Tax and Expenditure Limitations, Salary Reductions, and Public Employee Turnover

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Motivation

- It is vital for policymakers and public managers to **understand the factors that influence** public employee **turnover**.
  - Prior studies find a **link between turnover** and organizational **performance** (Kim, 2002; Meier & Hicklin, 2007; Pitts, 2005; Ronfeldt, Loeb, & Wyckoff, 2013; Shaw, Gupta, & Gupta, 2005)
  - Even "healthy" turnover has significant **financial costs** on public organizations (Meier & Hicklin, 2007; Park & Shaw, 2013)

Motivation

- **Salary** is a potentially important, yet **understudied**, factor for public employee turnover.
- Previous PA studies find that higher salaries are **associated** with lower rates of turnover intention.
- However, due to **data availablitiy challenges**:
  - Vast majority of PA studies rely on turnover intention, not actual data on employee turnover.
    - These are distinct concepts and not necessarily correlated with each other (e.g. Cohen, Blake, & Goodman, 2015).
  - no identification strategy to estimate the strength of the effect of salary on turnover.

Motivation

- **Natural Experiment**
  - State-imposed fiscal limitations (e.g., TELs) to restrict the growth in local government expenditures and revenues.
  - One example is the **New Jersey Superintendent Salary Cap (NJSSC)** implemented in February 2011.
    - Sets a maximum salary for all future superintendent contracts based on student enrollment.
    - Large salary reduction for the average NJ superintendent.

Motivation

- Expected Reductions in Salaries by Enrollment

Enrollment	% of Districts	Cap on Salary	Average Salary	Difference
0 to 250	7.5	$125,000	$128,951	**-3,951 (-3.1%)**
251 to 700	20.9	135,000	143,943	**-8,943 (-6.2%)**
751 to 1,500	23.3	145,000	160,556	**-15,566 (-9.7%)**
1,501 to 3,000	23.3	155,000	192,732	**-37,732 (-19.6%)**
3,001 to 6,500	19.2	165,000	187,224	**-22,224 (-11.9%)**
6,501 to 10,000	5.8	175,000	200,962	**-25,962 (-12.9%)**
Over 10,000	.	Waiver	221,182	.

Motivation

- **Interestingly…**
  - The cap does not impact school districts until there is a new superintendent contract.
  - Therefore, only school districts with **an expiring superintendent contract** in the 2010-11 school year would be directly impacted in the first year of NJSSC.
- Therefore, superintendent turnover following the 2010-11 school year is more likely …
  - in districts with an expiring contract AND current salary is above the salary cap

Motivation

- **Research Question**
  - Did the NJSSC increase the likelihood of superintendent turnover following the 2010-11 school year?
- **Main Finding**
  - I exploit district-level data on NJ employee contracts
  - I find an additional $10,000 reduction in base salary results in a **16% increase in the likelihood of superintendent turnover.**

Background on NJSSC

- Prior to NJSSC in 2011, **NJ enacted various TELs** to limit growth in government spending and revenue.
  - In 2004, 2.5% Growth Cap on School District Administrative Expenditures
- **The push for NJSSC started in summer of 2010** by former NJ Governor Chris Christie.
  - To "ensure the maximum amount of education funding stays in the classroom…" (Jahn, 2014).
- On February 7, 2011, the NJSSC went into effect.

Background on NJSSC

- Four important aspects of NJSSC:
  1. Sets a maximum salary based on student enrollment
  2. A $2,500 bonus if district contains a high school.
  3. A maximum 3.3% bonus if superintendent meets pre-determined district performance goals.
  4. **Only affects NEW superintendent contracts** after February 7, 2011.
     - In other words, school districts can continue to pay salaries above the cap until the pre-NJSSC contract expires.

Literature Review

- The current study **contributes to two separate literatures**:
  1. The unintended consequences of tax and expenditures limitations (TELs)
  2. Factors that affect the likelihood of public employee turnover

Literature Review

- **Tax and expenditure limitations (TELs)**
  - Previous studies have documented several unintended consequences of TELs in the context of K-12 education:
    - Decrease in **teacher quality** (e.g., Figlio and Rueben, 2001)
    - Reduction in **student test scores** (e.g., Downes, Dye, & McGuire, 1998)
    - Increase in **teacher turnover** (e.g, Hayes, 2019)
  - The NJSSC is the first TEL placed directly on public employees.
  - **My contributions:**
    - First study to estimate the unintended consequences of this unique type of TEL.
    - First study to estimate the effect of a TEL on superintendent turnover.

Literature Review

- **Factors that predict public employee turnover**
  - Prior studies generally find lower turnover intention rates are correlated with (e.g., Grissom, Viano, & Selin, 2016; Pitts, Marvel, & Fernandez, 2011):
    - More years of experience
    - Female employees
    - Less years of education
    - In organizations with "better working conditions"
    - Supervised by a "more effective" public manager
  - Only a limited number of studies estimating the causal effect of salary on actual turnover (e.g., Clotfelter, Ladd, & Vigdor, 2011; Grissom & Anderson, 2012; Grissom & Mitani, 2016; Hendricks, 2014).
    - Vast majority comes from the field of Economics of Education

Literature Review

- **Effect of salary changes on superintendent turnover**
  - There are **very few credible studies** estimating the effect of salary reductions (or increases) on superintendent turnover.
    - Data limitations
    - Rely on correlational analyses
  - One exception is **Grissom and Mitani (2016)**.
    - Using administrative data from Missouri over time.
    - Longitudinal dataset on superintendents with salary information
    - Using a fixed effect model, they find superintendent salary is a strong turnover predictor.
  - **My contributions:**
    - I exploit data from a natural experiment created by the NJSSC to estimate the causal effect of a large salary reduction on superintendent turnover.
    - Different state and different context.

Data

- Cross-sectional dataset on **416 NJ school districts** that contains information on:
  - Superintendent turnover status following 2010-11 school year
  - Expected reduction in base salary from NJSSC
  - Indicator for whether superintendent has an expiring contract
  - Current superintendent characteristics
  - District-level characteristics

Data

- In 2010-11 school year, NJ had 590 operating, non-charter school districts.
  - Charter schools were exempt from the NJSSC.
- The **analytical sample includes only approximately 71%** of these districts.
  - full-time, non-shared superintendents
  - No missing information to create relevant variables
  - Excludes 12 school districts with enrollments above 10,000.
- I **conduct a balance test** to check for systematic differences between population and analytical sample.

Data

- **Outcome of Interest: Superintendent Turnover**
  - NJ Department of Education (DOE) data on employee contracts.
    - Contains information on approximately 3,850 employees each year
      - employee name, job title, base salary, and contract start/end dates
  - Manually compare the superintendent name and contract start date over time.
    - To identify turnover if a new superintendent is listed for a contract starting on July 1, 2011 (i.e. start of the 2011-12 school year)
  - **25% experienced superintendent turnover** following the 2010-11 school year.

Data

- **Variables of Interest**
  1. Binary indicator for an expiring contract
     - **26% had an expiring contract** at the end of the 2010-11 school year.
  2. Estimated reduction in base salary
     - A continuous measure based on a district's total enrollment and whether or not it contains a high school.
     - NJSSC would result in a **$19,000 reduction in base salary** for the average school district in the sample.

Data

- **Superintendent Characteristics**
  - Gender indicator
  - Base Salary in 2010-11 school year
- **District Characteristics**
  - District type indicators
    - Contains a high school, # of operating schools, total enrollment, locale, total spending per pupil, and Δ in spending from last year
  - Student demographics
    - % Race categories, % FRL students, % LEP students, % Migrant students

Data

Descriptive Statistics for New Jersey School Districts				
	Expiring Contract		**No Expiring Contract**	
Outcome of Interest	Mean	SD	Mean	SD
Turnover following 2010-11 SY	63.9***		9.4	
Independent Variable				
Expiring contract during 2010-11 SY	100.0		0.0	
Superintendent Characteristics				
Estimated salary cut	15,597.0	27,266.7	20,599.2	94,900.7
Base Salary in 2010-11 ($)	166,754.4	32,104.1	170,721.0	96,900.7
Male	75.9		71.0	
N Districts	108		308	

Notes: Marked *p* values indicate the statistical significance of the mean difference between NJ school districts with an expiring superintendent contract and NJ school districts without an expiring superintendent contract. * p<0.1, ** p<0.05, *** p<0.01.

Data

Descriptive Statistics for New Jersey School Districts				
	Expiring Contract		No Expiring Contract	
District Characteristics	Mean	SD	Mean	SD
Regular district	95.4		95.8	
Contains a high school	53.7		49.0	
# of operating schools	3.9	3.3	3.8	3.1
Total enrollment	2,146.1	2,004.5	2,164.5	2,161.9
Located in urban area	0.9		1.3	
Located in suburban area	73.1		78.2	
Located in rural area	26.0		20.5	
Total spending per pupil ($)	17,770.1	4,699.8	17,485.6	
Δ in total spending from last year	-1.7	5.2	-1.7	4.8
N Districts	108		308	

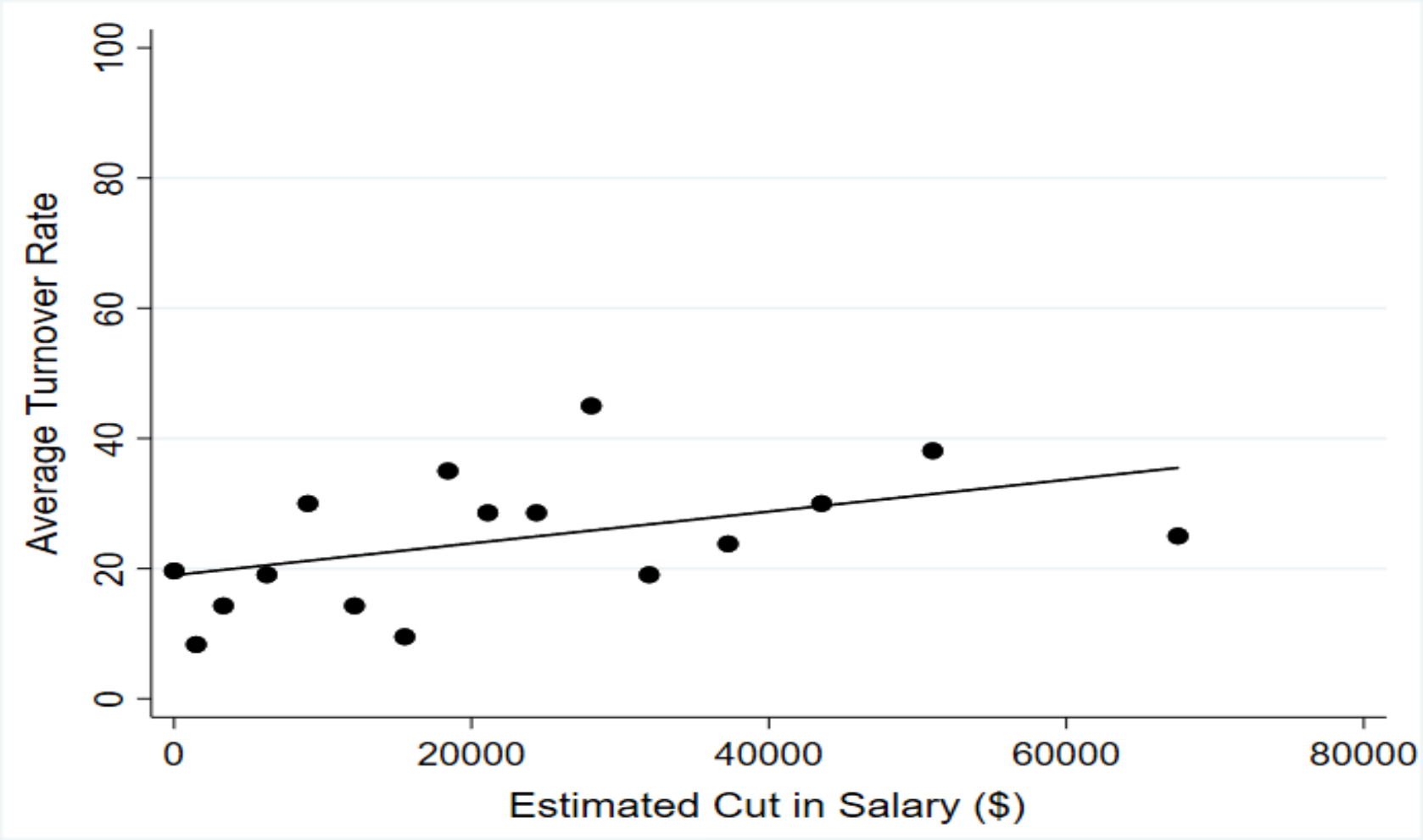
Notes: Marked *p* values indicate the statistical significance of the mean difference between NJ school districts with an expiring superintendent contract and NJ school districts without an expiring superintendent contract. * p<0.1, ** p<0.05, *** p<0.01.

Data

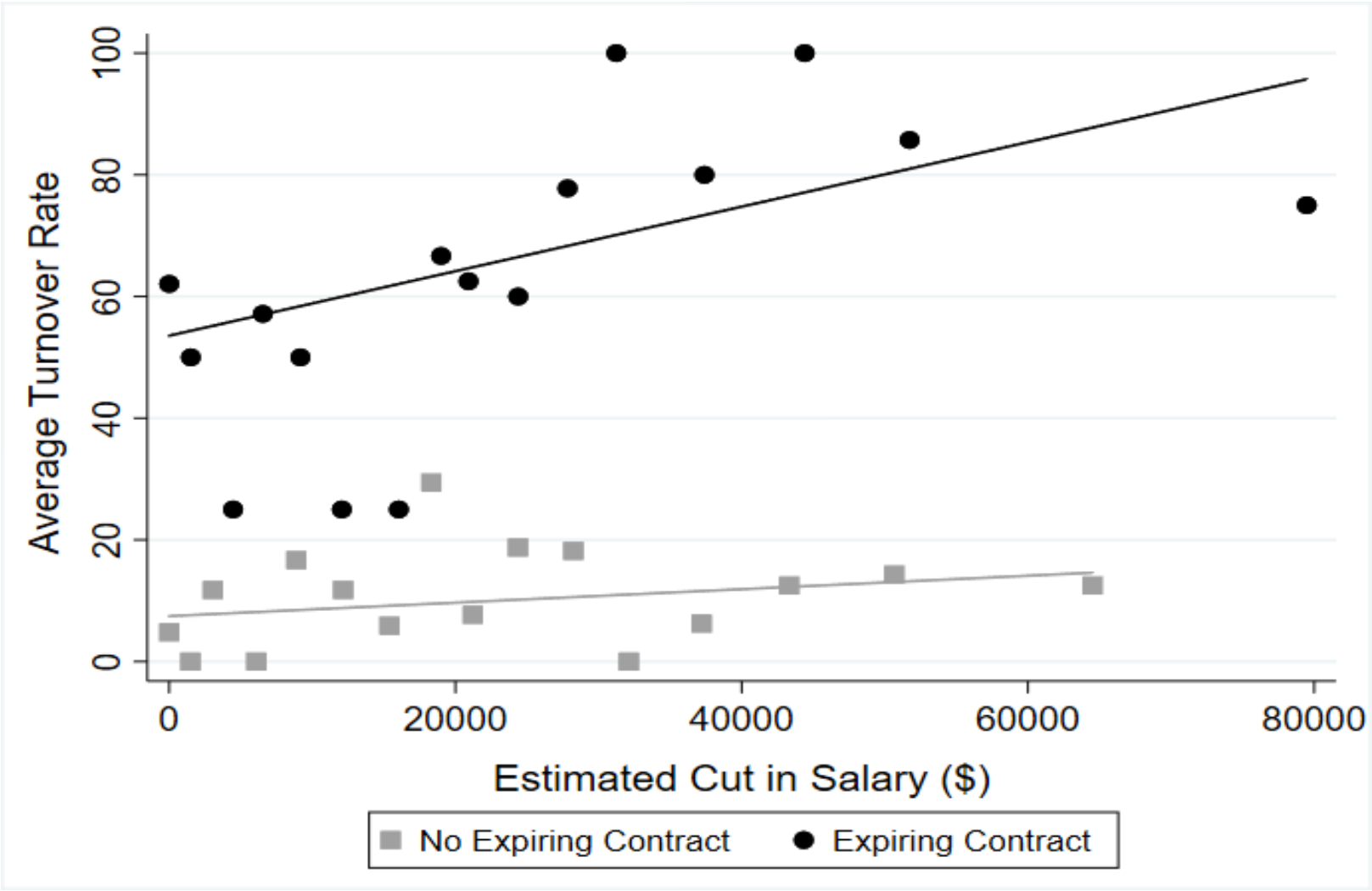
Descriptive Statistics for New Jersey School Districts				
	Expiring Contract		No Expiring Contract	
Student Characteristics	Mean	SD	Mean	SD
White students	66.5	25.7	69.9	23.5
Black students	11.2	16.2	8.6	12.2
Hispanic students	14.8	15.3	13.2	15.4
Asian students	6.3	6.9	7.0	8.3
Other race students	1.2	1.2	1.2	1.4
Female students	48.5	2.8	48.4	3.8
FRL students	24.2	21.9	20.2	20.5
LEP students	2.3	3.4	2.1	3.2
Migrant students	0.1	0.2	0.1	0.2
N Districts	108		308	

Notes: Marked *p* values indicate the statistical significance of the mean difference between NJ school districts with an expiring superintendent contract and NJ school districts without an expiring superintendent contract. * p<0.1, ** p<0.05, *** p<0.01.

Graphical Evidence #1



Graphical Evidence #2



Method

- I estimate **linear probability models (LPMs)**:

$$Y_d = \alpha + \beta_1 Expire_d + \beta_2 Cut_d + \beta_3 Expire_d \times Cut_d + \gamma X_d + \theta_d + e_i$$

  - *d* indexes school district
  - Y is binary indicator for superintendent turnover
  - $Expire$ is a binary indicator for expiring contract
  - Cut measures expected reduction in base salary (in $00000)
  - X is vector of control variables
  - θ is a county fixed effect

  – β_3 is coefficient of interest

Method

- Robustness Checks
  1. Regressions on Expiring Contract Indicator
     - to test for systematic differences between school districts with an expiring contracts and those without expiring contracts.
  2. Estimate baseline model
     - With and without controls
     - With and without county FEs
  3. Estimate Logit and Probit models

Main Results

Baseline Estimates of the Effects on Superintendent Turnover (OLS estimates)					
	(1)	(2)	(3)	(4)	(5)
Estimated Cut (in 00000s)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.012)	0.001 (0.045)	0.001 (0.045)
Expiring Contract	0.477*** (0.056)	0.491*** (0.055)	0.486*** (0.055)	0.482*** (0.056)	0.483*** (0.056)
Estimated Cut × Expiring	**0.043*** **(0.014)**	**0.038**** **(0.015)**	**0.038**** **(0.015)**	**0.039*** **(0.014)**	**0.040*** **(0.014)**
County FEs		X	X	X	X
Superintendent Controls			X	X	X
District Type Controls				X	X
Student Demographics					X
Adjusted R-squared	0.332	0.333	0.333	0.322	0.317

Notes: N = 416. Each column reports the coefficient from a unique regression. *** p<0.01, ** p<0.05, and * p<0.1.

Main Results

- Summary of Main Findings
  - I find an additional $10,000 reduction in base salary corresponds to a **4.0 percentage point increase in the likelihood of superintendent turnover** for school districts with an expiring contract relative to those without an expiring contract.
  - This is equivalent to a **16% increase** in the probability of superintendent turnover.

Heterogenous effects…

- However, this is just the average effect of NJSSC.
- It is possible that the **effect of NJSSC varies by**…
  - men vs. women?; North vs. South NJ?
  - Varies by **district factor group (DFG)**?
    - Since 1975, New Jersey has categorized school districts by their communities' socioeconomic status (SES).
      - % of adults with less than HS degree, unemployment rates, % households in poverty, median household income, etc.
    - DFG categories are A, B, CD, DE, FG, GH, I, and J
      - Type A contains school districts located in areas with the lowest SES.
- It is **important to test for heterogenous effects**.

Heterogenous effects…

Heterogeneous Effects on Superintendent Turnover (OLS Estimates)				
	(1)	(2)	(3)	(4)
Estimated Cut × Expire × Female	**0.069** **(0.032)**			
Estimated Cut × Expire × Rural		-0.040 (0.052)		
Estimated Cut × Expire × Non-South			**0.079** **(0.040)**	
Estimated Cut × Expire × Lowest SES				**0.308***** **(0.085)**
County FEs	√	√	√	√
Adjusted R^2	0.343	0.343	0.345	0.349

Notes: N = 411. Each column reports the coefficients from a unique regression. All variables interacted are included in the model in levels, but these coefficients are not reported in the interest of brevity. Non-South is a binary indicator that equals 0 if the school district is located in a south NJ county (Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean, and Salem) and 1 otherwise. FE = fixed effects. *** p<0.01, ** p<0.05, and * p<0.1.

Heterogenous effects…

- The effect of NJSSC is **largest** for school districts **located in the poorest communities in NJ.**
  - A $10,000 expected reduction in superintendent salary as a result of the NJSSC **increased the likelihood of superintendent turnover by 30 percentage points more in the poorest NJ school districts** relative to all other NJ school districts.
  - This is equivalent to a **125% increase** in the probability of superintendent turnover.

Heterogenous effects…

- The effect of NJSSC is **largest for female superintendents**.
  - On average, female superintendents make less money.
  - Therefore, women might it easier to find new positions paying a salary close to their 2010-11 salary.
- The effect of NJSSC is **largest for non-South NJ**.
  - Average salaries in South NJ are roughly $10,000 lower than in Central or North NJ.

Robustness Checks

- The preferred specification is a linear probability model (LPM).
- Alternatively, I could formulate equation (1) as a logit model.
  - Logit is vulnerable to the incidental parameter bias problem (Wooldridge, 2010).
- As a robustness check, **I run both logit and probit models**.

Robustness Checks

Average Partial Effects (APEs) from LPM, Logit, and Probit Models			
	LPM	**Logit**	**Probit**
Estimated Cut (in 00000s)	0.011 (0.042)	0.012*** (0.004)	0.012*** (0.004)
Expiring Contract	0.477*** (0.057)	0.546*** (0.048)	0.546*** (0.048)
Estimated Cut × Expiring	**0.045*** **(0.013)**	**0.046*** **(0.017)**	**0.046*** **(0.017)**
Superintendent Controls	X	X	X
District Type Controls	X	X	X
Student Demographics	X	X	X

Notes: N = 416. Average partial effects (APE) are reported to make comparisons between the OLS estimates with the estimates from the logit and probit models reported above. *** p<0.01, ** p<0.05, and * p<0.1.

Conclusions

- **This study documents** the effects of NJSSC on superintendent turnover.

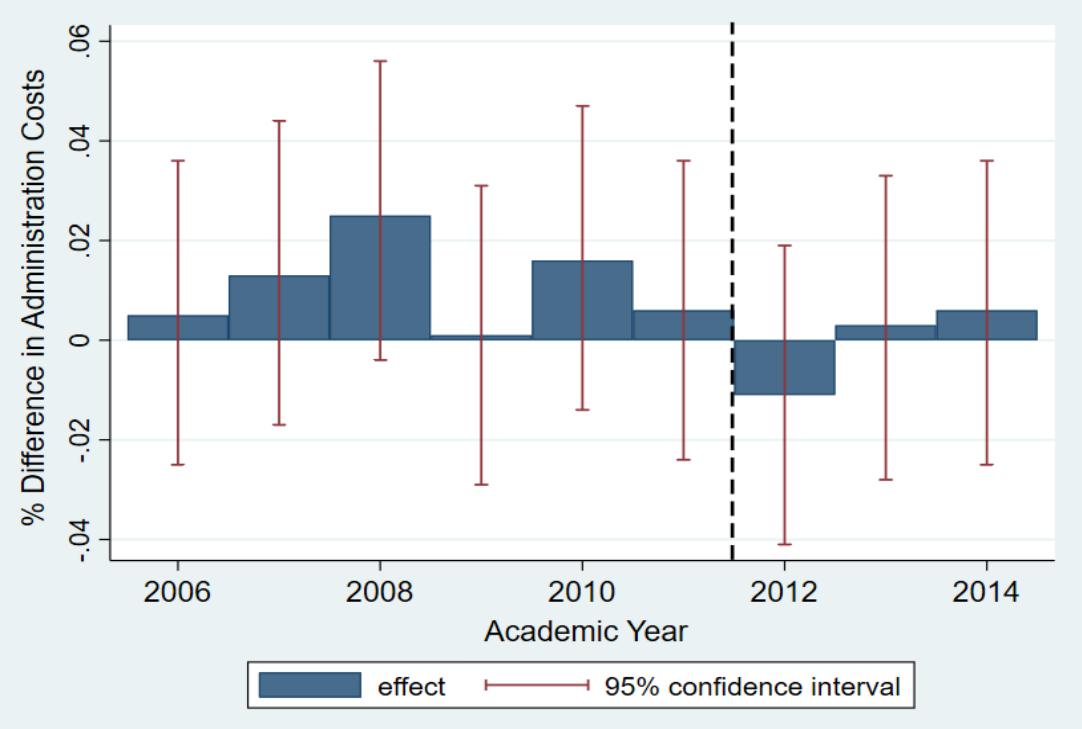
- Using a D-in-D approach, I find…
  - An additional $10,000 reduction in base salary corresponds to a **16% increase in the likelihood of superintendent turnover**
  - The effect is largest for school districts with **female** superintendents, the **non-South region** of NJ, and the **poorest** school districts.

Conclusions

- **But it saved school districts money, right?**

Conclusions

- But it saved school districts money, right?
  - **Unfortunately, it did not.**
    - Only a **0.5% reduction** in total current expenditures.
    - Only a **1.4% reduction** in total current expenditures on administration.



Conclusions

- **Contributions to the literature…**
  1. First study to examine the effect of TEL placed directly on a local public manager.
  2. Adds to previous research on the effect of salary on employee retention.
     - Specifically, this study is the first to exploit natural experiment to estimate the causal effect of a large salary reduction on superintendent turnover.

Conclusions

- **Limitations**
  1. Employee turnover could be healthy for these organizations.
  2. Lack of data on reason for turnover.
     - Involuntary vs. voluntary turnover?
     - This study relies on an **untestable assumption** that NJSSC did not systematically change the likelihood of involuntary turnover between the treatment and control groups.
       - Prior NJSBA survey data suggests the main reason was the NJSSC.
  3. External validity? NJSSC is a unique case study.
  4. Missing data on superintendent characteristics.

Conclusions

- **Moving forward…**
  - This study can only investigate short-term effects of NJSSC.
  - It is possible that there are **long-term negative impacts**:
    1. Increase in principal and teacher turnover?
    2. Instability in long-term policy initiatives?
    3. Effect on student outcomes?
  - **Future research is needed** to investigate these long-term effects of NJSSC.

Conclusions

- **One policy recommendation…**
  - It is **important to incentivize** school districts to monitor and control costs.
  - However, a **rigid, state-level cap** on public managers' salaries **creates potentially costly unintended consequences**.
  - Other state governments interested in pursuing a similar policy need to consider these unintended consequences.

Thanks!

- Questions?
- Comments or suggestions?

- Please contact me at michael.hayes@rutgers.edu

- Follow me on twitter: @MichaelSHayes

Bonus Slides

1. Coefficients on Control Variables
2. Balance Check
3. Regressions on Expiring Contract Indicator
4. NJ Map for Turnover Status following 2010-11 SY

1. Coefficients on Control Variables

Baseline Estimates of the Effects on Superintendent Turnover (OLS estimates)					
	(1)	(2)	(3)	(4)	(5)
Estimated Cut (in 00000s)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.012)	0.001 (0.045)	0.001 (0.045)
Expiring Contract	0.477*** (0.056)	0.491*** (0.055)	0.486*** (0.055)	0.482*** (0.056)	0.483*** (0.056)
Estimated Cut × Expiring	0.043*** (0.014)	0.038** (0.015)	0.038** (0.015)	0.039*** (0.014)	0.040*** (0.014)
Base salary in 2010-11 ($)			0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Male superintendent			0.065* (0.036)	0.065* (0.037)	0.053 (0.038)
Regular district				-0.031 (0.096)	-0.038 (0.101)
Contain a high school				0.021 (0.061)	0.011 (0.064)
# of operating schools				0.009 (0.015)	0.010 (0.015)

Notes: N = 416. Each column reports the coefficient from a unique regression. *** p<0.01, ** p<0.05, and * p<0.1.

1. Coefficients on Control Variables

Baseline Estimates of the Effects on Superintendent Turnover (OLS estimates)					
	(1)	(2)	(3)	(4)	(5)
Total enrollment				-0.000 (0.000)	-0.000 (0.000)
Total enrollment^2				0.000 (0.000)	0.000 (0.000)
Located in urban area				-0.093 (0.192)	-0.085 (0.221)
Located in suburban area				-0.009 (0.052)	0.004 (0.054)
Total spending per pupil ($)				-0.000 (0.000)	-0.000 (0.000)
Δ in total spending from last year				-0.308 (0.357)	-0.264 (0.367)
% Black students					-0.001 (0.002)
% Hispanic students					0.000 (0.003)

Notes: N = 416. Each column reports the coefficient from a unique regression. *** p<0.01, ** p<0.05, and * p<0.1.

1. Coefficients on Control Variables

Baseline Estimates of the Effects on Superintendent Turnover (OLS estimates)					
	(1)	(2)	(3)	(4)	(5)
% Asian students					-0.001 (0.003)
% other race students					-0.010 (0.011)
% Female students					0.005 (0.005)
% FRL Students					0.001 (0.002)
% LEP					-0.010 (0.009)
% Migrant					0.142 (0.102)
Adjusted R-squared	0.332	0.333	0.333	0.322	0.317

Notes: N = 416. Each column reports the coefficient from a unique regression. *** p<0.01, ** p<0.05, and * p<0.1.

2. Balance Check

Mean Differences between Analytical Sample and All NJ School Districts		
	Analytical Sample	**All NJ Districts**
% Regular Districts	95.7	95.1
% Contain a High School	50.2	46.6
# Operating Schools	3.8	4.1
% Located in Urban Area	1.2	1.4
% Located in Suburban Area	76.9	75.1
% Located in Rural Area	21.9	23.4
Total Spending per Pupil ($)	17,559.4	17,948.2
% Change in Spending from last year	-1.8	-1.5
Total Enrollment	2,159.7	2,323.0
% White Students	69.0	67.9
Sample Size	416	590

Marked p-values indicate statistical significance of mean differences between sampled districts and all NJ districts. * p<0.10, ** p<0.05, *** p <0.01.

2. Balance Check

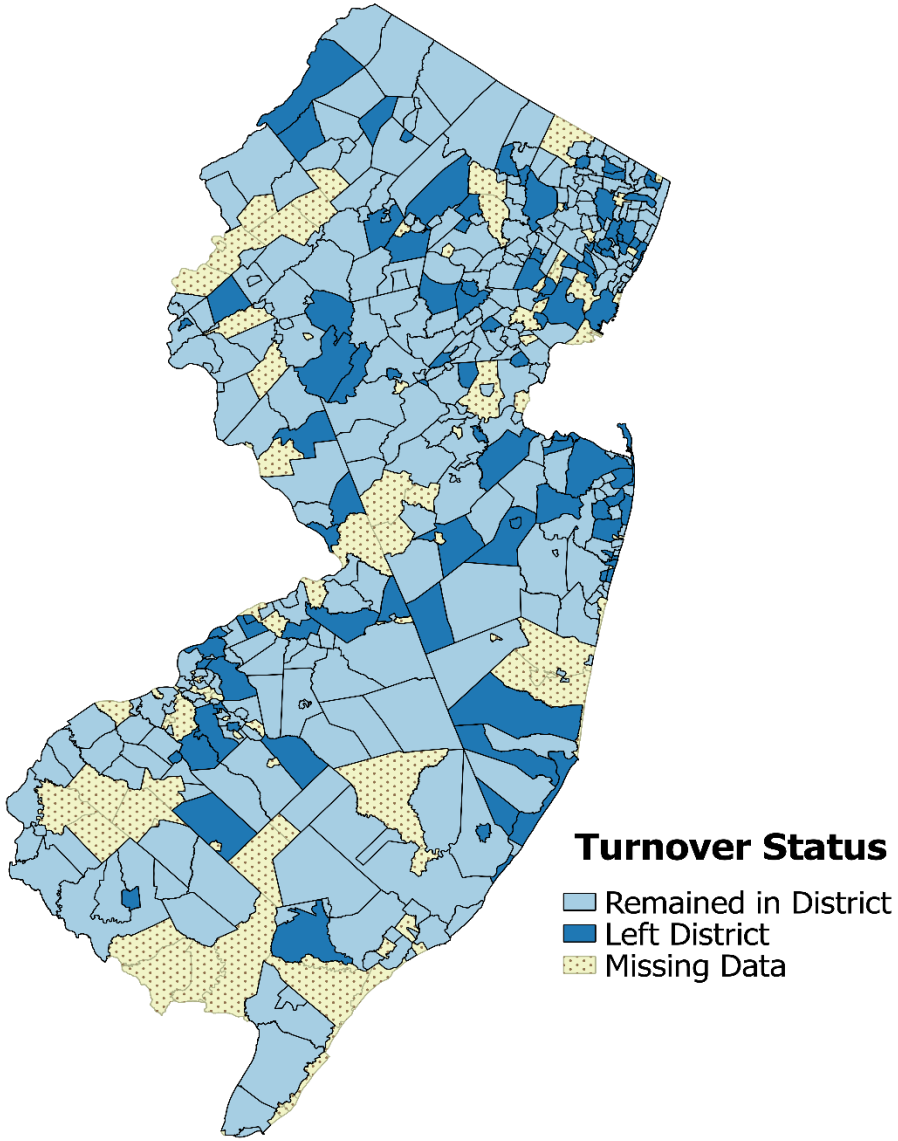
Mean Differences between Analytical Sample and All NJ School Districts		
	Analytical Sample	**All NJ Districts**
% Black Students	9.3	9.9
% Hispanic Students	13.6	14.6
% Asian Students	6.8	6.4
% Other Race Students	1.2	1.2
% Female Students	48.4	48.3
% FRL Students	21.3*	23.7
% LEP Students	2.2	2.4
% Migrant Students	0.1	0.1
% Black Students	9.3	9.9
Sample Size	416	590

Marked p-values indicate statistical significance of mean differences between sampled districts and all NJ districts. * p<0.10, ** p<0.05, *** p <0.01.

3. Regressions on Expiring Contract

Expiring Contract Regressions (OLS Estimates)				
	(1) Employee	**(2) District**	**(3) Students**	**(4) All**
Superintendent Covariates	**Yes**	No	No	**Yes**
F Statistic	1.513			1.490
(p-value)	(0.211)			(0.216)
District Covariates	No	**Yes**	No	**Yes**
F Statistic		0.694		0.890
(p-value)		(0.697)		(0.523)
Student Covariates	No	No	**Yes**	**Yes**
F Statistic			0.643	0.660
(p-value)			(0.742)	(0.728)
Adjusted R^2	-0.004	-0.006	-0.007	-0.017

4. NJ Map for Turnover Status



Motivation

- Superintendents are important local public managers
  - Responsible for a broad set of managerial duties:
    - Staff recruitment
    - Allocation of scarce resources
    - Forming organizational strategic goals
  - Can foster positive learning environments ➔ improve student outcomes (e.g. Alsbury, 2008; Byrd, Drews, & Johnson, 2006; Petersen, 2002)

Motivation

- Superintendents are important local public managers
  - Responsible for a broad set of managerial tasks:
    - Staff recruitment
    - Allocation of scarce resources
    - Forming organizational strategic goals
  - Can foster positive learning environments ➔ improve student outcomes
- Vital for local officials to recruit and retain talented superintendents.