# The Effects of Tenure-Track Systems on Selection and Productivity in Economics

Marco G. Nieddu ♣ Roberto Nisticò ♠ Lorenzo Pandolfi ♦

This version: July, 2025

♣University of Cagliari & CRENoS
♠University of Naples Federico II, CSEF, CESifo & IZA
♦University of Naples Federico II & CSEF

# Motivation

- Tenure-track systems are designed to:
  - maximize career incentives for junior scholars
  - ensure academic freedom and intellectual independence for senior scholars
- However, this comes at the expense of **job security** at entry
  - lower job security may discourage young researchers from entering academia
  - ambiguous effects on selection:
    - better graduates have better outside options...
    - but may value more merit-based promotion systems

# In this paper

- We exploit the introduction of a tenure-track system in Italy in 2010 to study its impact on:
  - the selection of PhD graduates into the academic profession
  - academic productivity and career trajectories
  - marriage and fertility choices of PhD graduates
- Shedding light on these issues is important to understand the overall effects (and desirability) of similar reforms

# Preview of the results

- The reform ↓ PhD graduates' prob of staying in Italian academia and ↑ their prob of pursuing a career abroad or outside academia
- The reform had significant negative **selection effects**:
  - funded PhD graduates more likely to leave italian academia and start an academic career aboard
  - lower SES graduates more likely to exit academia and enter the public sector
  - PhD graduates more likely to live in a couple and to have children
- Yet, it produced weak positive **incentive effects** on productivity
- Overall, the incentive effects seem to offset the negative selection effects

# Contribution

- Literature on impact of tenure on academic productivity and innovation
  - Tenure ↑ productivity (Checchi et al., 2021; De Philippis, 2021; Huang et al., 2021) but can create complacency (Brogaard et al., 2018)
- Literature on impact of job security on fertility
  - Job insecurity ↓ fertility (De Paola et al., 2021; Clark and Lepinteur, 2022), while tenure ↑ fertility (De Paola et al., 2022)
- Literature on gender gap in the academic labor market
  - women disadvantaged in promotions (Bagues et al., 2017)

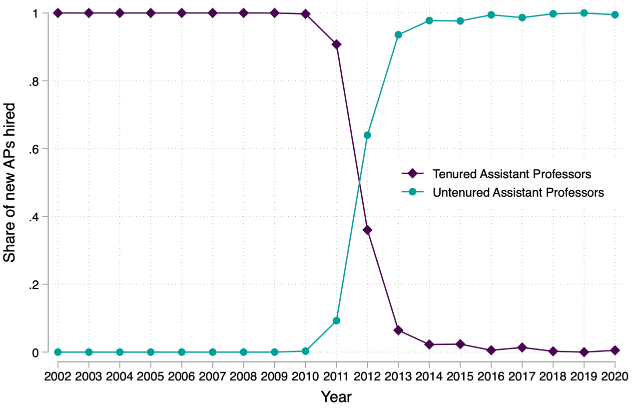
# Outline

1. Introduction
2. Setting and Empirical Strategy
3. Results
4. Conclusion

# The 2010 Gelmini Reform

- Replaced the entry-level permanent assistant professor (AP) position with:
  - a 3-year contract (+2-year ext.) **non-tenured** AP position (RTD/A)
  - a 3-year **"tenure-track"** AP position (RTD/B)
- Introduced National Scientific Qualification (NSQ) to regulate career advancements
  - publication thresholds required to gain eligibility for promotion to associate/full professor

# New hires by type of contract 2002-2020



# Data

- **ISTAT** survey on the careers of all Italian PhD graduates (2004-2014)
- We construct an individual panel dataset from different admin data sources:
  - **Admin data** on universe of PhD candidates in Economics (2007-2017)
  - **Biblioteca Nazionale Centrale di Firenze** data on all PhD theses (1990-present)
  - **IRIS** university repositories data on all PhD theses (2005-present)
  - **CINECA** data on all researchers, associate and full professors employed in Italian universities (2000-2022)
  - **SCOPUS** records on scholars' publications + academic careers abroad

# Empirical strategy

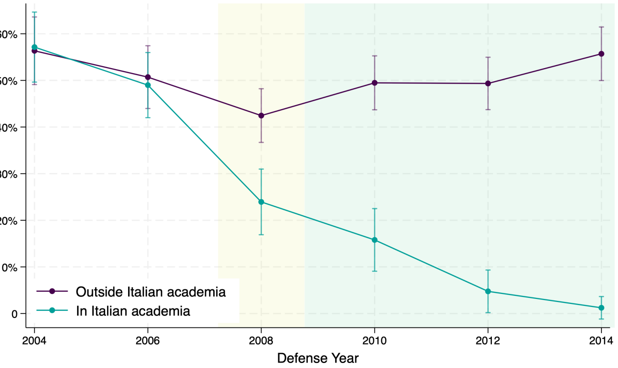
- We compare pre- and post-2010 cohorts of PhDs in fields more and less exposed to the reform using a DiD aproach
  - Exposure to the reform depends on a field's academic orientation at baseline
  - Compare Economics vs less academically oriented fields, e.g. Earth, Medicine, Engineering and Veterinarian

## Specifications

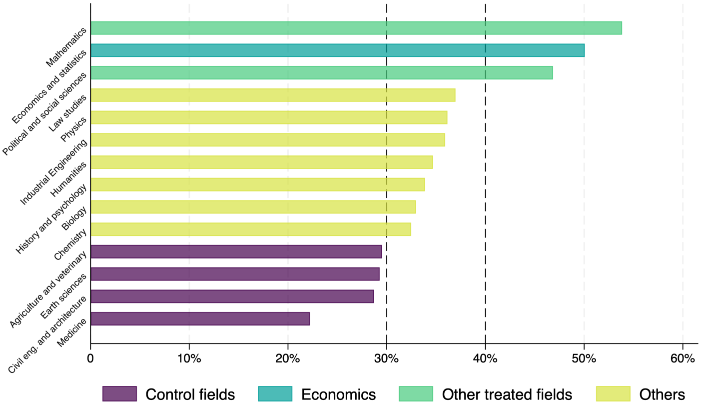
$$Y_{ift} = \alpha + \sum_{t \neq 2006} \beta_t \mathbf{1}(t = \tau) \times \text{Economics}_f + \delta_f + \lambda_t + \epsilon_{ift}, \quad (1)$$

$$Y_{ift} = \alpha + \sum_{t \neq 2006} \beta_t \mathbf{1}(t = \tau) \times \text{AcademicallyOriented}_f + \delta_f + \lambda_t + \epsilon_{ift} \quad (2)$$

# Exposure by cohort of Econ PhDs



# Exposure by field of study



# Summary statistics I

| Panel A: Administrative Data | (1) Economics | (2) Other Treated Fields | (3) Control Fields |
|---|---|---|---|
| Female | 0.50 | 0.44 | 0.57 |
| | (0.50) | (0.50) | (0.50) |
| In Italian academia | 0.22 | 0.19 | 0.10 |
| | (0.42) | (0.39) | (0.30) |
| If in Italian academia: years after defense | 4.06 | 5.31 | 5.10 |
| | (3.39) | (3.58) | (4.04) |
| If in Italian academia: same univ. as the PhD | 0.43 | 0.47 | 0.71 |
| | (0.50) | (0.50) | (0.45) |
| Observations | 6387 | 6716 | 31473 |

# Summary statistics II

| Panel B: ISTAT Survey Data | (1) Economics | (2) Other Treated Fields | (3) Control Fields |
|---|---|---|---|
| Female | 0.50 | 0.45 | 0.57 |
| | (0.50) | (0.50) | (0.49) |
| Years between master and PhD | 5.97 | 5.62 | 6.48 |
| | (2.42) | (2.28) | (2.77) |
| Public PhD scholarship | 0.73 | 0.73 | 0.69 |
| | (0.44) | (0.44) | (0.46) |
| Father education: secondary | 0.33 | 0.36 | 0.34 |
| | (0.47) | (0.48) | (0.48) |
| Father education: tertiary | 0.36 | 0.32 | 0.33 |
| | (0.48) | (0.47) | (0.47) |
| Employed in Italian academia | 0.32 | 0.30 | 0.20 |
| | (0.47) | (0.46) | (0.40) |
| Employed in public sector | 0.26 | 0.29 | 0.43 |
| | (0.44) | (0.45) | (0.49) |
| Observations | 2483 | 2835 | 13504 |

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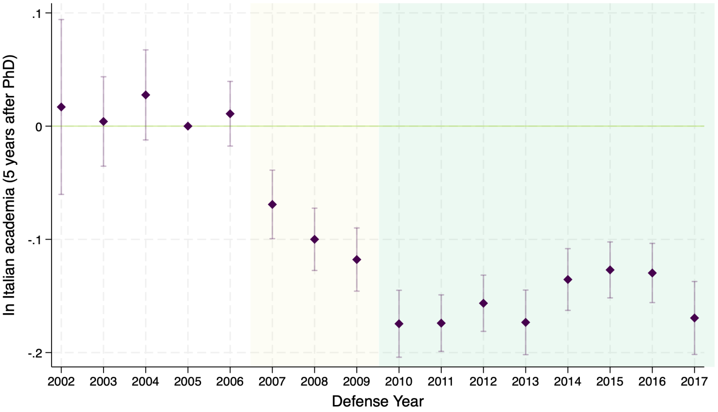
# Prob. of staying in Academia

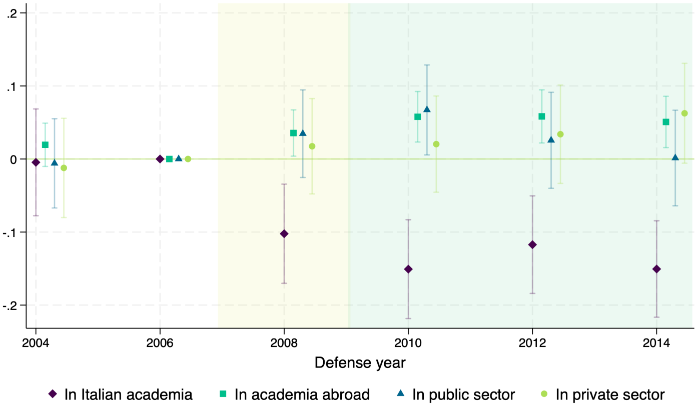


# Career choices I

**Table:** Reform Effects on Career Choices

| Panel A: Administrative Data | | | | | | |
|---|---|---|---|---|---|---|
| | Academic position: | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Any | Any | Any | Any | Assist. | Assoc. |
| Post X Economics PhD | -0.165*** | -0.168*** | -0.169*** | | -0.156*** | -0.002 |
| | (0.009) | (0.008) | (0.010) | | (0.014) | (0.004) |
| Post X Academic. oriented field | | | | -0.142*** | | |
| | | | | (0.011) | | |
| Female | -0.035*** | -0.034*** | -0.034*** | -0.035*** | -0.029*** | -0.009*** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.004) | (0.002) |
| University-by-area FE | No | Yes | Yes | Yes | Yes | Yes |
| Defense year FE | Yes | Yes | No | No | No | No |
| University-year FE | No | No | Yes | Yes | Yes | Yes |
| Observations | 26,678 | 26,428 | 26,406 | 31,117 | 26,406 | 26,406 |
| Mean dep. var. | 0.32 | 0.32 | 0.32 | 0.29 | 0.31 | 0.01 |
| N. of Univ.-by-Area | | 213 | 213 | 309 | 213 | 213 |
| N. of clusters | 65 | 65 | 65 | 91 | 65 | 65 |

# Career choices II



# Career choices III

**Table:** Reform Effects on Career Choices

| Panel B: Survey Data | | | | | | |
|---|---|---|---|---|---|---|
| | Employed in: | | | | | |
| | For. Academia | | Pub. Sect. | | Priv. Sect. | |
| Post X Economics | 0.041*** | | 0.036* | | 0.038* | |
| | (0.011) | | (0.020) | | (0.022) | |
| Post X Academic. oriented field | | 0.036*** | | 0.041*** | | 0.062*** |
| | | (0.007) | | (0.013) | | (0.017) |
| Female | -0.015*** | -0.015*** | 0.034*** | 0.037*** | -0.042*** | -0.040*** |
| | (0.003) | (0.003) | (0.007) | (0.009) | (0.007) | (0.009) |
| Province-by-field FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Defense year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 15,848 | 18,650 | 15,848 | 18,650 | 15,848 | 18,650 |
| Mean dep. var. | 0.04 | 0.04 | 0.19 | 0.21 | 0.27 | 0.23 |
| N. of Province-by-fields | 185 | 257 | 185 | 257 | 185 | 257 |
| N. of clusters | . | 42 | . | 42 | . | 42 |

# Persistence of the effects I

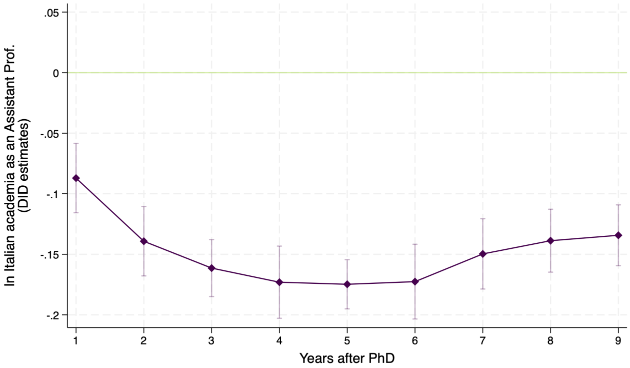



**Figure:** P(Assist. Prof.)

# Persistence of the effects II

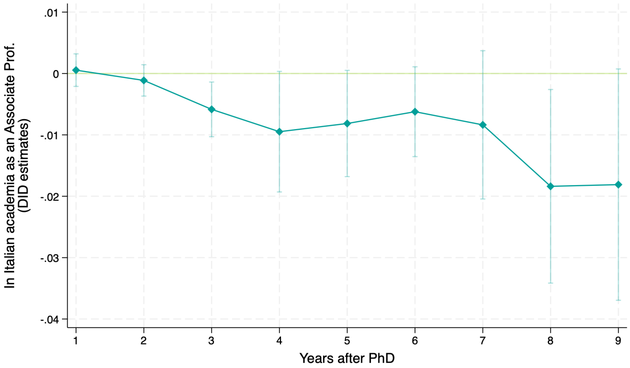
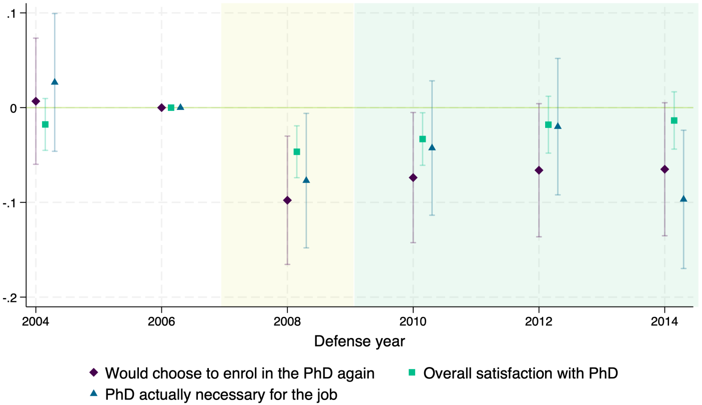



**Figure:** P(Associate Prof.)

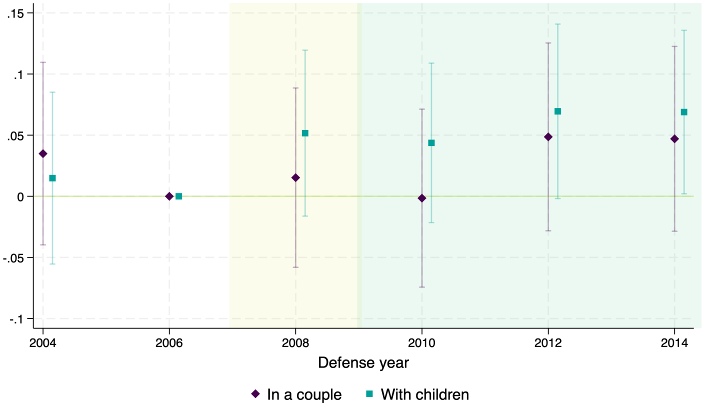
# Effects Heterogeneity

| | Employed in: | | | | | |
|---|---|---|---|---|---|---|
| | Italian Acad. | | | Foreign Acad. | | |
| Post X Economics | -0.127*** | -0.076* | -0.233*** | 0.038** | 0.015 | 0.060*** |
| | (0.031) | (0.042) | (0.053) | (0.016) | (0.019) | (0.023) |
| Post X Econ X Female | -0.008 | | | 0.007 | | |
| | (0.044) | | | (0.021) | | |
| Post X Econ X Univ. Scholarship | | -0.065 | | | 0.037* | |
| | | (0.049) | | | (0.023) | |
| Post X Econ X Father works | | | 0.124** | | | -0.021 |
| | | | (0.057) | | | (0.025) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Province-by-area FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Defence year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 15,971 | 15,971 | 15,971 | 15,971 | 15,971 | 15,971 |
| Mean dep. var. | 0.46 | 0.46 | 0.46 | 0.04 | 0.04 | 0.04 |
| N. of Province-by-fields | 186 | 186 | 186 | 186 | 186 | 186 |

# Satisfaction with the choice of doing a PhD



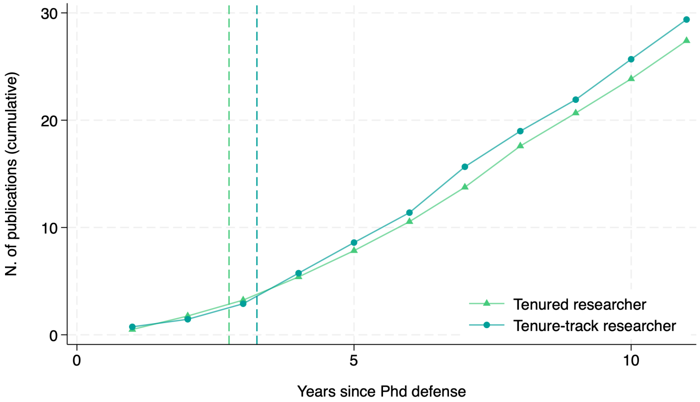
# Family formation



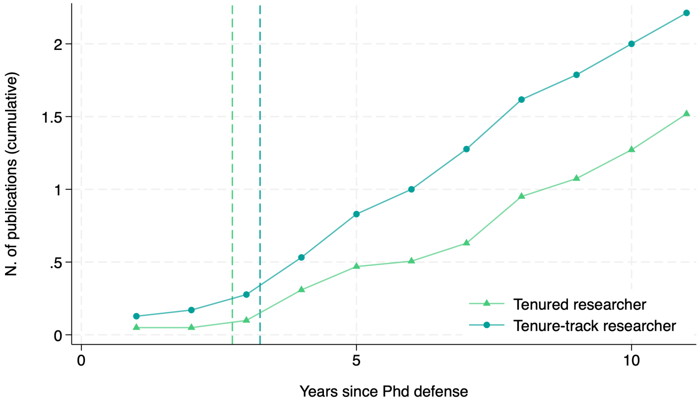
# Potential demand factors

| | Importance of lack of qualified jobs among: | | | | | |
|---|---|---|---|---|---|---|
| | Leavers | | Potential leavers | | Both | |
| Post X Economics | 0.091 | | -0.066 | | 0.086 | |
| | (0.127) | | (0.158) | | (0.100) | |
| Post X Academic. oriented field | | 0.063 | | -0.096 | | 0.089 |
| | | (0.072) | | (0.102) | | (0.059) |
| Father educ. dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Province-by-field FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Defense year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,073 | 1,418 | 1,124 | 1,405 | 2,241 | 2,882 |
| Mean dep. var. | 3.65 | 3.61 | 3.26 | 3.21 | 3.39 | 3.34 |
| N. of Province-by-fields | 112 | 155 | 132 | 180 | 151 | 208 |
| N. of clusters | . | 42 | . | 42 | . | 42 |

# Publications



# Top publications



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# Conclusions

- Our results highlight the potential unintended consequences of reforms aimed at increasing competitiveness and stimulate productivity
- Lowering job security may:
  - push young researchers – especially those with better outside options – to leave academia or opt for a foreign university
  - increase brain drain and **inequalities** in academic development across countries
- However, the overall impact of such reforms on productivity may still be positive if incentive effects offset selection effects

# Thank You!

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