

# Work from Home & Productivity: Evidence from Personnel & Analytics Data on IT Professionals\*

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## Abstract

We study productivity before and during the working from home [WFH] period of the Covid-19 pandemic, using personnel and analytics data from over 10,000 skilled professionals at a large Asian IT services company. Hours worked increased, including a rise of 18% outside normal business hours. Average output declined slightly, thus productivity fell 8-19%. We then analyze determinants of changes in productivity. Employees with children at home increased work hours more and had a larger decline in productivity than those without children. Women had a larger decline in productivity, while those with longer company tenure fared better. An important source of changes in WFH productivity is higher communication and coordination costs. Time spent on coordination activities and meetings increased, while uninterrupted work hours shrank considerably. Employees communicated with fewer individuals and business units, both inside and outside the firm. They also received less coaching and 1:1 meetings with supervisors. The findings suggest key issues for firms to address in implementing WFH policies.

**Keywords:** Collaboration, Coordination, Covid-19 Pandemic, Productivity, Remote Working, Telecommuting, Working From Home, Work Hours, Work Time

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# 1 Introduction

Working from Home [WFH] has been rising for years, as more occupations use computers and telecommunications, more people have reliable home Internet connections, and more families have both parents working full time. The Covid-19 pandemic accelerated this process by forcing a large fraction of the global workforce to switch to WFH at least temporarily. Compared to Working from the Office [WFO], WFH has the potential to reduce commute time, provide more flexible working hours, increase job satisfaction, and improve work-life balance. However, little is yet known about some of the more fundamental consequences of WFH, including its effects on productivity and which factors play a role in making WFH more or less productive than WFO (WSJ, 2020; Financial Times, 2021b).

In this paper we provide an analysis of the effects of WFH in a large Asian IT services company. The company abruptly switched all employees from WFO to WFH in March 2020, in response to the largely unanticipated pandemic shock. Our study has several novel and interesting features.

The industry and occupations analyzed here are among those predicted to be most amenable to WFH. The employees are highly-skilled professionals in an information technology company where a high degree of work has always been computer driven. At the same time they are some of the most difficult to analyze. The jobs involve significant cognitive work, collaboration on teams, working with clients, and innovation. Productivity is hard to measure for such professions. WFH for occupations with such characteristics has not previously been studied with non-survey data.

For a panel of over 10,000 employees and a period of 17 months including both WFO and WFH, we obtained unusually rich data from the company’s personnel records and workforce analytics systems. These include each employee’s key output and work hours, which provide a natural measure of productivity. For a sub-sample, the firm provided data on how employees allocated time between work tasks. This includes meetings, collaboration and time focused on performing work without distractions. It also includes information on networking activities (contacts) with colleagues both inside and outside the firm. We also have employee experience, tenure, age, commute time (for WFO), gender, and the number of children at home.

These data provide a unique opportunity to obtain a measure of productivity for this complex type of work, and to investigate the determinants of productivity during WFH. We analyze how WFH productivity varied by employee characteristics, whether or not children were at home, and commute time. We also analyze how it varied with the nature of the work: the extent of collaboration, networking, supervision and coaching. Our analysis of the productivity differences between WFH and WFO provide valuable insights about the issues that are likely to be most important when designing future WFH schemes.

Our findings are presented in two parts. We first analyze how average work time, output, and productivity changed during WFH. With that foundation, we then analyze what drives those changes and which employees are more affected. We consider the role of both employee and job characteristics and study extensively changes in working patterns induced by WFH.

We find that employees significantly increased average hours worked during WFH. Much of this came outside of normal office hours. At the same time, there was a slight decline in output as measured

by the employee’s primary performance measure. Combining these, we estimate that productivity declined by 8-19%. These results are consistent with employees becoming less productive during WFH, and working longer hours to try to compensate.

Employees with children at home had a greater decline in productivity than those without, but even those without suffered productivity losses. Moreover, women were more negatively affected by WFH than men, but this gender difference was not due to the presence of children in the home. We conjecture that it might be due to other demands placed on women in the domestic setting while working from home.<sup>1</sup>

Employees with lower company tenure decreased output slightly during WFH, whereas output remained about the same for those with longer tenure. This is separate from age or experience effects. This suggests that employees who are more adapted to firm culture and processes are better able to perform in WFH, where there is no colleague at the next desk for quick help or advice.

WFH also affected working patterns in substantial ways. Employees spent more time participating in various types of meetings, but less time in personal meetings with their manager or receiving coaching. They engaged in fewer contacts with colleagues inside and outside of the firm. At the same time, they had less “focus time,” i.e., uninterrupted time to perform tasks. All of these factors were significantly correlated with the productivity changes due to WFH. These were not temporary adjustments to a switch to WFH, but persisted over time. These findings suggest that increased coordination costs during WFH at least partially explain the drop in productivity.

A potential concern is that the pandemic affected estimates of productivity changes during WFH. However, several pieces of evidence suggest that this is not a major concern. First, the effects on work time and productivity begin immediately at the move to WFH, not gradually as the pandemic developed. Second, the decline in productivity is also observed among employees without children at home, though to a lesser degree, so the detrimental productivity effects are not solely driven by school closures. Third, changes in work time and productivity do not correlate with the evolution of the pandemic, such as the rate of infections or easing of lockdown measures. Fourth, there is a decline, not an increase, in sick days during WFH. Finally, as with many information technology firms, the company’s economic performance was quite strong throughout the pandemic, so employees were not at more risk of job loss.

The evidence presented below provides important insights into how WFH may vary across different types of occupations and firms employing a blended WFH / WFO approach. Our analyses indicate that communication, coordination and collaboration are more costly in a virtual work setting. This is likely to present a significant challenge to WFH in occupations where such aspects are important, especially for less experienced employees. While WFH is likely to remain a feature of modern workplaces, some aspects of in-person interactions cannot easily be replicated virtually, including the quality of

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<sup>1</sup>In the Western context it has often been reported that the burden of childcare and home-schooling disproportionately affected women during the pandemic ([Financial Times, 2021a](#)). In the country from which our data are drawn, extended families often live together, and middle and upper class families often have domestic staff. Having extended family and staff at home can provide help with childcare, but may place other demands on women at home whether or not children are present.