

Occupational Licensing and Labor Market Fluidity

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Motivation

- Occupational licensing has grown rapidly over the past few decades

Introduction

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- Occupational licensing has grown rapidly over the past few decades
- Declining labor market dynamism

▶ Graph

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Research Question:

- What are the effects of occupational licensing on labor market dynamics?
- What are the welfare effects of increasing licensing requirements for workers?

Main Results & Contribution

- **What We Do:**

- Examine the relationship between licensing, occupational switching, and the wage changes associated with these switches.

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- **Main Results**

- Less exit – licensed workers are 13% less likely to switch occupations, and 1.5% less likely to become non-employed

Main Results & Contribution

- **What We Do:**

- Examine the relationship between licensing, occupational switching, and the wage changes associated with these switches.

- **Main Results**

- Less exit – licensed workers are 13% less likely to switch occupations, and 1.5% less likely to become non-employed
- Less entry – conditional on switching in, workers are 13.4% less likely to have switched into a licensed occupation if they were working, and 0.5% less likely if they were non-employed.

Main Results Continued...

- Higher premium – wage growth is higher for licensed workers whether they stay in the same occupation (5 pp) or switch occupations (3.7 pp out & 7.6 pp in from another job (J), 14.3 pp in from not employed (N)).

Main Results & Contribution

Main Results Continued...

- Higher premium – wage growth is higher for licensed workers whether they stay in the same occupation (5 pp) or switch occupations (3.7 pp out & 7.6 pp in from another job (J), 14.3 pp in from not employed (N)).
- Licensing can account for at least 0.1pp decline (3.4% to 2.1% total decline), or 7.7% of the total decline in occupational mobility.
 - Results above hold switching rates constant within groups, and vary only licensing shares across time.
 - Licensed occupations experience a decline in mobility from 1.98% to 1.45%.

Licensing effects

- Effect of licensing on static labor market outcomes: Kleiner and Krueger (2013), Kleiner and Vorotnikov (2017), Wiswall (2007), Kleiner and Soltas (2019)
- Licensing and dynamic decisions: Gittleman, Klee and Kleiner (2018), Johnson and Kleiner (2017)

Declining labor market dynamism

- Davis and Haltiwanger (2014), Hyatt (2015), Moscarini and Vella (2008), Xu (2019)

Road Map

- Data
- Empirical Evidence
- Baseline Specification and results
- Robustness
- Conclusion

Data Sources

Main Data Sources

- CPS 2016 - 2018

Supporting Data Sources

- SIPP Panel 2008, Wave 12-14, core + topical module
- SIPP Panels 1990 – 2008, all core data
- New licensing data set
- ONET

Empirical Evidence: Growth of Licensing

Empirical Evidence - Growth of Licensing

- Licensing has grown drastically over the past few decades (Kleiner and Krueger (2013), Redbird(2017))
 - Share of workers who are licensed has increased
 - Share of occupations that require licensure has increased
 - Within occupations, licensure is required in more states over time [▶ Graph](#)
 - Occupational requirements become more costly [▶ Example](#)

Licensing Requirement Change

- Changes in requirements covers education, licensing costs, renewal time, exams, hours of training, cost of renewal, etc.

Licensing Requirement Change

- Changes in requirements covers education, licensing costs, renewal time, exams, hours of training, cost of renewal, etc.
- Examples:

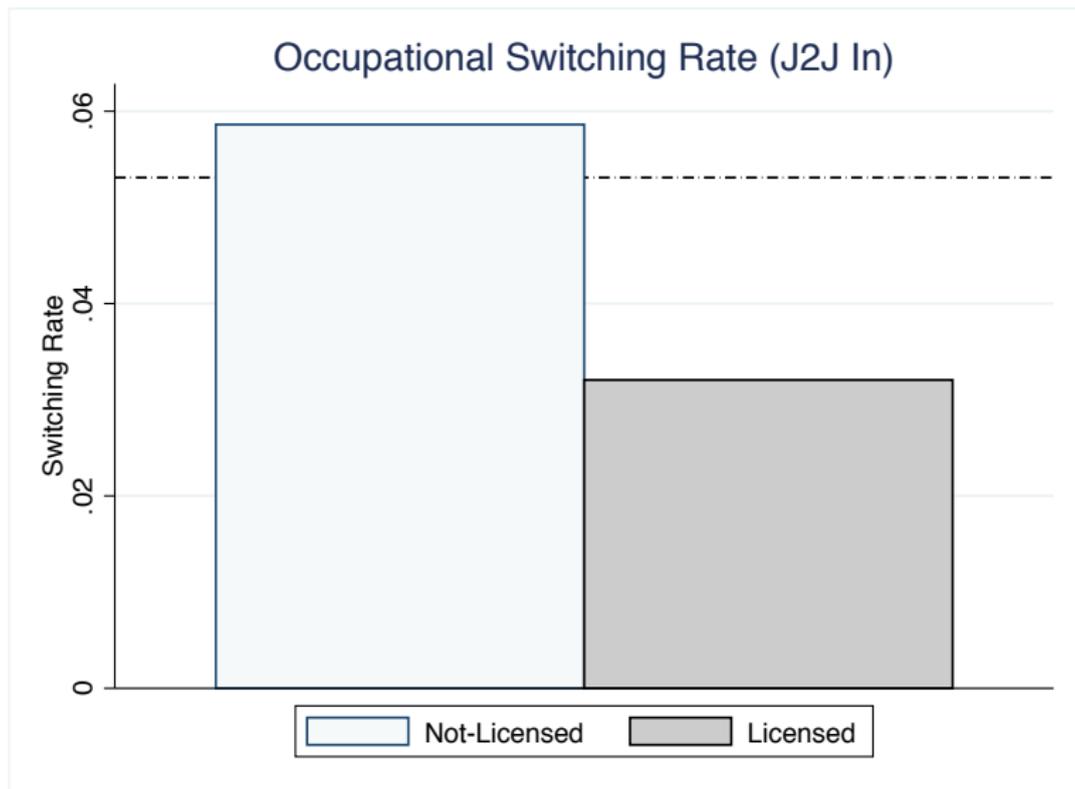
Table 1: Changes in Occupational Licensing Requirements

Occupation	Education (yrs)		Initial Cost		Renewal Cost	
	'95	'13	'95	%Δ ('13)	'95	%Δ ('13)
Land Surveyor	0.8	4.1	\$82	42%	\$86	24%
Psychologist	5.8	6.0	\$263	33%	\$169	56%
Nurse	2.0	2.0	\$36	124%	\$26	142%
Teacher	2.3	3.7	\$19	177%	\$16	188%
Veterinarian	6.0	6.0	\$23	512%	\$23	468%
Total (Mean)	3.22	4.9	\$101	116%	\$83	106%

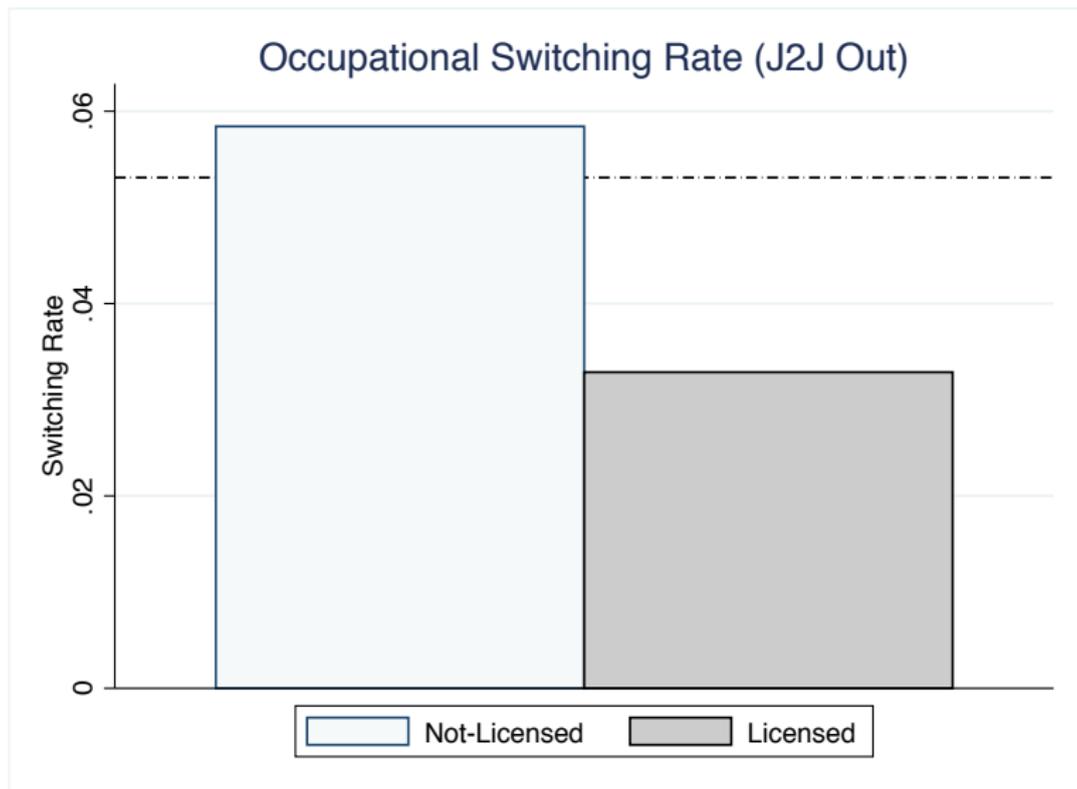
Note: Years of Education: 2 is High School, 4 is Assoc., 6 is Bachelor, 8 is Post-Grad

Empirical Evidence: Occupation Switching Rates

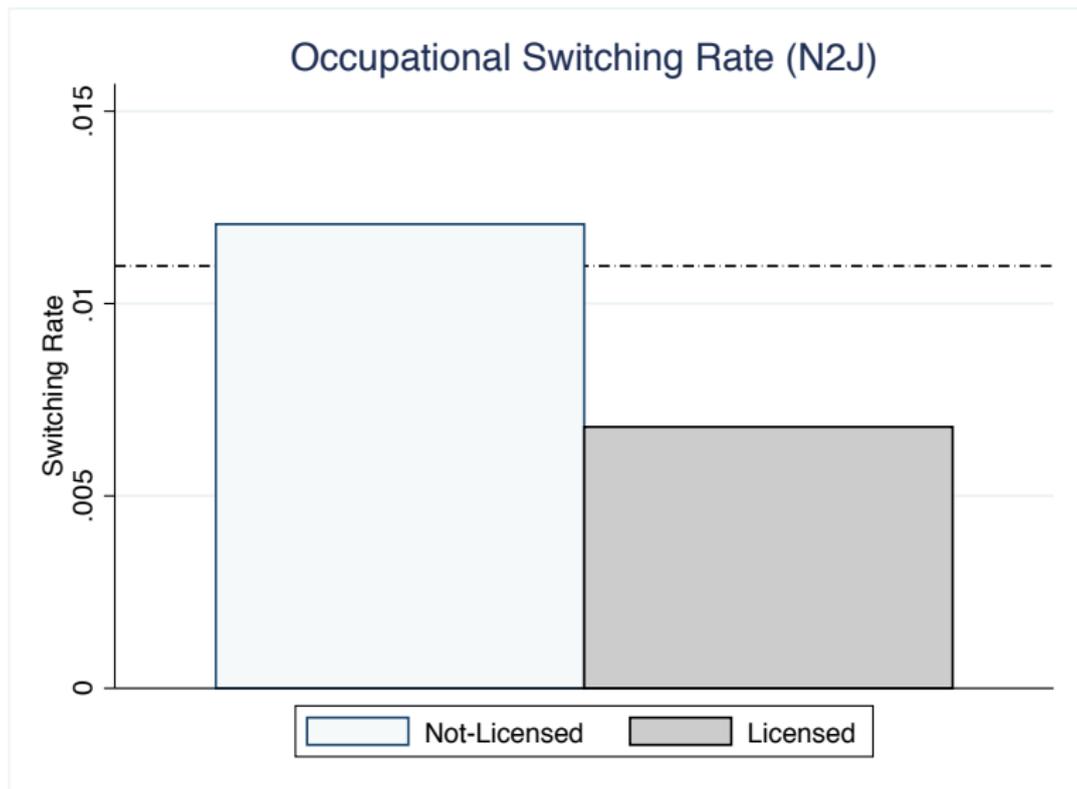
Empirical Evidence - Occupational Switching Rate



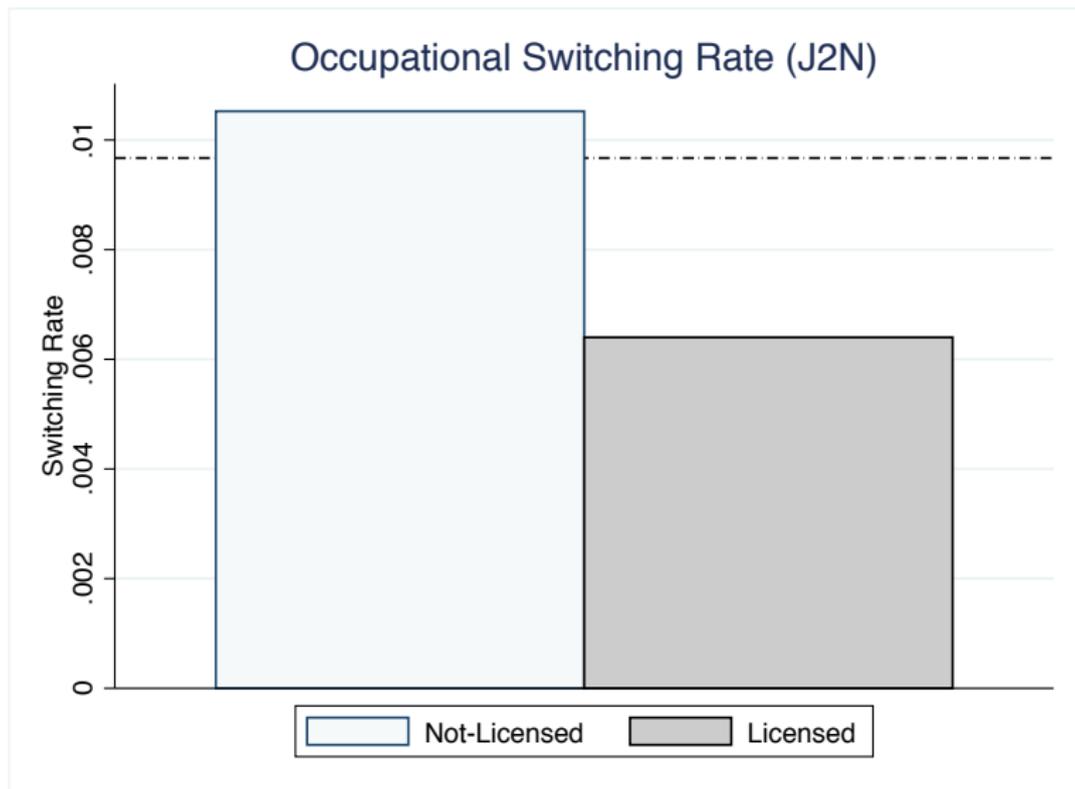
Empirical Evidence - Occupational Switching Rates



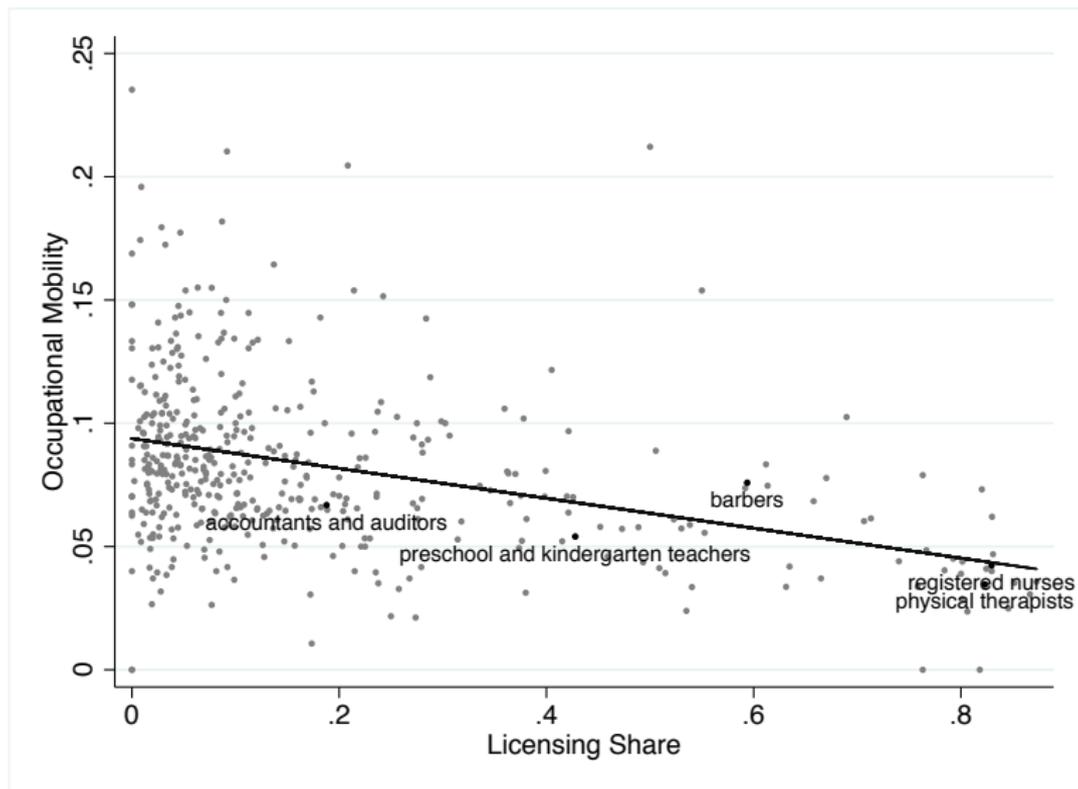
Switching in Rate from Non-employment



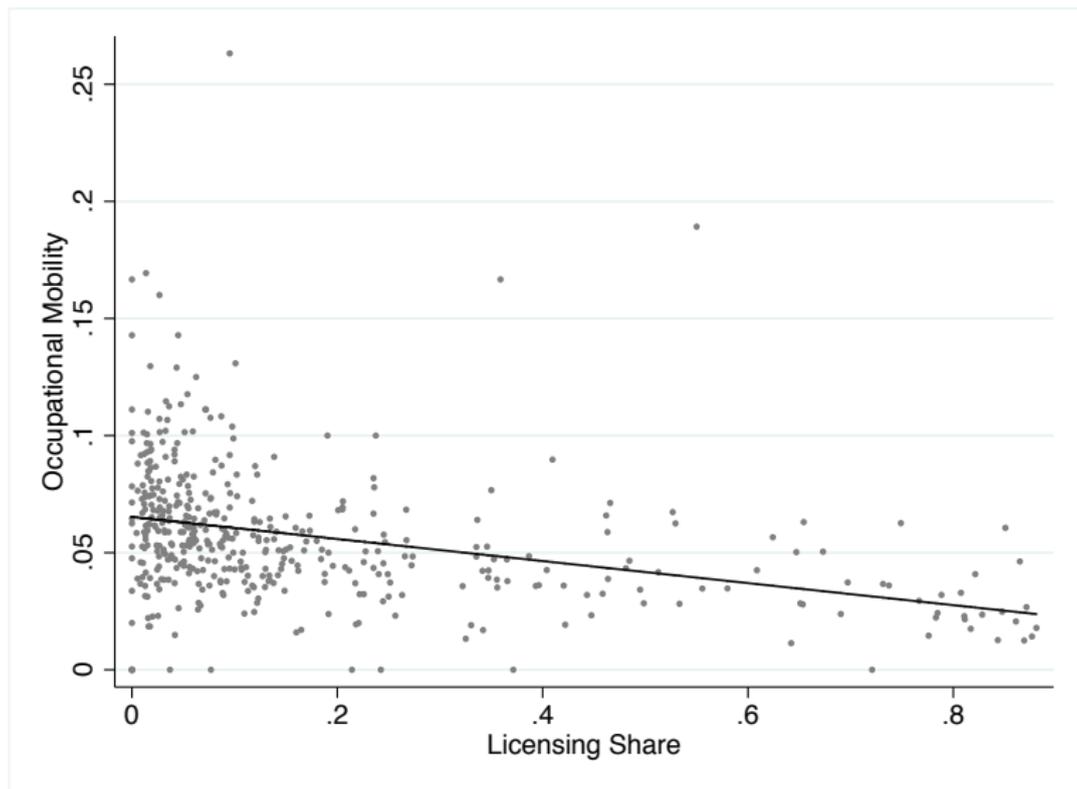
Switching Out Rate to Non-employment



Licensing Share vs Mobility – Switch Out



Licensing Share vs Mobility – Switch In



Empirical Specification

Labor market flows:

$$Y_{it} = \alpha_0 + \alpha_1 L_{it} + \beta X_{it} + \gamma S_{it} + \theta_t + \varepsilon_{it}$$

- Y_{it} : Indicator of labor market status changes
- X_{it} : Individual observable characteristics
- S_{it} : Skill contents

- X include: age, gender, race, education, marriage status, income level, union status, state and occupation fixed effects
- θ_t : year effect
- S include: cognitive skill, manual skill, interpersonal skill (ONET)

Empirical Specification

Labor market flows timing:

- Switching out effect

$$Y_{it+1} = \alpha_0 + \alpha_1 L_{it} + \beta X_{it} + \gamma S_{it} + \theta_t + \varepsilon_{it}$$

- Y_{it+1} is switching status between t and t+1

- Switching in effect

$$Y_{it-1} = \alpha_0 + \alpha_1 L_{it} + \beta X_{it-1} + \gamma S_{it-1} + \theta_{t-1} + \varepsilon_{it}$$

- Y_{it-1} is switching status between t-1 and t

Establishing a causal relationship:

- Use Propensity Score Matching (PSM) to establish causal relationship between treatment and outcome.
- Match workers over observable characteristics
 - Matched characteristics: age, gender, marital status, education, cognitive skills, manual skills, interpersonal skills, etc.
- Apply Coarsened Exact Matching (CEM) algorithm to ensure balance between the treated and non-treated group (Blackwell, Iacus, King, Porro 2010).

Baseline Results

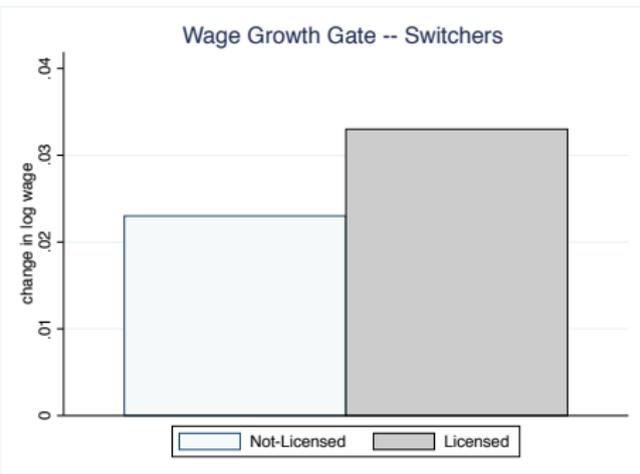
Table 2: Percentage Effect of Licensing on Annual Transitions

	CPS Annual Results		
	$\widehat{\alpha}_1$	$\mathbb{E}[Y]$	% Effect
Probability of Switching Out (J2J)	-0.129 (.005)	0.425	-33.20%
Probability of Switching In (J2J)	-0.133 (.006)	0.423	-36.38%
Probability of Switching to N (J2N)	-0.015 (.003)	0.522	-2.78%
Probability of Switching In from N (N2J)	-0.005 (.003)	0.549	-0.87%
Prob of Switching In from J vs N (N2J vs J2J)	-0.044 (.003)	0.246	-17.82%

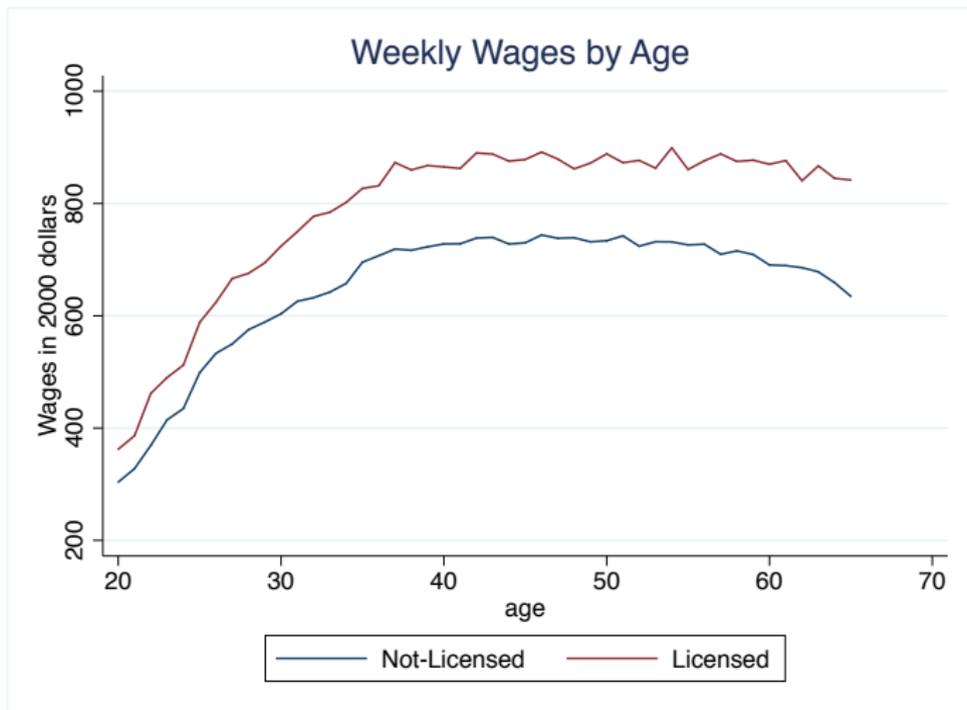
Note: All results above include occupational fixed effects, year fixed effects, CEM matching and PSM weights.

Empirical Evidence: Wage Differences

Wage Growth Differences



"Life Cycle" Difference



Empirical Specification – Wage Changes

Wage growth:

- Switching out effect

$$\Delta W_{it+1} = \alpha_0 + \alpha_1 L_{it} + \beta X_{it} + \gamma S_{it} + \theta_t + \varepsilon_{it}$$

- ΔW_{it+1} is wage change between t and t+1

- Switching in effect

$$\Delta W_{it-1} = \alpha_0 + \alpha_1 L_{it} + \beta X_{it-1} + \gamma S_{it-1} + \theta_{t-1} + \varepsilon_{it}$$

- ΔW_{it-1} is wage change between t-1 and t

Table 3: Annual Wage Effect of Licensing

	CPS Annual Results $\widehat{\alpha}_1$
Wage Growth for Stayers	0.050 (.002)
Wage Growth for Switchers (Out)	0.037 (.005)
Wage Growth for Switchers (In)	0.076 (.004)
Wage Growth for New Hires (N2J)	0.143 (.007)

Note: All results above include occupational fixed effects, year fixed effects, CEM matching and PSM weights.

Robustness Checks

- Different licensing indicators

▶ examples

- Different data cleaning strategies

▶ examples

- Different data sources

▶ examples

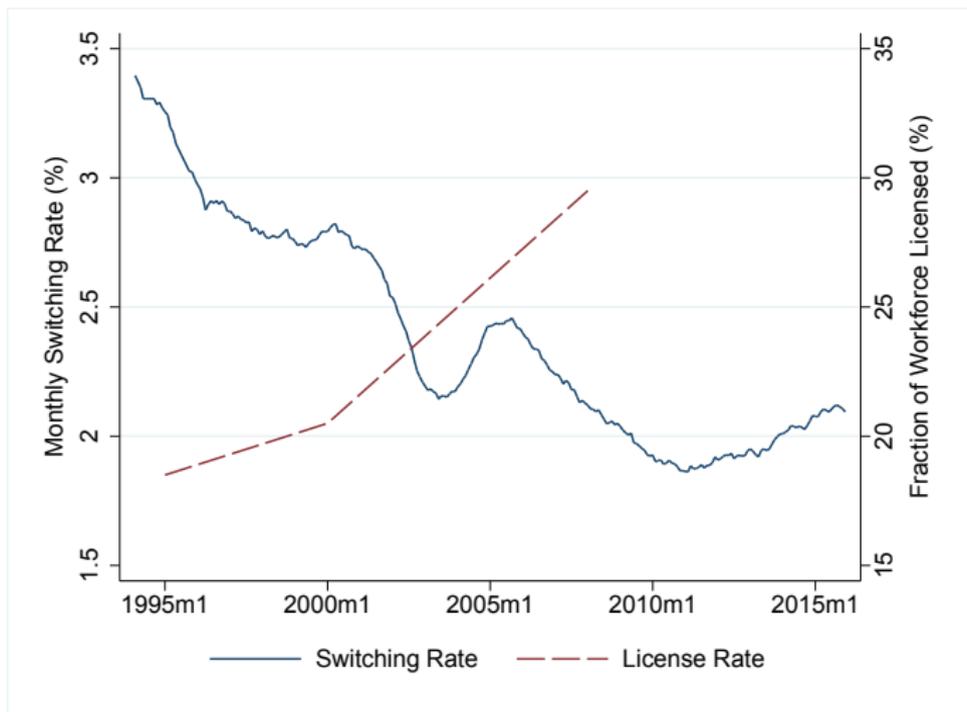
- Heterogeneity Across Major Occupation Groups

▶ examples

Key Take Aways

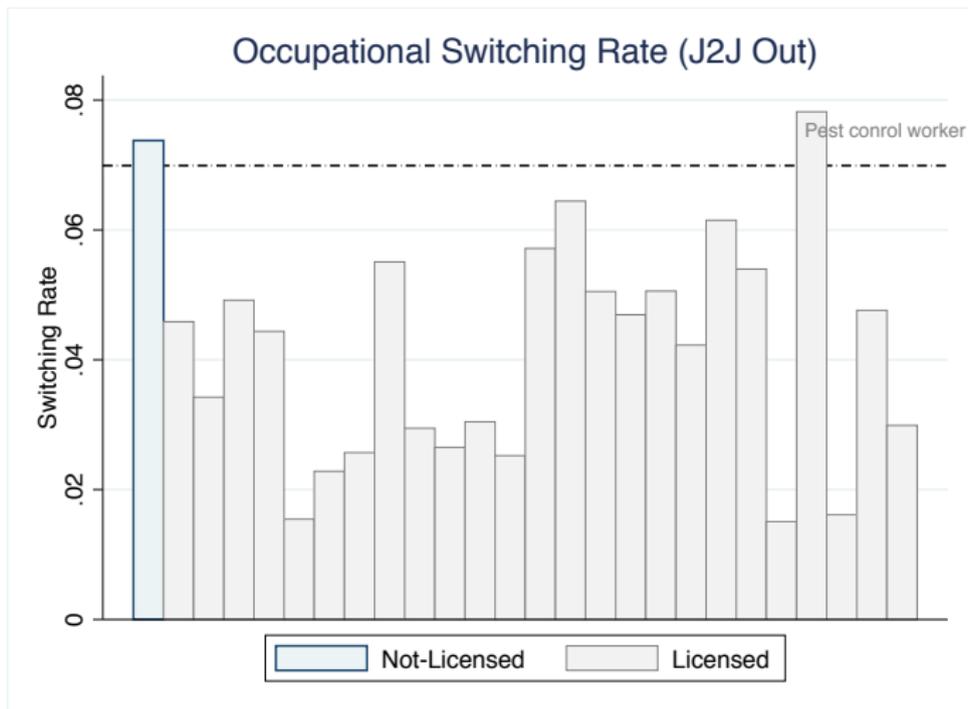
- Licensing decreases the frequency that workers switch occupations. Over the past two decades, licensing accounts for at least 7.7% of the total decline in the occupational switching rate.
- Licensing acts as a barrier to entry for workers who would switch into a licensed occupation. The effect is stronger for employed workers than non-employed ones.
- Licensed workers experience higher wage growth rates, whether they stay or switch out of the occupation.

Licensing Growth and Occupation Switching Rate



Licensing rate is from Kleiner and Krueger (2013), Switching rate is from Xu (2019)

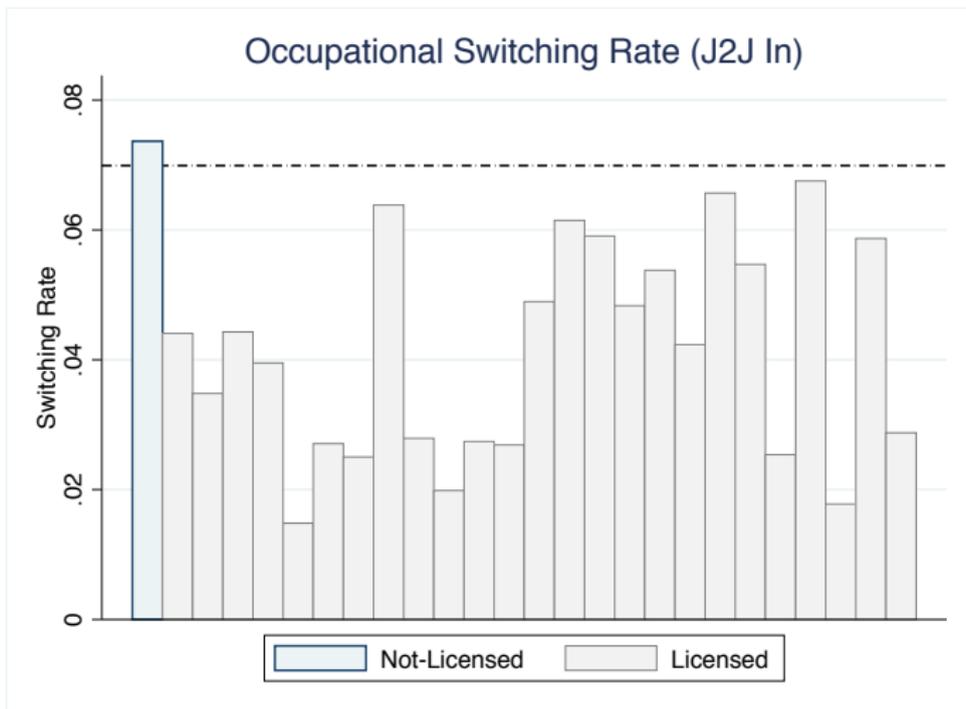
Occupational Differences- Switching Out



Note: Licensed here is universally licensed occupations

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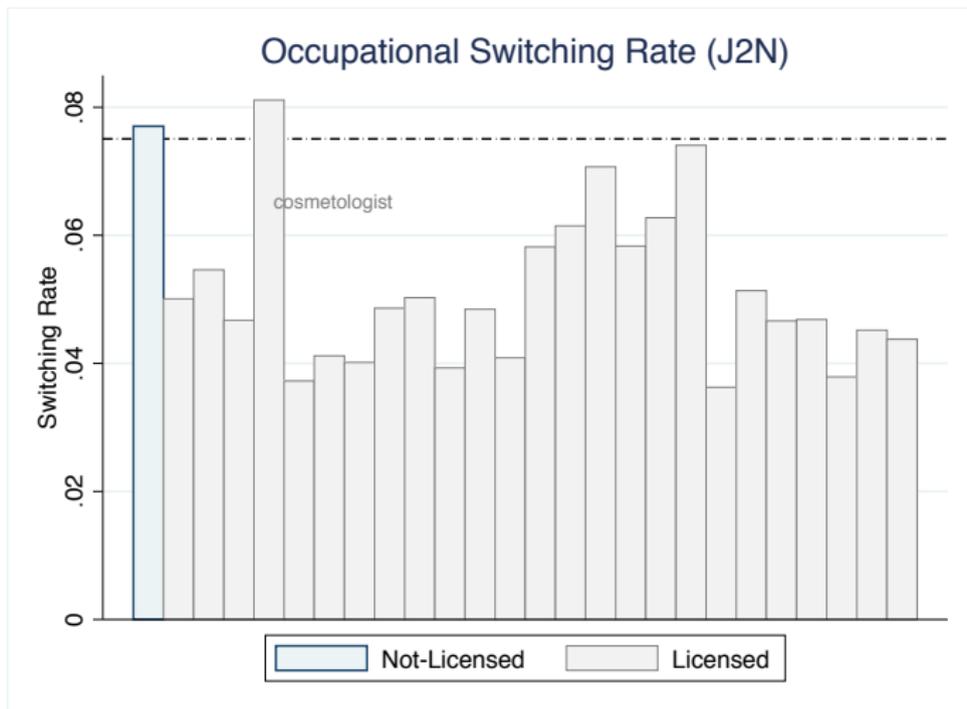
Occupational Differences-Switching in



Note: Licensed here is universally licensed occupations

▶ Back

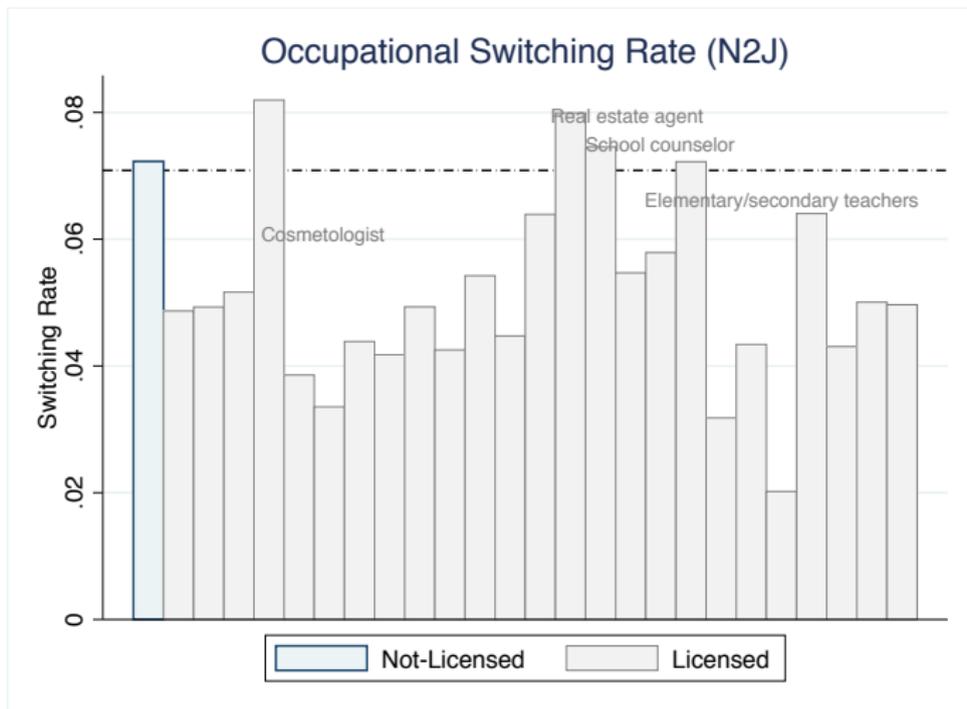
Occupational Differences- Switching to Nonemployment



Note: Licensed here is universally licensed occupations

▶ Back

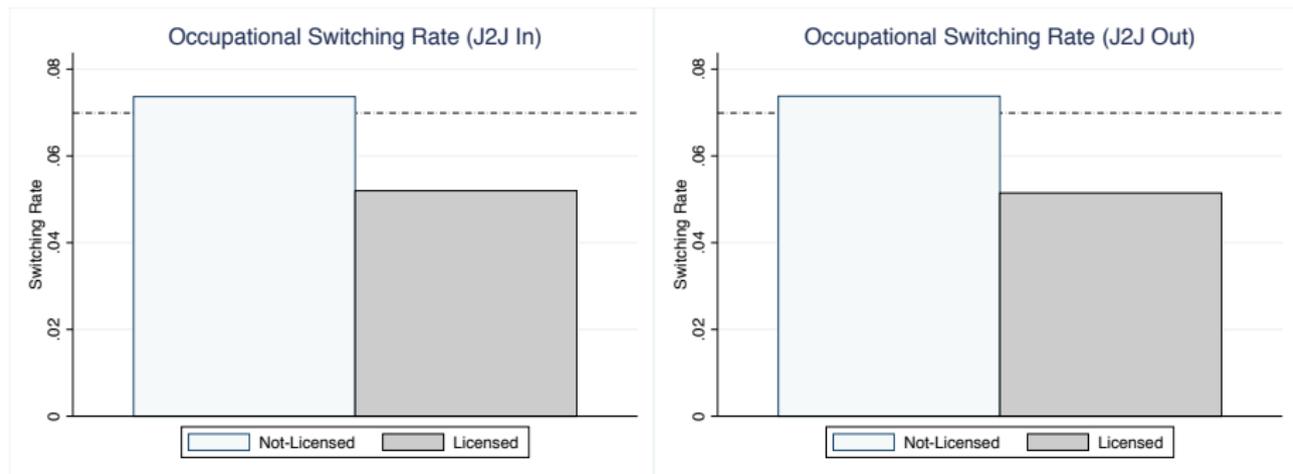
Occupational Differences-Switching in from N



Note: Licensed here is universally licensed occupations

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Alternative Licensing Definitions



Note: Licensing indicator: universally licensed occupations

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Licensing Growth Over Time

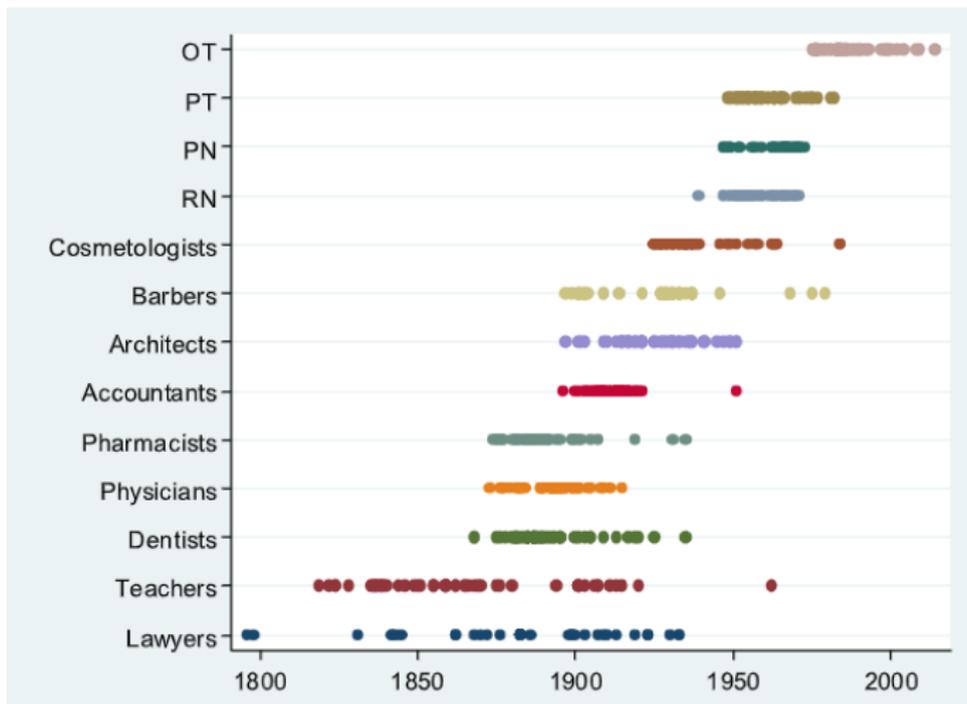
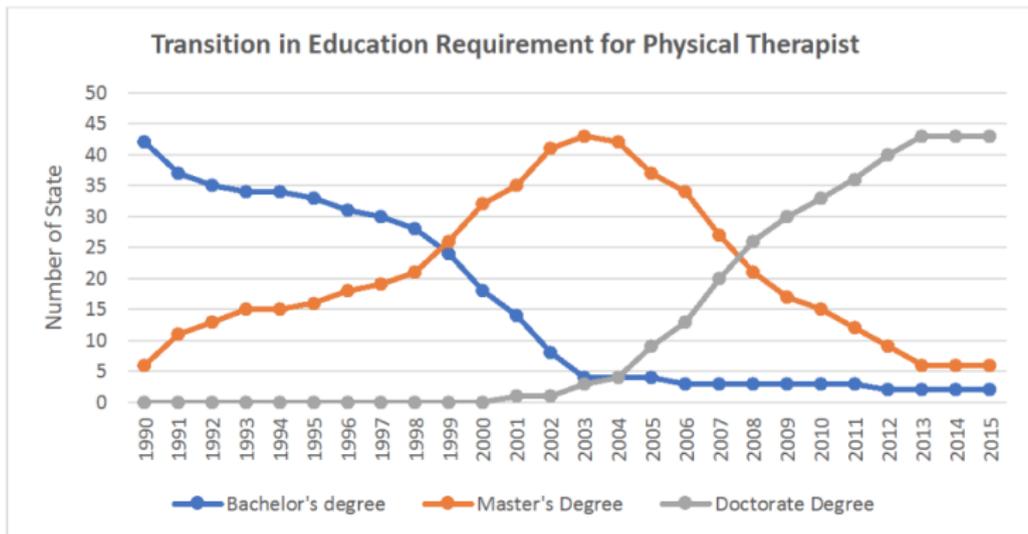


Figure is from Kleiner and Han (2019)

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Licensing Requirement Changes Over Time



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Other results

- Occupation differences - switching in from a different occupation [▶ Graph](#)
- Occupation differences - switching out to a different occupation [▶ Graph](#)
- Occupation differences - switching in from nonemployment [▶ Graph](#)
- Occupation differences - switching to nonemployment [▶ Graph](#)
- More alternative definition results here [▶ Graph](#)
- Regression Results [▶ Table](#)

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Occupational Switching Rate Analysis

	Switching Out (J2J)		
	1A	1B	1C
Licensed (α_1)	-0.016***	-0.015***	-0.010***
Age	-0.002***	-0.002***	-0.001***
Female	-0.012***	-0.014***	-0.007***
Married	-0.020***	-0.020***	-0.020***
College	0.009***	0.010***	0.002*
Monthly Income	-0.010***	-0.010***	-0.008***
Cognitive		-0.009**	0.023***
Manual		-0.022***	-0.038***
Interpersonal		-0.020***	-0.020***
$\mathbb{E}[Y]$			0.053
% Effect of α_1			-18.7%
Matched	No	No	Yes
Observations	1,131,107	1,127,636	379,876

Note: Licensing indicator – universally licensed occupations

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Impute Wages Instead of Licensing Status

	CPS Annual Results		
	$\widehat{\alpha}_1$	$\mathbb{E}[Y]$	% Effect
Probability of Switching Out (J2J) (Table 2, Column 1D)	-0.147 (.005)	0.405	-36.35%
Probability of Switching In (J2J) (Table 3, Column 2D)	-0.153 (.005)	0.402	-38.10%
Probability of Switching Out to Unemployment (J2N) (Table 4, Column 3D)	-0.003 (.003)	0.523	-0.57%
Probability of Switching In from Unemployment (N2J) (Table 5, Column 4D)	-0.002 (.003)	0.510	-0.44%
Prob of Switching In from J vs N (N2J vs J2J) (Table 6, Column 5D)	-0.048 (.003)	0.264	-18.10%

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	SIPP Panel 2008		
	$\widehat{\alpha}_1$	$\mathbb{E}[Y]$	% Effect
Probability of Switching Out (J2J) (Table 2, Column 1D)	-0.011 (.005)	0.036	-32.06%
Probability of Switching In (J2J) (Table 3, Column 2D)	-0.011 (.005)	0.043	-26.57%
Probability of Switching Out to Unemployment (J2N) (Table 4, Column 3D)	-0.004 (.004)	0.022	-18.48%
Probability of Switching In from Unemployment (N2J) (Table 5, Column 4D)	-0.012 (.004)	0.028	-44.96%
Prob of Switching In from J vs N (N2J vs J2J) (Table 6, Column 5D)	-0.102 (.049)	0.681	-14.93%

Heterogeneity Across Occupation Groups

	CPS Annual Results					
	occ1	occ2	occ3	occ4	occ5	occ6
Prob of Switching Out (J2J) (Table 2, Column 1D)	-0.16***	-0.11***	-0.15***	0.09	-0.11***	-0.12***
Prob of Switching In (J2J) (Table 3, Column 2D)	-0.15***	-0.155***	-0.14***	0.03	-0.16***	-0.11***
Prob of Switching Out to N (J2N) (Table 4, Column 3D)	-0.00	-0.01	-0.01	-0.03	-0.02**	0.02*
Prob of Switching In from N (N2J) (Table 5, Column 4D)	-0.01**	0.00	0.00	-0.03	0.01	0.01
Switching In from J vs N (Table 6, Column 5D)	-0.04***	-0.04***	-0.04***	-0.05	-0.06***	-0.05***
Wage Growth for Stayer (Table 7, Column 1)	0.05***	0.05***	0.09***	0.28*	0.07***	0.11***
Wage Growth for Switcher (Out) (Table 7, Column 2)	0.02	0.03	0.11***	0.38***	0.11***	-0.01
Wage Growth for Switcher (In) (Table 7, Column 3)	0.06***	0.08***	0.12***	0.17	0.08*	0.09***
Wage Growth for New Hire (N2J) (Table 7, Column 4)	0.16***	0.17***	0.13***	-0.11	0.15***	0.16***

Note: All results above include year fixed effects, CEM matching and PSM weights. The six occupations are: 1. Managerial and Professional 2. Technical, Sales and Administration Support 3. Service Occupations 4. Farming, Forestry, and Fishing 5. Precision Production, Craft and Repair 6. Operators, Fabricators and Laborers.