

# Who Hires Non-Standard Labor? Evidence from Employers

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Any opinions and conclusions expressed herein are those of the authors and do not reflect the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information on individual firms is disclosed. The DRB bypass number is CBDRB-FY19-437.

# Motivation

- Measuring gig economy or non-standard work arrangements
- Gap in data (Abraham et al. 2018a; Bernhardt 2014; Bernhardt et al. 2016)
  - Differences between IRS tax data (e.g. 1099) and household surveys (e.g. CPS, CPS-CWS, etc.)
  - Potential data sources: Administrative data, Employer surveys, Financial data, Private sector data
- 2015 Annual Survey of Entrepreneurs

# Main Questions

- Non-standard work = non-employee labor. Types:
  - Day laborers
  - Temporary agency workers
  - Leased workers
  - Outside contractors
- How much of each type of non-standard work is reported by employers?
- Correlation of non-standard types across employers
- What sorts of tasks do they carry out, relative to employees?
- Who hires non-standard workers and why?
  - Variation by industry, size, and age
  - Specialized tasks (complements) or same as employees (substitutes)
  - Franchise firms (type of “fissuring” - Weil 2014)

# Previous research

- Review studies
  - Abraham et al. (2018a), Bernhardt (2014), Bernhardt et al. (2016), Kalleberg (2009), OECD (2019), Weil (2014)
- Gig economy
  - e.g. Abraham et al. (2018a, b), Farrell and Greig (2016a, 2016b), Jackson et al. (2017), Katz & Krueger (2016, 2019), Koustas (2018), Hall and Krueger (2018)
- Non-standard work arrangements
  - e.g. Abraham and Taylor (1996), Cappellari et al. (2012), Dey et al. (2012), Goldschmidt and Schmieder (2017), Houseman (2001), Houseman (2014), Kalleberg et al. (2003)
- Job Quality
  - e.g. Batt and Nohara (2009), Dube and Kaplan (2010), Houseman et al. (2003), Ji and Weil (2015), Schneider and Harknett (2018)

# Results from Previous Research on Non-Standard Labor using Data on Firms

- Abraham (1988): survey of 442 firms in 1985
  - 93% use temporary or on-call
  - Average 1.5% of all labor, 8% in top 10% of firms
- Davis-Blake and Uzzi (1993): 5089 establishments in 1979
  - 15% of labor is temporary or seasonal
  - 41% of establishments use contractors
- Abraham and Taylor (1996): 2700 establishments in 1986-7
  - 5 types of services (janitorial, maintenance, computer, etc.)
  - 15-28% of firms use contractors for each service
  - Implied mean fractions contracted out range up to 30%

# Results from Previous Research on Non-Standard Labor using Data on Firms

- Houseman (2001): 550 establishments ( $E > 4$ ) in 1996
  - 46% use agency temps, 44% use contractors
- Dey et al. (2012): OES data (with CES and CWS) for temporary and PEO employees in manufacturing
- Cappellari et al. (2012): 13,000 Italian firms 2004-2007
- Goldschmidt and Schmieder (2017): outsourcing in Germany

# Data Source:

## 2015 Annual Survey of Entrepreneurs (ASE)

- Random sample of all employer businesses filing IRS tax forms (receipts > \$1,000, number of employees > 0)
- Large companies are selected with certainty.
- Stratified by frame, geographic area, and number of years the firm was in business
- Response rates: 66.9% (among 290,000 businesses); weights adjust for sampling
- Final sample: 158,000 employers

# Advantages of ASE 2015

- Nationally representative sample
  - All private industries (excluding public sector), all size groups, including all private employers
- Large sample size
- Measures of non-standard work
  - Use of types of workers (“extensive”)
  - Percentages of use of types of workers (“Intensive”)
  - Tasks performed by types of workers
- Detailed characteristics of firms and owners
  - e.g. firm age, franchise businesses (“fissuring”)



# Limitations of ASE 2015

- Only employers: no information on non-standard work at firms with no employees
- Snapshot of non-standard employment in 2015 and no longitudinal information on percentages or tasks (use of types of workers is available)
- No information on hours of work
- No information on union
- Information only on offshoring (international outsourcing), not domestic outsourcing

# Use of Types of Workers ("Extensive")

## TYPES OF WORKERS

In 2015, which of the following types of workers were used by this business? **Select all that apply.**

- Full-time paid employees (workers who received a W-2)
- Part-time paid employees (workers who received a W-2)
- Paid day laborers
- Temporary staffing obtained from a temporary help service
- Leased employees from a leasing service or a professional employer organization
- Contractors, subcontractors, independent contractors, or outside consultants (workers who received a 1099 or payment from another company)
- None of the above – Skip to Managing Service or Production Problems

# Percentages of Types of Workers ("Intensive")

## PERCENTAGES OF TYPES OF WORKERS

In 2015, on average what percent of the total number of workers was accounted for by each of the following Types of Workers? *Round to the nearest whole percent. Your best estimate is fine. Total should sum to 100%.*

<b>Types of Workers</b>	<b>Please report %</b>
Full-time paid employees	
Part-time paid employees	
Paid day laborers	
Temporary staffing obtained from a temporary help service	
Leased employees from a leasing service of a professional employer organization	
Contractors, subcontractors, independent contractors, or outside consultants	
<b>Total</b>	<b>100%</b>

# Tasks Performed by Types of Workers

## TYPES OF TASKS PERFORMED BY LEASED EMPLOYEES FROM A LEASING SERVICE OR PROFESSIONAL EMPLOYER ORGANIZATION

If you selected “**Leased employees from a leasing service or a professional employer organization**” in ‘Types of Workers’, please answer the following question.

In 2015, what types of tasks did **leased employees from a leasing service or professional employer organization** perform? **Select all that apply.**

- Procurement, logistics, and distribution
- Operations (Primary business activities related to producing this business’s goods and/or services)
- Marketing, sales, and customer accounts
- Customer and after sales service
- Product or service development
- Technology and process development
- General management and firm infrastructure
- Human resources management
- Strategic management
- None of the above

# Measuring Standard and Non-Standard Workers

- Start with  $E_i = \text{paid employees} = \text{“standard workers”}$ 
  - $E_i = FT_i + PT_i$
- Compute  $N_i = \frac{n_i}{e_i} E_i = \text{“non-standard workers”}$ 
  - where  $n_i$  is the share of non-standard workers in all labor and  $e_i$  is the share of full- and part-time workers
- Compute  $L_i = E_i + N_i = \text{“total workers”}$

# Variables of Interest (Firm Characteristics)

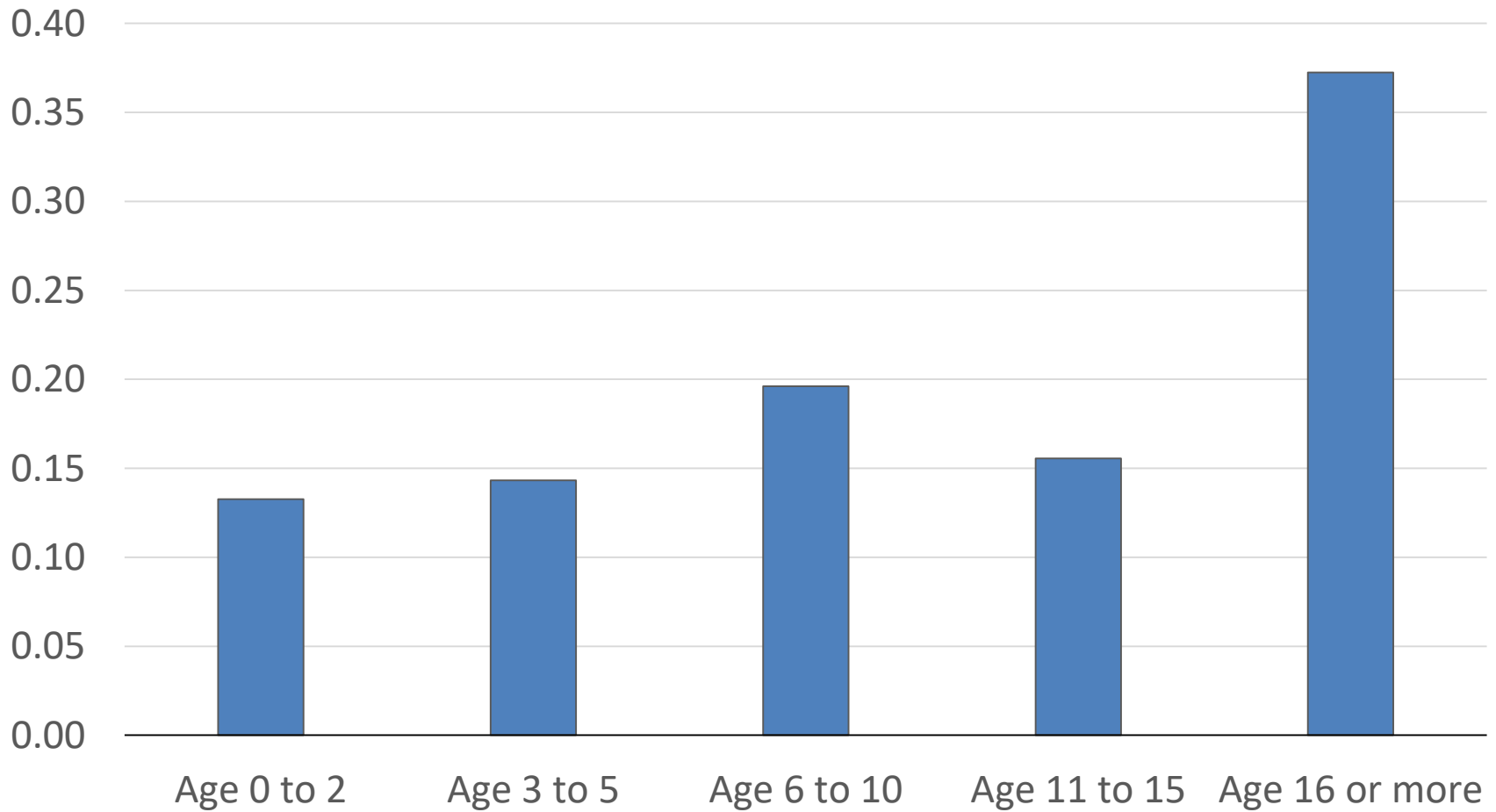
- Firm Age
  - Based on oldest establishment hiring the first paid employee
- Firm Size:  $L_i$  (headcount of all workers)
- Franchise Status
- Industry
  - 2-digit NAICS

# Descriptive Statistics

<b>Variables</b>	<b>Mean</b>
Firm Age	10.650
Total Workers (L)	22.340
Employees (E)	19.090
Payroll (\$1000s)	912.100
Multi-establishment	0.035
Female ownership (51% or more)	0.196
Minority (51% or more)	0.169
White (51% or more)	0.847
Black (51% or more)	0.094
Asian (51% or more)	0.017
Franchise	0.058
Observations	158000

Source: ASE, DRB bypass number CBDRB-FY19-437

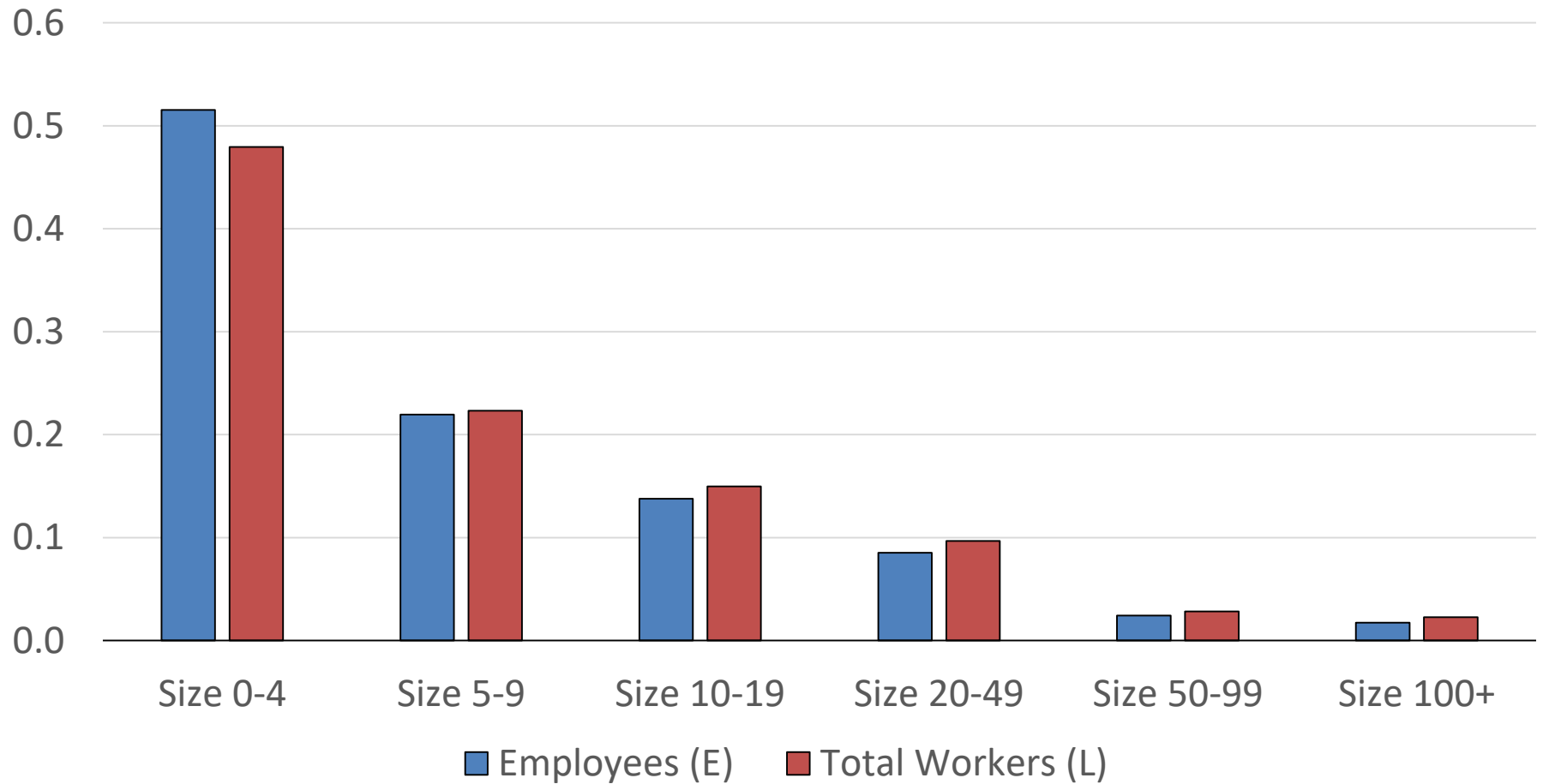
# Descriptive Statistics (entire sample): Age



Source: ASE, DRB bypass number CBDRB-FY19-437

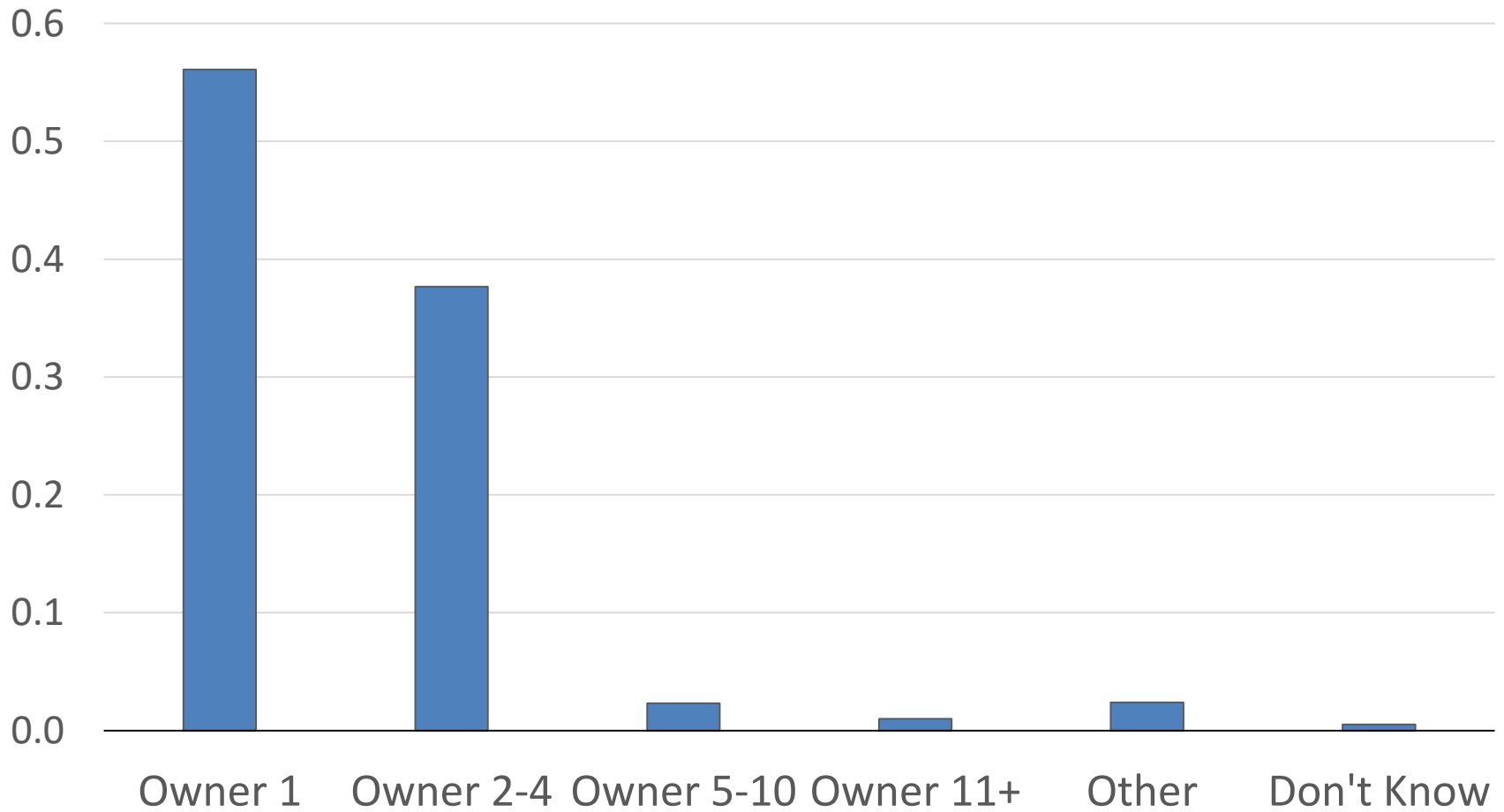


# Descriptive Statistics: Size Measured by Employees (E) vs. Total Workers (L)



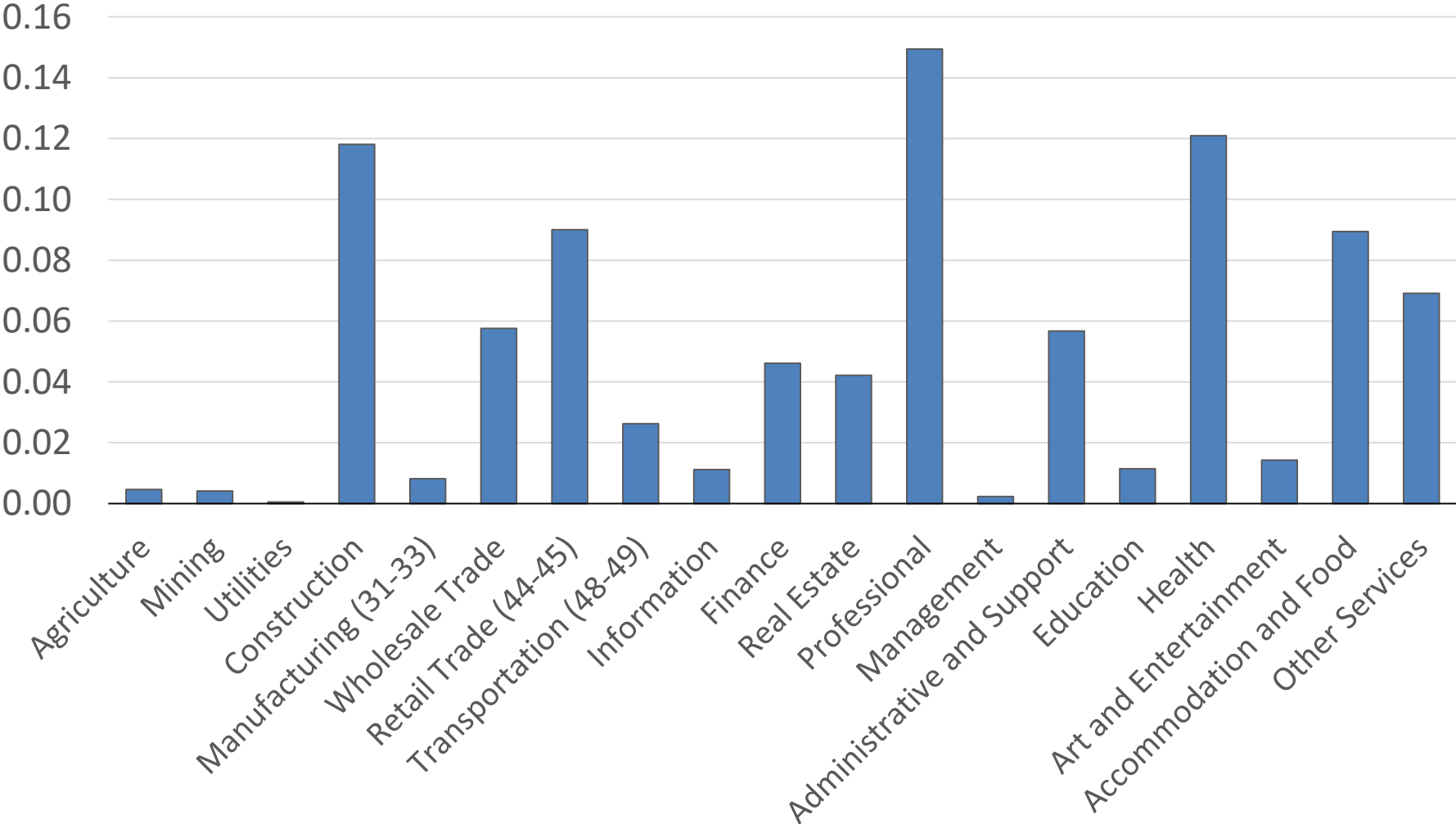
Source: ASE, DRB bypass number CBDRB-FY19-437

# Descriptive Statistics: Number of Owners



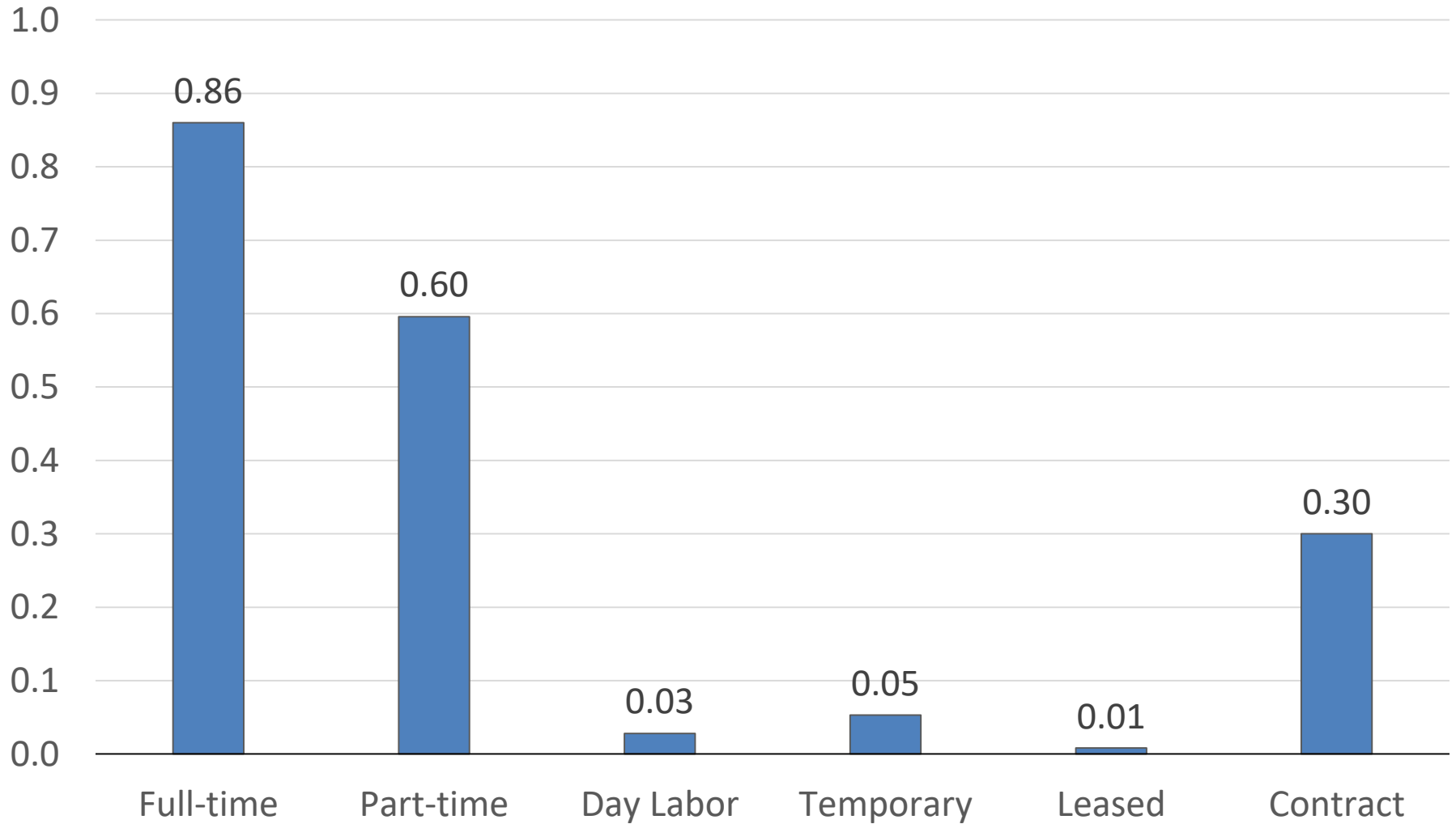
Source: ASE, DRB bypass number CBDRB-FY19-437

# Descriptive Statistics: Share of Industry



Source: ASE, DRB bypass number CBDRB-FY19-437

# Fraction of Firms Using Different Types of Workers

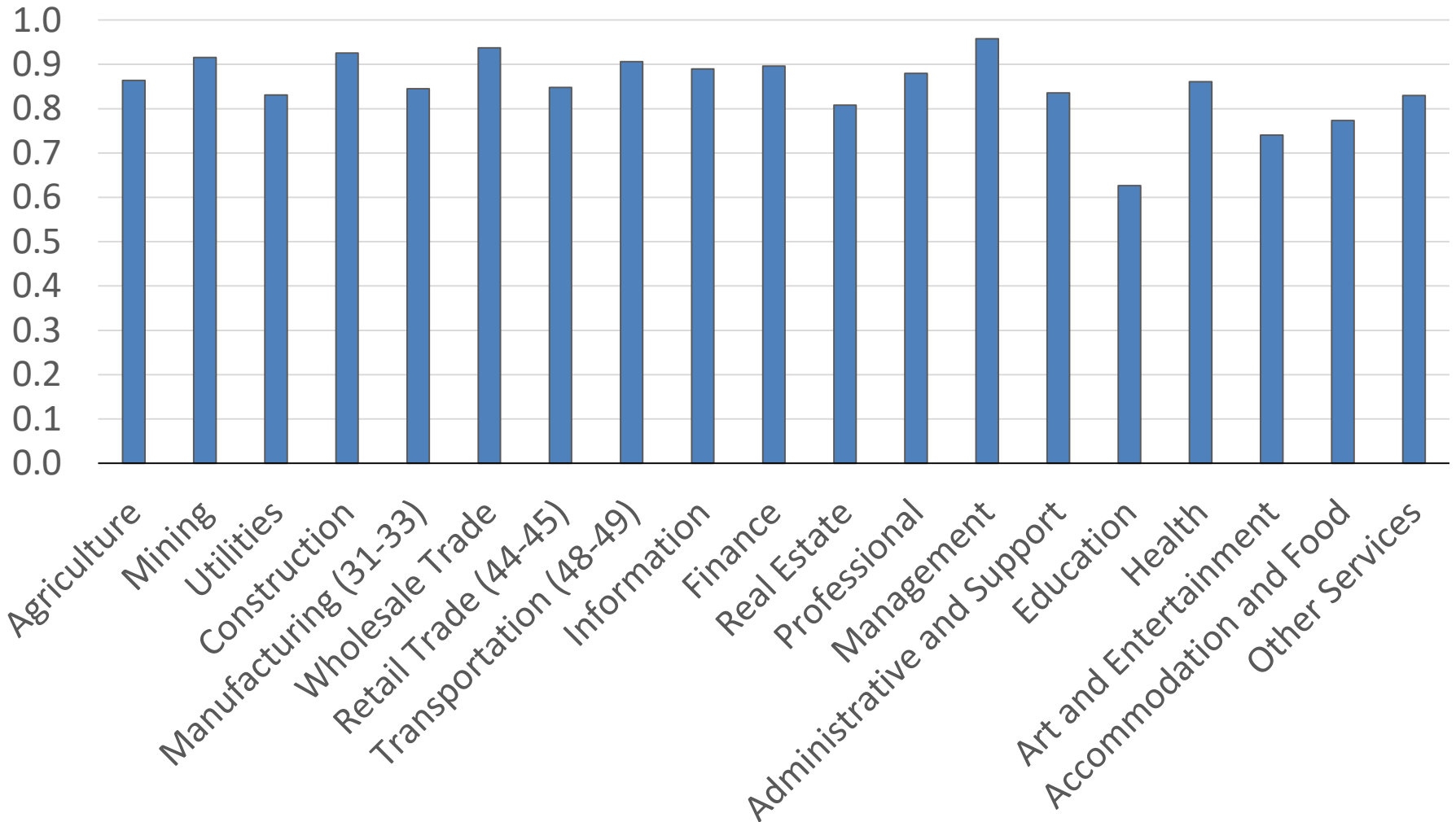


# Comparisons: SBO 2012 & ASE 2014, 2015, 2016 (Published Estimates)

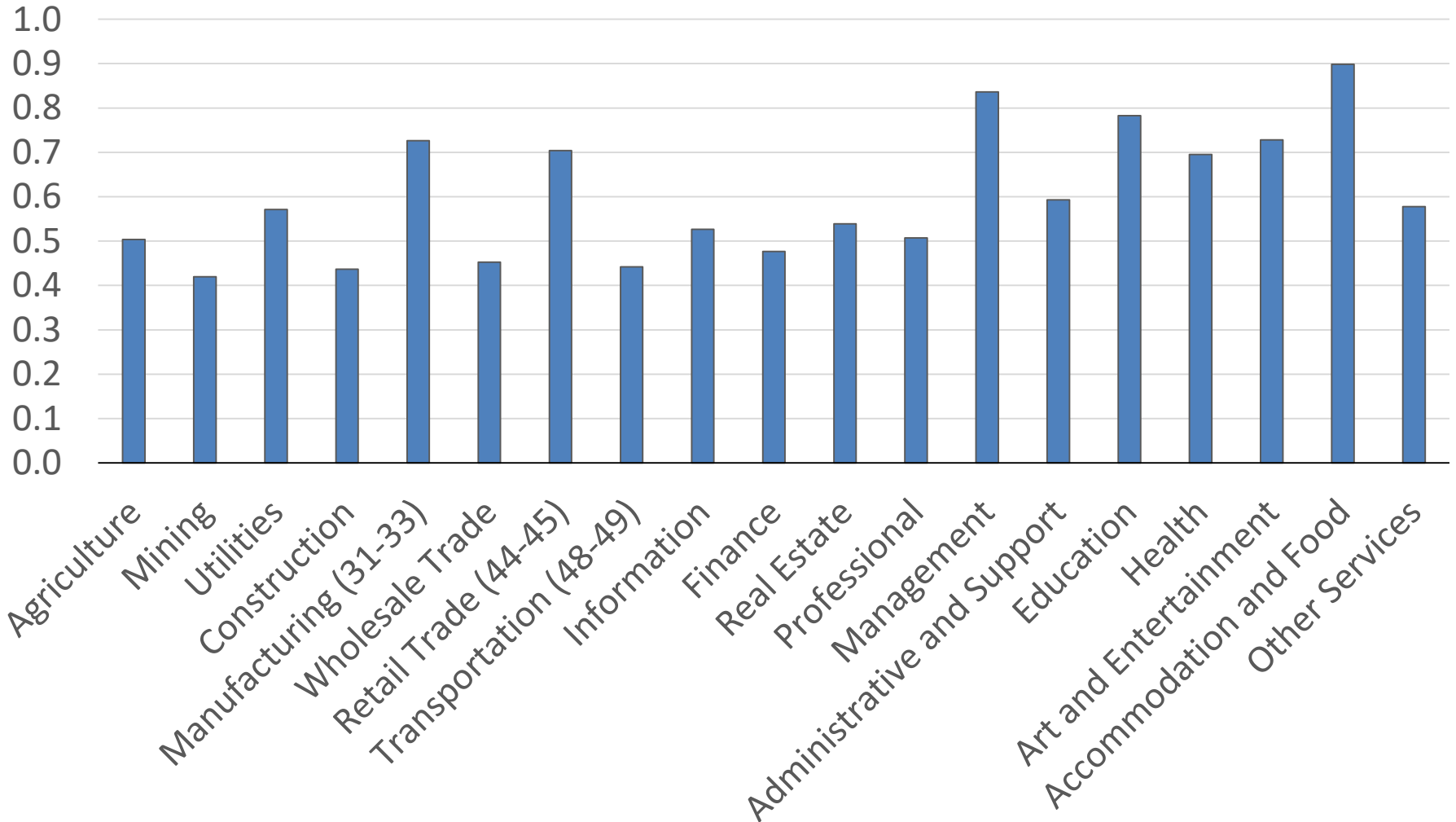
	SBO 2012	ASE 2014	ASE 2015	ASE 2016
Full-time	68.7	69.5	73.3	71.1
Part-time	54.5	53.3	51.0	50.4
Day labor	2.9	3.4	2.9	2.9
Temporary	4.4	5.0	4.6	4.6
Leased	0.8	0.9	0.9	0.8
Contractors	28.2	28.8	29.7	29.4
None of the above	9.5	10.2	9.2	10.0
Total reporting	100.0	100.0	100.0	100.0
Item not reported	0.6	1.1	0.9	1.5

Note: Estimates are from American Fact Finder table SB1200CSCB48 (SBO 2012), SE1400CSCB20 (ASE 2014), SE1500CSCB20 (ASE 2015), and SE1600CSCB20 (ASE 2016). Rates for “Item not reported” are computed by authors using the published number of firms. Published estimates for ASE 2015 are different from our estimates because we excluded firms with item not reported, none of the above, or missing values for other business characteristics.

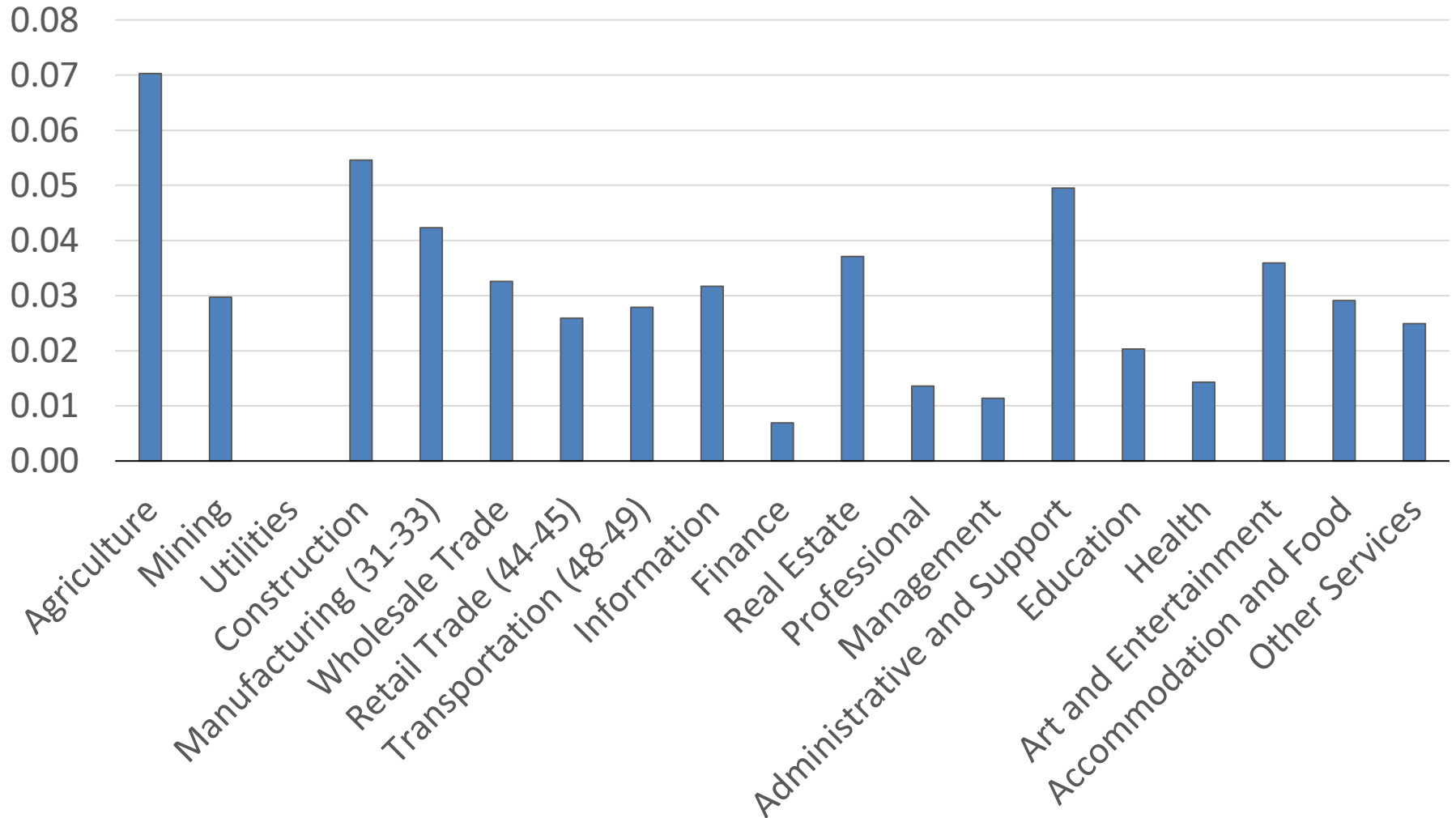
# Fraction of Firms Using Full-Time Workers by Industry



# Fraction of Firms Using Part-Time Workers by Industry

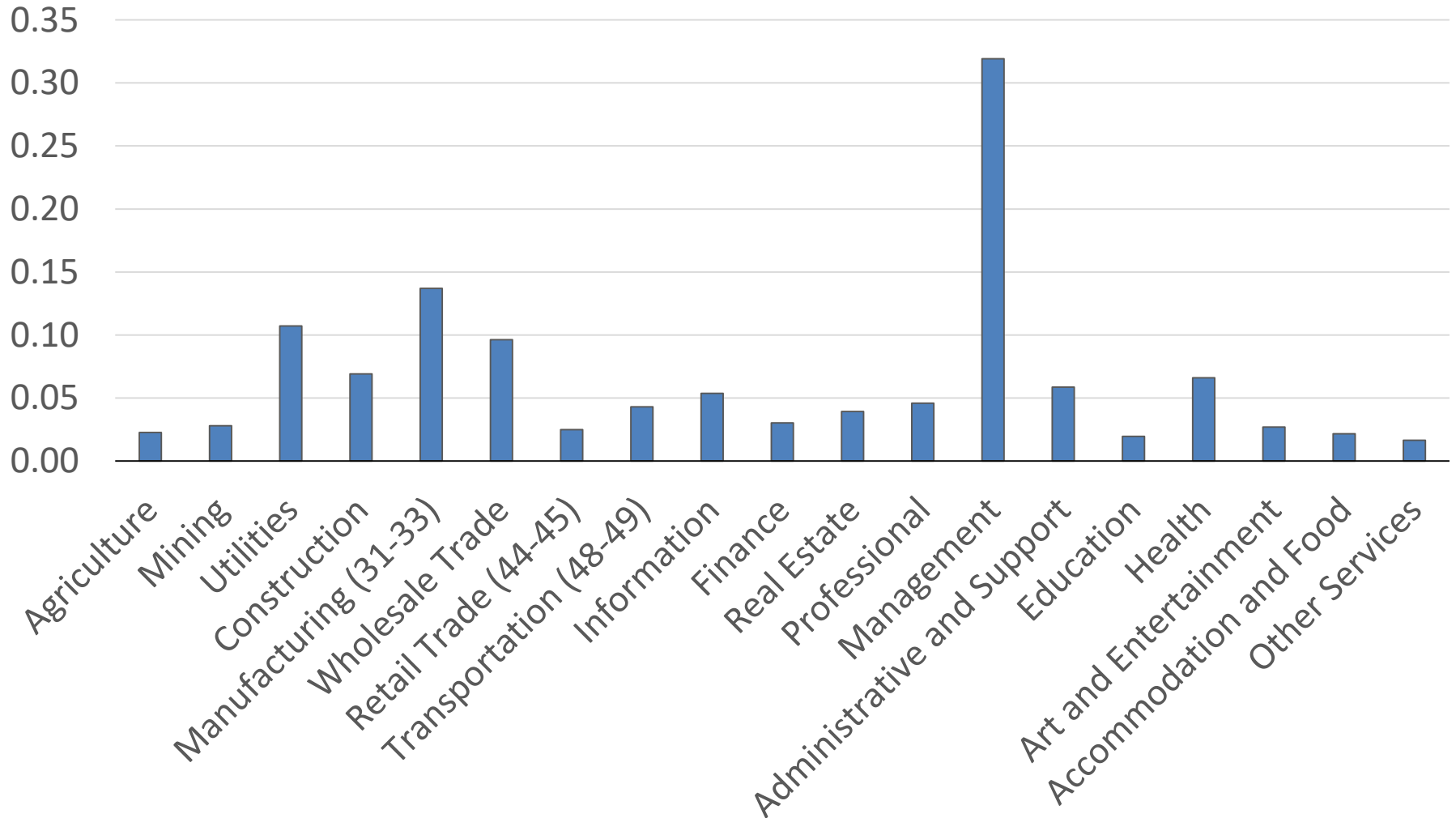


# Fraction of Firms Using Day Laborers by Industry

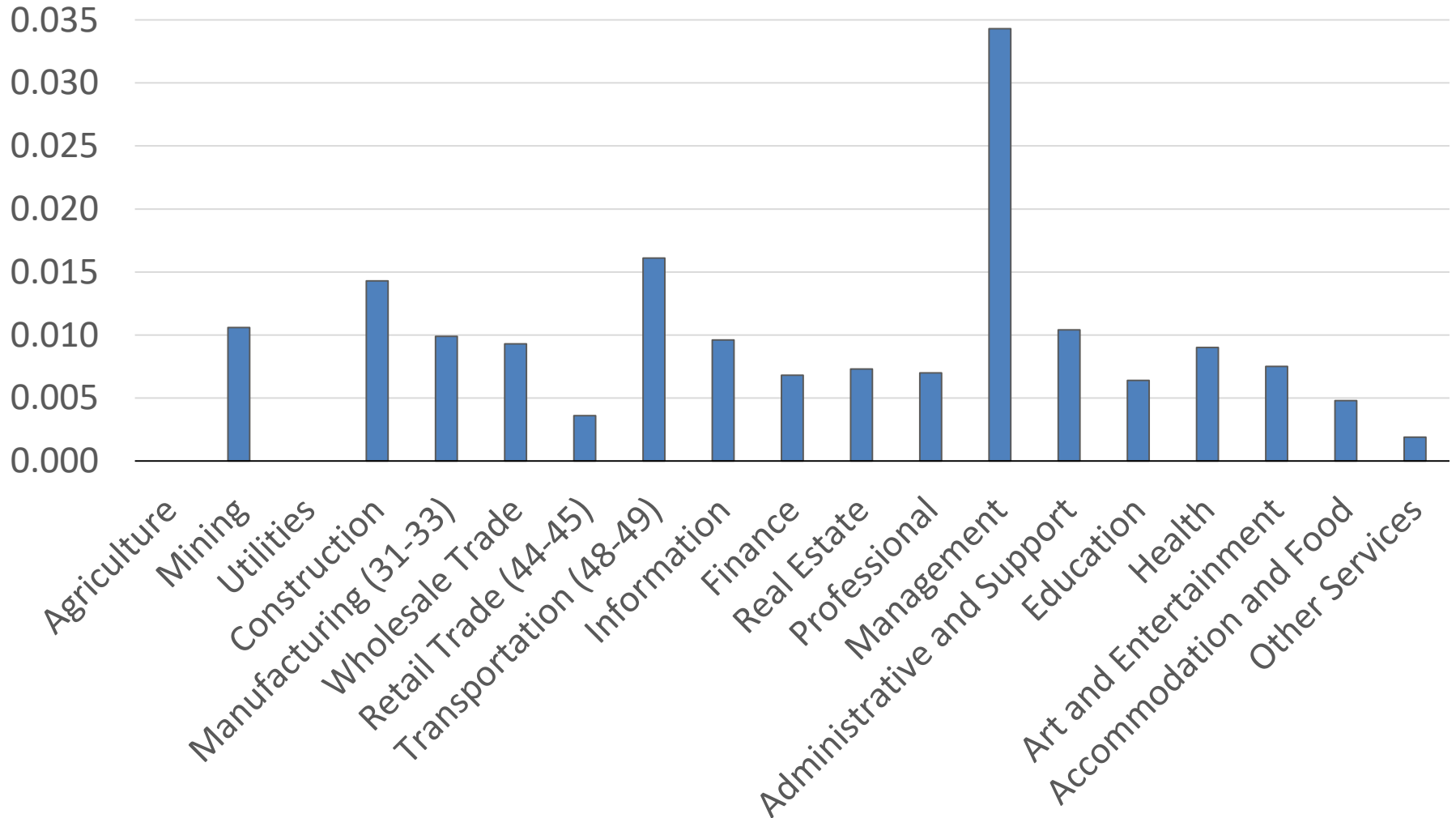




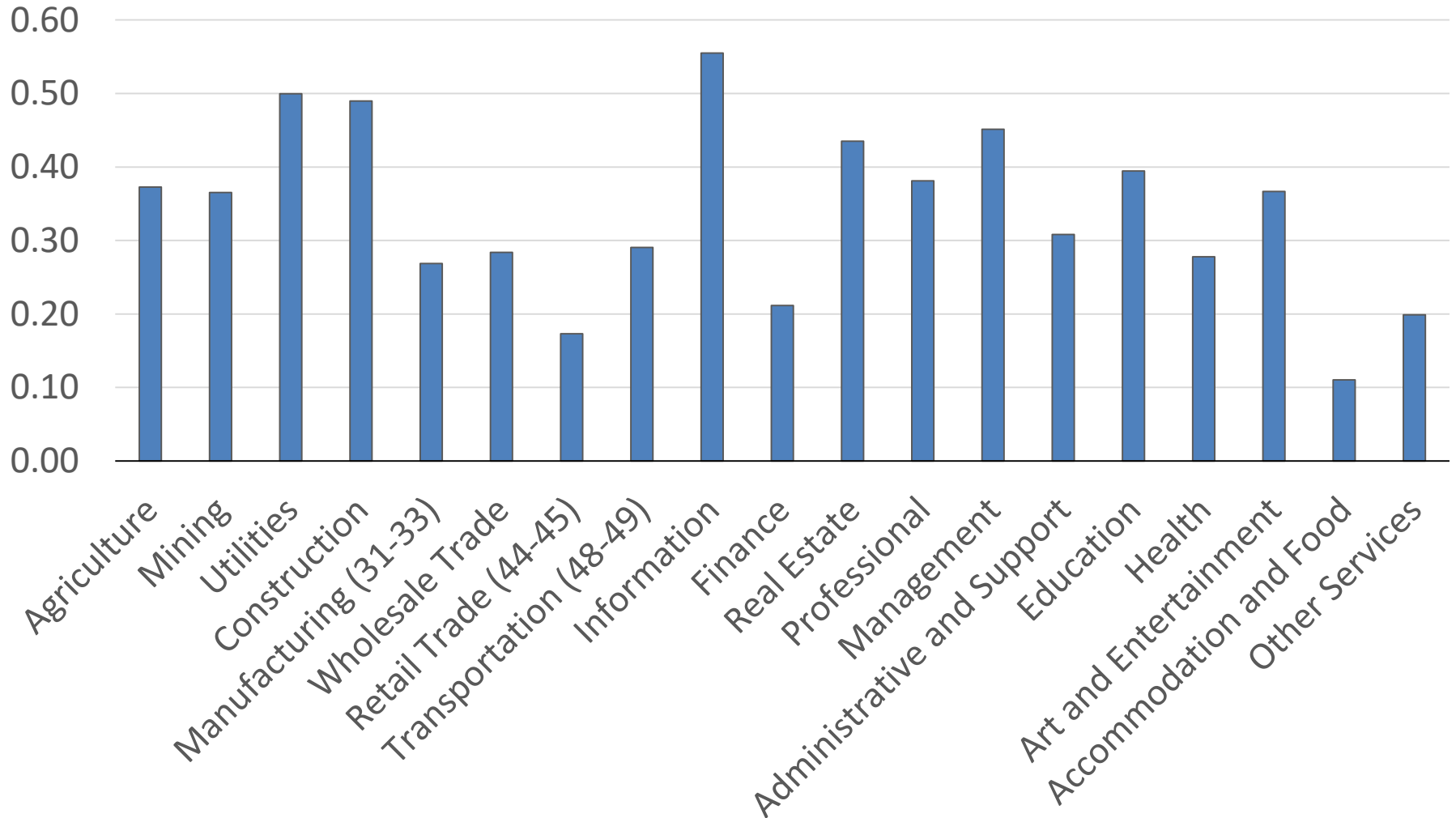
# Fraction of Firms Using Temporary Workers by Industry



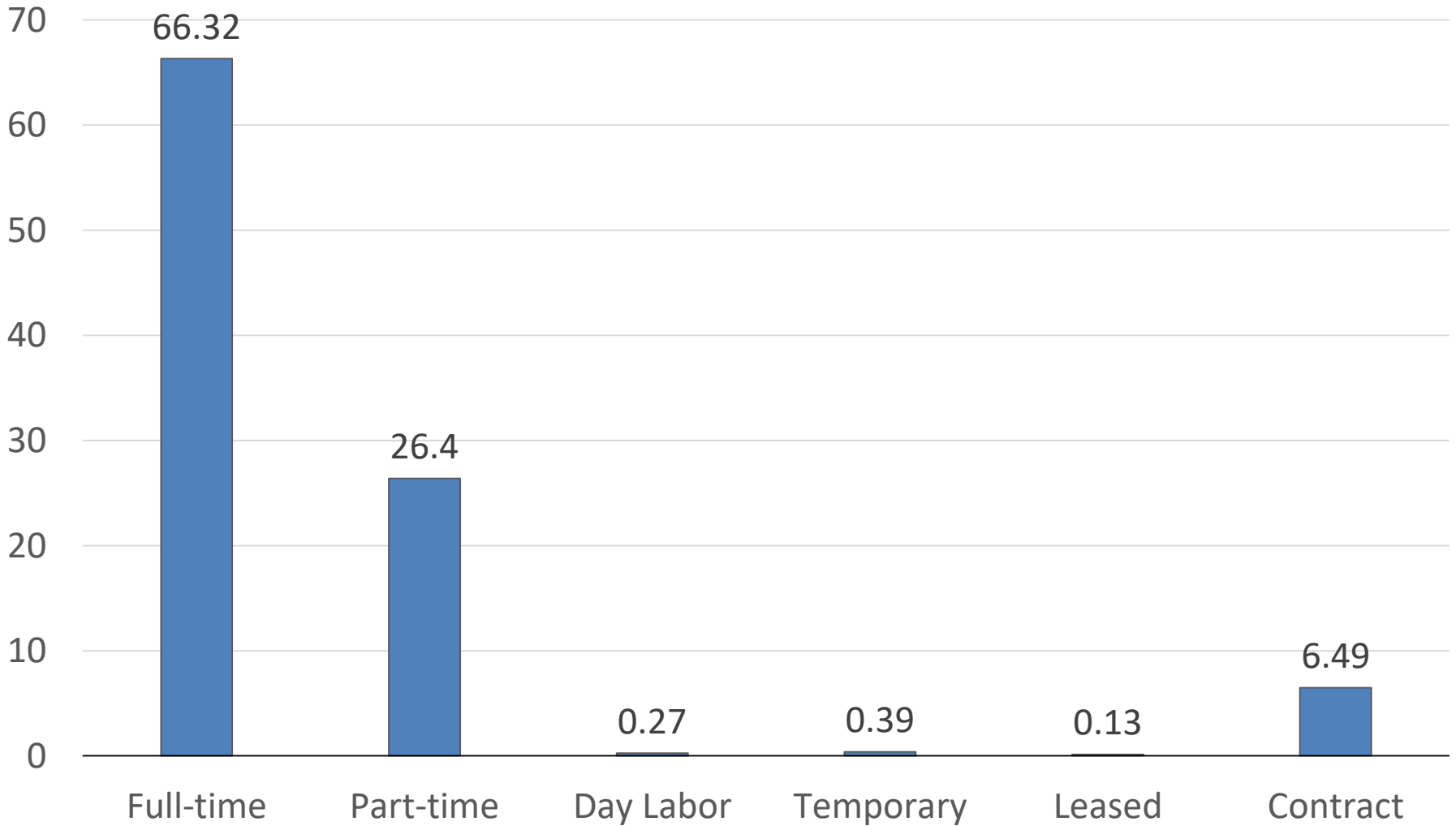
# Fraction of Firms Using Leased Workers by Industry



# Fraction of Firms Using Contractors by Industry



# Percentages of Types of Workers in All Workers: Firm-Level Means



# Percentages of Types of Workers in All Workers: Distribution

	Full-time	Part-time	Day Labor	Temporary	Leased	Contract
0% (Zero percent)	0.141	0.413	0.974	0.951	0.993	0.713
>0% to 25%	0.056	0.233	0.023	0.045	0.006	0.193
25% to 50%	0.065	0.095	0.002	0.002	0.001	0.039
50% to 75%	0.151	0.090	0.001	0.001	0.001	0.033
75% to 100%	0.587	0.169	0.000	0.000	0.001	0.023
Observations	158000	158000	158000	158000	158000	158000

# Comparisons: CWS 2017 and ASE 2015

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	CWS 2017		ASE 2015
On-call workers	1.7	Day laborers	0.3
Workers from temp help agency	0.9	Temporary	0.4
Workers from contract firms	0.6	Leased	0.1
Independent contractors	6.9	Contractors	6.5

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# Estimating the Share of Non-standard Workers in Total Workforce

$$\hat{L}_s^t = (1 + n_s^t) * E_s^t$$
$$\hat{N}_s^t = n_s^t * \hat{L}_s^t = n_s^t * (1 + n_s^t) * E_s^t$$

Where

$\hat{L}_s^t$ : estimated # of total workers for type  $t$  and size  $s$

$\hat{N}_s^t$ : estimated # of non-standard workers for type  $t$  and size  $s$

$n_s^t$ : share of non-standard workers for type  $t$  and size  $s \leq$  from ASE

$E_s^t$ : # of employees (FT+PT) for type  $t$  and size  $s \leq$  from BDS

$$\hat{n}^t = \frac{\sum_s \hat{N}_s^t}{(\sum_s \hat{N}_s^t + \sum_s E_s^t)}$$

Where

$\hat{n}^t$ : estimated share of non-standard workers for type  $t$

# Approximated Percentage of Non-standard Workers in Total Workforce

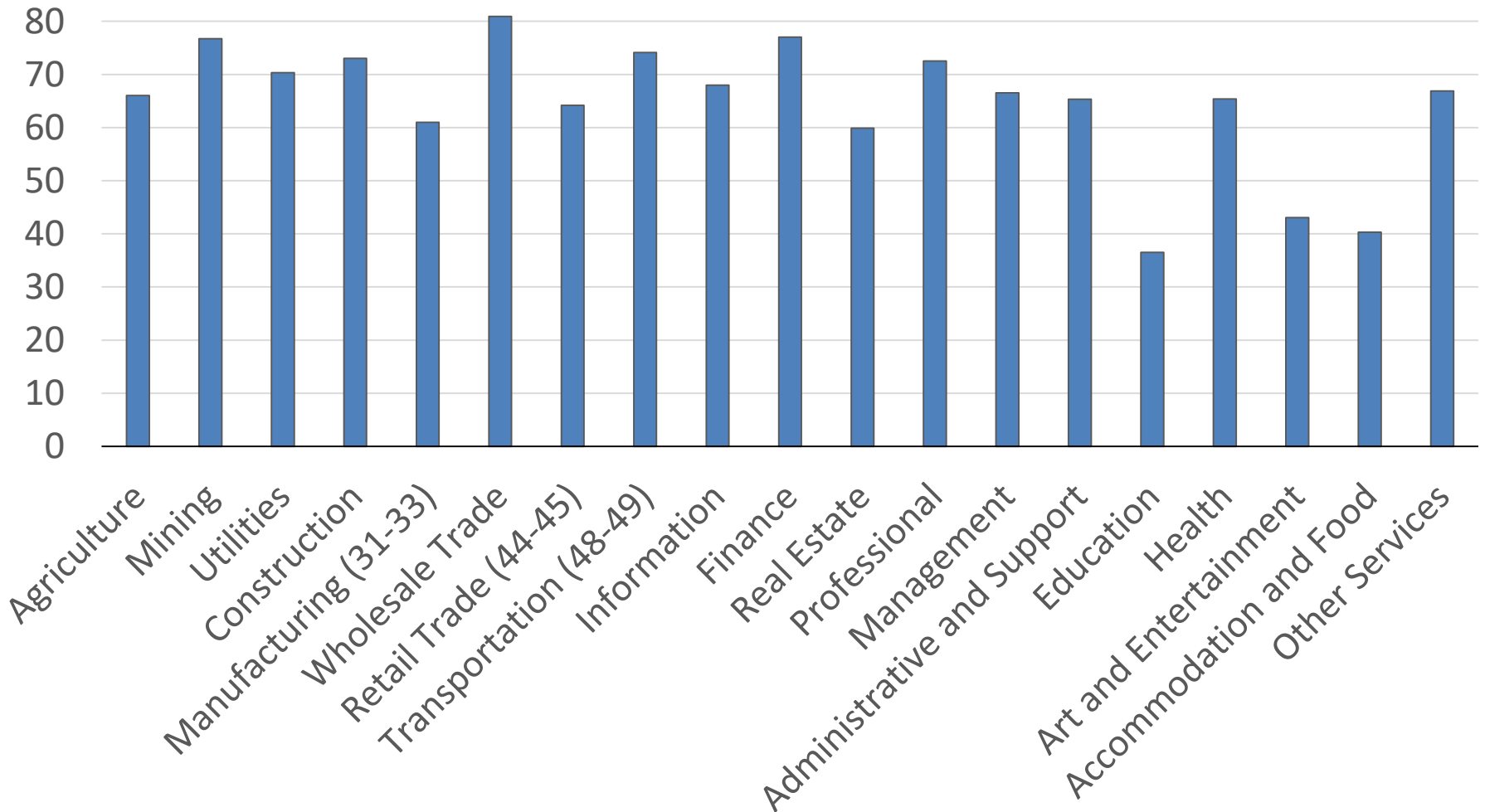
	Employees (FT+PT)	Day Labor	Temporary	Leased	Contract	Non- standard
Size 1-4	6,009,848	13,854	9,028	3,006	265,622	291,511
Size 5-9	6,759,790	19,660	23,742	5,412	453,458	502,272
Size 10-19	8,383,615	27,757	39,588	14,276	793,814	291,511
Size 20-49	11,974,400	34,826	92,913	28,808	1,390,779	1,547,326
Size 50-99	8,387,462	19,336	119,931	33,684	1,062,085	291,511
Size 100+	80,122,336	637,967	2,061,549	932,003	16,626,744	20,258,262
Total	121,637,451	753,401	2,346,751	1,017,190	20,592,501	24,709,842
Percentage	83.1	0.5	1.6	0.7	14.1	16.9

Note: Business Dynamics Statistics is the data source for the number of employees (FT+PT) by size groups.

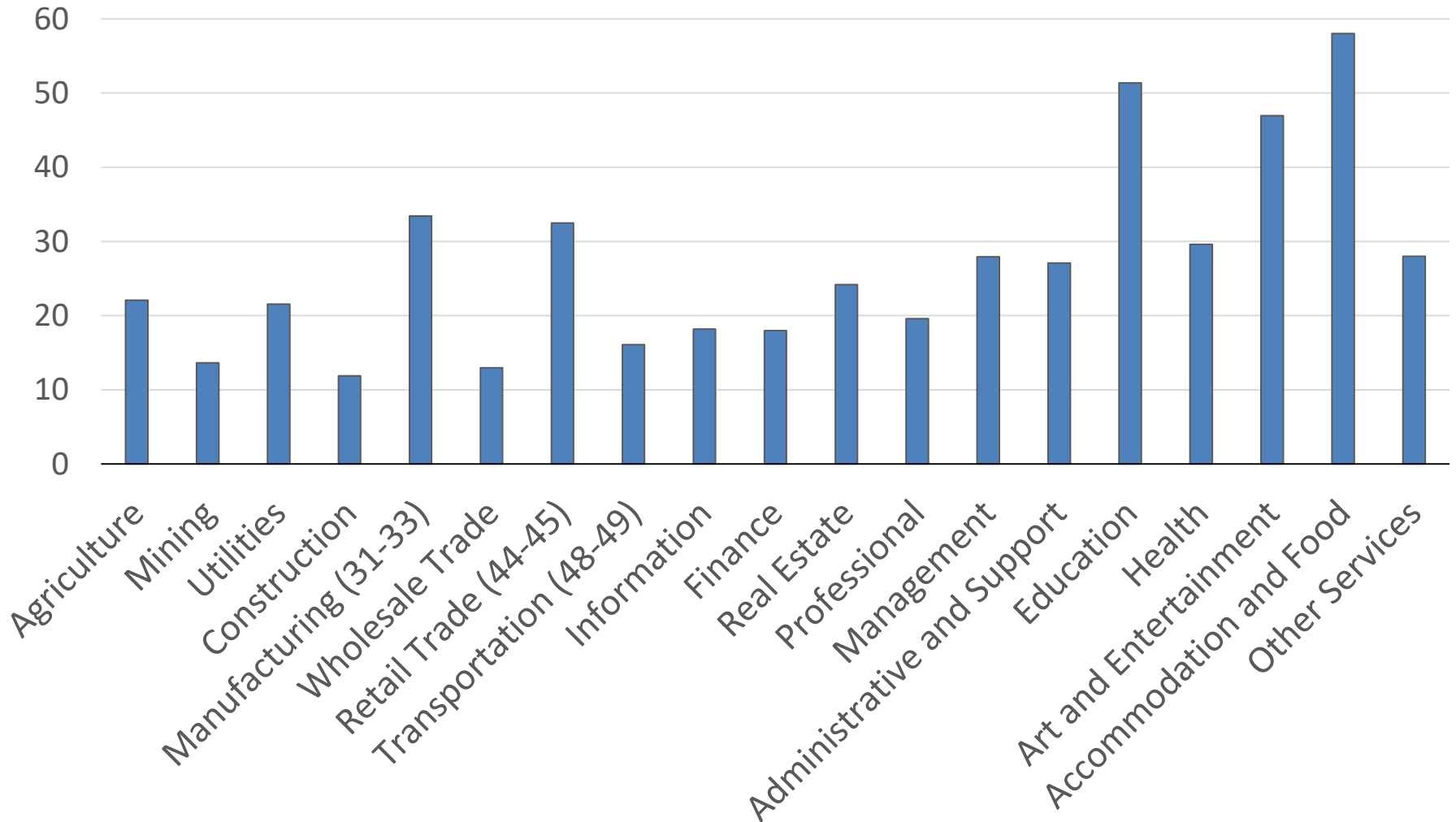
Dey et al. (2012) percentage of employment by temporary help agencies in total employment  
= ~1.3-2.0% in late 1990s, 2000s, and early 2010s



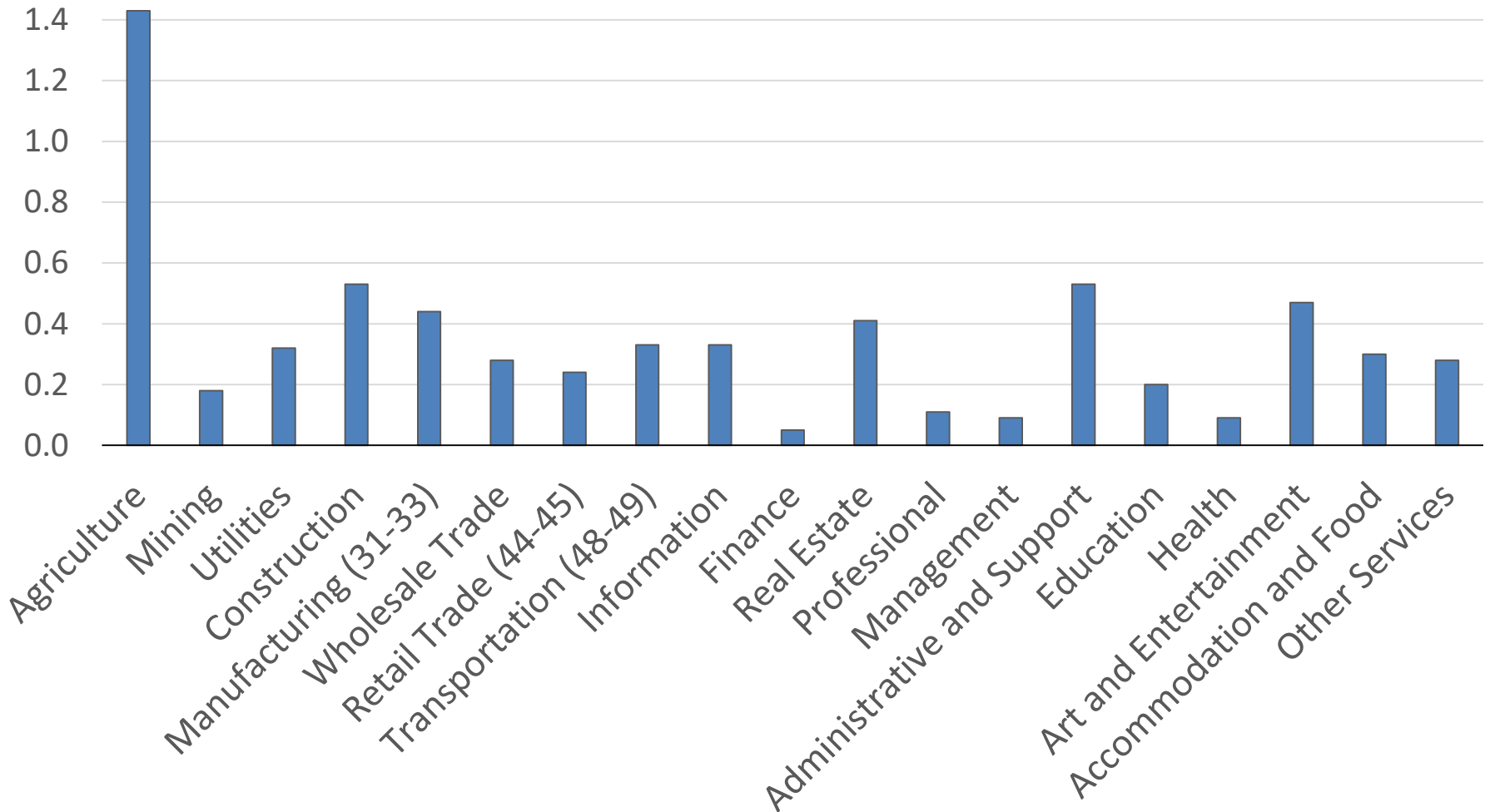
# Percentages of Full-Time in All Workers, by Industry



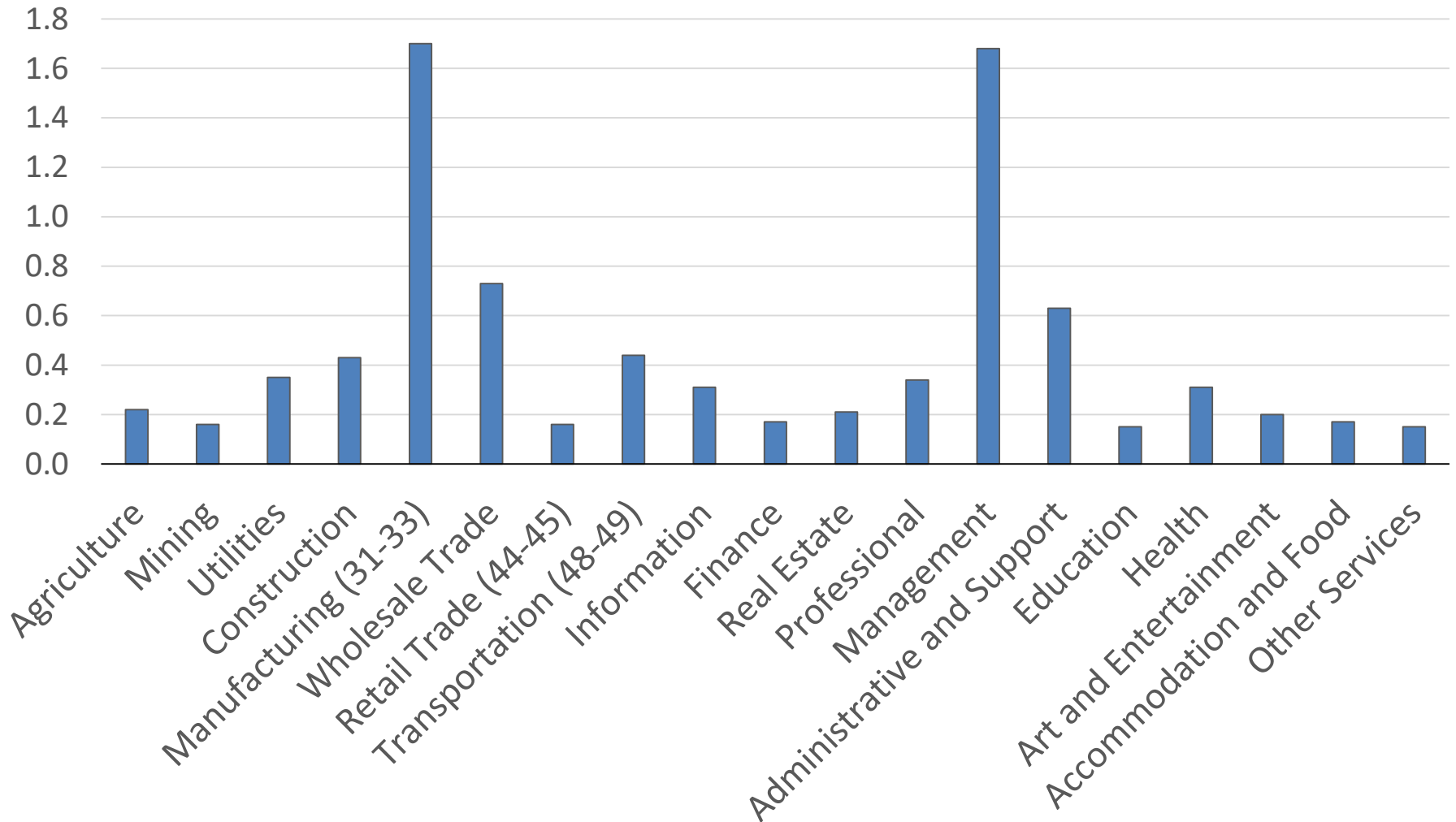
# Percentages of Part-Time in All Workers, by Industry



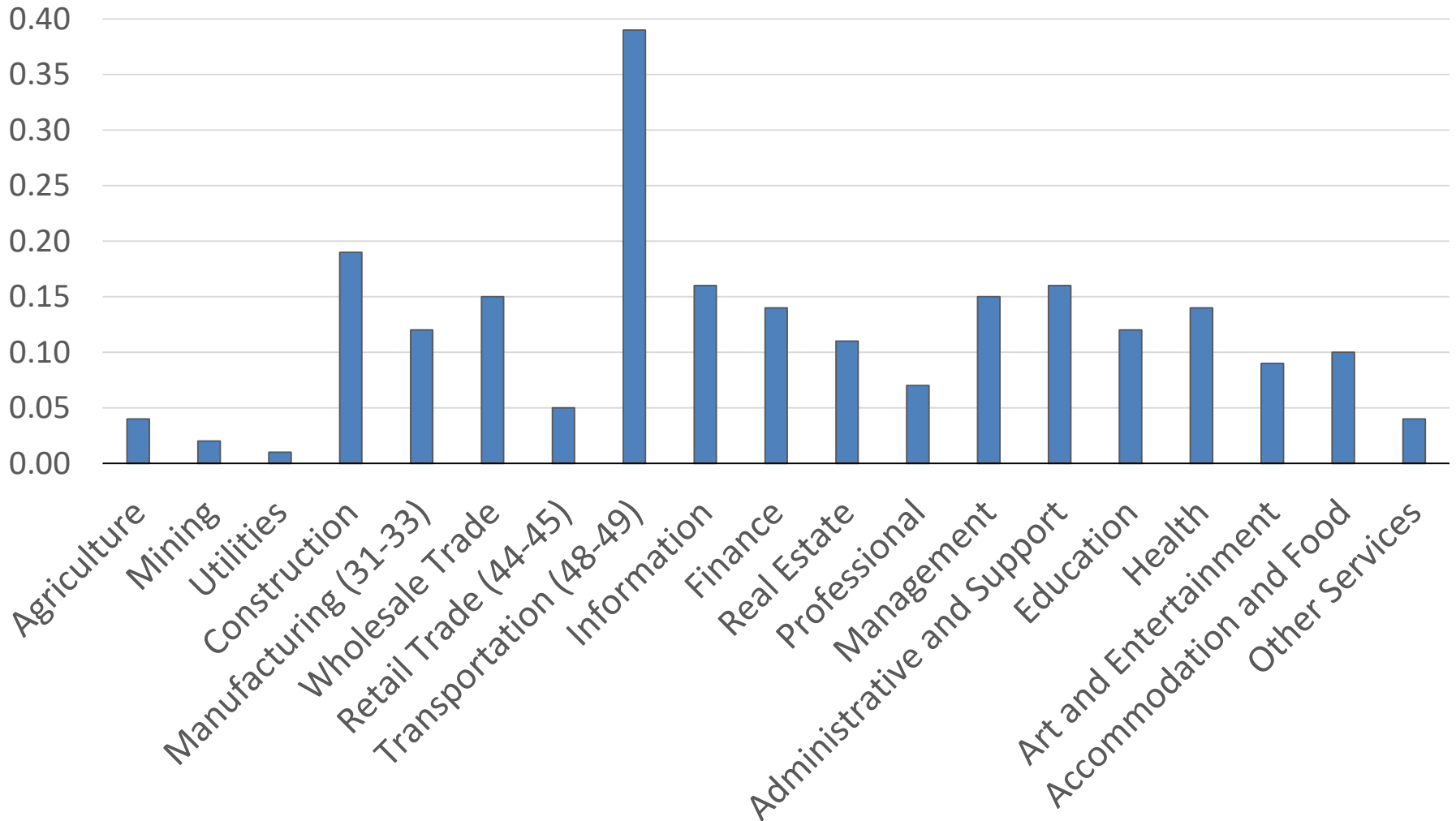
# Percentages of Day Laborers in All Workers, by Industry



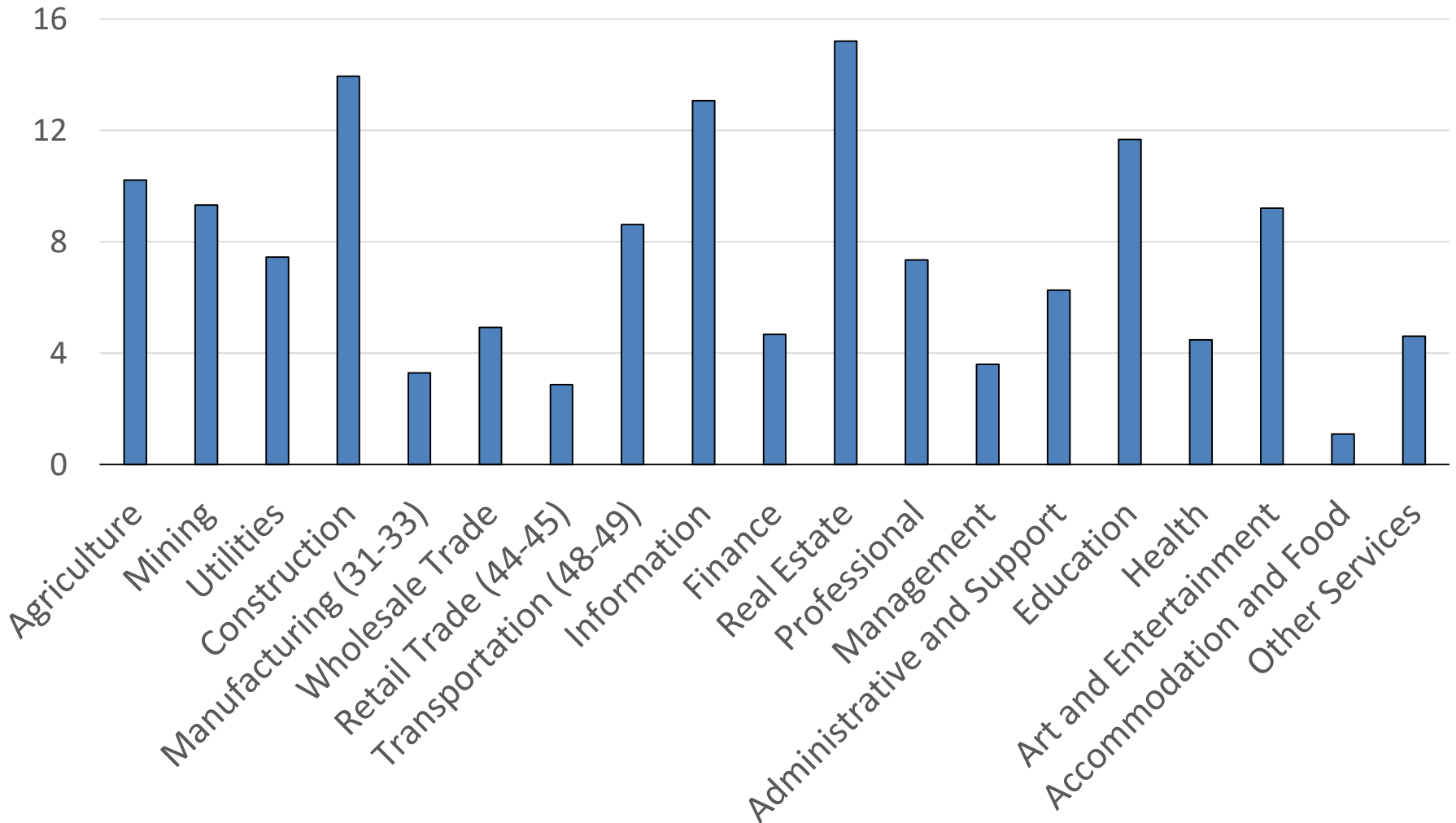
# Percentages of Temporary Workers in All Workers, by Industry



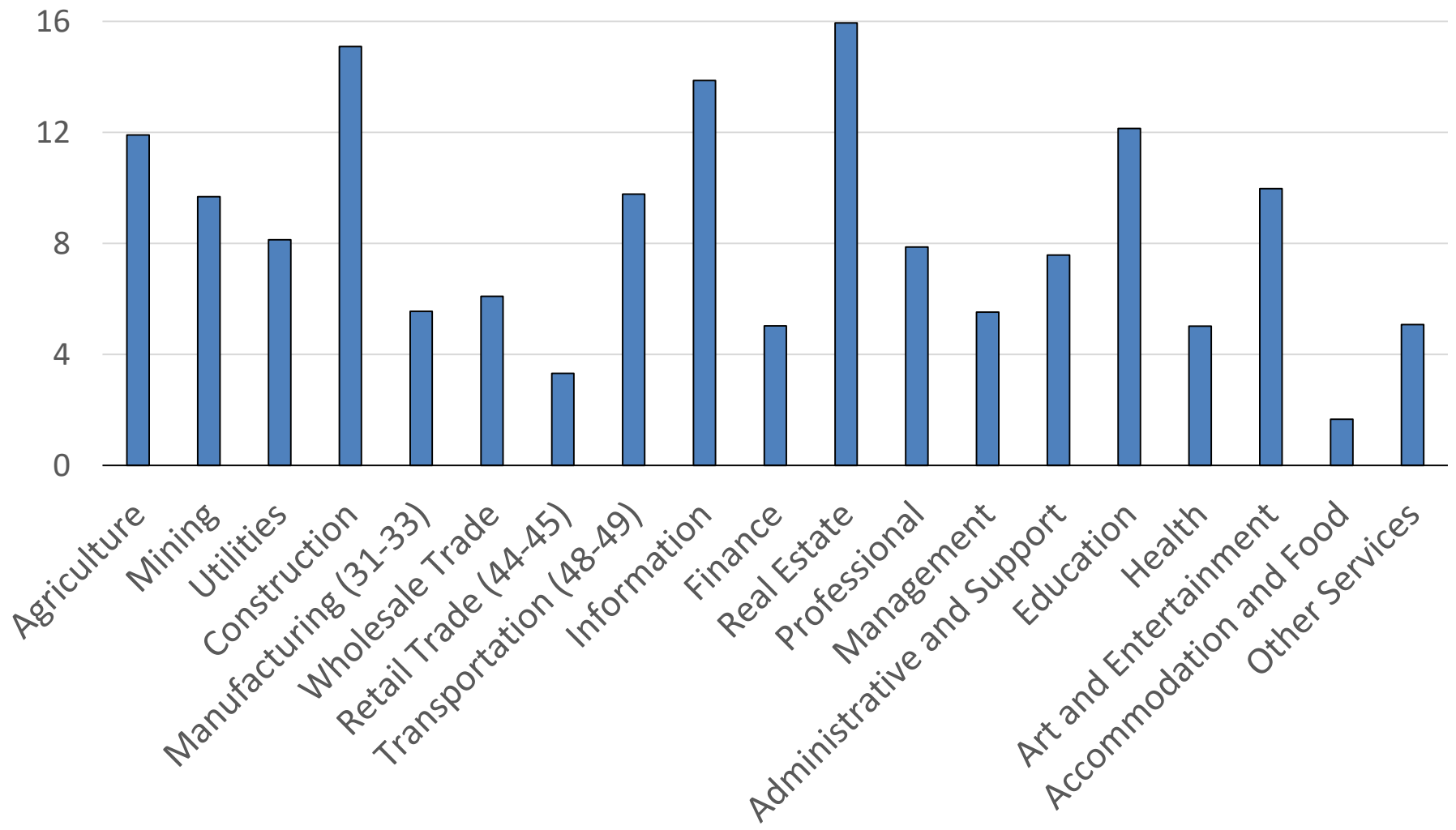
# Percentages of Leased Workers in All Workers, by Industry



# Percentages of Contractors in All Workers, by Industry



# Percentages of Non-standard in All Workers, by Industry

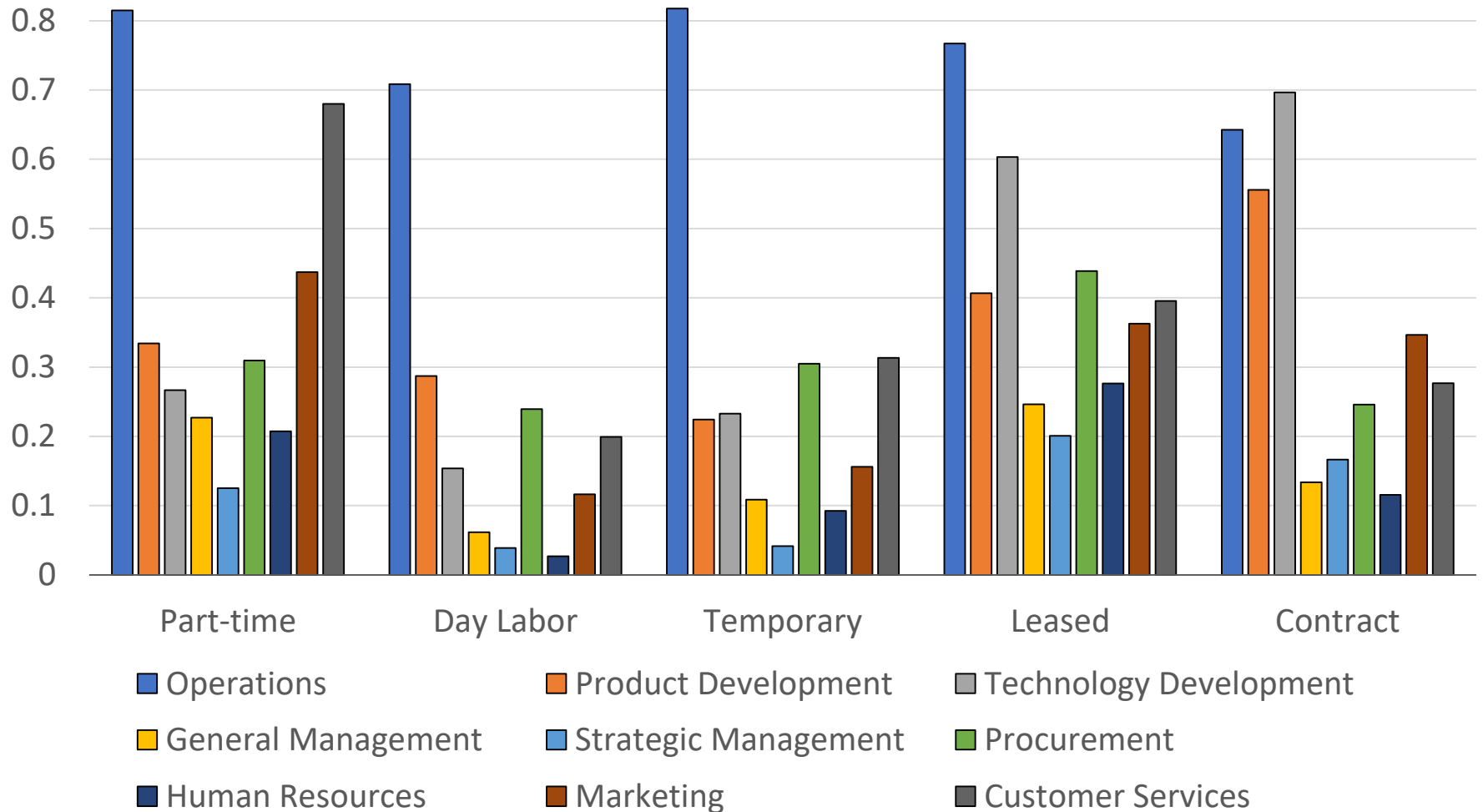


# Tasks Done by Types of Workers

	Full-time	Part-time	Day Labor	Temporary	Leased	Contract
Operations	0.81	0.66	0.57	0.66	0.62	0.52
Product Development	0.21	0.07	0.06	0.05	0.09	0.12
Tech. Development	0.16	0.04	0.02	0.04	0.10	0.11
General Management	0.35	0.08	0.02	0.04	0.09	0.05
Strategic Management	0.18	0.02	0.01	0.01	0.04	0.03
Procurement	0.22	0.07	0.05	0.07	0.10	0.05
Human Resources	0.26	0.05	0.01	0.02	0.07	0.03
Marketing	0.43	0.19	0.05	0.07	0.16	0.15
Customer Services	0.46	0.31	0.09	0.15	0.18	0.13
None of the Above	0.07	0.12	0.27	0.14	0.15	0.19
Sum Count	3.15	1.61	1.15	1.25	1.60	1.38



# Tasks Done by Types of Workers Relative to Full Time Worker



# Correlation: Use of Types of Workers

	Full-time	Part-time	Day Labor	Temporary	Leased	Contract
Full-time	1.000					
Part-time	-0.332	1.000				
Day Labor	0.008	0.032	1.000			
Temporary	0.073	0.049	0.075	1.000		
Leased	0.027	0.016	0.041	0.104	1.000	
Contract	0.102	0.005	0.087	0.127	0.067	1.000

# Correlation: Percentages of Types of Workers

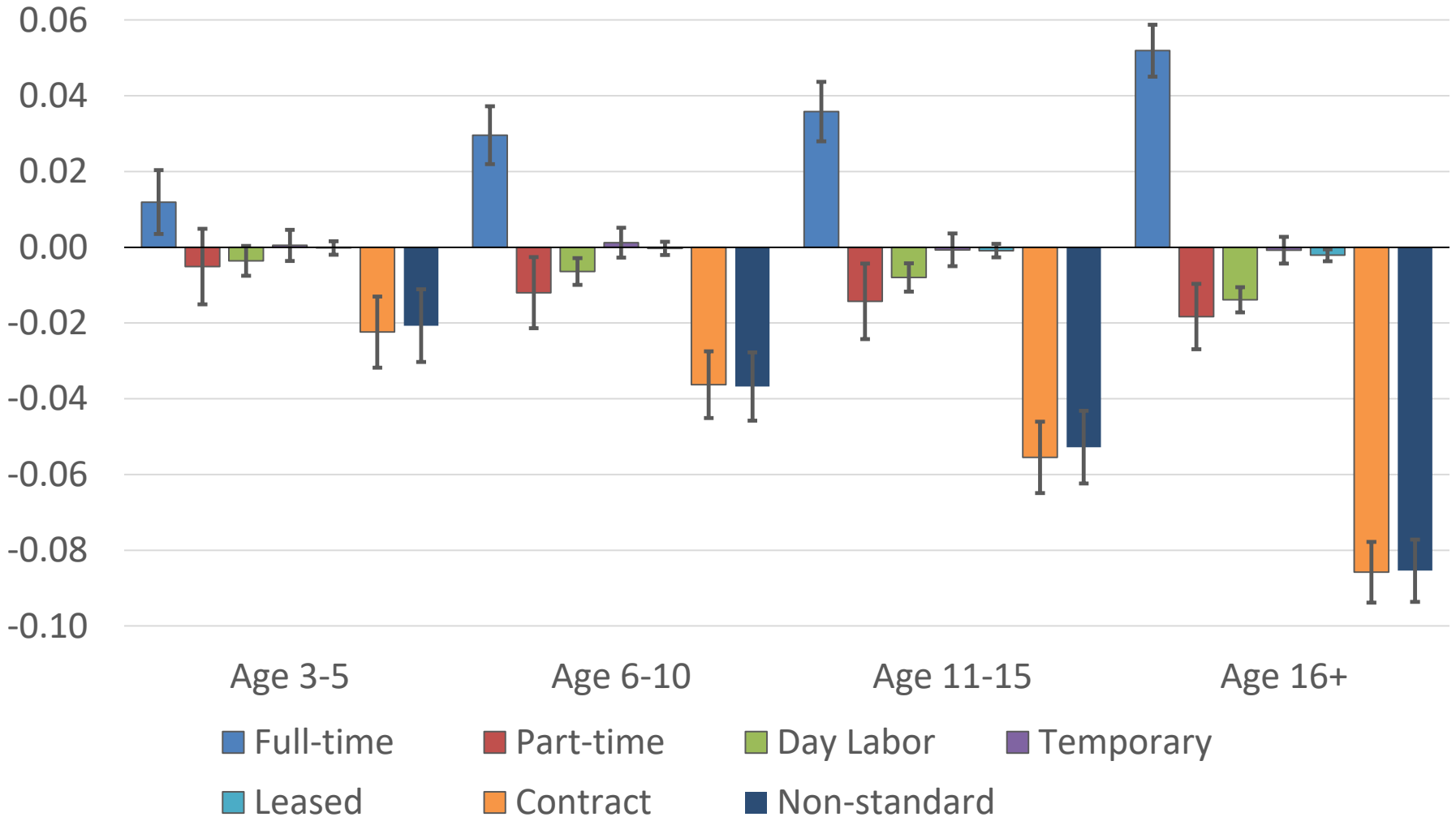
	Full-time	Part-time	Day Labor	Temporary	Leased	Contract
Full-time	1.000					
Part-time	-0.882	1.000				
Day Labor	-0.072	-0.017	1.000			
Temporary	-0.035	-0.052	0.016	1.000		
Leased	-0.044	-0.026	0.002	0.012	1.000	
Contract	-0.302	-0.164	0.015	-0.002	0.001	1.000

# Regression Specifications

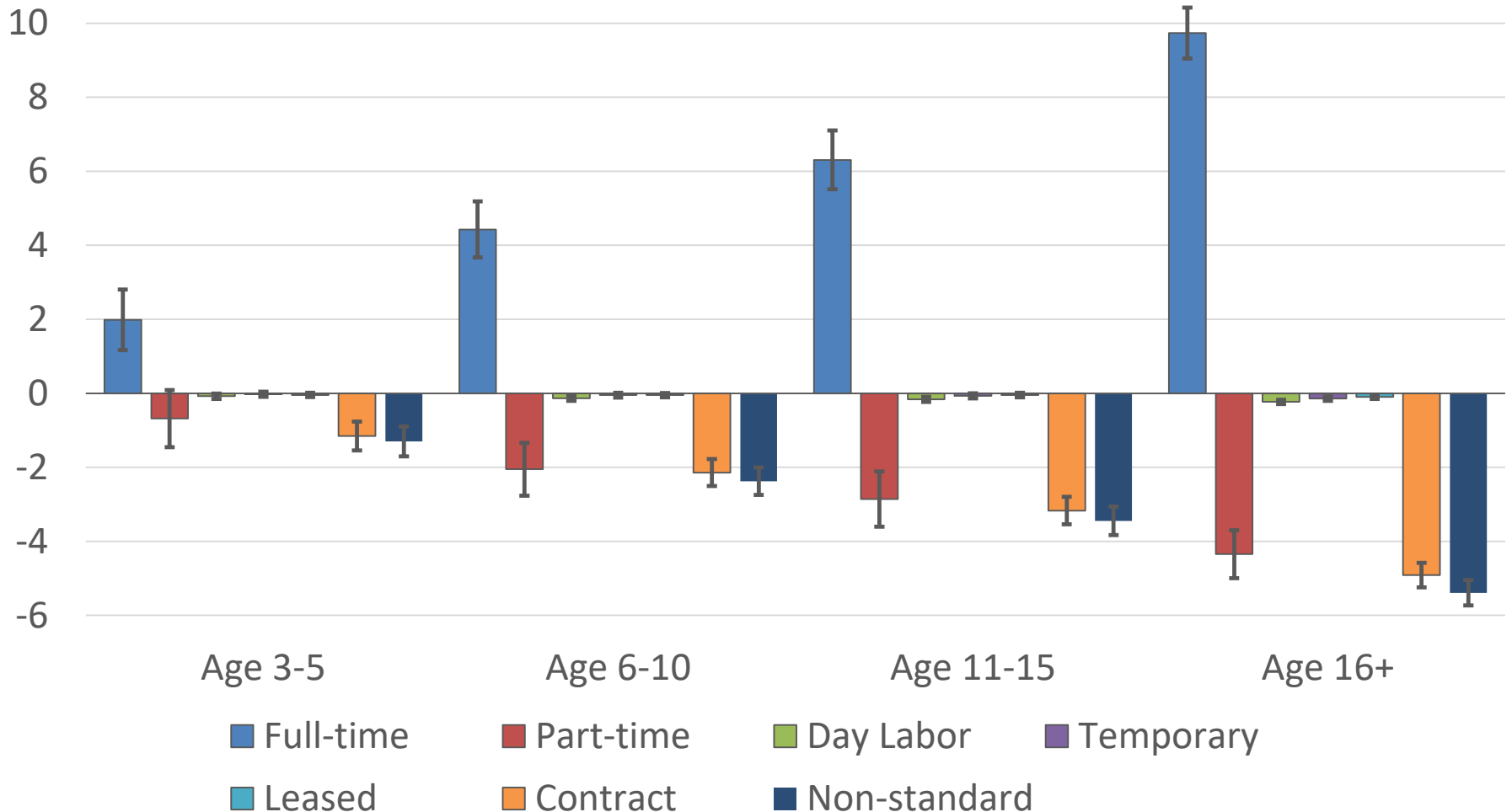
$$Y_i = \alpha_0 + \alpha_1 AGE_i + \alpha_2 SIZE_i + \alpha_3 FRANCHISE_i + \alpha_4 IND_i + \alpha_5 STATE_i + u_i$$

- $Y_i$  : outcome variables for firm  $i$ 
  - Use of types of workers
  - Percentage usage of types of workers
- $AGE_i$  : set of firm age group dummies for firm  $i$
- $SIZE_i$  : set of size group (number of total workers) dummies for firm  $i$
- $FRANCHISE_i$  : status of franchise business for firm  $i$
- $IND_i$  : set of two-digit industry dummies for firm  $i$
- $STATE_i$  : set of state dummies for firm  $i$

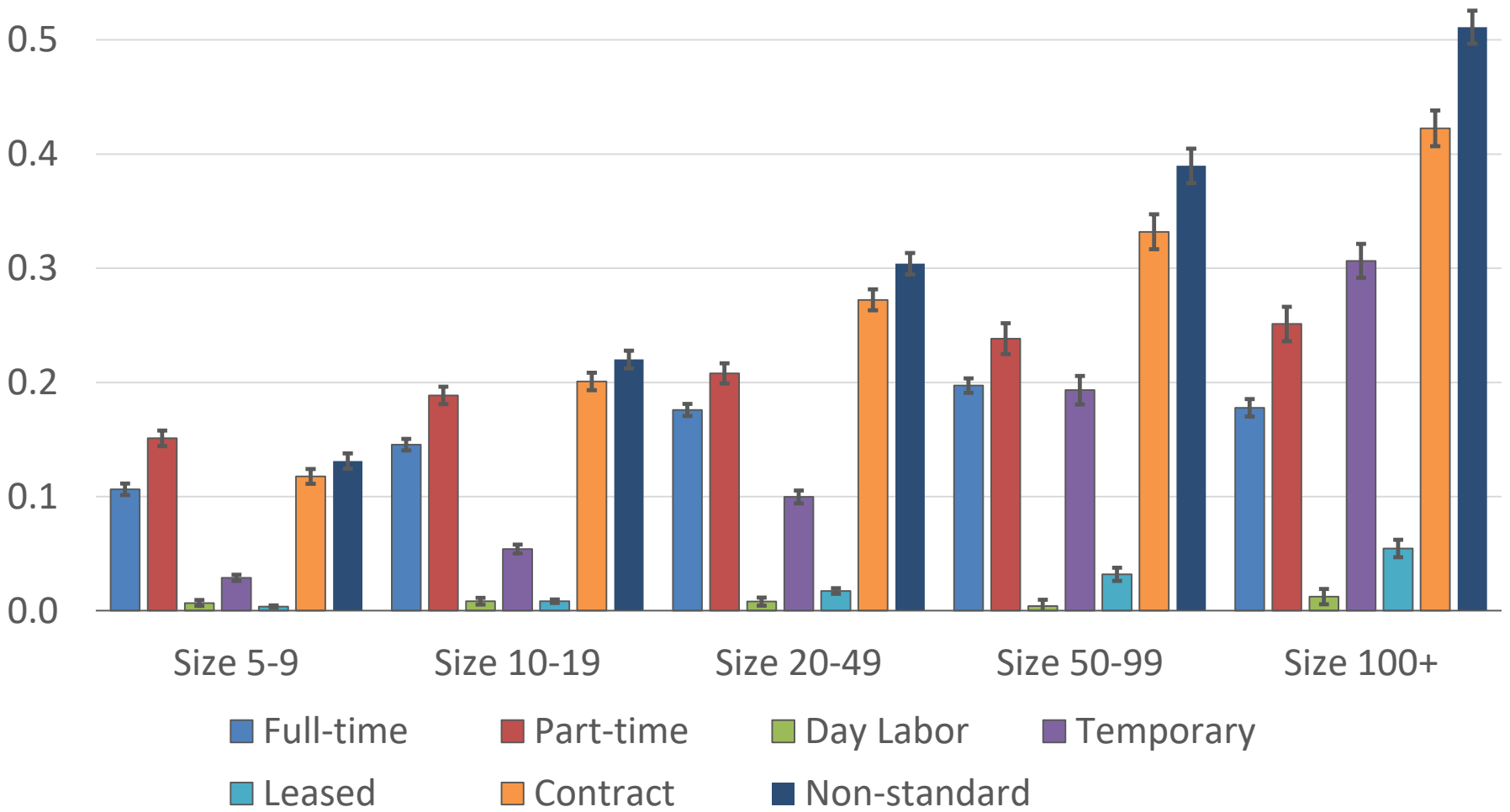
# Use of Types of Workers by Firm Age: Estimated Coefficients (base = Age 0-2)



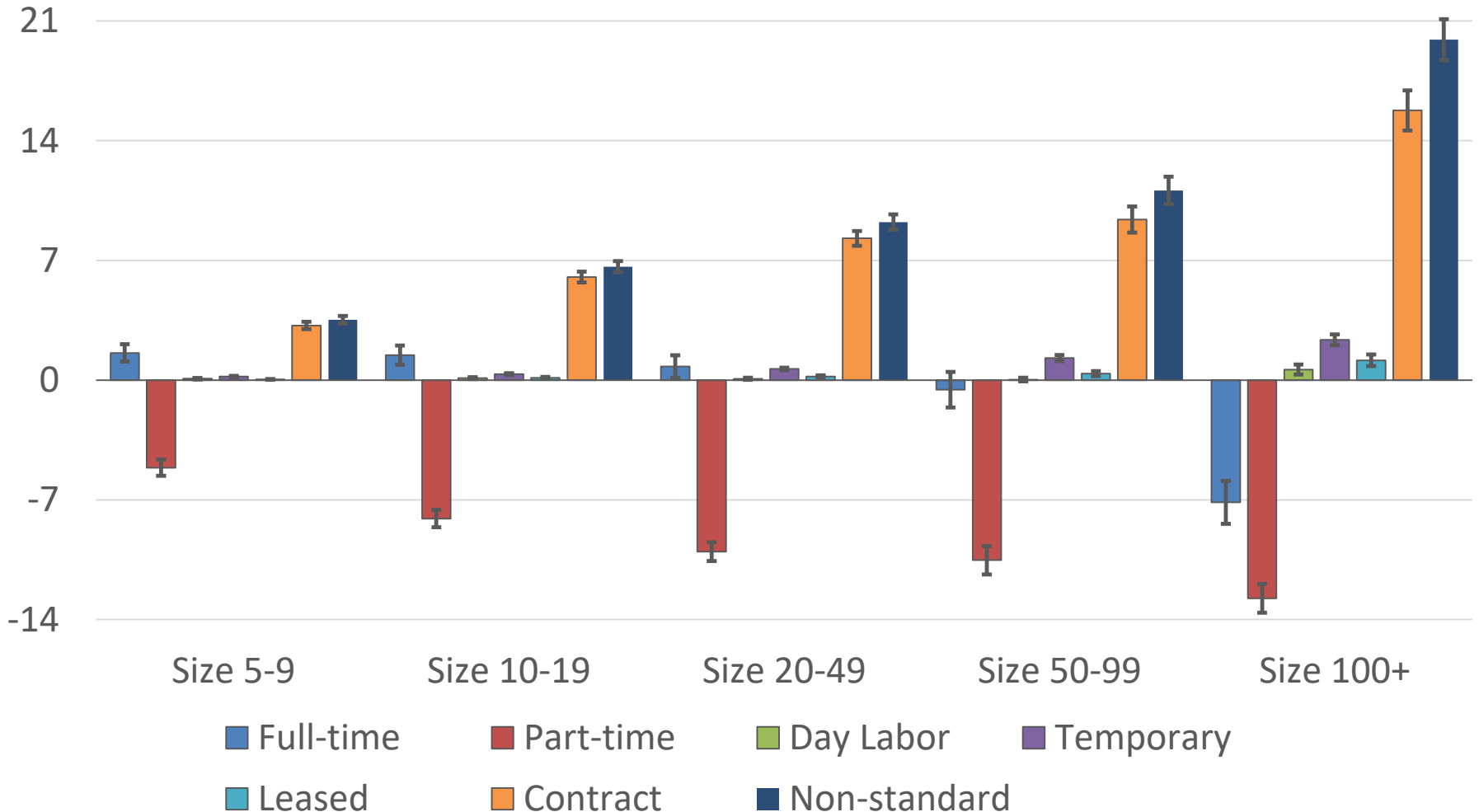
# Percentages of Types of Workers by Age: Estimated Coefficients (base = Age 0-2)



# Use of Types of Workers by Size: Estimated Coefficients (base = Size 1-4)

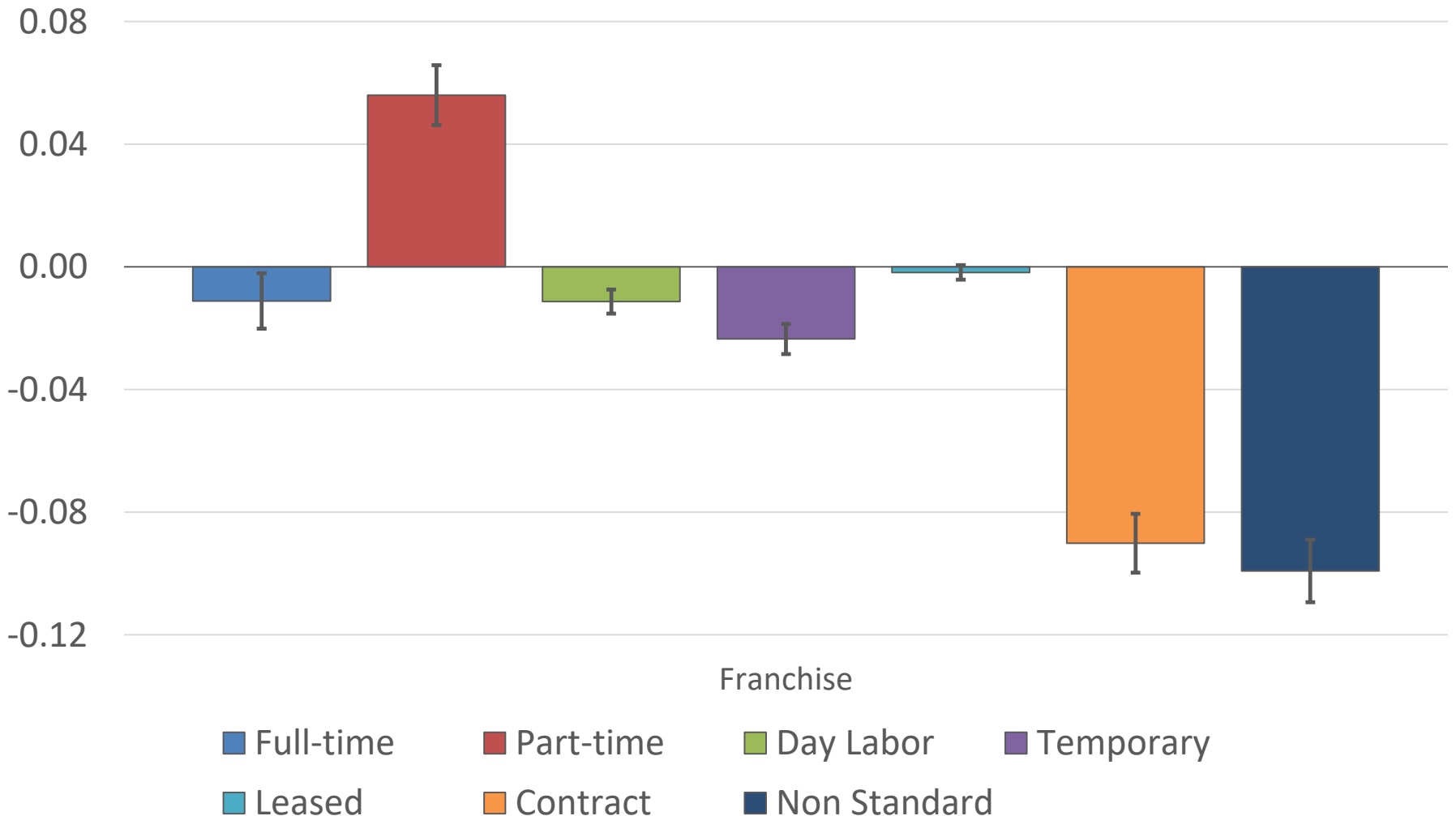


# Percentages of Types of Workers by Size: Estimated Coefficients (base = Size 1-4)

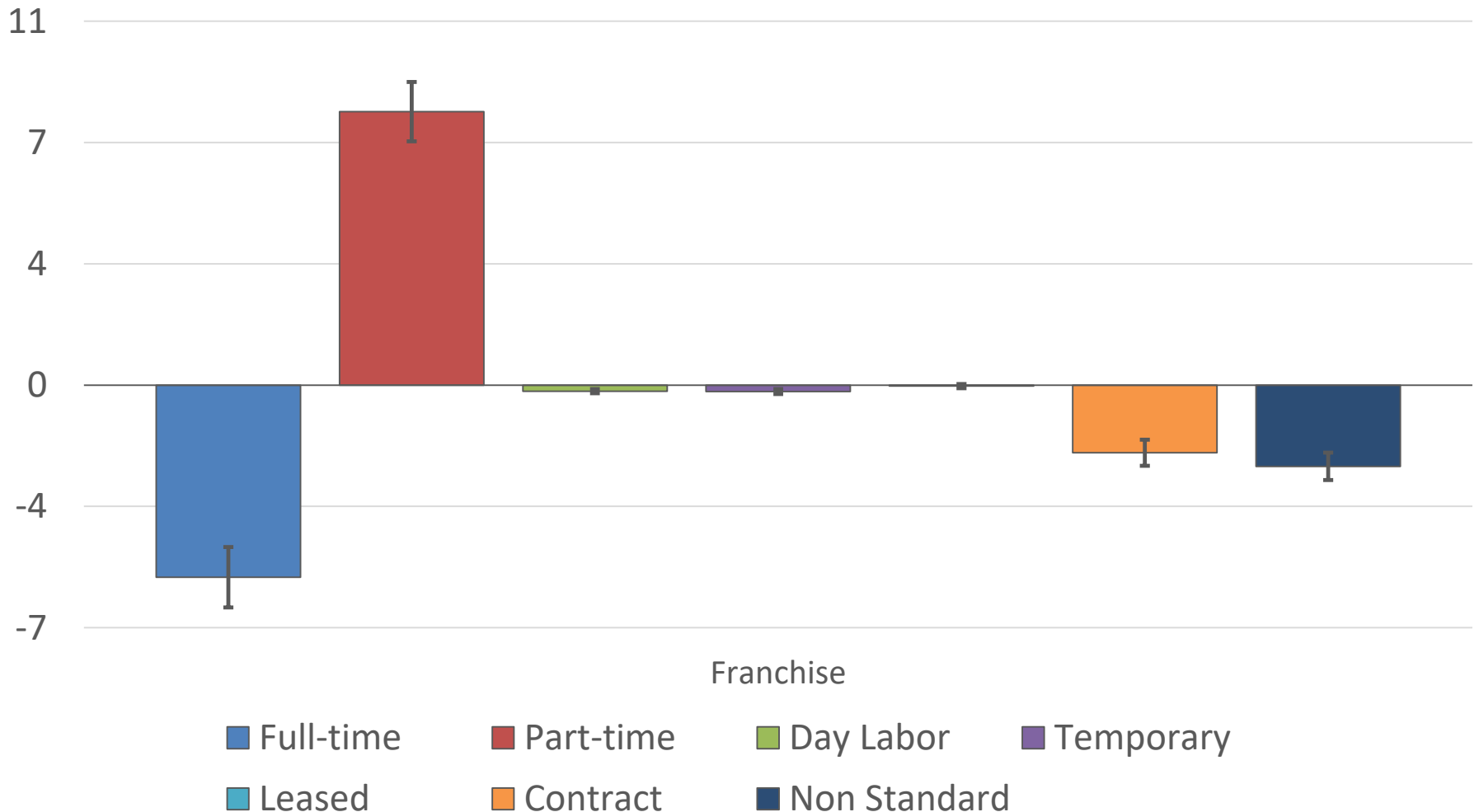




# Use of Types of Workers by Franchise: Estimated Coefficients (base = non-franchise)



# Percentages of Types of Workers by Franchise: Estimated Coefficients (base = non-franchise)



# Conclusions (1/2)

- Quantity of non-standard labor
  - Extensive
    - fraction of firms using non-standard labor = ~30-39%
  - Intensive
    - fraction of non-standard labor in total headcount mean = 7%
    - approximated percentage of non-standard in total workforce = ~17%
- Most important non-standard type: contractors
  - Fraction of firms using contract workers = 30%
  - Distribution of all non-standard similar to contractors
- Heterogeneity across industries
- Mix of complementarity and substitutability between employees and non-standard workers

# Conclusions

- Young firms are more likely to use non-standard workers
- Larger firms tend to hire more non-standard workers, particularly temporary workers and contractors
- Franchise firms are more likely to hire part-time workers, but less likely to hire non-standard workers

# Future Research

- Weight by size to compare with population statistics from household data
- Seasonality
- Benefits (e.g. Health Insurance)
- State Level Regulations
  - e.g. Fair Labor Standards Act (FLSA), Employee Retirement Income Security Act (ERISA)
- Nonlinear estimation
  - Logit/Probit: Use of Non-standard Workers
  - Tobit: Percentages of Use of Non-standard Workers