

# Corruption and Talent Allocation

Yang Xun, CEMFI

Job Market Talk

# The Civil Servant Fever



public sector exams (*concursos públicos*) in Brazil

# The *Civil Servant Fever*

- Civil servant fever around the world
  - **Brazil:** extremely competitive public *concursos* → avg. prob. of being hired around 4%
  - **China:** 2.1 million sit *Guokao* exam in 2021 → 1-in-68 chance
  - **India:** 1 in 4 recent college graduates appear in civil service exams in the state of Tamil Nadu
- “...when young people say they want to become civil servants, I cannot help but wonder why...It’s because they see in it a way to get rich quickly – the opportunity for **corruption**. In other words, it offers the prospect of rapid success without having to put in the hard work.”

—— Dmitry Medvedev (July 2011)

Russian politician who later faced with major corruption allegations

# Corruption and Talent Supply for the Public Sector

- Talent is key for gov. performance (Fenezia, 2022; Best et al., 2023)
  - Yet less is known about how factors such as corruption can “distort” the allocation of talent
  - A priori unclear whether corruption in the public sector attracts or repels talent
    - corruption may attracts capable *rent-seekers* by increasing pecuniary returns to public sector careers (Baumol, 1990; Murphy et al., 1991; Acemoglu, 1995)
    - corruption may crowd out *pro-social* or *reputation-driven* agents (Hanna and Wang, 2017; Barfort et al., 2019)
- ambiguous theoretical prediction calls for empirical investigation

# This Paper

## Context & Research Design

- Brazil: randomized anti-corruption audits at municipal gov. (2003-2015)
    - exogenous policy shock: evidence that it diminished local corruption ([Avis et al., 2018](#))
    - rich administrative data on the universe of college students and the labor market
  - Event-study estimation exploiting randomized and staggered nature of audits
    - staggered difference-in-difference framework
    - stack-by-event design to account for potential treatment effect heterogeneity ([Goodman-Bacon, 2020](#))
- first empirical evidence in a natural experiment setting using economy-wide data

# This Paper

## Overview of Results

- Audits lead to negative sorting into public sector careers by ability (proxied by standardized test scores)
  - ↓ share of high-ability students enrolling in majors tailored towards the public sector
  - ↓ share of high-ability students working as civil servants→ *brain drain* out of public sector
- Mechanisms: effects driven by student behavioral response
  - suggestive evidence consistent with *diminished rent-seeking* and a *reputation deterrence effect*
  - not driven by *education supply* or *labor demand*

# Literature & Contribution

- **Selection into the public sector** (Finan et al., 2013; Besley et al., 2022)
  - financial incentives and selection in experimental settings (Dal Bó et al., 2013; Deserranno, 2019; Ashraf et al., 2020)
  - corruption and honesty selection in experimental settings (Hanna and Wang, 2017; Barfort et al., 2019; Brassiolo et al., 2021)→ first empirical evidence in a natural experiment
- **Corruption & anti-corruption policies**
  - Murphy et al. (1993); Acemoglu (1995); Ehrlich and Lui (1999); Fisman and Miguel (2007); Olken and Pande (2012); Ajzenman (2021); Gulino and Masera (2022)
  - political and economic impacts of the same audit program (Ferraz and Finan, 2008, 2018; Colonnelli and Prem, 2022; Gonzales, 2021)→ implications of corruption on talent (mis)allocation
- **College major choice & labor market outcomes**
  - career & family (Wiswall and Zafar, 2021); stereotypes (Colon and Patel, 2022)
  - divergence in realized careers (Kirkeboen et al., 2016; Sloane et al., 2021)→ anti-corruption policy can impact human capital specialization

# Outline

## Institutional Background & Data

## Effects of Audits on Talent Allocation

- Empirical Strategy

- Audits and College Majors

- Audits and Realized Careers

## Drivers of Talent Allocation: Mechanisms

## Concluding Remarks



## Institutional Background & Data

# Institutional Background: Brazil

## Corruption in the Public Sector



"251 civil servants dismissed for corruption in the first half of 2016"  
(Source: *Agência Brasil*)

# Institutional Background: Brazil

## Anti-Corruption Drive by Lula Gov. 2003

- Publicly-aired lottery draws targeting municipal gov.
  - eligibility: non-capital muni. below certain population thresholds
  - replacement: can be audited again after some draws
  - over 40% municipalities audited during 2003-2015 [audits](#) [maps](#)
  - program upgraded to be non-randomized (hybrid) in 2015
- Timeline of key events
  - audit *announcement*: covered by media and followed by audit activities within weeks
  - audit *report*: made public within 6-8 months after announcement, followed by anti-corruption enforcement activities

# Institutional Background: Brazil

## Tertiary Education and Public Sector Careers

- Higher education system in Brazil
  - public-private divide
    - public institutions: prestigious, free, and over-subscribed
    - private institutions: under-subscribed with 80% market shares
  - students enroll in specific university-degree programs
  - centralization reform 2010: students applying to the same program in public uni. are ranked by uniform exam grades
- Public sector careers in Brazil
  - selection is professionalized and meritocratic ([Grindle, 2012](#))
  - civil servants enjoy tenure and a public sector wage premium  
-> highly competitive: avg. prob. of being hired 4% ([Mocanu, 2023](#))
  - discretionary positions are still prevalent ([Colonnelli et al., 2020](#))

# Data & Sample

- **National High School Exam (ENEM)** (2009-2017)
    - municipality of residence → *geo-locator*
    - exam performance as a proxy for (cognitive) ability
  - **Census of Higher Education** (2010-2018)
    - universe of freshman major enrollment
  - **Matched Employer-Employee Dataset (RAIS)** (2010-2018)
    - trace students to first jobs in the formal labor market
    - define public or private sectors by contract details
- all micro-data linked with individual ID and aggregated to a muni.-level panel
- **Municipal Datasets**
    - CGU audits (focus on 2011-2014 waves)
    - population census and municipal surveys

# Effects of Audits on Talent Allocation

# Stacked Diff-in-Diff

Traditional TWFE model could induce bias in the presence of treatment effect heterogeneity (Goodman-Bacon, 2021), instead

- consider the “sub-experiment” for treatment cohort  $c \in \{2011, 2012, 2013, 2014\}$ 
  - $Treated_{mc} = 1$ : units audited for the first time at time  $c$
  - $Treated_{mc} = 0$ : units not-audited in the time window of interest

→ reduced to *first-audited* (2011-2014) and *never-audited* balance check
- stack all sub-datasets (treated units and respective controls)
- estimate TWFE for the “stacked” dataset

$$Y_{mct} = \beta Treated_{mc} \times Post_{ct} + \delta_{mc} + \lambda_{sct} + \epsilon_{mct},$$

- $Y_{mct}$ : outcome for municipality  $m$  in cohort  $c$  at time  $t$
- $Post_{ct}$  equals one for observations in year  $c$  and after
- $\delta_{mc}$  and  $\lambda_{sct}$ : municipality-cohort and state-cohort-time FE
- standard errors clustered at muni. level

# Stacked Event-Study

- To investigate dynamic evolution of treatment effects & test for pre-trends, my main specification follows the event-study design

$$Y_{mct} = \sum_{\tau=-4}^7 \beta_{\tau} D_{ct}^{\tau} \times Treated_{mc} + \delta_{mc} + \lambda_{sct} + \epsilon_{mct},$$

- $Y_{mct}$ : outcome for municipality  $m$  in cohort  $c$  at time  $t$
  - $D_{ct}^{\tau}$ : cohort-specific indicator variables for “relative time to audit announcement”, where  $\tau = -1$  is the reference period
  - baseline time window  $[-4,7]$ , where unit of time is the year
  - $\delta_{mc}$  and  $\lambda_{sct}$ : municipality-cohort and state-cohort-time FE
- Students are directly exposed to audits if their residence muni. is *announced* to be audited the year or before they enroll in college
    - $\tau = 0$ : partially-treated
    - $\tau \geq 1$ : fully-treated

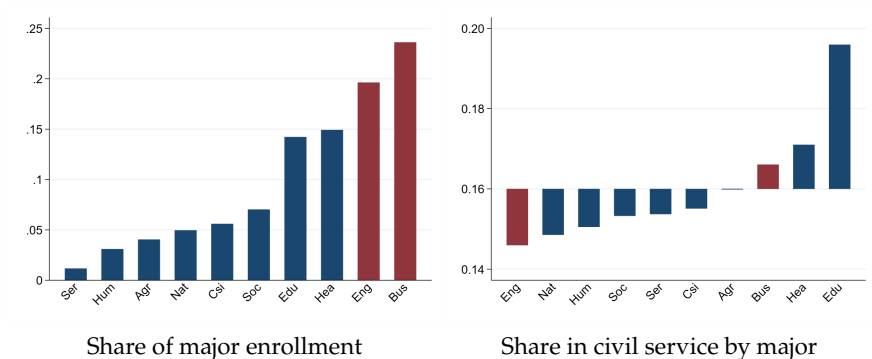


# Effect of Audits on Majors: Motivating Facts

Among high-ability (top 25% grade) students low-ability

- > 40% choose either business/law or engineering
- business/law students more likely to become civil servants more

**Figure:** Majors & Careers for High-Ability Students in 2010



# Effect of Audits on Majors: Aggregate Enrollment

Figure: Shares of Aggr. Major Enrollment (All Universities)

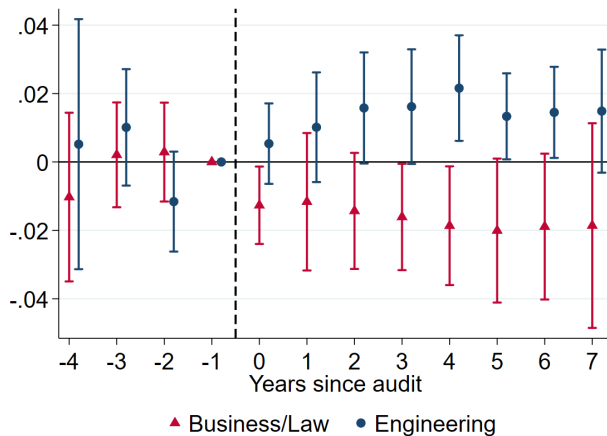


table estimates

college entry

all majors

balanced-panel

→ on average, 1 in 70 students switches majors after anti-corruption audits

# Effect of Audits on Majors: *Public vs. Private Uni.*

Recall the public-private divide

- public universities: over-subscribed
- private universities: under-subscribed

**Figure:** Shares of Aggr. Major Enrollment (Private vs. Public Uni.)

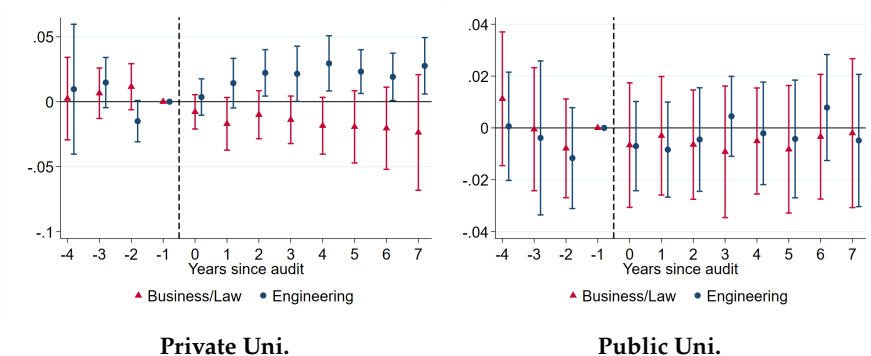
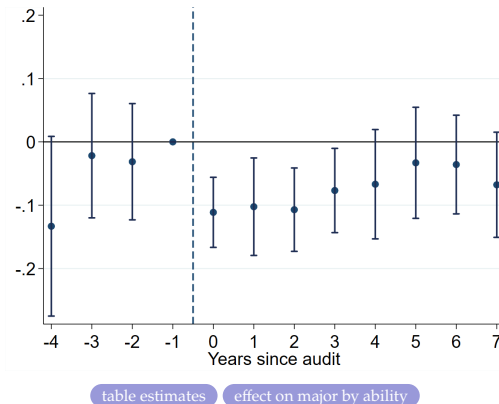


table estimates

# Effect of Audits on Majors: Ability Composition

However, null effects on aggr. enrollment shares in public uni. mask compositional changes:

**Figure:** Share of High-Ability in Business/Law in Public Uni.



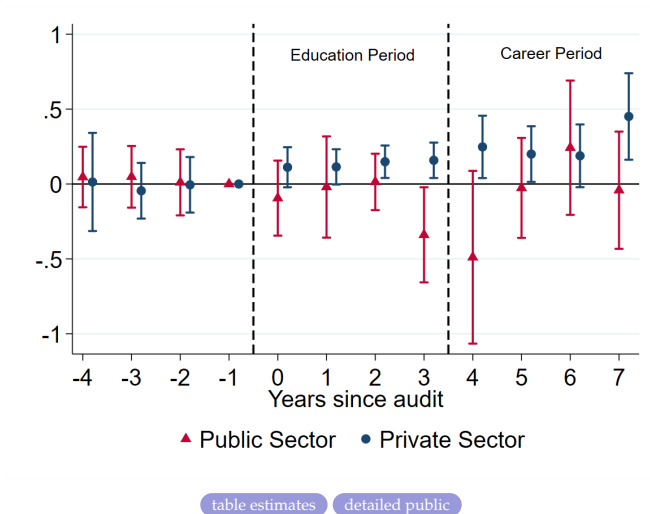
DiD coefficient: -0.063 (0.026) → 13.4% relative decline

# Effect of Audits on Careers: Sample Construction

- College Enrollment (2010-2018) → RAIS (2010-2018)
- Sample attrition: 3.4% freshmen traced to full-time first-job [more](#)
  - exclude students with past work experiences
  - short timespan and unemployment spells
  - do not observe emigration, the informal sector, or postgraduate education
- Sample restriction: restrict *Post* to be at least 4 years onwards in the diff-in-diff [sum. stats.](#)
  - hypothetical minimum timing for degree completion
  - remove (partially) those who are preparing to enter public sector careers and choose majors accordingly

# Effect of Audits on Careers: Career Realizations

Figure: Number (asinh) of First Jobs by Sector



# Audits and Realized Careers: Ability Composition

Focus on ability composition among (tenure-track) civil servants:

**Figure:** Share of High-Ability in Civil Service

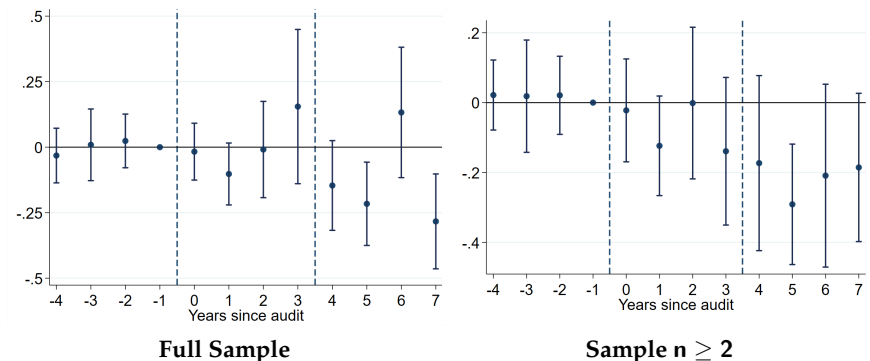


table estimates

DiD coefficient (full sample): -0.197 (0.074) → 52% relative decline

# Summary of Results

- Audits lead to an inferior candidate pool for the public sector
- Audits lead to an inferior civil service workforce

→ public sector *brain drain*



## Drivers of Talent Allocation: Mechanisms

# Possible Mechanisms

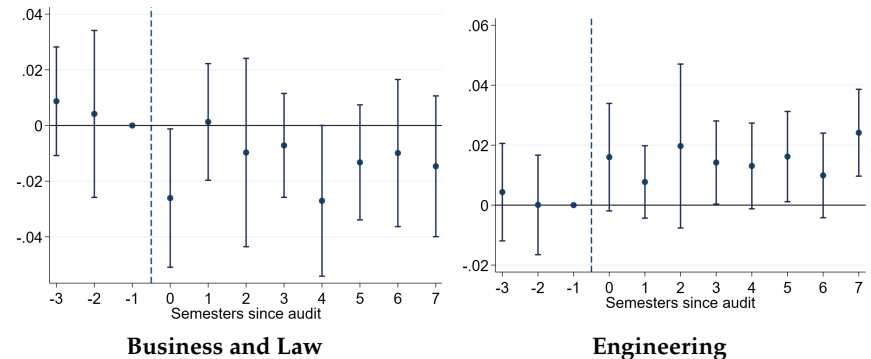
Why do audits lead to public sector *brain drain*?

- Suggestive evidence consistent with a decrease in perceived attractiveness of public sector careers following audits
  - ↓ rent-seeking returns
  - ↑ reputation costs
- Possible simultaneous crowding-in of prosocial agents
- Evidence inconsistent with demand-side explanations

# Mechanisms: Immediate Effects at Announcement

Immediate responses of students at audit *announcement*, but before audit *report* (available 6-8 months later) → *priors* matter

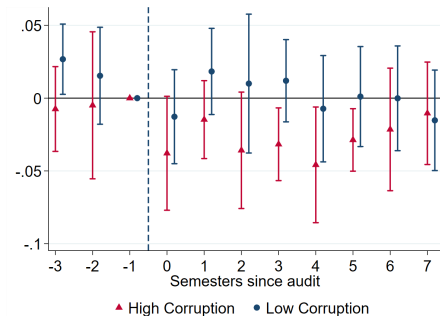
**Figure:** Shares of Major Enrollment (Time is Semester)



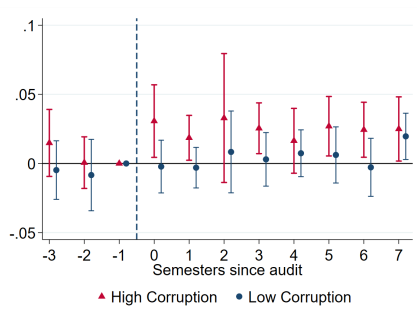
# Mechanisms: Heterogeneity by Corruption Level

Effects concentrated in high-corruption (above-median irregularities) muni.  
→ *priors* are largely correct

Figure: Shares of Major Enrollment (Corruption Level)



**Business and Law**



**Engineering**

# Mechanisms: Discussions

How to interpret the heterogeneous immediate effects?

- students hold largely correct priors on local corruption and foresee future  $\downarrow$  in corruption rents and/or  $\uparrow$  reputation costs
  - effects seem to be amplified by issue salience more
- unlikely to be driven by motivation *crowding-out*
  - pro-social talent would abstain from a corrupt public sector evidence
  - no surprise shock at audit announcement before corruption revelation
- possible *crowding-in* of pro-social students
  - consistent with anti-corruption efforts leading to *honesty gain* in other middle-income contexts ([Hong, 2023](#))
  - suggests the negative sorting by ability are net effects

# Mechanisms: General Equilibrium Responses

- Audits impact a wide range of political and economic outcomes (Ferraz and Finan, 2008; Avis et al., 2018; Colonnelli and Prem, 2022)
- So far, treatment is defined based on students' "origin"
- Yet, both the higher education market and the labor market in Brazil are somewhat localized
  - 50% of students go to college in their hometown muni.
  - 58% of students end up working in the same muni. as their muni. of high school residence
- Next, evaluate the direct effects of audits on
  - university degree supply
  - labor demand in private firms & public organizations

# Mechanisms: University Degree Supply

- Education sector in Brazil vulnerable to corruption & political turnover ([Ferraz et al., 2012](#); [Akhtari et al., 2021](#))
  - audits may affect degree supply, esp. in public uni.
- Directly effects of audits on vacancies offered (sample of muni. with universities located)
  - results consistent with private uni. catering to market demand
  - fewer vacancies in public uni. would increase competition & the ability of the “marginal” student
    - not what I observe in the student sample

# Effect on Degree Vacancies

	Num. of Degree Vacancies (asinh)	
	Business/Law (1)	Engineering (2)
<b>Panel A: Private University</b>		
Audit $\times$ Post	-0.156* (0.090)	0.456** (0.200)
$R^2$	0.72	0.73
Mean Dep. Var.	5.44	5.38
SD Dep. Var.	0.68	0.59
Observations	14,488	6,161
Num. of Clusters	403	195
<b>Panel B: Public University</b>		
Audit $\times$ Post	-0.428 (0.327)	-0.049 (0.251)
$R^2$	0.76	0.77
Mean Dep. Var.	4.60	4.55
SD Dep. Var.	1.21	0.83
Observations	6,346	5,689
Num. of Clusters	208	186
Muni. $\times$ Cohort FE	X	X
State $\times$ Year $\times$ Cohort FE	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*

$p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



# Mechanisms: Labor Demand

- Audits boost private sector firm entry and growth ([Colonnelli and Prem, 2022](#))
  - limited effects on first hires in the medium run
  - do not explain immediate effects on majors
- Audits increase patronage hiring in public sector ([Gonzales, 2021](#))
  - do not explain negative sorting in fields of study (candidate pool)
  - negative selection by ability unobserved among temporary contracts, where patronage hiring is more prevalent [detail](#)

# Effect on Total First Hires

	Num. of Total First Hires (asinh)		
	Public Sector		Private Sector
	Civil Service (1)	Temporary (2)	(3)
<b>Panel A: RAIS 2010-2018</b>			
Audit $\times$ Post	0.021 (0.274)	0.187 (0.235)	0.009 (0.048)
$R^2$	0.67	0.80	0.97
Mean Dep. Var.	2.82	3.07	6.89
SD Dep. Var.	2.28	2.43	1.68
Observations	156,266	156,266	156,266
Num. of Clusters	3,693	3,693	3,693
<b>Panel B: RAIS 2002-2018</b>			
Audit $\times$ Post	0.393*** (0.116)	0.178 (0.118)	0.007 (0.027)
$R^2$	0.62	0.73	0.96
Mean Dep. Var.	2.69	2.84	7.03
SD Dep. Var.	2.27	2.33	1.66
Observations	524,351	524,351	524,351
Num. of Clusters	5,347	5,347	5,347
Muni. $\times$ Cohort FE	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X

Notes: "Post" is [t+4, t+7]. Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Additional Results & Robustness Checks

- Heterogeneous effect by local media [see](#)
- Effect on other dimensions of workforce composition
  - degree background [see](#)
  - demographic and socioeconomic background [see](#)
- Geographic spillovers [see](#)
- Audits and selective migration [see](#)
- Audits and corruption perception [see](#)
- Robustness checks:
  - alternative estimators ([Borusyak et al., 2023](#)) [see](#)
  - Poisson QMLE ([Chen and Roth, 2023](#)) [see](#)
  - audits and civil servants: alternative timespans [see](#)
  - audits and civil servants: alternative sample restrictions [see](#)

## Concluding Remarks

# Taking Stock

- Anti-corruption efforts in Brazil lead to a public sector *brain drain*
  - fewer high-academic achieving students opt for business/law
  - downstream effects on the composition of civil servants
- Results are mainly driven by students self-selecting out of a less attractive public sector career
  - corruption could distort talent allocation toward rent-seeking in the public sector, other than its direct costs on the economy
  - top-down anti-corruption policy could potentially adjust this “allocative inefficiency”

# Moving Forward

- Survey data can help elicit traits unavailable in admin. data, such as *prosociality* and further pin down mechanisms
- Economy-wide microdata is a promising first step to gauge the concrete effects of bureaucratic selection on economic growth and public service delivery
  - link employer-employee data to firm registries to uncover firm creation and entrepreneurial activities ([Baumol, 1990](#))

*Thank you!*

yang.xun@cemfi.edu.es

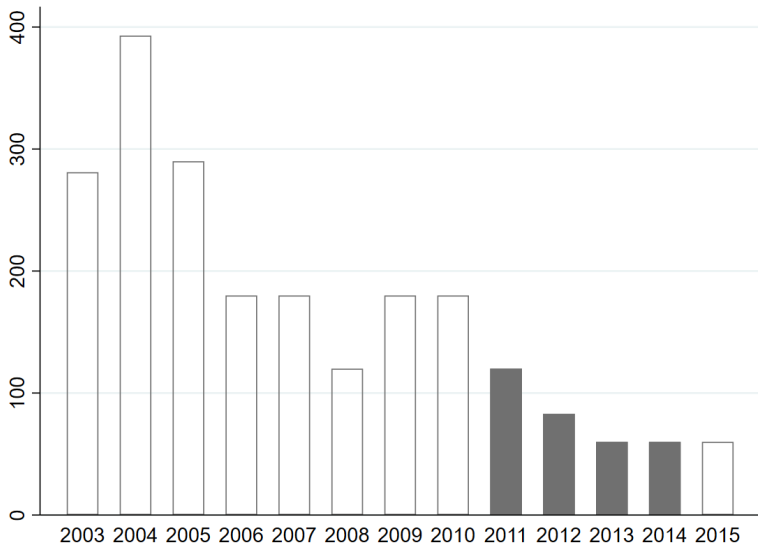
# Appendix



# Number of Municipalities Audited by Year

[Back](#)

Source: Controladoria-Geral da União (CGU)



# Geographic Distribution of Audits

[Back](#)

Source: Colonnelli and Prem (2022)

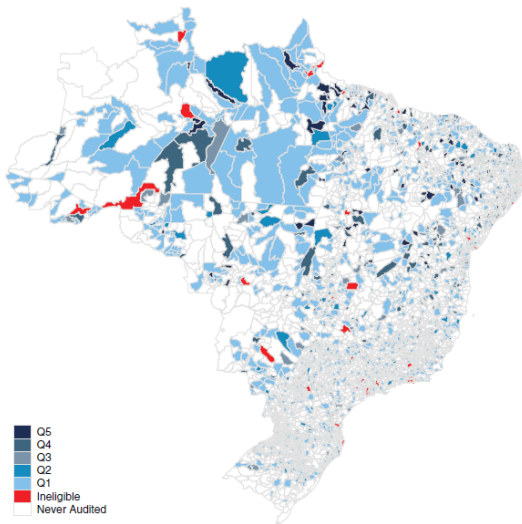


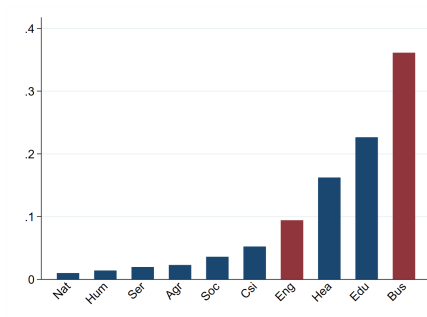
FIGURE 2  
Corruption across Brazilian municipalities

# Sample Balance Test [back](#)

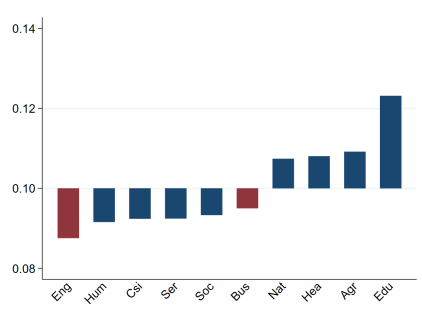
	Control		Treatment		Difference
	Mean (1)	Std. Dev. (2)	Mean (3)	Std. Dev. (4)	(5)
<b>Panel A: Pre-Treatment Municipal Characteristics</b>					
Population (logs)	10.02	0.60	10.09	0.62	0.03 (0.04)
Share urban	0.63	0.22	0.64	0.20	0.02* (0.01)
Share literate	0.78	0.09	0.77	0.09	0.00 (0.00)
Share of population with a college degree	0.04	0.02	0.03	0.02	0.00 (0.00)
Has AM radio 2009	0.19	0.39	0.20	0.40	0.02 (0.03)
Has internet provider 2009	0.54	0.50	0.59	0.49	0.03 (0.03)
<b>Panel B: Pre-Treatment Higher Education Market Characteristics</b>					
Num. of freshmen (logs)	3.10	1.39	3.15	1.41	0.02 (0.09)
Share female	0.49	0.02	0.49	0.02	-0.00 (0.00)
Share in public universities	0.34	0.27	0.35	0.27	0.01 (0.02)
Share enrolled in business/law	0.27	0.17	0.27	0.18	0.01 (0.01)
Share enrolled in engineering	0.11	0.12	0.10	0.10	-0.00 (0.01)
Share enrolled in education	0.28	0.21	0.30	0.21	0.00 (0.01)
Share enrolled in health	0.17	0.15	0.18	0.15	0.00 (0.01)
<b>Panel C: Pre-Treatment Labor Market Characteristics</b>					
Num. of public sector workers (logs)	5.75	1.22	5.96	1.11	0.05 (0.07)
Share of workers in public sector	0.42	0.29	0.47	0.30	0.01 (0.02)
Share of workers in civil service	0.34	0.26	0.37	0.27	0.01 (0.02)
Observations	3,409		221		

# Appx: Low-Ability Students (Lowest 50% Grade) [back](#)

Figure: Majors & Careers for Low-Ability Students in 2010



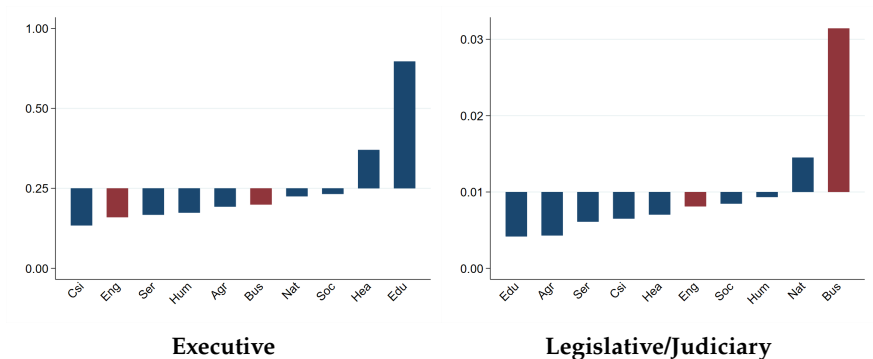
Share of major enrollment



Share in civil service by major

# Appx: Detailed Major-Career Mapping [back](#)

Figure: Shares in Public Careers by Major



# Effect on Major Enrollment [back](#)

	Freshmen Major Enrollment: All Universities					
	Business/Law			Engineering		
	Share (1)	Num. (asinh) (2)	Num. (log) (3)	Share (4)	Num. (asinh) (5)	Num. (log) (6)
Audit $\times$ Post	-0.016*** (0.005)	-0.033 (0.029)	-0.035 (0.029)	0.015** (0.007)	0.085 (0.054)	0.091* (0.055)
$R^2$	0.58	0.98	0.98	0.73	0.96	0.97
Mean Dep. Var.	0.30	5.35	4.67	0.16	4.64	4.04
SD Dep. Var.	0.08	1.68	1.66	0.08	1.83	1.74
Observations	155,290	155,290	150,043	155,290	155,290	132,374
Num. of Clusters	3,693	3,693	3,692	3,693	3,693	3,630
Muni. $\times$ Cohort FE	X	X	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Appx: Effect on College Entry [back](#)

	Num. of Freshmen (log) (1)	Num. in Public Uni. (log) (2)	Share in Public Uni. (3)
Audit $\times$ Post	0.019 (0.025)	0.010 (0.040)	0.004 (0.008)
$R^2$	0.99	0.96	0.85
Mean Dep. Var.	5.90	4.37	0.27
SD Dep. Var.	1.59	1.73	0.17
Observations	155,920	143,667	143,667
Num. of Clusters	3,693	3,684	3,684
Muni. $\times$ Cohort FE	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Appx: Effect on Other Majors [back](#)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A	Education		Humanities		Soc. Sci.		Nat. Sci.	
	Share	Num.	Share	Num.	Share	Num.	Share	Num.
Audit $\times$ Post	0.008 (0.006)	0.040 (0.036)	-0.002 (0.001)	-0.062 (0.065)	-0.002 (0.002)	-0.067 (0.054)	0.003 (0.002)	0.144* (0.083)
$R^2$	0.71	0.95	0.62	0.93	0.52	0.94	0.63	0.92
Mean Dep. Var.	0.19	4.84	0.02	2.37	0.05	3.40	0.02	2.34
SD Dep. Var.	0.11	1.52	0.02	1.85	0.03	1.86	0.02	1.75
Observations	155,920	155,920	155,920	155,920	155,920	155,920	155,920	155,920
Num. of Clusters	3,693	3,693	3,693	3,693	3,693	3,693	3,693	3,693
Panel B	Comp. Sci. and IT		Agriculture		Medicine		Services	
	Share	Num.	Share	Num.	Share	Num.	Share	Num.
Audit $\times$ Post	-0.001 (0.002)	-0.004 (0.050)	0.000 (0.003)	-0.016 (0.060)	-0.005 (0.005)	-0.026 (0.044)	0.000 (0.001)	-0.054 (0.096)
$R^2$	0.45	0.94	0.64	0.91	0.59	0.96	0.44	0.90
Mean Dep. Var.	0.05	3.41	0.04	3.05	0.15	4.65	0.02	2.35
SD Dep. Var.	0.03	1.78	0.04	1.55	0.07	1.63	0.02	1.69
Observations	155,920	155,920	155,920	155,920	155,920	155,920	155,920	155,920
Num. of Clusters	3,693	3,693	3,693	3,693	3,693	3,693	3,693	3,693
Muni. $\times$ Cohort FE	X	X	X	X	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X	X	X	X	X

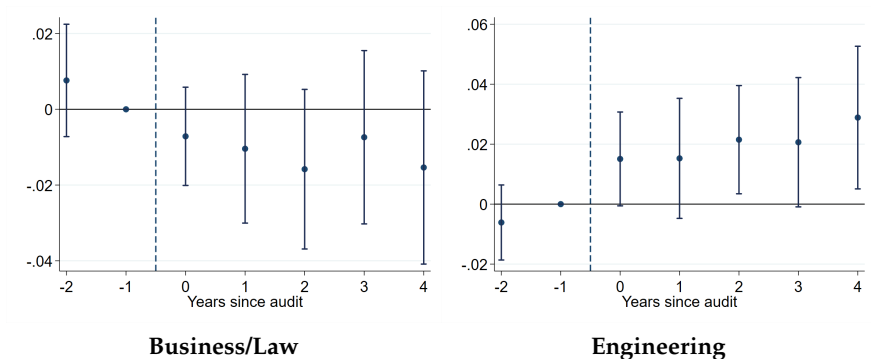
Notes: Num. in asinh transformation. Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



# Appx: Effect on Majors - Balanced Panel

[back](#)

**Figure:** Shares of Major Enrollment (All Universities)



# Effect on Major Enrollment (Pub. vs. Pri.) [back](#)

	Freshmen Major Enrollment: Private vs. Public Universities					
	Business/Law			Engineering		
	Share (1)	Num. (asinh) (2)	Num. (log) (3)	Share (4)	Num. (asinh) (5)	Num. (log) (6)
<b>Panel A: Private Universities</b>						
Audit $\times$ Post	-0.019*** (0.007)	-0.040 (0.031)	-0.041 (0.031)	0.019** (0.008)	0.135** (0.054)	0.143** (0.056)
$R^2$	0.51	0.97	0.98	0.68	0.96	0.96
Mean Dep. Var.	0.36	5.27	4.59	0.16	4.34	3.78
SD Dep. Var.	0.09	1.69	1.66	0.08	1.84	1.71
Observations	154,419	154,419	147,694	154,419	154,419	123,124
Num. of Clusters	3,693	3,693	3,691	3,693	3,693	3,596
<b>Panel B: Public Universities</b>						
Audit $\times$ Post	-0.005 (0.008)	-0.029 (0.094)	0.014 (0.093)	0.000 (0.006)	-0.017 (0.074)	-0.005 (0.075)
$R^2$	0.52	0.91	0.91	0.64	0.94	0.94
Mean Dep. Var.	0.13	3.13	2.79	0.17	3.38	3.03
SD Dep. Var.	0.11	1.89	1.67	0.13	1.95	1.72
Observations	143,667	143,667	80,317	143,667	143,667	86,176
Num. of Clusters	3,684	3,684	2,990	3,684	3,684	3,018
Muni. $\times$ Cohort FE	X	X	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Effect on Student Compo. in Pub. Uni [back](#)

	Total Num. (log)	Shares by Quartile of ENEM Grades		
		Lowest 50%	Second Highest 25%	Highest 25%
	(1)	(2)	(3)	(4)
<b>Panel A: Business/Law</b>				
Audit $\times$ Post	-0.028 (0.071)	0.026 (0.021)	0.036** (0.014)	-0.063** (0.026)
$R^2$	0.90	0.54	0.30	0.57
Mean Dep. Var.	3.02	0.25	0.28	0.47
SD Dep. Var.	1.63	0.24	0.20	0.29
Observations	50,448	50,448	50,448	50,448
Num. of Clusters	1,486	1,486	1,486	1,486
<b>Panel B: Engineering</b>				
Audit $\times$ Post	0.062 (0.069)	0.025** (0.013)	0.011 (0.011)	-0.037** (0.015)
$R^2$	0.95	0.55	0.36	0.60
Mean Dep. Var.	3.48	0.16	0.21	0.64
SD Dep. Var.	1.66	0.18	0.16	0.25
Observations	58,210	58,210	58,210	58,210
Num. of Clusters	1,648	1,648	1,648	1,648
Muni. $\times$ Cohort FE	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X

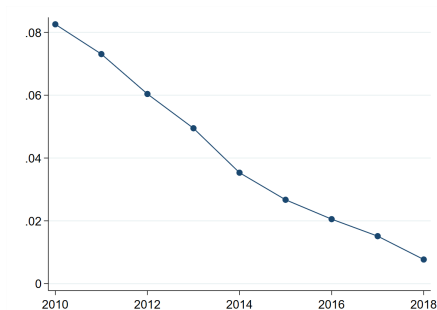
Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Appx: Effect on Major Enrollment by Ability [back](#)

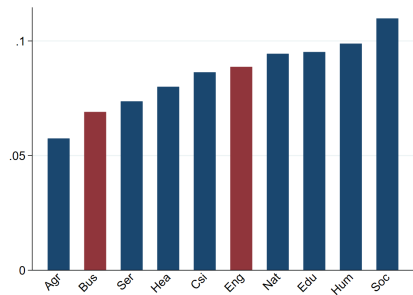
	Num. of Enrollment (asinh) in Broad Major Fields				
	Business/Law (1)	STEM (2)	Education (3)	Medicine (4)	Hum. & Soc. Sci. (5)
<b>Panel A: High-Ability Students (ENEM Highest 25%)</b>					
Audit $\times$ Post	-0.093*** (0.029)	0.049 (0.040)	-0.042 (0.039)	-0.005 (0.041)	-0.020 (0.052)
$R^2$	0.96	0.97	0.94	0.95	0.95
Mean Dep. Var.	3.90	4.27	3.26	3.50	3.01
SD Dep. Var.	1.73	1.83	1.70	1.71	1.87
Observations	136,686	136,686	136,686	136,686	136,686
Num. of Clusters	3,619	3,619	3,619	3,619	3,619
<b>Panel B: Low-Ability Students (ENEM Lowest 50%)</b>					
Audit $\times$ Post	-0.026 (0.035)	0.084 (0.054)	0.070* (0.042)	-0.055 (0.052)	-0.022 (0.064)
$R^2$	0.96	0.94	0.92	0.94	0.91
Mean Dep. Var.	4.57	3.83	4.13	3.85	2.58
SD Dep. Var.	1.71	1.77	1.50	1.62	1.76
Observations	154,800	154,800	154,800	154,800	154,800
Num. of Clusters	3,693	3,693	3,693	3,693	3,693
Muni. $\times$ Cohort FE	X	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Figure: Shares of Students Traced to RAIS



By Year of Enrollment



By Major (2010)

# Appx: Sum. Stat. of Tracked Students [back](#)

	Private Sector		Public Sector			
	Mean (1)	Mean ( $t \geq 4$ ) (2)	Tenure-Track		Temporary	
			Mean (3)	Mean ( $t \geq 4$ ) (4)	Mean (5)	Mean ( $t \geq 4$ ) (6)
Num. of students (log)	3.76	3.19	1.98	1.73	1.98	1.75
Lapse CES-RAIS (Years)	3.69	5.68	4.70	6.03	4.53	5.84
Share female	0.60	0.60	0.59	0.59	0.68	0.70
Age	24.28	26.26	28.50	29.36	28.40	29.46
Share with postgraduate degree	0.01	0.01	0.02	0.02	0.01	0.01
Share with college-educated parent	0.36	0.42	0.26	0.27	0.21	0.23
Share among top family income quartile	0.19	0.22	0.16	0.15	0.10	0.10
Share among top ENEM grade quartile	0.46	0.45	0.48	0.46	0.31	0.30
Avg. ENEM grade	568.83	585.75	570.53	576.51	533.98	537.42
Share enrolled in Business/Law	0.27	0.17	0.20	0.21	0.17	0.18
Share enrolled in Engineering	0.17	0.20	0.08	0.08	0.09	0.08
Share enrolled in Education	0.18	0.18	0.42	0.38	0.46	0.42
Share enrolled in Health	0.15	0.19	0.15	0.17	0.16	0.19
Observations	2,331		1,557		1,596	

# Effect on Career Realizations [back](#)

	Realizations of First Jobs by Sector					
	Public Sector			Private Sector		
	Share (1)	Num. (asinh) (2)	Num. (log) (3)	Share (4)	Num. (asinh) (5)	Num. (log) (6)
Audit $\times$ Post	-0.023 (0.027)	-0.317 (0.244)	0.024 (0.128)	0.023 (0.027)	0.232* (0.125)	0.234* (0.126)
$R^2$	0.66	0.84	0.85	0.66	0.95	0.95
Mean Dep. Var.	0.22	1.93	1.65	0.78	3.56	3.00
SD Dep. Var.	0.25	1.40	1.21	0.25	1.71	1.61
Observations	82,468	82,468	49,968	82,468	82,468	66,706
Num. of Clusters	2,898	2,898	2,159	2,898	2,898	2,525
Muni. $\times$ Cohort FE	X	X	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X	X	X

Notes: "Post" is now [t+4, t+7]. Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Appx: Effect on Careers in Public Sector [back](#)

	Realizations of First Jobs in Public Sector by Contract Type					
	Civil Service			Temporary		
	Share (1)	Num. (asinh) (2)	Num. (log) (3)	Share (4)	Num. (asinh) (5)	Num. (log) (6)
Audit $\times$ Post	-0.021* (0.011)	-0.241 (0.223)	0.146 (0.201)	-0.002 (0.024)	-0.151 (0.179)	0.003 (0.151)
$R^2$	0.51	0.81	0.82	0.63	0.83	0.84
Mean Dep. Var.	0.09	1.38	1.35	0.12	1.16	1.26
SD Dep. Var.	0.15	1.30	1.09	0.21	1.28	1.13
Observations	82,468	82,468	26,906	82,468	82,468	33,401
Num. of Clusters	2,898	2,898	1,404	2,898	2,898	1,564
Muni. $\times$ Cohort FE	X	X	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X	X	X

Notes: "Post" is now [t+4, t+7]. Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



# Effect on Workforce Composition [back](#)

	Total Num. (log)	Shares by Quartile of ENEM Grades		
	(1)	Lowest 50% (2)	Second Highest 25% (3)	Highest 25% (4)
<b>Panel A: Public Sector (Civil Servants)</b>				
Audit $\times$ Post	0.246 (0.189)	-0.079 (0.084)	0.322*** (0.109)	-0.197*** (0.074)
$R^2$	0.82	0.49	0.35	0.50
Mean Dep. Var.	1.25	0.32	0.27	0.38
SD Dep. Var.	1.07	0.36	0.31	0.36
Observations	26,896	26,701	26,701	26,701
Num. of Clusters	1,403	1,395	1,395	1,395
<b>Panel B: Private Sector</b>				
Audit $\times$ Post	0.267** (0.120)	-0.050 (0.031)	-0.026 (0.023)	0.062** (0.024)
$R^2$	0.95	0.42	0.26	0.55
Mean Dep. Var.	3.13	0.39	0.28	0.31
SD Dep. Var.	1.60	0.24	0.19	0.22
Observations	66,686	65,889	65,889	65,889
Num. of Clusters	2,524	2,497	2,497	2,497
Muni. $\times$ Cohort FE	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X

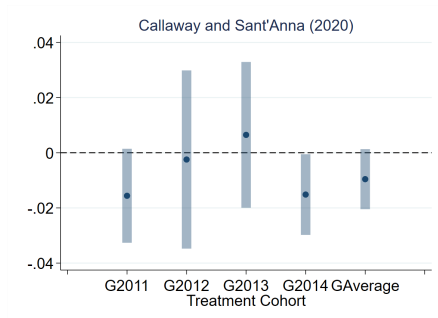
Notes: "Post" is now [t+4, t+7]. Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ ,

\*  $p < 0.1$

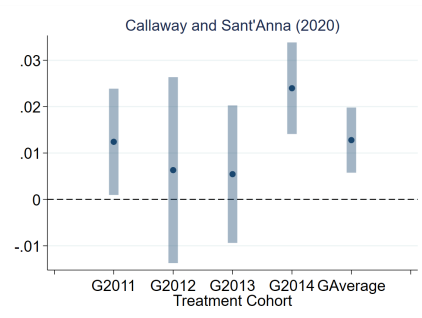
## Appx: Group-Specific Treatment Effects [back](#)

- 2011: Major high-profile corruption scandals
- 2014: Landmark anti-corruption probe (Operation Car Wash)

**Figure:** Shares of Enrollment by Audit Year



**Business/Law**



**Engineering**

# Appx: Effect on Workforce Comp. (Temp. Public) [back](#)

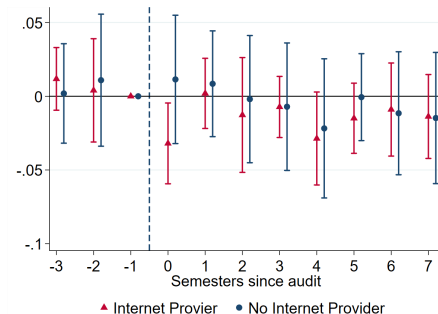
	Total Num. (log)	Shares by Quartile of ENEM Grades		
		Lowest 50%	Second Highest25%	Highest 25%
	(1)	(2)	(3)	(4)
Audit $\times$ Post	0.018 (0.133)	-0.041 (0.108)	0.035 (0.109)	0.011 (0.068)
$R^2$	0.85	0.45	0.33	0.45
Mean Dep. Var.	1.37	0.51	0.27	0.21
SD Dep. Var.	1.19	0.34	0.28	0.26
Observations	33,011	32,619	32,619	32,619
Num. of Clusters	1,562	1,548	1,548	1,548
Muni. $\times$ Cohort FE	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

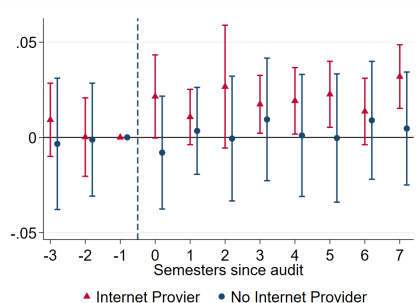
## Appx: Effect Heterogeneity by Local Media [back](#)

A similar pattern observed for muni. with better internet access  
→ media propagates audits & can be behind the formation of *priors*

**Figure:** Shares of Major Enrollment (Local Media)



**Business and Law**



**Engineering**

# Appx: Effect on Workforce Compo. (Degrees) [back](#)

	Share of Employee's Degree Background			
	Business/Law (1)	Engineering (2)	Education (3)	Health (4)
<b>Panel A: Public Sector (Civil Servants)</b>				
Audit $\times$ Post	-0.003 (0.056)	0.109 (0.127)	-0.047 (0.114)	-0.017 (0.049)
$R^2$	0.36	0.31	0.38	0.34
Mean Dep. Var.	0.21	0.09	0.43	0.13
SD Dep. Var.	0.29	0.20	0.35	0.23
Observations	26,896	26,896	26,896	26,896
Num. of Clusters	1,403	1,403	1,403	1,403
<b>Panel B: Private Sector</b>				
Audit $\times$ Post	-0.099*** (0.026)	0.090*** (0.022)	-0.034** (0.017)	0.014 (0.025)
$R^2$	0.29	0.32	0.44	0.26
Mean Dep. Var.	0.31	0.18	0.16	0.13
SD Dep. Var.	0.19	0.15	0.18	0.14
Observations	66,686	66,686	66,686	66,686
Num. of Clusters	2,524	2,524	2,524	2,524
Muni. $\times$ Cohort FE	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Appx: Effect on Workforce Compo. (Other Chara.)

[back](#)

	Demographic and Socioeconomic Characteristics			
	Share Female	Share College-Educated Parent(s)	Share Family Income (top 25%)	Avg. ENEM Grades (Std.)
	(1)	(2)	(3)	(4)
<b>Panel A: Public Sector (Civil Servants)</b>				
Audit $\times$ Post	0.046 (0.138)	0.090 (0.111)	-0.008 (0.124)	-0.039 (0.215)
$R^2$	0.39	0.43	0.43	0.48
Mean Dep. Var.	0.56	0.28	0.23	0.47
SD Dep. Var.	0.35	0.32	0.30	1.01
Observations	26,896	26,896	26,896	26,896
Num. of Clusters	1,403	1,403	1,403	1,403
<b>Panel B: Private Sector</b>				
Audit $\times$ Post	0.004 (0.029)	0.074** (0.031)	0.042* (0.022)	0.048 (0.080)
$R^2$	0.26	0.45	0.58	0.49
Mean Dep. Var.	0.59	0.35	0.31	0.31
SD Dep. Var.	0.20	0.21	0.22	0.67
Observations	66,686	66,686	66,686	66,686
Num. of Clusters	2,524	2,524	2,524	2,524
Muni. $\times$ Cohort FE	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Appx: Local Labor Market Spillovers [back](#)

	Share in Business/Law (1)	Share in Engineering (2)
<b>Panel A: Spillover effects</b>		
Audit $\times$ Post	-0.017* (0.009)	0.010* (0.005)
$R^2$	0.65	0.76
Mean Dep. Var.	0.29	0.16
SD Dep. Var.	0.08	0.07
Observations	21,128	21,128
Num. of Clusters	690	690
<b>Panel B: Excluding spillover effects</b>		
Audit $\times$ Post	-0.015** (0.008)	0.018*** (0.005)
$R^2$	0.64	0.77
Mean Dep. Var.	0.29	0.16
SD Dep. Var.	0.08	0.07
Observations	20,732	20,732
Num. of Clusters	647	647
Muni. $\times$ Cohort FE	X	X
State $\times$ Year $\times$ Cohort FE	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Appx: Effect on Out-Migration [back](#)

	Workplace Muni. and Residence Muni.	
	In the Same Muni. (1)	In the Same State (2)
<b>Panel A: Public Sector (Civil Servants)</b>		
Audit $\times$ Post	-0.112** (0.056)	-0.060 (0.103)
$R^2$	0.74	0.65
Mean Dep. Var.	0.30	0.47
SD Dep. Var.	0.39	0.48
Observations	26,906	26,906
Num. of Clusters	1,404	1,404
<b>Panel B: Private Sector</b>		
Audit $\times$ Post	-0.058* (0.033)	-0.015 (0.022)
$R^2$	0.61	0.53
Mean Dep. Var.	0.49	0.86
SD Dep. Var.	0.27	0.27
Observations	66,706	66,706
Num. of Clusters	2,525	2,525
Muni. $\times$ Cohort FE	X	X
State $\times$ Year $\times$ Cohort FE	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

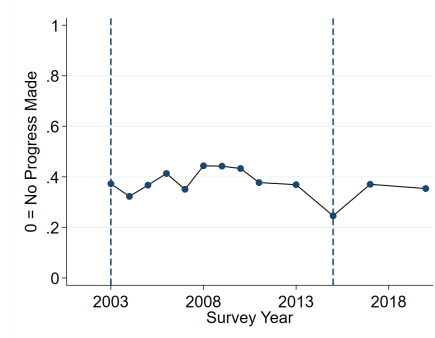


# Appx: Audits and Corruption Perception [back main](#)

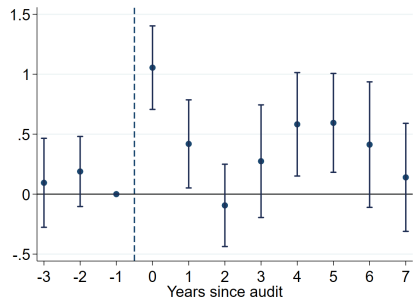
[back additional](#)

- *Latinobarómetro* Surveys (2004-2020)
- Suggestive: very few audited muni. are sampled

**Figure:** "How much progress has been made combatting corruption?"

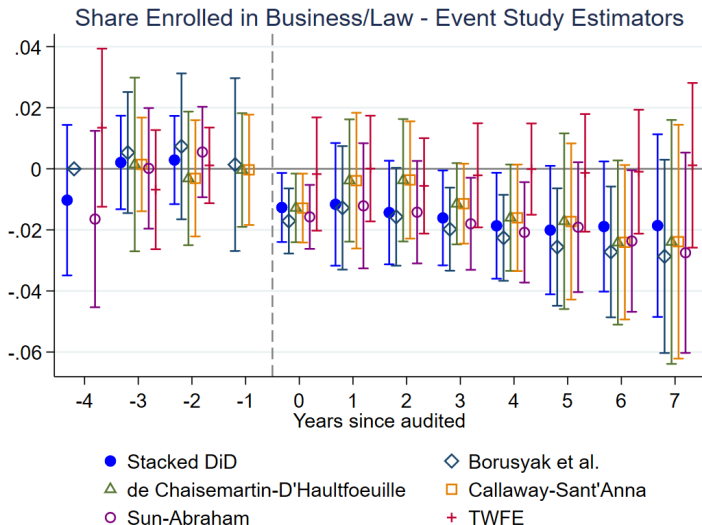


**Yearly Trend**



**Stacked Event-Study**

# Appx: Alternative Estimators

[back](#)

	(1)	(2)	(3)
<b>Panel A: Major Enrollment</b>	All Students	Business/Law	Engineering
Audit $\times$ Post	0.086*** (0.031)	-0.012 (0.032)	0.337*** (0.071)
Implied Prop. Effect	0.090*** (0.034)	-0.012 (0.032)	0.401*** (0.100)
<i>Mean Dep. Var.</i>	982.01	300.59	171.25
<i>SD Dep. Var.</i>	1338.89	409.65	241.89
Observations	155,920	155,920	155,240
Num. of Clusters	3,693	3,693	3,674
<b>Panel B: Career Realization</b>	All Workers	Public Sector	Private Sector
Audit $\times$ Post	0.314*** (0.116)	-0.204 (0.235)	0.376*** (0.139)
Implied Prop. Effect	0.427*** (0.169)	0.013 (0.344)	0.522*** (0.216)
<i>Mean Dep. Var.</i>	64.38	9.26	55.37
<i>SD Dep. Var.</i>	102.35	18.18	89.67
Observations	82,468	76,627	80,590
Num. of Clusters	2,898	2,548	2,771
Muni. $\times$ Cohort FE	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Effect on Civil Servants: Alternative Timespans [back](#)

	full post (1)	3 years + (2)	4 years + (3)	5 years + (4)
<b>Panel A: Num. of Civil Servants (asinh)</b>				
Audit $\times$ Post	-0.211 (0.147)	-0.374* (0.223)	-0.241 (0.223)	0.304* (0.160)
$R^2$	0.81	0.81	0.81	0.81
Mean Dep. Var.	1.38	1.38	1.38	1.38
SD Dep. Var.	1.30	1.30	1.30	1.30
Observations	83,034	82,609	82,468	82,351
Num. of Clusters	2,927	2,907	2,898	2,887
<b>Panel B: Share of High-Ability (Top 25%) Among Civil Servants</b>				
Audit $\times$ Post	-0.035 (0.049)	0.023 (0.133)	-0.197*** (0.074)	-0.218** (0.092)
$R^2$	0.50	0.50	0.50	0.50
Mean Dep. Var.	0.38	0.38	0.38	0.38
SD Dep. Var.	0.36	0.36	0.36	0.36
Observations	26,946	26,760	26,701	26,663
Num. of Clusters	1,434	1,409	1,395	1,386
Muni. $\times$ Cohort FE	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ ,

\*\*  $p < 0.05$ , \*  $p < 0.1$

# Effect on Civil Servants: Alternative Samples [back](#)

	full sample (1)	$n > 0$ (2)	$n > 1$ (3)	$n > 2$ (4)
<b>Panel A: Num. of Civil Servants (asinh)</b>				
Audit $\times$ Post	-0.241 (0.223)	0.151 (0.187)	0.083 (0.238)	0.284** (0.120)
$R^2$	0.81	0.82	0.82	0.84
Mean Dep. Var.	1.38	2.11	2.35	2.67
SD Dep. Var.	1.30	1.03	0.96	0.83
Observations	82,468	26,906	13,591	7,493
Num. of Clusters	2,898	1,404	715	408
<b>Panel B: Share of High-Ability (Top 25%) Among Civil Servants</b>				
Audit $\times$ Post		-0.197*** (0.074)	-0.247*** (0.096)	-0.215* (0.123)
$R^2$		0.50	0.57	0.63
Mean Dep. Var.		0.38	0.42	0.44
SD Dep. Var.		0.36	0.30	0.27
Observations		26,701	11,369	6,438
Num. of Clusters		1,395	615	362
Muni. $\times$ Cohort FE	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ ,

\*\*  $p < 0.05$ , \*  $p < 0.1$

# Appx: Effect on Student Compo. in Pri. Uni [back to main](#)

	Total Num. (log)	Shares by Quartile of ENEM Grades		
		Lowest 50%	Second Highest 25%	Highest 25%
	(1)	(2)	(3)	(4)
<b>Panel A: Business/Law</b>				
Audit $\times$ Post	-0.030 (0.031)	0.009 (0.007)	-0.001 (0.005)	-0.008 (0.006)
$R^2$	0.98	0.59	0.32	0.54
Mean Dep. Var.	4.71	0.60	0.26	0.14
SD Dep. Var.	1.62	0.14	0.09	0.09
Observations	130,798	130,798	130,798	130,798
Num. of Clusters	3,156	3,156	3,156	3,156
<b>Panel B: Engineering</b>				
Audit $\times$ Post	0.181*** (0.068)	0.031*** (0.011)	0.002 (0.009)	-0.033*** (0.012)
$R^2$	0.96	0.47	0.21	0.46
Mean Dep. Var.	4.15	0.47	0.30	0.23
SD Dep. Var.	1.64	0.17	0.12	0.13
Observations	82,007	82,007	82,007	82,007
Num. of Clusters	2,058	2,058	2,058	2,058
Muni. $\times$ Cohort FE	X	X	X	X
State $\times$ Year $\times$ Cohort FE	X	X	X	X

Notes: Standard errors in parenthesis are clustered at the municipality level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$