Do workers have a firm sense of industry codes? Comparing worker and employer descriptions of business activity

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2022 FCSM Conference

October 25, 2022

Background

- Workers report information about their employers to household surveys like ACS, SIPP, CPS
- Firms report information about their business activities to IRS, SSA, BLS, Census
- Census produces statistics that show distribution of workers across industries
  - Take snapshot of workers at point in time and look at industry distribution of "main jobs"
- Census also produces statistics that show distribution of employment across industries
  - Take snapshot of establishments at point in time and look at employment-weighted industry distribution
- Differences due to
  - Multiple job holders
  - Reporting by employees versus employers
    - Workers fail to report jobs
    - Informal employment not reported by an employer
    - Employers and employees describe the activities of the business differently

ACS
Questionnaire
2017

41 – 46 CURRENT OR MOST RECENT JOB ACTIVITY. *Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for his/her last job or business.*

General job category:
Class of worker (COW)

41 Was this person –
Mark (X) ONE box.

- [ ] an employee of a PRIVATE FOR-PROFIT company or business, or of an individual, for wages, salary, or commissions?

- [ ] an employee of a PRIVATE NOT-FOR-PROFIT, tax-exempt, or charitable organization?

- [ ] a local GOVERNMENT employee (city, county, etc.)?

- [ ] a state GOVERNMENT employee?

- [ ] a Federal GOVERNMENT employee?

- [ ] SELF-EMPLOYED in own NOT INCORPORATED business, professional practice, or farm?

- [ ] SELF-EMPLOYED in own INCORPORATED business, professional practice, or farm?

- [ ] working WITHOUT PAY in family business or farm?

Name of Employer

42 For whom did this person work?

If now on active duty in the Armed Forces, mark (X) this box → [ ]
and print the branch of the Armed Forces.

Name of company, business, or other employer

United States Census Bureau

43 What kind of business or industry was this?
Describe the activity at the location where employed. (For example: hospital, newspaper publishing, mail order house, auto engine manufacturing, bank)

Industry questions:
Write-in description and general industry

44 Is this mainly – *Mark (X) ONE box.*

- [ ] manufacturing?

- [ ] wholesale trade?

- [ ] retail trade?

- [ ] other (agriculture, construction, service, government, etc.)?

45 What kind of work was this person doing?
(For example: registered nurse, personnel manager, supervisor of order department, secretary, accountant)

Occupation questions:
Write-in descriptions

46 What were this person's most important activities or duties? *(For example: patient care, directing hiring policies, supervising order clerks, typing and filing, reconciling financial records)*

Questions from SS-4 Application for Employer Identification Number

16 Check **one** box that best describes the principal activity of your business. ☐ Health care & social assistance ☐ Wholesale-agent/broker

☐ Construction ☐ Rental & leasing ☐ Transportation & warehousing ☐ Accommodation & food service ☐ Wholesale-other ☐ Retail

☐ Real estate ☐ Manufacturing ☐ Finance & insurance ☐ Other (specify) ▶

17 Indicate principal line of merchandise sold, specific construction work done, products produced, or services provided.

Questions on Economic Census:
Example CRT 2012 Form for restaurants

⑲ KIND OF BUSINESS
Which ONE of the following best describes this establishment's principal kind of business in 2012?
(Mark "X" only ONE box.)

0700

722 110 00 1	☐	Full-service restaurant, patrons order through waiter/waitress service and pay after eating
722 211 00 2	☐	Limited-service restaurant, patrons pay before eating; including delivery-only locations
722 211 00 3	☐	Fast food restaurant
722 110 00 2	☐	Pizza place, full-service
722 211 00 5	☐	Pizza place, limited-service; including delivery-only and carry-out locations
445 299 00 6	☐	Pizza take and bake store

… many more categories
If don't fit into any of these, instructed to "Specify other kind of business"

Research Questions

- For jobs reported in the ACS, how do the person-reported industry codes compare to the BR/LBD industry codes at the person-level?

- Will answers to research questions change if we use the BR/LBD industry versus the ACS industry?

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Assembling Data

ACS
PIK-industry
PIK1 INDA

W-2
PIK-employer
PIK1 EIN1
PIK1 EIN2

LBD
Employer-industry
EIN1 INDA1
EIN2 INDC1

ACS
PIK-industry
PIK1 INDA

W-2
PIK-industry
PIK1 INDA1
PIK1 INDC1

Matching Rules
1. If a matching industry exists, take that W-2 job
2. Check for 5, 4, 3, 2 digit matches and take the first match found (i.e. most detailed match available)
3. If no match, then preference W-2 jobs on the following basis:
   1. Highest earnings in year
   2. If multi-unit employer has several industries, take industry with highest share of employment

Reasons for mis-match in industry codes

1. Job matched correctly but industry reports differ

     Might match at 2-digit sector but not 3- or 4-digit level

2. Job not matched correctly

     ACS job from a different time during the year

     This only affects the degree of mis-match. We take the best matching job we can find.

3. No job found in W-2

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Sample Description

- We use ACS, W-2, and LBD data from 2005 through 2020
- Sample is limited to
  - Workers that are at least 16 years old
  - Excludes self-employed and unpaid workers
  - Excludes Puerto Rico
- All industries are put onto a NAICS 2017 vintage
- Sample sizes:
  - ACS: 29,580,000 job observations
  - LBD: 32,680,000 job observations
  - ACS-LBD overlap sample: 27,550,000 job observations

Comparison of full ACS sample vs. full LBD sample

ACS   LBD
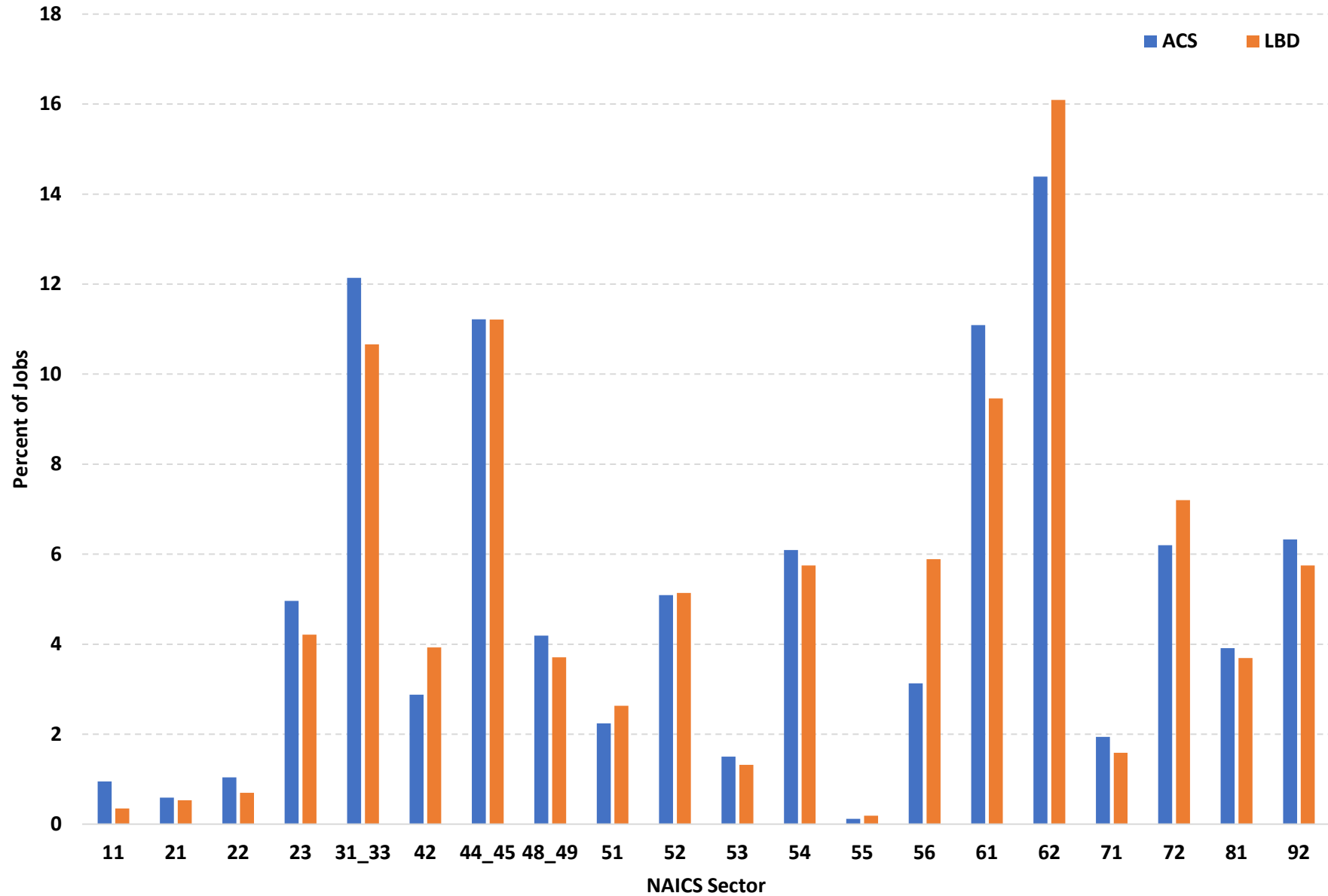
ACS vs LBD, all jobs, overlapping samples
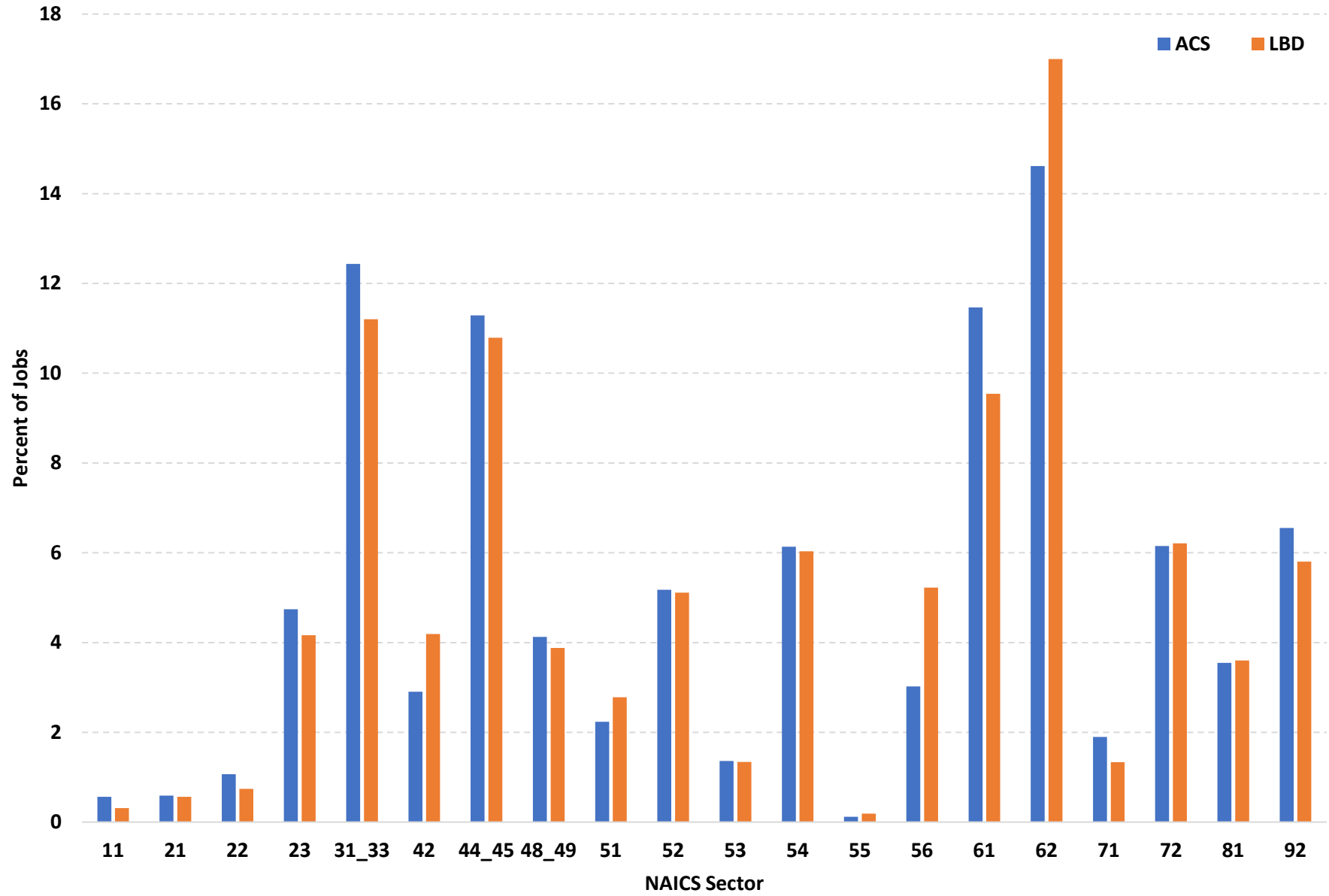
Comparison between Samples in Select Sectors

Match Rates between ACS and LBD Sectors

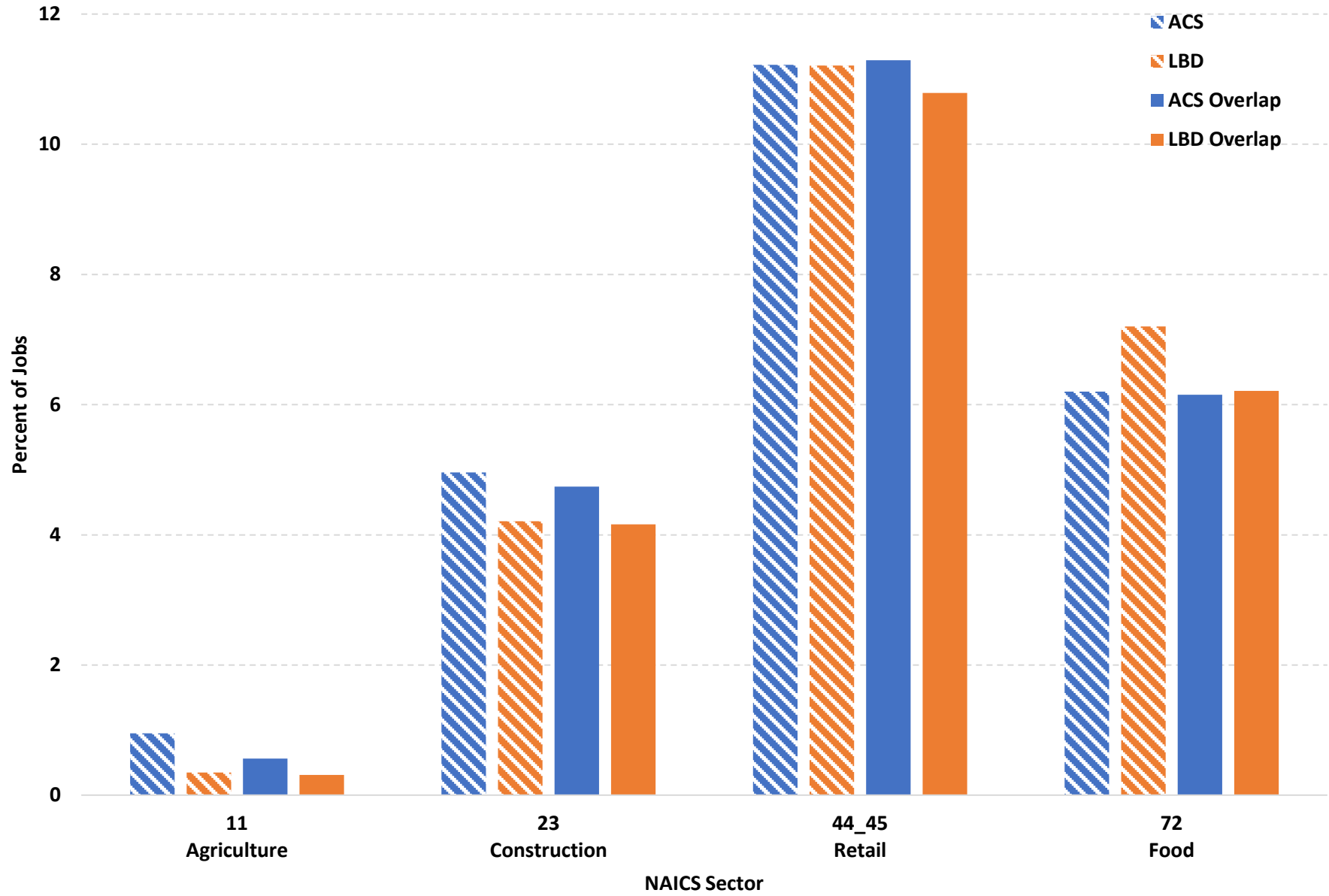|		LBD NAICS Sector																		
		Agr	**Mine**	**Util**	**Constr**	**Manu**	**WT**	**Retail**	**Transp**	**Info**	**Finance**	**Real Est**	**Prof Serv**	**Manage**	**Admin**	**Educ**	**Health**	**Arts**	**Food**	**Oth Serv**	**Pub Ad**
ACS NAICS Sector		**11**	**21**	**22**	**23**	**31_33**	**42**	**44_45**	**48_49**	**51**	**52**	**53**	**54**	**55**	**56**	**61**	**62**	**71**	**72**	**81**	**92**
11	Agr	63.49	0.46	0.18	0.45	0.47	1.28	0.33	0.48	0.13	0.12	0.41	0.23	0.43	0.60	0.13	0.15	0.45	0.26	0.39	0.85
21	Mine	0.23	73.63	0.41	0.57	0.28	0.50	0.07	0.41	0.07	0.07	0.44	0.25	1.48	0.40	0.04	0.04	0.06	0.06	0.13	0.06
22	Util	0.27	2.00	84.41	1.11	0.26	0.53	0.18	0.37	0.19	0.15	0.29	0.47	1.55	0.82	0.08	0.15	0.20	0.10	0.28	2.67
23	Constr	2.26	4.80	2.54	75.84	1.81	2.40	1.16	1.46	0.85	0.58	4.40	1.98	4.59	4.67	0.37	1.03	0.99	0.87	1.50	3.99
31_33	Manu	7.20	4.92	1.84	4.61	84.32	17.18	2.45	3.36	3.35	1.28	2.39	4.93	14.44	9.59	0.83	1.32	1.42	1.79	2.73	1.19
42	WT	5.57	2.38	0.57	1.13	1.65	46.69	1.97	1.59	1.12	0.40	1.21	1.11	3.15	2.33	0.21	0.27	0.43	0.46	0.78	0.28
44_45	Retail	5.18	2.04	1.02	2.87	2.25	12.52	81.69	2.55	4.90	1.43	3.84	2.50	9.46	5.34	1.04	1.44	3.06	2.93	2.93	1.12
48_49	Transp	2.53	1.95	0.72	1.37	0.85	2.72	0.66	79.24	0.63	0.50	2.30	0.95	3.22	3.74	0.61	0.55	0.88	0.66	1.06	1.98
51	Info	0.28	0.20	0.32	1.03	0.47	1.11	0.40	0.35	54.77	0.52	0.98	1.86	4.73	2.02	0.35	0.30	1.54	0.34	0.71	1.58
52	Finance	0.51	0.55	0.60	0.48	0.41	0.86	0.48	0.61	1.79	84.25	1.97	2.06	7.90	3.13	0.47	0.86	0.58	0.49	0.92	0.79
53	Real Est	0.53	0.36	0.18	0.92	0.17	0.49	0.34	0.35	0.41	0.68	62.13	0.67	1.64	1.75	0.18	0.39	0.73	0.42	1.29	0.84
54	Prof Serv	1.51	1.18	1.02	1.41	1.30	3.22	0.81	1.73	11.70	2.02	2.44	70.81	7.05	6.46	1.02	1.29	1.21	0.65	2.04	1.61
55	Manage	0.11	0.44	0.13	0.05	0.18	0.25	0.17	0.09	0.14	0.13	0.28	0.13	4.43	0.17	0.02	0.07	0.07	0.11	0.06	0.01
56	Admin	2.19	0.68	0.72	1.63	0.67	1.75	0.66	1.02	1.59	0.98	2.79	1.86	2.37	39.12	0.41	0.81	1.18	1.03	1.19	1.49
61	Educ	1.18	1.31	1.22	1.45	1.08	1.85	1.54	1.46	12.18	1.80	2.49	2.36	5.75	2.97	88.28	4.93	3.68	2.15	8.10	7.84
62	Health	1.47	0.85	1.00	1.13	1.19	1.79	1.67	1.46	2.24	2.37	4.05	3.01	13.31	6.98	2.63	71.84	2.90	2.20	7.68	6.58
71	Arts	0.71	0.24	0.26	0.43	0.25	0.39	0.55	0.37	0.95	0.32	1.25	0.59	3.24	1.52	0.58	0.55	71.90	3.46	2.05	3.13
72	Food	1.64	0.45	0.29	0.88	0.76	1.32	2.01	0.79	0.87	0.61	2.84	0.96	5.97	3.35	0.91	0.82	4.19	80.27	1.95	0.73
81	Oth Serv	1.65	0.75	0.50	1.40	0.90	2.11	1.75	0.92	0.86	0.68	1.68	1.17	1.96	2.64	0.95	1.69	2.97	0.97	61.97	1.02
92	Pub Ad	1.48	0.80	2.11	1.24	0.74	1.04	1.12	1.40	1.25	1.10	1.84	2.11	3.33	2.39	0.91	11.49	1.57	0.77	2.24	62.22

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Match Rates between ACS and LBD Sectors

LBD NAICS Sector

ACS NAICS Sector	Agr 11	Mine 21	Util 22	Constr 23	Manu 31_33	WT 42	Retail 44_45	Transp 48_49	Info 51	Finance 52	Real Est 53	Prof Serv 54	Manage 55	Admin 56	Educ 61	Health 62	Arts 71	Food 72	Oth Serv 81	Pub Ad 92
11 Agr	63.49	0.46	0.18	0.45	0.47	1.28	0.33	0.48	0.13	0.12	0.41	0.23	0.43	0.60	0.13	0.15	0.45	0.26	0.39	0.85
21 Mine	0.23	73.63	0.41	0.57	0.28	0.50	0.07	0.41	0.07	0.07	0.44	0.25	1.48	0.40	0.04	0.04	0.06	0.06	0.13	0.06
22 Util	0.27	2.00	84.41	1.11	0.26	0.53	0.18	0.37	0.19	0.15	0.29	0.47	1.55	0.82	0.08	0.15	0.20	0.10	0.28	2.67
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44_45 Retail	5.18	2.04	1.02	2.87	2.25	12.52	81.69	2.55	4.90	1.43	3.84	2.50	9.46	5.34	1.04	1.44	3.06	2.93	2.93	1.12
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51 Info	0.28	0.20	0.32	1.03	0.47	1.11	0.40	0.35	54.77	0.52	0.98	1.86	4.73	2.02	0.35	0.30	1.54	0.34	0.71	1.58
52 Finance	0.51	0.55	0.60	0.48	0.41	0.86	0.48	0.61	1.79	84.25	1.97	2.06	7.90	3.13	0.47	0.86	0.58	0.49	0.92	0.79
53 Real Est	0.53	0.36	0.18	0.92	0.17	0.49	0.34	0.35	0.41	0.68	62.13	0.67	1.64	1.75	0.18	0.39	0.73	0.42	1.29	0.84
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71 Arts	0.71	0.24	0.26	0.43	0.25	0.39	0.55	0.37	0.95	0.32	1.25	0.59	3.24	1.52	0.58	0.55	71.90	3.46	2.05	3.13
72 Food	1.64	0.45	0.29	0.88	0.76	1.32	2.01	0.79	0.87	0.61	2.84	0.96	5.97	3.35	0.91	0.82	4.19	80.27	1.95	0.73
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LBD 2-Digit Match Rates by Firm Age x Firm Size x MU

Firm Age (Years)	Firm Size (# Employees) x MU					
	0 - 19		20 - 499		500+	
	SU	MU	SU	MU	SU	MU
0	66.49	63.7	64.84	64.02	47.69	68.2
1 - 5	68.11	62.9	68.04	68.84	42.23	60.39
6 - 10	69.77	53.23	67.77	69.16	47.41	65.5
11+	71.33	51.85	69.11	60.92	57.44	65.05
Left Censored	71.81	49.95	67.95	69.63	79.23	80.01

Demographic Characteristics Match Rates

United States Census Bureau

DRB Approval Number: CBDRB-FY23-CES007-01
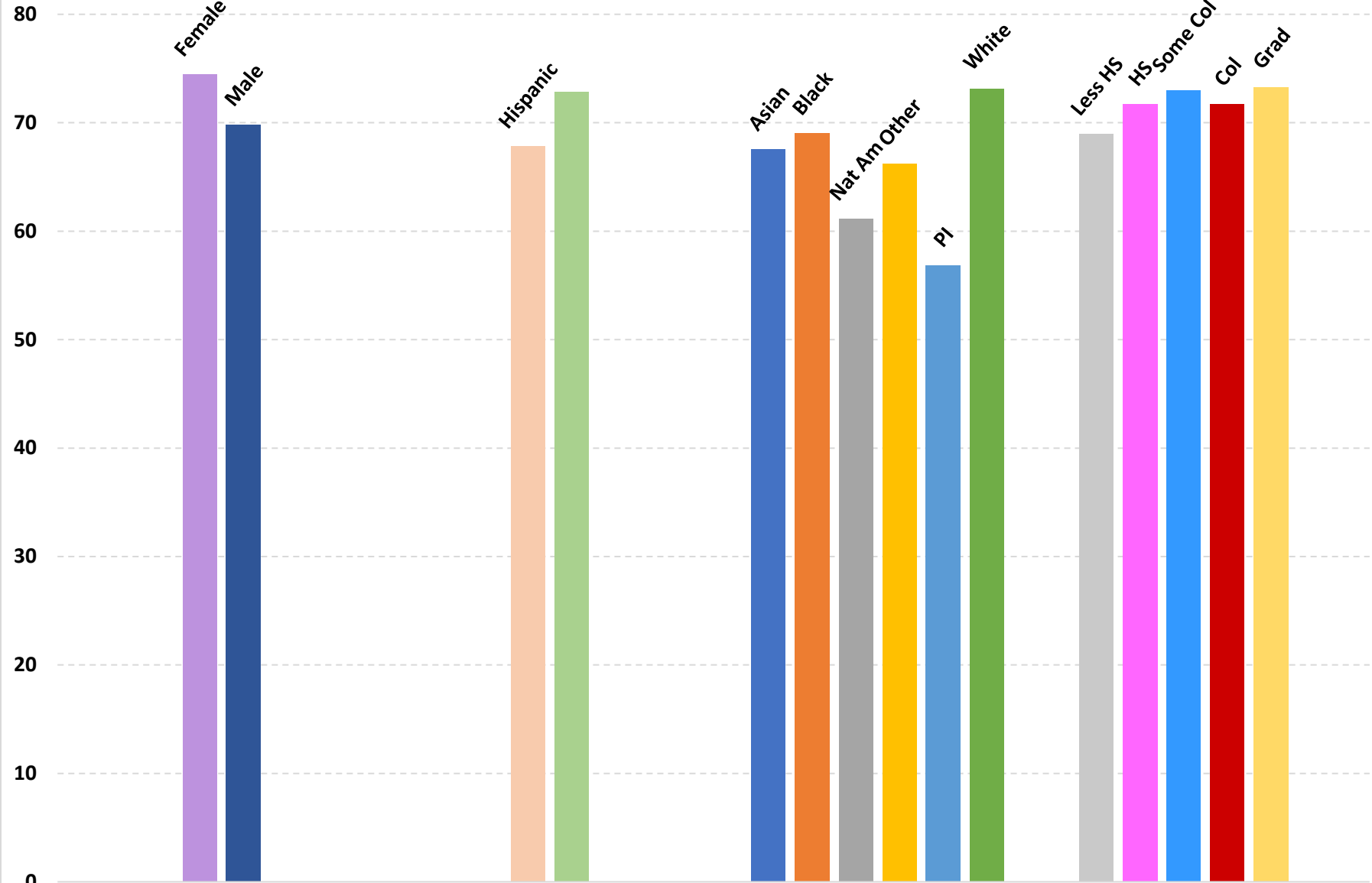
Conclusions

- There are some industry differences between the ACS and LBD, but most of these are sector specific

- Additional analysis

  - Regression analysis

  - Comparisons using LEHD data

  - Applications such as essential worker calculations, wage gap analysis, and factoryless goods producers