CHOICES

AAEA Agricultural & Applied Economics Association

Volume 37. Quarter 3

What Does COVID-19 Mean for the Workplace of the Future?

David W. Hughes, David Willis, and Harry Crissy

JEL Classifications: R1
Keywords: COVID-19, Rural and urban economies, Telecommuting

After 18 months of isolated, at-home work, it was widely anticipated that the workforce would enthusiastically return to the office and factory following the end of most COVID-19 workforce restrictions. However, as shown in Figure 1, the normally bustling District of Columbia Metro Center Station was far from crowded at 9 am Tuesday, September 7, 2021, the day after the Labor Day holiday weekend. Why wasn't the Metro station packed during peak hours?

We argue that the COVID-19 pandemic caused many U.S. workers to reassess their work status and the nature of their work, especially as regards working in an office or factory versus telecommuting (working from home). These reassessments are likely having a lasting impact on the U.S. labor market. Accordingly, we investigate some of the factors that likely affected the likelihood of Pennsylvania workers telecommuting during the COVID pandemic over a 9-month period (May 2020–January 2021). Among our findings, occupation, industry, education, and rural versus urban residency help explain who telecommuted and who did not.

Other Work

Little analysis centers on telecommuting due to COVID. Bick, Blandin, and Merterns (2021) examined the shift to home-based work in May 2020 and found that COVID-based telecommuters were likely to be well-educated, white, and higher income. They also indicated that worker occupation and industry were important influences in the work-at-home decision. Dey et al. (2021) reported differences in COVID-based telecommuting by occupation classification and employee demographics. Albanesi and Kim (2021) examined COVID's impact on the U.S. labor market and reported less work and less looking for work by women due to in-person schooling and reduced access to childcare. Mongey, Pilossoph, and Weinberg (2020) examined the impact of social distancing policies and found that more economically vulnerable (e.g., lower income, less educated) workers were more likely to experience job loss as a result. Others have examined telecommuting before COVID. Gallardo and Whitacre (2018) contended that telecommuting is a benefit for local economies, with positive spillovers to neighboring areas, while Conroy and Low (2022) argued that improved broadband access results in increased rates of new business establishments, especially for women-owned businesses. Dingel and Neiman (2020) found that workers in better paid occupations are more likely to telecommute, while Lund et al. (2020) argue that better educated workers are more likely to do so. However, Frazis (2020) found that women were less likely to telecommute.

Numerous popular press articles have speculated on the likelihood of "the return to the office" once the pandemic eases, given the flexibility that telecommuting provides (Banister, Schenke, and Barragan, 2021, and Schenke, 2021, for example). This information, along with office occupation rates for major metropolitan areas (see the "Kastle Back to Work Barometer," 2022, for example), shows that workers have not returned to the office at anything close to pre-COVID levels. Therefore, we believe that work in general will likely become more virtual on a permanent basis, with many workers engaging in a "mixed" telecommuting work schedule that allows them to travel to the office 1–3 days a week. Because of these changes, we believe that our results speak not only to the impact of COVID on telecommuting patterns but also to emerging new work patterns in a post-COVID world.

Our Analysis

Our primary data source is the Monthly U.S. Labor Force Survey, part of the Current Population Survey Microdata (the same dataset used by Dey et al., 2021, in their analysis). In our case study, the data are limited to workers living in Pennsylvania. The data were accessed through the Integrated Public Use Microdata Series (IPUMS-CPS). Using monthly data from May 2020 through January 2021, we examined whether an individual telecommuted at all that month, as possibly explained by whether they lived in a city versus a rural community, and their family income, race, educational attainment, and marriage, military veteran, and

Figure 1. District of Columbia, Metro Center Station, 9AM 9/7/21

Source: Banister, Schenke, and Barragan (2021).

citizenship status. Number of children and the number of children under 5 years of age in single-parent households were also included, as was family type (whether they are a traditional family or a nonfamily living together), whether their place of work was closed at any time that month due to COVID, whether the worker had more than one job, and month. Worker occupation and industry were also included, with each converted to a telecommuting likelihood value based on Dingel and Neiman (2020) for the former and Lund et al. (2020) for the latter. We limited our analysis to the top two wage earners in a given household, excluding workers who made only minor contributions to household income.

Results

Among the 9,018 observations, 2,618 (29%) reported telecommuting due to COVID-19. We considered major arguments (hypotheses) regarding location (metropolitan or urban versus rural) as well as the influence of family income, gender, education, and age of the respondents (Table 1). Being a city resident, having higher family income, being female, and having more formal information was expected to positively impact the probability of telecommuting because of COVID, while age was expected to have a negative influence. Working in an industry or an occupation more prone to telecommuting was felt to have a positive influence on telecommuting. We had no idea how the number of children in a household would affect telecommuting, but single parents with children under 5 were expected to be less likely to telecommute due to COVID because of their home childcare responsibilities.

Our analysis tended to confirm these hypotheses (Table 1). Being a resident of a metropolitan area versus a rural area increased the probability of telecommuting due to COVID by 20.8%, while household income and age had a slight positive and a slight negative influence, respectively. Both being a woman or having more formal education had moderate positive impacts on the probability of telecommuting. Not surprisingly, industry and occupation were important drivers in the likelihood of workers telecommuting due to COVID. A 1-percentage-point increase in the occupation telecommuting index led to a 31% increase in the probability of telecommuting due to COVID. A 1-

Table 1. Major Hypothesis (Key Variables) and Results Regarding Factors Influencing the Probability of Telecommunication Due to COVID for Pennsylvania Workers: Expected Results Versus Estimated Results

Variable	Expected Impact (Postive vs. Negative)	Estimated Impact (Postive vs. Negative)	Impact on Probability
Metropolitan	+	+	+20.8%
Family income	+	+	+0.42%
Gender (female 1)	+	+	+4.60%
Education	+	+	+4.90%
Age	-	-	-0.14%
Occupation	+	+	+31.0%
Industry	+	+	+22.3%
Children	?	Insignificant	0.00%
Single with children under 5	-	-	-8.30%

percentage-point increase in the industry telecommuting index resulted in a 22.3% increase in the likelihood to telecommute due to COVID. The presence of children in the household in general had no impact. However, there was an 8.3% decrease in the probability of telecommuting due to COVID among single parents with children under the age of 5.

We conducted a separate analysis of rural versus urban areas. Urban residents had a much higher rate of telecommuting than rural residents (31.4% vs 11.3%). Average annual urban household income is $95,488 versus $72,531 for rural households (31.7% greater). Urban households were better educated and more likely to have occupations (such as financial managers) and work in industries (such as professional services, including sectors such as legal services) that were more conducive to telecommuting. Rural areas had more single-parent households with children younger than 5.

Education, occupation, and industry were all much more important for urban than for rural areas, and neither family income nor gender were important for rural areas. These results and our overall results imply that in the short run, removing the digital divide (i.e., the lack high speed broadband in rural areas as compared to urban places) would not completely remove rural-urban differences in telecommuting levels because differences (such as better educated workers in urban areas) would remain. Additionally, industries and occupations more common in rural areas, such as farming and woodworking, offer relatively limited opportunities to telecommute. Lower levels of formal education for rural workers also imply lower rates of telecommuting, even if the lack of high speed internet is not a barrier.

We conducted another separate analysis based on gender. Overall, 33.7% of females and 24.7% of males reported working from home due to COVID. Our analysis shows that education, urban residency, and occupation were more important for females, while family income and industry were more important for males. Most telling, single females with children under five had a 11.9% lower probability of telecommuting to work due to COVID. As pointed out by a reviewer, this result perhaps speaks more to situations as opposed to preferences. Indeed, we strongly suspect that many such individuals would prefer to telework if affordable childcare were available.

Implications

We argue that our results tell something about the future of telecommuting. As expected, living in a rural area greatly reduces the chance of telecommuting. However, our results imply that not all of this difference is caused by a lack of broadband access. In particular, the nature of the workforce and the nature of their jobs are important. Male rural workers are a larger share of the rural workforce and tend to be less likely than females to telecommute due to COVID. Workers in rural areas have less formal education and so are less likely to telecommute due to COVID. Rural workers also tend to work in occupations (such as routine manufacturing) and industries (such as farming) that do not necessarily lend themselves to telecommuting.

Females were more likely to telecommute than male workers due to COVID. Our results imply that, in general, the presence of children in the household was not important. However, single parents (especially single females) with children under the age of 5 were less likely to telecommute due to the pandemic. These results speak to the need for more available childcare, especially for single women, if they are going to take advantage of virtual workplace in the future.

While our work provides some interesting findings it also calls out for further analysis. In particular, a better job of determining the location of workers and their jobs would be useful (for example, analysis based on the county of residency would provide extra insight). Another interesting area of future analysis is longer-term changes. As telecommunication becomes more accessible in rural areas, the nature of some rural places can be expected to change as telecommuting-prone workers and businesses move there. We would expect to see this happen in higher-amenity rural places and/or

those with much lower housing costs relative to higher cost urban areas. We also anticipate that the definition of what is considered a commuting zone will expand for certain industries and occupations. As work options become more virtual in nature (such as going into the office 1 or 2 days a week), commuting longer distances to urban centers might occur. Of course, telecommuting has broader implications that need to be assessed. In particular, economic impacts can be expected for city-based service providers and resource owners as well as rural communities that can anticipate growth. The effects of these changes need to be explored as part of the wider implications with respect to a changing labor market (particularly the impact of the so-called great resignation).

For More Information

Albanesi, S., and J. Kim. 2021. "Effects of the COVID-19 Recession on the US Labor Market: Occupation, Family, and Gender." *Journal of Economic Perspectives* 35(3): 3-24.

Arruda, W. 2020, May 7. "6 Ways COVID-19 Will Change the Workplace Forever." *Forbes.* Available online: https://www.forbes.com/sites/williamarruda/2020/05/07/6-ways-covid-19-will-change-the-workplace-forever/.

Banister, J., J. Schenke, and B. Barragan. 2021, September 7. "Empty Lobbies, Untouched Doughnuts and Shattered Plans: Offices Stayed Quiet the Day after Labor Day." *BISNOW*.

Bick, A., A. Blandin, and K. Merterns. 2020. "Work from Home after the COVID-19 Outbreak." CEPR Discussion Paper 15000.

Conroy, T. and S.A. Low. 2022. "Entrepreneurship, Broadband, and Gender: Evidence from Establishment Births in Rural America." International Regional Science Review 45(1): 3-35.

Desilver, D. 2020, March 20. "Before the Coronavirus, Telework Was an Optional Benefit, Mostly for the Affluent Few." *Pew Research Center*. Available online: https://www.pewresearch.org/fact-tank/2020/03/20/before-the-coronavirus-telework-was-an-optional-benefit-mostly-for-the-affluent-few/.

Dey, M., H. Frazis, D.S. Piccone, and M.A. Loewenstein. 2021. "Teleworking and Lost Work during the Pandemic: New Evidence from the CPS." *Monthly Labor Review,* July. Available online: https://www.bls.gov/opub/mlr/2021/article/teleworking-and-lost-work-during-the-pandemic-new-evidence-from-the-cps.htm.

Dingel, J.I., and B. Neiman. 2020. "How Many Jobs Can be Done at Home?" University of Chicago, Booth School of Business, NBER, and CEPR White Paper. https://bfi.uchicago.edu/wp-content/uploads/BFI_White-Paper_Dingel_Neiman_3.2020.pdf.

Flood, S., M. King, R. Rodgers, S. Ruggles and J.R. Warren. 2020. *Integrated Public Use Microdata Series, Current Population Survey: Version 8.0* [dataset]. Minneapolis, MN: IPUMS. https://doi.org/10.18128/D030.V8.0.

Frazis, H. 2020. "Who Telecommutes? Where Is Time Saved Spent?" Washington, DC: Bureau of Labor Statistics Working Paper 523, April. Available online: https://www.bls.gov/osmr/research-papers/2020/ec200050.htm.

Gallardo, R., and B. Whitacre. 2018. "21st Century Economic Development: Telework and Its Impact on Local Income." *Regional Science Policy and Practice* 10(2): 103-123.

Kastle. 2022, January 17. "Kastle Back to Work Barometer: Weekly Occupancy Report." Available online: https://www.kastle.com/safety-wellness/getting-america-back-to-work/.

Lund, S., A. Madgavkar, J. Manyika, and S. Smit. 2020, November 23. "What's Next for Remote Work: An Analysis of 2,000 Task, 899 Jobs, and Nine Countries." *McKinsey Global Institute*. https://joserobertoafonso.com.br/wp-content/uploads/2020/12/MGI-Whats-next-for-remote-work-v3.pdf.

Mongey, S., L. Pilossoph, and A. Weinberg. 2020. "Which Workers Bear the Burden of Social Distancing Policies?" National Bureau of Economic Research, Working Paper 27085, May. Available online: https://www.nber.org/papers/w27085.

Schenke, J. 2021, October 27. “Office Rethink Has Cities Skittish on the Future of Their Property Tax Revenue.” *Bisnow Atlanta*. Available online: https://www.bisnow.com/author/jarred-schenke-5711.

Author Information: David W. Hughes (dhughe17@utk.edu) is Professor and Greever Endowed Chair in Agribusiness Development, Department of Agricultural and Resource Economics, University of Tennessee, Knoxville, TN. David B. Willis (willis9@clemson.edu) is Professor in the Department of Agriculture Science, Clemson University, Clemson, SC. Harry Crissy (hjc115@psu.edu) is Community Development Agent, Penn State University Extension, University Park, PA.

Acknowledgments: We would like to acknowledge the helpful comments of the three reviewers and the assistance of Sheila Martin in improving the manuscript. All conclusions are those of the authors. This paper benefited from the comments of two attentive reviewers. This paper was supported, in part, by the National Institute of Food and Agriculture Award Number 2020-68006-31183.