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Who works from home during the COVID-19 pandemic? Case of Indonesia

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Executive Summary

During the COVID period, a form of remote working, work from home, is adopted in the workplace and/or is opted by the workers. Based on SAKERNAS August 2020 survey, 10.39% of salaried workers worked from home during this early period of the COVID-19 pandemic. Exploring on factors affecting the choice of remote working, we find vulnerable populations, as in the case of women and disabled workers, have a higher probability of working remotely from home. However, married workers correlated with a lower probability of working from home. Across sectors, manufacturing, transport, hotel and restaurant sectors are positively correlated with a higher probability of working remotely, and the reverse for the case of health and social and the government sector in general. In this early pandemic period, salaried workers who work from home mostly experienced a lower or the same level of hours work compared to the period before the COVID-19 pandemic. There seems to be divergence on the benefits of working from home, as from descriptive, an increase in earnings is dominated by workers with a relatively high wage rate.

JEL Classification: J21; J22; O21

Keywords

COVID-19 impact on jobs — work from home — remote work — internet usage — vulnerable workers

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1. Introduction

One of the prolonged COVID-19 pandemic impacts is remote work, primarily from workers' homes. In several businesses, some workers may have opted to work from home. The workplaces can also force the work-from-home (WFH) policy to mitigate and adapt the risk of COVID-19 infection. The WFH policy has varying degrees of implementation, ranging from a policy of full workdays WFH to a blended WFH and work from office (WFO) adoption.

In the context of Indonesia, remote working in pre-pandemic period cannot be tracked either from registration data and/or from the national labor survey, referring to SAKERNAS, given that it is not part of questions asked in labor survey questionnaire. The SAKERNAS questionnaire has only included questions on remote working starting August 2020. Given current data availability, this study will explore the profile of work from home as part of remote working during the early period of the COVID-19 pandemic in Indonesia.

Working from home is only one way to adapt during a period of COVID-19 pandemic. Workers who fear getting infected and/or have high risks of COVID-19 infection may take on leave, reduce their work hours, other than choose to work from home. A study by Belzunegui-Eraso & Erro-Garcés (2020) views the WFH policy adopted by workplaces as a safety measure for their employees. Health safety is one reason for employees to choose to work from home. There may also be additional requirements on whether workers can conduct their work assignments from home. Some workers may not have a choice to work from home, as in some sectors and/or type of work, the tasks may be harder or even not feasible to be conducted remotely.

Applying WFH requires workers to conduct their assignment at home and generally use the internet and/or some technological or digital device (Baruch, 2001; Mitchel, 1995; Negroponte, 1995). Therefore, remote working requires workers own and/or have access to digital device(s), access to the internet to perform its work, and adequate infrastructures in their house and other supporting infrastructures. There may be uneven digital infrastructures in developing countries in addition to housing conditions (Stanton & Tiwari, 2021; Zenkteler et al., 2022).

Recent studies on remote working, especially in the context of working from home during this period of COVID-19 pandemic, have not discussed much on the issue of digital accessibility, which may become major constraint for effective remote working especially for the case of emerging countries such as Indonesia. Uneven digital accessibility may contribute to a less effective working from home.

Therefore, in addition to exploring the recent condition of working from home, we will assess factors affecting workers to work from home, combining micro-individual level characteristics, province and/or local government, as well as sectors characteristics. We limit this study to the group of salaried employees, as a proxy of workers who work in a formal sector. The reason is that the informal sector generally consists of type of works that is harder to be performed remotely (Gottlieb et al., 2020; Dingel & Nieman 2020; Edwards & Field-Hendrey, 2002; Nguyen, 2021). In this case, we exclude self-employed workers as it is generally associated with informal work. Also, for the case of self-employed workers, it is not feasible to track whether the location of work stays the same or not in this type of non-longitudinal survey.

2. Data

In this study, we define remote working during the period of COVID-19 as working from home (WFH), referring to working from the outside office, and in this case, work location refers to work conducted at home. This coverage or definition is much more limited than the general concept of remote working. Baruch (2001) define remote or tele-working as a condition in which work activities can be conducted not only from the office, and generally, technology or electronic media is a tool that can make it happen, as also stated by Mitchel (1995) and Negroponte (1995). However, during the COVID-19 pandemic, remote working that is in compliance with health protocols, is mainly conducted from home to prevent the crowds that typically happen at the office or any onsite meeting.

We use data of remote working from SAKERNAS, a bi-annual labor force survey issued by the Central Bureau of Statistics (BPS), in February and August. The earliest direct question on remote working is only available in August SAKERNAS of 2020. There are several versions on how remote working is asked in the questionnaire. The following shows questions in SAKERNAS that may relate to remote working in this August SAKERNAS 2020:

1. *Does your workplace adopt work from home (WFH) policy?* (1. Yes, 2. No)
2. *Where are you working?* (1. at home, 2. in the market, 3. in the cinema, 4. at mall/shop, 5. transit station/terminal/airport, 6. street side, 7. others)
3. *Last week, did you work fully at home?* (1. Yes, 2. No)
4. *What are major constraints during WFH?* (1. internet's connections, 2. costs of internet, 3. taking care of family, 4. others, 5. no challenges)

To note, workplace policy on work from home, as shown in question no. 1 above, may not automatically be equivalent with workers opt to work from home. There is a question in SAKERNAS, question no. 3 above, on whether an individual has full workdays working from home as well as question addressing the location of work, as shown in question no. 2 above. Though the definition can be more general, covering not only individual who works remotely from home for all workdays, there are no direct questions identifying an individual who may work partially on certain days only from home.

There is a view that remote working before COVID-19 pandemic is different to the period during the COVID-19 pandemic, as the later period link policy of remote working as mandatory policy, and thus is not decided by an individual (Carillo et al., 2021; Anderson & Kelliher, 2020). However, we view whether the decision to work from home, is mandatory or voluntary, can be identified from the August 2020 SAKERNAS questionnaire. In the SAKERNAS, there is a question asking whether the office require or adopt a work from home policy, as shown in question no. 1 above. There is also another question, asking individuals who work, whether they conduct remote working, stated in question no. 3. We assume question no. 1 associates with a mandatory policy on remote working, while question no. 3 may indicate a decision from an individual whether she or he chose to work remotely. Even when the workplace indicates mandatory WFH policy, to some extent, this policy may not

be applied to all type of workers.

The existing literature represented the period before the COVID-19 pandemic, generally showing that work from home is rarely conducted as full workdays working remotely, rather than an option in which workers choose to work remotely partially (Bailey & Kurland, 2002). The August 2020 SAKERNAS represents an early period of the COVID-19 pandemic, which may reflect that some workers or firms applied a sudden shift from office work arrangement to working from home to cope with the health crisis. The SAKERNAS data not only informs on workplace policy of working from home but also post a different question directed to workers on their work status, whether they have worked remotely. Workers experiencing working from home, may not always state that their workplace does adopt a work from home policy, implying the prevalence of working from home could also be assessed at the worker or individual level data.

Table 1 shows the share of workers working from home, across the three questions, question no.1, no. 2, and no. 3. As shown in Table 1, across the three questions that to an extent reflect some type of remote working, there is a higher share of workers that stated of having fully worked from home last week (question no. 3) as well as workers who stated their working location is at home (question no. 2), in comparison to question no. 1 referring to workers informing that their workplace is adopting a work from home policy. In this context, we combine information from questions no. 2 and no. 3 as our definition of worker is choosing to work remotely. Given this definition and the questions in this SAKERNAS questionnaire, we will treat information from these questions to reflect workers working from home for full workdays and/or partial work from home. Within this definition, our study will address factors affecting the choice of working from home, but not on whether it is full workdays WFH or partial WFH.

3. Estimation Model

On factors affecting working from home during COVID-19 pandemic, existing studies explored through analysis at cross-country level (Dingel & Nieman, 2020; Espinoza & Reznikova, 2020), country specific that generally discuss data at the state or provincial and/or city level (Brynjolfsson et al., 2020; Okubo, 2020), as well as at the individual-micro analysis based on either cross-countries labor survey as well as specific country labor survey (Gottlieb et al., 2020; Gallacher & Hossain, 2020). In this case, Gottlieb et al. (2020) is one of few recent studies that explore the prevalence of remote working during the COVID-19 pandemic, using a micro-level labor survey, which focuses on the case of developing countries.

Our estimation model, in terms of factors that potentially may affect the decision of having conducted work from home, will be based on those existing studies, which includes socio-economic worker characteristics, sectors as well as the type of works, and the regional or spatial aspect that may or may not have a role on the adoption of working from home. Meanwhile, in terms of the analysis on plausible indicators that may inform the effectiveness of working from home, the analysis in this study will be

Table 1. Profile Across Regions of Working From Home

Descriptions	Regions						
	Sumatera	Java-Bali	Nusa	Kalimantan	Sulawesi	Mapua	National
All employees							
Workplace adopt WFH policy (WWFH) (%)	6.52	7.93	6.30	7.64	8.71	7.49	7.13
Working location at home (LWFH) (%)	16.32	22.97	21.94	16.47	19.12	13.04	18.99
Full work from home (FWFH) (%)	16.45	19.91	20.67	16.10	17.52	14.57	18.64
FWFH and WWFH (%)	10.58	12.37	7.87	14.08	14.32	13.95	12.08
FWFH or LWFH (%)	20.96	24.45	25.16	20.65	22.19	17.87	23.15
WFH - salaried employees							
Median Age (year)	34	36	34	35	36	37	38
Education decree minimal Diploma (%)	33.31	30.17	37.90	38.87	50.89	50.78	33.5
Women (%)	47.21	47.33	54.22	46.33	54.84	42.41	47.81
Disable (%)	3.67	3.26	5.97	4.27	5.49	4.83	3.66
Married (%)	63.13	69.45	67.86	70.31	69.74	74.31	68.43
Urban (%)	37.92	37.07	21.14	39.79	35.23	35.62	36.88
Median years of working (year)	5.0	5.4	4.6	5.4	6.5	6.6	5.3
Have multiple works (%)	8.64	8.54	14.51	11.08	9.64	9.51	8.96
Workplace adopt WFH policy (%)	29.87	35.73	32.35	39.72	48.73	47.57	36.05
salaried employees							
Median Age (year)	35	35	34	35	35	36	37
Education decree minimal Diploma (%)	30.19	24.76	46.26	27.05	41.36	43.41	27.99
Women (%)	35.51	36.09	38.68	30.76	39.24	33.81	35.83
Disable (%)	3.27	2.10	3.42	3.35	3.96	4.32	2.62
Married (%)	70.06	69.6	70.92	71.72	70.23	74.51	70.01
Urban (%)	34.76	33.67	21.49	31.52	30.99	32.84	33.25
Median years of working (year)	5.30	5.30	5.50	5.30	6.08	6.30	5.40
Have multiple works (%)	72.86	44.06	78.37	65.35	49	38.12	51.31
FWFH or LWFH (%)	8.70	10.31	10.48	10.06	13.16	13.69	10.39
FWFH (%)	6.40	7.71	6.62	7.29	8.55	10.26	7.51

Note: The salaried employees refer to workers aged 18 to 60 years old working at least for nine months.

limited as exploratory or based on the descriptive summary of SAKERNAS data and/or other relevant data.

The following estimation on the decision to work from home is based on the logit estimation model:

$$P(Y_i) = \beta_0 + \sum \beta_k E_i + \beta_1 A_i + \sum \delta_m X_i + \varepsilon_i \quad (1)$$

Y_i : The dummy variable for working from home, which equals one if worker chose to work from home and zero otherwise;

E_i : The respective worker socio-economic characteristics;

A_i : The dummy variable for work from home policy adoption by workplace, which equals one if the workplace is reported to issue work from home policy and zero otherwise;

X_{it} : Other covariates;

ε_i : error term.

E_i represents a worker's socio-economic characteristic variables, as used in the study by Gottlieb et al. (2020) as well as Gallacher & Hossain (2020), consisting of worker's gender, age, marital status, having more than one job, and educational background (at least diploma degree). These socio-economic worker's attributes are also standard labor supply explanatory variables following other studies that have explored labor supply in Indonesia (Alam et al., 2018).

We also include the occupation type of worker, referring only to whether she or he is a manager or professional. Dingel & Nieman (2020) and Gallacher & Hossain (2020) explore the prevalence of remote working based on occupation type and across sectors. However, given that the category of work occupation is not quite extensive, we only assess white-collar or high-skilled workers as our study used a sample of salaried workers. To note, the occupation types of workers in SAKERNAS consist of nine categories

of occupation following KBJI 2014 (*Klasifikasi Baku Jabatan Indonesia* or Standard Classification of Indonesia's Work Occupation issued in 2014). We construct a dummy variable equal to one if a worker's occupation type is manager or professional, referring to categories 1 and 2 in KBJI 2014. These categories represent the white-collar type of occupation and to an extent may also signal high-skilled workers.

Meanwhile, X_{it} other covariates refer to sector and region characteristics variables, which respectively include sectoral dummy variables, and the context of whether worker lives and/or work in city instead of municipality, and islands dummy variables.

Our observation consists of full sample, referring to salaried workers aged 18–60 years who are working when it was surveyed in August 2020, and a sub-sample of salaried workers who had worked before the COVID-19 pandemic occurred. In this case, we refer to the observations of salaried workers aged 18–60 years who have worked at least nine months in the same job, as worker's primary work (*pekerjaan utama*). This sub-sample is constructed, as we would also like to address the effectiveness of remote working. There are questions in SAKERNAS on whether hours of work or income have been changed compared to the period before the COVID-19 pandemic.

In the SAKERNAS questionnaire, the period before the COVID-19 pandemic is February 2020. To ensure that workers have at least worked and received wages prior to the COVID-19 pandemic, we assume that at least workers have worked 3 months prior to the pandemic period, which for the case of Indonesia started in March 2020. Thus, in our sample, we set a minimum of nine months of work for salaried workers and thus referring to all salaried workers of working age that have started working at least since

December 2019.

From SAKERNAS, we have a total of 161,997 salaried workers, and there are 155,541 workers with the age range of 18–60 years. Given that workers need to have work experience of at least nine months, we exclude salaried workers that have work experience of less than nine months. Therefore, the final sample consists of 139,322 observations.

There are questions in SAKERNAS on whether hours of work and/or income have changed compared to the pre-pandemic period, but no information on the quantities of the changes. The effectiveness of working from home may be different between workers that reported having constraints and workers who have no problems associated with working from home. In SAKERNAS, as discussed in the previous section, there is also a question asking respondents whether there is any constraint(s) of working from home.

4. Estimation Results and Descriptive Summary

The estimation results in Table 2 show factors correlated with the choice of working at home. In addition to estimation results in Table 2, Table 1 provides descriptive of SAKERNAS data regarding remote working, which in the context of COVID-19 pandemic referred to remote working at home.

From Table 2, women workers tend to have a higher probability of working remotely from home. As shown in Table 1, for salaried workers, there is also a higher share of women who choose full working from home. In this case, 49.81% of salaried workers who work from home are women while the overall share of women workers for salaried workers is 35.83%. Table 2 also shows that an increase in household size is also linked to a higher probability of working from home. However, married workers seem to correlate with lower probability of working from home.

Working from home gave more flexibility and to an extent positive experiences from workers (Edwards & Field-Hendrey, 2002; Moens et al., 2021; Groen et al., 2018; Fana et al., 2020), though there may be a limitation in terms of adequate working environment if the tasks are conducted at home. Studies by Anderson & Kelliher (2020) and Golden (2012) show a negative effect of working from home, as it put pressure on family and work balance; it would instead lead to an increase in hours of work. Despite the issue of work-family balance, a study by Fana et al. (2020) found that working from home has brought a positive impact for women especially women with children, in terms of closeness with family. Their qualitative study refers to the adoption of working from home in Italy, France, and Spain.

The vulnerable population as in the case of disabled workers may likely also choose remote working. Digital use that supports remote working can promote a better working environment for people with disabilities, though it may as well depend on the type of disabilities as the device and platform of video can still exclude some type of disabilities, for example, people with low vision and/or deaf (Tang, 2021). However, during the period of COVID-19, there may be less support, especially in terms of external health access

to people with disability, and in this regard workers with impairment. Based on case studies from other countries, people with disability are a group of population who are disproportionately affected by COVID-19 as a higher proportion of people with a disability get infected by COVID-19 (Rotarou et al., 2021).

Existing literature on remote working, during the period of COVID-19 pandemic, find that younger worker tends to have a higher probability to work from home in the case of developing countries (Gottlieb et al., 2020), while a study by Brynjolfsson et al. (2020) based on US data found that it is older workers that tend to remain working from home. For the case of Indonesia, during the early period of the COVID-19 pandemic, as shown in Table 2, it is older workers who correlate with a higher probability of working from home. Also shown in Table 1, at the national level, the median age of salaried workers who opt to work from home is 38 years, while the median age of salaried workers, in general, is 37 years. The salaried workers who opt to work from home in aggregate have median age that is slightly higher, and in the context of the COVID-19 pandemic, older workers may be more vulnerable to COVID-19 and therefore, they may prefer working remotely from home.

The option of working from home is more applicable for workers that have multiple works and/or high-skilled workers signaled by their higher education degree attribute or type of work (Espinoza & Reznikova, 2020; Golden, 2001). From Table 1, there is a different share of workers with multiple works from salaried workers who opt to work from home than from overall salaried workers. In aggregate, the share of salaried workers who work from home and have multiple works is 8.96% while for the overall salaried workers is 51.31%. The workers who hold a minimal diploma degree have a higher share of working from home than the overall share of high-educated salaried workers.

From the result in Table 2, workers having more than one job have instead link to lower probability of working from home, and similarly for the case of workers with a higher education background. The attribute of having a high educational background as well as the pre-existing condition of having multiple works, may not be major factors affecting the decision to work from home in the context of Indonesia¹. High-skilled workers can be reflected either through educational background or signaled from work occupation classification. As shown also in Table 2, workers referring to salaried workers with job positions as managers or professionals are more likely to opt to work from home.

By type of occupation, referring to the classification of KBJI 2014, professionals and people who work in services and sales, and craftsmanship have a higher probability of working from home. The managers do have a positive likelihood of working from home, although from the estima-

¹The hypothesis of workers having multiple work tend to associate with higher probability of working from home is based on assumption that the work hour schedule may be conducted during the same hours. For example, in the case of manufacturing sector, it is possible that workers have half-day shift in one factory, and thus can also work to a different factory or workplaces for a different shift. To note as well, the question of working from home in the SAKERNAS is only being asked to worker's main work and not to their secondary work. There may be the case that workers are working from home for their secondary work rather than primary work, but it is not captured in the data.

Table 2. Estimation Result of Working from Home: Probit Estimation and Marginal Effect

Explanatory Variables	Probit Coefficient	Marginal Effect
having multiple works	-0.038**	-0.006**
workplace adopted WFH policy	0.677***	0.106***
woman	0.221***	0.035***
married	-0.050***	-0.008***
disable	0.123***	0.019***
age	0.006***	0.001***
educational decree minimal diploma	-0.163***	-0.025***
years of working	-0.006***	-0.001***
Sectors		
manufacturing	0.083***	0.013***
trade	0.358***	0.056***
hotel and restaurant	0.072**	0.011**
transportation and logistic	0.246***	0.038***
construction	-0.123***	-0.019***
government sector	-0.123***	-0.019***
education	0.034	0.005
health and social sector	-0.331***	-0.052***
ict	0.075	0.012
finance	-0.136***	-0.021***
occupation		
manager	0.009	0.001
professional	0.175***	0.027***
technician	-0.030	-0.005
clerical	-0.188***	-0.029***
salesperson	0.261***	0.041***
skilled primary sector workers (agriculture, fishery, livestock)	-0.220***	-0.034***
craftworkers	0.249***	0.039***
operators	-0.020	-0.003
regions		
Sumatera	-0.030*	-0.005*
Java-Bali	-0.060***	-0.009***
Sulawesi	0.022	0.003
Maluku and Papua	0.173***	0.027***
Nusa islands	-0.098***	-0.015***
Constant	-1.744***	
<i>Pseudo R2</i>	0.080	
<i>No. Obs</i>	139,322	139,322

Notes: *** 1% significance level, ** 5% significance level, *10% significance level.

Table 3. WFH Constraints and Internet Usage of WFH Salaried Employees

Descriptions	Regions						National
	Sumatera	Java-Bali	Nusa	Kalimantan	Sulawesi	Mapua	
WFH - Constraints (%)							
Internet connections	32.5	30.47	30.52	37.61	40.68	51.63	32.98
Costs of internet	41.18	31.30	32.42	30.85	28.41	17.15	32.07
Taking care of family	4.93	6.37	11.36	5.06	5.14	6.86	6.05
Others	5.02	4.69	3.89	3.96	3.49	4.23	4.54
No constraint	16.36	27.17	21.80	22.52	22.28	20.13	24.35
WFH - Internet Usage (%)							
Use internet for work	49.77	57.64	45.59	60.09	62.35	49.31	56.20
Promotion	9.74	15.16	10.58	10.57	13.56	6.22	13.41
Communication	48.44	56.51	45.27	59.34	61.62	48.69	55.11
Transaction	9.80	14.00	8.83	11.63	11.07	10.18	12.64

tion result, it is not statistically significant. Meanwhile, the works of clerical supports or people who work in primary sectors such as agriculture and fisheries sectors link to a lower probability of working remotely from home. This finding aligned with existing studies showing a higher probability of working from home for a white-collar or skilled worker (Sostero et al., 2020; Gottlieb et al., 2020).

There may also be a different uptake across sectors on the adoption of working from home. Sostero et al. (2020) discuss how teleworking was previously adopted mostly in high-IT used sectors and for high-skilled workers, and manufacturing with high-IT used and absorbing relatively high-skilled workers. By differentiating sectors, our estimation results in Table 2 signal sectors in which the tasks are

relatively easy to be delivered remotely. These sectors tend to also have a higher share of workers that opt for working remotely from home. From Table 2, workers in manufacturing, trade, hotel and restaurants, as well as in transport sectors are positively correlated with a higher probability of working remotely. In this case, the higher likelihood of workers conducting WFH in the education and ICT sectors is not significant.

Meanwhile, the estimation result shows that workers in the health and social sectors, and the government sector in general, tend to have a low probability of working remotely from home. Before the pandemic COVID-19, existing studies show that health and government sectors are types of sectors that rarely have a high share of workers

working remotely and/or have a flexible work time arrangement (Golden, 2001; De Vries et al., 2019). De Vries et al. (2019) view public servants tend to experience a negative effect from working from home, showing less organizational commitments on the days they work from home. Nonetheless, their study shows that engagement can still be strong especially when it is feasible for leader-member exchange.

In the early period of the COVID-19 pandemic, the Ministry of Civil Service and Administrative Reform issued ministry decree no. 19 2020, stating a work from home policy of most government units from mid-March to late April 2020. There is also a mobility restriction policy in some provinces and local governments, referring to a policy dubbed as PSBB (*Pembatasan Sosial Berskala Besar* or mobility restriction policy). In regions that have adopted mobility restriction policy, the adoption of working from home by workplaces may be put in place, as part of compliance with government policy on mobility restriction.

Given the severity of COVID-19 in Java-Bali, we initially presume that working remotely may be chosen, especially by workers living in Java-Bali islands, as shown by existing studies from other countries (Brynjolfsson et al., 2020; Okubo, 2020). However, our estimation result shows the opposite. To note, the data summarized in Table 1 are disaggregated to area referring to five major islands: Sumatera, Java-Bali, Sulawesi, Nusa, and Mapua (Maluku and Papua) islands.

From Table 2, salaried workers reside in the eastern part of Indonesia, referring to islands of Nusa, Maluku, and Papua linked to a higher probability of working from home. These regions are characterized by manufacturing that is associated with natural resources activities, and thus there may reflect the condition in which workplaces highly recommended work from home and/or migrant workers plan to travel back to their region and therefore opt to work remotely. Meanwhile, in the context of the urban area, as expected and shown in Table 3, there is a positive correlation of residing in urban areas, referring to workers who lived in a city, tend to have a higher probability of working from home.

4.1 Working from Home during period of COVID-19

The aggregation data from SAKERNAS August 2020 shows that only 7.13% of workers who reported their workplaces have adopted a work from home policy (see Table 1). The data, to an extent, show that working remotely is also a decision taken by workers or flexibility offered from workplaces to the workers. The workers working from home due to policy from their workplaces or individual's own voluntary choice are not mutually exclusive, as there may be the case that even if the workplace adopted WFH policy, it is not mandatorily applied to all workers. From SAKERNAS data, there are around 23.15% of workers that reported conducted remotely working from home. This information is extracted from the question of whether workers answer that they fully work from home or information of working location is at home. As also shown in Table 1, only 12.08% of workers reported working from home also have WFH policy in their workplaces in response to this COVID-19 pandemic.

A lower share of workplaces that issue work from home

policy indicates that the workplace policy does not seem to bind workers to opt to work from home, and to an extent choose to be fully working from home. It is also possible that the objective of the WFH policy issued by workplaces is more of a guideline on office work hours. Workers may not also automatically have their full workdays work from home. For example, it is possible that they can only be working from home on certain days following guidelines from their workplaces. For salaried workers, as also shown in Table 1, there is only 10.39% of salaried workers who work from home.

The low share of workers who work from home to an extent may be due to the limited type of work that can be done remotely. Existing literature shows that developing countries are likely to have a lower share of work that can be done remotely (Dingel & Nieman, 2020; Gottlieb et al., 2020). For example, in the U.S, the share of workers working remotely is 37% and even more than 40% for the UK and Sweden. The share of work that can be performed remotely in Mexico and Turkey is less than 25% (Dingel & Nieman, 2020), and similarly in the case of other developing countries such as Brazil and Costa Rica, which are 10.6% and 13.3% respectively (Gottlieb et al., 2020). Nonetheless, not all developed countries reflect a relatively higher share of work from home. Okubo (2020) shows that in the context of Japan, only 17% of workers conduct working from home during the early period of the Covid-19 pandemic.

4.2 Constraints of Working from Home

Table 3 show SAKERNAS summary data on the constraints of working from home (WFH). In general, constraints on working from home are internet access and internet costs. For salaried workers who have been full working from home, 24.35% of workers reported not having any challenges or constraints on conducting full remote working. More than 30% of these workers reported difficulties from internet networks and internet costs.

Across the regions, workers who work from home also needs to deal with constraints that may hamper their effectiveness of conducting work remotely. Issue of internet accessibility is prevalent, especially in Maluku and Papua (Mapua) islands. In the eastern part of Indonesia, as in Mapua islands, workers who work from home following workplaces adoption of working from home policy stated that difficulties of this remote working are not necessarily costs of the internet but rather the internet network quality in this area, and to a less extent, a similar condition also occurred for workers located in Sulawesi islands.

On the use of the internet for working, especially for WFH salaried workers, the internet is mainly used for communication rather than handling transaction and/or promotion activities. As shown in Table 3, 68.3% of workers reported internet use for office-related communication while only 16.11% and 15.5% respectively reported using internet for handling workplace transactions and promotion.

4.3 Is there a premium from WFH?

From workers' perspectives, the benefit of working from home can either be reflected from an increase in income or a time saving as the workers experienced shorter work hours for relatively the same level of income. The use of digital

and technology may create ease and improve efficiency related to work activities. It may translate to timesaving to engage in the respective work (Moens et al., 2021; DeFilippis et al., 2020). Thus, the premium of working from home existed when workers experienced an increase in income compared to the period before the COVID-19 pandemic, or when workers have received the same income despite spending shorter hours working during the COVID-19 pandemic. If premium from working remotely existed, it reflects an increase in the welfare of those workers.

In comparison to the period before the Covid-19 pandemic, from Table 4, the share of WFH salaried employees who experienced a decrease in hours of work is 46.2%; however, the majority of them also experienced a decline in earnings during this COVID-19 period. As shown in Table 4, there is 26.7% of WFH salaried employees in which lower hours works have also translated to receiving lower earnings. To an extent, working from home, for some workers possibly indicates part-time workers. In this case, an increase in welfare from lower hours of work and an increase in income is only experienced by 0.6% of WFH salaried employees.

Based on a sub-sample on salaried employees, as shown in Table 4, workers working from home, as a group, have a lower average of weekly work hours, although respectively have a higher average monthly income in comparison to non-WFH workers. WFH salaried employees have average weekly work hours of 30.97 hours, while non-WFH salaried employees work 38.67 hours a week. Lower average weekly work hours for WFH salaried employees does not necessarily imply lower worker's income given as there may be different characteristics even within each group, referring to salaried workers who work from home and similarly in the case of salaried workers who opt not to work from home.

To some extent, as also shown in Table 4, there is a lower average monthly income for salaried employees who work from home than non-WFH salaried employees. At the national level, WFH and non-WFH salaried employees' average monthly income are 2.49 million IDR and 2.83 million IDR. The average monthly income of non-WFH salaried employees is still statistically higher than the overall WFH salaried employees. To note, in terms of monthly earnings, only 1.89% of WFH salaried employees have an increase in earnings. There is a higher share of WFH salaried employees who experienced a reduction in their monthly payments during the COVID-19 pandemic. From Table 4, 39.68% of WFH salaried employees have lower monthly earnings compared to the period of February 2020.

An increase in wage rate is an indication of both an increase in workers' welfare as well as worker productivity. From the question that compares weekly hours of work and earnings received before and during the COVID-19 pandemic, we can also extract information of whether a worker has a higher wage rate during this early period of COVID-19, referring wage rate as per hour wage income. From Table 4, only 20.5% of WFH salaried employees experienced improved welfare, referring to an increase in the wage rate.

Overall, it is not clear whether there is a premium of WFH and/or an increase in productivity from working from home. As the sectors that correlate with a higher likelihood of working from home are also sectors that experienced low

and even negative sector GDP growth, it may partially be the cause of limited productivity increase, referring to the rise in worker wage rate during this pandemic COVID-19, especially from WFH salaried employees.

5. Conclusion

During the COVID-19 pandemic, a form of remote working, work from home, is adopted in the workplace and/or is opted by the workers. Based on the SAKERNAS August 2020 survey, 23.15% of workers chose remote working, and 10.39% in the case of salaried workers. On exploring factors affecting remote working during COVID-19, we limit the sample of SAKERNAS to only include salaried workers, generally referred to as formal sector workers.

Exploring on factors affecting the choice of remote working in the formal sector, we find vulnerable populations, as in the case of women, and disabled workers, have a higher probability of choosing to work remotely. However, married workers correlated with a lower probability of working from home. Across sectors, manufacturing, trade, transport, and hotel and restaurant sectors are positively correlated with a higher probability of working remotely, and the reverse for the case of health and social, as well as the government sector in general. There are also seen differences in responsiveness to work from home depending on the type of work, as professionals and people who work in services, sales, and artist or craftsmanship tend to correlate with a higher probability of working from home.

From the group of salaried workers who work from home, 75.65% of workers reported difficulties in conducting tasks optimally remotely. The constraints range from internet network accessibility, connection reliability, internet costs, and other issues, which may limit the potential benefit of working from home. The perceived major constraints of working remotely also vary across regions. For example, in the western part of Indonesia, affordability of internet access is a major constraint of having work from home, while it is more of internet network accessibility in the eastern part of Indonesia.

In this early COVID-19 pandemic period, for salaried workers, the descriptive has not clearly shown that workers experienced an increase in their welfare or working productivity by working remotely from home. From the descriptive, remote working has not been linked to longer work hours compared to pre-pandemic periods or salaried workers who are not working from home. There seem to be instead under-employed salaried workers who work from home, as hours of work at home on average are lower than salaried workers who have not worked remotely. Most salaried workers who work from home tend to have shorter hours of work, and the group that experienced longer hours of work seems to be salaried workers with a low wage rate.

References

- Alam, I. M., Amin, S., & McCormick, K. (2018). The effect of religion on women's labor force participation rates in Indonesia. *Journal of the Asia Pacific Economy*, 23(1), 31-50. doi: <https://doi.org/10.1080/13547860.2017.1351791>.

Table 4. WFH and Non-WFH Salaried Employees on Average Hours Work and Average Wage Rate Across Category of Earnings and/or Hours Work Changes

Category of Impact	WFH				Non-WFH				t-test		
	% of WFH	mean hours work	mean earnings	mean wage rate	% of Non-WFH	mean hours work	mean earnings	mean wage rate	weekly hours work	monthly earnings	per hour wage
Increase in both Earnings and Work Hours	0.34%	46.64	2.53	17173.26	0.52%	46.40	2.84	16105.38	(Hwfh = Hnon-wfh)***	(Ewfh = Enon-wfh)***	(Wwfh = Wnon-wfh)***
Increase in Earnings while Work Hours stays the same	0.94%	40.83	3.06	29933.06	1.41%	43.21	3.20	19771.18	(Hwfh < Hnon-wfh)**	(Ewfh = Enon-wfh)***	(Wwfh > Wnon-wfh)***
Increase in Earnings while Work Hours decrease	0.62%	19.83	3.26	67684.89	0.40%	27.19	3.24	35790.25	(Hwfh < Hnon-wfh)***	(Ewfh = Enon-wfh)***	(Wwfh > Wnon-wfh)***
Earnings stays the same while Work Hours increase	1.30%	41.40	2.99	20998.78	1.16%	46.25	3.53	21738.37	(Hwfh < Hnon-wfh)***	(Ewfh < Enon-wfh)***	(Wwfh = Wnon-wfh)***
Both Earnings and Work Hours stays the same	38.16%	40.00	2.54	18392.25	52.34%	41.92	2.96	19008.64	(Hwfh < Hnon-wfh)***	(Ewfh < Enon-wfh)***	(Wwfh < Wnon-wfh)**
Earnings stay the same while Work Hours decrease	18.90%	19.38	3.10	56768.16	11.87%	27.12	3.25	37508.49	(Hwfh < Hnon-wfh)**	(Ewfh < Enon-wfh)***	(Wwfh > Wnon-wfh)***
Earnings decrease while Work Hours increase	0.76%	44.04	2.43	15821.6	0.48%	47.67	2.94	16534.64	(Hwfh < Hnon-wfh)*	(Ewfh < Enon-wfh)**	(Wwfh = Wnon-wfh)***
Earnings decrease while Work Hours stays the same	12.21%	39.94	2.01	13287.6	13.19%	43.71	2.36	14362.57	(Hwfh < Hnon-wfh)***	(Ewfh < Enon-wfh)***	(Wwfh < Wnon-wfh)**
Both Earnings and Work Hours decrease	26.70%	20.99	1.95	23863.41	18.50%	32.17	2.23	19049.4	(Hwfh < Hnon-wfh)***	(Ewfh < Enon-wfh)***	(Wwfh > Wnon-wfh)***
Overall Sample	100.00%	30.97	2.49	27641.73	100.00%	38.67	2.83	21107.25	(Hwfh < Hnon-wfh)***	(Ewfh < Enon-wfh)***	(Wwfh > Wnon-wfh)***

Notes: *** 1% significance level, ** 5% significance level, * 10% significance level,
 E: monthly earnings (in million IDR),
 W: per hour wage (in IDR), and
 H: number of hours work in a week.

- Anderson, D., & Kelliher, C. (2020). Enforced remote working and the work-life interface during lockdown. *Gender in Management*, 35(7/8), 677-683. doi: <https://doi.org/10.1108/GM-07-2020-0224>.
- Bailey, D. E., & Kurland, N. B. (2002). A review of telework research: Findings, new directions, and lessons for the study of modern work. *Journal of Organizational Behavior*, 23(4), 383-400. doi: <https://doi.org/10.1002/job.144>.
- Baruch, Y. (2001). The status of research on teleworking and an agenda for future research. *International Journal of Management Reviews*, 3(2), 113-129. doi: <https://doi.org/10.1111/1468-2370.00058>.
- Belzunegui-Eraso, A., & Erro-Garcés, A. (2020). Teleworking in the Context of the Covid-19 Crisis. *Sustainability*, 12(9), 3662. doi: <https://doi.org/10.3390/su12093662>.
- Brynjolfsson, E., Horton, J. J., Ozimek, A., Rock, D., Sharma, G., & TuYe, H. Y. (2020). COVID-19 and remote work: An early look at US data. *NBER Working Paper*, 27344. National Bureau of Economic Research. doi: 10.3386/w27344.
- Carillo, K., Cachat-Rosset, G., Marsan, J., Saba, T., & Klarsfeld, A. (2021). Adjusting to epidemic-induced telework: Empirical insights from teleworkers in France. *European Journal of Information Systems*, 30(1), 69-88. doi: <https://doi.org/10.1080/0960085X.2020.1829512>.
- DeFilippis, E., Impink, S. M., Singell, M., Polzer, J. T., & Sadun, R. (2020). Collaborating during coronavirus: The impact of COVID-19 on the nature of work. *NBER Working Paper*, 27612. National Bureau of Economic Research. doi: 10.3386/w27612.
- De Vries, H., Tummers, L., & Bekkers, V. (2019). The benefits of teleworking in the public sector: Reality or rhetoric?. *Review of Public Personnel Administration*, 39(4), 570-593. doi: <https://doi.org/10.1177/0734371X18760124>.
- Dingel, J. I., & Neiman, B. (2020). How many jobs can be done at home?. *NBER Working Paper*, 26948. National Bureau of Economic Research. doi: 10.3386/w26948.
- Edwards, L. N., & Field-Hendrey, E. (2002). Home-based work and women's labor force decisions. *Journal of Labor Economics*, 20(1), 170-200. doi: <https://doi.org/10.1086/323936>.
- Espinoza, R., & Reznikova, L. (2020). Who can log in? The importance of skills for the feasibility of teleworking arrangements across OECD countries. *OECD Social, Employment and Migration Working Papers*, 242. Organisation for Economic Co-operation and Development. <https://www.oecd.org/publications/who-can-log-in-the-importance-of-skills-for-the-feasibility-of-teleworking-arrangements-across-oecd-countries-3f115a10-en.htm>.
- Fana, M., Milasi, S., Napierala, J., Fernandez-Macias, E., & Vázquez, I. G. (2020). Telework, work organisation and job quality during the COVID-19 crisis: a qualitative study. *JRC Working Papers Series on Labour, Education and Technology*, 2020/11. European Commission, Joint Research Centre (JRC).
- Gallacher, G., & Hossain, I. (2020). Remote work and employment dynamics under COVID-19: Evidence from Canada. *Canadian Public Policy*, 46(S1), S44-S54. doi: <https://dx.doi.org/10.3138/cpp.2020-026>.
- Golden, L. (2001). Flexible work schedules: What are we trading off to get them. *Monthly Labor Review*, 124(3), 50-67.
- Golden, T. D. (2012). Altering the effects of work and family conflict on exhaustion: Telework during traditional and nontraditional work hours. *Journal of Business and Psychology*, 27(3), 255-269. doi: <https://doi.org/10.1007/s10869-011-9247-0>.
- Gottlieb, C., Grobovšek, J., Poschke, M., & Saltiel, F. (2020). Working from Home in developing countries. *IZA Discussion Paper Series*, 13737. IZA Institute of Labor Economics. <https://www.iza.org/publications/dp/13737/working-from-home-in-developing-countries>.
- Groen, B. A., Van Triest, S. P., Coers, M., & Wtenweerde, N. (2018). Managing flexible work arrangements: Teleworking and output controls. *European Management Journal*, 36(6), 727-735. doi: <https://doi.org/10.1016/j.emj.2018.01.007>.
- Mitchell, W. J. (1995). *City of bits: space, place, and the infobahn*. MIT Press.
- Moens, E., Lippens, L., Sterkens, P., Weytjens, J., & Baert, S. (2021). The COVID-19 crisis and telework: a research survey on experiences, expectations and hopes. *The European Journal of Health Economics*. doi: <https://doi.org/10.1007/s10198-021-01392-z>.
- Negroponte, E. (1995). *Being digital*. Hodder and Stoughton.
- Nguyen, M. H. (2021). Factors influencing home-based telework in Hanoi (Vietnam) during and after the COVID-19 era. *Transportation*, 48(6), 3207-3238. doi: <https://doi.org/10.1007/s11116-021-10169-5>.
- Okubo, T. (2020). Spread of COVID-19 and telework: Evidence from Japan. *Covid Economics: Vetted and Real-Time Papers*, 32, 1-25.
- Rotarou, E. S., Sakellariou, D., Kakoullis, E. J., & Warren, N. (2021). Disabled people in the time of COVID-19: identifying needs, promoting inclusivity. *Journal of Global Health*, 11, 03007. doi: 10.7189/jogh.11.03007.
- Sostero, M., Milasi, S., Hurley, J., Fernandez-Macias, E., & Bisello, M. (2020). Teleworkability and the COVID-19 crisis: a new digital divide?: Labour market change. *JRC Working Paper Series on Labour, Education, and Technology*, 2020/05. European Foundation. <https://euagenda.eu/upload/publications/wpef20020.pdf>.
- Stanton, C. T., & Tiwari, P. (2021). Housing consumption and the cost of remote work. *NBER Working Paper*, 28483. National Bureau of Economic Research. doi: 10.3386/w28483.
- Tang, J. (2021). Understanding the telework experience of people with disabilities. *Proceedings of the ACM on Human-Computer Interaction*, 5(CSCW1), 30. doi: <https://doi.org/10.1145/3449104>.
- Zenktele, M., Darchen, S., Mateo-Babiano, I., & Baffour, B. (2022). Home-based work in cities: In search of an appropriate urban planning response. *Futures*, 102494. doi: <https://doi.org/10.1016/j.futures.2019.102494>.

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