0.000
2003	0.059	0.075	0.099	0.067		2003	0.009	0.021	0.014	0.003
2004	0.073	0.082	0.119	0.102		2004	0.009	0.022	0.016	0.003
2005	0.104	0.105	0.142	0.134		2005	0.011	0.024	0.022	0.003
2006	0.107	0.103	0.138	0.142		2006	0.010	0.024	0.020	0.004
2007	0.096	0.102	0.133	0.139		2007	0.012	0.023	0.021	0.003
2008	0.113	0.094	0.136	0.151		2008	0.015	0.023	0.022	0.006
2009	0.071	0.082	0.115	0.141		2009	0.011	0.021	0.025	0.007
2010	0.064	0.081	0.110	0.136		2010	0.012	0.021	0.026	0.004
2011	0.070	0.083	0.119	0.140		2011	0.013	0.022	0.027	0.006
2012	0.070	0.083	0.112	0.146		2012	0.012	0.022	0.028	0.004
2013	0.051	0.093	0.121	0.146		2013	0.011	0.024	0.028	0.005
2014	0.046	0.104	0.110	0.128		2014	0.011	0.027	0.023	0.004
2015	0.050	0.103	0.108	0.136		2015	0.012	0.028	0.025	0.004
2016	0.054	0.094	0.100	0.122		2016	0.011	0.029	0.023	0.003
2017	0.057	0.091	0.101	0.133		2017	0.012	0.032	0.023	0.004
2018	0.064	0.091	0.106	0.124		2018	0.011	0.031	0.025	0.005
2019	0.068	0.095	0.114	0.113		2019	0.011	0.029	0.026	0.003
2020	0.072	0.089	0.111	0.115		2020	0.014	0.029	0.026	0.002
2021	0.073	0.086	0.115	0.126		2021	0.011	0.029	0.024	0.003

Table A4: Intensive margin: incidence of revenues from external activities on salaries

Intensive margin - mean incidence of earnings from occasional+permanent external activities on salaries					Intensive margin - mean incidence of earnings from occasional+permanent external activities on salaries of academics undertaking external activities				
Year	Non-teaching	Assistant	Associate	Full	Year	Non-teaching	Assistant	Associate	Full
2000	0.201	0.258	0.075	0.010	2000	2.811	3.026	0.763	0.160
2001	0.423	0.255	0.112	0.019	2001	4.735	2.760	0.929	0.205
2002	0.361	0.199	0.104	0.010	2002	4.001	2.314	1.037	0.202
2003	0.240	0.221	0.124	0.017	2003	4.037	2.932	1.259	0.257
2004	0.321	0.370	0.321	0.061	2004	4.478	4.503	2.728	0.598
2005	0.354	0.236	0.198	0.026	2005	3.411	2.255	1.392	0.199
2006	0.452	0.227	0.251	0.027	2006	4.270	2.198	1.814	0.193
2007	0.355	0.218	0.285	0.026	2007	3.757	2.131	2.148	0.189
2008	0.606	0.299	0.299	0.037	2008	5.758	3.170	2.222	0.244
2009	0.169	0.233	0.232	0.025	2009	2.420	2.818	2.028	0.176
2010	0.418	0.270	0.261	0.025	2010	6.762	3.316	2.383	0.181
2011	0.441	0.301	0.300	0.025	2011	6.646	3.608	2.524	0.175
2012	0.143	0.255	0.344	0.025	2012	2.128	3.055	3.070	0.173
2013	0.102	0.235	0.317	0.029	2013	2.129	2.545	2.604	0.198
2014	0.104	0.280	0.288	0.024	2014	2.336	2.700	2.626	0.186
2015	0.120	0.312	0.272	0.035	2015	2.467	3.023	2.520	0.257
2016	0.159	0.307	0.267	0.033	2016	3.074	3.272	2.669	0.268
2017	0.161	0.308	0.260	0.037	2017	3.058	3.398	2.585	0.276
2018	0.120	0.256	0.265	0.046	2018	2.137	2.857	2.507	0.372
2019	0.164	0.275	0.287	0.030	2019	2.509	2.939	2.541	0.262
2020	0.172	0.219	0.299	0.020	2020	2.506	2.463	2.697	0.175
2021	0.182	0.336	0.306	0.021	2021	2.495	3.910	2.653	0.165