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WAVE 5

National Income Dynamics Study (NIDS) – Coronavirus Rapid Mobile Survey (CRAM)

Socioeconomic inequalities in ability to work from home during the coronavirus pandemic:

The case of South Africa

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Socioeconomic inequalities in ability to work from home during the coronavirus pandemic: The case of South Africa

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Abstract

The coronavirus pandemic has changed the nature of work, with physical distancing regulations aimed at preventing infections necessitating work-from-home arrangements. According to previous studies, many individuals have expressed a preference for working from home due to fear of contracting the virus at work. However, not all work can be performed from home. Moreover, the literature indicates that jobs that are amenable to be performed from home generally pay more, while the ability to work from home will likely increase income inequality. Therefore, we ascertained the magnitude of the socioeconomic inequalities in ability to work from home among South African employees during the pandemic. We used data from the last four waves of the National Income Dynamics Study-Coronavirus Rapid Mobile Survey, a nationally representative longitudinal telephonic survey of South African adults conducted between May 2020 and May 2021. Using years of education as the ranking variable and calculating concentration indices, we found that the ability to work from home was pro-rich (i.e. concentrated more on the better off) in all the study periods. The results were robust to the use of different ranking variables like per capita household income and monthly wage as well as varying the age cut-off. There was no gender difference in the inequalities. Casual employment, urban residence, being married/cohabiting, age, and household size dampened the degree to which ability to work from home favoured those in higher socioeconomic classes. Conversely, being non-African, living in a house/flat, and having more education enhanced the pro-richness of ability to work from home. This study highlights the significant inequalities associated with ability to work from home, a likely important determinant of labour market attachment and economic outcomes in the pandemic and post-pandemic periods. Interventions targeted at inequality-enhancing factors like race, housing and education may be important in lowering these inequalities.

Keywords: Ability to work from home; Inequality; South Africa; COVID-19

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Executive summary

Introduction

It is common knowledge that the coronavirus (COVID-19) pandemic has fundamentally changed the global economy and the nature of work over the past year. One of the most common measures enacted by governments especially during the early days of the pandemic was the imposition of movement restrictions through lockdowns and associated directives to employers to implement remote working measures. While many of these restrictions have been relaxed over the course of the pandemic, there is a recognition that the prevalent onsite work culture prior to the pandemic may no longer be the norm going forward. For instance, recent research from a survey of 190 countries shows that about 89% of people expect to be able to work from home at least sometimes after the end of the COVID-19 pandemic. In South Africa, the survey found that up to 44 percent of people liked the idea of working from home (Strack et al., 2021). No doubt, preference for remote work is largely fuelled by the fear of contracting the virus at work.

Irrespective of the popularity of work-from-home arrangements, the reality is that most jobs currently cannot be performed from home in South Africa as well as in many countries globally. For instance, using the 2017-2019 South African Quarterly Labour Force Surveys, a recent study found that of the 13.8 million South African workers employed prior to the strictest level 5 lockdown restrictions, only about 14 percent could feasibly work from home. Meanwhile, working from home in South Africa is mostly possible only for relatively skilled workers (Kerr & Thornton, 2020). Little wonder that jobs amenable to being performed from home generally pay more both globally and in South Africa (Benhura & Magejo, 2021; Dingel & Neiman, 2020). Consequently, ability to work from home has been predicted to be a driver of both within and between-country inequalities (Delaporte et al., 2021). Given the expected significant role of ability to work from home to inequalities and given the already high level of income inequality in South Africa, this study sought to ascertain the magnitude of the socioeconomic inequality in ability to work from home as well as its determinants.

Summary of findings and policy recommendations

Using longitudinal data from the National Income Dynamics Study-Coronavirus Rapid Mobile Survey conducted between May 2020 and May 2021 and focusing on employees, we found the following:

- Women were significantly more likely to work from home than men in most periods of the survey. The prevalence of ability to work from home ranged from 26-30 percent and 20-25 percent for women and men respectively between July 2020 and May 2021.

- Expectedly, ability to work from home has been declining over time even though the decline was not statistically significant.

- Workers able to work from home significantly earned more than those who could not work from home, with the average monthly wage of the former between two and three times that of the latter over the July 2020-May 2021 period.

- Ability to work from home was pro-rich. In other words, it was concentrated more on those in higher socioeconomic categories irrespective of the measure of socioeconomic measure used to rank workers (years of education, monthly wages, or per capita household income). This result was consistent in each of the periods for which data was available – July-August 2020, November-December 2020, February-March 2021, and April-May 2021.

- However, there was no significant gender difference in the extent of the socioeconomic inequalities in ability to work from home.

- Factors that contributed towards exacerbating the socioeconomic (education-related) inequality in ability to work from home included race (being non-African relative to African), housing type (living in a house or flat relative to a traditional structure or shack) and higher educational attainment. This was due to each of these conditions being associated with better socioeconomic outcomes as well as being associated with a higher probability of ability to work from home.

It is well known that South Africa is one of the most income unequal countries in the world. Moreover, the country has been hard hit by the coronavirus pandemic and is currently reeling from a so-called third wave of infections resulting in a spike in infections over a year since the first lockdown was announced in March 2020. Given the asymmetric impact of the pandemic on various aspects of life (Nwosu & Oyenubi, 2021), it has become imperative to analyze socioeconomic inequalities in a key feature of the pandemic era economy – the ability to work from home. We showed that ability to work from home is concentrated more on the better off (in terms of educational attainment, labour market earnings and household income). While women are more likely able to work from home than men, the associated socioeconomic inequalities do not differ by gender. Race, housing quality and education are the factors that contribute to widening the extent to which inequalities in ability to work from home favour the better educated in the country. Therefore, targeting African workers, those living in poor housing conditions and workers with lower educational attainment will likely mitigate the observed inequalities and provide a more level playing ground for enabling workers to be able to carry out their jobs from home when possible. This will mitigate the fears of these economically disadvantaged workers about contracting the virus at work and minimize the need to have to choose between one's health and livelihood.

Introduction

That the coronavirus disease (COVID-19) pandemic has fundamentally changed the global economy is not in dispute. Given the infectious nature of the disease, one of the most common measures enacted by most governments especially during the early days of the pandemic was the imposition of severe movement restrictions through lockdowns and associated directives to employers to implement remote working measures (Benhura & Magejo, 2021). While many of these restrictions have been relaxed over the course of the pandemic, there is a recognition that the prevalent onsite work culture prior to the pandemic may no longer be the norm going forward. For instance, recent research from a survey of 190 countries shows that about 89% of people expect to be able to work from home at least sometimes after the end of the current pandemic (Strack et al., 2021).

Available evidence demonstrates that many workers remain apprehensive about working onsite due to fears of contracting the virus. Some of the reasons for such apprehension include perceived lack of workplace preparedness to protect workers from COVID-19 and a lack of comprehensive workplace policies regarding COVID-19 and associated safeguards. For instance, in a survey of 1,049 employees in Hong Kong surveyed between 17 and 27 February 2020, workers who reported having a workplace policy in their company reported dissatisfaction with its comprehensiveness (36%), timeliness (38%) and transparency (63%) (Wong et al., 2020). While it is expected that workplace preparedness for COVID-19 is likely to have improved over time, it is not surprising that worker apprehension regarding onsite work persists (Strack et al., 2021).

It is therefore, not surprising that many workers prefer working from home on a full time basis, with recent results indicating a greater preference in developing countries relative to most of their economically advanced counterparts. For instance, in a survey conducted by the Boston Consulting Group in 2020, about 44% of South Africans and 39% of Indians liked the idea of working from home compared to lower figures from advanced countries except the USA which reported a prevalence of 35% (Strack et al., 2021). While some form of remote working arrangement has become imperative presently, it is also important to note that it is associated with a number of challenges not least the challenge of maintaining work-life balance and stress (Toniolo-Barrios & Pitt, 2021).

Given the widespread need for remote working arrangements, the International Labour Organization (ILO) has published a guide for teleworking during and beyond the pandemic (International Labour Organization, 2020). It sees telework during the current pandemic as a necessary means of ensuring business continuity in a crisis situation akin to natural disasters and urges employers to ensure that all workers who perform tasks compatible with teleworking arrangements (including interns and temporary employees) be allowed to work remotely during the pandemic.

However, not every job is amenable to be performed remotely and not every worker or occupational grouping is equipped to effectively work remotely. In fact, majority of jobs cannot be performed remotely. In this vein, Dingel and Neiman (2020) have provided an estimation of the feasibility of working from home in the USA, taking advantage of the US Bureau of Labour Statistics' detailed occupational dictionaries based on the Occupational Information Network database. They found that only 37% of jobs in the USA can be entirely performed at home, with substantial cross-city and industry variations. Moreover, these jobs are better remunerated than those that cannot be done at home. This can at least be partly explained by the fact that jobs that require face-to-face interactions are mostly concentrated among the lower wage categories (Avdiu & Nayyar, 2020). These outcomes are not restricted to the USA.

One drawback of studies of job amenability to remote work based on developed countries is their limited applicability given that the task content of many jobs within an occupational category exhibits substantial cross-country heterogeneity. Thus, some jobs that may be classified as being amenable to working from home in developed countries with high internet penetration and quality may however, be characterized as requiring intensive face-to-face interactions and physical exertion in poorer countries (Hatayama et al., 2020; Saltiel, 2020).

To provide more nuance to the discussion, Hatayama et al. (2020) examined the amenability of jobs to work-from-home arrangements in 53 countries with varying levels of economic development. Using home access to the internet as a determinant of working from home, they found that a country's level of economic development was positively correlated with the amenability of jobs to working from home. They described this phenomenon as being explained by the fact that jobs in poor countries are relatively more manual in nature and use less information and communications technology, while workers in such countries have poorer access to home internet. In terms of worker characteristics, women, college graduates, and workers on salaried and formal jobs were more likely to be engaged in jobs amenable to working from home than the average worker. Moreover, the converse obtained for workers in the hotel and restaurant, construction, agriculture, and commerce industries. They warned that these outcomes may exacerbate inequities between and within countries. Other studies have also shown wide cross-country variations in the percentage of jobs that can be done remotely, with job amenability to working from home disfavouring poorer countries. For instance, the percentage of jobs that can be done remotely ranges from 6% in Ghana, 23% in Yunnan, China, to 56% in Germany (Alipour et al., 2020; Dingel & Neiman, 2020; Saltiel, 2020) while about 39% of Canadians were in jobs that could be done from home during the pandemic (Deng et al., 2020).

Adapting the Dingel and Neiman (2020) methodology, Kerr and Thornton (2020) ascertained job amenability to working form home in South Africa. They show that of the 13.8 million South African workers employed prior to the strictest level 5 lockdown, only 13.8% could feasibly work from home. Furthermore, 63% of the workers were neither classified as essential nor could work from home.

Such varied capabilities to work from home especially in a period when such work arrangements are essential if not the only feasible way of ensuring business continuity has the potential to widen existing inequalities and inequities. One of the reasons for this is that the essential nature of social distancing regulations has necessitated working from home, thereby increasing wage inequality between those able and unable to adhere to such regulations (Delaporte et al., 2021). Consequently, as already noted, jobs amenable to being performed from home pay higher, in part due to the nature of such jobs. For instance, it has been noted that domestic workers and security guards (who make up some of the lowest paid workers) need to work onsite, while some of their counterparts in higher paid occupations like teachers can afford to perform their work remotely (Benhura & Magejo, 2021). And according to Kerr and Thornton (2020), working from home is almost an exclusive preserve of relatively skilled workers in a developing country like South Africa. They found that while 65% of skilled workers and 56% of professionals could work from home in South Africa, such a luxury was virtually not possible for those in low-skilled occupations. This finding is similar to results from Japan (Kawaguchi & Hiroyuki, 2020).

The South African context

As is well documented, South Africa is one of the most unequal countries globally with a Gini coefficient of 0.65 in 2015 (Statistics South Africa, 2019). Much of this inequality is rooted in the country's ugly history of racial segregation and economic exclusion. This already sad situation has been worsened by the current pandemic. As highlighted in previous reports, the massive job loss in the country due to the pandemic adversely affected the poor and vulnerable more than the better off. For instance, between February and April 2020, low earning workers (earning below 3,000 Rands, i.e. about US$214 per month) were about eight times as likely to lose their jobs as top earners (who earned more than 24,001 Rands, i.e. about US$1,714 per month) (Ranchhod & Daniels, 2020). Such enormous socioeconomic gradient to job loss during a period characterized by some of the strictest lockdown restrictions in the country is no doubt partly due to the fact that most jobs could only be done remotely. And with the growing importance of remote work, it is likely that such a gradient will persist. In this vein, it is likely that the ability to work from home will play an important role in determining socioeconomic inequality in South Africa for the foreseeable future.

South Africa implemented stringent restrictions as a means to controlling infections against the COVID-19 pandemic (Carlitz & Makhura, 2020). One of the main measures was the declaration

of a national state of disaster on 15 March 2020 and the implementation of a series of nationwide lockdowns, with the highest level (i.e. level 5) in force from 26 March to 30 April 2020 (Dlamini-Zuma, 2020). Level 5 lockdown restrictions proscribed every form of non-essential travel and gathering including for work, with people confined to their homes. The restrictions were lowered to level four which banned most non-essential travel and gatherings between 1-31 May 2020. Further lowering of the restrictions to levels 3, 2 and the least restrictive 1 (which allowed almost all economic and social life to resume) were implemented in the periods, 1 June – 17 August 2020, 18 August – 20 September 2020, and 21 September – 28 December 2020. An increase in infections both locally and internationally resulted in the country being placed on adjusted level 3 lockdown from 29 December 2020 to 28 February 2021. Since then, the country has implemented alert levels 1 and two during 1 March – 30 May 2021 and 31 May – 15 June 2021. Currently, the country has been on adjusted alert level 3 since 16 June 2021 (South African Government, 2021).

While some studies have analyzed various facets of the ability to work from home during the pandemic in South Africa, to the best of our knowledge, none has estimated its socioeconomic inequalities as well as the associated determinants (Benhura & Magejo, 2021; Kerr & Thornton, 2020). The closest study to ours is Benhura and Magejo (2021) who estimated the determinants of the inability to work from home during November-December 2020. However, their study did not tackle the issue of socioeconomic inequalities, i.e. the extent to which ability to work from home favours the better off and places the poor at a socioeconomic disadvantage. Moreover, they only analyzed data over a short duration which does not encompass the entire period of the pandemic for which data is available in South Africa.

Given the foregoing, this study estimates the socioeconomic inequality associated with the ability to work from home as well as the factors that significantly contribute to the observed inequality in South Africa during the COVID pandemic. We hope that the study will provide the evidence base for the better targeting of the determinants of socioeconomic inequalities in the ability to work from home.

Material and methods

Data and key variables

Waves 2-5 of the National Income Dynamics Study (NIDS)-Coronavirus Rapid Mobile (CRAM) survey were used for the analysis (NIDS-CRAM, 2020a, 2020b, 2021a, 2021b). The NIDS-CRAM survey is a five-wave telephonic longitudinal survey of South Africans designed to assess the socioeconomic and health impacts of the COVID-19 pandemic. The sampling frame was drawn from the adult sample of the fifth (i.e. final) wave of the NIDS survey which was conducted in 2017. NIDS is the first nationally representative panel dataset of South Africans. Batch sampling, a sampling technique whereby potential sample members were provided to fieldwork teams in batches (in this case, of 2,500), was used for sampling. This allowed for flexibility through the adjustment of the sampling rate as the survey progressed and more information about stratum response became available (Kerr et al., 2020). The five waves of NIDS-CRAM were conducted between 7 May 2020 and 11 May 2021; thus, data were collected under various lockdown levels[4].

The outcome variable is ability to work from home. Employees were asked whether they were able to work from home. Possible responses were, “Yes – most of the time”, “Yes – some of the time”, and “No – none of the time”. For the primary analysis, the measure of socioeconomic condition used as the ranking variable was the number of years of schooling. We would have used per capita

4 Wave 1 data were collected between 7 May and 27 June 2020 (lockdown levels 4 and 3) while wave 2 were collected between 13 July and 13 August 2020 (lockdown level 3). Wave 3 was collected from 2 November to 13 December 2020 (lockdown level 1) while wave 4 was obtained between 2 February and 10 March 2021, coinciding with adjusted lockdown levels 3 and 1. Finally, wave 5 was collected between 6 April and 11 May 2021 (i.e. adjusted lockdown level 1) (Ingle et al., 2021; South African Government, 2021)

household income; however, as has been earlier documented, the income variable had a substantial number of missing observations (Nwosu et al., 2021). Variables employed as determinants of the socioeconomic inequality in ability to work from home were: the type of employment (casual or formal), occupation, gender, location, race, co-residence with children, marital status, respondent having a chronic health condition, age, household size, years of schooling, and indicators for time.

Analytical methods

We used concentration curves and indices to measure the magnitude of socioeconomic inequality in ability to work from home. A concentration curve measures the cumulative shares of the population with a particular outcome (in this case ability to work from home) ranked against a measure of socioeconomic status. A 45-degree line depicts the line of perfect equality – points at which the rich and the poor have the same value of the outcome. In most empirical cases however, the concentration curve either lies above or below this line of equality. Curves lying above the line of equality indicate that the outcome disfavours the poor while those lying below the line of equality are indicative of the outcome being pro-rich, i.e. favouring the rich/socioeconomically better off (O'Donnell et al., 2008).

Following O'Donnell et al. (2008), we note that the concentration index can be measured as twice the area between the concentration curve and the 45-degree line. However, for ease of computation, it can also be defined as twice the covariance between the outcome of interest and the fractional rank in the distribution of the socioeconomic ranking variable (equation [1] below).

$$C = \frac{2}{\mu} cov(A, r) \qquad [1]$$

where C, A, r, and μ depict the concentration index, outcome (here, ability to work from home), the fractional rank in the distribution of the socioeconomic status variable, and the mean of the outcome respectively. It ranges from -1 to +1, where negative values indicate the outcome of interest disfavouring the poor (similar to the concentration curve lying above the 45-degree line) while the converse holds for positive values. A zero value indicates perfect equality, analogous to the concentration curve coinciding everywhere with the 45-degree line.

Intuitively, both measures complement each other. While the concentration curve is a useful tool for depicting the existence of socioeconomic inequalities in outcomes of interest, it cannot be used to compare the magnitude of inequality between various populations, time periods, etc. Especially in situations where various concentration curves cross, it becomes difficult to determine which curve dominates. Conversely, while the concentration index provides a useful summary of socioeconomic inequality, it does not provide the kind of nuance possible with the concentration curve across the entire socioeconomic distribution. For instance, it is possible for a zero value to be the result of the curve crossing the line of equality with equal areas below and above the line. Similarly, a positive (negative) value may not necessarily result from the curve lying exclusively below (above) the line of quality). Such outcomes may be due to a significantly larger area of the curve lying below (above) the 45-degree line (O'Donnell et al., 2008).

The concentration index for categorical variables (as in this study) however, does not lie between -1 and +1, hence the need for some normalization (Wagstaff, 2005). To correct for this, we used the Erreygers' normalization as follows (Erreygers, 2009a, 2009b):

$$\mathrm{E} = 4\left(\frac{\mu}{b-a}\right) C \qquad [2]$$

where E, a and b depict the Erreygers' correction and the lower and upper bounds of the outcome respectively while other terms are as defined in equation [1].

Decomposition of the inequality

We employed the Wagstaff technique in decomposing the socioeconomic inequality in the ability to work as follows (Wagstaff et al., 2003):

$$C_i = \alpha + \sum_k \beta_k Z_{k,i} + \varepsilon_i \quad [3]$$

Where Z denotes the determinants; α and β are parameters; ε is the error term; while i and k are individual and covariate identifiers.

The concentration index can therefore be re-written as:

$$C = \sum_{k=1}^{K} \left(\frac{\beta_k \bar{Z}_k}{\mu} \right) C_k + \left(\frac{\eta_\varepsilon}{\mu} \right) \quad [4]$$

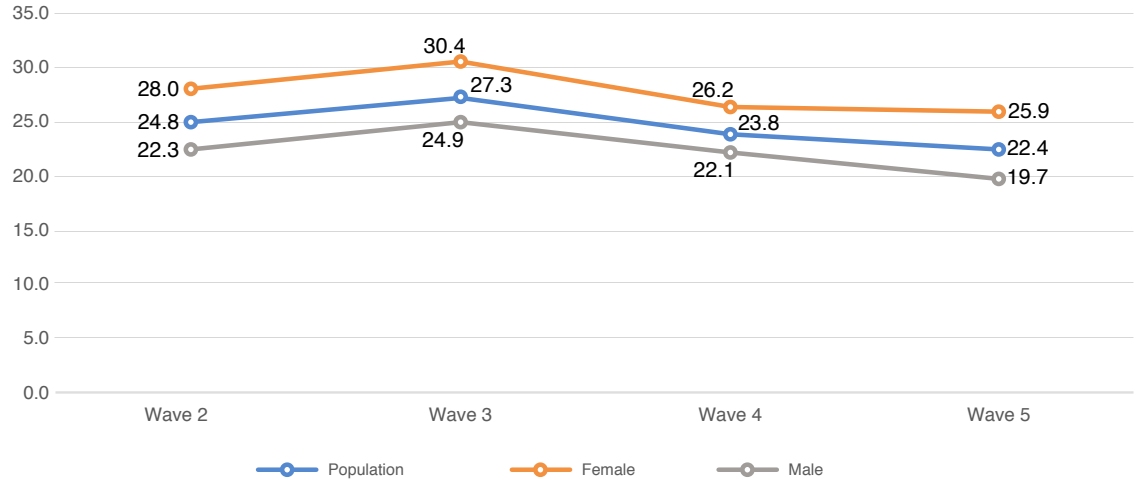
where $\left(\frac{\beta_k \bar{Z}_k}{\mu} \right)$ is the elasticity of the ability to work from home to marginal changes in the k-th covariate, while C_k is the concentration index of the k-th covariate. η_ε denotes the generalized concentration index of the error term. $\left(\frac{\beta_k \bar{Z}_k}{\mu} \right) C_k$ represents the contribution of the k-th covariate to the socioeconomic inequality in ability to work from home. The term, $\left(\frac{\eta_\varepsilon}{\mu} \right)$ measures the unexplained/ residual component.

Given the lack of analytical standard errors, we obtained standard errors for the components of equation [4] via bootstrapping with 1,000 replications.

Results

Figure 1 presents the trend of employees' stated ability to work from home between wave 2 and wave 5.

Figure 1: Prevalence of ability to work from home

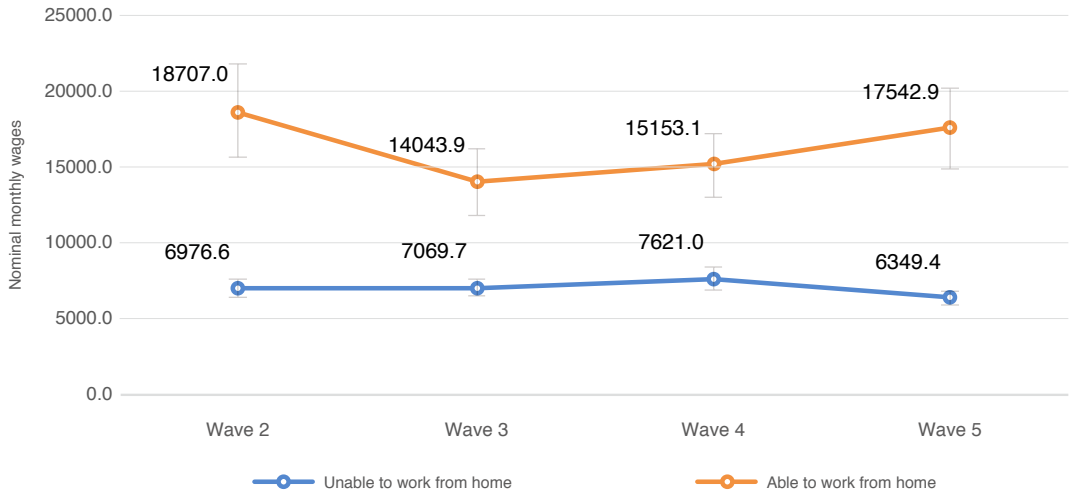


Note: Authors' computation; Estimates on unbalanced panel and weighted by wave-specific sampling weights

Figure 1 indicates a 2.5 percentage point increase in the ability to work from home between wave 2 and wave 3. However, this fell by 3.5 percentage points in wave 4, with a further 1.4 percentage points in wave 5. While not shown here, 95% confidence intervals indicate that these between-wave changes were not statistically significant in the population. Women consistently reported a higher prevalence of ability to work from home in each wave, with the gender differences significant in all periods except wave 4.

As noted in the above review, jobs that are amenable to working from home also pay higher wages internationally. We therefore depict average monthly wages for those able to work from home and their counterparts who reported inability to work from home.

Figure 2: Wages by ability to work from home



Note: Authors' computation; Estimates on unbalanced panel and weighted by wave-specific sampling weights; 99% confidence intervals

Figure 2 indicates an obvious association between ability to work from home and wages, with employees able to work from home significantly earning more than those unable to work from home. Employees able to work from home earned more than their counterparts unable to work from home by orders of magnitude ranging from two to three times.

We present the descriptive statistics in *Table 1*.

Table 1: Descriptive statistics

Dummy variables	Percentages
Able to work from home	23.5
Casual employment	34.2
Manager	4.7
Professional	17.2
Technicians and associate professionals	7.4
Clerical support workers	11.3
Service and sales workers	16.7
Skilled agricultural, forestry and fishery workers	0.9
Craft and related trades workers	8.7
Plant and machine operators	8.6
Elementary occupations	24.4
Male	56.1
Urban (base=Traditional/farm location)	81.1
Think you're likely to get COVID (base=No/uncertain)	52.8
Non-African	23.9
Lives with (an) under-7 child(ren)	43.7
Lives in house/flat (base=Traditional/informal/other housing)	80.2
Married/cohabiting	53.7
Has a chronic health condition	15.8
Wave 2	20.6
Wave 3	26.8
Wave 4	25.7
Wave 5	26.9
Continuous/count variables	**Means**
Age (years)	38.6
Household size	4.3
Years of schooling	12.3
Number of observations	6,589

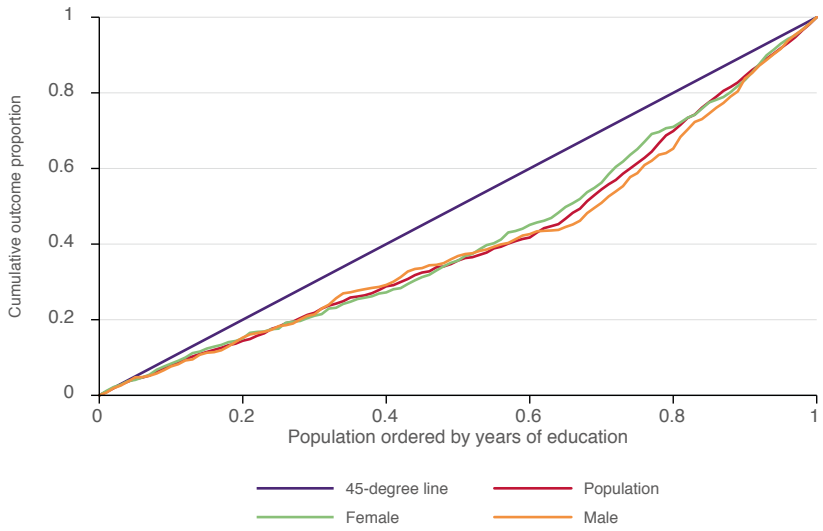
Note: Pooled unbalanced sample (wave 2-wave 5); Estimates based on estimation sample defined by non-missing outcome and covariates; Estimates weighted by wave-specific sampling weights

Table 1 indicates that about 24% of the employee population indicated that they were able to work from home between wave 2 and wave 5. Moreover, the level of casualization was very high, with 34% of employees being employed in casual jobs. The common occupational category was elementary occupations followed by professionals while the least common was skilled agricultural, forestry and fishery workers. Unexpectedly, men were in the majority of the employee population while most

employees lived in urban areas. More than half of the employee population thought that they were likely to catch COVID-19. In terms of household structure, 44% lived with under-7 children while 54% were either married or cohabiting. Sixteen percent of the population has a chronic condition. Average age was 39 years while the average household size was 4.3 while the average number of years of schooling was 12 years.

Figure 3 depicts the concentration curves for ability to work from home with the population ranked by years of education (as a measure of socioeconomic status).

Figure 3: Concentration curves for ability to work from home



Note: Pooled unbalanced sample (wave 2-wave 5); Estimates weighted by wave-specific sampling weights

As shown in *Figure 3*, ability to work from home is pro-rich, implying that workers with higher socioeconomic status (here, proxied by education) were more likely to work from home during the pandemic. Moreover, the degree of socioeconomic inequality was similar between the female and male populations. Similar graphs also result when household per capita income and monthly wage are used as ranking variables, indicating that the pro-richness of ability to work from home was robust to the socioeconomic measure used as the ranking variable (results available on request).

We provide a quantitative confirmation of the results in *Figure 3* by presenting the concentration indices of ability to work from home using years of schooling as the ranking variable in *Table 2*.

Table 2: Concentration indices of ability to work from home

	Total		Female		Male		Male-Female
Period	N	CI[a]	N	CI[a]	N	CI[a]	CI[a]
Wave 2	1,888	0.227***	1,009	0.245***	879	0.204***	-0.041
Wave 3	2,251	0.172***	1,185	0.193***	1,066	0.152***	-0.041
Wave 4	1,995	0.145***	1,061	0.148***	934	0.143***	-0.005
Wave 5	2,211	0.177***	1,170	0.151***	1,041	0.194***	0.043
Pooled	8,345	0.179***	4,425	0.184***	3,920	0.173***	-0.011

Note: Estimates weighted by wave-specific sampling weights; Pooled sample based on unbalanced panel; *** p<0.01, ** p<0.05, * p<0.1;
[a] Concentration index

Table 2 mirrors the results in *Figure 3*, with ability to work from home favouring workers in higher socioeconomic status groups. Moreover, the gender differences in inequality were not statistically

significant even at the 10% level. These results were consistent across the waves as well as in the pooled population. The results were also robust to restricting the analysis to individuals at least 25 years to prevent those yet to finish school from contaminating the results (results available on request). Similarly, the same pattern of results obtained when using monthly wage and monthly per capita household income as ranking variables (see *Table A1* in the Appendix).

To ascertain the determinants of the socioeconomic inequality in ability to work from home, we decomposed the observed inequality following equation [4]. The results are presented in *Table 3*.

Table 3: A decomposition of the socioeconomic inequality in ability to work from home

	(1)	(2)	(3)
VARIABLES	**CI[a]**	**Elasticity**	**Contribution**
Casual employment (base=Regular employment)	-0.180***	0.063***	-0.011**
	(0.019)	(0.024)	(0.005)
Occupation (base=Managers)			
Professional	0.284***	-0.025	-0.007
	(0.017)	(0.039)	(0.011)
Technicians and associate professionals	0.074***	-0.047**	-0.003**
	(0.012)	(0.019)	(0.001)
Clerical support workers	0.048***	-0.083***	-0.004*
	(0.016)	(0.028)	(0.002)
Service and sales workers	-0.023	-0.172***	0.004
	(0.015)	(0.039)	(0.003)
Skilled agricultural, forestry and fishery workers	-0.011***	-0.015***	0.000*
	(0.004)	(0.003)	(0.000)
Craft and related trades workers	-0.071***	-0.083***	0.006***
	(0.011)	(0.020)	(0.002)
Plant and machine operators	-0.047***	-0.131***	0.006***
	(0.012)	(0.021)	(0.002)
Elementary occupations	-0.306***	-0.325***	0.100***
	(0.017)	(0.054)	(0.018)
Male	0.021	-0.062	-0.001
	(0.022)	(0.044)	(0.002)
Urban (base=Traditional/farms)	0.122***	-0.067	-0.008*
	(0.015)	(0.058)	(0.004)
Non-African	0.138***	0.138***	0.019***
	(0.021)	(0.026)	(0.006)

Lives with (an) under-7 child(ren)	-0.118***	-0.011	0.001
	(0.021)	(0.034)	(0.003)
Lives in house/flat (base=Traditional/informal/other)	0.133***	0.203***	0.027***
	(0.016)	(0.058)	(0.009)
Married/cohabiting	-0.088***	0.035	-0.003**
	(0.021)	(0.038)	(0.001)
Has a chronic health condition	-0.124***	0.007	-0.001
	(0.015)	(0.015)	(0.001)
Age (years)	-0.069***	0.397***	-0.027***
	(0.003)	(0.145)	(0.004)
Household size	-0.057***	0.114**	-0.007***
	(0.006)	(0.057)	(0.002)
Years of schooling	0.185***	0.200	0.037*
	(0.002)	(0.139)	(0.020)
Wave fixed effect	0.000	0.050	0.000
	(0.020)	(0.054)	(0.001)
Residual		0.053***	
		(0.014)	
Observations	6,589	6,589	6,589

Pooled sample based on unbalanced panel; Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; [a] Concentration index

Table 3 indicates that being employed in casual (relative to formal) employment, belonging to technical and clerical occupational groups (compared to mangers), urban residence, being married or cohabiting, age, and household size contributed in mitigating the pro-richness of ability to work from home. Thus, eliminating the contribution of each of these covariates would accentuate the pro-richness of ability to work from home. Such an outcome could result from eliminating the socioeconomic inequalities in these variables and/or the elasticity of ability to work from home to changes in them. The converse obtained for the covariates with positive contribution coefficients like being in skilled agricultural, craft and related occupations, plant and machine operations, and elementary occupations (relative to managers), being non-African, living in a house/flat, and having more years of schooling. We note however, that a given sign for the coefficient of different covariates' contributions may be informed by different signs in both their concentration indices and elasticities. For instance, though being in casual employment and living in urban areas each has a negative contribution to the inequality in the outcome, these contributions were informed by opposite signs in the covariates' concentration indices and elasticities. We look at this in more depth in the Discussion below.

Discussion

In this paper, we have examined a phenomenon that has assumed a far greater importance during the current pandemic than before and is likely to play an important role in the world of work in the post-pandemic period – the ability to work remotely. We ascertained the trend in employees' ability to work from home, its association with earnings, the magnitude of socioeconomic inequality associated with it, and the determinants of such inequality. We found a generally downward trend in ability to work from home – consistent with firms being more in a position to implement safety measures to protect staff onsite over time – even though the temporal differences were not statistically significant. Furthermore, we found that employees able to work from home earned significantly higher wages – between two and three times – than those who could not work from home. Moreover, while women were significantly more likely to be able to work from home, there was no significant gender difference in the socioeconomic inequalities associated with the ability to work from home during the period examined. Casual employment, urban residence, being married or cohabiting, age, household size and certain occupations (technical and clerical occupational groups, compared to managers) dampened the degree to which ability to work from home favoured those in higher socioeconomic classes. Conversely, being non-African, living in a house/flat, having more education, and some occupational groups (skilled agricultural, craft and related occupations, plant and machine operations, and elementary occupations, relative to managers) enhanced the extent to which ability to work from home favoured those in higher socioeconomic categories.

That only a quarter of employees were able to work from home over the pandemic period is not surprising and is consistent with the wider international literature which aver that far fewer jobs can be performed from home in developing countries compared to their advanced counterparts (Dingel & Neiman, 2020; Hatayama et al., 2020; Saltiel, 2020). The downward trend in ability to work from home is not surprising given that workplaces must have increasingly implemented safety measures at work over time. However, the safety of workers must not be taken for granted while legitimate employee concerns about workplace safety and the premature return to the workplace (Strack et al., 2021) must be addressed.

Our finding of women being more likely to work from home than male (*Figure 1*) (even though the gender-related elasticity was not significant in a multiple regression context) concurs with earlier evidence in South Africa (Benhura & Magejo, 2021), but contradicts some international evidence where men were found to be more likely to work from home during the pandemic (Bonacini et al., 2021).

While the consistent finding of a significantly pro-rich distribution of ability to work from home over the period of the pandemic is not unexpected, it suggests that ability to work from home may significantly worsen various forms of socioeconomic inequalities in the pandemic and post-pandemic periods especially if potential workers' ability to work remotely becomes an important determinant of employment in the pandemic and post-pandemic periods. Already, there are predictions that social distancing regulations will likely increase inequality within and between countries (Bonacini et al., 2021; Delaporte et al., 2021).

While the negative concentration index of casual employment conforms to expectations, its associated positive elasticity is unexpected given that ability to work from home is consistently positively correlated with most markers of socioeconomic advantage in South Africa. The positive and significant elasticity was true for both males and females ($p<0.1$). The same applies to urban residence whereby its positive concentration index conforms to expectations given that the better off are more likely to live in urban areas. However, while statistically insignificant, its associated negative elasticity is surprising. However, it conforms to earlier evidence from South Africa based on a limited time period, where urban residence was positively correlated with inability to work from home (Benhura & Magejo, 2021).

That being married/cohabiting enhances the pro-richness of ability to work from home resulted from a combination of those with higher educational attainment being less likely to be married/cohabiting as well as the married/cohabiting being more likely to be able to work from home (positive

elasticity). That being married/cohabiting is concentrated more on the less educated in South Africa is not surprising given that prior studies have shown declining marriage rates among the younger generation who are more likely to be better educated (Posel et al., 2011) – also see the negative age concentration index in *Table 3*. Furthermore, the positive elasticity of marriage/cohabitation conforms with prior evidence on South Africa (Benhura & Magejo, 2021). That said, the elasticity may be affected by nuanced family composition as some dated studies found stronger interest in telework among couples with no children than those with one to two children (Huws et al., 1990).

The negative concentration index of household size is not surprising given the negative relationship between indicators of family size and education as found in previous studies based on developing countries like Mexico and Bangladesh (Binder, 1998; Maitra, 2003). Also, the associated positive elasticity for household size seems to conform to pre-pandemic evidence where having more than four household members was positively associated with interest in telework (Huws et al., 1990). However, we are mindful that both periods are vastly different in terms of both the motivation for telework and the prevailing social context.

The associated positive schooling elasticity concurs with evidence from the US during the pandemic, as workers there with less education tend to more likely be in jobs where working from home is not feasible (Dey et al., 2020). Furthermore, the negative elasticities of other occupational categories relative to the managerial category conforms to evidence from the USA where the management, business, and financial occupations had the highest proportion of jobs where working from home was feasible during the pandemic (Dey et al., 2020).

That race – i.e. being non-African (relative to African) – accentuated the socioeconomic inequality in ability to work from home is not surprising. This result was due to a positive racial concentration index and a positive elasticity of the outcome with respect to being non-African. These results conform to prior studies which demonstrate that Africans have lower educational attainment as well as a lower ability to work from home especially relative to whites during the pandemic (Benhura & Magejo, 2021; Salisbury, 2016). Thus, the double whammy of Africans having lower educational attainment and lower ability to work remotely in a period when the latter has become important for labour market attachment and productivity contributed in widening the inequality in ability to work from home. The same applies to living in a house or flat (relative to inferior housing structures like mud huts and shacks).

Finally, all other occupational groups had a negative elasticity coefficient (relative to the managerial occupational class) with all statistically significant except the professional category. While this is not surprising, it highlights the need for policies to provide adequate protection to all categories of workers. While it is understandable that by their nature, certain occupations are less amenable to work-from-home arrangements in South Africa (e.g. technicians and associate professionals) – see e.g. Kerr and Thornton (2020), it is essential to provide adequate workplace safeguards for the affected workers. Where possible, flexible working arrangements such as a combination of onsite and remote working arrangements can be implemented to enable them discharge their duties in an atmosphere devoid of heightened fear of contracting the virus due to work commitments.

Conclusion

This study shows that ability to work from home has been generally declining over time during the pandemic and is positively associated with various indicators of socioeconomic wellbeing. Particularly, employees able to work from home earn significantly more than those who are not able while women are more able to work from home than men even though this relationship lost statistical significance in a multiple regression context. Ability to work from home consistently favoured workers in higher socioeconomic groups – irrespective of the measure of socioeconomic status used as the ranking variable. Casual employment, urban residence, being married or cohabiting, age, household size and certain occupations (technical and clerical occupational groups, compared to managers) mitigated the degree to which ability to work from home favoured those in higher socioeconomic classes. Conversely, being non-African, living in a house/flat, having more education, and some occupational groups (skilled agricultural, craft and related occupations, plant and machine operations, and elementary occupations, relative to managers) accentuated the extent to which ability to work from home favoured those who were socioeconomically better off. This study provides the first set of evidence on the magnitude and determinants of socioeconomic inequality in ability to work remotely in South Africa during the period of the COVID-19 pandemic. This is important given the potential impact of ability to work remotely on continued attachment to the labour market, and therefore, in driving income inequality in the pandemic and post-pandemic periods. Interventions targeted at inequality-enhancing factors like race, housing and education may be important in lowering such inequalities. Such interventions will likely mitigate the fears of these economically disadvantaged workers about contracting the virus at work and minimize the need to have to choose between one's health and livelihood.

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Appendix

Table A1: Concentration indices of ability to work from home using monthly wage and monthly per capita household income as ranking variables

Ranking variable: Monthly wage								Ranking variable: Monthly per capita household income						
	Total		Female		Male		Male-Fem	Total		Female		Male		Male-Fem
Period	N	CI[a]	N	CI[a]	N	CI[a]	CI[a]	N	CI[a]	N	CI[a]	N	CI[a]	CI[a]
Wave 2	1313	0.323***	736	0.366***	577	0.323***	-0.044	1273	0.285***	701	0.327***	572	0.278***	-0.049
Wave 3	1564	0.187***	877	0.227***	687	0.234***	0.007							
Wave 4	1464	0.224***	816	0.209***	648	0.287***	0.079	1538	0.161***	843	0.140**	695	0.193***	0.053
Wave 5	1604	0.253***	913	0.165***	691	0.368***	0.203**	1681	0.193***	894	0.163**	787	0.247***	0.084
Pooled	5945	0.247***	3342	0.240***	2603	0.305***	0.065	4492	0.209***	2438	0.205***	2054	0.237***	0.032

Note: Estimates weighted by wave-specific sampling weights; Pooled sample based on unbalanced panel; *** p<0.01, ** p<0.05, * p<0.1; [a] Concentration index; Household income not available in wave 3

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