Monopsony Power in Higher Education: A Tale of Two Tracks

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MONOPSONY & ITS DOCUMENTATION

Interest in Monopsony

- Firm concentration, falling L share, unions, min wage
- Search frictions, dynamic monopsony, bargaining
- Differentiated products

Basic Approaches

- Search/dynamic monopsony: hires/separations on W
- MP_L vs W: measure gap or impact of shocks
- Correlate W or pass-through w/empl concentration
- **Estimate firm level L supply:** Experiments, IVs

OUR MONOPSONY ESTIMATION: BASIC IDEA

1. Estimate inverse L supply curve to an individual school

$$\ln(w_{it}) = \mu \ln(L_{it}) + School_i + Year_t + \epsilon_{it} \quad (1)$$

   - Demand IV for L: school-specific lagged applications
   - Bias to $\mu > 0$ if S curve shifts opposite way as D IV

2. If profit maximizing (non-profit + SR/LR issues):

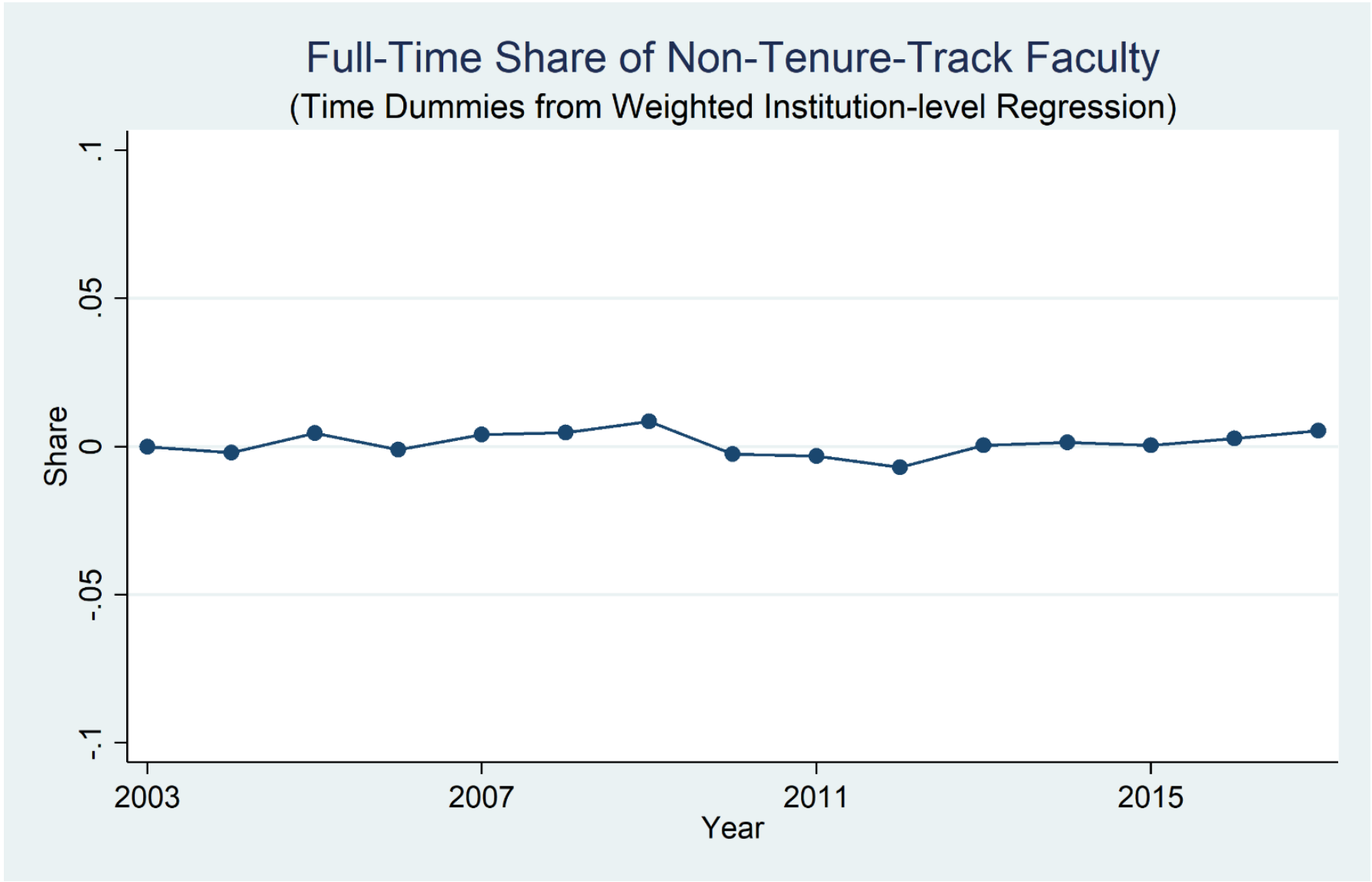
$$\frac{(MP_L - w^m)}{w^m} = \mu \quad (2)$$

3. Does μ vary by tenure track/rank, gender, quality, size, concentration, school type, etc.?
4. Did μ of tenure track faculty plus a rise in enrollments contribute to increase in non-tenure track faculty?

DATA

Integrated Post-Secondary Data System: 2003-17

- Mandatory for all schools accepting federal financial aid
- Sample is ~1500 4-year, nonprofit schools
- Undergrad applications, enrollments, test scores
- Headcount & earnings by school, academic rank, gender
- Monthly avg wage with no summer money
- Non-TT includes lecturers, instructors and non-ranked
  - Wages only for FULL-TIME adjuncts
  - Full-time share of non-TT faculty is relatively constant through sample at ~30%


Full-Time Share of Non-Tenure-Track Faculty
(Time Dummies from Weighted Institution-level Regression)
Share
.1
.05
0
-.05
-.1
2003
2007
2011
2015
Year

OVERVIEW

I. Core results: OLS, 1st-Stage, IV

II. Marginal vs. inframarginal wage shifts

III. Monopsony power over time

IV. Heterogeneity analysis

V. Non-TT faculty shares and monopsony

I: OLS

LHS: $\ln(W_{it})$	Non-TT	TT
$\ln(L_{it})$	-0.0123	-0.0042
	(0.0078)	(0.0193)
School FE	Y	Y
Year FE	Y	Y
R^2	0.85	0.95
N	19,944	21,162

Notes: SEs clustered at the university level

I: FIRST STAGE RESULTS

LHS: $\ln(L_{it})$	Non-TT	TT	Prof	Assoc	Asst
$\ln(Apps_{it-1})$	0.2379	0.0847	0.0469	0.0701	0.1226
	(0.0417)	(0.0150)	(0.0117)	(0.0126)	(0.0245)
School FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
F	32.5	32.1	16.1	31.0	25.0
R^2	0.92	0.99	0.99	0.98	0.96
N	19,944	21,162	20,969	20,698	20,623

Notes: SEs clustered at the univ. level

I: FIRST STAGE AT CONSTRAINED SCHOOLS

LHS: $\ln(L_{it})$	Top 10% Spend/student		Non-Top 10% Spend/Student	
	Non-TT	TT	Non-TT	TT
$\ln(Apps_{it-1})$	-0.0567	0.0243	0.2768	0.0949
	(0.0799)	(0.0378)	(0.0466)	(.0164)
School FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
F	32.5	32.1	31.0	25.0
R^2	0.92	0.99	0.92	0.99
N	1,407	1,427	17.796	18,950

SCHOOL MEANS BY APP GROWTH QUARTILE '02-'17

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
ΔLn(Apps)	-.003	.517	.835	1.434
ΔLn(Enroll)	-.109	.117	.232	.477
#Frosh 2002	731	954	1064	681
Public	.426	.383	.343	.285
R1	.028	.083	.176	.059
Q-tle 4 SAT	.218	.296	.348	.192
% T-Track	.821	.890	.898	.891

I: ESTIMATES OF MONOPSONY: IV

LHS: $\ln(W_{it})$	Non-TT	TT	Prof	Assoc	Asst
$\ln(L_{it})$	0.0348	0.1957	0.5361	0.3258	0.1277
	(0.0320)	(0.0809)	(0.1542)	(0.0754)	(0.0661)
School FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
1^{st}-stge F	32.5	32.1	16.1	31.0	25.0
N	19,944	21,162	20,969	20,698	20,623
Implied Elas.	28.7	5.1	1.9	3.1	7.8

Notes: SEs clustered at the univ. level

II: MONOPSONY BY HIRING RATE

LHS: $\ln(W_{it})$	Non-TT	TT
$\ln(L_{it})$	0.0213	0.1469
	(0.0381)	(0.0520)
$\ln(L_{it})$ x Flow Rate	0.0009	0.0121
	(0.0025)	(0.0108)
Flow Rate	-0.0052	-0.1197
	(0.0119)	(0.0456)
1^{st}-stage F	18.7	9.0
N	19,281	18,254

Notes: Incl. school and year fixed effects. SEs clustered at the univ. level

II: MONOPSONY BY PUBLIC/PRIVATE

LHS: $\ln(W_{it})$	Non-TT	TT
$\ln(L_{it})$	0.0513	0.2183
	(0.0402)	(0.0881)
$\ln(L_{it})$ x Public	-0.0395	-0.0893
	(0.0293)	(0.0641)
1^{st}-stage F	17.5	16.2
N	19,944	21,162

Notes: Incl. school and year fixed effects. SEs clustered at the univ. level

II: UNIVERSITY OF CALIFORNIA SYTEM DATA

- Panel of individual UC faculty salaries from 2010-2018
- Use for decomposition of average annual wage change
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	Total	**Within Incumb.**	Entry	Exit	**Net Entry**
Asst. Prof	3.4%	**3.5**	0.4	0.4	**0.0**
Assoc. Prof	4.0%	**4.3**	0.4	0.6	**-0.3**
Full Prof	3.9%	**4.8**	-1.0	0.0	**-1.0**

III: MONOPSONY OVER TIME

	Non-TT	TT	Non-TT	TT
$\ln(L_{it})$	0.0269	0.1691		
	(0.0352)	(0.0787)		
$\ln(L_{it})$ x year	0.0010	0.0029		
	(0.0008)	(0.0004)		
$\ln(L_{i17}/L_{i03})$			0.0852	0.2997
			(0.0352)	(0.0706)
1^{st}-stage F	16.9	16.1	26.2	26.8
N	19,944	21,162	1090	1253

Implied TT elasticity: 2003 = 5.9; 2017 = 4.8

IV: MONOPSONY BY GENDER

	Non-TT	TT
$\ln(L_{it})$	0.0231	0.1814
	(0.0312)	(0.0844)
$\ln(L_{it})$ x Male	0.0222	0.0075
	(0.0028)	(0.0079)
1^{st}-stage F	16.4	15.2
N	37,208	41,954

Notes: Incl. school and year fixed effects. SEs clustered at the univ. level

IV: MONOPSONY: SIZE AND MARKET SHARE

	Non-TT	TT	Non-TT	TT
$\ln(L_{it})$	0.0402	0.1125	0.0354	0.0501
	(0.0361)	(0.0742)	(0.0376)	(0.0929)
$\ln(L_{it})$ x Nat'l %	-0.0266	1.8052	-0.0052	1.7597
	(0.1707)	(0.6109)	(0.1336)	(0.5305)
$\ln(L_{it})$ x State %	0.0018	0.0072		
	(0.0018)	(0.0066)		
$\ln(L_{it})$ x CZ %	-0.0005	-0.0029		
	(0.0004)	(0.0015)		
1^{st}-stage F	14.0	6.8	28.0	12.5
N	19,944	21,162	19,944	21,162

IV: MONOPSONY: SIZE AND MARKET SHARE

- Median-sized school (0.030% of nationwide TT faculty) faces residual TT labor supply elasticity of around 10
- 75^{th} percentile school (0.064%): elasticity of 6.1
- 90^{th} percentile school (0.153%): elasticity of 3.2

IV: MONOPSONY: PRESTIGE

	Non-TT	TT
$\ln(L_{it})$	-0.0162	0.0961
	(0.0354)	(0.0634)
$\ln(L_{it})$ x R1	0.0788	0.6857
	(0.0301)	(0.1093)
$\ln(L_{it})$ x R2/R3	0.0930	0.1848
	(0.0285)	(0.1154)
1^{st}-stage F	15.6	15.6
N	19,944	21,162

IV: MONOPSONY: PRESTIGE

	Non-TT	TT
$\ln(L_{it})$	0.012	0.109
	(.034)	(.077)
$\ln(L_{it})$ x US News 1-50	0.080	1.213
	(.047)	(.258)
$\ln(L_{it})$ x US News 51-100	0.073	0.435
	(.056)	(.130)
$\ln(L_{it})$ x US News 101-200	0.062	0.332
	(.0274)	(.079)
1^{st}-stage F	10.6	8.8
N	19,944	21,162

IV: MONOPSONY: PRESTIGE

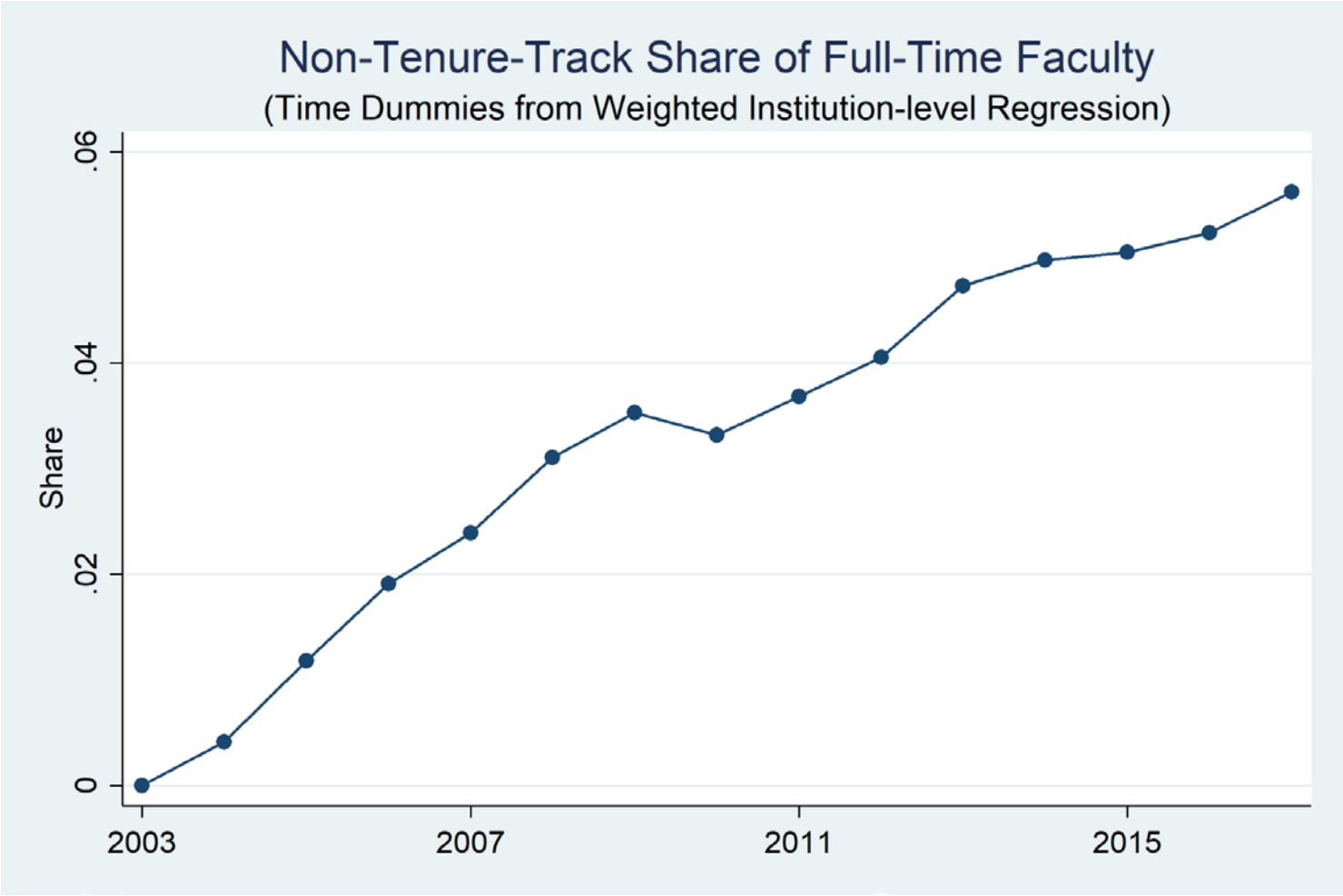
	Non-TT	TT
$\ln(L_{it})$	0.0146	0.1074
	(0.0353)	(0.0714)
$\ln(L_{it})$ x UG avg SAT	0.0502	0.5181
in top quartile	(0.0297)	(0.0920)
1^{st}-stage F	14.1	19.1
N	18,293	19,766

IV: MONOPSONY: PRESTIGE

	Non-TT	TT
$\ln(L_{it})$	0.0010	-0.1246
	(0.0646)	(0.0636)
$\ln(L_{it})$ x pre-sample	0.0007	0.0075
salary pctile	(0.0007)	(0.0015)
1^{st}-stage F	28.0	12.5
N	17,402	19,104

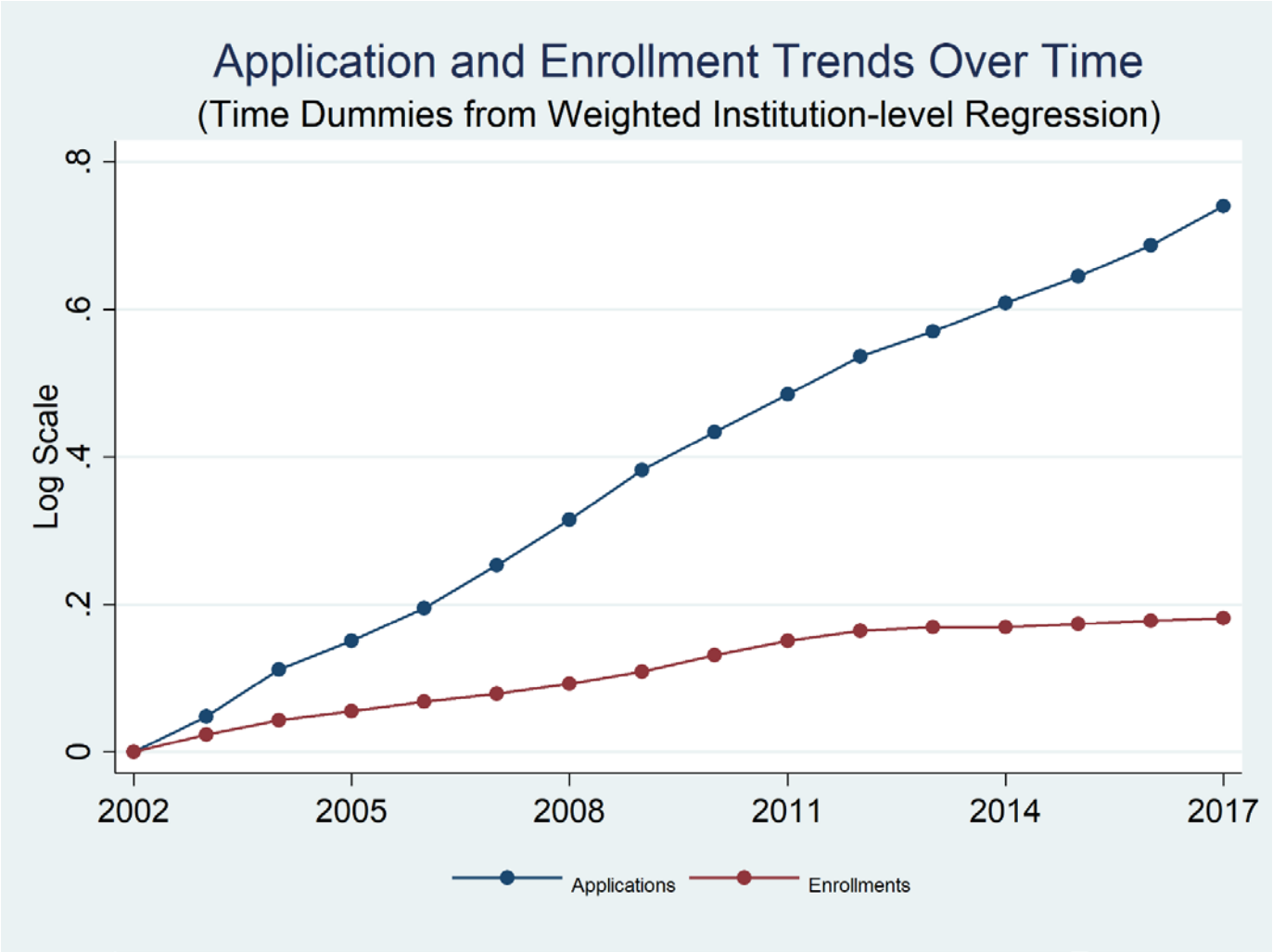
Implied TT elasticity: 1Q salary = 15.9; 2Q = 4.0; 3Q = 2.3

V: THE RISE OF NON-TENURE TRACK FACULTY



In 2003 mean non-TT share was 0.12; 50% increase

V: THE RISE OF NON-TENURE TRACK FACULTY



V: THE RISE OF NON-TENURE TRACK FACULTY

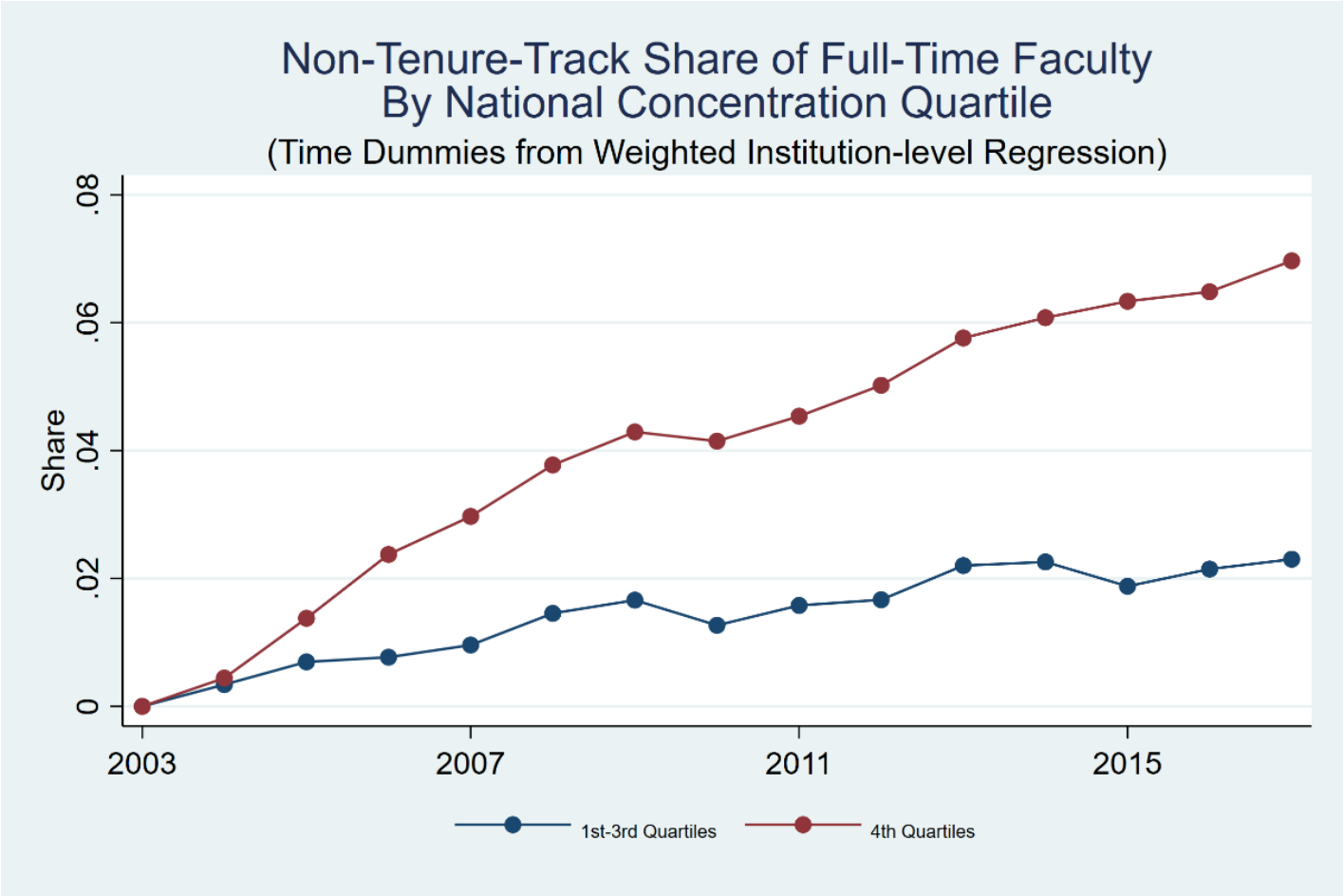
Observe 75-log-point increase in applications within schools

- 1^{st} stage results imply this corresponds to:
  - 18-log-point increase in non-TT faculty
  - 6-log-point increase in TT faculty

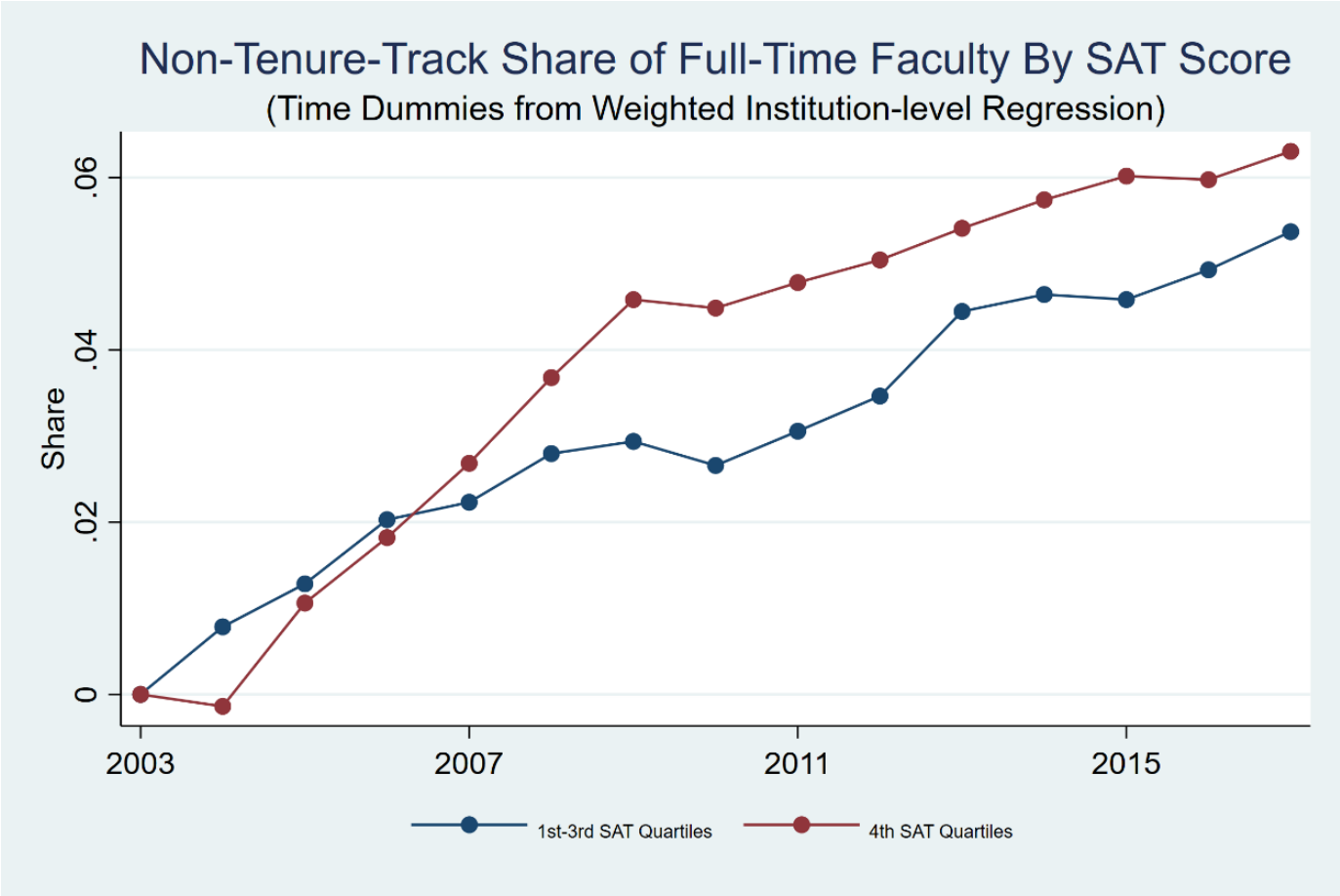
Implied increase in non-TT intensity accounts for 20% of observed increase in non-TT in the data

- Caveat: uses only within-school response; may be aggregate labor supply feedback

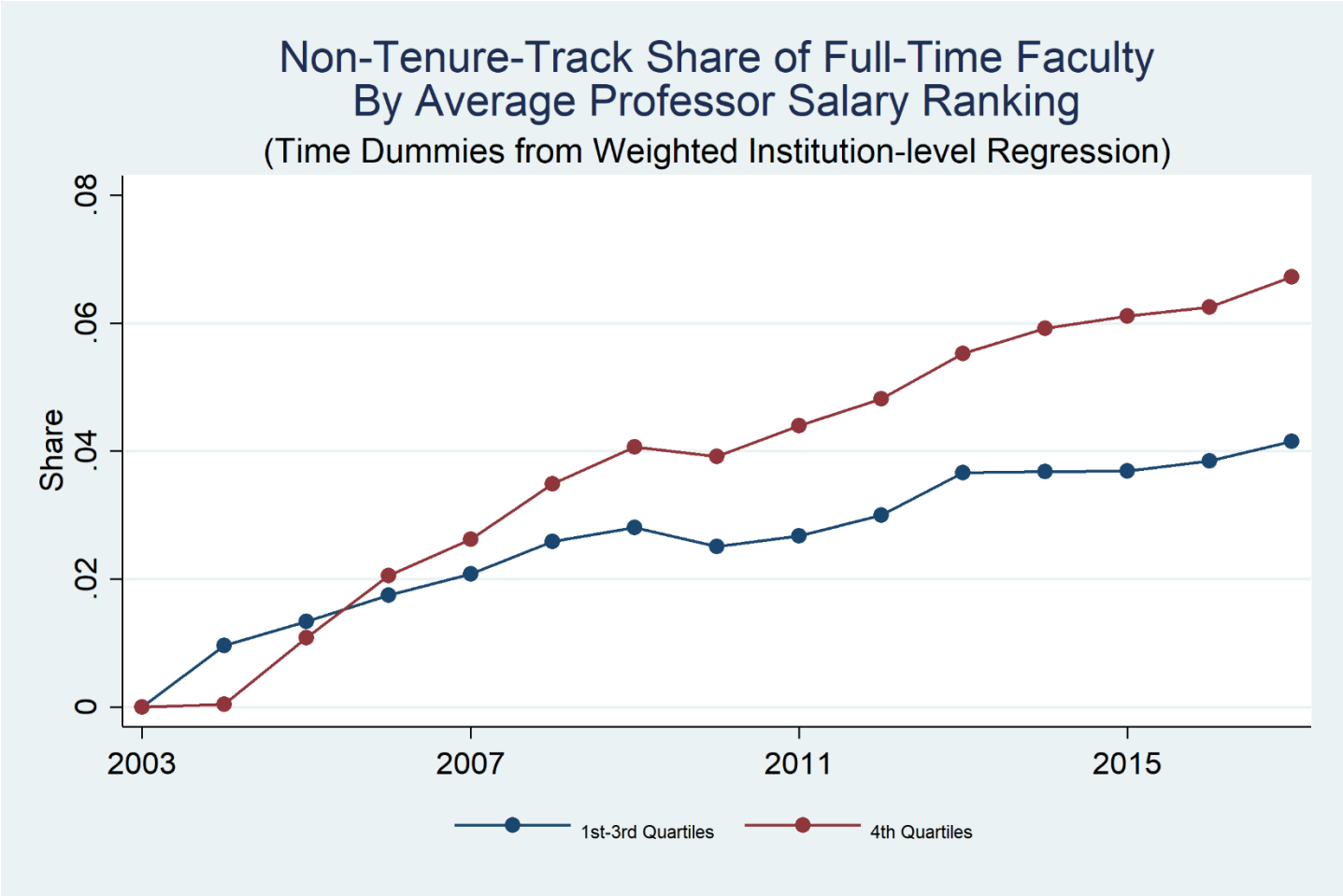
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CONCLUSIONS

I. Schools have monopsony power over TT faculty (and increasing in rank), not over non-TT
II. Results comport with "textbook" monopsony model (inframarginal wages rise with hiring)
III. Monopsony power appears to grow over time, both in aggregate trend and in long-run within schools
IV. Heterogeneity analysis
    a. Doesn't vary with: public/private, gender
    b. Does vary with: size, multiple measures of prestige