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You are unmuted: The impact of virtual arrangements on women and old age legislators' participation during the COVID-19 pandemic

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During the COVID-19 pandemic, parliaments around the world implemented virtual arrangements to facilitate participation by legislators who were negatively affected. This article explores if the pandemic had a differential impact on MP participation in parliamentary proceedings by age or gender and whether virtual arrangements have mitigated these adverse effects. Using the adoption of hybrid proceedings in the United Kingdom House of Commons as its case study, and exploiting the change in its form and application during the pandemic period as treatment, this article demonstrates that the pandemic has had an especially adverse impact on women MPs' participation in parliamentary proceedings and that virtual arrangements had a substantive role in mitigating the gendered effect of the pandemic when its application was more extensive. These results suggest that maintaining virtual arrangements for parliamentary proceedings post-pandemic is potentially beneficial for the descriptive representation of women.

Keywords: COVID-19; gender; legislative speech; parliament; representation; text as data.

1. Introduction

As countries around the world grappled with the consequences of the emerging COVID-19 pandemic in the spring of 2020, parliaments faced the unprecedented

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challenge of maintaining their essential business under the various adverse effects of the pandemic. The onset of COVID-19 posed several problems for legislatures. Governments and health authorities across the globe issued social distancing orders or guidelines for their citizens to slow the rate of infection. This created obstacles for parliaments to accommodate staff and members, with buildings and infrastructure ill-suited to host their usual business in a socially distanced setting. Lockdown measures, such as the shielding of vulnerable members of society and the disruption to essential public services, impeded the life and work of legislators. In response to these problems, parliamentarians across countries have employed different emergency measures to mitigate the adverse effects of the pandemic. Most parliaments devised cross-party agreements reducing the number of members present in plenary sessions whilst some temporarily suspended meetings during the peak of infection. Another commonly used alternative was to adopt some form of virtual arrangement for parliamentary proceedings by allowing some members to participate remotely via videoconferencing software.

The pandemic and its resultant disruptions might, moreover, have had differential impacts on some members: older legislators needed to stay at home and avoid social interaction to prevent catching a virus that is more lethal to them (Cummins et al., 2020); women legislators were more likely, given ongoing patterns of domestic division of labour, to be responsible for the increase of domestic and caring responsibilities during the pandemic (Carlson et al., 2022; Yarovskiy et al., 2022), thus diverting their attention from participation in parliamentary businesses. Such differential impacts of the pandemic could have hampered the representativeness of parliaments if Members who are the descriptive representatives of groups adversely affected by the pandemic are also the ones most likely to find it impossible to participate in parliamentary businesses to reflect the interests of such groups. It is therefore important to ask (1) did disruptions from the pandemic have a more severe impact on the work of some MPs? (2) Whether mitigations such as virtual arrangements alleviated this problem by maintaining their voices in parliaments during the pandemic.

Moreover, whilst the world has since moved on from the pandemic and emergency measures adopted by parliaments have mostly been rolled back, the switch to virtual proceedings in response to the pandemic has been suggested as an opportunity to facilitate the introduction and updating of parliamentary procedures and institutions in the digital age (Mencarelli, 2022). Rather than a mere emergency measure to tackle the challenges that come with COVID-19, virtual arrangements could serve to facilitate participation among some groups of MPs, such as women (Smith and Childs 2021).

The purpose of this article is therefore to examine the efficacy of virtual arrangements, both as an emergency measure during the pandemic as well as long-term procedural innovations of parliaments by exploring how its adoption has affected

the amount of MPs' participation in parliamentary proceedings during the pandemic. Using the adoption of hybrid proceedings (HP) in the United Kingdom House of Commons, in particular, the expansion and contraction of its application during the pandemic, I will demonstrate that HP reduced the differential adverse effect of the COVID-19 pandemic on participation in parliamentary proceedings among some MPs, in particular women, who made more contributions to parliamentary proceedings when the application of HP was more extensive.

The article will be organized as follows. I will first explain the choice of HP by the House of Commons as the case study and present the background of the adoption of HP. Attention will be paid to the expansion and contraction of the application of HP through its different phases, which will play a crucial role in the subsequent analysis. This is then followed with a discussion of who the potential beneficiaries of virtual arrangements are, and the reasons that HP could increase their participation in parliamentary proceedings. I will then present the research design as well as the empirical results that demonstrate the impact of HP on MPs' participation. Lastly, I will discuss a couple of alternative explanations and test the robustness of my findings against them as well as the limitations of the research design before presenting my conclusion on the effectiveness of HP and whether parliaments should adopt some form of virtual arrangement in the long term.

2. Hybrid proceedings in the House of Commons

2.1 Choice of case

HP in the House of Commons is chosen as the case study for two reasons. Firstly, HP saw several phases of expansion and contraction of its application during the pandemic. Such changes are crucial in the subsequent analysis. A major methodological obstacle to determining the impact of virtual arrangements during the pandemic is the lack of a counterfactual to act as a baseline of comparison, as it is impossible to know how legislators would have behaved if the impact of the pandemic had not been mitigated through virtual arrangements such as HP. In lieu of that, I propose that we can instead get as close as possible to estimate a causal effect of HP by considering the expansion and contraction of the application of HP as treatment and using the more constricted phase as a baseline of comparison to determine if the expansion of HP, and virtual arrangements in general, alter MPs behaviour. To put it differently, if HP does indeed enable some MPs to be more active in parliamentary proceedings, we should see those MPs being more active in the more expansive phases in comparison to the more constricted phases.

Secondly, HP in the House of Commons is chosen as the most likely case where virtual arrangements ought to affect the tendency of MPs to participate in parliamentary proceedings. The procedure of the House of Commons places

few limitations on MPs' floor activities (Blumenau and Damiani 2021). Unlike some parliaments where access to the floor and speech-making are controlled by party leaders, speaking in the House of Commons is mostly driven by the individual initiative of MPs (Proksch and Slapin 2012). This makes the House of Commons a suitable case to examine the impact of virtual arrangements as British MPs' speech-making behaviour would be better able to reflect how HP might have altered the individual cost and benefit of participating in parliamentary proceedings.

2.2 Adoption of hybrid proceedings (HP) and its phases

The United Kingdom recorded its first case of COVID-19 on 22nd January 2020. As the number of infections rapidly increased throughout early spring, the UK government issued the first stay-at-home order on the 23rd of March. In response to the pandemic, the House of Commons adopted social distancing measures in March and moved forward with the scheduled Easter recess. Proposals for remote participation and voting were recommended by the Procedure Committee during the Easter Break, which let Members participate in proceeding remotely via teleconferencing software whilst Members who wished to participate physically could still do so under social distancing rules. TV screens were fitted in the chamber during the Easter recess to facilitate interaction between Members who participated physically and those who participated remotely. On its first day returning from the Easter recess, the House approved the Standing Order for HP and had its first hybrid sitting on the 22nd of April. (For details on the adoption of HP, see Priddy 2021.)

During the initial phase 1 (22nd Apr–20th May) of HP, MPs could participate virtually in both (1) scrutiny businesses, such as asking ministers oral questions and responding to ministerial statements to the House, and (2) substantive businesses, such as participating in debates on legislation. Moreover, all MPs were eligible to participate virtually with no questions asked. The House also prioritized non-contentious issues for its proceedings and placed heavy restrictions on time so that it could avoid proper parliamentary discussion on substantive and contentious issues being undermined by disruption from the pandemic (Hansard 2020, 2 June 2020 col 726).

As the first wave of the pandemic in the UK subsided and the number of infections decreased in early summer 2020, the House moved to phase 2 of HP (8th June to 17th December)¹, during which MPs could only virtually participate in

¹It should be noted that procedures surrounding HP went through several changes between 2nd and 8th June, during which parliament sat with no virtual arrangement. As this phase is too short to be analytically meaningful, it is therefore omitted in the subsequent statistical analysis for simplicity.

scrutiny business, but not in substantive business, meaning that MPs could only question ministers and respond to ministerial statements virtually but had to be physically present in the Commons chamber in order to participate in debates on legislations and motions. Moreover, MPs also needed to self-certify that it was necessary for them to participate virtually on a weekly basis. This contracted form of HP was in place during most of the summer and autumn until the peak of the second wave in December 2020, which resulted in a new round of national lockdowns in the UK. The House moved to phase 3 of HP on 30th December 2020, which in practice reverted to the arrangement under phase 1 until the provision that enabled HP lapsed on 22nd July 2021, thus ending the application of HP in the House of Commons.

3. Differential impact of COVID-19 and virtual arrangement on descriptive groups of MPs

In this section, I will discuss how disruptions caused by the COVID-19 pandemic could have had differential adverse effects on MPs belonging to some descriptive groups, hindering their ability to physically speak in parliamentary proceedings and how virtual arrangements could have mitigated these. Whilst older and women MPs are by no means the only descriptive groups of MPs who could have found HP helpful in facilitating them speaking in parliamentary proceedings during the pandemic, they are chosen because the benefit derived from HP is most straightforward and they are most easily identifiable from existing dataset.

3.1 Older MPs

Age-based representation is an understudied but emerging topic in political science. Contemporary research focus has been on the underrepresentation of younger cohorts (for literature review, see [Stockmer and Sundström 2023](#)). It has been found that age can be an important determinant of attitudes towards issues such as education and pension spending ([Busemeyer and Lober 2020](#)) and the existence of climate change ([Lorenzini et al., 2021](#)). Moreover, the age of MPs also determines if they substantively represent the interests of their cohort as young MPs are more likely to pay attention to youth-related issues such as parental leave and childcare ([Bailer et al., 2022](#)) whilst older MPs focus on issues such as assistance and housing for the elderly ([Curry and Haydon 2018](#)).

Despite the focus of recent research on the subject, representation of the older cohort during the COVID-19 pandemic is of particular importance for several reasons, all of which stem from the fact that older individuals were particularly vulnerable to suffering from the worse effects of COVID-19: more likely to show severe symptoms; be hospitalized; and die from COVID-19 should they be infected

(Cummings et al., 2020). Heightened health risks in older cohorts contribute to the formation of distinct attitudes and preferences with respect to government policies in response to the pandemic. Older individuals were more supportive of government vaccination programs (Barbieri et al., 2023), and less hostile towards the use of masks (Mallinas et al., 2021). Such distinctive interests regarding the government's response to the pandemic ought to be reflected in parliament.

Yet, it is precisely this vulnerability that made older MPs less able to physically participate in parliamentary proceedings during the pandemic. Heightened perceptions of pandemic health risks changed seniors' behaviour, such as avoiding public places and restaurants (Kim and Crimmins 2020). Like most countries across the world, the UK government issued guidelines during the height of the pandemic for individuals with a high risk of severe COVID-19 infection, including seniors and those with underlying medical conditions, to 'shield' at home by avoiding social contact outside of their household. This included avoiding their place of work, such as the parliamentary estate for older MPs. Seniors have been found to have been more likely to comply with public health guidelines with respect to COVID-19 (Moran et al., 2021). Because of the guidelines and restrictions adopted by authorities as well as heightened concern around potential exposure to COVID-19 in public spaces, we would expect older MPs to be particularly reluctant to physically participate in parliamentary proceedings during the pandemic and to be more reliant on virtual arrangements to maintain their presence in parliamentary proceedings than their younger colleagues. We would therefore expect older MPs to be more active during parliamentary proceedings when the application of HP was more expansive in comparison to the more restrictive phase.

H1a: Older MPs are more active during phases 1 and 3 of HP in comparison to phase 2.

3.2 Women

Another group of MPs who might find virtual arrangements such as HP beneficial would be women MPs. Participation of women politicians in legislatures and other political institutions has profound implications for the substantive representation of women in democracies. It has long been argued that parliaments are gendered institutions, with practices and norms that are disadvantageous toward women (Puwar 2004; Erikson and Josefsson 2019, 2022). Whilst the literature has found conflicting evidence as to whether female legislators are, in general, speaking more (Pearson and Dancey 2011) or less (Kathlene 1994; Bäck et al., 2014; Bäck and Debus 2019), it has been found that the number of women present in a legislature or party group (Childs and Mona, 2008; Bäck and Debus 2019), the salience of 'feminine' or 'soft' policy (Bäck et al., 2014), as well as the presence

ability of women MPs to participate in parliamentary proceedings. The impact of the pandemic on domestic and caring responsibilities largely stemmed from the widespread suspension of essential services, such as schools and childcare, that many working parents rely on but which disproportionately affected women (Yavorsky et al., 2022). Studies conducted before the pandemic had already shown that women are more likely to adjust their work patterns and responsibilities to accommodate familial and caring responsibilities (Weeden et al., 2016). Studies conducted during the pandemic have also shown that women took on more domestic responsibilities (Carlson et al., 2022) and were more likely to become unemployed due to the pressure from loss of access to childcare (Petts et al., 2021).

Seeing as these challenges disproportionately affect women MPs, providing them with opportunities to virtually participate via teleconferencing software could encourage women MPs, especially those with young children, to be more active in parliamentary proceedings. Women are more likely to adopt telecommuting before the pandemic (U.S. Bureau of Labor Statistics 2020). Childs (2016) has suggested, that remote voting can make parliamentary procedures more accommodative to MPs on maternity or paternity leave. The increase in flexibility that comes with virtual arrangements in parliamentary proceedings should enable women MPs to better balance their professional and domestic responsibilities (Goldin 2014; Hibbs 2022). In fact, it has already been found that women MPs in the House of Commons were more likely to have signed up for the call list for HP and applied for proxy voting during the pandemic (Uberoi 2021).

Hence, we have strong reasons to expect that women MPs ought to be more active during the phases where the application of HP was more expansive and these benefits should largely come from compensating for the negative impact of the pandemic on women MPs' participation.

H2a: Women MPs are more active during phases 1 and 3 of HP in comparison to phase 2.

3.3 Severity of the pandemic and MPs' participation in parliamentary proceedings

Furthermore, the adverse effects of the pandemic on older and women MPs, such as the increased perception of risk of infection and increase in domestic or caring responsibilities as a result of disruption to essential services, are partly a function of the changing prevalence of infection in the community. Fluctuation in the number of COVID-19 cases and deaths has been found to correlate with changes in travel patterns (Truong and Truong 2021) and consumer behaviour (Kapetnaios et al., 2022). It is therefore reasonable to expect increases in the severity of the pandemic to further impede older and women MPs' ability to contribute

to parliamentary proceedings during the restrictive phases of HP but less so when the application of HP was more expansive. Moreover, If HP can indeed encourage older or women MPs to speak in parliament beyond mitigating the adverse effect of the pandemic on these two groups of MPs, we should see that the expansion of HP's application increases MPs' participation even after controlling for the fluctuating severity of the pandemic. Hence, estimating how the fluctuating prevalence of COVID-19 in the community affects MPs' tendency to speak in parliament also has the added benefit of determining whether HP has any intrinsic value in boosting participation among older and women MPs beyond being an emergency measure during the pandemic.

H1b: The severity of the pandemic is negatively related to participation in parliamentary proceedings by older MPs during phase 2, but less so during phases 1 and 3.

H2b: The severity of the pandemic is negatively related to participation in parliamentary proceedings by women MPs during phase 2, but less so during phases 1 and 3.

4. Data and methodology

To further investigate the effect of HP on MPs' participation in parliamentary proceedings, I collected the content and associated data of all the speeches recorded in Hansard from the inception of the 2019 parliament, following the 2019 general election in December of that year, until the 18th March 2021, which is roughly a year since the onset of COVID-19 pandemic-related restrictions in the United Kingdom. All the data prior to and including August 2020 are from the Hansard Speeches 1979–2020 dataset (Odell, 2021) whilst the data for speeches made between September 2020 and March 2021 are pulled from the Theyworkforyou API.

The analysis only includes contributions made by backbench MPs because frontbenchers' contributions are not necessarily made on their own initiative, but are dependent on the policy brief assigned to them as well as the agenda of the House that requires certain ministers or shadow ministers to speak on behalf of the government or the opposition (Searing 1994). Since what we are interested in is how virtual arrangements in parliament, such as HP, affect MPs' behaviour, it is therefore necessary to restrict the analysis to backbench MPs.

The main dependent variable of interest is the number of words spoken by each MP during any week with at least one parliamentary sitting day, as recorded by Hansard. I use this to measure how the length of contribution made by MPs during parliamentary proceedings changes as the scope and application of HP expand and contract between phases.

It should be noted that using the number of words spoken by MPs as the dependent variable has its limitations. This is an indicator of the presence of MPs in parliamentary proceedings, which does not directly translate into substantive representation. Most importantly, it does not tell us about the influence exerted by MPs in debates or the quality of its content. It is plausible that speaking remotely reduces the impression MPs can make among their peers or that it limits the rigour of their scrutiny of ministers (Short et al., 1976; Kiesler 1984; Walther and Lee 2014). Being physically absent could also limit MPs' abilities to interact with colleagues in informal settings, which is an important way for MPs to influence ministers and party leaders (Norton 2019). Moreover, as this measure did not delineate virtual speeches from those delivered physically, it is therefore possible, however unlikely, that the increase in words spoken in expansive phases of HP is driven by MPs increasing their physical participation.

The independent variable *Older MPs* is a dummy variable where all MPs who are 65 years of age or over at the beginning of COVID-related restrictions on 18th March 2020 take the value of 1 whilst every other MP takes the value of 0 throughout the study period. The variable *Women MPs* is a dummy variable that takes the value of 1 for women MPs and 0 for all male MPs.

To test whether the different phases of HP alter the effect of the severity of the pandemic on MPs' participation, the variable *COVIDdeath* measures the weekly number of COVID-19 deaths in the whole of the UK as a measure of the changing intensity of the pandemic throughout the study period. A unit increase in *COVIDdeath* corresponds to one thousand deaths attributed to COVID-19 during a week. The data on COVID-19 deaths is collected from the data.gov.uk website.² I have relied on death data to measure the severity of the pandemic as it is less affected by limitations in testing capacities than the number of confirmed cases. Whilst COVID-19 death is a delayed measure of the intensity of the pandemic, as deaths from COVID-19 usually take place several weeks after the initial infection, it is nevertheless prominent information throughout the pandemic and is thus a relevant measure of how people, including MPs, update their impression of the severity of the pandemic and, hence adapt their behaviour. Moreover, as most of the study period pre-dates mass vaccination taking an effect in weakening the link between number of deaths and prevalence of infection in the community, I would argue that the number of deaths from COVID-19 is a reliable measure of the intensity of the pandemic in this study.

5. Results

We begin by looking at summary statistics on how changes in the scope of HP affect participation from older age and women MPs at the aggregate level.

²<https://coronavirus.data.gov.uk/>, retrieved on 2nd April 2021.

Figure 1 shows the change in the participation of older and women MPs as the proportion of all words recorded in Hansard each week during the study period. For older MPs, there is a gradual increase in participation throughout the pandemic, which does not conform with the phases of HP as hypothesized. For women MPs, there appears to be a slight increase in the proportion of words spoken by them during phases 1 and 3 in comparison to phase 2, as suggested by H2a. Moreover, there is a gradual decrease in the proportion of words spoken by women throughout phase 2. This is consistent with H2b as there is a gradual increase in the number of COVID-19 deaths throughout phase 2, which is in line with this pattern.

After examining MPs' participation at the aggregate level, this paper further investigates the impact of HP at the individual level. Since the dependent variable is longitudinal count data, and what we want to observe is how MPs behave differently throughout the pandemic, all the models presented here are Time-Series Negative Binomial regressions with MP fixed effects as well as robust standard error. What we are interested in from the following tables is the interaction effect between the main independent variable (*Older MPs* and *Women MPs*) and the phases of HP that a particular week falls into. This will demonstrate if a change in the scope of HP has a differential effect among groups of MPs. As mentioned previously, MPs' behaviour during the more restrictive phase 2 serves as the baseline comparison. I have also included a week-fixed effect in the models unless otherwise specified. The purpose of the week-fixed effect is to control for time-varying factors that have a uniform effect upon all Members, most important of which is

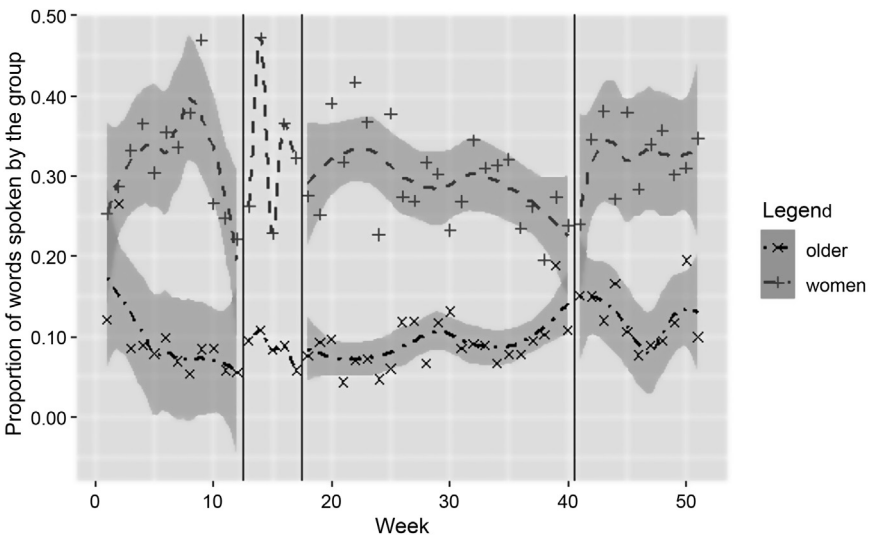


Figure 1. Proportion of words spoken by women and older MPs.

the fact that the number of sitting days differs, and hence the length of parliamentary proceedings, change between the weeks, which ought to have an impact on the length of the contribution made by individual MPs.

Table 1 shows the results of the analysis at the individual level. Models 1 and 2 test H1a. Model 1 considered all the phases of HP separately, with MPs' behaviour in phase 2 acting as the baseline of comparison. It largely confirms some of the observations in the previous section. Although in comparison to the baseline in phase 2, older MPs are not making more contribution during phase 1 as hypothesized, they are considerably more active during phase 3 in comparison to phase

Table 1. Results from time-series negative binomial regression, *** $P < .001$, ** $P < .01$, * $P < .05$

	(1)	(2)	(3)	(4)
Phase 0	-1.486*** (0.115)	-1.486*** (0.115)	-1.422*** (0.116)	-1.422*** (0.116)
Phase 1	-0.821*** (0.101)		-0.867*** (0.103)	
Phase 3	0.240** (0.0836)		0.216* (0.0846)	
Phases 1 and 3		0.247** (0.0836)		0.219** (0.0845)
Older MPs	-0.277*** (0.0455)	-0.279*** (0.0455)		
Older MPs#Phase 0	0.185* (0.0745)	0.185* (0.0745)		
Older MPs#Phase 1	-0.0637 (0.127)			
Older MPs#Phase 3	0.223** (0.0712)			
Older MPs#Phases 1 and 3		0.164* (0.0667)		
Women MPs			0.0406 (0.0301)	0.0404 (0.0301)
Women MPs#Phase 0			-0.130** (0.0479)	-0.130** (0.0479)
Women MPs#Phase 1			0.122 (0.0794)	
Women MPs#Phase 3			0.161*** (0.0477)	
Women MPs#Phases 1 and 3				0.153*** (0.0441)
Constant	-1.862*** (0.0610)	-1.862*** (0.0610)	-1.903*** (0.0617)	-1.903*** (0.0617)
Observations	22,646	22,646	22,646	22,646
Number of MPs	526	526	526	526

2, as indicated by the positive and statistically significant coefficient for the interaction term between *Older MPs* and *Phase 3*. Model 2 seeks to replicate Model 1, but considers phases 1 and 3 together instead of separately. This is because, since the scope of HP is largely similar across both phases 1 and 3, it is reasonable to test whether the result is consistent should we consider both phases as one. Results from Model 2 indicate that older MPs are indeed more active during phases 1 and 3 when the application of virtual arrangements in parliamentary proceedings is more extensive.

Models 3 and 4 set out to test whether HP has a gendered effect on MPs' participation, as hypothesized in H2a. Results from Model 3 mostly confirm the expectation from H2a that expanding the application of HP during phases 1 and 3 does lead to an increase in contributions made by women MPs during parliamentary debate, as indicated by the positive coefficient of both interaction terms. Model 4 considers both phases 1 and 3 as a single phase of extensive application of HP. The result is consistent with the previous finding and indicates that the expansion of HP during phases 1 and 3 has indeed led to an increase in contributions made by women MPs. All in all, these results provide strong evidence in support of H2a that the expansion of virtual arrangements, in particular during phase 3, has indeed led to more contributions made by women MPs in parliamentary proceedings.

5.1 Do virtual arrangements mitigate the impact of the COVID-19 pandemic?

I will now turn the attention to how the changing severity of the COVID-19 pandemic affected MPs' participation differently depending on their age and gender, as well as whether HP mitigated the negative impact of the COVID-19 pandemic on MPs' participation. The following analysis serves two purposes. Firstly, it tests whether the effect that we observed so far is the result of virtual arrangements mitigating the negative impact of the COVID-19 pandemic on MPs' participation as suggested by H1b and H2b. Secondly, a methodological issue with the research design of this study is that the expansion and contraction of the application of HP is not independent, but potentially endogenous to the changing severity of the pandemic: the scope of HP was contracted during phase 2 due to the decrease in number of infections in the early summer of 2020, and the reinstatement of HP on all parliamentary business during phase 3 was in response to the wave of infection following the Christmas break of 2020. It is plausible that the observed difference in MPs' participation in parliamentary debates between the phases of HP is partly, if not entirely, driven by the changing severity of the pandemic during the study period rather than the changing scope of HP between phases. The subsequent results will demonstrate that some of the trends that we observed in the previous models are not simply caused by MPs reacting to the changing severity of the

pandemic between different phases of HP, but rather caused by the changing scope of the application of HP between the phases.

To determine if the impact of the pandemic on MPs' participation differs between different phases of HP, I have added interaction terms between the key independent variable, the phases of HP, and *COVIDdeath* into the models. Since *COVIDdeath* does not change among subjects within a particular week, this collinearity prevents the estimation of the marginal effect of *COVIDdeath* in different phases. The week-fixed effect was therefore removed from the model and a control variable *Sittingday* was added to control for the variation in the number of days of parliamentary business each week to account for the difference in the length of proceedings across weeks.

Figure 2 shows the marginal effect of *COVIDdeath* on the number of words spoken by MPs and how that changes between phases of HP as well as between MPs below or above the age of 65. Results of the full model from which these marginal effects are calculated can be found in the [Supplementary Appendix](#). Moreover, data from phase 0 are included in the analysis but the marginal effect is omitted in the figure due to the significantly larger marginal effect of *COVIDdeath* during phase 0 that would have rendered the figure difficult to read. From Figure 2, we can see some interesting results that are in contrary to our expectations in H1b. Firstly, these results indicate that whilst the increased severity of the pandemic, as measured by the weekly number of deaths, does correlate with reduced contributions made by MPs, this effect seems to be mostly concentrated among MPs below the age of 65, especially during phases 1 and 2 of HP. In fact, the model estimates that during phases 1 and 3 *COVIDdeath* has the same effect on both younger and older MPs, but under the more restricted use of HP during phase 2, contributions made by older MPs increase as the number of COVID-related deaths increased whilst contribution made by younger MPs continue to be negatively affected by the increase in COVID-related deaths. This finding is the opposite of what H1b expected.

Figure 3 shows the marginal effect of *COVIDdeath* on the number of words spoken by MPs divided by their gender. Detailed results of the model can be found in the [Supplementary Appendix](#). We can see that the results largely conform to the expectation from H2b. During the more extensive phases 1 and 3 of HP, the changing severity of the pandemic has the same effect on participation by both men and women MPs. Participation from MPs of both genders is reduced to a similar extent as the number of COVID-related deaths increases during phase 1, whilst neither men nor women MPs were affected by the changing severity of the pandemic during phase 3. However, when the scope of HP was restricted during phase 2, we saw a clearly gendered effect from the changing severity of the pandemic: it is estimated that, during phase 2, every 1,000 COVID-related deaths is associated with a 7% decrease in the number of words spoken by a women

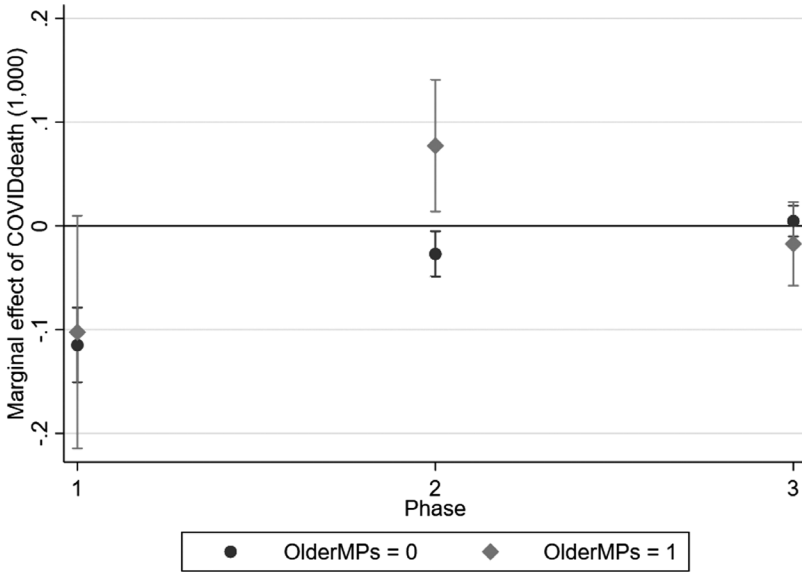


Figure 2. Average marginal effects of *COVIDdeath* through phases of HP among MPs aged above or below 65.

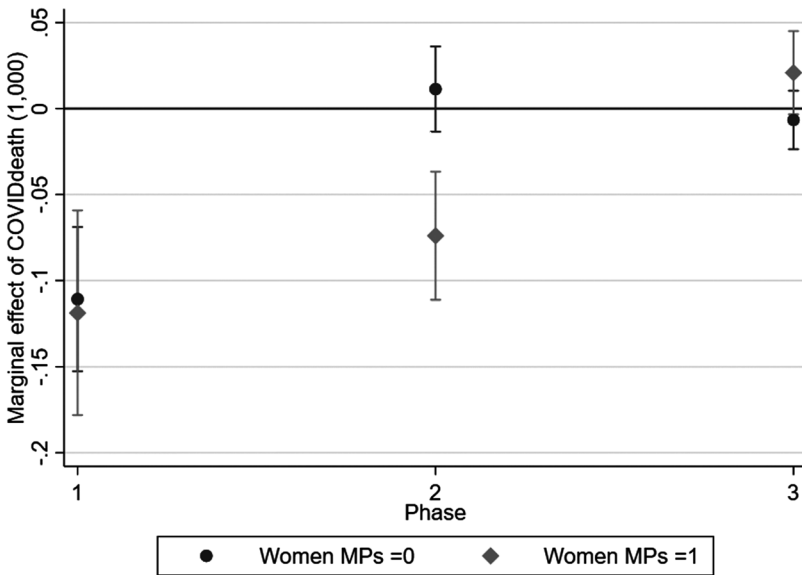


Figure 3. Average marginal effects of *COVIDdeath* through phases of HP among men and women MPs

MP during the same week, whilst it has no significant effect on the number of words spoken by men MPs during the same period. These results provide strong evidence in support of H2b, that the adverse effect of the pandemic on MPs' participation during parliamentary proceedings is indeed gendered, affecting women MPs more than men MPs, and the implementation of HP has significantly mitigated this gendered impact of the pandemic in phases 1 and 3 when its application was most expensive.

Taking all the empirical findings into account, we have strong evidence to support H2a and H2b. Virtual arrangements do have a substantial effect in increasing women MPs' contributions to parliamentary proceedings during the COVID pandemic as they are more active when the application of HP is more expansive under phases 1 and 3 in comparison to the more restrictive phase 2. Moreover, the analysis also suggests that the benefit of HP toward participation from women MPs largely stemmed from mitigating the negative effect of the pandemic among women as the severity of the pandemic, measured by the weekly number of COVID deaths, only has a negative impact on participation by women MPs during phase 2 of HP. These results also cast doubt on the intrinsic benefit virtual arrangements may have in encouraging women MPs' participation, such as preventing harassment and interruption during physical debates.

5.2 Alternative explanations and limitations

Several possible alternative explanations could potentially account for the patterns that have been observed shall now be tested to establish the robustness of these results. The first alternative explanation is the learning effect: namely, that the increase in MPs' participation during the latter phases of HP is best explained by their gradual familiarization with the use of videoconferencing technology in parliamentary proceedings rather than the change in the scope of HP between different phases. This is particularly relevant to the findings with respect to the behaviour of older MPs. It is possible that older MPs require more extensive training in adapting to technological solutions in response to the pandemic (Hibb 2022). As seen from Figure 1, there has been a gradual increase in older MPs' participation during the pandemic. It has also been found in Table 1 that older MPs are only more active in comparison to the baseline phase 2 during phase 3, but not during phase 1, despite the scope of HP being the same for both phases 1 and 3. All of these findings are consistent with the learning effect being particularly pronounced among older MPs, who might find it more challenging to adopt the use of technologies in parliamentary proceedings.

Table 2 presents models that seek to estimate the impact of the training effect on MPs' participation during various phases of HP and pit it against the main hypothesis that expansion of the scope of HP during phases 1 and 3 led to

Table 2. Models estimating the training effect, *** $P < .001$, ** $P < .01$, * $P < .05$

	(5)	(6)	(7)	(8)
Week Since HP	-0.00581** (0.00212)	0.0107*** (0.00117)	0.000294 (0.00242)	0.0130*** (0.00134)
Older MPs	-0.518*** (0.124)	-0.452*** (0.0779)		
Older MPs#Phase 0	0.451** (0.138)	0.385*** (0.0982)		
Older MPs#Phase 1	0.154 (0.159)			
Older MPs#Phase 3	-0.00560 (0.129)			
Older MPs#Phases 1 and 3		0.0728 (0.0747)		
Older MPs#Week Since HP	0.0144* (0.00651)	0.0107** (0.00345)		
Women MPs			0.284*** (0.0794)	0.0875 (0.0502)
Women MPs#Phase 0			-0.390*** (0.0878)	-0.195** (0.0628)
Women MPs#Phase 1			-0.0866 (0.100)	
Women MPs#Phase 3			0.369*** (0.0844)	
Women MPs#Phases 1 and 3				0.161*** (0.0479)
Women MPs#Week Since HP			-0.0141*** (0.00420)	-0.00322 (0.00222)
Sitting Day	0.331*** (0.0133)	0.324*** (0.0137)	0.331*** (0.0133)	0.324*** (0.0137)
Phase 0	-0.345*** (0.0437)	-0.0487 (0.0313)	-0.168*** (0.0503)	0.0592 (0.0359)
Phase 1	-0.507*** (0.0505)		-0.460*** (0.0582)	
Phase 3	0.206*** (0.0440)		0.0904 (0.0496)	
Phases 1 and 3		-0.114*** (0.0270)		-0.156*** (0.0302)
Constant	-3.036*** (0.0602)	-3.305*** (0.0547)	-3.185*** (0.0644)	-3.385*** (0.0566)
Observations	22,202	22,202	22,202	22,202
Number of MPs	526	526	526	526

increased participation among older and women MPs by controlling and interacting the number of weeks since the initial adoption of HP with the *Older MPs* and *Women MPs* dummy, which capture a linear learning effect on the use of virtual arrangements during the study period. Models 5 and 6 confirmed some of the expectations from above: changes in participation among older MPs during

various phases of HP are better explained by the learning effect as the interaction term between the number of weeks since the adoption of HP and *Older MPs* is positive and statistically significant, indicating that older MPs are indeed making more contributions as time progresses. On the other hand, the interaction term between the *Older MPs* dummy and phases of HP are no longer statistically significant, indicating that changes in the scope of HP can no longer account for the pattern of participation among older MPs once we take the training effect into consideration. These findings suggest that older MPs are likely to require a longer time to adopt technological solutions than their younger colleagues, thus their participation during HP lags behind their colleagues during the initial stage but gradually catches up once they are acquainted with HP toward the end of the study period. Models 7 and 8 replicate the same specification for women MPs. The results from these models indicate the results from the previous models are robust even after the training effect is taken into account and the training effect cannot explain the changing pattern of behaviour among women MPs during the study period.

Another alternative explanation that requires consideration is how the pandemic has changed the relative salience of policy issues, which in turn affects different MPs' tendency to contribute to parliamentary proceedings. As noted in a previous section, one of the major explanations regarding women legislators' contributions is that they are more likely to speak in discussions regarding policy issues that are regarded as 'feminine' or 'soft' (Bäck et al., 2014). One of the consequences of the pandemic is that it disrupts the ongoing political debate and policy discussion by propelling issues such as healthcare, which is usually considered a 'soft' issue, into a top priority for all governments. This could potentially provide an alternative explanation to why women are making more contributions: because the change in issue salience is putting 'soft' issues front and centre in parliamentary debates.

Whilst this is a valid hypothesis, I would argue that this is unlikely to be the explanation for the results observed in the analysis. Since the focus of the empirical finding is how MPs behave differently throughout the pandemic, in particular between the different phases of HP. For this 'issue salience' hypothesis to explain why women MPs are more active during phases 1 and 3, it relies on the assumption that the salience of 'soft' issues, such as healthcare, is also increased during these phases in comparison to phase 2, most probably due to the spike in the number of COVID-19 infections and deaths associated within these two periods. However, results from Figure 3 show that during both phases 1 and 2, the relationship between the intensity of the pandemic and women MPs' participation is negative, running counter to the expectation from the 'issue salience' hypothesis.

Lastly, it is also plausible that the increase in contributions made by older MPs in phase 3 is just capturing the positive impact of the COVID-19 vaccine rollout

among senior citizens in the UK, which began on 8th December 2020 (Baranluk 2021). As older MPs are likely to be among some of the first who received the vaccine in the early stage of the program, this would have significantly reduced the perceived health risk of attending parliamentary sessions in person, thus increasing older MPs' contributions by enabling them to participate in person. However, since the rollout of the vaccine at this stage was relatively gradual, and it takes several weeks from the first dose of vaccine for the second dose to be administered and the course of vaccination to take its full protective effect, it is therefore unlikely that the general increase of contribution made by older MPs in phase 3 is entirely due to the impact of vaccination.

6. Discussion

The world has since emerged from the COVID pandemic and most parliaments have scaled back their emergency response to the pandemic, including HP in the House of Commons. However, experiences during the pandemic have raised the question of whether virtual arrangements via teleconferencing software should play any role in the future and become a permanent fixture for parliamentary procedure. Results from this study can provide us with some clues as to the consequence of embracing virtual arrangements in the long run.

Empirical findings from this study clearly indicate that the virtual arrangements implemented by the House of Commons increased participation amongst women MPs in parliamentary proceedings during the pandemic. Even though the results also suggest that virtual arrangements in parliamentary proceedings might not have any residual benefits besides mitigating the negative shock that comes with the pandemic, I would argue that readopting virtual arrangements would be beneficial to all MPs. As aforementioned, a major consequence of the COVID pandemic is the sudden increase in domestic and caring responsibilities, which mostly fall upon women due to traditional gender roles. Whilst such a uniform shock is (hopefully) rare, similar shocks can and do frequently occur at the individual level. It is not uncommon for resignations of elected officials to be motivated by changing domestic or personal circumstances, such as the death or deteriorating health of themselves or a loved one, which would have put extra strain on balancing their domestic and political responsibilities. Although the impact of such changing circumstances is mostly borne by female politicians, as demonstrated by the results in this study, but this could happen to male politicians as well.

Furthermore, difficulties in balancing familial and professional life have been cited as one of the major obstacles for some women to participate in politics and run for office (Norris and Lovenduski 1995; Thomas 2002; Lawless and Fox 2005; McKay 2011; Allen 2012; Campbell and Childs 2014; Maguire 2018; Teele et al.,

2018). The association between the temporal increase in the severity of the pandemic and the decrease in contributions made by women MPs provides further evidence of the potential clash between the domestic and professional responsibilities of women politicians that has long been hypothesized in the literature. Hence, I would argue that retaining or adopting some limited form of virtual participation for legislators experiencing sudden changes in circumstances that necessitate such arrangement should be considered as an element of family-friendly practices among parliaments (Allen et al., 2016). It ought to be beneficial to both the presence of women in parliamentary proceedings as well as attracting more women to participate in politics and run for elected offices by facilitating them balancing their domestic and political responsibilities.

However, this study does not suggest that virtual arrangements are the silver bullet in enhancing the representation of women in parliaments, as there remain important questions to be asked regarding how virtual participation differs from physically attending parliamentary sessions in terms of the impact and influence of individual legislators. The results of this paper only indicate how virtual arrangements might increase the presence of women, an important aspect of representation, but this does not necessarily lead to improvements in substantive representation. Research in communication has established how computer-mediated communication, such as the use of teleconferencing, hinders the transmission of non-verbal cues such as gestures and facial expressions, which in turn lower the salience of one's message from the perspective of counterparts in communication (Short et al., 1976; Kiesler 1984; Walther and Lee 2014). Lack of social presence could hinder the influence of virtual speeches in parliamentary debates in unanticipated ways. For example, it has been found that women attorneys were disadvantaged in oral arguments in the US Supreme Court during the pandemic as teleconferencing hinders their ability to balance the double bind of gender and professional norms (Gleason 2023).

Another potential downside of virtual participation in parliamentary proceedings is it physically removes legislators from the corridor of power. This study only considers what happens in the formal proceedings of parliament. Yet we know that parliamentary business is not only conducted within the debating chamber or committee rooms but also in the corridors and other informal settings beyond formal proceedings (Norton 2019). MPs frequently cite informal exchanges with their colleagues as an important source of learning the ropes in Westminster (Rosenblatt 2006; Rush and Giddings 2011). Conversations in the corridors and voting lobby also play important roles in the exchange of ideas and information between MPs as well as exerting pressures on ministers and party leaders (Norton 2019).

Seeing the potential for the diminishing influence of virtual participation and the continuing importance of informal interactions that took place physically,

if women legislators are indeed more reliant on virtual arrangements, then the adoption of these measures might, instead of enhancing women's representation, merely introduce gender bias against women legislators through different means. The impact of virtual arrangements on the representation of women therefore merit more thorough examination among scholars of legislative studies.

Lastly, focusing only on what happened in parliamentary proceedings could also underestimate the substantive benefit of virtual arrangements beyond increasing MPs' participation, in particular how HP could have improved the wellbeing of MPs. The results presented in this paper did not consider how virtual arrangements could enable better work-life balance and improved wellbeing and health among MPs even if it did not result in increased participation in parliamentary proceedings. In other words, virtual arrangements in parliaments could provide other benefits for MPs beyond those described here.

7. Conclusion

This study has demonstrated that the hybrid proceedings adopted by the House of Commons as an emergency measure during the pandemic have mostly achieved their purpose of continuing the essential business of parliament whilst preserving the presence of older and women MPs by enabling remote participation in parliamentary proceedings. The findings demonstrate that the expansion and contraction of the application of virtual arrangements affected women MPs' contributions during parliamentary proceedings, mostly through mitigating the gendered adverse impact of the pandemic. Although older MPs appear to have faced some difficulty in adopting these measures, over time they too saw an increase in their participation as well. Moreover, the results show that women legislators' participation is associated with the changing severity of the COVID-19 pandemic over time. As the pandemic is a shock that greatly increases caring and domestic responsibilities among women, the results from this study also provide empirical support to the existing literature on how the work and careers of women politicians are hampered by their domestic and caring roles. All in all, these results show the efficacy of virtual arrangements in parliamentary proceedings as a mitigating measure during the COVID pandemic, as well as its potential benefit as a long-term addition to parliamentary procedures that could enhance the presence of women in parliament.

Supplementary data

Supplementary data are available at *Parliamentary Affairs* online.

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