

POLICY SPOTLIGHT | FEBRUARY 6, 2024

# Working from Home in Illinois: Who Can and Does?

The COVID-19 pandemic precipitated a once-in-a-lifetime disruption of interpersonal activities. Attendance at in-person gatherings, whether for school, work, family, or even worship, was either restricted or prohibited altogether. Today, many societal functions such as education, entertainment, worship, and travel have rebounded to pre-pandemic levels. At the same time, many commercial activities—especially white-collar office jobs—remain online or are now “hybrid” (i.e., with both remote and in-person options). This shift from working at office buildings or other job sites to one’s own home (WFH) in some sectors of the economy disrupted labor markets and remains an enduring societal reminder of the pandemic.

The implications of WFH span policy areas, bring-

ing challenges and opportunities for public administrators whether they work in environmental protection, housing affordability, workforce inclusion, migration, physical- or mental-health services, productivity, or even innovation (Johal 2023). WFH leaves almost no policy areas untouched.

This report focuses on Illinois workers and how they adapted to WFH in the wake of the pandemic. We emphasize who works from home and how they do so to facilitate an evidence-based discussion of appropriate policy evolution in the face of massively increased WFH. We believe that both employers and employees are still learning about and adapting to new patterns of WFH. Our aim is to document these patterns.

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We first look at national trends in WFH. The second section specifically looks at Illinois with data from the U.S. Census Bureau’s American Community Survey (ACS). We conclude with an analysis of geographical variation in WFH and its relationship with worker characteristics.

## NATIONAL AND ILLINOISIAN WFH TRENDS

In this section, we provide information from national surveys about WFH to provide a basis of comparison to Illinois. **Table 1** provides a summary of results for four sources of data assessing WFH at the national level in the United States. Each source uses a different methodology and sampling technique and answers a slightly different question. This difference in methodology and rate of WFH measured is also discussed at length in Winship and O’Rourke (2023). While all sources show an increase in some form of WFH from pre-pandemic levels, the amount of increase in WFH varies considerably.



Data Source	WFH Question	WFH Measure	Sample	Time Period	Recent Findings (National)
SWAA	“For each day last week, did you work a full day (6 or more hours), and if so, where?”	Paid full days worked from home	Full time workers, aged 20-64 earning \$10,000 or more	Monthly	31% of full paid days are WFH (July 2023)
HPS	“In the last 7 days, have you teleworked or worked from home?”	Respondents who answered “Yes”	Respondent in Household, aged 18 and up	Biweekly	25.8% of households report partial or full WFH (October 2023)
ATUS	Respondents report the location of their work activity	Hours spent on activity (work)	Individuals aged 15 and up (randomly selected from CPS households sample)	Monthly	34% of workers were partially or fully WFH in 2022
ACS	“How did this person usually get to work last week?”	Respondents who answered “Worked from home”	Full- and part-time workers aged 16 and up	Annual	17.9% of workers did WFH in 2021 ACS. 2022 data not released as of writing

The Survey of Working Adults and Attitudes (SWAA) has collected monthly data online since May 2020, primarily targeting U.S. workers<sup>1</sup>. The SWAA’s measure of WFH is the percentage of paid full days worked from home in a month. While this source peaked at over 60% of paid

full days being worked from home in April 2020, it had declined to around 40% of workdays by the end of 2021. As of July 2023, their most recent data available at the time of writing, the SWAA finds that about 31% of paid full days were worked from home (Barrero et al. 2021).

<sup>1</sup>Data and results are available at [www.wfhresearch.com](http://www.wfhresearch.com).

The U.S. Census Bureau’s Household Pulse Survey (HPS), initiated during the pandemic, has collected data on U.S. workers’ WFH status on a bi-weekly basis since August 2020<sup>2</sup>. The HPS Phase asks if the respondent within the household worked from home in the previous week and the frequency i.e., “Yes, for 1-2 days,” “Yes, for 3-4 days,” or “Yes, for 5 days or more” (Barrero et al. 2023). WFH rates appear to have peaked in March 2021 when around 39% of respondents reported working from home in any capacity (partially or fully). This has decreased to 25.8% at the national level as of September 2023. The HPS also found that respondents with greater income and higher levels of education have generally been more likely to WFH, with bachelor-degree earners three times as likely to WFH compared to a high-school diploma or GED earner (Marshall et al. 2021.).

The American Time Use Survey (ATUS) survey from the Bureau of Labor Statistics is a monthly survey on how individuals allocate their time on the day prior to the survey, including questions on if they worked, the location of work, and for how many hours. Results in 2021 found that 38% of workers were either partially or fully WFH, up from 24% in 2019. This share decreased slightly to 34% of workers in 2022.<sup>3</sup>

In addition to these surveys, summary level (or aggregate) data from the U.S. Census Bureau’s American Community Survey (ACS) provide information on WFH workers across the U.S. The individual level (or micro) ACS data contain individual responses to the ACS surveys with identifying information removed, while the summary (or aggregate) ACS data weigh and tabulate all responses to create aggregate values, such as by geographic region.<sup>4</sup>

Estimated WFH levels from each of the four data

sources are almost certainly much higher than historic values.<sup>5</sup> The variation in estimates reflects not only sampling error, but different definitions. It is entirely possible, for example, that about 19 percent of respondents “usually worked from home last week” at the time of the ACS interview and that twice as many (38%) worked from home on a particular day for the period being described in the ATUS.<sup>6</sup>

Our Illinois-specific analysis relies on the ACS because no other source provides similarly robust individual-level data (i.e., as large a sample size and as many useful variables)(Ruggles et al. 2023).



## WHO CAN WORK FROM HOME IN ILLINOIS?

For most employees, the option to work from home depends on employers first allowing their employees some flexibility in their work schedules. This agreement must depend, at least in part, on whether the employer believes the employee’s productivity working at home will be similar to their productivity if they were to come to the place of employment. Relative productivity

<sup>2</sup> Weeks 1-12 of the Household Pulse Survey (HPS) did not have survey questions regarding WFH. Weeks 13-27 ask if, “Some adult in household substituted some or all of their typical in-person work for telework because of the coronavirus pandemic.” Weeks 28-33 ask if “some adult in household teleworked in the last 7 days” and “because of the coronavirus pandemic,” excluding those teleworking not because of the pandemic. Weeks 34-45 ask if “someone worked onsite at a workplace in the last 7 days.” Differences in survey phrasing and data collected can be viewed at <https://www.census.gov/programs-surveys/household-pulse-survey.html>.

<sup>3</sup> BLS News Release June 2023. <https://www.bls.gov/news.release/pdf/atus.pdf>.

<sup>4</sup> For more on the differences between the two types of surveys, see the U.S. Census Bureau’s 2020 report, “Understanding and Using American Community Survey Data” at [https://www.census.gov/content/dam/Census/library/publications/2020/acs/acs\\_researchers\\_handbook\\_2020.pdf](https://www.census.gov/content/dam/Census/library/publications/2020/acs/acs_researchers_handbook_2020.pdf).

<sup>5</sup> Unfortunately, there is very limited data available on the extent of WFH prior to the pandemic. The data that do exist suggests very low levels of WFH in prior years. See [https://wfhrefsearch.com/wp-content/uploads/2023/08/WFHResearch\\_updates\\_August2023.pdf](https://wfhrefsearch.com/wp-content/uploads/2023/08/WFHResearch_updates_August2023.pdf).

<sup>6</sup> Consider the following example with five people, all interviewed in two surveys. One of the five people works at home every day while four of the five work at home only one of five days. When the ACS asked “How did [you] usually get to work?” one person accurately responds that work was done from home while four report some other usual method of transport to work (e.g., car, walking, bus). The ACS data thus show that 20% of these people WFH (on a usual day). The ATUS asks each of the five people “Where are you working today?” The person who works at home every day reports working at home and each of the other four has a 20% probability of working from home. The expected total WFH in that survey is  $(1+(0.2 \cdot 4))/5 = 1.8/5 = 0.36$ , which appears to be inconsistent with the results reported in the ATUS.

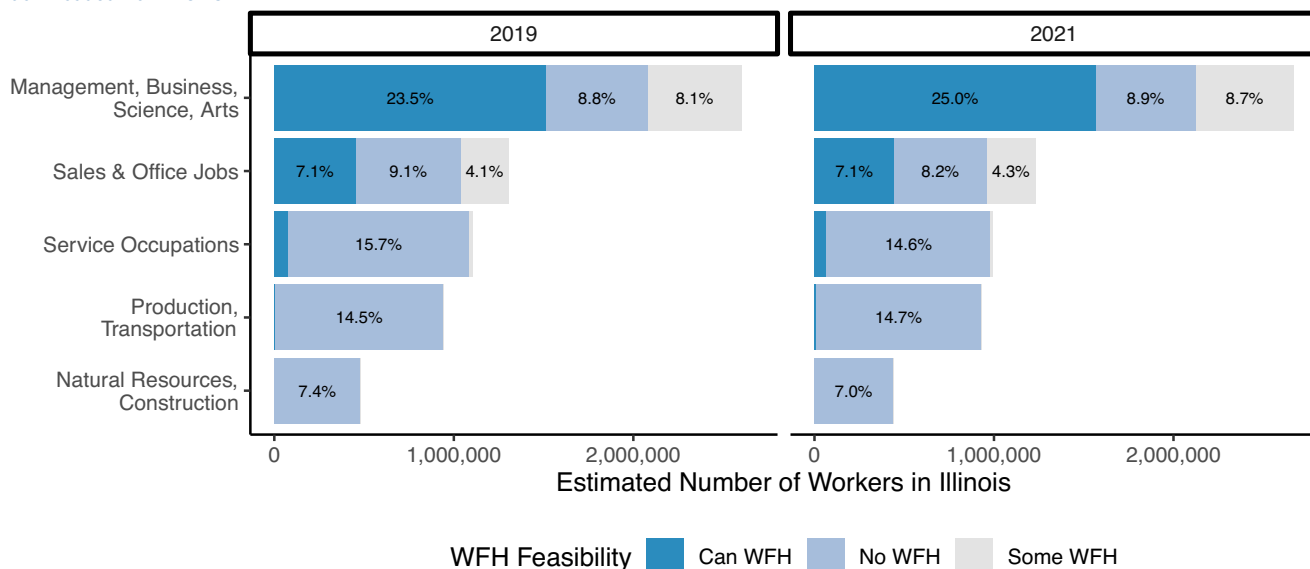
depends in part on the tasks the employee performs. In the early stages of the pandemic, Dingel and Neiman (2020) used detailed information on the tasks performed in different occupations to determine whether employee productivity at home could be similar to employee productivity at an employment location. We adapt and expand their method of applying “Teleworkable” scores to occupation codes for Illinois workers at the County and Public Use Microdata Area (PUMA) levels. Our methodology separates occupations into three types: Can WFH, No WFH, Some WFH. The “Some WFH” type includes broad occupational categories that subsume several narrower occupational categories with mixed

WFH feasibility. That is, WFH is feasible in some but not all of the narrow occupational categories. **See Appendix Item 1: Detailed Methodology** for methodological details.

Our results, like Dingel and Neiman’s, show that WFH feasibility differs by geographic location, industry, income level, and other socio-economic and demographic variables. Individuals working in jobs where WFH is feasible made up around 30-45% of the labor force in Illinois in both 2019 and 2021. **Figure 1** shows both total numbers and percentage of that total for five occupation categories, each divided into shares with complete WFH feasibility, no WFH, or some WFH options.

*Figure 1. Work From Home Feasibility in Illinois by Occupation Type*

WFH Feasibility is based on job requirements associated with occupation type<sup>7</sup>. Occupation groups in the image were created by aggregating ACS occupation codes to the broadest Major Occupation Group used by the BLS. See Appendix 1 for additional details. Occupation categories with less than 2% of workers were not labeled for legibility purposes. Data Source: ACS 2019 and 2021 1-year surveys used for weighted population estimates were downloaded from IPUMS.



The two broad occupation groups with the highest WFH potential make up over half of the entire workforce in Illinois. The 2019 and 2021 data are nearly identical, and both show just under one-third of workers in the “can WFH” category with another 12-13% coded as having “some WFH” potential.<sup>7</sup>

Counties with the largest percentage of workers who could WFH include McLean, Champaign, DuPage, and Sangamon, each with around 40% of the workforce potentially able to WFH (See **Figure 2**). Counties with higher WFH feasibility tend to have more office or technology jobs than

counties with lower WFH feasibility. For example, McLean County has a large proportion of its workers in Finance & Insurance occupations. In contrast, Kankakee County has a larger proportion of workers in Health Care and Manufacturing. These differences in county occupational distribution contribute to differences in the share of workers who could WFH. Jobs that require physical labor or tangible consumer service are considerably less likely to be able to WFH. In summary, Illinois is much like the rest of the nation concerning the feasibility of WFH. A large portion of the Illinois workforce is employed in occupations that can WFH. Concentrations of

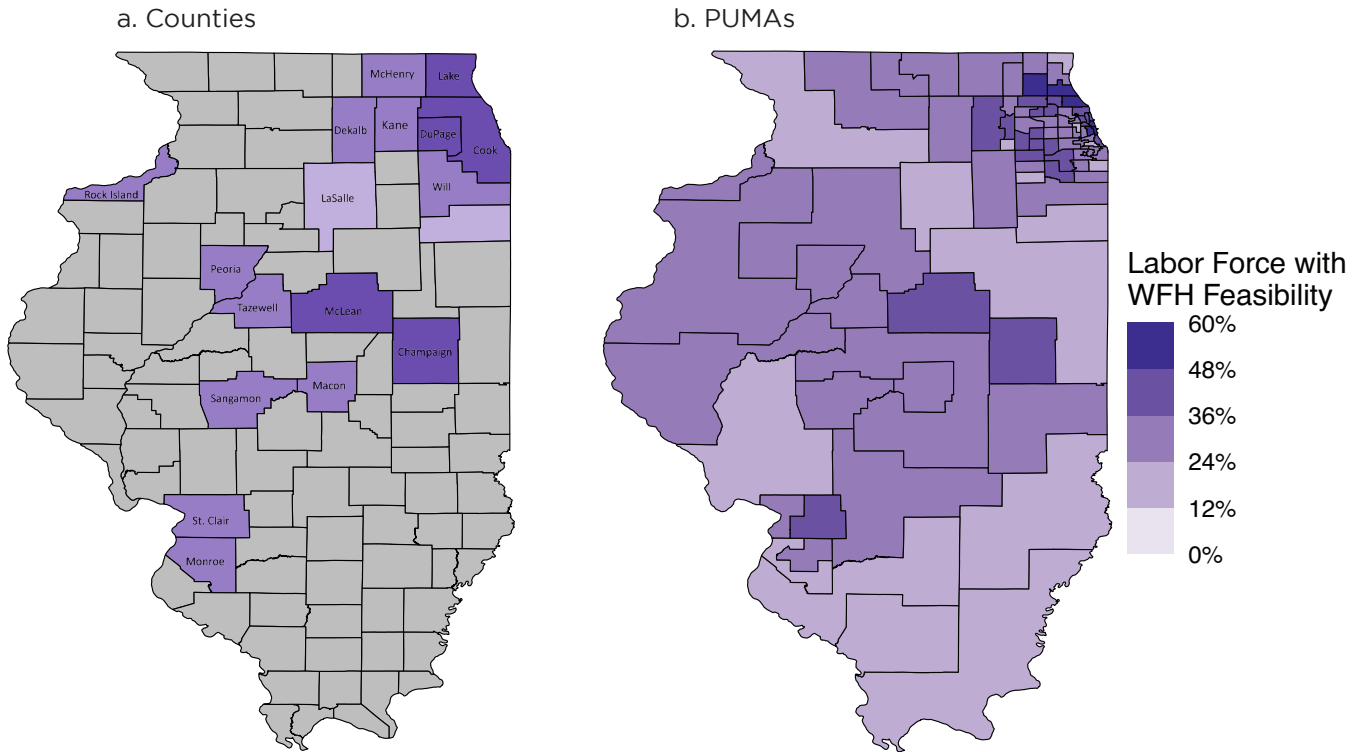
<sup>7</sup> Occupations were created from OCCSOC occupation codes aggregated to the broadest Major Occupation Groups used by the BLS. A more detailed list of occupations created from the first 2-digits of OCCSOC codes can be found in Appendix Item 1.

occupational types vary geographically based on the location of large employers, and more of those who live in urban areas can WFH due to the

type of employers that tend to be located in more populated areas.

**Figure 2. Percent of Labor Force Who Could Feasibly Work from Home**

Percent of County Population (Left) and PUMA Population (Right) who could feasibly work from home. For counties with less than 65,000 people, ACS removes the county identifier to protect respondent anonymity. The average WFH feasibility for responses with de-identified counties was 8.4% of the labor force. The average WFH rate for identified counties was 22.4% of the labor force.



## WHO DID WORK FROM HOME?

Prior to the pandemic, relatively few workers worked from home. During the early part of the pandemic virtually everyone who could WFH did so. Many workers returned to their workplaces as the corona virus became better understood and treated, vaccines were developed, and many people tired of the extraordinary restrictions imposed by the initial health emergency.

The feasibility of WFH does not necessarily match who does WFH. To observe the prevalence of working from home in Illinois we take advantage of the American Community Survey question that asks respondents to select their usual method of transportation to work in the last week, with an option for “Worked from home.” We compare the years 2019, before the pandemic, and 2021, when

many work arrangements were relatively unconstrained by the public-health emergency, using 1-year ACS data for each.<sup>8</sup>

In 2021, of those who answered the question on how they traveled to work, 19.2% of Illinois workers said they worked primarily from home compared to only 5.5% working from home in 2019. However, this increase in working from home did not occur equally across income earners or geographic regions; in general, the higher the earned income and more populated the area, the more likely one shifted to working from home by 2021.

Earned income and population density are associated with the type of occupation one has. **Figure 3** shows the pre-Covid and post-Covid proportions of the labor force that did and did not work from home. Workers with sales and office jobs

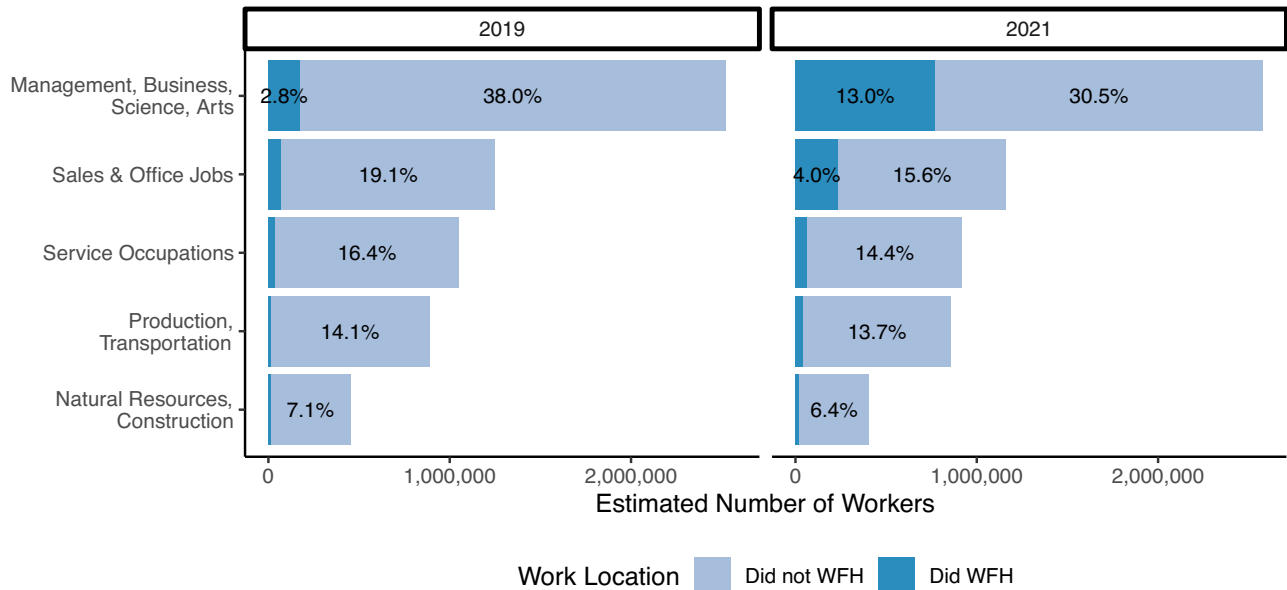
<sup>8</sup> See Appendix Item 1 for additional details on the methodology used. 2021 is the latest ACS data currently available. All data and replication code can be found on GitHub at <https://github.com/AleaWM/WorkFromHome>.

or management, business, science, and arts jobs were the vast majority of workers working from home. In 2021, around 43.5% of all workers in Illinois fall into the broad category of management, business, science, and arts. In this category, the

WFH workers represent 13% of the Illinois workforce compared to 2.8% in 2019. In 2021, those in sales and office jobs represent close to 20% of the Illinois workforce, with 4% who are WFH.

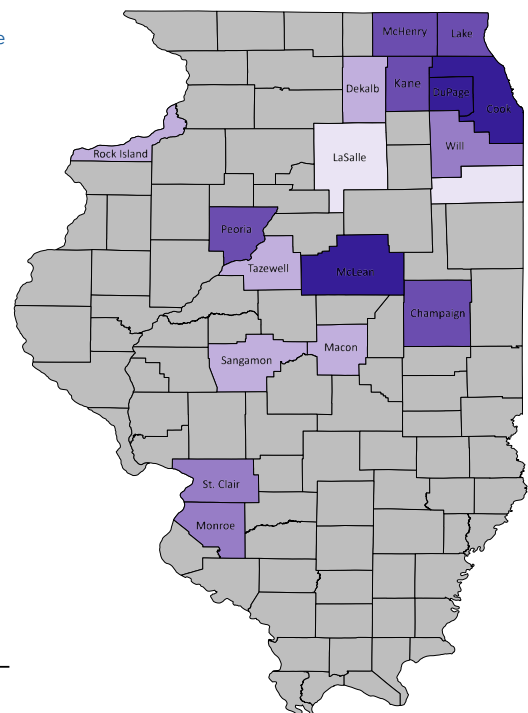
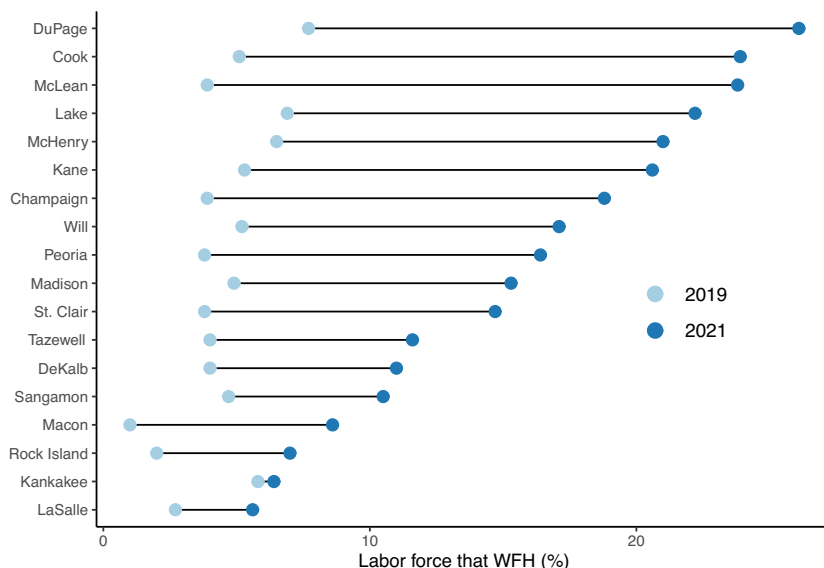
**Figure 3. Proportion of Illinois Workforce Who Worked From Home**

Over 43% of the Illinois workforce worked in management, business, science, and arts professions in 2021. Within that occupation category, 13% reported working from home in 2021 compared to 2.8% in 2019. Data: Weighted population estimates based on 2019 and 2021 1-year ACS samples.



**Figure 4. Change in County Level Workforce Who Worked From Home**

Shift in percentage of workers working remotely from 2019 to 2021. Map shows change as the percent of labor force that was remote in 2021 minus the percent remote in 2019.



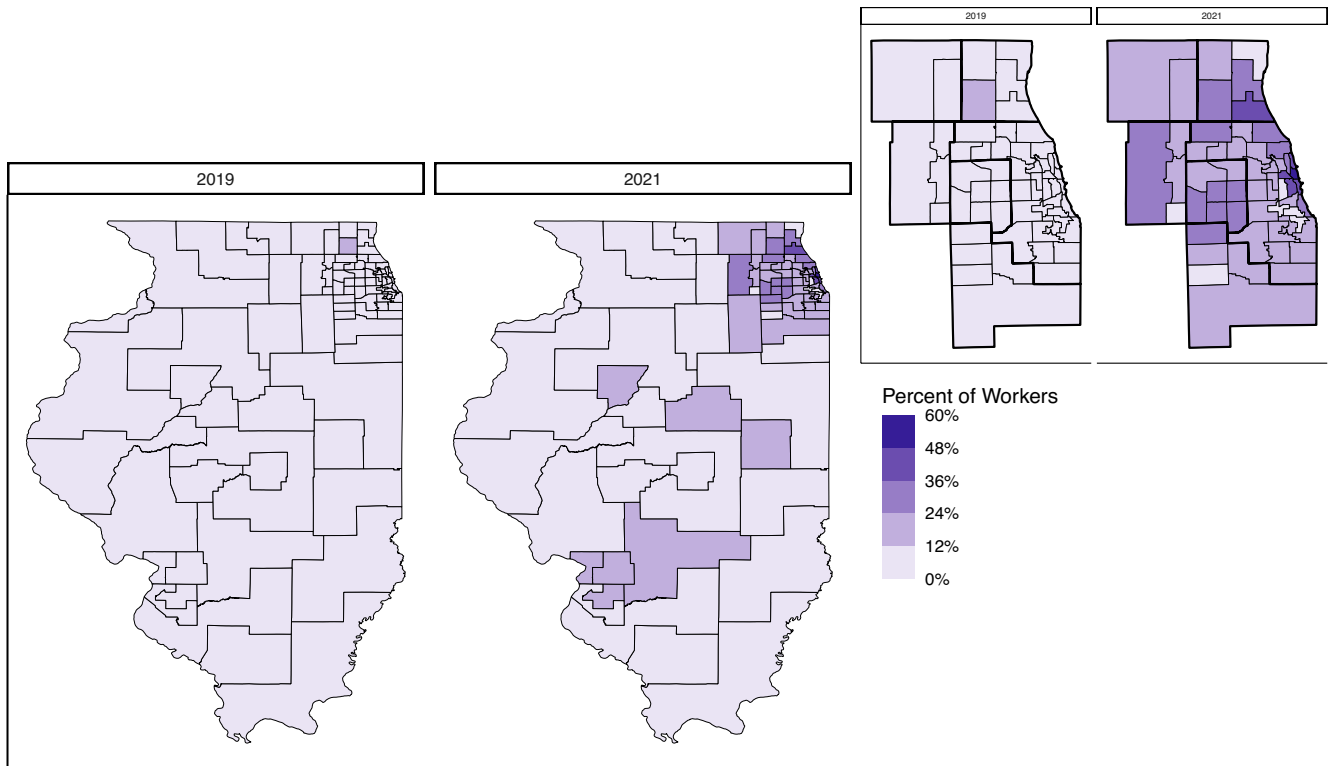
We can also observe the geographic variation in WFH across Illinois. **Figure 4** shows the percentage of WFH workers in each county. Counties that experienced the largest shift in the make-up of commuters and non-commuters included Cook, McLean, and DuPage County with around 20% of their labor force shifting to working from home. Rock Island, La Salle, and Macon Counties had very low work from home rates of around 2% or less of its labor force in 2019 but experienced varying shifts in commuting habits in 2021. Interestingly, Kankakee County had one of the highest proportions of remote workers pre-pandemic but experienced almost no increase in WFH workers during the pandemic. A potential explanation could be that Kankakee has a much larger share of workers with occupations involving production and transportation, which were less able to shift to working from home. On average, counties (in gray) had 8.3% of their labor force working from home and counties with at least 60,000 people had 22.4% of their labor force working from home in 2021. In 2019, 4% and 5.5% of workers worked from home in those two groups of counties, respectively.

**Figure 5** shows the percentage of the labor force that did WFH for 2019 and 2021 by PUMA areas. PUMAs are geographic areas with more than 100,000 people and less than 200,000 people. They tend to follow neighborhood or county lines depending on the population density of the area. For rural areas, multiple counties may be combined into one PUMA.

Some areas in Illinois experienced over 50% of their labor force working from home while less populated areas had fewer than 10% of workers working from home. This is partly due to the sorting of occupations and economic productivity in urban and rural areas. Areas in the Northeast Illinois area surrounding Chicago had the largest increase of people working from home, with some areas going from less than 10% of their workforce working from home in 2019 to more than 30% in 2021. Certain neighborhoods in Chicago, such as Lake View and Lincoln Park, had over 50% of workers working from home in 2021. Near North Side, the Loop, Near South Side, West Town, Near West Side, & Lower West Side had around 10% remote in 2019 and over 40% remote in 2021 and

**Figure 5. Percent of Workers Who Did Work from Home in 2019 and 2021**

Remote Workers as a percent of all workers in each PUMA area. Each geographic region has between 100,000 and 200,000 people. Cook County and its surrounding counties (Lake, McHenry, Kane, DuPage, and Will) are enlarged on the right.



many other areas in Chicago had over a third of their workers working from home. The Western side of Kane County went from 5% to over 30% of the labor force working from home; by contrast, Aurora Township saw only a nine-point increase, from 2% to 11% of workers working remotely. The East side of Kane County containing St. Charles, Batavia, and Geneva Townships experienced a much smaller increase in workers working from home in 2021 compared to those in the surrounding area.

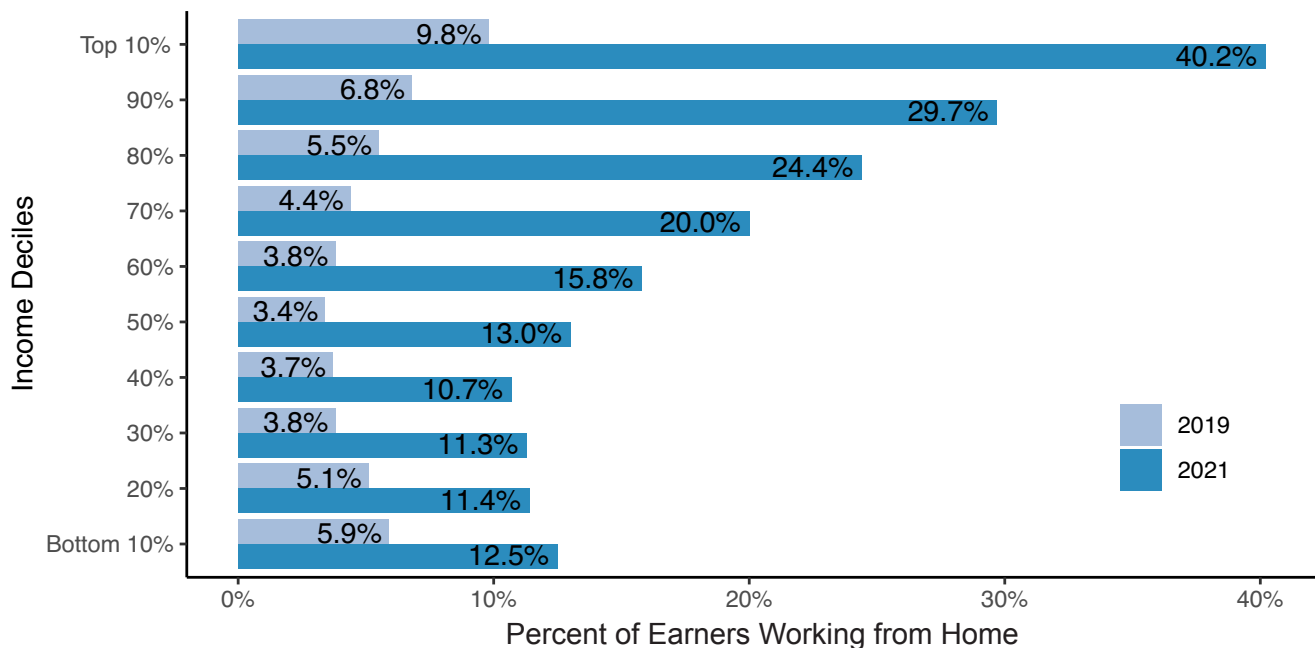
All counties along the Illinois-Indiana border saw very little change in commuting habits. Before and after COVID-19, less than 5% of the workforce worked from home. Kankakee, Douglas, Edgar, and Cole counties were some of the few areas that experienced very little change in remote work. Livingston, Ford, Iroquois, Vermilion, Jo Daviess, Carroll, Whiteside, and Lee Counties and the entire South and Southeast section of Illinois experienced less than 2% of their workers shifting to remote work.

Across both years, there were more workers working from home in the highest income deciles than in the middle or lower deciles. Working from home became more prevalent across all incomes in 2021 compared to 2019, however, the share of WFH in 2021 became less evenly distributed and occurred more often for those earning higher incomes. For example, among the highest earning workers, about 40.2% worked from home in 2021 compared to 9.8% in 2019 (See Figure 6).

Income is highly correlated with certain occupations that were more able to shift to working from home. For example, management, business, science, and arts experienced large increases in the percent of people working from home.<sup>10</sup> The majority of those that did work from home in the bottom 10% of earners had management, business, sales, or office jobs, specifically tutors, secretaries, and administrative assistants. We note that with currently available data it is too early to determine whether 2021 represents the long-term situation.

Figure 6. Working From Home by Earned Income Deciles

Data: 2019 and 2021 1-year ACS sample. Sample includes all workers in the labor force aged 16 and older. Income is based on total earned income (INCEARN) of survey respondents. Whether someone WFH or not was based on data involving methods of transportation to the worksite (TRANWORK).



<sup>10</sup> Supporting figures in Appendix Item 2. Information on Occupation Categories from IPUMS US can be found here: <https://usa.ipums.org/usa/volii/occtoooccsoc18.shtml>



The ability to work at home is largely based on the onsite requirements of a profession. However, examining who did or did not work from home in occupations that should have been able to work from home has value. Who was given additional flexibility in their schedule?

### OCCUPATIONS AND GEOGRAPHY

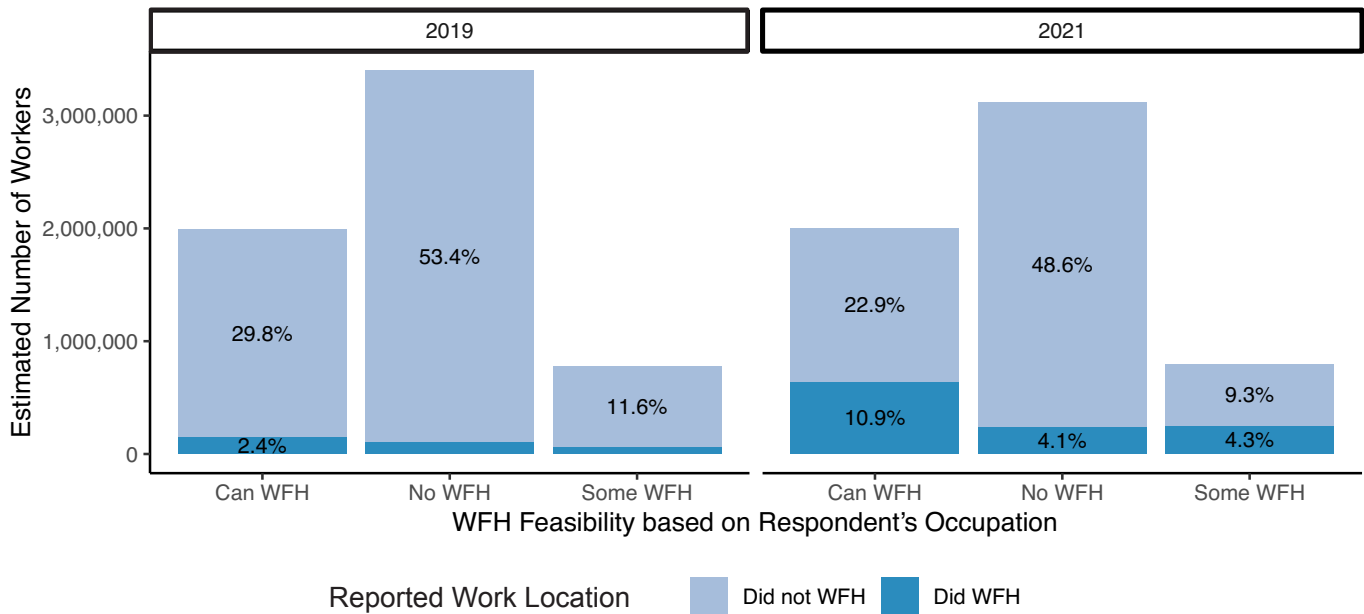
While the biggest changes were concentrated in more heavily populated areas, several downstate counties saw increases of 10% or more in their proportion of the labor force working from home (See Figure 4 & Figure 5). Montgomery, Bond, Clinton, Fayette, and Effingham Counties (located in PUMA 00501) and Stephenson and Ogle Counties (PUMA 02700) experienced an additional 8.9% and 5.2% of their labor force working from home in 2021. These regions with relatively larger increases in WFH workers all have higher proportions of management and administrative occupa-

tions than counties or PUMAs that experienced little change in people working from home.

In 2021, at least one third of those who could feasibly work from home did in fact work from home (See Figure 7). Even if one is allowed the option to work at home, there are some factors that influence who does so. For example, McLean County and Champaign County both had large percentages of workers who could feasibly work from home and did end up working from home. Champaign County had one of the highest percentages of workers who should feasibly be able to work from home and experienced over 10% of workers shifting to remote work in 2021. Over 50% of the jobs in Champaign County are management, business, office and administrative support, or sales related occupations, which supports the relationship between WFH feasibility and actually working from home.

Figure 7. Workers that Did WFH by WFH Feasibility: 2019 vs 2021

Similar numbers of workers were in occupations in 2019 and 2021. Of those that could WFH in 2021, 1/3rd did report WFH in 2021 compared to less than 1/10th of workers with WFH feasibility in 2019. Data: 2019 and 2021 1-year ACS sample. Sample includes all workers in the labor force aged 16 and older. See Appendix Item 1 for additional details regarding coding of WFH Feasibility and Reported Work Location.





## GENDER & HOUSEHOLD DYNAMICS

In Illinois, the labor force is 52% male and 48% female but more than half of WFH employees were women.<sup>11</sup> In 2019, WFH rates were nearly equal between men and women: around 2.6% each for a total of 5.3% of the labor force. In 2021, 10.0% of the workforce were women working from home compared to 9.2% of male workers WFH (19.2% combined). Women worked at home at a higher rate than men when considering the proportion of the labor force that is made up of women. Are differences in WFH probabilities associated with differences in occupations, gender differences, both, or something else?

To partially answer this question, we restrict our attention to the single occupational category of management or business occupations who could feasibly work from home (i.e. 25% (23.5%) of all workers in 2021 (2019) shown in **Figure 1**). This subset of workers experienced large increases in the proportion who did WFH in 2021. Around one third of men and women in management or business occupations, regardless of having children, shifted to WFH in 2021.

**Table 2. Working from Home by Sex and Family Status**

	Women < 40 years old, Could WFH in Management or Business Occupations		Men < 40 years old, Could WFH in Management or Business Occupations	
	2019	2021	2019	2021
<b>Children &lt; 5 yrs old</b>	9%	37.1%	7.6%	40.6%
<b>No Children &lt; 5 yrs old</b>	5%	34.4%	7.2%	40.5%

*Data: ACS 2019 and 2021 1-year samples. Percentages calculated from the subset of workers who could feasibly work from home in management or business occupations (See Figure 1).*

An additional complicating factor involves working while parenting young children. When comparing women under the age of 40 in this occupational category, women with children under five were slightly more likely to work from home compared to women without children under the age of five in 2019 and 2021. Men with children under

five were not more likely to work from home than those without young children during both years. Overall, it appears that women with children were slightly more likely to WFH than women without children in both years. By 2021, men were more likely to work from home, whether or not they had young children.

<sup>11</sup>Based on 2021 1-year American Community Survey response of "in the labor force" in the ACS for the variable LABFORCE: 9.25% WFH men + 10% WFH women = 19.25% of people who worked from home.

## ACCESS TO INTERNET

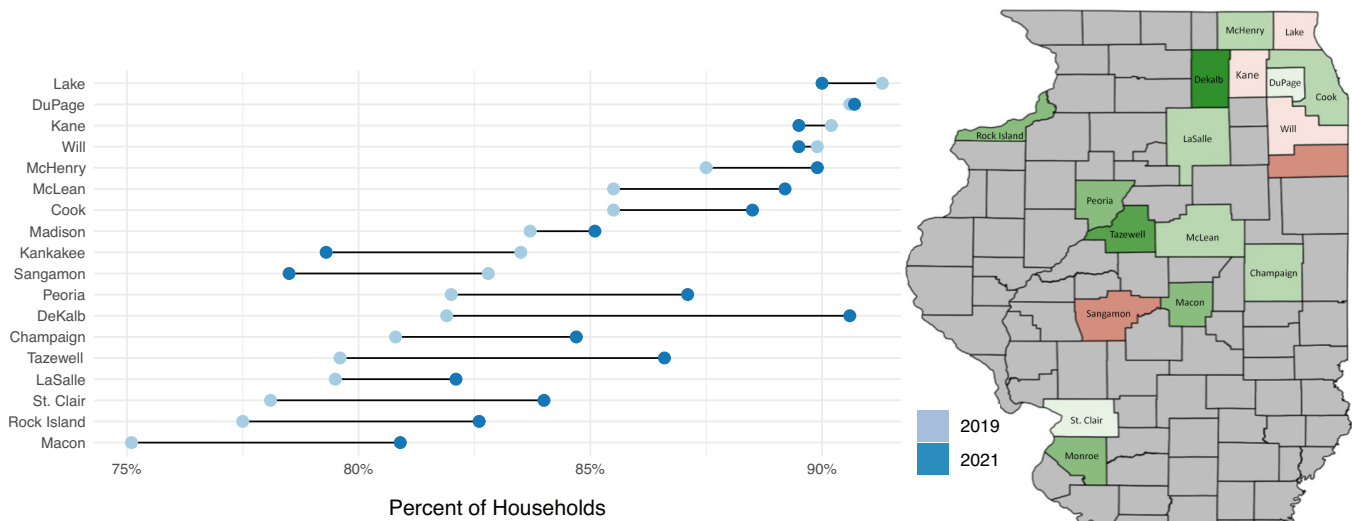
High speed internet, or broadband, is considered any download speed faster than 25 megabits per second (Mbps), but the Federal Communications Commission (FCC) recommends that 100 Mbps be considered minimum broadband speed. If more than one person in a household is trying to use the internet for online meetings, then 25 Mbps is usually not enough. Based on the ACS individual level data, essentially all workers who worked from home had access to the high-speed internet within their own homes. Having access to the internet, especially high-speed internet, is a necessity for many workers who work from home. While we cannot establish a causal relationship, we can say that the increase in workers working remotely was seen almost exclusively in households that had access to high-speed internet in their homes. 5% of residents had high speed internet and worked from home in 2019 (<1% worked from home and had internet that was not

high-speed); this increased to 18.1% of the population having high-speed internet at home in 2021 (with <1.5% of the population working from home with internet that was not considered “high speed”).

There were increases in internet access of some sort within the home in nearly all PUMA regions and all counties. There was also a decrease in numbers who lacked access to the internet for almost all geographic regions in Illinois and a corresponding increase in households that had high speed internet. 84.2% of the labor force had access to high-speed internet in 2019; this increased to 86.3% of the labor force in 2021. Work from home mandates may have forced people either to acquire or to upgrade their internet services to maintain their job. While most people have internet that meets the ACS’s definition of “high speed,” it is likely that many households do not have internet that can support multiple people on video calls or online classes at the same time.

**Figure 8. Change in Access to High-Speed Internet**

Counties in gray have fewer residents than necessary for individual level data to be reported in 1-year survey estimates. Internet speed based on the ACS variable CHISPPEED.



## CONCLUSION

The impact of WFH on Illinois's workforce largely tracks the trends across the country, with a significant increase in the share of remote workers in the labor force after the pandemic. The ability to WFH differs based on occupational characteristics as Dingel and Nieman have shown. In Illinois, the distribution of these occupations and industries across counties shapes who can and who does work from home. Counties in northeastern Illinois saw the greatest increases in WFH prevalence. Those in management, business, sales, and office jobs make up most of the occupations with WFH feasibility. Following the pandemic, the increase in WFH was largely concentrated among workers who were in these occupations and upper income deciles. Those in lower income deciles were in less WFH feasible occupations and were less likely to WFH.

While not all who can work from home actually do work from home, feasibility is still a significant factor. A large proportion of those who can work from home are now actually working from home in Illinois. This added flexibility to one's schedule helps with work-life balance and decreases time, money, and stress spent commuting to work. In addition, the wage disparities between the types of jobs where WFH is feasible further separate classes of workers and influences money spent and tax revenue collected.<sup>12</sup> WFH is here to stay and is likely to continue with many workers, especially in more populated areas with higher concentrations of technology-based occupations



where WFH is more feasible. We must continue to track Illinois labor force WFH trends to better understand its lasting implications on topics ranging from government tax revenue to economic disparities.

Addressing these topics requires a multifaceted approach involving policymakers, employers, and society as a whole. It involves promoting equitable access to remote work opportunities, investing in infrastructure and resources for remote work, ensuring fair compensation for essential workers, and providing support for workers who are unable to work remotely through measures like affordable transportation and improved work conditions.

<sup>12</sup> Funderburg R, Kriz K, Merriman D, Wu. Y (2023) provide analyses of the impact of WFH on tax revenue in Illinois.

## REFERENCES

Barrero JM, Bloom N, Buckman S, & Davis S. SWAA April 2023 Updates. Work from Home Research [Internet]. 2023. [cited December 4, 2023] Available from: <https://perma.cc/CD94-HT9E>

Barrero JM, Bloom N, Buckman S, & Davis S. Benchmarking SWAA Estimates of the Prevalence of Working from Home. Work from Home Research. [Internet]. 2023. [cited December 4, 2023] Available from: <https://perma.cc/B4N3-3TCT>

Dingel J, Neiman B. (2020). How Many Jobs Can Be Done at Home? NBER Working Paper. [Internet]. 2020. [cited December 4, 2023] Code and data available from: <https://github.com/jdingel/DingelNeiman-workathome>.

Funderburg R, Kriz K, Merriman D, Wu. Y. Effects of Post-COVID Work from Home on the Spatial Distribution of Local Government Revenues in Illinois. Mun. Fin. J. 2023; 44(1): 65-92.

Johal S. Out of Office: The Public Policy Implications of Remote Work. CSA Public Policy Centre. [Internet]. 2023. [cited December 4, 2023] Available from: <https://perma.cc/9KZY-2KJJ>

Marshall J, Burd C, Burrows M. Those who switched to telework have higher income, education and better health. U.S. Census Bureau, America Counts Stories. [Internet]. 2021[cited December 4, 2023] Available from: <https://perma.cc/L3L3-XHV7>

Ruggles S, Flood S, Sobek M, Brockman D, Cooper G, Richards S, et al. IPUMS USA: Version 13.0 [dataset]. [Internet] Minneapolis, MN: IPUMS, 2023. [cited December 4, 2023] Available from: <https://perma.cc/UMN7-LTLY>

Winship S, O'Rourke T. Working from Home Has Increased More Modestly Than Many Believe. American Enterprise Institute [Internet]. 2023. [cited December 4, 2023] Available from: <https://perma.cc/YU9P-XZVX>

## APPENDIX ITEMS

### Appendix Item 1. Detailed Methodology

This section explains how the constructs of “WFH Feasibility” and “WFH Occurrence” were derived in greater detail. All data, replication code, and additional graphs can be found on GitHub at <https://github.com/AleaWM/WorkFromHome>.

#### Construct: Work from Home Feasibility

WFH Feasibility is based on the methodology used by Dingel and Neiman’s (2020) working paper that assessed WFH feasibility in the USA and other countries during the early stages of the COVID-19 pandemic. Dingel and Neiman first classify the WFH feasibility for all occupations in the United States using survey responses from the Occupational Information Network (O\*NET). O\*NET is an online database sponsored by the US Department of Labor and provides detailed information on types of job in the United States. Two O\*NET surveys on Work Context and Generalized Work Activities were used determine which occupations must be performed on site and which could feasibly be done at the worker’s home. For example, some information implied that a physical presence at the work site was necessary to do the job; other information showed that working closely with other individuals was necessary. Dingel and Nieman used this information to determine which occupations could feasibly be done at home and which could not. Please see Dingel and Neiman’s (2020) section on “Classification of Occupations” for more details on survey questions used to assign “teleworkable” scores to occupation codes. The authors created a publicly available file with 968 O\*NET occupations with their assigned value of 0 (WFH not feasible) or 1 (WFH is feasible) to indicate an occupation’s WFH feasibility.

Occupations in O\*NET are given an 8-digit, detailed version of the Standard Occupational Classification (SOC) system structure. The ACS and Bureau of Labor Statistics use a 6-digit version of the SOC-based 2018 occupation codes. As can be seen in Figure 1, there are cases in which multiple O\*NET occupations map to a single occupation code used by the ACS. For these codes, we average the feasibility scores of the 8-digit O\*NET occupations to create a 6-digit occupation code that matches the ones used by the ACS. This creates values ranging from 0 to 1; values between 0 and 1 were labeled as “Some WFH feasible” to indicate that some occupations feasibly could be done at home and others could not. Those occupations can be grouped into 23 major groups using the first 2 digits of their occupation code.

**Figure 1.** Example of 8-digit O\*NET occupation codes. These would be assigned a value of 0 or 1, and then averaged together to create a 6-digit teleworkable score for occupation 113071.

11-3051.00	<a href="#">Industrial Production Managers</a>
11-3051.01	<a href="#">Quality Control Systems Managers</a>
11-3051.02	<a href="#">Geothermal Production Managers</a>
11-3051.03	<a href="#">Biofuels Production Managers</a>
11-3051.04	<a href="#">Biomass Power Plant Managers</a>
11-3051.06	<a href="#">Hydroelectric Production Managers</a>
11-3061.00	<a href="#">Purchasing Managers</a>
11-3071.00	<a href="#">Transportation, Storage, and Distribution Managers</a>

**Figure 2.** Bureau of Labor Services occupations using a 6-digit identifier. Image is a screen capture from [https://www.bls.gov/oes/current/oes\\_stru.htm](https://www.bls.gov/oes/current/oes_stru.htm).

#### 11-0000 Management Occupations

- 11-0000 [Management Occupations](#)
  - 11-1000 [Top Executives](#)
    - 11-1010 [Chief Executives](#)
      - 11-1011 [Chief Executives](#)
    - 11-1020 [General and Operations Managers](#)
      - 11-1021 [General and Operations Managers](#)
    - 11-1030 [Legislators](#)
      - 11-1031 [Legislators](#)
  - 11-2000 [Advertising, Marketing, Promotions, Public Relations, and Sales Managers](#)
    - 11-2010 [Advertising and Promotions Managers](#)
      - 11-2011 [Advertising and Promotions Managers](#)
    - 11-2020 [Marketing and Sales Managers](#)
      - 11-2021 [Marketing Managers](#)
      - 11-2022 [Sales Managers](#)
    - 11-2030 [Public Relations and Fundraising Managers](#)
      - 11-2032 [Public Relations Managers](#)
      - 11-2033 [Fundraising Managers](#)
  - 11-3000 [Operations Specialties Managers](#)
    - 11-3010 [Administrative Services and Facilities Managers](#)
      - 11-3012 [Administrative Services Managers](#)
      - 11-3013 [Facilities Managers](#)
    - 11-3020 [Computer and Information Systems Managers](#)
      - 11-3021 [Computer and Information Systems Managers](#)
    - 11-3030 [Financial Managers](#)
      - 11-3031 [Financial Managers](#)
    - 11-3050 [Industrial Production Managers](#)
      - 11-3051 [Industrial Production Managers](#)

## Expanded Work from Home Feasibility Codes

When merging Dingel and Neiman’s file of occupation codes with ACS occupation codes, there were many unmatched occupations which limited the sample size of respondents that had occupation data at the individual level. Some unmatched values were due to new SOC codes that began to be used in 2018, others were due to the ACS data aggregating to 4-digit SOC codes (e.g. 5140XX) to protect respondent anonymity in occupations with few workers. In order to better assess one’s ability to work at home based on their job requirements, we added additional occupation codes and teleworkable scores to Dingel and Neiman’s WFH feasibility classification and then merged the updated classifications with the Illinois ACS data.

Occupation codes for Illinois workers that did not match were identified and manually given “teleworkable” codes based on similar occupation codes and job title or O\*NET survey responses (as was done for Dingel and Neiman’s original teleworkable scores). Additional occupation codes not included in Dingel and Neiman’s coded occupations were also added by comparing the most recent list of current and past occupation codes according to the 2018 SOC for 2018-onward and identifying occupation codes that had changed.<sup>13</sup> Using only the codes provided by Dingel and Neiman resulted in 331 unique occupation codes matching for 31,563 observations. Our expanded occupation codes resulted in 520 unique occupation codes matching 61,234 observations.

Occupation Code	Description	Aggregated 2-digit codes	5 categories	Broadest categories of occupations used by BLS
11, 13, 15, 17, 19, 21, 23, 25, 27, 29	Management, Business, Science & Arts	Aggregated 2-digit codes	5 categories	Broadest categories of occupations used by BLS
11	Management Occupations	2-digit categories	23 categories	
113050	Industrial Production Managers	First 5 digits + 0 at end. Aggregates all 6 digits with same first 5 digits.	463 codes	Manually scored by researchers to compare to teleworkable scores assigned from BLS characteristics
113051	Industrial Production Managers	BLS 6 digits	764 codes	0 or 1 by D&N
11-3051.01	Quality Control Systems Managers	ONET 8 digits	968 codes	
.....				
11-3051.06	Hydroelectric Production Managers	ONET 8 digits	968 codes	
1130XX		4 digits, Comparable to 113000	Created to match more observations in ACS data	
11305X		5 digits, Comparable to 113050	Created to match more observations in ACS data	

<sup>13</sup> OCCSOC reports an individual's primary occupation, classified according to 2018 Standard Occupational Classification (SOC) for 2018-onward. [https://usa.ipums.org/usa-action/variables/occsoc#description\\_section](https://usa.ipums.org/usa-action/variables/occsoc#description_section)

After merging our expanded WFH classification to the Illinois ACS data, 55% of them cannot be performed at home, 31.8% of them can be performed at home, and 13.2% of occupations have less clear designations and scores between 0 and 1 indicating that some of the jobs that had been combined into a 6-digit code used by the ACS should be able to be done at home.

**Table 2** below shows the WFH feasibility in Illinois based on our updated classification. According to Table 2, individuals who may be able to work from home in Illinois based on likely job requirements are around 30% of the labor force in both 2019 and 2020.

**Table 2. Summary Statistics for Work from Home Feasibility: 2019 & 2021**

	Population Estimate		Percent of Labor Force		Observation Count	
	2019	2021	2019	2021	2019	2021
<b>WFH not feasible</b>	3,734,527	3,581,686	56.9%	55.0%	34,844	34,087
<b>WFH feasible</b>	2,005,835	2,074,934	30.5%	31.8%	20,269	20,556
<b>Some WFH feasible</b>	827,508	859,373	12.6%	13.2%	8,101	8,272
<b>Total</b>	6,567,867	6,515,993	100.0%	100.0%	63,214	62,915

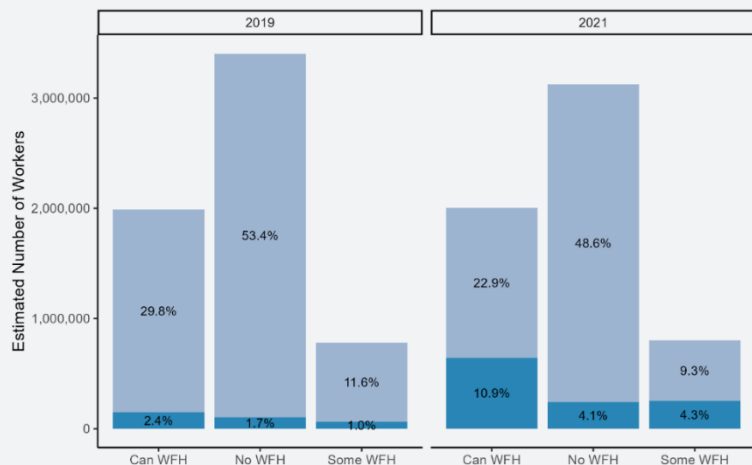
*Includes Illinois individuals in the labor force whose age begins from 16. WFH feasibility calculated with O\*NET & BLS survey responses for detailed occupations and their job requirements. Items with a "Some WFH Feasible" represent 6-digit occupation categories used by the ACS containing values a mix of 8-digit BLS occupation codes coded where some occupations are coded as "WFH Feasible" and others are coded as "WFH not Feasible." A value between 0 and 1 is created when aggregated to six digits and is labeled as "Some WFH Feasible."*

**Table 3** and **Figure 3** show the comparison between WFH feasibility and those who did WFH in 2019 and 2021. We find that in 2019, 1.7% of Illinois individuals are classified as being in occupations that cannot be done from home but they in fact have worked at home. 2.4% of Illinois individuals are classified as being able to work from home and did work at home.

In 2021, 4.1% of Illinois individuals are in occupations where WFH was coded as not feasible but they did work from home. 10.9% of Illinois individuals are classified as being able to work from home and they have indeed worked at home.

**Figure 3. Workers Who Did WFH by WFH Feasibility: 2019 and 2021**

WFH Feasibility based on Dingel & Niemen (2020) occupation classification and BLS occupation categories. Data for if one did WFH is from ACS 1-year samples for 2019 and 2021.





**Table 3. Comparison Between WFH Feasibility and Workers who Did WFH in 2019 and 2021**

	2019				2021			
	WFH Feasible	Some WFH feasible	WFH Not Feasible	Row Totals	WFH Feasible	Some WFH Feasible	WFH Not Feasible	Row Totals
<b>Did not WFH</b>	18,423 (29.8%)	7,094 (11.6%)	30,664 (53.4)	56,181 (94.7%)	13,594 (22.9%)	5380 (9.3%)	27,599 (48.6%)	46,573 (80.8%)
<b>Did WFH</b>	1,484 (2.4%)	596 (1.0%)	971 (1.7%)	3,051 (5.3%)	6,217 (10.9%)	2,370 (4.3%)	2,255 (4.1%)	10,842 (19.2%)
<b>Column Totals</b>	19,907 (32.2%)	7,690 (12.9%)	31,615 (55.1%)	59,232	19,428 (33.8%)	7,699 (13.6%)	7,818 (52.7%)	57,415

*Illinois individuals in the labor force whose age begins from 16. WFH Feasibility calculated with O\*NET & BLS survey responses for detailed occupations and their job requirements. "CanWorkFromHome" variable in R code. Items with a 2 imply jobs coded with values between 0 and 1 due to aggregating detailed 8-digit occupation codes to 6-digit occupation codes used by the ACS.*

**Construct: Did Work from Home**

Our main analysis is performed at the individual level using IPUMS USA (Integrated Public Use Microdata Series) data from 2019 and 2021 American Community Surveys (ACS) for all Illinois residents. Summaries calculated using individual level data were compared to ACS Detailed Summary Tables when possible during the analysis as intermediate robustness checks. The summary level ACS data closely align with the individual level ACS data on WFH.

The variable *did\_wfh* is a binary variable created from *TRANWORK* to indicate whether someone did or did not work from home. "*did\_WFH*" was created by recoding all forms of transportation as 0 and responses where an individual worked from home as 1. We use the *PERWT* to obtain the population-level estimate. If respondents did not answer *TRANWORK*, they were dropped from the analysis. In 2021, there were 58,085 observations representing a 5,972,987 person workforce aged 16 and above. In 2019, there were 59,979 observations representing a 6,213,391 person workforce in Illinois.

**Table 4** below shows summary statistics for *did\_WFH*, the recoded form of *TRANWORK*, after excluding individuals who respond to the survey question. Before the pandemic, individuals that worked from home made up 5.3% of Illinois' labor force; after COVID-19 individuals that worked from home increased to 19.2% of the labor force.

Table 4. Summary Statistics for WFH Indicator in 2019 and 2021						
	Weighted Count		Weighted Proportion		# of Observations	
	2019	2021	2019	2021	2019	2021
<b>Did not WFH</b>	5,886,440	4,828,057	94.7%	80.8%	56,809	47,168
<b>Did WFH</b>	330,796	1,149,074	5.3%	19.2%	3,219	10,959
<b>Total</b>	6,217,236	5,977,131	100.0%	100.0%	60,028	58,127

*Includes Illinois individuals in the labor force, 16 years and older. Uses ACS variable TRANWORK which asks respondent how they got to work. Totals exclude individuals who did not report their method of transportation to work.*

<sup>14</sup> According to IPUMS ACS, tranwork reports a respondent's primary means of transportation to work on the most recent day worked or over the course of the previous week. See Appendix 3 for the question design. [https://usa.ipums.org/usa-action/variables/TRANWORK#description\\_section](https://usa.ipums.org/usa-action/variables/TRANWORK#description_section)

### Additional Variables Used

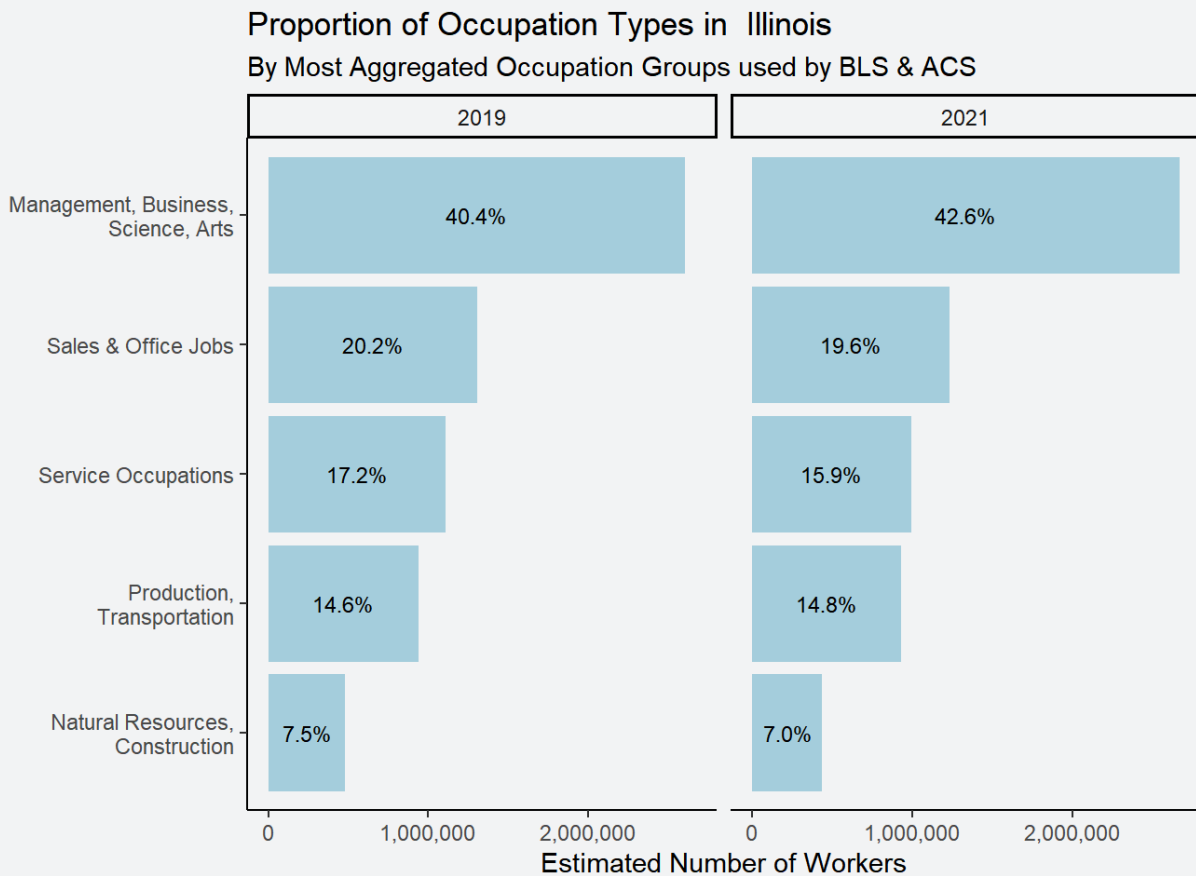
**Income:** This study used INCEARN to create earned income deciles. INCEARN includes all salary, wages, and business income.

**Internet Access:** Can be measured with CINETHH which measures a household's access to internet (At home, somewhere else, or no access) or CHISPEED which asks about what type of internet they have. Only counties with more than 100,000 residents are reported with IPUMS responses.

### Appendix Item 2. Work at Home Feasibility - Detailed Occupations

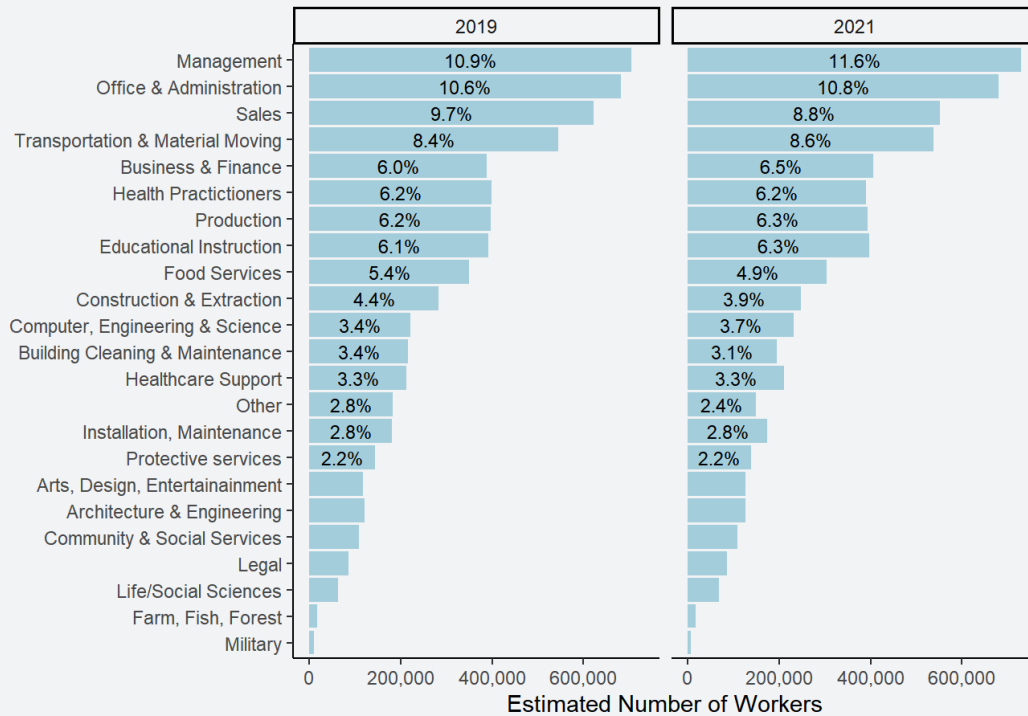
*Figure 1. Occupations in Illinois*

ACS 1-year samples for 2019 and 2021 used for weighted population estimates. Military occupations make up less than 0.5% of the labor force and were removed from the graph. Occupation categories are based on broadest aggregated BLS categories used by the BLS.



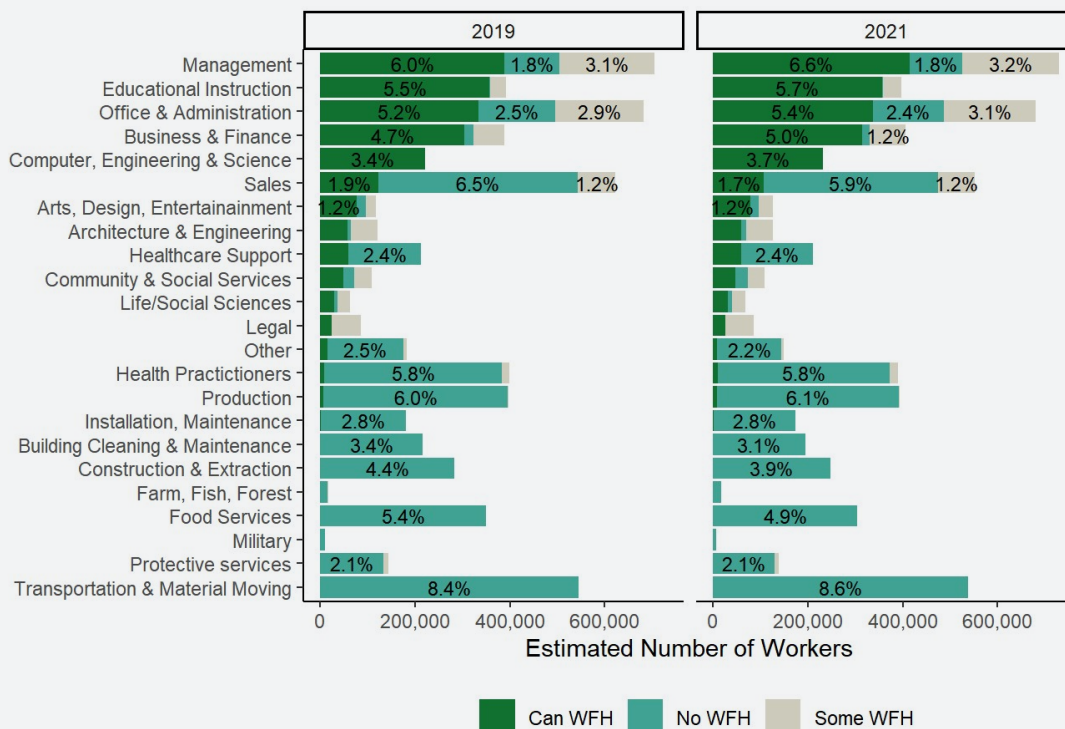
**Figure 2. Work From Home Feasibility by Occupation Type**

ACS 1-year samples for 2019 and 2021 are used for weighted population estimates. Occupation categories based on first 2 digits of OCCSOC occupation codes. Labels for occupations that make up less than 2% of the workers were not labeled for legibility reasons.



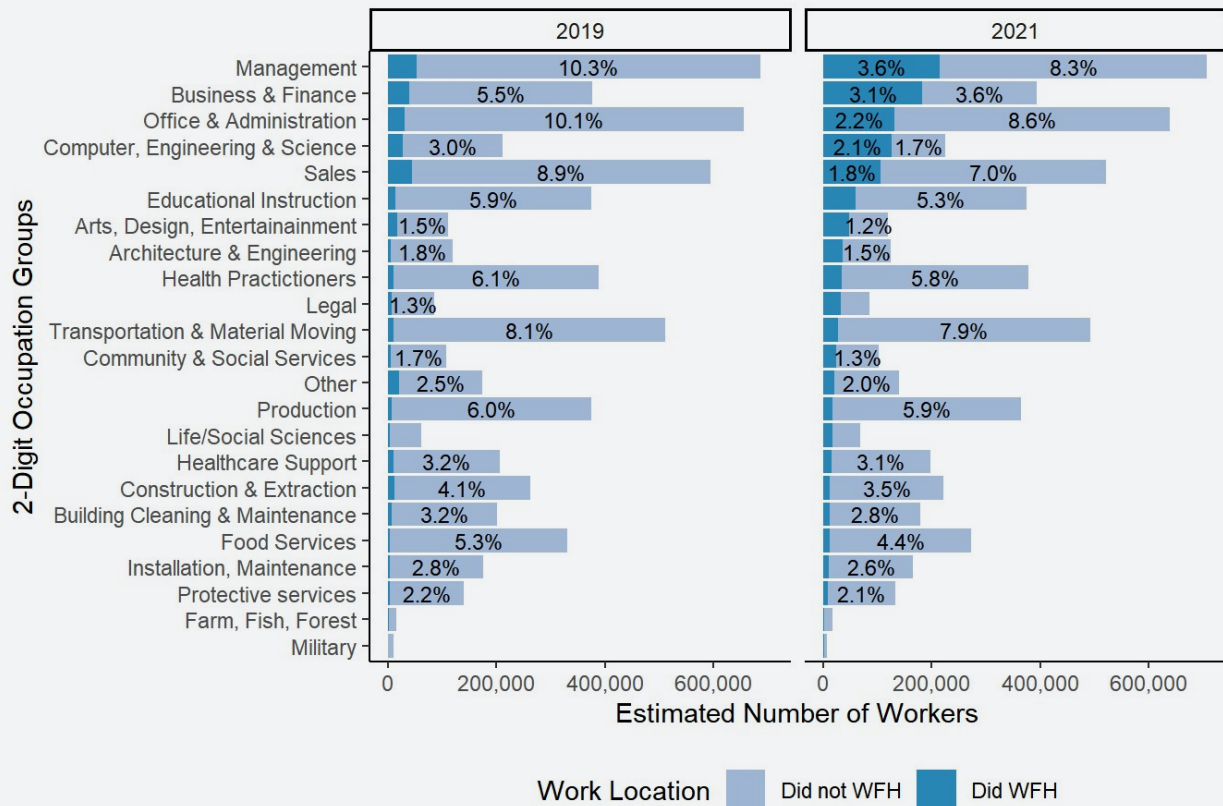
**Figure 3. Work from Home Feasibility for Occupations in Illinois**

OCCSOC codes and Teleworkable scores from occupation characteristics. 11.6% of all workers in Illinois had management occupations (6.6 Can WFH + 1.8 No WFH + 3.2 Some WFH in 2021). 6.6% of all workers in Illinois had management occupations and could feasibly WFH. ACS 1-year samples for 2019 and 2021 were used for weighted population estimates.



**Figure 4. Occupations in Illinois and Percent of Workers that Did Work From Home**

ACS 1-year samples for 2019 and 2021 used for weighted population estimates. Graph interpretation: 3.6% of all workers in the labor force in 2021 were in Management occupations and worked from home. 8.3% of all workers were in management and did not work from home. Workers in Management occupations make up 11.9% of the entire workforce.



### Appendix Item 3. Survey Questions

#### *Exact Survey Questionnaire Wordings*

9. At this house, apartment, or mobile home - do you or any member of this household have access to the internet?
- Yes, by paying a cell phone company or Internet service provider
  - Yes, without paying a cell phone company or Internet service provider -> SKIP to question 11
  - Not very likely
10. Do you or any member of this household have access to the Internet using a broadband (high speed) Internet service such as cable, fiber optic, or DSL service installed in this household?
- Yes
  - No
32. How did this person usually get to work LAST WEEK? Mark (X) ONE box for the method of transportation used for most of the distance.
- Car, truck, van
  - Bus
  - Subway or elevated rail
  - Long-distance train or commuter rail
  - Ferryboat
  - Taxicab
  - Motorcycle
  - Bicycle
  - Walked
  - Worked from home
  - Other method

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#### *Publisher's Note*

Any opinions expressed herein are those of the authors and not necessarily those of the Institute of Government and Public Affairs, the author's employers, or the University of Illinois System.

#### **Photographs**

Mast - Chicago cityscape - Elena Sivitskaia, stock.adobe.com, Illinois State Capitol Dome - Frame from video at <https://www.youtube.com/watch?v=F2wPy7DfXfQ>, Capitol Dome at Dusk - Frame from Adobe Stock video file 187821651, by VIA Films

Pg. 2 - Man at standing desk home office talking on business video call, #1401737961 by martin-dm, istockphoto.com

Pg. 3 - Video call, online conference. Over shoulder view of african american man at computer screen with multi-national group of successful business people, virtual business meeting, work from home concept, #1314080931 by Kateryna Onyshchuk, istockphoto.com

Pg. 10 - African girl in wireless headphones sitting at the table in front of the laptop and making notes, she studying at home, #1369279540 by AnnaStills, istockphoto.com

Pg. 12 - New reality - working from home with pets and kids, #1235601598 by Drazen\_, istockphoto.com

Pg. 20 - Traffic driving into Downtown Chicago, #527462607 by ghornephoto, istockphoto.com