Research Brief,

Short Paper

Vol. 4 , No. 7

(2022, April 7)

The Illinois Institute for Rural Affairs (IIRA) works to improve the quality of life for rural residents by partnering with public and private agencies on local development and enhancement efforts.

Western Illinois University

Job-to-Job Flows in Illinois, 2000-2021

ISSN 2687-8844

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Abstract

This paper explores the dynamics of labor movements in Illinois using data from the US Census Bureau. Empirical analysis reveals that Covid-19 has altered the level of job-to-job movements, from a pre Covid-19 average of 285,000 moves to 221,610 moves.

Introduction

In an earlier *Research Brief*[2], I argued that the Covid-19 pandemic has reduced the size of Illinois' labor force. This paper explores the resultant labor market adjustments, the flow of workers between jobs.

According to the Bureau of Labor Statistics (BLS), it is typical for a worker born during the baby boom to hold 12.4 jobs during his or her working age, 18-54[3]. In addition, research on job change suggests that it is one of the main avenues for wage growth for the young[4]. While it explains, at least in part, the outmigration of youth

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[2] Athiyaman, A. (2022). Interpreting the Recent Decline in Illinois' Labor Force: April 2020 – December 2021. Research Brief, 4(2), January 23, 1-10. Available online: http://www.iira.org/wp-content/uploads/2022/01/RB42_LF_Final.pdf.
[3] The focus was on workers born between 1957-64; see, https://www.bls.gov/news.release/nlsoy.nr0.htm.
[4] Topel, R., and Ward, M. (1992). Job Mobility and the Careers of Young Men, *Quarterly Journal of Economics*, 107(2), 439-479.

from the nonmetro[5], it doesn't account for the fact that the Covid-19 pandemic has increased annual earnings by an average of $8,350[6]. In other words, it is likely that the pandemic has reduced job movements. What are the dynamics of labor turnover in Illinois during the 2000-2021 time period? Specifically, which industry in Illinois had the most flow of workers during the last 22 years, 2000-2021[7]? What are the demographic characteristics of the job-to-job movers? How could we quantify the impact of the pandemic on job-to-job movements? This paper addresses these and other related questions.

Conceptual Framework and Hypotheses

Human-capital theory[8] has a salient component, 'movement capital'. Movement capital enables easier movement between jobs. Educational achievement is considered as a movement capital that is stable; education improves general knowledge, skills, and abilities (KSA) which are the determinants of individual "employability"[9]. Thus,

> H_1: Higher educational achievement is associated with higher job-to-job movements.

If we conceptualize industry into two segments, "old" sector such as agriculture and new or "modern" sector

[5] Athiyaman, A. (2021). Explaining Outmigration Intentions of Rural Population. *Research Brief,* 3(17), October 24, 1-7. Available online: http://www.iira.org/wp-content/uploads/2021/10/Explaining-Outmigration-Intentions.pdf.

[6] Athiyaman, A. (2022). Rural Education in Charts, 2000-2022. *Research Brief*, 4(6), March 21, 1-8. Available online: http://www.iira.org/wp-content/uploads/2022/03/Rural-education-in-charts-2000-to-2022_v4_6.pdf.

[7] Quarterly data were used; 2000 had the first quarter missing; 2021 had data only for the first quarter.

[8] Becker, G.S. (1964). *Human Capital*. New York, NY: Cambridge University Press

[9] Wright, P. M., Coff, R., & Moliterno, T. P. (2014). Strategic human capital: Crossing the great divide. J*ournal of Management, 40,* 353–370.

such as information[10], then labor in each segment is expected to possess the following KSAs: specific or vocational education for the old segment and general education for the modern sector[11]. The portability of skills is asymmetric: people with general education can be employed in the old sectors, for example, as managers, but people with vocational education cannot be used in the modern sector (Figure 1). Hence,

> H_2: The relationship between educational achievement and job-to-job movement is moderated by the *industry segment*, such that the relationship is more positive for the "modern" sector.

Methodology

Jobs-to-Jobs (J2J) statistics published by the US Census Bureau[12] were used to decompose and analyze job-to-job transitions across 20, two-digit, NAICS sectors[13] for the period 2000 - 2021; Illinois was the geographical unit of analysis. The variables listed in Table 1 were analyzed by means of exploratory data analysis techniques such as five-number summary, cross-breaks of variables with coefficient of contingency metrics, and interrupted timeseries analysis; Appendix 1 contains a non-technical summary of the interrupted timeseries model.

[10] In finance literature, the old sector is labeled the blue-chip sector; they produce reliable financial returns. See, Olsen, R. A. (1997). Investment risk: The experts' perspective. *Financial Analysts Journal*, *53*(2), 62-66.

[11] See, for example, Lamo, A., & Messina, J. (2010). Formal education, mismatch and wages after transition: Assessing the impact of unobserved heterogeneity using matching estimators. *Economics of Education Review*, *29*(6), 1086-1099.

[12] See, https://lehd.ces.census.gov/.

[13] See, https://www.bls.gov/ces/naics/.

Table 1: Operational Definitions

Variable	Measure
J2JHire: Job-to-Job Hires	Main job hires that are part of a job-to-job move with a short or no nonemployment break.
EEHire: Within-quarter job-to-job hires	Main job hires where workers start a new main job in the same quarter they leave their old job.
AQHire: Adjacent-quarter job-to-job hires	Main job hires where workers start a new main job in the quarter following a separation from their old main job.
Demo: Worker demographics	Gender (male; female); race (White, Black, and Other); age (14-18; 19-21; 22-24; 25-34; 35-44; 45-54; 55-64; 65+); education (LT High School; HS diploma; Some college or associate degree; Bachelor's or advanced degree).

Findings

Industry with the greatest number of flow of workers

Table 2 shows the median job-to-job hires for the 2000-2021 time period. Administrative and support services had the greatest number of job-to-job hires, with upwards of 142,000 median number of hires; extractive industries (mining, quarrying, and oil and gas extraction) had the least number of job-to-job hires, the median value was 1,490 hires.

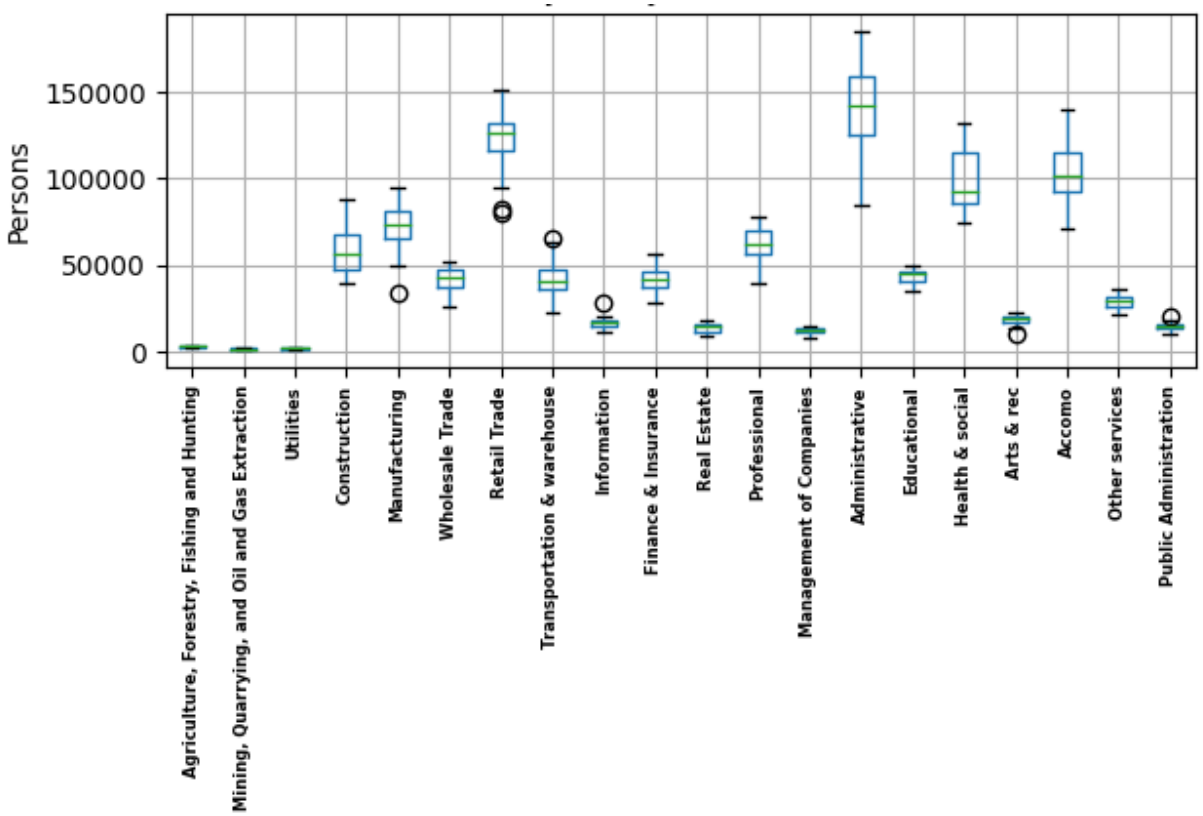
Figure 1 highlights the variability in the number of hires by sector[14]. For example, for administrative and support services sector, the variability in job-to-job hires for a 22-year period is around 100,000. The same number for extractive industries is 1,237; see Appendix 2.

[14] Maximum value – Minimum value, range, was the variability measure.

Table 2: Job-to-Job (J2J) Hires by Industry Sectors, 2000-2021

Description	Median J2J Hires	Median Rank
Agriculture, Forestry, Fishing and Hunting	2,934	18
Mining, Quarrying, and Oil and Gas Extraction	1,490	20
Utilities	1,937	19
Construction	56,681	7
Manufacturing	73,154	5
Wholesale Trade	42,847	9
Retail Trade	126,240	2
Transportation and Warehousing	40,847	11
Information	17,156	14
Finance and Insurance	41,921	10
Real Estate and Rental and Leasing	14,357	16
Professional, Scientific, and Technical Services	62,189	6
Management of Companies and Enterprises	12,620	17
Administrative, Support, and Remediation Services	142,147	1
Educational Services	44,761	8
Health Care and Social Assistance	92,536	4
Arts, Entertainment, and Recreation	18,944	13
Accommodation and Food Services	101,887	3
Other Services (except Public Administration)	29,539	12
Public Administration	15,031	15

Figure 1: Five Number Summary: Job-to-Job Hires



Note: The size of the box plot, including the whiskers, shows the magnitude of variability in the observations. Thus, variability is largest in the "administrative, support and remedial services" sector and closer to "null" in the mining sector.

Demographics of the Job-to-Job Mover

Men were the dominant job-to-job hires in the "old" sectors: agriculture, mining, construction, and manufacturing[15]. In contrast, females were the dominant job-to-job hires in modern sectors such as health and finance (Table 3). For all sectors, the modal age group of the job-to-job mover is 25-34 (Appendix 3); college educated was the typical "mover" to the modern sectors whereas a high school diploma was the modal educational achievement for a job-to-job mover in the "old" sector (Appendix 4). Healthcare, transportation, and administrative sectors hired non-Whites

[15] Old industrial sectors, also called old economy, do not rely heavily on technological advancement in the production processes.

at a ratio of one-to-three; other sectors had less minorities in their hires (Appendix 5).

Table 3: Impact of Gender on Job-to-Job Moves

Sector	Year	Male %	Female %	N
Agriculture, Forestry, Fishing and Hunting	2001	67	33	3,248
	2020	65	35	3,062
Mining, Quarrying, and Oil and Gas Extraction	2001	91	9	1,499
	2020	90	10	766
Utilities	2001	70	30	1,918
	2020	67	33	2,161
Construction	2001	91	9	88,108
	2020	88	12	47,846
Manufacturing	2001	68	32	88,417
	2020	68	32	65,922
Wholesale Trade	2001	66	34	48,549
	2020	67	33	36,410
Retail Trade	2001	51	49	151,507
	2020	49	51	120,724
Transportation and Warehousing	2001	74	26	42,415
	2020	72	28	51,657
Information	2001	53	47	28,758
	2020	56	44	12,773
Finance and Insurance	2001	38	62	56,137
	2020	45	55	34,395
Real Estate and Rental and Leasing	2001	55	45	18,015
	2020	53	47	11,770
Professional, Scientific, and Technical Services	2001	51	49	65,768
	2020	51	49	61,104
Management of Companies and Enterprises	2001	49	51	12,366
	2020	47	53	11,535
Administrative and Support and Waste Management and Remediation Service	2001	56	44	144,161
	2020	57	43	151,470
Educational Services	2001	32	68	49,903
	2020	33	67	35,497
Health Care and Social Assistance	2001	18	82	105,936
	2020	19	81	116,995
Arts, Entertainment, and Recreation	2001	51	49	23,071
	2020	52	48	10,726
Accommodation and Food Services	2001	45	55	114,942
	2020	46	54	75,964
Other Services (except Public Administration)	2001	53	47	36,006
	2020	50	50	24,343
Public Administration	2001	52	48	20,317
	2020	54	46	12,967

Impact of the Covid-19 Pandemic on Job-to-Job Movements

Figure 2 is a line graph of the 83 quarterly observations used in the interrupted timeseries analysis; the decline in the number of job-to-job hires at the center of the graph relates to the 2008-2009 recession; the negative trend towards the end is during the Covid-19 phases [16].

The results of the econometric model calibrated to understand Covid-19 impacts on job-to-job moves shown in Table 4; Covid-19 has altered the level of job-to-job movements, from a pre Covid-19 average of 285,000 moves to 221,610 moves.

Figure 2: Quarterly Data on Job-to-Job Hires, all Sectors, 2000-2021

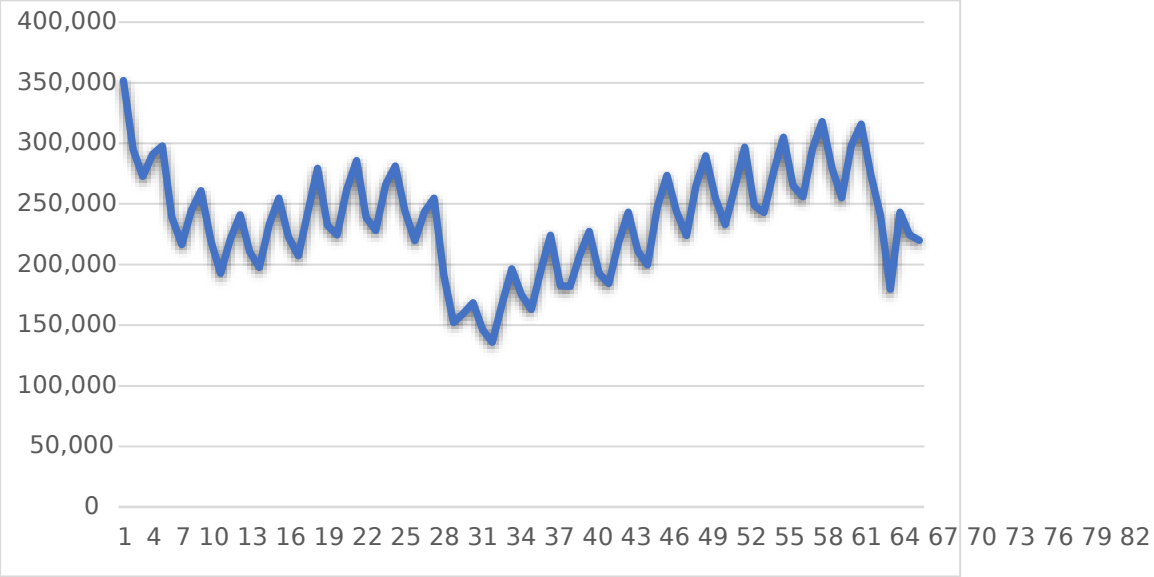


Table 4: Changed Level of Job-to-Job Moves, Econometric Model Estimates

Multiple R	0.822014782
R Square	0.675708303
Adjusted R Square	0.63517184

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	284622.6	10913.29	26.08037	0.001
Covid-19 intervention	-63012.6	15433.72272	-4.08279	0.003

[16] Athiyaman, A. (2021). Covid-19 Pandemic: Effects on Minority Owned Businesses in Illinois. *Research Brief*, 3(6), April 6, 1-10. Available online: http://www.iira.org/wp-content/uploads/2021/04/ResBrief6_Minority_Apr2021.pdf.

Finally, the hypothesis that higher educational achievement is associated with higher job-to-job movements was confirmed – higher education explains 35% of variance in job-to-job movements ($r = 0.59$, $p < .05$). The correlation did not differ in strength between the old and the modern sector; put differently, the hypothesis that the relationship between educational achievement and job-to-job movement is moderated by the *industry segment*, such that the relationship is more positive for the "modern" sector, did not gain empirical support.

Summary and Conclusion

This paper explores the dynamics of labor movements in Illinois; the Jobs-to-Jobs (J2J) statistics published by the US Census Bureau were used to decompose and analyze job-to-job transitions across 20, two-digit, NAICS sectors. Results of data analysis suggest that:

1. administrative and support services had the greatest number of job-to-job hires, with upwards of 142,000 median number of hires; extractive industries (mining, quarrying, and oil and gas extraction) had the least number of job-to-job hires;

2. men were the dominant job-to-job hires in the "old" sectors: agriculture, mining, construction, and manufacturing;

3. for all sectors, the modal age group of the job-to-job mover is 25-34;

4. healthcare, transportation, and administrative sectors hired non-Whites at a ratio of one-to-three; other sectors had less minorities in their hires, and

5. Covid-19 has altered the level of job-to-job movements, from a pre Covid-19 average of 285,000 moves to 221,610 during 2021.

This paper provides new evidence on labor movements during the Covid-19 years. The next paper in the series will explore industry-to-industry flows.

Appendix 1: A Non-technical Summary of Interrupted Timeseries Analysis

The technique models *N* cross-sectional cases observed at *T* equally spaced time intervals. The simplest design involves a single intervention across all cases.

Consider a model of the form:

$Y_t = b_1 + b_2 X_t$, where Y_t is the dependent variable (job-to-job hires) measured across all cross-sectional cases, b_1 is the intercept; X_t is a dummy variable coded as 0 and 1; 1 for each observation that follows the advent of Covid-19 in the US, all of 2020 and 2021.

The intercept b_1 estimates the average level of the dependent variable (job-to-job hires) across all cross-sectional cases before the intervention and b_2 estimates the difference between the former level and the average level across all cross-sectional cases after the intervention.

Appendix 2: Five Number Statistics: Job-to-Job Hires

Sector	Min.	25th Percentile	Median	75th Percentile	Max.
Agriculture, Forestry, Fishing and Hunting	2,330	2,644	2,934	3,213	3,572
Mining, Quarrying, and Oil and Gas Extraction	766	1,251	1,490	1,787	2,003
Utilities	1,137	1,550	1,937	2,109	2,731
Construction	39,899	47,140	56,681	68,041	88,107
Manufacturing	34,337	65,748	73,154	81,349	94,754
Wholesale Trade	25,963	37,277	42,847	47,956	51,499
Retail Trade	80,660	116,553	126,240	132,375	151,509
Transportation and Warehousing	23,007	35,781	40,847	47,255	65,298
Information	11,693	15,271	17,156	18,233	28,758
Finance and Insurance	28,090	37,531	41,921	46,708	56,137
Real Estate and Rental and Leasing	8,638	11,638	14,357	15,490	18,014
Professional, Scientific, and Technical Services	39,262	56,894	62,189	69,527	78,145
Management of Companies and Enterprises	7,511	10,998	12,620	13,766	15,033
Administrative, Support, and Remediation Services	85,188	124,973	142,147	159,400	185,571
Educational Services	34,567	40,332	44,761	46,162	50,160
Health Care and Social Assistance	74,977	85,858	92,536	115,348	131,761
Arts, Entertainment, and Recreation	10,725	16,996	18,944	20,058	23,073
Accommodation and Food Services	71,471	92,565	101,887	115,438	140,219
Other Services (except Public Administration)	21,729	25,708	29,539	31,451	36,006
Public Administration	10,254	13,387	15,031	15,556	20,318

Appendix 3: Impact of Age on Job-to-Job Hires

		Age Group								
Sector	**Year**	**14-18**	**19-21**	**22-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65-99**	**N**
Agriculture, Forestry, Fishing and Hunting	2001	12%	14%	10%	21%	19%	13%	6%	4%	3,250
	2020	6	12	11	26	16	12	11	6	3,063
Mining, Quarrying, and Oil and Gas Extraction	2001	2	8	11	28	26	20	5	0	1,494
	2020	1	6	7	30	27	17	9	2	766
Utilities	2001	3	9	8	30	28	16	5	0	1,916
	2020	1	5	8	30	25	19	11	2	2,161
Construction	2001	3	8	9	29	27	17	6	1	88,107
	2020	2	7	8	26	24	20	11	2	47,851
Manufacturing	2001	4	10	10	30	25	14	5	1	88,417
	2020	2	8	10	28	21	17	10	3	65,922
Wholesale Trade	2001	4	9	11	32	24	14	5	1	48,552
	2020	2	7	10	29	21	17	10	3	36,410
Retail Trade	2001	18	21	13	22	14	8	3	1	151,509
	2020	13	20	13	23	13	9	6	3	120,726
Transportation and Warehousing	2001	5	10	10	29	26	14	5	1	42,416
	2020	4	12	13	30	18	13	8	2	51,656
Information	2001	5	10	14	36	20	11	3	1	28,758
	2020	1	4	11	40	21	13	7	2	12,773
Finance and Insurance	2001	4	11	14	33	21	12	4	1	56,137
	2020	1	5	12	32	23	17	10	2	34,392
Real Estate and Rental and Leasing	2001	9	13	12	28	19	12	5	1	18,014
	2020	2	7	11	31	20	16	10	3	11,771
Professional, Scientific, and Technical Services	2001	4	9	14	36	21	12	4	1	65,767
	2020	1	4	12	36	21	14	8	3	61,104
Management of Companies and Enterprises	2001	7	11	12	31	22	13	4	1	12,364
	2020	3	7	10	30	21	16	10	2	11,537
Administrative and Support and Waste Management and Remediation Service	2001	6	13	13	28	21	12	5	3	144,161
	2020	2	10	11	28	19	15	9	5	151,470
Educational Services	2001	4	7	16	31	20	15	6	1	49,904
	2020	1	5	12	31	22	15	10	3	35,499
Health Care and Social Assistance	2001	5	11	12	30	22	14	5	1	105,938
	2020	2	9	12	32	19	14	9	3	116,995
Arts, Entertainment, and Recreation	2001	21	19	14	22	12	7	3	2	23,073
	2020	11	16	14	26	13	9	7	4	10,725
Accommodation and Food Services	2001	19	21	14	22	13	6	2	2	114,941
	2020	18	18	13	22	13	8	5	3	75,965
Other Services (except Public Administration)	2001	11	15	12	26	18	11	4	2	36,006
	2020	5	12	13	28	17	13	9	3	24,339
Public Administration	2001	8	12	13	30	18	12	5	1	20,318
	2020	3	7	11	32	19	15	10	4	12,968

Appendix 4: Impact of Education on Job-to-Job Hires

Sector	Year	Level of Education					
		Less than high school	High school or equivalent	Some college /associate degree	Bachelor's degree or more	Not available (workers aged 24 or less)	N
Agriculture, Forestry, Fishing and Hunting	2001	16%	22%	17%	9%	37%	3,249
	2020	14	22	21	14	29	3,062
Mining, Quarrying, and Oil and Gas Extraction	2001	11	32	24	11	22	1,500
	2020	12	33	26	14	14	763
Utilities	2001	4	18	25	32	20	1,918
	2020	10	21	27	28	13	2,162
Construction	2001	12	30	27	12	20	88,109
	2020	14	28	27	15	17	47,846
Manufacturing	2001	13	23	23	17	25	88,418
	2020	15	23	23	18	20	65,921
Wholesale Trade	2001	8	19	24	25	24	48,551
	2020	12	22	24	22	19	36,409
Retail Trade	2001	7	17	16	9	51	151,507
	2020	9	16	17	11	46	120,724
Transportation and Warehousing	2001	11	26	25	14	24	42,417
	2020	14	23	22	14	28	51,660
Information	2001	4	13	22	31	30	28,756
	2020	9	18	24	32	16	12,771
Finance and Insurance	2001	3	13	21	33	29	56,136
	2020	9	19	25	30	17	34,395
Real Estate and Rental and Leasing	2001	8	19	22	17	34	18,016
	2020	13	23	25	20	19	11,768
Professional, Scientific, and Technical Services	2001	4	12	20	38	26	65,768
	2020	10	18	23	32	17	61,103
Management of Companies and Enterprises	2001	5	13	20	32	29	12,363
	2020	10	19	24	28	20	11,537
Administrative and Support and Waste Management and Remediation Service	2001	13	21	22	14	32	144,161
	2020	17	22	22	16	23	151,469
Educational Services	2001	4	14	20	36	27	49,904
	2020	9	18	24	30	19	35,496
Health Care and Social Assistance	2001	7	18	28	20	28	105,936
	2020	12	20	26	19	23	116,994
Arts, Entertainment, and Recreation	2001	6	13	15	12	54	23,074
	2020	8	16	18	16	41	10,727
Accommodation and Food Services	2001	9	15	14	7	55	114,940
	2020	11	15	15	10	49	75,964
Other Services (except Public Administration)	2001	8	19	20	14	39	36,007
	2020	11	19	22	17	30	24,344
Public Administration	2001	5	17	25	20	33	20,316
	2020	10	22	26	21	20	12,966

Appendix 5: Impact of Race on Job-to-Job Hires

Sector	Year	Race			
		White Alone	Black or African American Alone	Others	N
Agriculture, Forestry, Fishing and Hunting	2001	90%	4%	6%	3,249
	2020	90	6	4	3,059
Mining, Quarrying, and Oil and Gas Extraction	2001	97	1	2	1,500
	2020	95	2	2	771
Utilities	2001	83	13	4	1,920
	2020	79	15	6	2,166
Construction	2001	92	6	2	88,105
	2020	90	6	3	47,848
Manufacturing	2001	83	10	7	88,417
	2020	77	15	8	65,922
Wholesale Trade	2001	86	8	6	48,546
	2020	81	11	8	36,411
Retail Trade	2001	81	14	5	151,507
	2020	74	19	7	120,723
Transportation and Warehousing	2001	76	20	4	42,416
	2020	65	29	6	51,660
Information	2001	74	20	7	28,757
	2020	77	12	12	12,771
Finance and Insurance	2001	78	15	6	56,136
	2020	76	14	11	34,394
Real Estate and Rental and Leasing	2001	79	17	4	18,015
	2020	74	20	6	11,770
Professional, Scientific, and Technical Services	2001	79	11	9	65,767
	2020	73	12	15	61,103
Management of Companies and Enterprises	2001	78	14	8	12,365
	2020	75	14	11	11,534
Administrative and Support and Waste Management and Remediation Service	2001	69	24	7	144,158
	2020	65	28	8	151,471
Educational Services	2001	82	14	4	49,902
	2020	79	14	7	35,494
Health Care and Social Assistance	2001	69	25	6	105,935
	2020	67	24	9	116,996
Arts, Entertainment, and Recreation	2001	86	10	4	23,072
	2020	84	10	6	10,725
Accommodation and Food Services	2001	79	15	6	114,943
	2020	73	19	9	75,963
Other Services (except Public Administration)	2001	83	12	5	36,008
	2020	80	13	7	24,342
Public Administration	2001	82	15	3	20,317
	2020	81	15	4	12,968