

Working From Home in Israel

Noam Zontag, Shavit Madhala, and Benjamin Bental

Taub Center for Social Policy Studies in Israel

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Abstract

As a result of social distancing restrictions put in place during the COVID-19 pandemic, working from home became a much more widespread phenomenon. Many researchers view the pandemic as a catalyst for the expansion of remote work, a development that may affect many other areas as well. Based on the Central Bureau of Statistics (CBS) Labor Force Survey, which as of September 2020 includes data on hours worked from home, the current study examines working from home trends in Israel and the gaps between various groups of workers. The study's findings, like those of studies in other countries, show that working from home in Israel is particularly common among workers who belong to the stronger socioeconomic groups. In particular, the study shows that during the periods without a lockdown and after controlling for other variables, the likelihood of working from home and the number of hours worked from home are related to level of education. Simply put, workers with less education, worked less from home. Similarly, it was found that when controlling for these same variables, the likelihood of working from home among the Arab and Haredi (ultra-Orthodox Jewish) populations is lower than among the non-Haredi Jewish population. From a gender perspective, it was found that the share of women working from home is greater than that of men and that this gap widened significantly during the lockdowns. Parents with children up to the age of nine, and in particular mothers, work from home at higher rates than others. With regard to economic sector, in the information and communication sector — which includes many high tech workers and is characterized by a particularly high rate of working from home — the rate of working from home remained high even during periods without a lockdown

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and it appears to be more open to this style of working. Nonetheless, even in this sector, the rates of working from home fell dramatically in the months following the third lockdown. The study also discusses the issues involved in expanding the scope of working from home and suggests policy alternatives.

Introduction

The onset of the COVID-19 pandemic brought about changes in many aspects of life. Apart from the health domain, the pandemic also had a major effect on the labor market — from the closing of businesses and the furloughing and layoff of workers to a transformation in the style of employment, such as the shift to remote working.

Since the onset of the pandemic, many studies have attempted to assess the potential for working from home. In the early stage of the crisis, Dingel and Neiman (2020) examined the ability of the US labor market to shift to working from home. They based their analysis on information on the O*NET information network and created an occupational classification according to the characteristics that facilitate work from home. Another study that examined the potential to work from home in a number of European countries and which was also based on data from O*NET regarding various occupations, found differences between countries in the share of workers able to work remotely (Boeri et al., 2020). Holgersen et al. (2021), who also tried to assess the types of jobs that facilitate working from home, created a special index that measures the ability to work from home by occupation. Finally, Hatayama et al. (2020) took this one step further by using data from the PIAAC survey of the tasks required in each type of job, with the goal of identifying which jobs facilitate working from home.

Alongside the attempts to evaluate the potential ability to work from home, other studies have examined the actual data on working from home. Bick et al. (2020) analyzed data from a survey carried out in the US labor market during the pandemic and showed that the actual rates of working from home were fairly consistent with the predicted ability to work from home. Von Gaudecker et al. (2020) tracked the changes in employment data in the Dutch labor market prior to the pandemic, during the first lockdown, and during the months following the first lockdown. To do so, they used data from the Longitudinal Internet Studies for the Social Sciences (LISS) survey, which makes it possible to measure the number of work hours worked from home.

Other researchers delved further into the ability of workers to work from home. For example, Yasonev (2020) studied the characteristics of workers in the US and showed that the young, those with low levels of education, the lower paid, immigrants, and members of a minority tended to be employed less in jobs that allow for working from home. Mongey et al. (2021) found that in the US the ability of low-earning workers to work from home is significantly lower, and, therefore, during the pandemic they were more exposed to employment loss as a result of social distancing restrictions. Similarly, the OECD's *Report on Employment* for 2020 found that vulnerable workers, such as the lower-paid, the young, temporary workers, the self-employed, and women, were harmed disproportionately by the crisis (OECD, 2020a). Meanwhile the data from a survey carried out in April 2020 in a number of European countries showed that the likelihood of a worker in the upper income quartile working from home was 50% higher than that of workers in the lowest quartile (Galasso & Foucault, 2020). A policy paper published by the European Commission, which surveyed working from home patterns prior to and during the pandemic, also related to these gaps and concluded that according to past trends, the non-uniformity in the ability to work from home is liable to result in an exacerbation of inequality between countries, between firms, and between workers (European Commission, 2020).

In Israel, Madhala and Bental (2020) evaluated the potential ability to work from home in the Israeli labor market based on the employment characteristics related to working from home that appear in the 2015 PIAAC survey. They identified variation in this potential across employment sectors and across population groups in Israeli society. In particular, the study indicated that workers in prestigious occupations with high hourly wages have the greatest potential to work from home. Debowy et al. (2021) looked at the extent of working from home in Israel between 2020 and 2021 and also found gaps between the various employment sectors and between the public sector, the private sector, and the third sector. Specifically, they found high rates of working from home in the "intangible" sectors such as information and communication and finance, and among workers in education, who had the highest rates of working from home in particular during the lockdowns. An analysis carried out by the Bank of Israel during the pandemic and based on the Central Bureau of Statistics (CBS) Survey of Employers found that only a limited number of employers were interested in increasing the scope of working from home following the pandemic and that most of them plan on reducing the use of

this employment practice. Nonetheless, its use will remain at a higher level than prior to the pandemic. The analysis also showed that the opinions of employers on this issue vary widely across sectors and that in the high tech sector employers are most willing to adopt working from home (Bank of Israel, 2021). Another analysis carried out by the Bank of Israel using 2020–2021 data found that working from home during the pandemic was common even in sectors where it had been relatively unknown, such as the public sector, and that this required overcoming shortages in equipment, improvement in infrastructure, and adopting new work methods (Bank of Israel, 2022).

It appears that the world, and with it the labor market, has recovered more rapidly than expected from the pandemic; however, it is still not possible at this stage to accurately identify the expected changes in behavior patterns in the labor market in the intermediate and long term as a result of the pandemic. There are those who predict that working from home will remain at a high level in the post-COVID era and they point to the advantages of this type of employment to both employers and workers (Barrero et al., 2021). In contrast, other researchers claim that in many cases this work pattern has become more common only as a result of social distancing and that in normal times working from home is neither feasible nor efficient for a number of reasons (Juhász et al., 2020). One way or another, as of the time of writing and given the uncertainty regarding additional waves of the pandemic, it appears that the possibility of working from home remains highly relevant.

In this paper, we will briefly present the global trends in working from home during the pandemic and then will delve deeper into the current trends in Israel. To this end, we have made use of the CBS Labor Force Survey, which includes data on working from home since September 2020. These data make it possible to carry out a more precise and informed analysis of the subject. The study looks at the level of working from home in Israel during the periods of more and less stringent limitations on movement. In particular, the study focuses on the likelihood that various groups of workers in Israeli society will work from home and the extent of working from home among those who do.

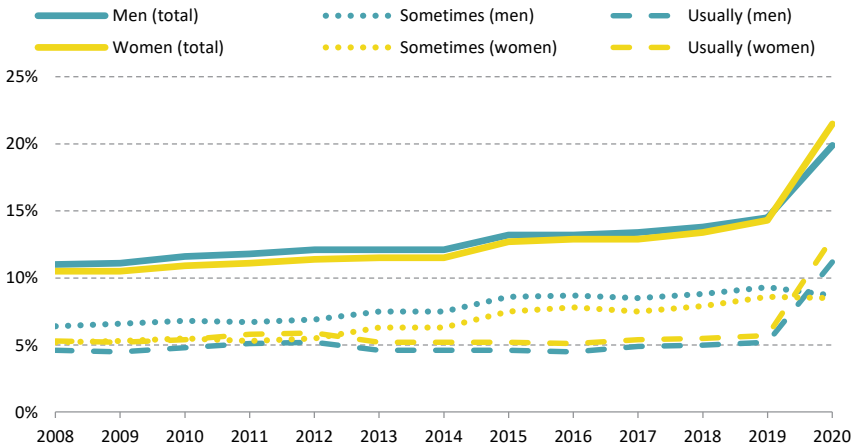
Working from home during the COVID-19 pandemic

As a result of the COVID-19 pandemic, the practice of working from home became the accepted norm of employment for hundreds of millions of people worldwide. In Japan, the share of workers working from home rose from about 10% in December 2019 to about 28% in May 2020, even though a national lockdown was not imposed there (OECD, 2021). In the US, the share of employees working from home between April and May 2020 reached about one-half of salaried workers, where about 35% reported that they worked only from home during this period (Brynjolfsson et al., 2020). Similar rates were observed in the EU, such that, in July 2020, about 48% of salaried workers were working from home and about 34% were working only from home. Moreover, the data from the survey conducted in the EU countries showed that almost one-half of workers who were working from home during the pandemic had not done so previously (Ahrendt et al., 2020).

Annual data from the EU Labor Force Survey show that in 2020 about one-fifth of employees worked from home to some extent (usually or sometimes).¹ The trend in the share of workers who *usually* work from home in the European countries shows that following a decade of relative stability, in which this rate fluctuated around 5%, it jumped to about 12% in 2020 (Figure 1). In contrast, the share of workers who *sometimes* work from home was found to be on a moderate upward trend in recent years, and, in the year of the pandemic, there was no major change, and even somewhat of a decline, perhaps because some of those who sometimes worked from home prior the pandemic shifted to usually working from home. It is interesting to note that, in normal times, the share of men who sometimes work from home is higher than that of women and in the case of usually working from home, the opposite is true. We also see that until 2019, the total share of men working from home (usually or sometimes) was somewhat higher than among women while this trend reversed with the onset of the pandemic in 2020: 21.5% of women as opposed to 19.9% of men. This change was primarily the result of the growth in the share of women usually working from home in the EU countries.

1 “Usually” working from home is defined as “doing any productive work at home that is connected to one’s current job for not less than half of the days on which you worked during the four-week reference period.” Working from home “sometimes” relates to any productive work related to one’s current job that was done at home for “at least one hour and up to one-half of the days in the four-week reference period.”

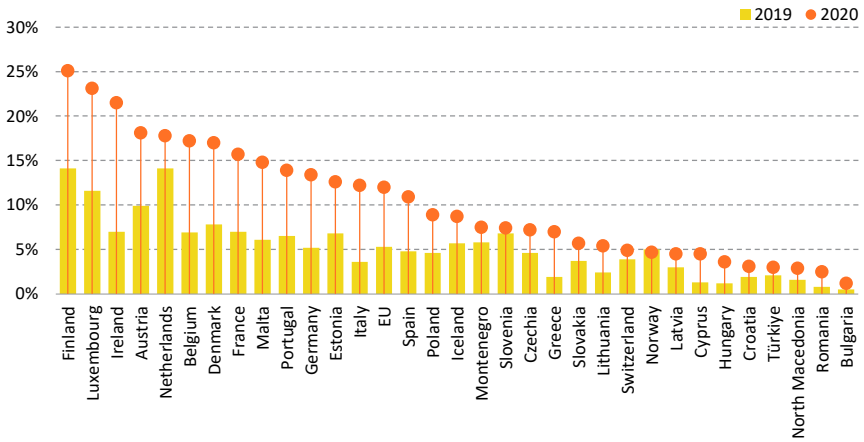
Figure 1. Share of workers working from home in the EU countries, by gender



Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: Eurostat

Figure 2 presents the variation across countries in the rates of usually working from home and the changes in those rates. It can be assumed that factors such as a lack of technological skills, inefficient managerial methods, or tasks that require physical presence have limited the adoption of working from home in certain countries (OECD, 2020b). Thus, for example, in wealthy countries such as Finland, Luxembourg, and Ireland, the rates of those usually working from home were 7%, 12% and 14%, respectively, while in 2020, those rates exceeded 20%. In contrast, in poorer countries, such as Bulgaria, Romania, and North Macedonia, the rate was negligible prior the pandemic and in 2020 did not even reach 3%.

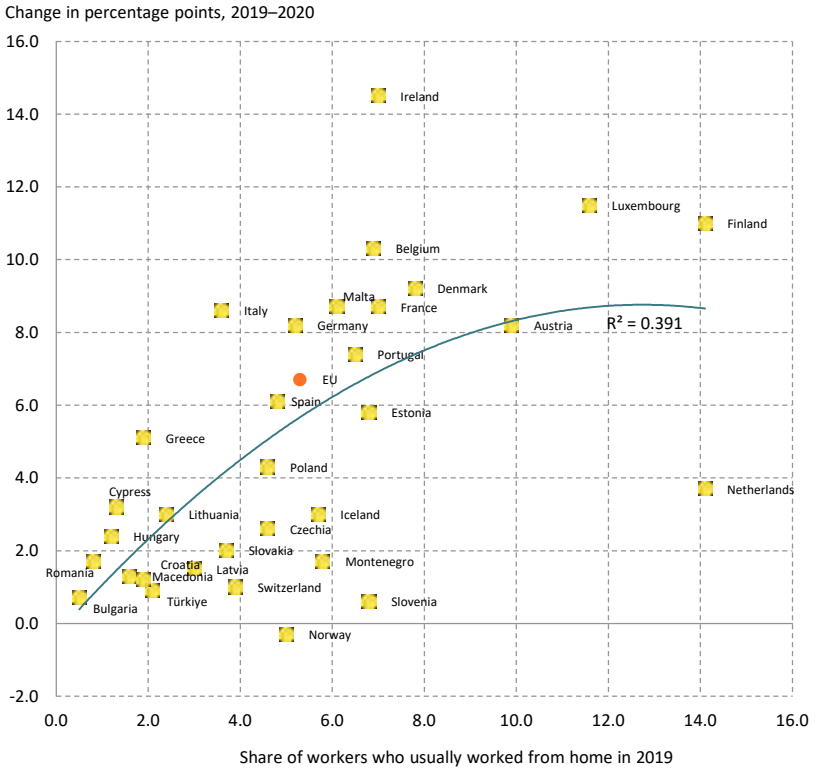
Figure 2. Share of workers who usually worked from home in the EU countries, 2019 and 2020



Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: Eurostat

Figure 3 shows the connection between the share of workers who usually worked from home in 2019 and the change in percentage points that occurred in this rate in 2020 in various countries. It appears that apart from Norway, in which there was only a negligible change, the frequency of working from home increased in all of the countries and that the increase was larger in countries that have more experience with this type of employment.

Figure 3. Share of workers who usually worked from home in 2019 and the change in percentage points in 2020



Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: Eurostat

Working from home in Israel: Conclusions from the pandemic period

In September 2020, the CBS Labor Force Survey began including questions on working from home which enables estimates of the frequency of this type of employment in Israel.² The sample period for this paper (September 2020 to November 2021), includes the second and third lockdowns, the recovery following the third lockdown, and the military operation “Guardian of the Walls” in May 2021.

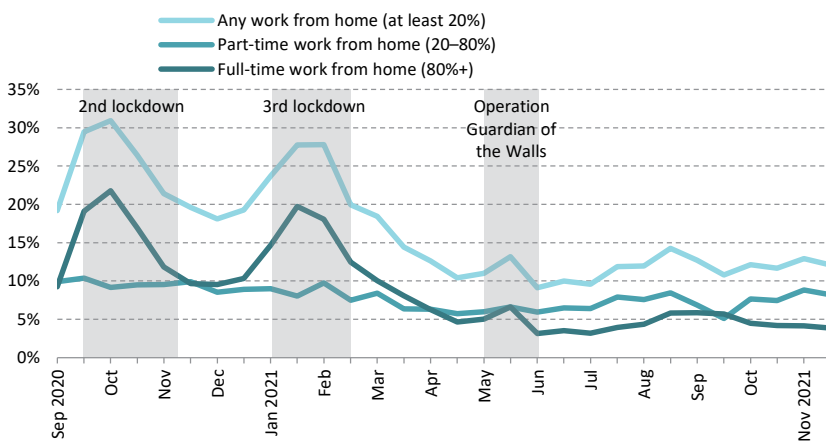
The analysis focuses on salaried workers in the economy. A large share of the self-employed who reported that they work from home essentially run businesses using their home as an office, but during most of the hours of the day they are working at their customers’ residences (as in the case of contractors and real estate agents) or they are service providers who provide service in their homes (as in the case of hair designers, childminders, and psychologists). Since the focus of the analysis is on workers who work from home, namely workers who are engaged in activities that could have been carried out in the work place and in order to work at home use various technological means, as opposed to workers who work in the home, such as the self-employed workers noted, we decided to concentrate on salaried workers only. Furthermore, the descriptive portion of the study focuses on workers with a significant number of work hours, i.e., those who worked 20 hours per work or more during the sample period.

During the periods of the lockdowns, in which severe restrictions were imposed in order to ensure social distancing, many workers refrained from going to their normal place of work and, accordingly, the data clearly indicate an increase in the rate of working from home. Figure 4 presents the share of workers working from home in Israel, grouped by the number of work hours at home relative to total work hours. The graph shows that the main part of the increase during the lockdowns was due to the share of workers working at home full-time or almost full-time (80% or more). During the second and third lockdowns, the share of workers working from home at these levels was 22% and 20%, respectively, and declined significantly to between 3% and 6% from

2 The questions that were added: Do you usually work at your main employment most of the days of the week from home? Last week did you work from home in your main job for at least one paid hour? And if the answer is yes: Last week, how many hours did you work from home in your main job?

June onward. In contrast, the share of workers working from home only part-time (20%–80%) remained relatively unchanged during this period, at about 10% during the lockdowns and about 6%–8% in the following months.

Figure 4. Share of workers who worked from home out of all workers in Israel, by the percent of work done from home out of all work hours



Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS Labor Force Survey

Rates of working from home in Israel by demographic and other variables

As mentioned, studies that have looked at the potential for working from home (such as Madhala & Bental, 2020) showed that it is not uniform across all workers. The following graphs (Figures 5–9), which present the average number of work hours worked at home in Israel between September 2020 and November 2021 according to demographic and other variables, support this conclusion. The variable measured in the graphs is the average number of work hours worked at home out of total work hours among workers in the relevant group. For example, a worker who worked 20 hours from home during the sample period and another 20 hours at his or her place of work (for a total of 40 weekly work hours) is defined as someone working 50% from home.

Overall, an analysis according to the average number of work hours worked at home shows that during the lockdowns this rate was significantly higher than during other periods. For example, while at the peak of the second and

third lockdowns, the rate of working from home was about 25% and 23% of total work hours respectively, during the period between the lockdowns (November–December 2020) it was about 13%–15% and between June and July 2021, the period of economic recovery following the third lockdown, the average share of work hours worked at home was only about 6%–7%.

Furthermore, according to the data, the increase in rates of working from home was more moderate during the period that includes Operation Guardian of the Walls in May 2021.³

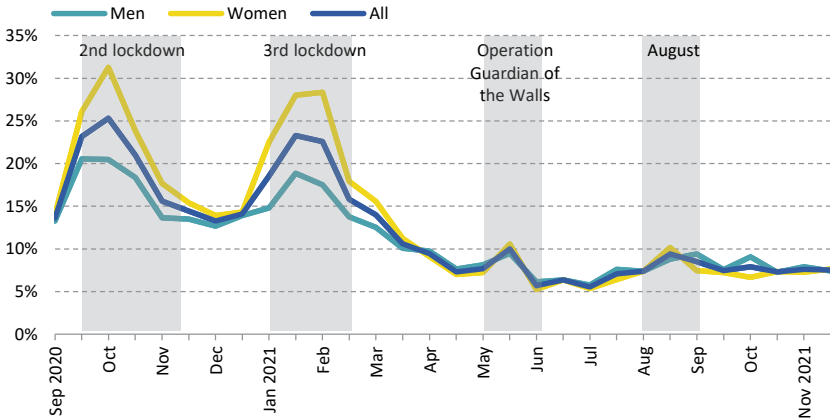
Working from home by gender and parenthood

The level of working from home by gender points to a gender difference, particularly during the lockdowns when severe restrictions were imposed to achieve social distancing. Essentially, the levels of working from home were similar between the genders during the periods without a lockdown while during the lockdowns there was a significant difference. Thus, there was a sharp increase among women, while among men, the increase was more moderate: during the first half of October 2020, which was during the second lockdown, the rate of working from home among women reached 31% on average as compared to only about 20% among men (Figure 5).

An examination of the gender gap according to whether the worker is a parent of children up to the age of nine indicates that it was higher among fathers and mothers of young children than among other men and women and that during the lockdowns the level among mothers was particularly high (Figure 6). From June 2021 until the end of the sample period, the rate of working from home fell significantly relative to the lockdown periods, apart from moderate increases that can be attributed to, among other things, the school vacation in August. During these months, the gaps in rates of working from home according to gender and parenthood were only a few percent.

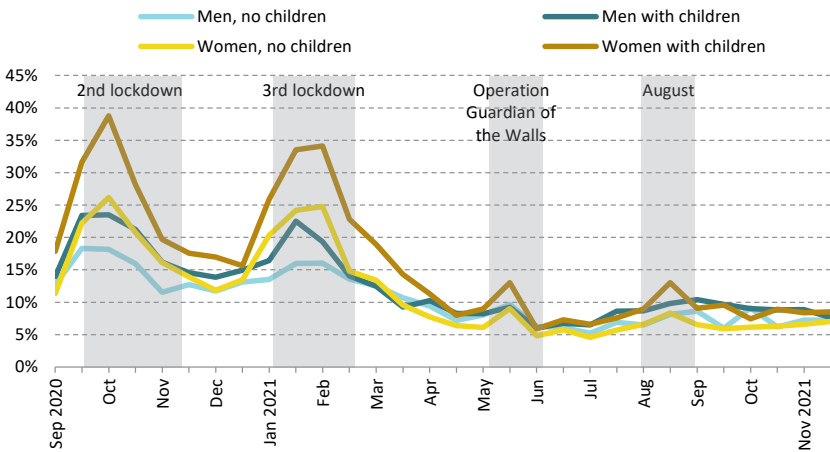
3 Since the descriptive data relate to workers who worked for at least 20 hours per week during the sample period and do not include workers who were absent from work temporarily (for example, those placed on unpaid leave), it may be that at least part of the increase in the work hours worked at home during the lockdown is a result of the fact that a relatively high percentage of workers whose work is not conducive to working from home were absent from their jobs during these periods (due to unpaid leave, forced vacation, etc.). In order to check this, we examined the rates of hours worked from home for all participants in the work force, including those on unpaid leave and the unemployed who were searching for a job during the sampled week. The results are quite similar to what is presented in Figures 5–9, with respect to both trends and the gaps between the groups.

Figure 5. Share of hours worked from home out of all work hours, by gender



Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS Labor Force Survey

Figure 6. Share of hours worked from home out of all work hours, by gender, for parents of children up to age nine



Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS Labor Force Survey

Working from home in the Arab and Haredi populations

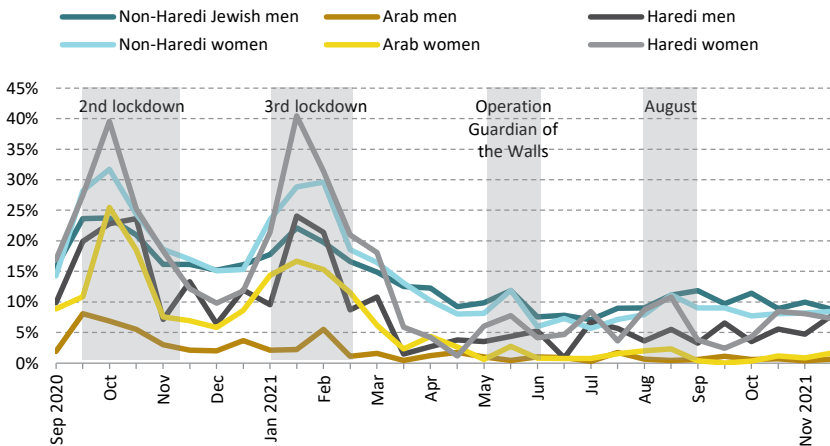
Overall, workers in the Arab and Haredi populations tend to work from home at lower rates than non-Haredi Jews. There are several possible reasons for this. The first is related to the relatively low level of digital literacy among these populations, as reflected in the low levels of achievement in problem solving in a computerized environment on the PIAAC test (a survey that measures the skills of the working-age population in the OECD countries) (Weiss, 2017, pp. 74–75). Another possible explanation, which is more relevant in the case of the Arab population, is the lack of sufficiently high-quality internet infrastructure in some Arab towns. This factor affects the residents of Arab towns both directly, since they have no possibility of working from home, and indirectly, since the lack of infrastructure means that it is difficult for children and adults to acquire the skills that will allow them to work from home in the future. Added to these factors is the effect of the distribution of Arab workers among the various sectors of the economy. The level of working from home is much lower among Arab men than among the other population groups and it can be seen that, during the lockdowns, the increase in working from home was only moderate within this group. Although the rate among Arab women was higher and rose substantially during the lockdowns, even in their case, the rates of working from home remained low relative to non-Haredi Jewish women. From May 2021 onward, the rates of working from home among Arab women were particularly low.

In contrast, the findings for the Haredi population are somewhat more complicated. During the periods without a lockdown the share of Haredi workers working from home was lower than among non-Haredi Jews, although during the lockdowns it rose significantly and sometimes exceeded the level among non-Haredi Jews (Figure 7). Nonetheless, an examination of the rates of working from home among women during the lockdowns among all labor force participants (in other words, all of the unemployed and furloughed workers) shows that there was no difference between Haredi and non-Haredi women. A possible explanation is that as a result of the pandemic, the jobs and rates of participation among Haredi women declined more than among non-Haredi Jewish women. Another possibility is that, as the primary wage earners, more Haredi women preferred to work from home in order to avoid

being furloughed relative to non-Haredi Jewish women.⁴ One way or another, starting from April 2021, the rates of working from home in the Haredi population returned to levels that were lower than among non-Haredi Jews. In this context, it is worth mentioning that in the Haredi population there are groups who are ideologically opposed to using the internet. Thus, in the 2019 Social Survey only 37% of employed Haredi individuals reported that they have access to a computer with an internet connection (Madhala & Bental, 2020; Fuchs, 2021).

With respect to gender, during most of the sample period, the rate of working from home among women in all three sectors was higher than among men.

Figure 7. Share of hours worked from home out of all work hours, by gender and sector



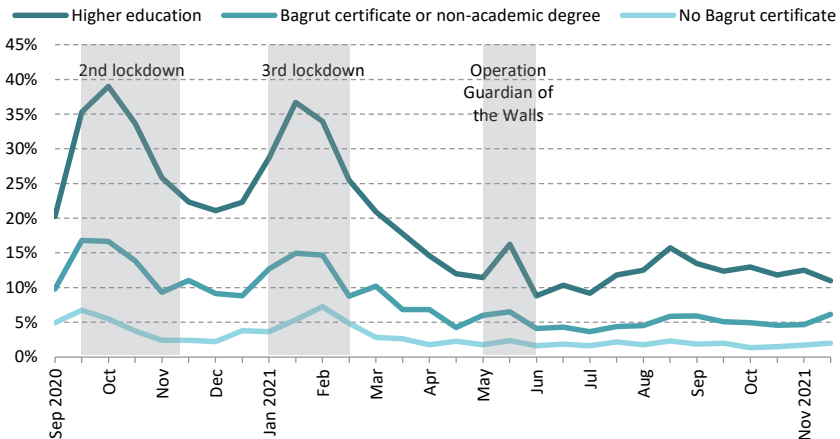
Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS Labor Force Survey

4 Apart from the reasons cited, it may be that the gap between the data for the rates of working from home among all participants in the work force (including the unemployed and those on unpaid leave) is related to the volatility due to the low number of observations in the Labor Force Survey among workers from the Haredi population.

Working from home by education level

According to previous findings (such as Madhala and Bental, 2020; OECD, 2020a), the potential ability to work from home is greater among educated workers and in particular graduates of higher education. The gaps in rates of working from home between workers at different levels of education, which also existed during the periods without a lockdown, were exacerbated during the lockdowns. Thus, for example, at the height of the second lockdown, the rate of working from home among higher education graduates was about 39% as opposed to 17% for workers with only a Bagrut (matriculation) certificate and 5% for workers without a Bagrut certificate (Figure 8). There may be a connection between the increase in rates of working from home among workers with higher education during the lockdowns and the fact that their jobs were less affected by the crisis (Zontag et al., 2020). Thus, during the lockdowns, when going into one's place of work was not permitted, workers with higher levels of education could work from home while those with lower levels of education were less able to do so and were forced to exit the labor market either temporarily or permanently. Indeed the data show that many of them were sent on unpaid leave or forced vacation or were even fired (Zontag et al., 2020).

Figure 8. Share of hours worked from home out of all work hours, by education level



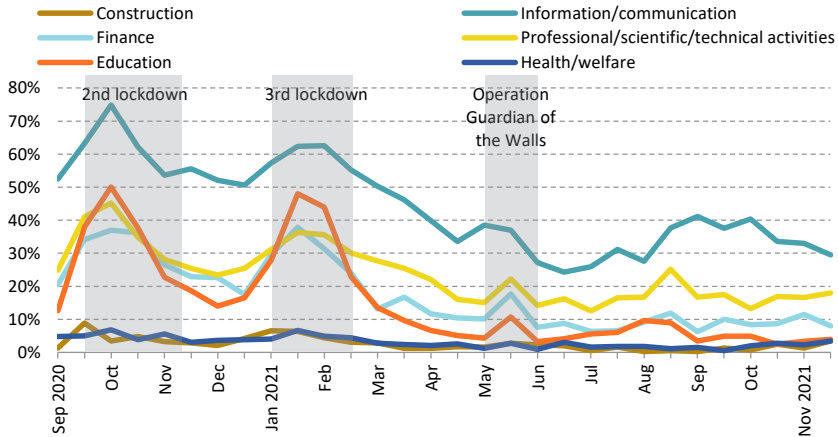
Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS Labor Force Survey

Working from home by economic sector

An examination of the data shows significant differences between economic sectors. Overall, it is possible to identify three sector groupings (Figure 9). The first is information and communication, which includes many of the high tech workers. This group is characterized by high levels of working from home relative to other sectors during the entire sample period, including not only the lockdowns but also the periods between them and to a lesser extent also the recovery period following the third lockdown. During the period between the lockdowns (November–December 2020), the rate of working from home in this group was slightly above 50% while during the months following the third lockdown it dropped to around 25%–40% (June to November 2021). The fact that in these sectors the rate of working from home remained high even during periods without a lockdown may indicate that both workers and employers are more open to this type of employment and this is perhaps an indicator that even in the future, after the effects of the pandemic have passed, rates of working from home in this sector may remain high.⁵ The second group includes the finance sector, the education sector, and the scientific and technical services sector. This group, and in particular workers in the education sector, is characterized by high rates of working from home during the lockdowns and a sharp drop in those rates during periods without a lockdown. Thus, for example, the rate of working from home among workers in the finance sector was almost 40% during the lockdowns; however, it fell to about 20% between the lockdowns and between June and July 2021 it continued to decline to levels below 10%. It appears that in these sectors working from home is feasible and is taken advantage of more often; however, during periods without any restrictions on presence in the work place it did not become the accepted way of working. The third group includes the construction sector and the health and welfare sector, in which the physical presence of workers in the work place is in most cases unavoidable and working from home is not common in these sectors.

5 Nonetheless, a recent article in *The Economist* raises doubts as to the widespread adoption of this type of employment among high tech companies, primarily due to reluctance among employers. See [Is hybrid work the worst of both worlds?](#) *The Economist*, March 12, 2022.

Figure 9. Share of hours worked from home out of all work hours, by economic sector

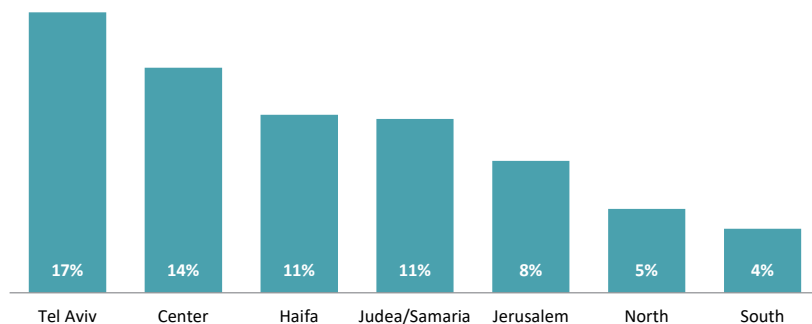


Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS Labor Force Survey

Working from home by region

An examination of rates of working from home according to place of residence points to substantial gaps between regions in Israel and in particular between Tel Aviv and the Center on the one hand and the periphery on the other. During the second half of March 2021, which represents the beginning of the recovery following the third lockdown, the average rate of working from home among residents of Tel Aviv was three times higher than among residents of the Northern District and four times higher than among residents of the South (Figure 10).

Figure 10. Share of hours worked from home in the second half of March 2021, by residential district



Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS Labor Force Survey

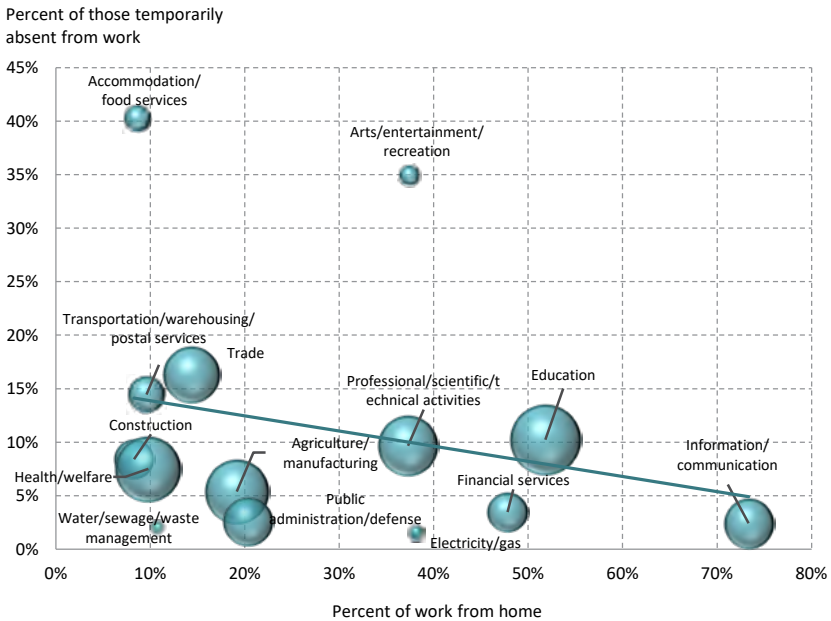
Rates of working from home and rates of temporary absence due to the pandemic during the lockdowns: An analysis at the economic sector level

The rate of unemployment, whose original definition includes unemployed workers who are seeking employment, rose during the pandemic by only a few percentage points. However, the main drop in employment during the pandemic was reflected in the high rate of workers who were absent from their jobs temporarily for pandemic-related reasons, such as workers sent on unpaid leave or forced vacation (Debowy et al., 2021; Zontag et al., 2020). Studies that have looked at the labor markets in the US, England, and Germany show that workers in professions and in sectors with a high potential for working from home were less affected by the pandemic relative to workers in sectors with less potential (Adams-Prassl et al., 2020; Brynjolfsson et al., 2020). Figure 11 presents the correlation between ability to work at home in Israel and the rate of workers temporarily absent from their jobs during the pandemic because they were sent on unpaid leave, forced vacation, etc., by economic sector.⁶

⁶ The graphs present the share of those on temporary absence from work who still had a contractual connection with their employer (as in the case of unpaid leave and forced vacation). As a result of the limited data, the graphs do not include unemployed individuals who were fired from their job, since the Labor Force Survey does not enable identification of either the economic sector or occupation of an individual who is unemployed or is not participating in the labor market during the sampled week.

The graph implies that in sectors with a relatively greater potential for working at home, such as the information and communication sector and the finance sector, the rate of temporary absence from work during the lockdowns was lower than in sectors with a lower potential, such as the commerce sector and the accommodation and food sector. Nonetheless, the findings do not hold in all sectors and although in general the coefficient of correlation for all sectors is negative (-0.27) it is not statistically significant.

Figure 11. Share of hours worked from home and share of those temporarily absent from work during the lockdowns, by economic sector



Note: The size of the circles reflects the number of employees in the sector.

Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS Labor Force Survey

Multivariate econometric analysis of the likelihood and intensity of working from home during periods with no lockdown

In order to quantitatively estimate the correlations between the demographic and other variables on the one hand and the likelihood of working from home on the other, a multivariate regression was estimated. In view of the possibility that the group of workers who are working from home is not a random sub-sample of all workers, a two-stage Heckman correction model was used in order to deal with the potential bias. Accordingly, in the first stage the entire sampled population was included in order to estimate the effects of the various variables on the probability that an individual will work some positive number of hours from home. In the second stage, estimates of the effect of the variables on the share of work hours worked from home for those employees who were actually working from home were made. We preferred to use the share of work hours worked at home as the dependent variable rather than the number of work hours worked at home in order to control (as much as possible) the influence of total work hours on the results.⁷

The multivariate analysis focuses on the periods without a lockdown for two reasons. First, the periods of the lockdowns — as interesting as they may be — represent outlying time periods that will not necessarily produce the same correlations as during normal times or what can be expected in the future. In contrast, the periods without a lockdown — though they are also influenced to some extent by the pandemic — are closer to representing normal time periods and are likely to provide an indication of possible future trends. The second reason is related to the possibility of selection during these periods as previously noted. During the lockdowns, a relatively high share of workers are temporarily absent from the labor market because they are on unpaid leave or forced vacation or they have been fired. Therefore, it may be that the workers who are temporarily absent from their jobs included a relatively high number of workers who in any case cannot work from home or can work only a small portion of their work hours at home. Selection of this type can undermine the

7 In particular, the potential hours that a part-time worker can work from home is of course less than that for a full-time worker. Nonetheless, we carried out an additional regression of a parallel model in which the dependent variable in the second stage is the number of work hours worked at home. The results were similar for the most part, with the appropriate reinterpretation of the second stage coefficients.

reliability of the econometric estimation during these periods. Furthermore, the month of May 2021 was not included in the regression because Operation Guardian of the Walls took place during that month and large parts of the education system were closed. As in the case of the descriptive graphs, the regressions were estimated only for working-age salaried workers (aged 25–64).⁸

The variables

The first-stage estimation, i.e., the likelihood that a worker will work from home, included the following explanatory variables: a categorical variable for number of weekly hours worked by the worker (total work hours, whether at home or not); a categorical variable for sector – non-Haredi Jewish, Haredi, and Arab; a categorical variable for level of education according to three levels – does not have a Bagrut certificate, has a Bagrut certificate or has a non-academic post-secondary education, and has acquired higher education; binary variables for workers who live in relatively crowded living conditions (at least one person per room); economic sector; parents with children under the age of nine; workers in the public sector (as opposed to the private sector and the third sector); and a variable representing the period from March 2021 onward, the period of recovery following the third lockdown, during which the rates of working from home were lower than during the earlier periods. In addition, the analysis included categorical variables for occupation, economic sector, residential district, and age group. Also included were interactive variables between gender on the one hand and education, sector, and parenthood on the other. All of the aforementioned variables were also included in the second stage of the regression. For the purposes of identifying the selection model, the first stage of the estimation (works from home/does not work from home) is supposed to include at least one variable that affects whether a worker works from home but does not appear in the second stage (intensity of working from home), based on the assumption that it does not

8 In order to confirm that the sampling system used by the Labor Force Survey, whereby individuals are surveyed several times over a number of months (waves), is not detrimental to the reliability of the findings, regressions were estimated based on observations gathered in specific months, thereby removing repeat samplings. The findings of these regressions were similar to those of the regression presented in Appendix Table 1, apart from lower significance levels for some of the coefficients in the regression based on one-month data only. These differences are likely to be the result of the relatively small number of observations in the latter case.

affect this intensity. Given the limitation of the Labor Force Survey data, we chose as the identifying variable (instrumental variable) the presence or lack of a house cleaner.⁹

Findings of the multivariate analysis

Appendix Table 1 presents the results of the two-step multivariate regression (Heckman). The selection coefficients for working from home lend themselves to direct interpretation, although they indicate the variable's direction of influence on the likelihood of working from home. Nevertheless, further calculations allow an estimate of the marginal impact of each variable on the likelihood of working from home (marginal effect). In the second stage of the regression (target equation), the coefficients directly represent the influence in percentage points on the fraction of hours worked from home. Since the regression variables are categorical, the effect relates to the change associated with belonging to a particular category relative to the reference category.

Overall, it appears that the findings of the multivariate analysis support the descriptive analysis presented above.¹⁰ As expected, and in line with similar studies in other countries (such as Foucault & Galasso, 2020), it was found that, other things being equal, the likelihood of working from home among workers with a higher level of education, and in particular academic graduates, is 8 percentage points higher than for workers with a low level of education. In addition, among those working from home, the fraction of work hours worked at home among individuals with a Bagrut certificate is 6 percentage points higher than among those without a Bagrut certificate, and among individuals with higher education, it is 9 percentage points higher. With respect to population sector, compared to a non-Haredi Jew, a Haredi worker is 3 percentage points less likely to work from home and an Arab worker is less likely to work from home by 7 percentage points; both of these differences are statistically significant. The intensity of working from home among Arabs is 8 percentage points lower than among non-Haredi Jews, while the gap between the Haredi population and the non-Haredi Jewish population in this intensity is not statistically significant. With respect to residential district, the likelihood of

9 In the course of the multivariate analysis, a Tobit regression and multinomial logistic regression were also estimated. The findings were similar to those of the regression presented in Appendix Table 1 with respect to both the gaps between the groups and the coefficients' significance levels.

10 The findings are presented in Figure 12 and in more detail in Appendix Table 1.

working from home was higher in the Tel Aviv district than among residents of the other districts, except for the Jerusalem district. In particular, the likelihood of working from home in the Northern District is 4 percentage points lower than in Tel Aviv and in the Southern District is 5 percentage points lower. It is worth noting that the high likelihood of working from home for residents of the Jerusalem District was not observed in the descriptive analysis (Figure 10). This discrepancy is apparently the result of controlling for other variables in the multivariate analysis and primarily variables that are highly related to Jerusalem District characteristics relative to other districts, such as the high share of Haredi workers and of workers in the public sector within the total number of workers in the district. Nonetheless, other things being equal, the fraction of work hours worked from home among those who work from home is similar in all of the districts, apart from the Southern District in which the intensity is lower than in the Tel Aviv District by 5 percentage points. It may be that this reflects gaps in the level of infrastructure or even in digital intensity (the degree of usage of various types of technology) in these regions. Thus, for example, it was found that the rate of adoption of digital technologies among businesses in the service sectors in the country's periphery is lower than in the central regions (Be'ery & Esperensa, 2022). With respect to age group, it was found that apart from the 55–59 age group, the probability of working from home increases with age. However, among those who work from home there is no difference by age group in the fraction of work hours worked at home.

Some of the studies that have looked at the intensity of working from home found a negative correlation between level of crowding in a worker's home environment and the rate of working from home. An example is a study based on data from the Canadian labor market (Baylis et al., 2020).¹¹ Similarly, the data for the Israeli labor market points to a negative correlation between the level of home crowding and working from home. Our research found that both the likelihood of working from home and the fraction of work hours worked from home are lower among workers living in more crowded conditions.

11 The claim in Baylis et al. (2020) is that living in a crowded dwelling moderates between the gaps in education (which are correlated with the level of crowding in one's home environment) and the degree of employment loss during the pandemic. (In Canada, as in Israel, the employment loss during the pandemic was larger among workers with lower levels of education.) The researchers base their claim on the hypothesis that living in a crowded home reduces the feasibility of working from home during periods of severe social distancing restrictions.

In addition, the likelihood that a worker from a family that employs a house cleaner in the household (the instrumental variable) will work from home is 4 percentage points higher than in the case of a family that does not and the difference is statistically significant.

A number of variables that capture the character of the worker's employment are correlated with the likelihood of working from home and with the fraction of work hours worked from home. For example, it was found that part-time workers (up to 19 hours per week) tend to work from home with a higher likelihood. Moreover, it was found that the fraction of hours worked from home declines as the number of weekly hours increases: from 15 percentage points less for those who work 20–34 weekly hours up to 27 percentage points less for those who work more than 45 hours, relative to those who work 19 hours or less. Nonetheless, the results point to a substantial rise in the *number* of work hours worked from home as the number of weekly work hours increases: from about 4 work hours worked from home for those who work 27 weekly hours, to about 10 work hours for those who work 39 weekly work hours and to about 12 work hours for those who work 45 weekly work hours.¹²

Public sector workers are less likely to work from home relative to workers in the private sector or the third sector by 7 percentage points and the fraction of work hours that they work from home is 9 percentage points lower. With respect to occupation, the likelihood that workers in an academic occupation will work from home is higher than that of any other occupation, including managers. This probability is 19 percentage points higher relative to, for example, occupations in agriculture, manufacturing and construction and relative to unskilled workers. Nevertheless, it stands out that the fraction of hours worked from home among sales and service workers, clerks and office workers is similar to the rates of those in the academic professions but lower among the remaining groups, especially workers in construction and unskilled work whose fraction of work hours worked from home is 30 percentage points lower than that of workers in an academic occupation. With respect to economic sector, it appears that the likelihood of working from home for workers in the information and communication sector (who are mainly high tech workers) is higher than for workers in other sectors and in particular those in the health and welfare sectors (by 27 percentage points) and in the accommodation and food services (by 25 percentage points).

12 Calculated approximately based on the regression coefficients and the midpoint of the range of hours in each group.

The fraction of work hours worked from home for workers in the information and communication sector was also found to be higher than that of workers in all the other sectors, including those characterized by high intensity of working from home during the lockdowns, such as finance and education. A noteworthy finding is that the fraction of work hours worked from home among workers in health and welfare is 39 percentage points lower than among workers in information and communication.

There were interesting and statistically significant findings also with respect to gender and parenthood to young children. For example, all other things being equal, women working from home are 4 percentage points more likely to be working from home than men. However, the effect of gender declines in the case of women with a Bagrut certificate or higher education. In general, the fraction of work hours worked from home among women is 8 percentage points higher than among men. This difference disappears in the case of women with a Bagrut certificate or higher education but increases by 12 percentage points for Arab women.¹³ Parenthood to a child under the age of 9 increases the probability of working from home by 2 percentage points, and in the case of a mother, the probability increases by an additional percentage point. However, the fraction of work hours worked from home is not related to parenthood — not in the case of men nor in the case of women — which is in line with the findings of studies in other countries, such as the US (Barrero et al., 2021).¹⁴

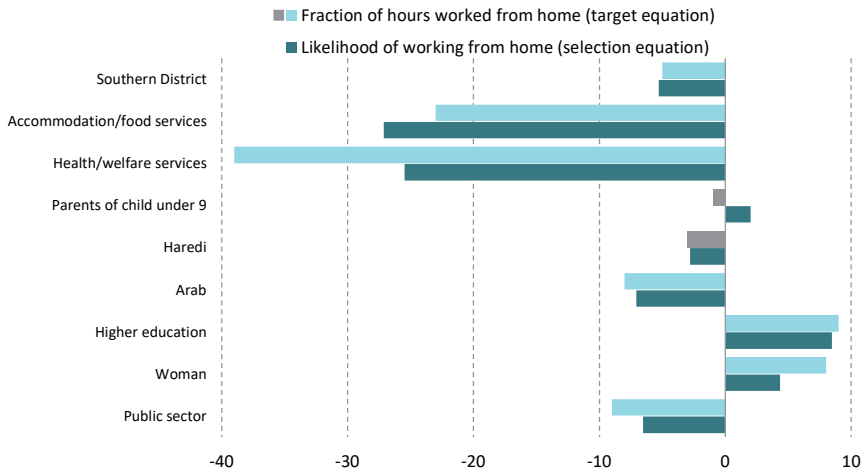
Figure 12 illustrates the findings for some of the main variables, where the vertical axis measures the marginal effect of a change in each of the variables in percentage points. For example, if a worker in the private sector moves to the public sector the probability that he will work from home declines by 7 percentage points and if he already works from home the fraction of his work hours worked from home declines by 9 percentage points. As another example, if a worker from the information and communication sector moves to the health and welfare sector, the probability of working from home drops

13 It is likely that the coefficient reflects the relatively high share of Arab women who are employed as teachers, a profession that was characterized by high rates of working from home during the sample period.

14 The Bank of Israel also recently published an analysis of data on working from home in Israel and its findings are in part similar to those of the current study. In particular, it arrives at similar conclusions with respect to the effect of gender variables, having young children, education and economic sector on working from home (Bank of Israel, 2022).

by 25 percentage points, and if the worker already works from home, the fraction of work hours worked at home will decline by 39 percentage points.

Figure 12. Marginal effects in percentage points of selected variables on the likelihood of working from home and the fraction of hours worked from home



Note: The results present the marginal effect relative to the excluded base group, as described in Appendix Table 1. The grey bars indicate marginal effects that are not statistically significant ($p > 0.05$). Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center | Data: CBS

Finally, it is worth noting that the analysis according to the Heckman model estimates a positive correlation between unobservable factors that affect the probability that an individual will work from home and unobservable factors that influence the fraction of work hours worked from home by that employee (positive selection).¹⁵ Accordingly, and given the observed individual characteristics, the fraction of hours worked from home for a worker who belongs to the group who work from home is predicted to be higher than that of a random worker drawn from the entire population.

15 A positive value for Heckman's lambda. See Appendix Table 1.

SPOTLIGHT

The implications of increasing the amount of working from home

If the COVID-19 pandemic served as a catalyst for working from home, then it is likely to have important implications for the labor market in Israel, as well as for other areas. One of the most important benefits of this type of employment is the increased accessibility of high-paying high-quality employment for populations who currently find it difficult to get such jobs due to their concentration in the large cities and their geographic distance, workers' mobility limitations, and the need for flexible work hours (for example, in the case of parents of young children). If in coming years working from home becomes more common, it will likely "shorten the distance" between the Center and the periphery, since the distance between a worker and his place of work becomes less relevant when work can be done remotely. For example, increasing the extent of work done from home may increase the supply of high-prestige high-paying jobs in the Southern District, where the percentage of workers in high tech is relatively low (Weinreb, 2021). The possibility of working from home on at least some days of the week (the hybrid work model) will enable workers living in the periphery to work for companies in the Center. Increased access to jobs for these populations can also be beneficial for employers who will have a greater supply of potential workers available to them, particularly in sectors that are suffering from a shortage of workers, such as high tech.

Moreover, in normal times working from home can contribute to narrowing gender wage gaps in the labor market and to improving the work-life balance. Thus, for example, the research of Arntz et al. (2019), which was conducted prior to the pandemic, shows that for workers with young children, and primarily female workers, working from home is a way of increasing the limit on contractual work hours. Moreover, another study carried out during the pandemic shows that working from home allowed workers to save the time they would have spent on commuting and that fathers increased the time they devoted to childrearing. The study also found that mothers were willing to accept a lower wage if they have the option of working from home (Pailnia & Vernon, 2021).

Another important element that is related to increasing the scope of working remotely is the reduction in employers' costs, such as transportation costs, parking costs, the cost of office space, and costs related to office maintenance (cleaning, electricity, furniture, etc.). In addition to the potential saving for employers as a result of the shift to working from home, there is also expected to be a reduction in the number of cars on the road, whose immediate consequence will be less congestion and lower levels of air pollution. Indeed, congestion on the roads imposes a cost of about NIS 35 billion per year on the economy and that is expected to triple by 2040 (Israel Society of Ecology and Environmental Sciences, 2020). From a broader perspective, working from home may have additional implications, such as changes in consumption habits (Barrero et al., 2021), changes in preferences in the real estate market, a drop in municipal tax revenues for local authorities (as a result of the reduction in office and commercial space), the strengthening of the global element of the labor market, and more.

Alongside the clear advantages of expanding the scope of working from home, there are some unanswered questions as to its effectiveness. First and foremost, there is a question as to the efficiency of working from home as opposed to working in the work place. For example, how will it be possible to efficiently manage workers who are working remotely? How will new workers be onboarded and trained? How will it be possible to verify that a worker invests the required time and energy according to the hours they report? Another question relates to the importance of interaction between workers in the work place, both from the standpoint of the organization and from the social and professional one. What is the contribution of work-related conversations at the coffee machine in the office, informal advice given from one worker to another, and the exchange of information between departments in order to carry out tasks and formulate efficient work methods?

A large-scale study involving more than 60,000 American workers at Microsoft found that the transition to remote working during the first six months of the pandemic reduced cooperation and communication between the company's various departments (Yang et al., 2021). From a social and professional perspective, working from home can create gaps between workers. For example, allowing workers to choose the number of work hours worked at home may lead to the creation of two groups of workers – workers who come to work on a regular basis and workers who find it convenient to work most of the time from home, and in particular women. It can be assumed that those who come into the office regularly will have a greater familiarity with their colleagues and their managers and will develop a deeper feeling of belonging to their place of work, while workers who work primarily from home will feel isolated and cut-off, which is liable to hinder their professional development and their advancement prospects (Bloom, 2021).

These issues indicate that there is no clear, unambiguous answer to the question of whether working from home is beneficial. The answer varies across occupations and economic sectors. It may be feasible and efficient for some workers, while other workers will see it as a disadvantage (Gibbs et al., 2021). Thus, there is no uniform level of working from home that is optimal for everyone (Behrens et al., 2021).

Summary and conclusions

Working from home is a fairly new form of employment in the Israeli labor market. Although there were workers working from home prior to the pandemic, their numbers were quite limited. With the onset of the pandemic, an immediate response was needed that would make it possible to maintain business activity while complying with social distancing restrictions. Thus, more and more employers adopted this form of employment, sometimes to their detriment. They were forced to adjust the scope of working from home according to the rapidly changing circumstances: during a lockdown, more employees worked from home, while during the calmer periods some workers returned to the work place. As a result of this experience many employers declared that they intend to adopt this employment model and to use it in some format also in normal periods (CBS, 2021). Alongside this desire of employers, the acceleration in technological progress in this area, which made it easier for companies to adopt the practice during the pandemic, is also likely to contribute to the expansion of working from home in the long run, once the pandemic has ended. Thus, it appears that to a large degree the pandemic served as a catalyst in the transition to remote work.

This study looked at the likelihood of Israeli workers working from home and the fraction of work hours of those who actually work from home. The findings indicate that a worker's ability to work from home is dependent in part on occupation and economic sector. Thus, it was found that in certain sectors and occupations, such as the information and communication sector and the academic and managerial occupations, the likelihood that employees will work from home is relatively high. However, the findings show that the likelihood of working from home is also dependent on worker characteristics, such as education, gender, and whether they are parents of young children. Thus, a worker's level of education was found to be positively correlated with working from home. With respect to gender, it was found that women, and in particular women with young children, have a higher likelihood of working from home, and that among all workers working from home, women work a higher fraction of their work hours at home than men. Other socioeconomic characteristics that were found to be related to the likelihood of working from home after controlling for additional variables were the worker's population group, and, in particular, whether they are Arabs or Haredi, living in a crowded home, and living in the Southern District, all of which lower the likelihood of working from home. Thus, for example, the gaps between the districts,

which indicate a low probability of working from home for residents of the South are apparently the result of infrastructure barriers and gaps in digital intensity. The gap in likelihood of working from home between the Haredi and Arabs on the one hand and non-Haredi Jews on the other is related to the unique problems facing these populations, and, in particular, the limited use of digital technology among Haredim and the inferior internet infrastructure in Arab towns. The level of crowding in the home is another factor that hinders working from home, since it does not facilitate a work environment that is amenable to working from home with minimal distractions.

In the current situation, these gaps create a concern that the expansion of working from home — which in theory will reduce the importance of geographic distance — will in fact widen gaps in the labor market, and in particular along ethnographic lines. The findings emphasize the importance of identifying barriers and formulating a policy to remove them, whether by means of vocational training or new infrastructure and the strengthening of the old infrastructure, with the goal of promoting equality of opportunity in the labor market.

The findings of the research with respect to the scope of working from home in various economic sectors indicate that this type of employment is not suited to every worker. Therefore, in order to optimally exploit the advantages of working from home and identify the workers and employers who will benefit the most and the ideal balance between working from home and working in the work place, it is important to further investigate this subject. The generation of insights will require the gathering of data on labor productivity and on satisfaction levels among workers and employers. This can be done by periodic surveys of employers and workers over time. From the perspective of the employers, the willingness to expand work hours worked from home is dependent on the benefit implicit in this type of employment for their businesses and on the barriers to its adoption. From the perspective of the workers, there are factors that contribute to the satisfaction gained from working at home, but there are also factors that make it more difficult to work from home or that lower labor productivity. To this end, controlled experiments can be carried out or existing hybrid models can be used, such as the pilots already being implemented in various government ministries. Monitoring the efficiency of the transition to this type of employment in the various sectors and occupations and the regular publishing of the results will provide useful information to both employers in the public and private sectors and to relevant policy makers.

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Appendix

Appendix Table 1. Results of two-step regression analysis

	Target equation: Share of hours working from home	Selection equation: Likelihood of working from home
Number of total weekly hours (reference category: 1–19 hours)		
20–34	-0.15*** (0.02)	-0.12*** (0.03)
34–44	-0.25*** (0.01)	-0.09*** (0.03)
45+	-0.27*** (0.01)	-0.05* (0.03)
Public sector employment	-0.09*** (0.02)	-0.43*** (0.03)
Woman	0.08** (0.03)	0.25*** (0.05)
Education level (reference category: no Bagrut certificate)		
Bagrut certificate or non-academic post-secondary education	0.06** (0.02)	0.22*** (0.04)
Higher education	0.09*** (0.03)	0.53*** (0.04)
Sector (reference category: non-Haredi Jew)		
Arab	-0.08** (0.04)	-0.52*** (0.05)
Haredi	-0.03 (0.03)	-0.16*** (0.05)
Parents of child aged birth to 9	0.01 (0.01)	0.11*** (0.02)
Occupation (reference category: academic profession)		
Managers	-0.10*** (0.01)	-0.14*** (0.02)
Engineers/technicians/agents	-0.06*** (0.01)	-0.27*** (0.02)
Clerks/office workers	0.00 (0.02)	-0.36*** (0.03)
Sales/services	0.01 (0.05)	-1.03*** (0.03)
Agriculture/manufacturing/construction/unskilled workers	-0.30*** (0.07)	-1.37*** (0.05)
Other	-0.05 (0.04)	-0.68*** (0.05)

Appendix Table 1. Results of two-step regression analysis

	Target equation: Share of hours working from home	Selection equation: Likelihood of working from home
Industry branch (reference category: Information/communication)		
Agriculture/manufacturing	-0.21*** (0.03)	-0.88*** (0.03)
Electricity/gas	-0.15*** (0.04)	-0.15* (0.09)
Construction	-0.12** (0.06)	-0.58*** (0.11)
Water/sewage/waste management	-0.29*** (0.05)	-1.09*** (0.05)
Wholesale/retail trade	-0.25*** (0.04)	-1.02*** (0.03)
Transportation/warehousing/postal services	-0.21*** (0.04)	-0.90*** (0.05)
Accommodation/food services	-0.23*** (0.06)	-1.11*** (0.07)
Finance/real estate	-0.23*** (0.03)	-0.73*** (0.03)
Professional/scientific/technical activities	-0.14*** (0.02)	-0.63*** (0.03)
Public administration/defense	-0.32*** (0.03)	-0.72*** (0.04)
Education	-0.22*** (0.03)	-0.63*** (0.03)
Education/welfare	-0.39*** (0.05)	-1.29*** (0.03)
Arts/entertainment/recreation	-0.21*** (0.04)	-0.85*** (0.06)
Other	-0.16*** (0.03)	-0.74*** (0.04)
Residential district (reference category: Tel Aviv)		
Jerusalem	0.00 (0.01)	0.05** (0.03)
North	-0.02 (0.01)	-0.20*** (0.03)
Haifa	-0.01 (0.01)	-0.15*** (0.02)
Center	0.00 (0.01)	-0.10*** (0.02)

Appendix Table 1. Results of two-step regression analysis

	Target equation: Share of hours working from home	Selection equation: Likelihood of working from home
South	-0.05*** (0.02)	-0.32*** (0.03)
Judea/Samaria	-0.02 (0.02)	-0.14*** (0.03)
<i>Age group (reference category: 25–29)</i>		
30–34	0.00 (0.01)	0.10*** (0.03)
35–44	-0.01 (0.01)	0.09*** (0.03)
45–54	-0.02 (0.01)	0.11*** (0.03)
55–59	-0.01 (0.02)	0.03 (0.03)
60–64	0.02 (0.02)	0.10*** (0.03)
Crowded living conditions	-0.03*** (0.01)	-0.11*** (0.02)
After the third lockdown (from March 2021)	-0.16*** (0.01)	-0.40*** (0.01)
Interactions:		
Woman x parent of child age birth to 9	0.01 (0.01)	0.06** (0.03)
Woman x Arab	0.12*** (0.04)	-0.02 (0.06)
Woman x Haredi	0.03 (0.03)	0.06 (0.06)
Woman x Bagrut certificate	-0.08*** (0.03)	-0.12** (0.05)
Woman x higher education	-0.09*** (0.03)	-0.19*** (0.05)
Housekeeper		0.21*** (0.02)
Constant	0.93*** (0.04)	0.12** (0.05)

Appendix Table 1. Results of two-step regression analysis

	Target equation: Share of hours working from home	Selection equation: Likelihood of working from home
Number of observations		68,293
Number working from home out of total observations		11,742
lamda		0.13*** (0.05)
rho		0.39
sigma		0.34

Significance levels: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: Noam Zontag, Shavit Madhala, and Benjamin Bental, Taub Center | Data: CBS