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TEACHING AND WORKING FROM HOME: GENDER DIFFERENTIALS IN THE IMPACT OF COVID-19 ON UNIVERSITY ACADEMICS IN SRI LANKA

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ABSTRACT

The COVID-19 pandemic has strongly impacted the higher education sector, with both students and faculty facing changes in the mode of teaching and learning and working environment. It is expected that women will bear the brunt of the impact of increased caregiving responsibilities following the closure of schools and childcare facilities given the gendered norms on the allocation of household activities. While there is emerging evidence of these gendered gaps in productivity among academics, the literature is either predominantly focused on developed countries or makes use of datasets based on publication records that cannot be used to explore in-depth the channels by which the gender gaps arise. As such, this paper examines the gendered impact of the pandemic on the working practices among university academics in Sri Lanka using a survey of teaching and research practices during the pandemic period. Information on living arrangements and time-use are also collected to further explore channels through which the differential impacts might have arisen. The responses of 241 academics from five state universities in Sri Lanka are analysed to identify gender differentials using two-sample t- and chi-square tests as well as a multiple regression model intended to further explore gender differentials in time-use before and after the pandemic, The results show that there are indeed gender differentials in the impact on carrying out research and the presence of young children is part of driving this differential. As women bear a disproportionate share of childcare, the results suggest that adverse gender impacts are likely to materialize further in years to come.

Keywords: COVID-19, Gender, Online teaching, Research practices, University academics

1. Introduction

With government-mandated lockdowns and social distancing measures in place, the COVID-19 pandemic forced a transformation of the higher education sector, with most countries discontinuing face-to-face teaching in favour of online instruction. Navigating this situation has been challenging, particularly in developing countries where both staff and students have faced issues of limited infrastructure for online teaching and learning,

and academics have experienced disruptions to research work due to limited funding, lack of access to specialized equipment, and increased caregiving responsibilities with the closure of schools and childcare facilities (World Bank, 2020).

Gender gaps in academia are already well-established, with women found to be underrepresented in senior positions, publishing less, and receiving fewer grants and citations; explanations posited for these differences include more intense domestic responsibilities for females, lack of mentoring and social networks particularly in male-dominated fields, fewer research collaborations, and implicit discrimination in the publication and tenure and promotion processes (Antecol et al., 2018; Ceci et al., 2014; Ductor et al., 2018; Lundberg & Stearns, 2019; Misra et al., 2017; Oleschuk, 2020, Uhly et al., 2017). Given gendered norms on the allocation of household activities, the impact of increased caregiving responsibilities caused by the Covid-19 pandemic is likely to be disproportionately borne by women as evinced by a growing body of literature (see, for example, Amano-Patino et al., 2020; Cui, Ding & Zhu, 2020; Deryugina, Shurchkov & Stearns, 2021).

Sri Lanka declared its first nationwide COVID-19 lockdown in mid-March 2020, which continued until mid-May 2020. During this period, all schools and higher education institutions were closed for students, though some institutions commenced online teaching almost immediately after the physical closures. While state universities have reopened for face-to-face teaching for brief periods since then, following subsequent waves of infections and localized lockdowns, universities continue to carry out most of their academic activities online.

In this context, we investigate the effect of COVID-19 on academics in the state university system in Sri Lanka, with an emphasis on gender differentials, using survey data. Statistics on the Sri Lankan state universities published by the University Grants Commission (UGC, 2020) show clear differentials in the share of female academics in certain disciplines (e.g., more women in medicine and allied health sciences but relatively fewer women in engineering, IT and architecture) as well as in designations (women are over-represented at the lecturer level but under-represented at the professor level). However, there is little research exploring these gaps, especially in the Covid and post-Covid period. As such, this study aims to investigate gender differences in the way research productivity and teaching practices were influenced by Covid-19. To further explore the drivers of these gender differences, we study living arrangements, caregiving responsibilities and the distribution of time use between paid and unpaid work.

By investigating these aspects, this study makes significant contributions to the literature on higher education and provides implications for current practices. First, this research adds to the literature on gender differentials in the impact of the pandemic on academics using survey data that spans information on teaching practices, living arrangements, and time use, in addition to research productivity, allowing for a more holistic investigation of the impact of the pandemic on the work-life of academics. Second, most of the literature focuses on academics in developed countries or on specific disciplines such as economics or the sciences. This paper provides a developing country perspective, where resource constraints pertaining to online teaching and working from home (Hayashi et al., 2020;

World Bank, 2020) and the academic culture, which has a heavier emphasis on teaching (Altbach, 2010; Dundar et al., 2017), tend to be different.

2. Related Literature

Much of the literature studying the impact of the COVID-19 pandemic focuses on gender differentials in research productivity, drawing on publication repositories in specific disciplines. For instance, Amano-Patino et al. (2020) study research outputs among economists as measured by working papers produced before and during the pandemic and find that while the share of female authors in non-pandemic related research has remained unchanged, the share of female authors in Covid-19 related research is much lower. The authors suggest that female economists are slower to initiate new research. Cui et al. (2020) use a pre-print repository for the social sciences to measure the number of papers produced by female and male academics between December 2018-May 2019 and December 2019-May 2020. They uncover a stronger gender differential with female academics facing a larger drop in research productivity than men, inferring that when faced with a short-term reorganization of care and work time, women become significantly less productive. Similar conclusions are reached for medical sciences (Anderson et al., 2020; Wehner et al., 2020). While these studies analyse research outputs produced in the immediate aftermath of the pandemic, they capture immediate and short-term effects. As discussed by Oleschuk (2020), since these papers lack background information on researchers (in most cases, with gender also being approximated using computer algorithms) such as caregiving responsibilities, the gender differences are likely to be underestimated and further intensify over time.

A smaller group of studies, more closely related to this one, uses survey data to further examine the channels by which the pandemic has affected academics. Staniscuaski et al. (2020) used a survey administered among Brazilian academics to study the impact of COVID-19-related isolation measures on academic productivity. They find that gender, motherhood, and race all play a role in determining the impact of the pandemic, with female academics, particularly Black females, and mothers, facing the largest declines in academic productivity as measured by the ability to meet deadlines and submit papers on schedule. A global survey by Deryugina et al. (2021) focuses specifically on research productivity using time-use data rather than publication records. They find that women, especially those with children, report disproportionate reductions in time spent on research and increased time on childcare and housework. While the decrease in time spent does not necessarily imply declines in productivity, these results are in line with the available evidence on reduced research productivity among women.

Less is known at present about gendered differences in the response to the shift to online teaching. Deryugina et al. (2021) note that time spent on non-research academic work that includes teaching and administrative work hardly changed, though women spent slightly more time on such work than men, even before the spread of COVID-19. This is consistent with pre-Covid-19 evidence that women spend more time on teaching and service-related work such as mentoring students (Lundberg & Stearns, 2019; Oleschuk 2020).

Patterns of gendered time use and differences in family responsibilities were recognized well before the onset of the Covid-19 pandemic and academia appears to be no different (Bianchi et al., 2012; Mason et al., 2005; Rubiano-Matulevich & Viollaz, 2019; Shollen et al., 2009). Aside from gendered norms on the division of household labour, another potential explanation for this in the context of university academics is that men are more likely to have a stay-at-home partner, engaged in full-time domestic work than women, freeing up more time for their research (Schiebinger et al., 2008; Uhly et al., 2017).

Most of the literature surveyed above studying the work-life of university academics is based in developed countries. However, Altbach (2010) shows that there is less emphasis on research and service roles and more focus on teaching in developing countries while the working conditions also tend to be different. For instance, academics in developing countries face heavier teaching loads, inadequate teaching and research facilities, and relatively lower remuneration packages than their developed country counterparts. In the Sri Lankan context too, high student-teacher ratios, inadequate infrastructure facilities, and low research output have been documented by Dundar et al. (2016). Given this backdrop, Hayashi et al. (2020) study the shift to online teaching and learning in Sri Lanka following the onset of the Covid-19 pandemic. The authors find that the transition while being relatively quick, has been challenging in terms of internet connectivity and devices suited to online education, lack of adaptability of curricula and pedagogy for blended learning, and lack of experience among faculty with online education.

3. Methods

3.1. Survey on university academics in Sri Lanka

A survey questionnaire was developed to collect information on the impact of the COVID-19 pandemic on the work-life of university academics in the state university system in Sri Lanka. In particular, the survey was designed to examine the impact of the pandemic on research and online teaching practices among university academics and the extent to which living arrangements, caregiving responsibilities and the time-use distribution between paid and unpaid work affected these changes brought about by the pandemic.
Accordingly, the survey composed of four key areas in addition to background information-research practices and productivity; online teaching practices; living arrangements and caregiving responsibilities; and time-use before and during the Covid-19 period. The survey was a structured questionnaire with a combination of questions requiring either numerical responses or ratings. Questions related to the self-assessed impact of the pandemic on research practices and constraints faced in online teaching were administered using Likert scales (27 questions in all with Cronbach's Alpha values of 0.70, 0.81 and 0.72, respectively). The questions on time use required respondents to report the average number of hours spent during an average five-day workweek on teaching, research, administrative work, commuting, housework, caregiving, and sleep, before and after the onset of the pandemic.

The survey was administered to university academics attached to the five oldest state universities in Sri Lanka. These universities were selected on the basis of being located in urban areas (three of the universities are located in the Colombo district, one in the

Gampaha district and one in the Kandy district), where COVID-19-related mobility restrictions were implemented the longest. The survey was administered via an online questionnaire which was emailed to all permanent or probationary academics (excluding academic staff attached to libraries). Contact details for academics were obtained from university websites and the questionnaire was emailed between July and November 2020, with two reminders subsequent to the first email. Responding to the questionnaire was voluntary with respondents able to opt out of answering any of the questions and identifiable information was not collected.

3.2. Target population and sample

According to the University Grants Commission (UGC) of Sri Lanka (2020), there were 3,196 permanent members of the academic staff in the five universities targeted by our survey in 2019. While this number may have changed slightly from 2019 to 2020, we successfully sent out the questionnaire to 2,846 academics. We received responses from 241 members from our target population (response rate of 8.5 per cent) with females accounting for 61 per cent of the sample. This sample size, given the population size, corresponds to a confidence level of 90 per cent and a margin of error of 5 per cent.

3.3. Data analysis

Data analysis was carried out using STATA 16 statistical software. Independent sample t-tests, Pearson's chi-square test, and multiple regression models were used for the data analysis. When analysing data for time use, given the presence of outlier responses, the responses were converted to shares of hours spent on paid work (teaching, research, administrative work, and commuting) or shares of hours spent on paid or unpaid work (caring for dependents, housework, and sleep) to ensure comparability between respondents.[1]

We excluded academics currently enrolled in full-time postgraduate education from the analysis of time use given that they are officially on study leave from their university of employment. Moreover, for certain parts of the analysis, we exclude lecturers, the majority of whom have not fulfilled the postgraduate study requirement (MPhil or PhD) to be confirmed as a senior lecturer, as they are ineligible within the state university system to apply for research grants or supervise postgraduate research students.

4. Results

4.1. Background characteristics

The demographic, job, and educational characteristics of the academics in our sample are presented in Table 1. We find that women academics tend to be younger and less experienced than men, which potentially explains the lower shares of women with PhD qualifications and women professors. These differences are consistent with those

[1] Following conventions in time-use literature we refer to domestic work and caregiving collectively as unpaid work.

observed in the total population of state university academics as published by the UGC (2020).

Table 1. Demographic, job, and educational background of respondents.

	Female	Male	Sig
Mean age	41.62	45.45	0.0042***
Job characteristics:			
Share in STEM fields	0.63	0.74	0.0775*
Share of senior lecturers or higher	0.66	0.79	0.0415**
Share of professors	0.18	0.25	0.1841
Mean years of experience in academia	11.27	15.13	0.0040***
Education:			
Mean years since completing the highest level of education	8.53	12.2	0.0014***
Share with PhD or equivalent	0.58	0.7	0.0477**
Share currently enrolled in PG education	0.36	0.18	0.0039***

Note: The last column reports the p-value for two-sided independent sample t-tests or chi-squared tests of proportions. Significance levels: * 0.1 ** 0.05 *** 0.01.

4.2. Research productivity

Panel A of Table 2 shows the analysis of differences in research productivity between male and female academics before the pandemic. The data shows that most academics report being engaged in postgraduate research supervision and having obtained research funding at some point in their academic careers. Further, there are no significant differences between genders in these numbers or in terms of the mean number of ongoing research projects, which is just over three. However, the data do provide evidence of significant gender differences in terms of maintaining a research group or research collaborators. Specifically, women are much less likely to report having regular research collaborators and when they do, they are more likely to collaborate with other academics within their university. The type of research conducted by female academics also appears to be different – women are more likely to report that research labs/equipment, in-person human subjects and fieldwork are important for their research productivity than men.

We then analysed the impact of the pandemic on the research productivity of academics (Panel B of Table 2). Over half of academics reported starting new research projects during the pandemic period while most continued with research supervision remotely, with no significant differences by gender. However, when asked to rate the impact of the pandemic on their research productivity, more women report being affected in terms of their ability to carry out research and present their work, whereas more men report being unable to find research assistants as a result of the pandemic. Taken together, these results provide partial support for the presence of gender differences in research productivity as well as a more adverse effect of the pandemic on the research productivity of female academics.

Table 2. Differences in research productivity.

	Female	Male	Sig
Panel A: Research productivity (before COVID-19)			
Mean number of ongoing research projects	3.40	3.47	0.831
Share with PG research students (among senior lecturer and above)	0.86	0.81	0.322
Share obtained research funding as principal investigator (among senior lecturer and above)	0.76	0.77	0.874
Share without a research group or research collaborators (negative response)	0.18	0.02	0.001***
Share reporting the following as very important for their research:			
Research laboratory/equipment other than computer	0.450	0.280	0.018**
Computing or library resources that are not available remotely	0.360	0.290	0.301
Research assistants/research student collaborators	0.430	0.450	0.736
In-person human subjects for experiments/research	0.420	0.290	0.062*
Research field sites	0.360	0.270	0.173 [a]
Conferences, research symposia	0.430	0.370	0.368
Panel B: Impact of Covid-19 on research productivity			
Research projects:			
Share started new projects during COVID-19 pandemic	0.58	0.52	0.429
Methods of PG research supervision (share using):			
Zoom meetings	0.75	0.73	0.838
Spoke over the phone/WhatsApp	0.67	0.77	0.1759[a]
Email	0.9	0.9	0.885
Share very satisfied with modes of supervision during COVID-19 lockdown	0.24	0.31	0.3583
Share reporting that COVID-19 affected the following:			
Ability to engage in discussions with collaborators	0.330	0.350	0.777
Ability to find/hire research students/assistants	0.570	0.430	0.072*
Ability to carry out research work (accessing literature, data collection, analysis)	0.410	0.620	0.004***
Ability to present/disseminate the findings at conferences, workshops, seminars	0.500	0.620	0.087*
Ability to obtain funding	0.550	0.480	0.436

Note: The last column reports the p-value for two-sided independent sample t-tests or chi-squared tests of proportions. Significance levels: * 0.1 ** 0.05 *** 0.01. [a] One-sided p-value is less than 10 per cent.

4.3. Teaching practices

Table 3 summarises the teaching practices adopted by academics as a result of the Covid-19 pandemic. Approximately, one-third of respondents reported having some prior experience with distance learning methods and the average time spent each week on preparations for a single course is between 9 and 10 hours. Most lecturers also report conducting assessments and providing teaching support sessions online. While the data suggests that academics now use a range of tools and techniques for teaching, we only observe gender differences in terms of some of these modes of delivery, with men

reporting slightly higher usage of video recordings and women reporting greater use of interactive material. Based on this evidence, there do not seem to be significant gender differences in terms of the online teaching practices adopted.

Table 3 also provides some insights into the constraints faced during teaching. The most common issues highlighted include poor internet connectivity, lack of suitable devices among students, lack of engagement from students, and some subjects being less conducive to fully online delivery. Here, we do observe some gender differences, with male academics being more likely to report being significantly constrained by lack of teaching support, involvement of students, and the nature of their subjects, than women.

Table 3. Teaching practices arising from COVID-19.

	Female	**Male**	**Sig**
Teaching practices:			
Share with prior experience in distance learning	0.33	0.35	0.7173
Mean time taken to prepare for one course per week (hours)	10.14	8.78	0.342
Mean contact time allocated to students for one course per week (hours)	4.94	5.80	0.2562
Share conducting online assessments	0.77	0.73	0.5021
Share providing teaching support sessions online	0.67	0.64	0.6125
Tools used for online teaching:			
Voice-embedded PowerPoint Presentations	0.58	0.56	0.8339
Video recordings	0.56	0.66	0.151[a]
Web resources	0.42	0.36	0.3996
Interactive material	0.47	0.33	0.0372**
Social media	0.53	0.45	0.2965
Share reporting online teaching affected by the following:			
Lack or limited functionality of LMS	0.10	0.10	0.9607
Poor internet connectivity	0.46	0.51	0.4975
Lack of suitable recording devices/software	0.29	0.36	0.3097
Lack of expertise in online delivery	0.18	0.26	0.2305
Lack of support from instructors/academic support staff	0.12	0.24	0.0351**
Students' lack of devices	0.46	0.52	0.4261
Students' lack of engagement	0.43	0.54	0.1174[a]
Subject requires more hands-on attention	0.59	0.69	0.1533[a]

Note: The last column reports the p-value for two-sided independent sample t-tests or chi-squared tests of proportions. Significance levels: * 0.1 ** 0.05 *** 0.01. [a] One-sided p-value is less than 10 per cent.

4.4. Channels for gender differences: Living arrangements and time-use

Table 4 describes the living arrangements and caregiving responsibilities among academics by gender. More women report having a young child at home or a dependent to care for and that the presence of young children at home due to COVID-19 lockdowns created disruptions to their academic work, though the latter difference is not statistically significant. Taken together, this may explain why female academics were more likely to report that their research has been adversely impacted due to the pandemic.

There are also significant differences between male and female academics in terms of the spouse's main activity. The spouses of male academics are significantly more likely to be academics, state sector employees, or not working whereas among female academics, the most common activity of the spouse was employment in the private sector. Potentially due to these differences, female academics were significantly more likely (close to four times more) to report that having one's spouse at home during the COVID-19 lockdown caused significant disruption to their work.

Table 4. Living arrangements and caregiving responsibilities during the COVID-19 lockdown.

	Female	**Male**	**Sig**
Living arrangements:			
Share married	0.71	0.83	0.0397**
Share having a child less than 15 years living at home	0.47	0.33	0.0569*
Share having any dependent (child or elder) to care for	0.59	0.47	0.0869*
Spouse's main activity:			0.000***
Academic	20.00	27.14	
State sector employee	25.88	38.57	
Private sector employee	51.76	18.57	
Not working	2.35	15.71	
Share reporting children were significant disruption during Covid-19 lockdown	0.56	0.43	0.2443
Share reporting spouse was a significant disruption during Covid-19 lockdown	0.19	0.04	0.0078***

Note: The Sig column reports the p-value for chi-squared tests of proportions. Significance levels: * 0.1 ** 0.05 *** 0.01

The impact of the pandemic on time-use

Next, we examine the differences in time use distribution between paid and unpaid work as a share of total hours of paid and unpaid work. To examine gender differences together with the differential impacts of the COVID-19 pandemic, we utilize a multiple linear regression model. Given that the presence of young children at home following the closure of schools and childcare facilities is likely to be a key factor constraining time use, we also control for the presence of children (own or grandchildren) aged less than 15 years. We estimate:

$$y_{it} = \beta_1 fem_i + \beta_2 post_t + \beta_3 fem_i * post_t + \beta_4 kids_i + \beta_5 kids_i * post_t + \beta_6 fem_i * kids_i + u_{it}$$

where y_{it} refers to the time spent (as a share of paid and unpaid working hours) on a particular activity by individual i at time t (there are two time periods – before and during the pandemic), fem_i is a dummy variable indicating the respondent is a woman, $post_t$ is a dummy variable taking the value 0 before the pandemic and 1 thereafter, $kids_i$ is a dummy variable indicating the presence of children in the individual's house, and u_{it} is a random error term. The regression model is estimated with and without controlling for

the presence of young children for each of the seven activities. The results of the regressions are presented in Table 5.

The results in Table 5 suggest that there are significant pre-existing gender differences in time use, though the pandemic does not appear to have had a significantly different impact on women. Women spent more time on housework and less time on sleep than men (with or without young children). Women also spent less time on administrative work and more time on caregiving though this difference becomes insignificant after controlling for the presence of young children, suggesting that it is the women with young children who are driving this difference. The lack of significance of the coefficient on the interaction term between gender and the onset of the pandemic suggests that the gender differences in time-use seen before the pandemic persisted over time. Rather, the pandemic results in all academics engaging in more housework and sleep and less administrative work and commuting.

What emerges as a factor giving rise to differential effects of the pandemic is the presence of young children. While academics with young children spent significantly less time sleeping and more time on childcare before the pandemic, the onset of the pandemic resulted in these academics spending less time on research and even more time on childcare. Having children also affects women differently than men – women with children spend significantly less time on teaching and administrative work and more time on caregiving. These results indicate that rather than gender alone, it is the combination of gender and childcare that gives rise to the disparities in time use. These results are consistent with those in Table 6 - even though the gender difference in the share of academics who reported that having their children at home disrupted their work was not significant, given that more female academics report having young children, they are more affected by the presence of children, on average, from before the onset of the pandemic.

5. Discussion

Gender gaps in academia are often measured with research productivity, specifically publication records. While we do not collect information about publication records, our analysis provides partial evidence of gender differences in ongoing research productivity. In particular, we see that women are less likely to have research collaborators, particularly those outside of their institutions. This is consistent with the existing evidence of fewer collaborations, particularly international collaborations, which are crucial for academic career advancement, among female academics (Ductor et al., 2018; Misra et al., 2017; Uhly et al., 2017). Uhly et al. (2017) tie international collaborations with family status and find that while having an academic partner benefits both men and women in terms of enhancing their chances of engaging in international collaborations, men benefit more than women. This is a potential explanation in our study too, where the men were more likely to have an academic partner than the women.

The Covid-19 pandemic caused an unprecedented shift to work from home and online teaching. While we do not find gender differences in the share of academics undertaking new research projects after the onset of the pandemic or continuing with postgraduate

Table 5. Effect of gender, having children, and the COVID-19 pandemic on time-use.

	Percent of paid and unpaid work													
	Teaching		**Research**		**Admin work**		**Commuting**		**Housework**		**Caregiving**		**Sleep**	
Female (=1)	-0.026	0.001	-0.022	-0.016	-0.038**	-0.017	-0.017	-0.015	0.045***	0.037**	0.058***	0.009	-0.151***	-0.130**
	[0.021]	[0.025]	[0.018]	[0.021]	[0.018]	[0.022]	[0.012]	[0.015]	[0.013]	[0.015]	[0.016]	[0.014]	[0.041]	[0.051]
Post Covid-19 (=1)	0.014	0.013	0.007	0.029	-0.041**	-0.042*	-0.061***	-0.064***	0.059***	0.058***	0.022	0.006	0.096*	0.098*
	[0.024]	[0.028]	[0.021]	[0.024]	[0.021]	[0.024]	[0.014]	[0.015]	[0.015]	[0.017]	[0.016]	[0.016]	[0.053]	[0.059]
Female* Post Covid-19	-0.024	-0.024	-0.004	0.003	0.004	0.002	0.008	0.007	0.006	0.006	0.01	0.007	-0.057	-0.059
	[0.031]	[0.030]	[0.029]	[0.028]	[0.025]	[0.024]	[0.017]	[0.017]	[0.021]	[0.021]	[0.027]	[0.021]	[0.065]	[0.064]
Have kids (=1)		-0.007		-0.026		-0.028		-0.003		-0.018		0.082***		-0.093*
		[0.027]		[0.022]		[0.022]		[0.015]		[0.017]		[0.017]		[0.053]
Have kids*Post Covid-19		0.001		-0.063**		0.005		0.007		0.005		0.045*		-0.002
		[0.029]		[0.027]		[0.022]		[0.017]		[0.021]		[0.023]		[0.061]
Have kids* Female		-0.054*		-0.005		-0.038*		-0.003		0.022		0.079***		-0.017
		[0.030]		[0.026]		[0.023]		[0.018]		[0.021]		[0.023]		[0.064]
R-square	0.019	0.045	0.009	0.071	0.054	0.099	0.127	0.128	0.137	0.14	0.07	0.409	0.099	0.127

Note: The regressions are estimated using responses from 179 respondents. All regressions include a constant term. Robust standard errors are given in parentheses. Significance levels: * 0.1 ** 0.05 *** 0.01.

research supervision remotely, women were more likely to report that they were adversely affected in terms of being able to carry out research activities. One possible explanation for the latter result is linked to differences in the type of research conducted, consistent with our finding that women are more likely to be doing research that involves laboratories or equipment, fieldwork and human subjects, access to which would have been affected by the pandemic. If the pandemic has affected women disproportionately in terms of the type of research they carry out, gender differences in research output are also likely to manifest in the coming months and years. Indeed, the international evidence of gender gaps in research output following the Covid-19 pandemic is growing (Amano-Patino et al., 2020; Cui et al., 2020; Vincent-Lamarre et al., 2020; Wehner et al., 2020).

We do not find any major differences between genders in terms of online teaching practices or teaching load. The latter is confirmed in the time-use analysis as well. These results suggest that whatever gender differentials arise as a result of the pandemic will be observed in terms of research rather than teaching, given the greater emphasis on fulfilling teaching responsibilities in universities such as those in Sri Lanka. There is some pre-Covid evidence pointing to differences in the division of academic work between genders, with women typically being assigned more student-centric tasks such as teaching leaving men more time to engage in research, resulting in gender differences in career progression (Barrett & Barrett, 2011; Lundberg & Stearns, 2019; Oleschuk 2020). However, our results on teaching load, preparation time, and contact time with students do not provide evidence of this type of gender difference.

The experience of working from home, particularly during the COVID-19 lockdowns and school closures, is strongly affected by living arrangements. We found that while male academics were much more likely to have a spouse who is also a university academic, state sector employee or not working, female academics were much more likely to be married to someone working in the private sector. These differences in the occupation of the partner may explain why women were more likely to report that having their spouse at home caused significant disruption to their work. If male academics are more likely to have partners with more flexible working hours than female academics, they may need to shoulder less of the household work. It is documented by Uhly et al. (2015), that while women academics are more likely to have partners who are working, women are also more likely to subordinate their careers to those of their partner, though co-working academic partners have more equal divisions of labour at home. In the context of the pandemic where paid childcare and housework became unavailable to many, it can be expected that the gender disparities will become more severe and may explain why women were more likely to report difficulties with carrying out their research than men.

We validate our results on research and online teaching in the aftermath of the COVID-19 outbreak with the analysis of time-use data. In line with stylized facts on gendered time use (Rubiano-Matulevich & Viollaz, 2019), we see women spending more time on caregiving and housework and less time on sleep, before and during the pandemic. The regression results provide the additional insight that the presence of young children is the key factor driving differential impacts of the pandemic. Young children result in less time in research for parents, less time in teaching and administrative work for women, and more time in caregiving for parents, especially for women. Given the closure of

schools and childcare facilities for long durations over the pandemic period, this result is not surprising. This may also explain why women appear to be slightly more positive towards teaching and attending meetings online – those with younger children may appreciate the flexibility that these options offer.

The motherhood penalty in academia has been documented before (see Uhly et al. [2017] for a review of the literature) and the Covid-19 pandemic is likely to exacerbate the issue, though this evidence is still incoming (Deryugina et al., 2021; Staniscuaski, 2020). Indeed, in many universities in the West, recommendations have been made to adjust tenure and promotion processes to account for these disparities, including extensions to the tenure clock (though work by Antecol et al. [2018] suggests that this measure may, in fact, widen gender gaps in academia), hiring additional support staff for those with added care burdens and waiving nonessential service for those with caregiving demands (Oleschuk, 2020).

On a more positive note, our results also show that while gendered differences in time use on housework and sleep persist, the onset of the pandemic has resulted in all academics spending relatively more time on the unpaid work of childcare and housework. The possibility of a more egalitarian division of labour for household work following the COVID-19 pandemic has been proposed by Alon et al. (2020), who suggest that as couples spend more time at home during lockdowns or working from home, gendered norms on childcare and housework may change or even reverse.

5.1. Limitations and directions for future work

Our study focuses on the five oldest state universities in the country, four of which are located in the Western Province where schools were closed for longer durations than in the rest of the country. This gives rise to concerns about the generalizability of our results to the state university system at large. However, results from Hayashi et al. (2020), which cover all state higher education institutions in Sri Lanka are similar to those presented here, suggesting that while the challenges faced may vary in magnitude across universities, qualitatively they are not very different.

Second, while our survey collects information on research outputs in terms of a number of ongoing research projects and research students supervised, and the self-assessed impact of the pandemic on research productivity, a more objective means of assessing gender gaps in academia in Sri Lanka would be to use information on publications and administrative positions held. We leave this for future research.

6. Conclusion

This study examined the impact of the COVID-19 pandemic on university academics in Sri Lanka, focusing on gender differences, using a survey administered in five state universities. Our results indicate that there are gender differentials in the impact of the pandemic in terms of carrying out research, though the impact on research productivity is not yet significant. These results are explored further using information on living arrangements and time use. We see evidence of gendered time use among academics both

before and during the pandemic but find that it is the presence of young children that drives the differential impacts of COVID-19 and the persistent gender differences in allocations of time for teaching and administrative work. Our results suggest that larger differences in research productivity and career progression may only materialize in the months or years to come, causing these gender gaps to intensify in the future.

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