Occupational Licensing, Labor Mobility, and the Unfairness of Entry Standards

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Introduction

- Prevalence of licensing (22% of workers in the EU, 20-29% in the US).

- In the EU (and the US), **hundreds of professions are licensed at the state level**.

- However, **mobility of workers is one of the cornerstones of the EU treaty (and US labor market)**.

- Examples in the EU: physicians, nurses, architects, dentists and veterinaries (state entry exams + automatic recognition). Lawyers, accountants, electricians, plumbers (state entry exams+ regulations and EU directives).

- Examples in the US: nurses (state exam + licensure compact), lawyers (state bar exam + bilateral agreements), teachers and dentists (state exam + recognition of title).

- Harmonization of entry requirements and the recognition of professional qualifications is high in the policy agenda.

Literature

- Long and distinguished literature on the effects of occupational licensing on wages, mobility, quality, migration... often exploiting variability in licensing regulations (across states, over time).

- Very few papers investigate how licensing boards operate, how they choose entry standards (Pagliero 2011, 2013), and how they interact with each other (Kleiner 2016).

This paper: questions and results

1. **What are the consequences of local occupational regulation and labor mobility across local markets?** We empirically show that the effects are dramatic:
   - **extreme heterogeneity across markets in admission outcomes,** (up to 50 percent differences in licensing exam pass rates)
   - **unfair (discriminatory) admission procedures** (up to 49 percent unfair exam results), and
   - **inefficient mobility of workers.**

2. **What is the mechanism?**
   - A new form of regulatory competition:
   Entry requirements in one market have consequences in the other, and regulators interact in setting entry requirements.

Outline of the talk

1. The **Italian market for lawyers** and the bar exam.
2. Data.
3. Extreme heterogeneity across regions in exam outcomes.
4. Extreme heterogeneity in exam grading standards.
5. Implications: unfairness and mobility.
6. Why differences in grading standards?
   Model: The role of strategic interaction (competition) among licensing boards.

The Italian market for lawyers and the bar exam

- **Entry requirements**: 5 year university degree in law, 2 year training period, and bar exam.
- **Local bar exam** (26 districts):
  1. Written and oral.
  2. Identical exam questions (written exam).
  3. Local professional associations grade the exam.
- **Labor mobility** (of licensed lawyers).
- Candidates cannot easily move for the only reason of taking the exam. Some do, but it is costly.
- Public debate on the fairness and efficiency of the system.
- **Reform** that introduced **randomization of grading district** (within size groups) for the written exam (starting 2004).

Why the Italian legal market?

1. Typical example of licensed market.
2. Ideal setting for studying occupational licensing.
3. At a small scale, it mimics the international market for many licensed professions,
   - local entry examination,
   - mobility of workers,
4. ... with the advantage of eliminating
   - heterogeneity across countries,
   - language differences,
   - differences in the admission processes, and
   - other barriers to international mobility.
5. Policy change and randomization.

Data

1. Dataset at the appeal court level over the period 1998 to 2012.
2. There are 26 appeal courts, usually one for each Italian region.
3. The dataset contains the number of candidates and the number of successful candidates at the written and oral examinations.
4. Match information on number of lawyers, and demographic characteristics at the local level.

Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Overall pass rate	390	0.39	0.15	0.16	0.96
Pass rate (written)	390	0.45	0.17	0.16	0.99
Pass rate (oral)	390	0.87	0.12	0.35	1.00
Passers / lawyer	390	0.14	0.14	0.03	1.36
Takers / lawyer	390	0.33	0.18	0.11	1.69
Takers	390	1,292	1,108	100	6,317
Passers	390	496	460	28	2,965

Heterogeneity in pass rates BEFORE
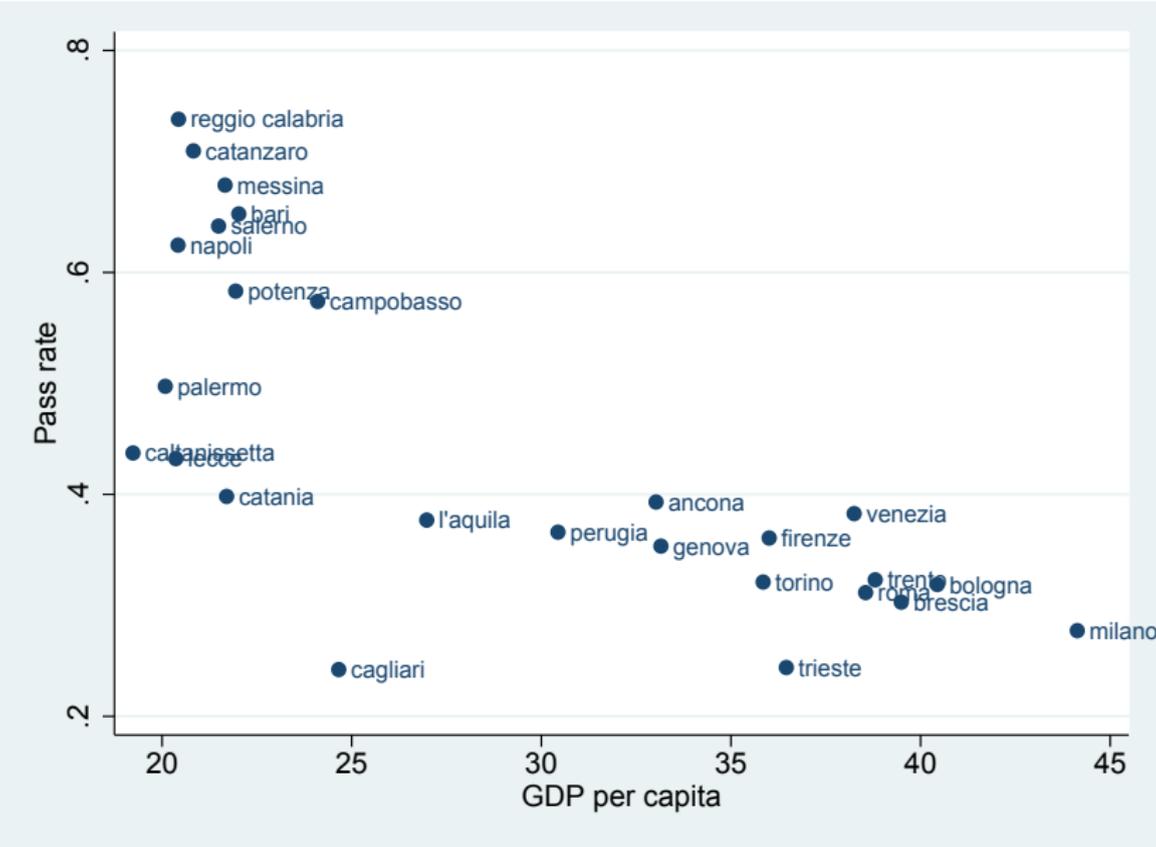
Heterogeneity in pass rates AFTER
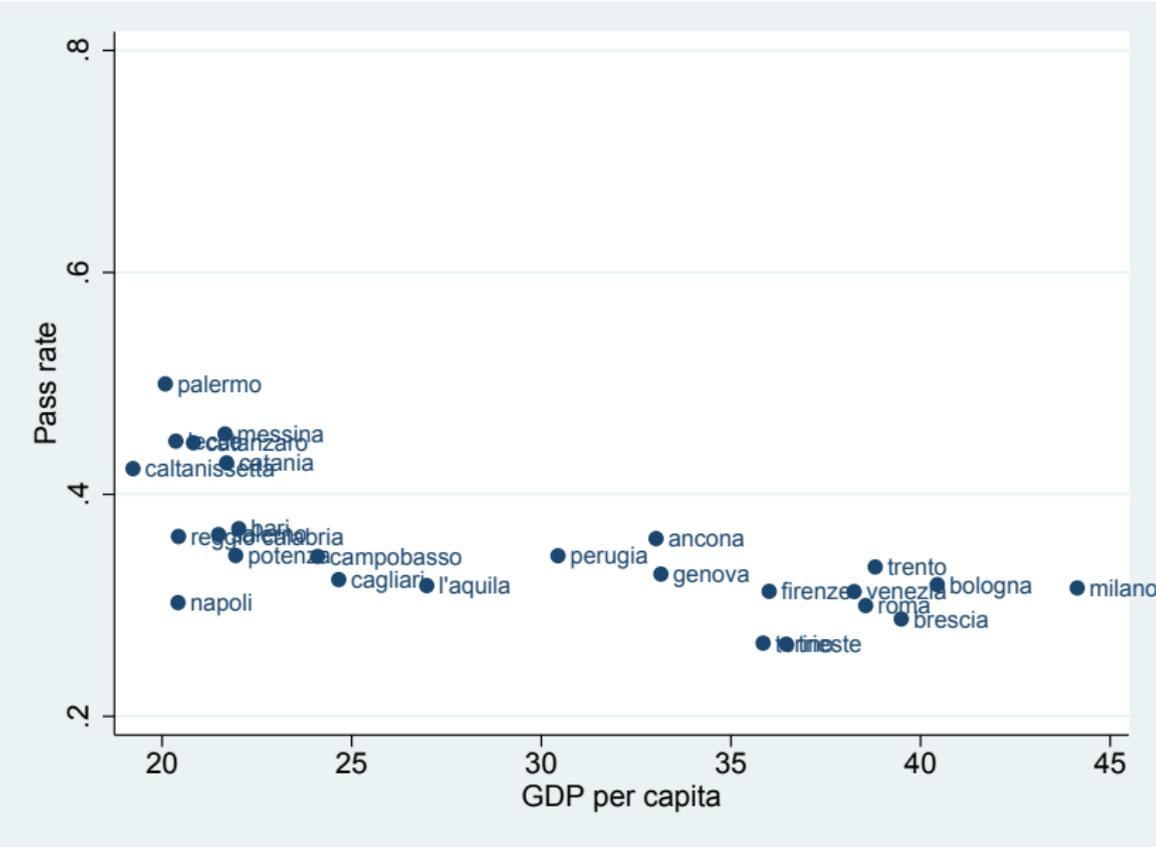
Heterogeneity in passers/lawyers BEFORE
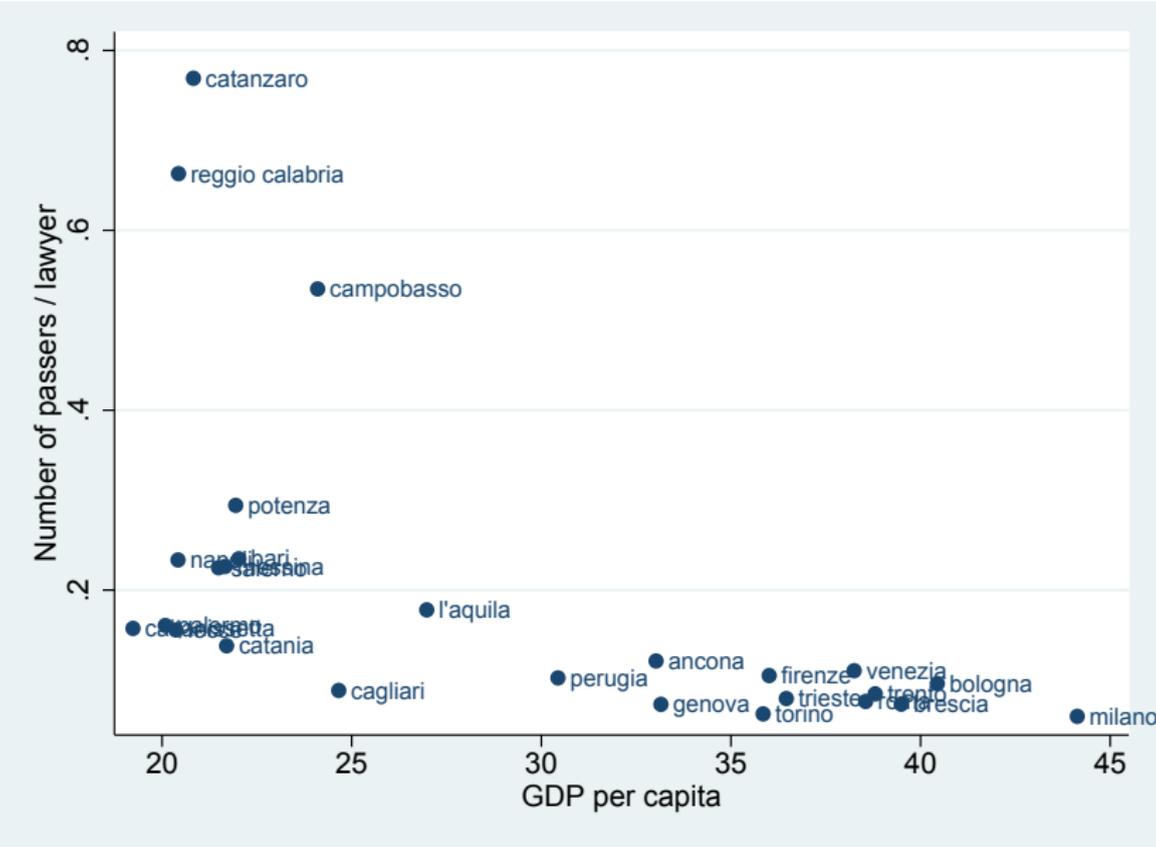
Heterogeneity in passers/lawyers AFTER
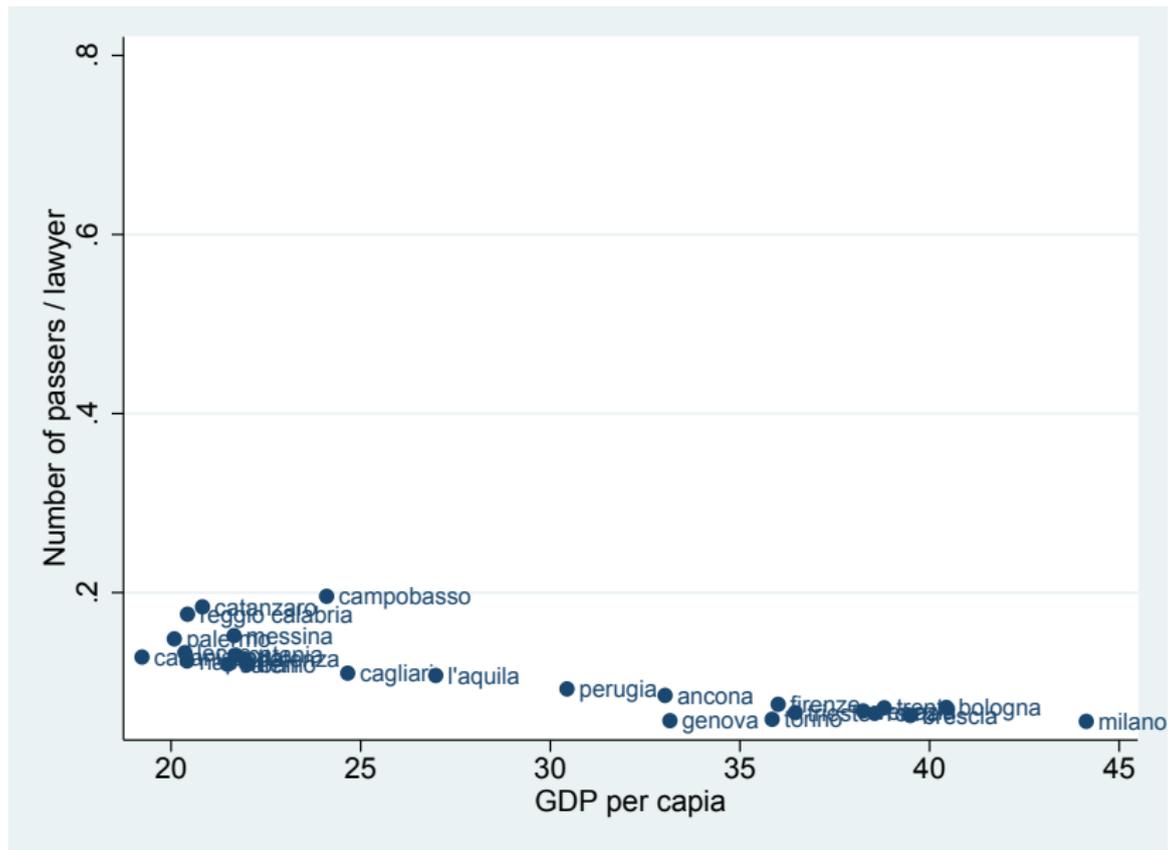
Heterogeneity in takers/licensed lawyer BEFORE
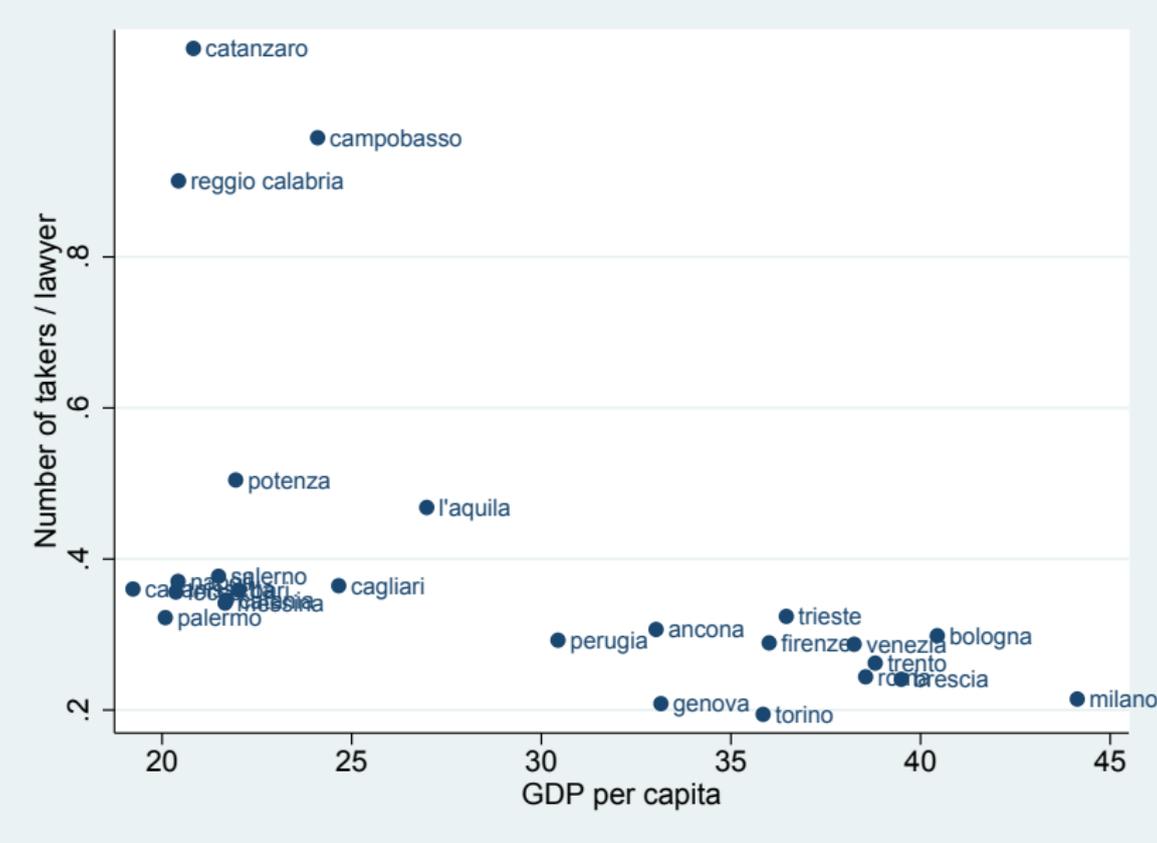
Heterogeneity in takers/licensed lawyer AFTER
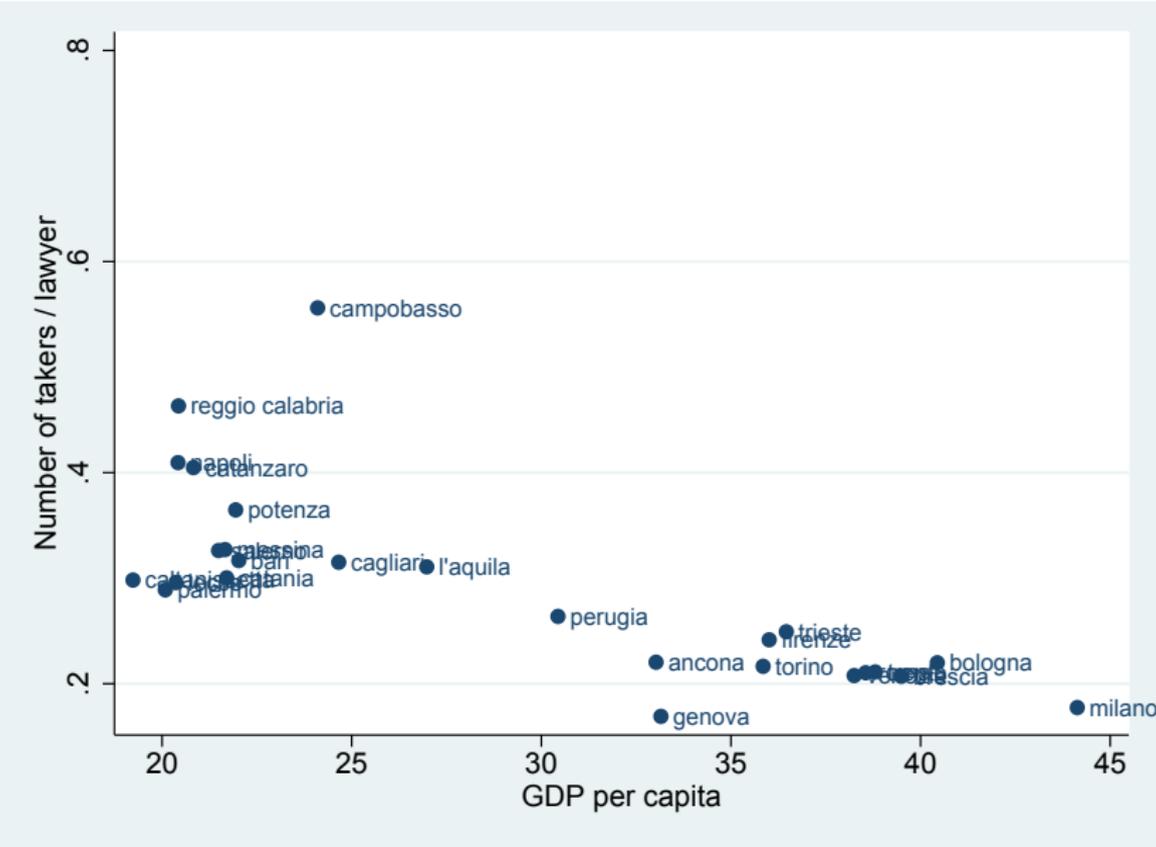
Are there differences in grading standards across districts?

- Are the extreme differences in pass rates **caused by the behavior of licensing boards**?
- The cross sectional evidence in previous figures is consistent with richer districts applying higher standards.
- Still, one cannot rule out that the quality of candidates was somewhat higher in the south.
- More in general, the problem is that of disentangling the effect of grading standards and candidate quality.

A simple test of equality of grading standards

- Consider the period after the reform:
  Written exams are **randomly** allocated to a different district.
- If all districts apply the **same standards** in grading written exams ⇒ we expect pass rates to be **uncorrelated** with the identity of the grading district.
- In a regression setting,

$$\text{Pass rate}_{it} = \alpha_i + \beta_0 X_{it} + \beta_1 X_j + \epsilon_{it}. \tag{1}$$

  where X_j includes characteristics of the grading district j or **(fixed effects)**.
- *Pass Rate*$_{it}$ refers to overall, written, or oral exam.
- Placebo test: The number of candidates is not correlated with identity of the grading district.

Pass rates and GDP of the grading district (all)
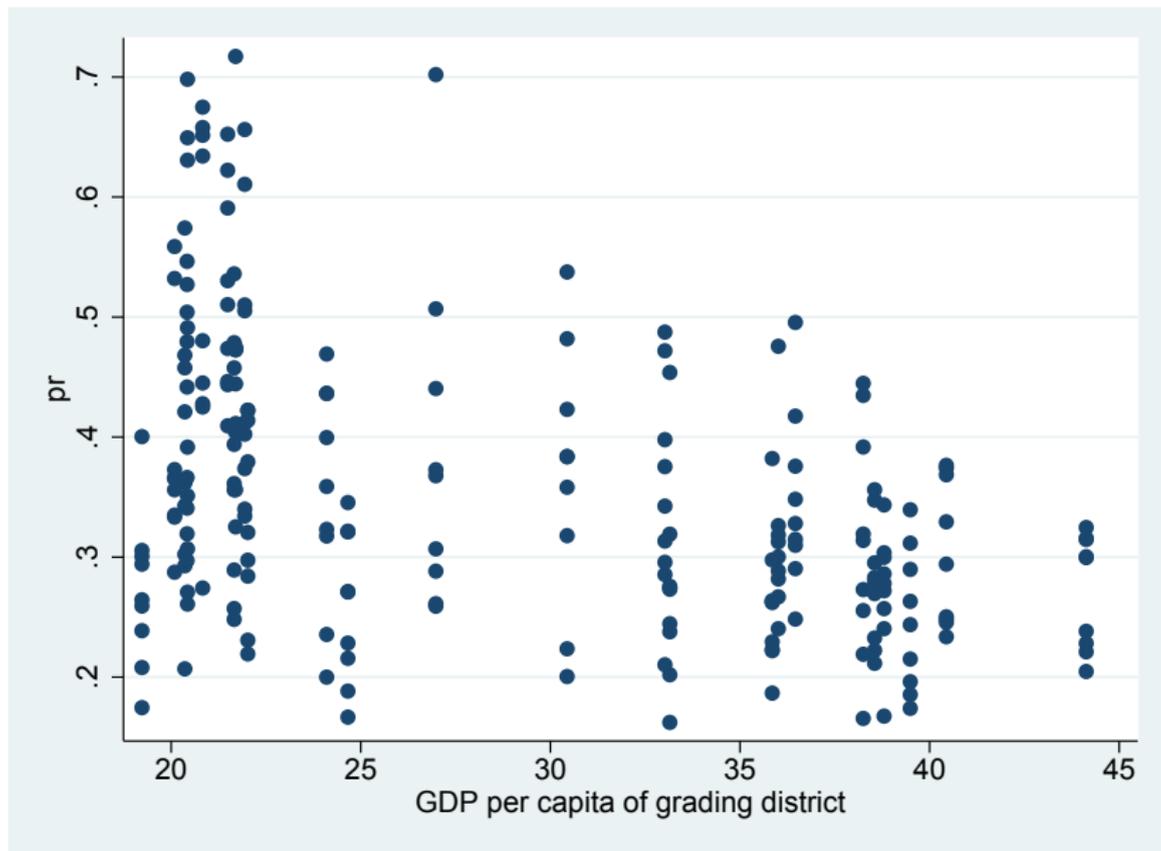
The heterogeneous impact of grading district on pass rates

VARIABLES	(1) Pass rate written exam	(2) Pass rate	(3) Pass rate oral exam	(4) Number of candidates
GDP per capita	-0.00893***	-0.00646***	0.00228***	-4.82e-05
of grading district	(0.00124)	(0.000958)	(0.000805)	(0.000574)
District f.e.?	Yes	Yes	Yes	Yes
Controls?	Yes	Yes	Yes	Yes
Observations	234	234	234	234
R-squared	0.463	0.460	0.821	0.775

Notes: Control variables include real GDP per capita (2009 euros), unemployment rate, and population density of the district in which the exam is taken.

Insights from reduced form regressions

1. Heterogeneous standards: Richer grading districts **cause** lower pass rates.

2. Different districts can lead to differences in pass rates as large as 50 percent for the written exam (35 percent overall).

3. Also pass rates for the oral exam are affected, but in the opposite direction. Why?
   - ▶ **Selection**: higher grading standards for the written exam → better candidates at the oral exam, hence higher pass rates. (positive correlation of candidates' ability in the written and oral exams.)
   - ▶ **Strategic behavior**: higher grading standards for the written exam lead to lower grading standards for the oral.

   ⇒ We need to define more precisely how candidates' ability and grading standards interact to determine pass rates.

Identification of exam grading standards

- Assume that candidates are evaluated by licensing boards using two performance measures, q_w and q_r.
- In each examination, the distribution of candidate performance is

$$\begin{pmatrix} q_w \\ q_r \end{pmatrix} = m_i + \begin{pmatrix} e_w \\ e_r \end{pmatrix} ; \text{where} \begin{pmatrix} e_w \\ e_r \end{pmatrix} \sim N \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \right) \tag{2}$$

where
m_i = mean candidate quality in district i.
N denotes the bivariate normal distribution.
ρ = correlation between q_w and q_r.

Identification of exam difficulty

The performance distribution and two thresholds w_i and r_i (grading standards) determine pass rates:

- Before the reform, a candidate passes
  1. the written component if $q_w > w_i$ and
  2. the overall exam if $q_w > w_i$ and $q_r > r_i$.
- After the reform, the written exam in district i is graded by district j, so that a candidate passes
  1. the written exam if $q_w > w'_j$ and
  2. the overall exam if $q_w > w'_j$ and $q_r > r'_i$,

  where w'_j and r'_i denote the exam thresholds after the reform.

Identification of exam difficulty
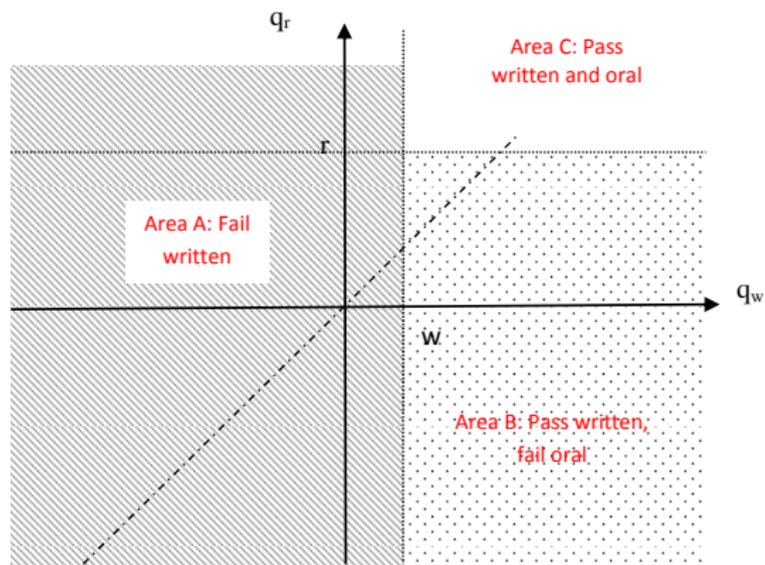
Identification of exam difficulty

- **Identification result 1**: If ...
  1. it is not possible to partition districts into subsets that grade exams independently,
  2. the mean quality of candidates in one district is normalized to zero, $m_1 = 0$,

  then the parameters m_i, w_i, w_i', r_i, r_i' and ρ are identified.

- Parameters are **jointly** identified by **pass rates**, **randomization**, and **functional form**.

- Intuition:
  1. Given $m_1 = 0$, pass rate data after the reform identify the exam thresholds in district 1, r_1' and w_2'.
  2. Then, given w_2', pass rates of the following year indentify r_3' and m_3.
  3. Repeated randomization sequentially identifies the thresholds and the mean quality in the other districts.
  4. The remaining parameter ρ is identified by the functional form assumption.

Identification of exam difficulty

▶ Pros and cons:

1. **The parametrization is flexible**: We allow for a response of grading standards to the reform:
   we expect $w_i \neq w_i'$ and $r_i \neq r_i'$.

2. **The parameters w_i and r_i (w_i' and r_i') are assumed to be constant** before (after) the reform.
   The model captures the average licensing boards behavior but not the transition process or the year to year variability in exam difficulty.

3. **The average quality m_i is time invariant**.
   However, the reform may have affected the mean quality of candidates in each district (e.g., through sorting or incentives).

4. If $m_i \neq m_i'$, then only m_i', w_i', r_i', and ρ are identified (no randomization before the reform).
   Analysis still possible (and results do not change), but we cannot assess the impact of the reform.

Identification of exam difficulty

- **Identifcation result 2**: If...
  1. $m_i = \mu_i + \varphi_1 r_i + \varphi_2 w_i$,
     before the reform, and
     $m_i' = \mu_i + \varphi_1 r_i' + \varphi_2 E(w_{-i}')$,
     after the reform,
  2. the mean and variance of the quality of candidates is constant (at the national level),

  then the **parameters** w_i', r_i', w_i, r_i, ρ, and φ **are identified**.

- This captures the possible endogeneity of candidates quality.

- Empirically, allowing for differences between m_i and m_i' does **not** affect the results.

Estimation

▶ Estimation by maximum likelihood.
The contribution to the likelihood of one observation in our
data set (one examination in one specific district) is

$$L = Pr(q_w < w, m_i, \rho)^{n_1} Pr(q_w > w, q_r < r, m_i, \rho)^{n_2}$$
$$Pr(q_w > w, q_r > r, m_i, \rho)^{n_3}$$

(3)

where
$n_1 =$ candidates failing the written exam,
$n_2 =$ candidates passing the written exam but failing the oral,
$n_3 =$ candidates passing both components.

Results: Parameters

Panel 1.	coeff.	s.e.
ρ	0.438	0.016
φ_1	0.003	0.148
φ_2	0.040	0.042

- ▶ High correlation of performance in written and oral exam.
- ▶ Small and non-significant impact of exam theresholds on quality.
- ▶ Results assuming $m_i = \mu_i$ are qualitatively identical.

Results: grading standards in written exam *w*
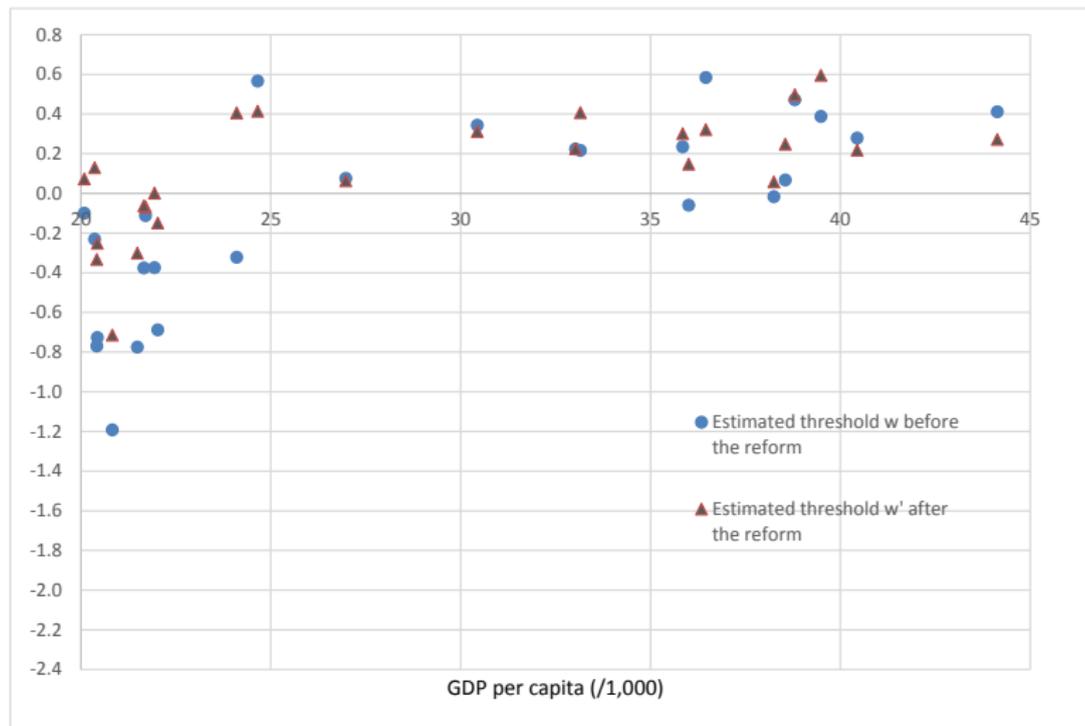
Results: Change in grading standards in written exams

GDP per capita (/1,000)
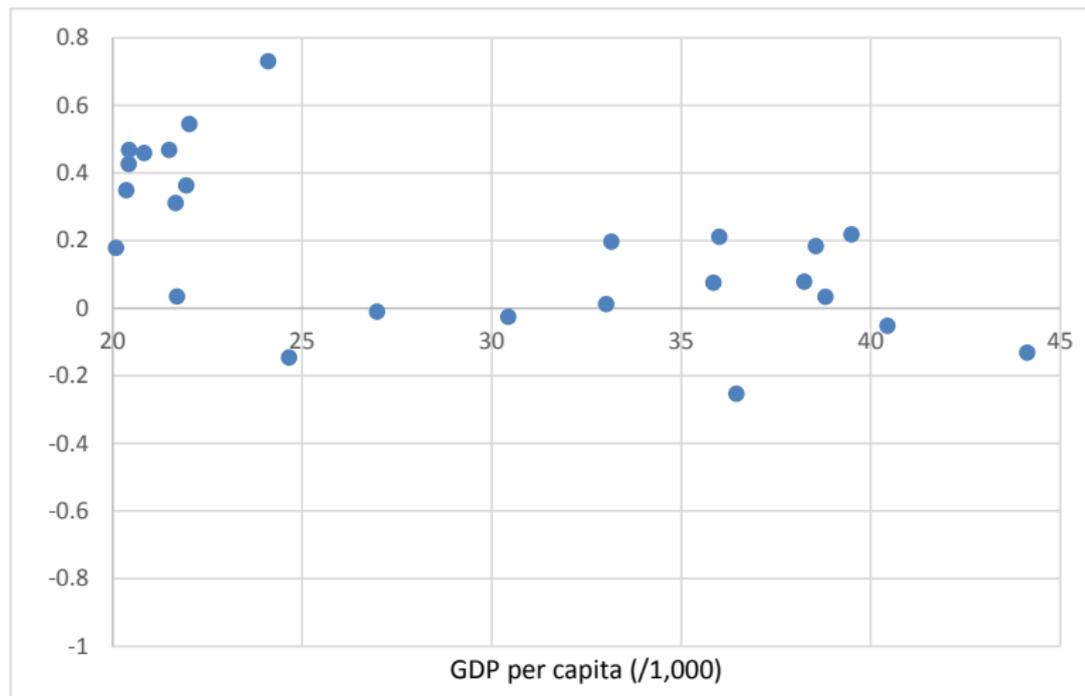
Results: Grading standards in oral exam *r*
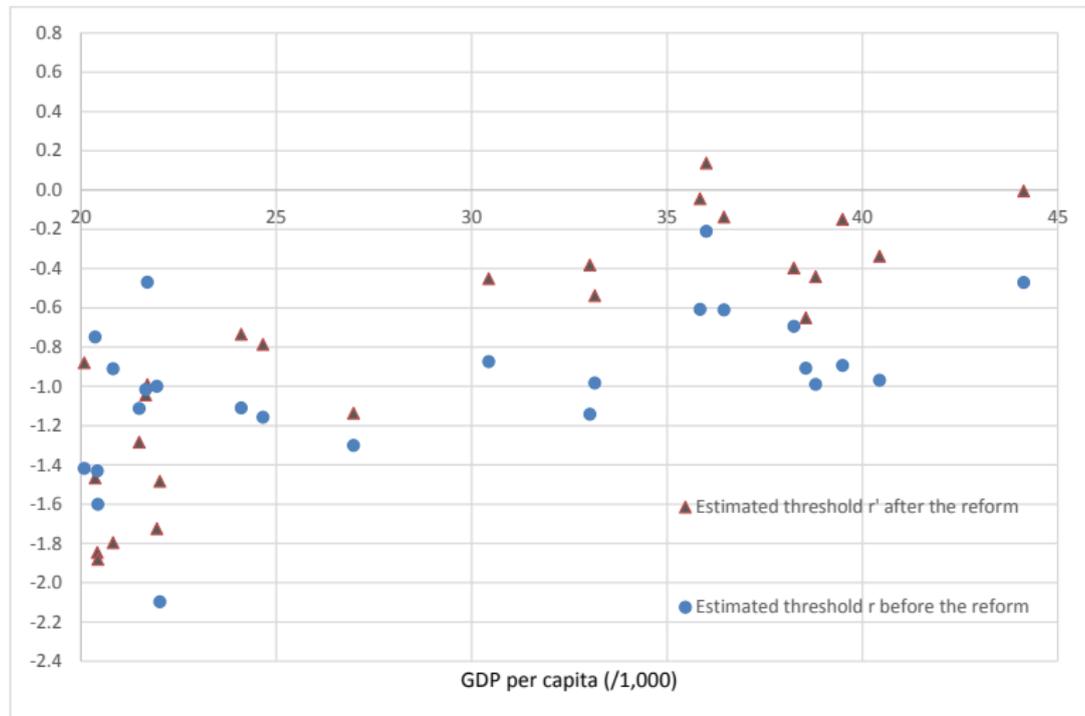
Results: change in grading standards in oral exams

GDP per capita (/1,000)
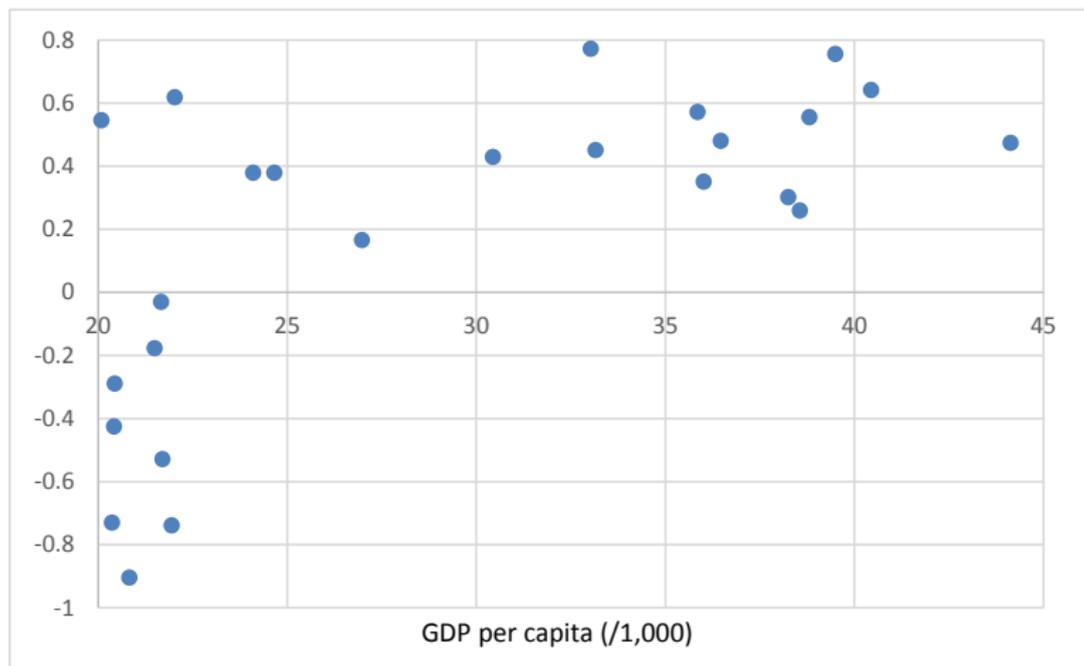
Results: estimated quality *m*

GDP per capita (/1,000)

△ Esitimated mean quality m after the reform

● Esitimated mean quality m' before the reform
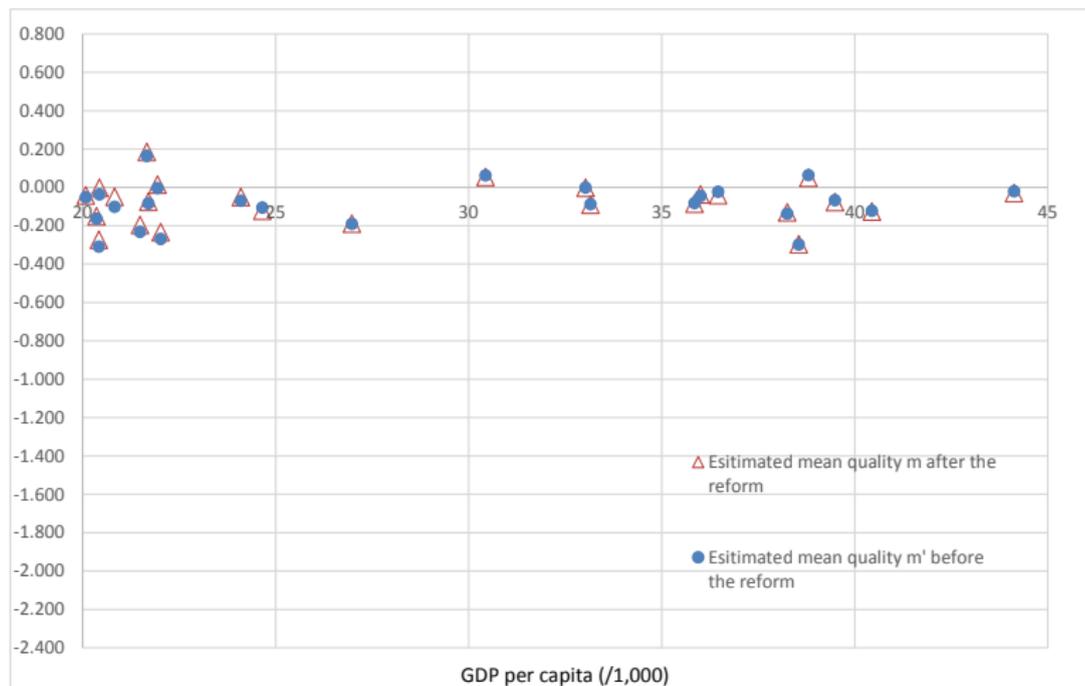
Results: Summary

1. Richer districts have higher grading standards than poorer districts.
2. After the reform, poorer districts increased their standards for the written exam and decreased their standards for the oral exam.
3. Richer districts kept their standards unchanged for the written exam and increased those for the oral exam.
4. Differences in mean quality across districts are small stable.

$\Rightarrow$ **Differences in pass rates are mainly driven by differences in grading standards**.

The unfairness of admission standards

▶ **Before the reform:**
We estimate the pass rates that would occur if the standards of Bari or Trieste were used in every district:

1. Bari: 24% more candidates (about 7,100 per year) would have passed.
2. Trieste: 25% more candidates (7,400) would have failed.

▶ (Strict) definition of fairness:

1. 24% of all candidates have experienced an unfair failure, being better than some admitted candidates
2. 25% of all candidates have experienced an unfair admission, being worse than some of the failed candidates

⇒ **49% of candidates obtained an unfair exam outcome**.

▶ **After the reform:**
only 26% ⇒ **The exam became less unfair.**

Why? Occupational licensing and strategic interaction

- We develop a new idea:
  Licensing boards strategically choose entry standards and interact with each other.
- Model setting:
  1. **Local self-regulating professions**: Licensing boards are voted by and represent professionals in each district. Objective function is a **weighted sum of producer and social surplus**.
  2. **Local exams**: Local licensing boards choose the grading standard (equivalently the number of entrants).
  3. **Labor mobility**: After admission, lawyers can freely move across districts.
  4. **No mobility of candidates and similar distribution of ability** (simplification).
  5. **Two districts**: market 1 poor; market 2 rich

Strategic interaction: Incentives to deviate at salary y
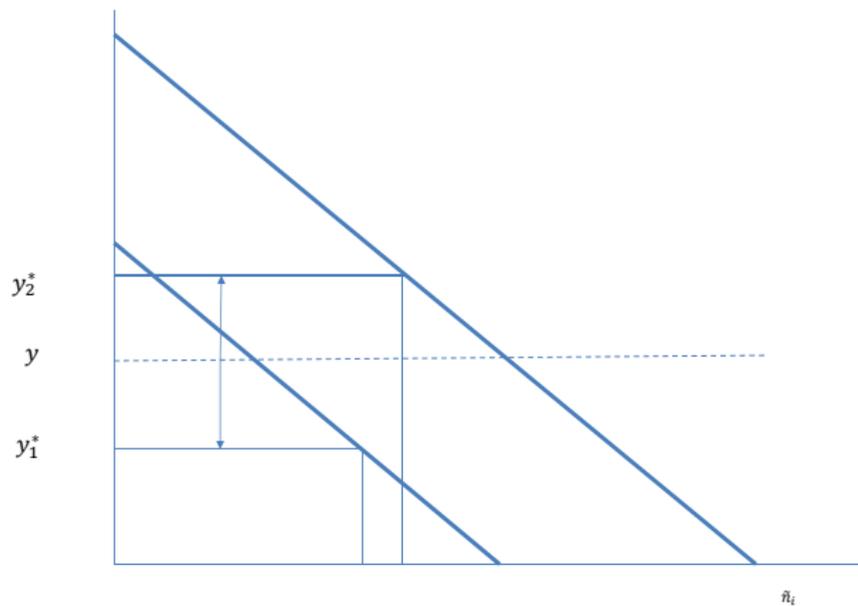
Best reply functions and equilibrium
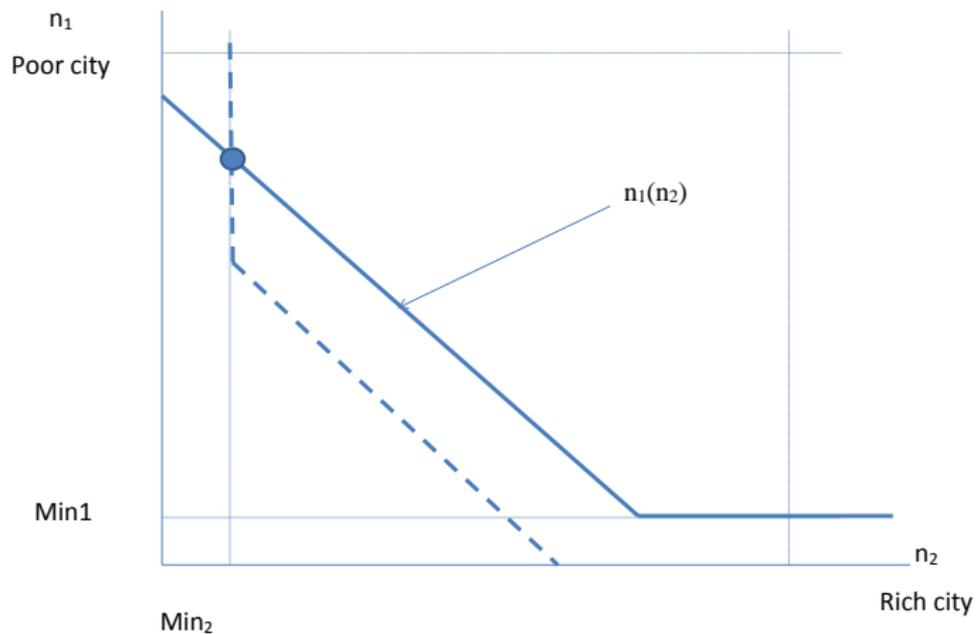
Equilibrium

In the **unique equilibrium**:

1. **Pass rates**:
   - ▶ in the rich market $n_2 = min_2$.
   - ▶ the pass rate in the poor market is such that the preferred wage is reached (or alternatively $n_1 = max_1$).

2. **Extreme differences in grading standards**

3. **Mobility**: Some licensed lawyers move from the poor to the rich market.

4. **Unfair exam**: exams treat differently identical individuals.

5. **Incentives to reform the grading procedure**: There are too many professionals from the point of view of the rich district (corner solution).
   $\Rightarrow$ *The rich district gains from imposing a lower n_1 (or max_1).*

Equilibrium (implications)

1. We can rationalize the differences in the levels of
   - pass rates,
   - grading standards (unfairness),
   - mobility,
   - asymmetric incentives to reform (Lega Nord)

   as an equilibrium outcome.

2. The reform mitigates the consequences of this equilibrium but does not change the nature of the equilibrium.

3. In fact, after the reform,
   - richer districts increase the grading standards in the oral exam (since written exams are graded elsewhere).
   - poorer districts decrease the standards in the oral exam (trying to undo the effect of higher standards).

   ⇒ the observed changes in grading standards are consistent with strategic interaction.

Conclusions

We study the combination of **local entry examinations and worker mobility**.

- ▶ Empirical evidence:
  1. Extreme differences in exam difficulty.
  2. Unfair exams.
  3. The reform makes the exam more difficult but less unfair.

- ▶ Strategic interaction provides an equilibrium explanation for these results and rationalizes the reform.

- ▶ **A new form of regulatory competition.**