

**The Economic Implications of Remote Work: A Study on Employee
Productivity**

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Introduction:

Recently, Amazon announced their return to five days in office policy which has been gone since the pandemic. This news has made headlines and led to intense discussions. The Financial Times described this as “one of the strictest corporate crackdowns on remote working that has become commonplace since the pandemic.” Moreover, according to data from Flex Index, only 3 percent of tech companies with over 25 000 employees have fully returned to the office. This makes Amazon one of the only big companies to do so. Employee response has also been mostly negative. A survey of about 2 600 Amazon employees on Blind showed that a vast majority are dissatisfied. Furthermore, 73 percent are reportedly considering a job change due to this return-to-office (RTO) policy. This news made me raise a question of why companies like Amazon would apply strict policies despite the risk of losing highly skilled workers.

Before COVID-19, remote work was rare, often exclusive, and even correlated with a pay cut. However, it has since become a standard practice. Many employees in large tech companies like Apple, Google, Meta are working remotely about two days a week. This change in the typical work environment has sparked interest in the quantitative impact of remote work on productivity. Against the framework of Amazon's decision, this study aims to investigate whether remote work is positively or negatively correlated with productivity. The aim is to assess whether policies restricting remote work may reduce productivity or on the contrary whether Amazon's strict RTO policy may be reasonable.

This research will focus on the influence of remote work on employee productivity, aiming to provide evidence that could help companies make informed policy decisions regarding working conditions.

Literature Review:

A preliminary review of past studies shows that research on remote work has largely focused on productivity outcomes of employees, their preferences and satisfaction and challenges in communication, collaboration, and technology adoption. The study “The Rise of Remote Work” (2020) found productivity challenges when the shift to remote work began. However, later data reported positive impacts as organizations adapted through technological improvements and management training for remote teams. By 2021, median small business owners reported that remote work could boost productivity, especially among employees who preferred this arrangement.

While considerable research exists on the influence of remote work - gaps still remain. One of the particular gaps is measurement challenge. It includes the difficulties with measuring productivity across different industries and occupations, especially for white collar workers. This is also reflected in self reported productivity measures, which can lead to subjective and potentially biased outcomes. Another estimation challenge is a binary treatment of work arrangements. Many studies focus on fully remote vs fully in office working policies which is not the case in current years. Big tech companies like Apple, Meta and others mostly use hybrid work arrangements. Also, contextual factors like workers’ locations, job types have an effect on remote work outcomes.

While this study does not address self-reported productivity limitation, it aims to contribute by focusing on considering hybrid working models and providing insights into how workers’ locations, industries and occupations affect productivity when working remotely.

Data and Methodology:

Data:

This study uses data from the Remote Working Survey conducted in New South Wales, which is a southeastern Australian state, with 1 500 workers in March - April 2021. The survey aimed to capture workers' experiences and attitudes toward remote and hybrid work, representing around 59% of NSW's working population. The dataset includes demographic and employment information such as age, gender, industry, occupation, job tenure, household type, and location type which provides the necessary context for analyzing remote work's impact. The survey also details how workers allocate time for commuting, work, domestic responsibilities, family time, and sleep when working remotely versus in-office.

Summary Statistics for Quantitative Variables

Variable	Mean	St. Dev	Min	Max
Remote Work (%)	49.42	35.19	1.00	100.00
Productivity	17.37	24.09	(50.00)	50.00
Age	44.77	11.84	22.00	67.00

Table 1.

According to Table 1, **Remote Work** variable has a wide range (from 1% to 100%) and a high standard deviation (35.19%), suggesting variability in remote work arrangements across organizations. While the mean of 50% indicates that, on average, about half of the work is done remotely, this high variability could make it difficult to draw general conclusions that apply to all organizations. The **Productivity** variable also shows substantial variation, with a mean of 17.37 and a standard deviation of 24.09.

Summary Statistics for Qualitative Variables

Male		48%	(723)
Organization Size			
	1 - 19	20%	(315)
	20 - 199	30%	(445)
	200+	50%	(752)
Have children		53%	(807)
Regional location		23%	(353)
Job Tenure			
	6 - 12 months	12%	(177)
	1 - 5 years	41%	(618)
	5+ years	47%	(717)

Table 2.

Table 2 presents summary statistics for employee characteristics, and while the data is generally well-distributed across different groups, there is an existing regional bias. Only 23% of respondents come from rural areas, indicating that the findings may not fully capture the experiences of workers in regional locations.

In conclusion, this dataset allows us to quantify the effect of remote work on productivity while controlling for key employee-related factors. Additionally, it helps to analyze the impact of partially remote work arrangements, providing an understanding of different remote work policies.

Methodology:

To explore the relationship between remote work and productivity, I will conduct a multivariate regression analysis with remote work as the primary independent variable and productivity as the

dependent variable. This approach will help to quantify the effect in addition to analyzing different remote work distributions.

Regression model:

$$\text{Productivity} = \beta_0 + \beta_1 \times \text{Remote Work} + \beta_2 \times \text{Gender} + \beta_3 \times \text{Industry} + \beta_4 \times \text{Occupation} + \beta_5 \times \text{Company Size} + \beta_6 \times \text{Household Type} + \beta_7 \times \text{Location} + \beta_8 \times \text{Age} + \beta_9 \times \text{Job Tenure} + \epsilon$$

To help simplify the analysis and interpretation of potential patterns, **Remote Work** was divided into three categories: “No remote work” (1-5%), “Moderate remote work” (6-50%) and “Predominantly remote work” (51-100%). These categories were established in order to identify meaningful differences in the impact of different proportions of remote work on productivity.

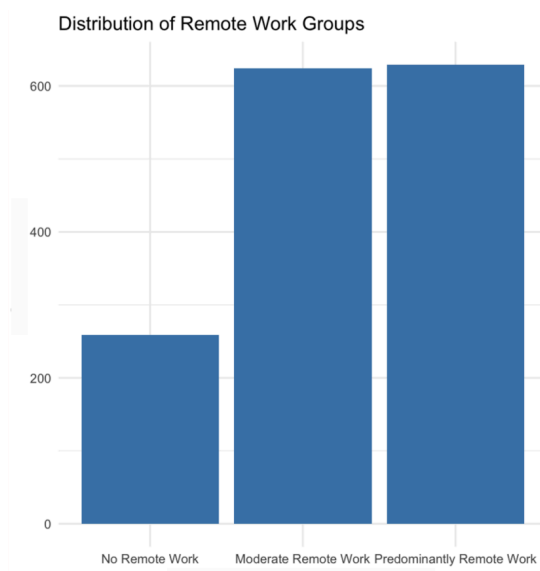


Figure 1.

Productivity, the dependent variable, is measured as a continuous, self-reported change in performance. While this allows employees to express their perceived productivity, it introduces a potential limitation, as subjective responses may be influenced by external factors or personal

biases rather than reflecting actual performance metrics.

Control variables such as **Gender, Age, Occupation, Industry, Job Tenure, and Location Type** are included to isolate the effect of remote work on productivity. Occupation, Industry, Company Size, Job Tenure are categorical variables divided into multiple groups to capture different contexts in which employees work. In addition, Location type is divided into two groups: city and regional, which allows the model to account for the potential effect of geographic difference in the impact of remote work.

Additional analyses will examine variations in time spent on activities (commute, family time, domestic responsibilities, sleep) when working remotely compared to in-office. By comparing time allocation in these areas, the study will provide insights into how remote work affects workers' daily routines, potentially influencing both productivity and overall well-being. These methods will help address the research question by providing a comprehensive view of remote work's impact on worker productivity and time management.

By conducting these analyses, we hypothesize that the increase in remote work positively influences the productivity change of employees while holding other variables constant.

Results:

The primary goal of this analysis was to evaluate the relationship between remote work and employee productivity. In addition, we need to determine if this relationship remains the same across different sectors after accounting for control variables.

The initial regression analysis, excluding control variables, returned a coefficient of 10.6 for Moderate Remote Work and 13.1 for Predominantly Remote Work. These coefficients indicate

a positive relationship between remote work amount and productivity. Specifically, employees engaged in moderate remote work report productivity levels that are, on average, 10.6 percentage points higher than those with no remote work and predominantly remote workers report an average increase of 13.1 percentage points. While it is hard to quantify the 10-15 increase, these results provide preliminary evidence supporting the hypothesis of a positive relationship between remote work and productivity.

Coefficients:

	Estimate	Std. Error	t value
(Intercept)	7.568***	1.470	5.147
Moderate Remote Work	10.589***	1.749	6.054
Predominantly Remote Work	13.052***	1.747	7.471

Table 3.

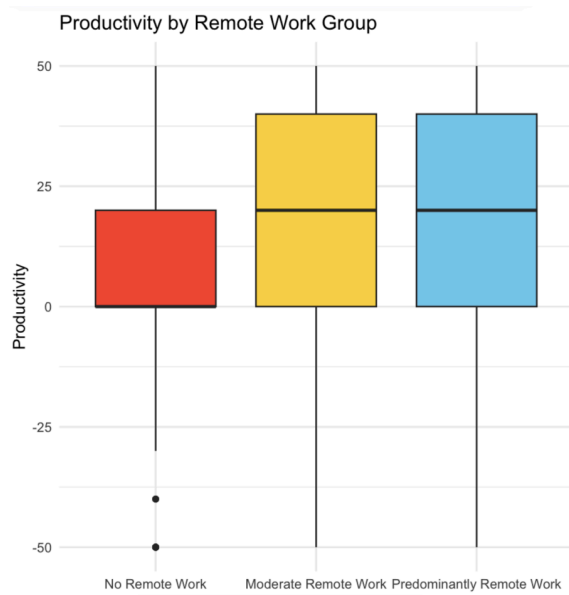


Figure 2.

In the second regression analysis, shown in Table 4, control variables such as age, gender, industry, occupation, company size, household type, job tenure, and location were included to better isolate the effect of remote work on productivity. The coefficients for remote work categories remained positive, indicating that remote work continues to be associated with higher productivity. Specifically, the coefficient for Moderate Remote Work decreased slightly to 10.44, while the coefficient for Predominantly Remote Work increased to 14, compared to the earlier regression without controls. These adjustments suggest that some of the productivity variation associated with remote work may be explained by other factors such as industry and occupation. Importantly, the consistent positive coefficients further strengthen the hypothesis that remote work contributes positively to productivity.

Most other control variables, including organization size, location type, and job tenure, had coefficients that were statistically insignificant, suggesting they may have limited influence on

productivity in this context. This highlights the robustness of the remote work variables' relationship with productivity, even after accounting for these workplace and demographic characteristics.

	Estimate	Std. Error	t value
(Intercept)	3.07218	7.28687	0.422
Moderate Remote Work	10.44047***	1.78033	5.864
Predominantly Remote Work	14.13256***	1.77663	7.955
Male	(2.54010)*	1.28297	(1.980)
Children	0.70219	1.23861	0.567
Company Size (20 - 199)	1.70364	1.77963	0.957
Company Size (200+)	(1.60188)	1.63623	(0.979)
Regional	0.27698	1.48620	0.186
Age	(0.04277)	0.05668	(0.755)

Table 4.

These findings suggest that the relationship between remote work and productivity is consistently positive, even after accounting for a wide range of control variables such as age,

gender, industry, occupation, company size, job tenure, and location. The results indicate that employees engaged in predominantly remote work experience the greatest productivity gains, followed by those in moderate remote work arrangements. While the inclusion of control variables caused slight fluctuations in the coefficients, the overall positive trend remained robust, reinforcing the hypothesis that remote work has a beneficial impact on productivity across different workplace contexts.

Conclusion:

By running the analysis, this research highlights a positive relationship between remote work and productivity change of employees. The relationship further increased when accounting for factors such as gender, industry, occupation, company size, and household type. By demonstrating that remote work is associated with productivity gains, this study provides valuable evidence for organizations to make informed policy decisions regarding working conditions.

This study, while insightful, has two key limitations that could be addressed in future research. First, it primarily focuses on short-term productivity changes, which may overlook long-term adaptations and improvements in remote work efficiency. Employees and organizations may adjust over time, with productivity potentially increasing as workers become more accustomed to remote work or as companies implement better support systems. Future studies should consider the long-term effects of remote work, especially as hybrid and fully remote models continue to evolve.

Second, the study relies on self-reported productivity, which introduces the challenge of

measuring productivity based solely on subjective perceptions. Self-reports are often influenced by individual biases or external factors unrelated to actual work output, making it difficult to accurately reflect true productivity levels. This limitation highlights the need for future research to incorporate objective performance metrics, which would provide a more reliable and valid measure of productivity in remote work settings.

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