



# Productivity

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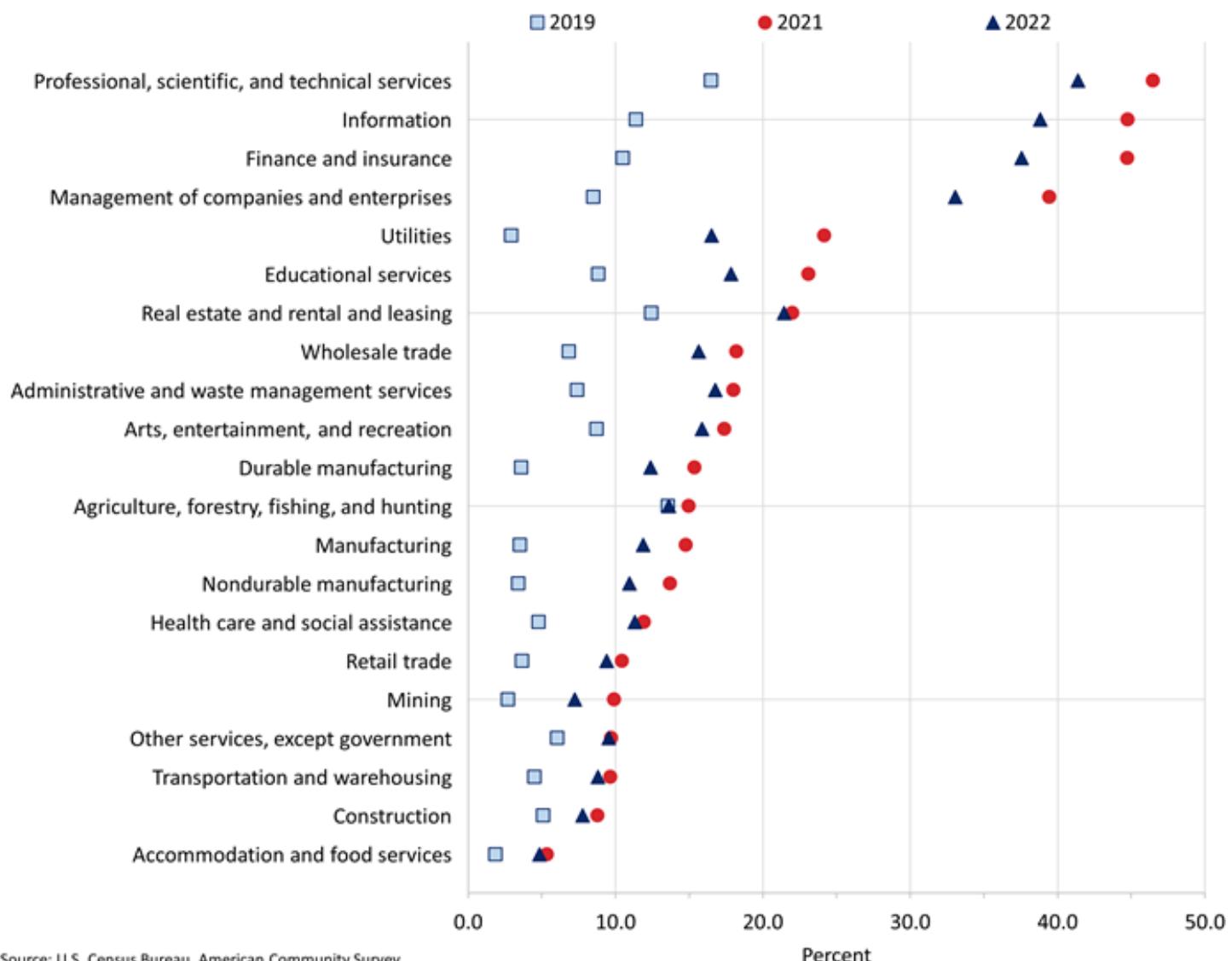
## Productivity and Remote Work

What is the relationship between remote work and productivity? Recent research in BLS Beyond the Numbers, October 2024, "[The rise in remote work since the pandemic and its impact on productivity](#)" by Sabrina Wulff Pabilonia and Jill Janocha Redmond, economists in the Office of Productivity and Technology, finds a positive relationship between total factor productivity and remote work.

New research incorporating the 2023 Total Factor Productivity data for major industries (revised March 21, 2025), [Remote Work and Productivity Growth from 2019-23](#), was presented at the 2025 Society of Government Economists Annual Conference. A paper is forthcoming.

According to the American Community Survey (ACS), remote work increased dramatically across all major industries between 2019 and 2021. Then, with the removal of all social distancing restrictions in 2022, the percentage of remote workers fell slightly. However, it was still higher than its 2019 level in all industries except agriculture, forestry, fishing, and hunting, which returned to its 2019 level. (See chart 1.)

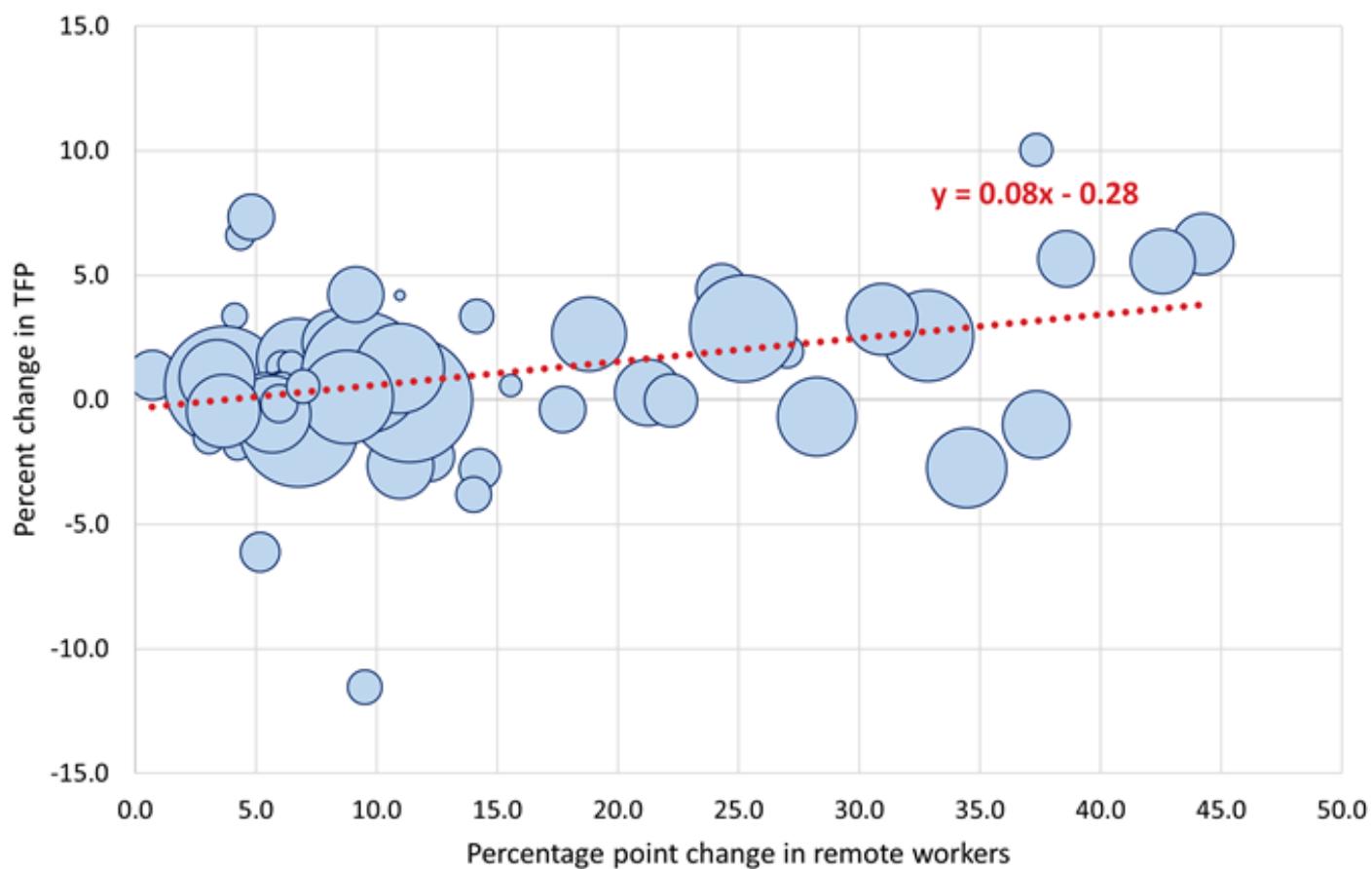
**Chart 1. Percent of remote workers by major industry group, ranked from largest to smallest in 2021**



Source: U.S. Census Bureau, American Community Survey

Chart 2 shows the relationship between TFP growth and the percentage-point change in remote workers across 61 industries in the private business sector from 2019 to 2021, when remote work was at its peak. The horizontal axis measures the change in the percentage of remote workers, while the vertical axis measures the annual percentage growth of TFP. The size of the bubbles represents the industry's share of total private business sector output in 2019. The fitted line shows the output-weighted average relationship between the two measures: a one percentage-point increase in the percentage of remote workers is associated with a 0.08 percentage-point increase in TFP growth. This association is 0.09 in the 2019–22 period, and relationships in both periods are statistically significant.

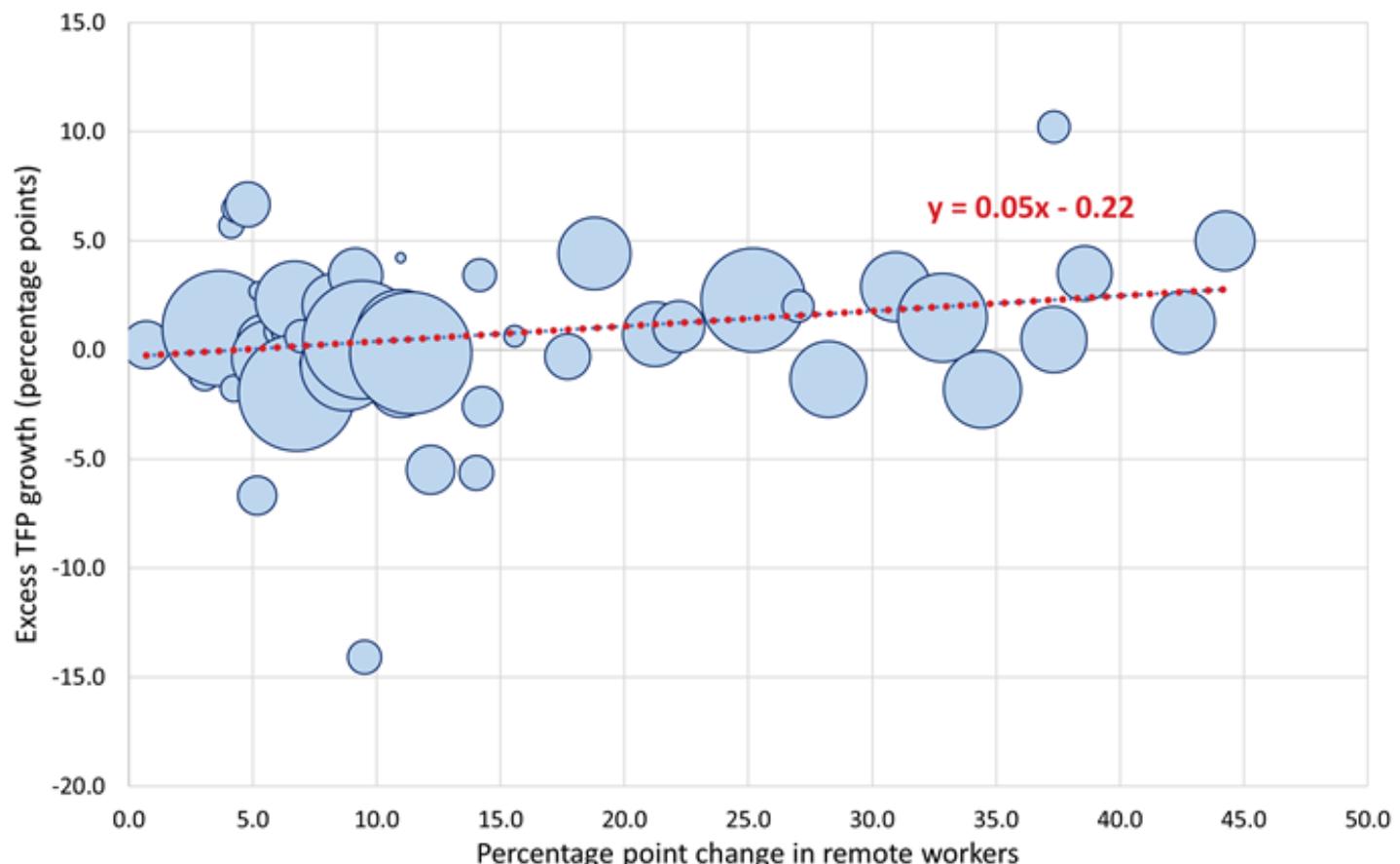
**Chart 2. Relationship between remote work and total factor productivity across 61 industries, 2019-21**



Source: U.S. Bureau of Labor Statistics, Productivity program and U.S. Census Bureau, American Community Survey

To better measure the association of the rise in remote work with productivity, we plot the relationship between the increase in the percentage of remote workers and the excess in TFP growth in the pandemic period (2019–21) over the prior-business-cycle TFP growth (2007–19). The vertical axis in Chart 3 represents the percentage point difference between the pandemic-period TFP growth and the prior-business-cycle TFP growth (2007–19). The horizontal axis represents the percentage-point change in remote workers (2019–21). Using this excess TFP growth measure, we still find a positive and statistically significant association between the rise in remote work and TFP growth, although the magnitude of the association is slightly smaller (significant at the 10-percent level). A one percentage-point increase in remote work is associated with a 0.05 percentage-point increase in TFP growth.

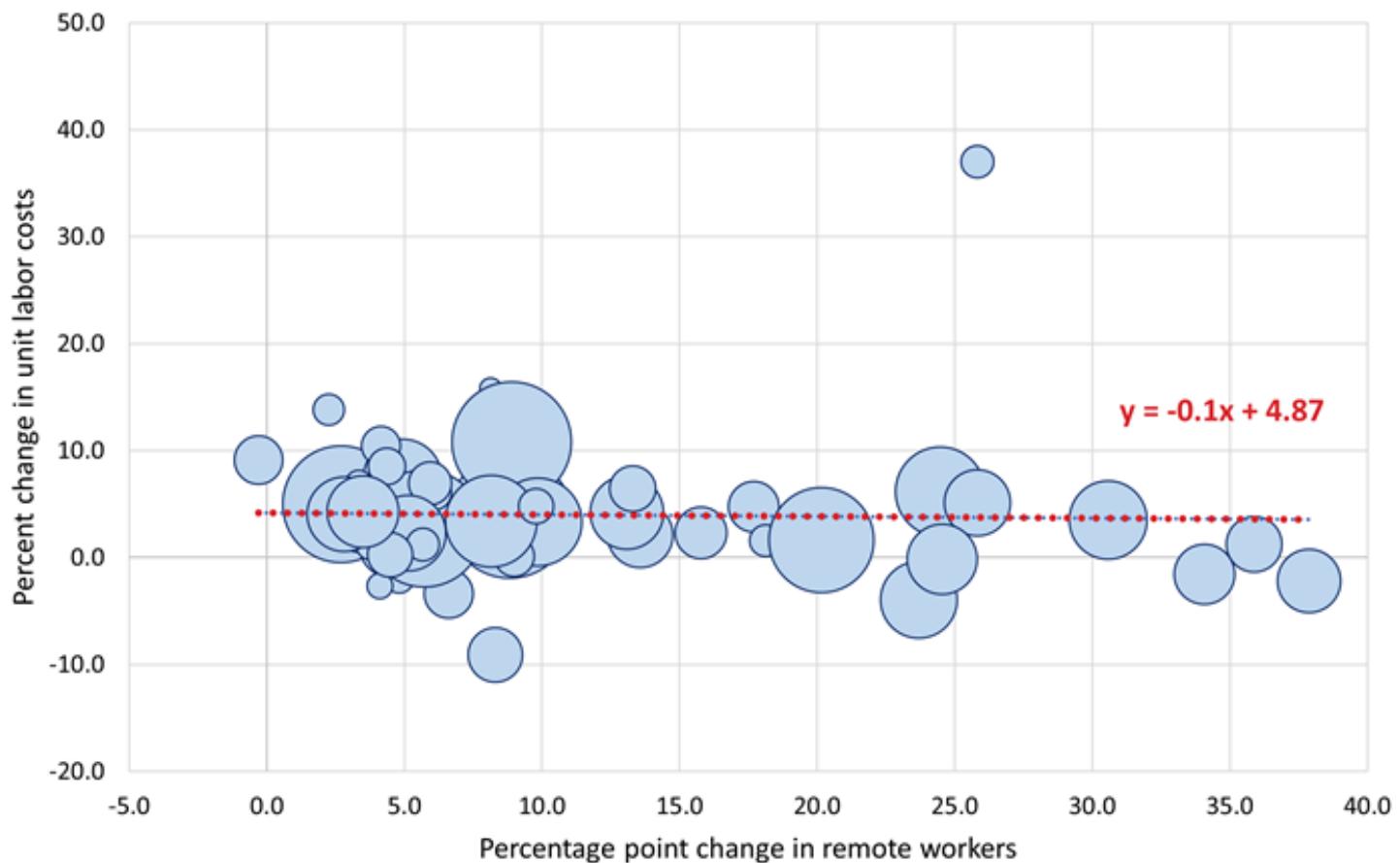
**Chart 3. Relationship between remote work and excess TFP growth, 61 industries, 2019-21 vs 2007-19**



Source: U.S. Bureau of Labor Statistics, Productivity program and U.S. Census Bureau, American Community Survey

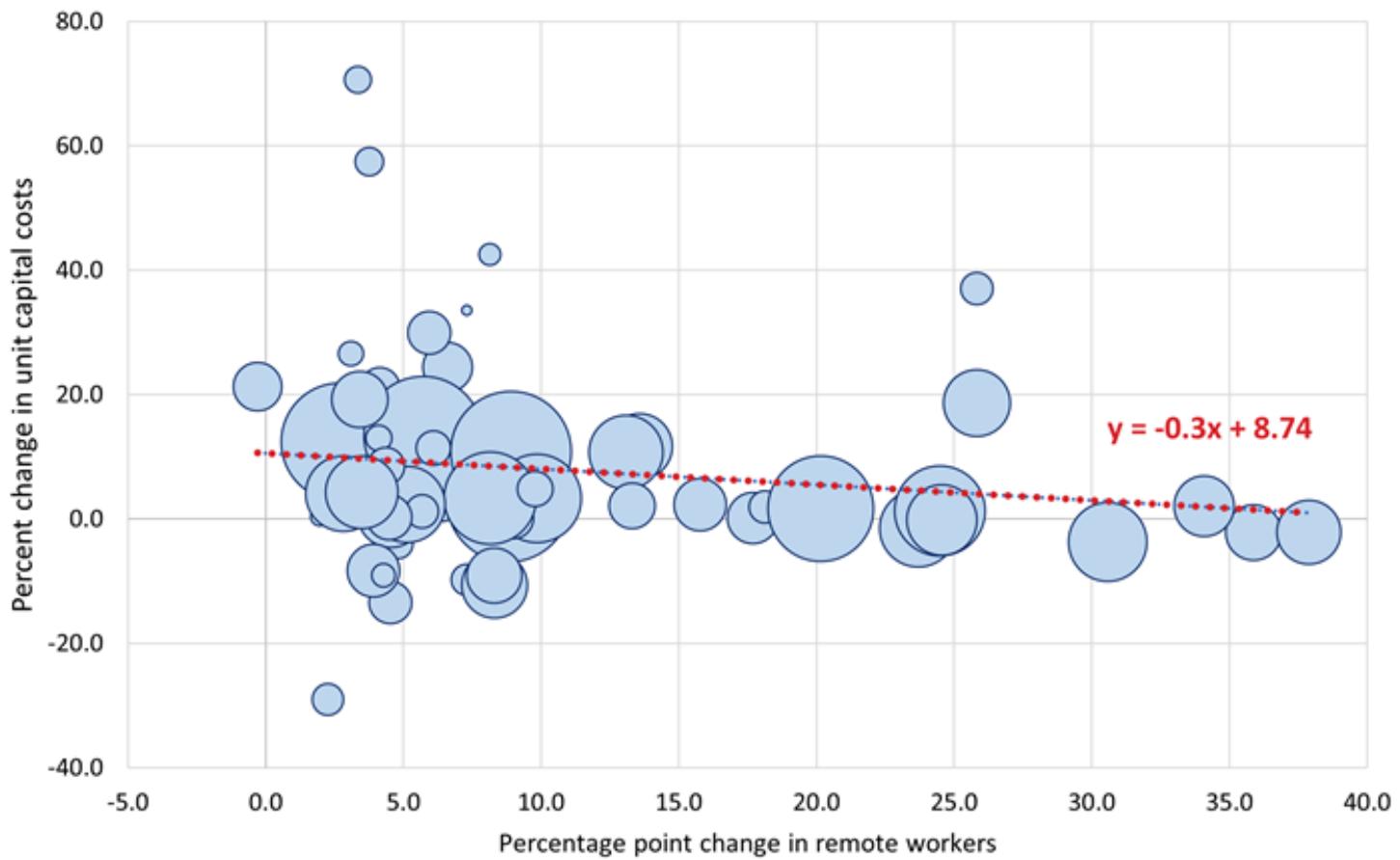
A 1 percentage-point increase in the percentage of remote workers is associated with a 0.1 percentage-points decrease in growth in unit labor costs. Our findings, shown in charts 4-6, also demonstrate a consistent pattern: the larger the increase in remote work, the larger the decrease in growth in unit capital, energy, material, and service costs across industries. These relationships, with the exception of energy costs, are statistically significant, reinforcing the reliability of our research. The associations are notably stronger than the link with unit labor costs, with values ranging from -0.2 to -0.4. A 1 percentage-point increase in the percentage of remote workers is associated with a 0.4 percentage-points decrease in growth in unit office building costs.

**Chart 4. Relationship between remote work and unit labor costs across 61 industries, 2019-22**



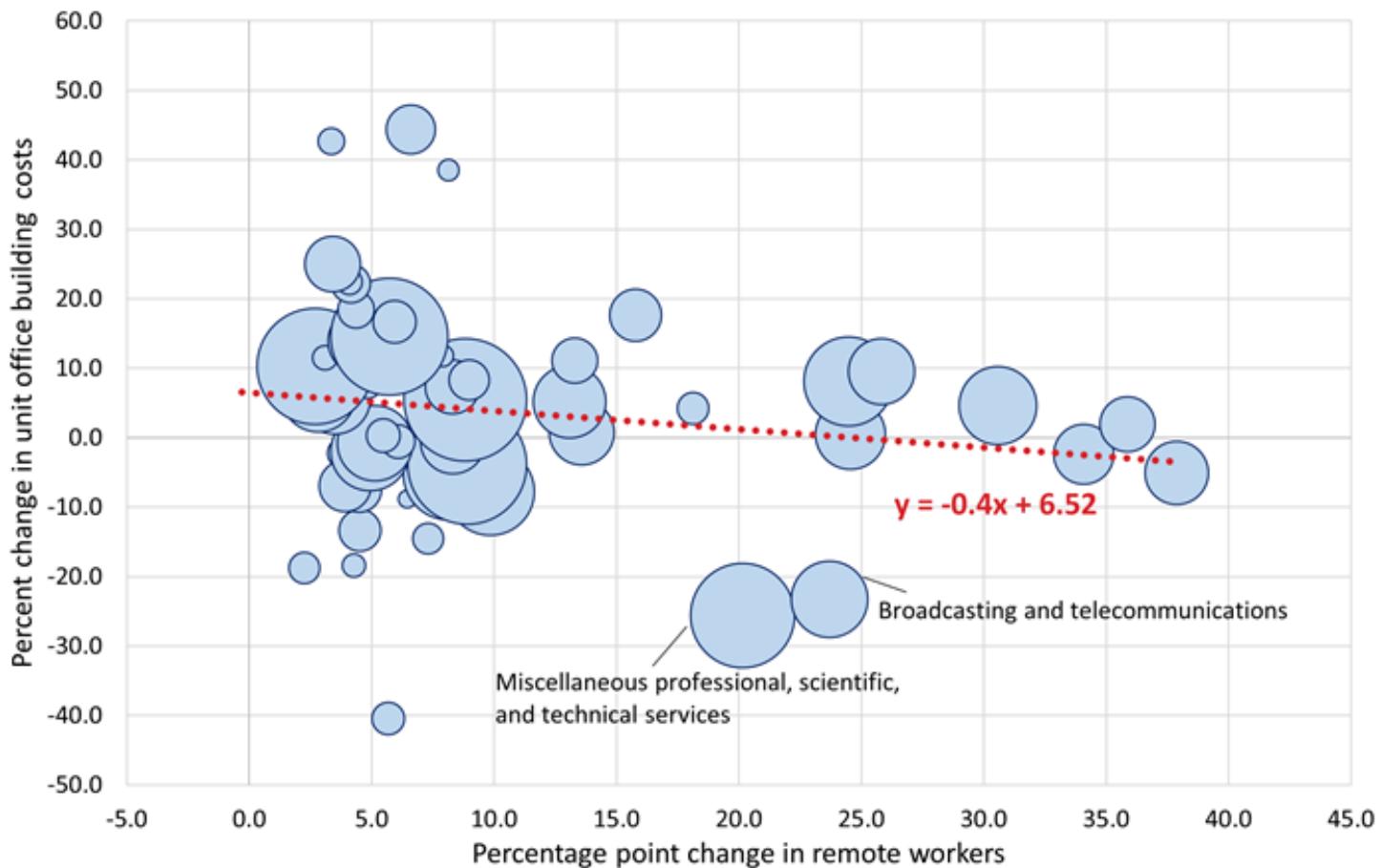
Source: U.S. Bureau of Labor Statistics, Productivity program and U.S. Census Bureau, American Community Survey

**Chart 5. Relationship between remote work and unit capital costs across 61 industries, 2019-22**



Source: U.S. Bureau of Labor Statistics, Productivity program and U.S. Census Bureau, American Community Survey

**Chart 6. Relationship between remote work and unit office building costs across 61 industries, 2019-22**



Source: U.S. Bureau of Labor Statistics, Productivity program and U.S. Census Bureau, American Community Survey

See [chart data in Excel](#).

Data used on this page and in BLS Beyond the Numbers, October 2024, "[The rise in remote work since the pandemic and its impact on productivity](#)" are consistent with the following vintages of productivity data tables:

- [Total factor productivity by major industries: 03-21-2024](#) (for hours and productivity)
- [Capital details for major sectors and industries: 11-21-2023](#) and [Rental prices: 11-21-2023](#) (for unit capital costs, investment and other capital measures)
- [Detailed industries: hours and employment: 04-25-2024](#) (for adjustment in hours shares for a few industries to account for classification differences between BLS and Census ACS data)

## Other Related Research

For more research related to productivity and remote work, you might find these historical articles useful:

- "[Bringing Work Home: Implications for BLS Productivity Measures](#)", (Sabrina Wulff Pabilonia and Lucy Eldridge). *Monthly Labor Review*, Vo1. 133, No. 12, December 2010, pp. 18-35.
- "[Are Those Who Bring Work Home Really Working Longer Hours? Implications for BLS Productivity Measures](#)", (Sabrina Wulff Pabilonia and Lucy Eldridge). In *Productivity Measurement and Analysis: Proceedings from OECD workshops*, Julien Dupont and Pierre Sollberger (Eds.), Swiss Federal Statistical Office, Neuchâtel, Switzerland, 2008,

Bureau of Labor Statistics (BLS) has many [Monthly Labor Review \(MLR\)](#) articles related to telework/remote work you may find interesting. Economists have also written the following research articles on telework/remote work:

- "[How Did the Remote Work Revolution Change Our Work and Leisure Time?](#)" (Sabrina Wulff Pabilonia and Victoria Vernon), Southern Economic Association Meetings. November 24, 2025.
- "[Couples' Remote Work Arrangements and Labor Supply](#)" (Sabrina Wulff Pabilonia and Victoria Vernon). *BLS Working Paper Series*. January 2025.
- "[Remote Work, Wages, and Hours Worked in the United States](#)" (Sabrina Wulff Pabilonia and Victoria Vernon). *BLS Working Paper Series*. June 2024.
- "[The Impact of Remote Work on Local Employment, Business Relocation,](#)" (Michael Dalton, Matthew Dey, and Mark Loewenstein). *BLS Working Paper Series*. March 2023.
- "[Who is Doing the Chores and Childcare in Dual-earner Couples during the COVID-19 Era of Working from Home?](#)" (Sabrina Wulff Pabilonia and Victoria Vernon). *Review of Economics of the Household*, 21(2), January 2023, pp. 519–565.
- "[Telework, Wages, and Time Use in the United States](#)" (Sabrina Wulff Pabilonia and Victoria Vernon). *Review of Economics of the Household* 20(3), September 2022, pp. 687–734
- "[Telework and Time Use](#)" (Sabrina Wulff Pabilonia and Victoria Vernon). In: Zimmermann, K.F. (eds) *Handbook of Labor, Human Resources, and Population Economics*. 2022. Springer, Cham.
- "[Is Telecommuting Family-Friendly? Evidence from the American Time Use Survey](#)" (Harley Frazis) *Journal of Time Use Research*. 2022. 17(1)
- "[Telework during the COVID-19 pandemic: estimates using the 2021 Business Response Survey](#)", (Michael Dalton and Jeffery A. Green). *Monthly Labor Review*, March 2022.
- "[Who telecommutes? Where is the time saved spent?](#)" (Harley Frazis). *BLS Working Paper Series*. April 2020.

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