

Leading the Fight Against the Pandemic: Does Gender ‘Really’ Matter?

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Abstract

Since the start of the ongoing coronavirus pandemic, the relationship between national female leaders and their effectiveness in handling the COVID-crisis has received a lot of media attention. In this paper we scrutinise this association more systematically. We ask if there is a significant and systematic difference by gender of the national leader in the number of COVID-cases and deaths in the first quarter of the pandemic. We also examine differences in policy responses by male vs. female leaders as plausible explanations for the differences in outcomes. Using a constructed dataset for 194 countries, a variety of socio-demographic variables are used to match nearest neighbours. Our findings show that COVID-outcomes (especially deaths) are systematically better in countries led by women and, to some extent, this may be explained by the proactive and coordinated emergency policy responses adopted by them. We use insights from behavioural studies and leadership literature to speculate on the sources of these differences, as well as on their implications. Our hope is that this article will serve as a starting point to illuminate the discussion on the influence of national leaders in explaining the differences in country COVID-outcomes.

Key words: COVID-19, Pandemic, National Leadership, Women Leaders, Risk Aversion.

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I. Introduction

National responses to the COVID-19 pandemic and their outcomes have been avidly compared across the world. Given the importance of leadership in times of crisis, national leaders have also been in the spotlight. Have leaders been slow in recognising the risks? Have they engaged with the science? Have they weighted the economic costs more heavily than the loss of lives? In this context, much has been written about the performance of women leaders (e.g., Taub, 2020; Friedman, 2020; Wittenberg-Cox, 2020). Much of the initial media analysis, however, was about two high-profile female leaders (Angela Merkel and Jacinda Ardern) who seemed to have steered their countries through the initial few weeks with less loss of life than their immediate comparators in Europe.

In this paper, we consider the question of national leader's gender and COVID-outcomes more systematically and discuss some of the plausible reasons for our findings. Using a 194-country dataset, specifically constructed for this purpose, we analyse two main questions. First, are there any significant and systematic differences in the COVID-outcomes (cases and deaths) of male and female-led countries in the first quarter of the pandemic? Second, can we point to any differences in policy measures adopted by male and female leaders that might explain the differences in outcomes? In particular, we consider the timing of lockdown in these countries.

The paper relates to various branches of literature that examine gender-differences in beliefs and behaviour, in particular the attitudes to risk and uncertainty. Studies in this area are largely focused on analysing decision-making in experimental settings. There is strong evidence within this literature that women, even those in leadership roles, appear to be more risk-averse than men (e.g., Croson and Gneezy, 2009; Charness and Gneezy, 2012). While this headline result is far from canonical (see Nelson, 2015), especially given the role that cultural and contextual modulators play (see Gneezy Leonard and List, 2009; Finucane et al., 2000; Schubert, 1999), there is a high level of consistency in the frequency with which it surfaces. For example, Charness and Gneezy (2012) assemble 15 different studies that report findings from one underlying investment game, carried out in different countries, with different instructions, durations, payments and subject pools. They find a very consistent result that men invest more, and thus appear to be more risk taking than women. Indeed, in the current crisis, several incidents of risky behaviour by male leaders have been reported in the press. Particularly noteworthy among these are Brazil's Jair Bolsonaro's dismissal of COVID-19 as "a little flu or a bit of a cold", while attending an anti-lockdown protest in April and Britain's Boris Johnson's statement, "I was at a hospital where there were a few coronavirus patients and I shook hands with everybody" (as reported in Lewis, 2020). Given the consistent result on women's relative aversion to risk and anecdotal reports of risky behaviour by male leaders, it is tempting to draw simplistic conclusions. A reliable conclusion on the issue however requires more systematic investigation.

The second strand of literature that our paper relates to is that on the role of leaders in national outcomes. The question of national leadership has given rise to a voluminous literature that lends texture to two conceptually extreme opinions: the idea that powerful leaders are simply a social myth, created to satisfy our psychological needs (Gemmill and Oakley, 1992) Vs. the view that, a handful of influential leaders could be seen as determining the course of history (Keegan, 2003). The second view has found greater credence in the literature. In their seminal work, Jones and Olken (2005) use death of a leader as an exogenous variation in leadership and find that individual leaders can play a crucial role in shaping the growth of nations. Building on this, Besley, Montalvo and Reynal-Querol (2011) find that more competent leaders (specifically in terms of education and skills) result in better national outcomes. The skill and attainment of the leader is also found to matter in other general settings, like that of organisational performance (Goodall, Kahn and Oswald, 2011).

The performance of leaders in the COVID pandemic offers a unique global experiment in national crisis management where various issues, including that of effectiveness of leadership, can be examined across countries. There are very few studies about the impact of leader's gender in a national crisis, partly at least, because there are so few female leaders. In our sample of 194 countries, we have just 20 (~10%) female leaders. A lack of female-leadership has given way to the 'single-sex' conjectures that support the 'Great Men' view of history, within which, events are seen as determined by the instrumental and causal influence of a small number of men. For example, Keegan (2003) writes that the political history of the last century can be found in the biographies of six men: Lenin, Stalin, Hitler, Mao, Roosevelt, and Churchill. However, if a leader's attributes or traits have explanatory power, as much of the literature concludes, then it is a natural next step to ask whether the gender of the national leader, that may represent inherent proclivity for certain types of policy making, exerts an influence on outcomes, especially in the case of an emergency like the pandemic.

This question is of significance to the feminist scholarship as it rekindles the debate around how a female leader should or shouldn't behave (Chin, 2004; Ford, 2005). Much of the dominant discourse within the leadership literature remains heavily masculinised and this has influenced perceptions around how female leaders should behave – constantly asked to 'lean-in' to and conform to behaviour expected of a "leader" (Sandberg, 2013). These impositions suggest an acceptance of the 'absolute' dominance of certain traits of leadership that are deemed as successful at all times and in all situations, and which women must imbibe if they seek to succeed. Is this correct, or is it more appropriate to view the success of leadership as being 'contextual' – where certain traits may be better suited to tackling certain situations. This also relates to the issue of diversity in leadership, not merely as a way of ensuring or signaling gender equality (which may have its own value) but as a way to promote efficiency in the face of multi-dimensional challenges.

A note of caution before we begin. The pandemic is still in its early stages and our analysis relates only to the initial responses of national leaders and initial outcomes of the pandemic. Given the fast-evolving situation, much will change over the next few months. Despite this, the first quarter reactions and outcomes are revealing because they capture the initial, instinctive and emergency responses of the leaders before institutions take over more fully. They therefore highlight the significance of early and effective management in a crisis.

The rest of the paper is arranged as follows. The next section discusses construction of the dataset and methodology. Section 3 presents the results. Section 4 uses insights from risk and leadership literature to speculate on the sources of these differences. Section 5 concludes.

II. Data and Methodology

Data construction

This paper uses a dataset specifically collected by the authors for the purpose of this enquiry. We gathered information on total deaths and total cases due to COVID-19 up to May 19th from the Worldometer site. We merged this data with a range of socio-demographic and economic data obtained from the World Development Indicators and UNDP's Human Development Indicators for 194 countries. We collated data on current female leaders from various websites. If countries have more than one head of state, we made a distinction between the executive head (de facto head) and the titular head (de jure or nominal head) based on the characteristics of the political system. We followed the general rule that: in parliamentary regimes, the prime minister is the executive leader while in presidential systems, it is the president, and in communist states, the chairman of the party is the executive head of state.² We use this dataset to analyse first, if there is a systematic difference by gender of the national leader in the total number of deaths and cases experienced due to COVID-19. We also use it to consider the national policy responses to the pandemic, particularly the timing of lockdown.

The first step of our analysis centres around two outcome variables – the total number of COVID cases and total deaths. There are several problems with the quality of data available on these two variables in the first quarter. To start with, the number of cases depended on the amount of testing that a country had been able to undertake. With the shortage of test kits, most countries had undertaken less than optimal testing. Over time, the amount of testing being undertaken is increasing as more testing capacity is being made available. To the extent that tests are being reserved for those who are symptomatic, data on deaths is likely to be more reliable though there are concerns about its comparability across countries. In some countries, if a COVID-positive

² It is worth noting that identifying a country as male or female-led was not always straightforward. This was true, for instance, of Namibia where the Head of Government is designated as a female but the Head of State and Government is a male. Further reading to understand the political economy of Namibia became necessary and we ultimately assigned it as a male-led country. Also, in the case of Switzerland, which is led by a Council of members who share power. Since 1 January 2020, the President (for one year only) is a woman. We therefore decided to designate Switzerland as a female-led country.

person dies, the death is registered as a COVID-death, irrespective of any other previous illness (like tuberculosis, cancer). But this is not standard or mandatory, so practice varies across countries. Our analysis is based on the best and most comprehensive data available but it is subject to these limitations. As time progresses better COVID data will become available and this analysis can be updated.

One other issue that needs to be highlighted is the fact that we are still very much at the start of the pandemic. There is the expectation that the pandemic will last for another 12-18 months, until we find a vaccine or develop herd immunity (Gallagher, 2020). Our analysis therefore is only about the immediate reaction to the first wave. Outcomes by the end of the pandemic will depend on a range of other issues including the impact of other institutions, the cultural norms prevalent in countries and the impact of the lockdown on the economy, health and well-being of individuals.

Methodology

As mentioned above, any investigation involving female leaders suffers from the problem of small sample size, with only 20 out of 194 countries being led by women in our data. In addition, countries that select female leaders may have specific characteristics which enable them to respond to such crises better. They may be richer, less populous or have better gender relations. Countries that select female leaders may also be more ‘modern’ and ‘equitable’ and therefore perform better during crises. Thus, the OLS results presented in Appendix (Table A1) could suffer from two problems – that of a small number of female-led countries and the potential problem of selection. To correct for these two problems, we use the nearest neighbour matching method wherein we compare a unit in the treated group (female-led countries) with a unit in the control group that is as similar to it as possible along a range of covariates. Matching is a quasi-experimental technique that provides a more reliable way of comparing two groups when sample sizes are heavily imbalanced and where there may be selection issues (see Durrant, 2009; Stuart, 2010).

The nearest neighbour matching method pairs each female-led country in our sample with its closest comparator and estimates the effect of being female-led on the dependent variables (COVID-19 cases and deaths). Matching pairs outcomes of a country in one treatment group (female-led) with the outcome of the “closest” country in the other treatment group (male-led). The closeness of the match depends on the variables we are matching by. While matching by discrete variables is straightforward, exact matching on continuous variables is less likely, because two countries are unlikely to have exactly the same population or the same elderly population. Additionally, the more continuous variables we match by, the harder such matching is likely to be so that as the number of covariates we match by increase the matches become less “close”. In Nearest Neighbour matching, the distance between covariate patterns is used to define “closest” and the system weights the differences by the inverse of the sample covariance matrix.

In our analysis, the initial matching is based on four socio-demographic and economic variables that have been seen as important in the transmission of COVID-19 – GDP per capita (current USD), Population, Population density (people/Km²) and Population over 65 Years. We use these variables to match for a range of reasons. First, we include population as we might expect the number of cases and deaths to be higher in countries with larger populations. This variable therefore helps us to control for differences in population size and the statistical impact it may have on numbers and spread. Second, we include GDP per capita as both the impact of COVID-19 and the ability to respond to it are likely to be influenced by how rich or poor a country is (Barnett-Howell and Mobarak, 2020). In particular, we might expect that individuals in less densely populated and prosperous countries are likely to be able to socially-distance more easily than those in heavily populated and poorer countries. In the initial estimates, the GDP variable would also capture the impact of health infrastructure but we have controlled for this separately in our extension models. Third, we include Population density as a matching variable because it has been remarked that COVID-19 spreads faster in densely populated regions where social distancing is difficult (Zhang, et.al., 2020). Finally, we include population over 65 because one of the few clear patterns of COVID-19 deaths across the world is that it is especially fatal amongst older individuals, with the death rates climbing steeply for the over 60s (Nikolich-Zugich, et.al., 2020; Zhang, et.al., 2020).

We follow this core analysis by testing for robustness across the sample as well as across matching variables. In our estimation, we consider not only the nearest neighbour but also two nearest, three nearest and five nearest neighbours to consider how robust the effect is. We also extend our matching variables to include three other characteristics – Annual Health Expenditure per capita, Number of Tourists entering the country and Gender Inequality. Each of these variables allows us to control for a range of differences that could be significant in determining the outcome variables.³

We may expect that countries that have a better equipped health system are likely to perform better in the context of a pandemic. We therefore extend our matching model by including the annual expenditure on health in each country (current USD). We also match by openness to tourism because the more open a country is to international travel, the harder it will be to control the initial importation of the pandemic. Third, it has been mooted that countries that have more gender equitable institutions might well be those that elect women

³ We considered several other variables. Noteworthy among these are ‘trust’ and ‘risk aversion’ that citizens evince (trusting citizens are more likely to be receptive to emergency policy measures and risk averse individuals more likely to socially distance and wear masks) as well as ‘timing of election’ (countries on track to run elections may have different policy responses in terms of the timing of lockdown). But data limitations for these variables reduced our sample severely. For instance, for ‘trust’ we had data for just six female-led countries; for a measure of ‘risk aversion’ it went down to four and for ‘timing of election’ it was one as Serbia was the only female-led country that was scheduled to have elections during the period of study. Despite this, results remained robust (especially on deaths) and are available from authors on request.

leaders and that, it is their gender equality more generally rather than their women leaders that have facilitated their differentially better outcomes (e.g., Champoux-Paillé and Croteau, 2020). This may not only mean that women find gaining power easier in these countries, but that women in power may also enjoy greater trust and support from a political and social context that perpetuates the acceptance of female leaders, and may find it easier to champion cautious policies, if they choose to do so. Indeed, the COVID-19 experience of a group of Scandinavian countries may well fall in this category. Matching by the Gender Inequality Index (GII) therefore allows us to control for these differences between the women-led countries and their comparators and to identify the impact of a country being female-led more precisely. The GII reflects society's view of women as equally worthy and capable of participating in critical socio-economic processes, including holding responsible positions. It is made up of three distinct components – health (maternal mortality and adolescent birth rate), empowerment (education and number of Parliamentary seats held by women) and women's labour market participation (Human Development Report, 2019).

III. Results

COVID-cases and deaths by gender of leader

Table 1 below presents summary statistics for the matching covariates and dependent variables by gender of the country's leaders. Although these are raw statistics and not useful to draw inferences, it is clear that female-led countries have fared better in terms of absolute number of COVID-cases and deaths, with male-led countries having nearly double the number of deaths (~2000) as female-led ones (~1000).

Table 1: Summary statistics for matching covariates and dependent variables by gender of leaders

Study variable	Female-led countries					Male-led countries				
	<i>N</i>	Mean	SD	Min	Max	<i>N</i>	Mean	SD	Min	Max
<i>Dependent variables</i>										
Total COVID-cases	20	16,806	40,231	12	177,289	173	26,333	126,399	8	1.550e+06
Total COVID-deaths	20	1,056	2,619	1	9,080	150	1,994	9,046	1	91,981
<i>First-stage matching covariates</i>										
GDP pc (current USD)	18	38,123	26,222	1,326	82,797	158	14,547	23,246	271.8	185,741
Population	20	2.001e+07	3.991e+07	38,717	1.647e+08	174	4.190e+07	1.555e+08	30,231	1.439e+09
Population density	20	675.2	1,569	3	7,140	174	505.3	2,652	0	26,337
Population 65 years and over	18	15.23	5.096	5.158	21.72	162	8.471	6.162	1.085	27.58
<i>Extended matching covariates</i>										
Avg annual pc health expenditure	13	3,014	2,538	18.75	7,375	159	724.4	1,240	13.59	7,456
Number of international tourists	18	7.151e+06	1.055e+07	178,000	3.888e+07	137	9.196e+06	1.598e+07	14,000	8.932e+07
Gender Inequality Index 2018	13	0.186	0.184	0.0390	0.542	141	0.363	0.186	0.0440	0.834

Source: Dataset constructed by authors from various sources.

- *COVID-outcomes (first step matching)*

As discussed above, we use the nearest neighbour matching method, which matches 18 of the 20 female-led countries in our sample with their nearest neighbour using four matching characteristics - GDP per capita, population, population density and size of elderly dependants. As the number of matching characteristics increase, the size of the sample falls as we do not have complete and comparable data for all countries. In

particular, for the smaller female-led countries like Aruba and Sint Maarten, we are unable to provide matches even with a base model which only matches with Population and GDP per capita.

Table 2a presents the results for matched estimations for both total COVID-cases and deaths. Our matched estimations show a definite and consistent pattern, confirming that the number of deaths is around 1900 lower in women-led countries than in comparable countries led by men. This is also true of the number of cases which are between 18,640 to 22,924 fewer in female-led countries when compared to matched male-led ones, although here the significance of the treatment variable decreases as we increase the number of matches. These results suggest that controlling for GDP per capita, population, population density and elderly population, female-led countries perform significantly better than male-led countries. Stronger results on deaths than cases indicate that although female-led countries were often as hard hit by the virus as comparable male-led ones – they managed the crisis better resulting in fewer fatalities. The results are robust whether we consider a single neighbour, the two nearest neighbours or even the three nearest neighbours.

Table 2a: Comparing COVID-outcomes in female-led countries with nearest neighbours (first-step matching)

Specification \ Dependent Variable	Nearest neighbour	Two nearest neighbours	Three nearest neighbours
COVID-cases	-22,924.199** (11,463.149)	-21,095.944* (11,080.639)	-18,640.055* (10,807.616)
Observations	171	171	171
COVID-deaths	-1,942.174** (825.987)	-1,883.039** (786.827)	-1,885.419** (913.729)
Observations	155	155	155

Note. Standard errors in parenthesis. Results for five nearest neighbours are similar.

** p<0.05, * p<0.1

- *COVID-outcomes (extended-matching)*

As mentioned earlier, to test the robustness of our results, we extend the matching to include three other variables that are likely to have an impact on COVID-outcomes: the condition of the country’s health care systems which will impact on its ability to fight the pandemic; openness to tourism which has been professed to affect the rate and speed of transmission, especially in the first quarter before the lockdown; and finally, more liberal and equitable gender norms which may support policy making and compliance in times of crisis.

Table 2b presents the results for these extensions. As before, we estimate these extended models for the nearest neighbours, for two and three nearest neighbours. Our results remain robust across these estimations, hence in the interest of space we present results only for the nearest neighbour. Overall, we find that both cases and deaths continue to be lower for female-led countries when we match using the three extension variables, with results for deaths being stronger and consistent.

With respect to *health expenditure*, conceptually speaking, we might expect this variable to both influence the number of deaths as well as the readiness with which a country is willing to shut down. In particular, countries with worse health infrastructure may choose to shut down quicker for fear of inability to cope with the impact of the virus. This has, in fact, been the case in many developing countries like India and South Africa. Empirically, however, we find that female-led countries with relatively good health care systems like Germany have led the decision to lockdown. After controlling for this, we find that female-led countries have significantly fewer deaths and also spread of COVID-19 than countries led by men. Results remaining as before – around 22,000 fewer cases and 1,900 fewer deaths (column 2, Table 2b).

There has been some concern that countries that are *open to international travel* are likely to be more badly affected by the virus, especially in the weeks before countries started closing borders. Our results show that, after controlling for such openness to travel, though female-led countries continue to have an advantage in COVID-19 deaths, they do not experience significantly lower cases. This is interesting as it confirms that women-led countries faced similar numbers of cases as other countries but they experienced fewer deaths. This seems to point to better policies and compliance in these countries.

Finally, we match also by a *gender inequality index* (GII) (to consider the fact that countries that elect women are generally more equal and therefore likely to have better resilience). We find that, even after matching for gender-equity indicator, female leadership provides an advantage.

Table 2b: Comparing COVID-outcomes in female-led countries with the nearest neighbour (extended-matching)

Variable	Health expenditure	Openness to tourism	Gender norms
COVID-cases	-22,218.469** (10,730.846)	-18,112.060 (12,517.940)	-20,614.353* (11,364.689)
Observations	162	134	150
COVID-deaths	-1,944.306** (834.670)	-1,654.561* (919.648)	-1,793.428** (874.805)
Observations	147	123	138

Note. Standard errors in parenthesis.

** p<0.05, * p<0.1.

- *Robustness tests*

We carry out further tests to check the robustness of our results. We drop the nations that have been in the COVID-19 spotlight – USA, Germany, and New Zealand – from our sample to see if they might be driving the results and we note that these changes in the sample only strengthen the results (Table 3a).

We also test the robustness of our results to dropping three other countries are various reasons. First, we drop Switzerland as it is effectively led by a Council of members with equal power, though in 2020, its President has been a woman. Second, we re-estimate our results after excluding Guam and Puerto Rico, two female-led

countries that are American protectorates and for which Worldometer provides COVID statistics under its mother-nation. Our results remain unchanged in sign and significance (Table 3b).

Table 3a. Comparing COVID-outcomes in female-led countries without nations in the spotlight

Dependent variable	Without the USA	Without Germany	Without New Zealand
COVID-cases	-13,950.271* (7,204.287)	-25,059.271** (11,436.389)	-22,290.665* (11,732.464)
Observations	170	170	170
COVID-deaths	-1,350.468** (589.843)	-1,927.662** (826.502)	-1,859.013** (830.593)
Observations	154	154	154

Note. Standard errors in parenthesis.

** p<0.05, * p<0.1

Table 3b. Comparing COVID-outcomes in female-led countries without nations in the spotlight

Dependent variable	Without Switzerland	Without Guam and Puerto Rico
COVID-cases	-23,095.212** (11,490.947)	-20,454.107* (11,471.198)
Observations	170	169
COVID-deaths	-1,948.792** (831.339)	-1,681.366** (780.867)
Observations	154	153

Note. Standard errors in parenthesis.

** p<0.05, * p<0.1

Policy responses to COVID-19 by gender of leader

Our results so far confirm that women-led countries performed better in terms of the number of COVID-deaths experienced and also (though less significantly) in the number of cases. We now turn to consider whether these differences are caused by the immediate policy responses of the leaders. In the early stages of the pandemic, leaders had very few policy instruments that they could deploy. In particular, given the global shortages of testing kits and associated materials, very few countries had sufficient equipment or infrastructure in place to deploy test and trace policies.⁴ This meant that the only policy that was widely available was lockdown and the only question then was the speed and decisiveness with which this policy was announced. Over time, the effectiveness of setting up a test and trace system might become crucial.

In what follows, therefore, we are interested in whether female leaders locked down countries systematically more quickly than male leaders. In this context, it is worth identifying that four female-led countries – Iceland, Taiwan, Hong Kong and Myanmar – managed their response without going into a national lockdown. They will therefore not feature in these results. Our analysis in this section therefore relates to only the 16 female-led countries that imposed national lockdowns and 99 male-led countries that did the same.

⁴ Given these issues, we decided not to analyse the testing strategies of leaders. However, raw statistics indicate that tests per million are marginally higher in countries led by women. See Appendix Table A2.

- *Policy responses (first-step matching)*

In trying to understand whether female-led countries locked down earlier than male-led countries we focus on deaths at lockdown – i.e., how many COVID-19 deaths occurred in the country before the leader decided to lockdown the economy. Our matching estimates comparing the timing of lockdown in female-led countries with their closest neighbour are presented in Table 4a. These results indicate that when compared with their closest neighbour, women-led countries did close down significantly more quickly than countries led by men when considering the number of deaths at lockdown. The total deaths at lockdown in female-led countries are approximately 24 fewer than their nearest neighbour male-led countries. Results remain robust when we match to two or three closest neighbours.

Table 4a. Comparing timing of lockdown in female-led countries with nearest neighbours (first-step matching)

Specification	Nearest neighbour	Two Nearest	Three Nearest
Dependent Variable			
COVID-deaths at lockdown	-23.974*** (7.752)	-23.291*** (8.065)	-24.643*** (8.535)
Observations	115	115	115

Note. Standard errors in parenthesis.

*** p<0.01.

- *Policy response (extended-matching)*

Extending our lockdown model to match for annual health expenditure, openness to tourists and GII, we find again that the women-led countries locked down significantly earlier (at lower number of deaths) than countries led by men (Table 4b). This reflects the fact that women leaders reacted more quickly and decisively to the crisis. Better initial outcomes in female-led countries when compared to male-led ones may have been at least partly because of this difference in responses.

Table 4b. Comparing timing of lockdown in female-led countries with nearest neighbours (extended-matching)

Dependent variable	Health expenditure	Openness to tourism	Gender norms
COVID-deaths at lockdown	-24.664*** (8.169)	-22.357** (9.029)	-20.552*** (7.915)
Observations	110	98	105

Note. Standard errors in parenthesis.

*** p<0.01, ** p<0.05.

Why did women leaders respond differently to the COVID-19 crisis from male leaders? What might explain the difference in the behaviour of women leaders as compared to their male counterparts? In the next section, we will consider some ideas from behavioural economics and leadership literature, including feminist scholarship to speculate on the sources of these differences, as well as on their implications.

IV. Discussion

Our results above clearly indicate that women leaders reacted more quickly and decisively in the face of potential fatalities. In almost all cases, they locked down earlier than male leaders in similar circumstances. While this may have longer-term economic implications, which we cannot test here, it has certainly helped these countries to save lives, as evidenced by the significantly lower numbers of deaths in these countries. Why have women been quicker to lockdown? As discussed earlier, one idea that might have a bearing on our result is that there are gender-differences in attitudes to risk and uncertainty (e.g., Croson and Gneezy, 2009; Charness and Gneezy, 2012). However, this basic hypothesis has to be nuanced to highlight that while women were less willing to take risks with lives, they were more willing to accept risks in relation to the early lockdown of economies. We also consider learnings from the leadership literature to understand differences in leadership behaviours evidenced by men and women.

Gender differences in attitudes to risk

While risk aversion may explain why women leaders chose to close down their countries significantly early (in terms of the COVID-deaths at lockdown) when compared to their male counterparts, it does not explain the significant risk that women leaders were prepared to take with their economies by locking down early. Clearly, we need to look beyond the simplistic headline result. It could be that risks manifest differently in different domains – human life vs economic outcomes. If this were true, then women leaders could be seen as being significantly more risk averse than male leaders in the domain of human life, though, in the domain of the economy, these women leaders were clearly prepared to take more risk than male leaders.

We find some support for this idea in studies that examine risk taking behavior when lotteries are framed as losses. For example, Schubert et al. (1999) find that men are more risk averse than women when lotteries are framed as financial losses rather than gains. A similar result is also reported by Moore and Eckel (2006) who find that in the loss-domain gambles, men are more risk-averse and less ambiguity-seeking than women. It could well be that the relatively late lockdown decisions by male leaders may reflect male risk aversion to anticipated losses from locking down the economy.

Another strand of the risk literature that is of interest to us is one that considers risk-taking decisions by leaders on behalf of others in their group. Ertac and Gurdal (2012) observe that in terms of risk attitudes, the women who like to lead and decide for the group are no different from women who do not wish to lead. For men, however, they find that the ones who would like to lead tend to take more risk on behalf of the group. Similarly, studies examining confidence and associated behaviour among men and women find that while both men and women are often overconfident, men are more overconfident of success in uncertain situations than women (Barber and Odean, 2001; Niederle and Vesterlund, 2007).

Evidence in psychology also indicates that men and women react very differently to negative experiences. Women are seen to respond more strongly and intensely than men when anticipating negative outcomes (see Fujita et al., 1991; Krings and Gordon, 1998). This can affect their utility of a risky choice and hence their decision. For example, if a negative outcome is anticipated as being worse by women than by men, they will be more risk averse when facing a negative situation, like the current pandemic. Men, on the other hand, were also found to respond with anger to negative experiences and anger is seen to make them less cautious about future gambles, but women respond with caution, making them more prudent in their beliefs and restrained in their actions (Lerner et al. 2003).

The neuroscience literature, in its turn, indicates that there could be sex differences in feelings of empathy which cannot be fully explained as cultural derivatives of socialisation alone but have deeper neurobiological drivers. Examining the neurobiological underpinnings of male and female feelings of empathy, Christov-Moore et. al., (2014) find that there are important quantitative gender differences in the basic networks involved in affective and cognitive forms of empathy, as well as a qualitative divergence between the sexes in how emotional information is integrated to support decision making processes (see also Eckel and Grossman, 2002). When combined with the findings from the risk literature and psychology, we begin to see how women leaders could have been risk-averse about anticipated losses to human life, while at the same time taking risk with negative financial outcomes associated with early lockdown.

Gender difference in leadership styles

It is likely that leadership characteristics other than risk attitudes may also systematically differ between men and women. The early literature associated leaders with ‘masculine’ attributes characteristic of the stereotypical male. For example, Rost (1991) examines 221 definitions of leadership from the last century and concludes that leadership has most frequently been described as “rational, management-oriented, male, technocratic, quantitative, cost-driven, hierarchical, short-term, pragmatic and materialistic”. Of course, women can display these supposedly ‘male’ management traits and vice versa. For example, both Ardern and Trudeau present themselves as being socially and environmentally aware and as being able to communicate sensitively with minority groups (Lewis, 2020). Despite this, is it possible that male and female leaders are inherently different? Do male and female leadership styles differ?

Eagly and Johnson (1990) conduct a meta-analysis of research that compares male and female leadership styles and conclude that evidence can be found for both the presence and absence of differences between the sexes. While research in organisational studies found little difference between male and female leadership styles, laboratory experiments and assessment studies found evidence to suggest that leadership styles were somewhat gender stereotypical with men likely to lead in a ‘task-oriented’ style and women in an ‘interpersonally-oriented’ manner. Consistent with this finding, women tended to adopt a more democratic

and participative style and a less autocratic or directive style than men. These attributes have been seen as key in a number of studies, especially in managing a crisis (Marcus, Dorn and Henderson 2006; Waugh and Streib 2006; Van Wart and Kapucu 2011).⁵

In another meta-analysis of 45 studies of transformational versus transactional styles of leadership, Eagly, Johannesen-Schmidt and van Engen (2003) find a small overall tendency for women to be more transformational than men – which the largest effects on individualised considerations where women demonstrate a tendency towards a style of leadership that is interpersonal, forming and nurturing new relationships with others. Male leaders, they find are more likely to exhibit aspects of transactional leadership associated with “management by exception”, a tendency to passive decision-making that avoids taking action until things get really critical. This finding coordinates with our results that women national leaders tended to act more quickly in terms of locking down their economies.

Evidence from the leadership literature also suggests that good communications skills are important for women to be chosen as leaders (Lemoine, Aggarwal, Steed, 2016). Indeed, the decisive and clear communication styles adopted by several female leaders have received much praise in the ongoing crisis (e.g., Henley and Roy, 2020; McLean, 2020; Taub, 2020). Thus, Norway’s Prime Minister, Solberg, spoke direct to children answering their questions, while the New Zealand Prime Minister, Ardern, was praised for the way in which she communicated and for checking in with her citizens through Facebook Live.

There seems to be some evidence therefore that being risk averse with respect to loss of lives and having a clear, empathetic, interpersonal and decisive communication style made a significant difference to immediate outcomes of the COVID-19 pandemic in women-led countries. These findings suggest that it may be useful to study leadership using a ‘contextual’ lens, rather than accept pre-conceived notions of what good leadership looks like and how successful leaders must behave. For feminist scholars this translates into the powerful idea that women leaders can gain respect and credibility not by ‘leaning-in’ but by leading with their own unique style of leadership. A demand for diversity in leadership is then not about affirmative action, but a demand for a range of abilities to manage a range of challenges.

V. Conclusion

In this paper, we ask if there is a significant and systematic difference by gender of the national leader in the number of COVID-cases and deaths in the first quarter of the pandemic. We also examine differences in policy responses by male vs. female leaders as plausible explanations for the differences in outcomes. We use a

⁵ In line with this, Zheng, Kark and Meister (2018) propose that effective women leaders may adopt a paradoxical mindset that simultaneously embrace the dual demands of their role as leaders and their gender identity to build a more resilient leadership style.

specifically constructed dataset for 194 countries for our analysis. Our findings show that COVID-outcomes are systematically and significantly better in countries led by women and, to some extent, this may be explained by the proactive policy responses they adopted. Even accounting for institutional context and other controls, being female-led has provided countries with an advantage in the current crisis.

Examining what is already known about the gender differences in behaviour from a variety of disciplines gives us some insights into observed differential behaviour of female and male leaders in tackling the current pandemic. The factors affecting the pandemic outcomes in various countries are likely to be complex. However, the gender of leadership could well have been key at the start of the pandemic when the immediate reaction of the leader mattered and therefore her attitudes to risk and empathy as well as communications style were central to outcomes. It is clear that many of these factors will need to be considered in the months and years ahead as the outcomes of the pandemic mature and the impacts on the economy become apparent across countries.

Our results point at the idea that the pandemic posed a very different and particular kind of challenge and one that is likely to become more (rather than less) common. Given that challenges countries and organisations face vary in their context and characteristics, it seems clear that diversity in leadership will prove to be a major advantage in managing and minimising risk. Such diversity is not simply a matter of equity but also a matter of effectiveness in the face of multi-dimensional challenges.

References

- Barber, Brad and Terrance Odean. 2001. Boys will be boys: Gender, overconfidence, and common stock investment”, *The Quarterly Journal of Economics*. 116(1): 261-92
- Barnett-Howell, Zachary and Mobarak Ahmed Mushq. 2020. The Benefits and Costs of Social Distancing in Rich and Poor Countries, *arXiv:2004.04867v1 [econ.GN]* <https://arxiv.org/abs/2004.04867> (accessed on 20/05/2020)
- Besley, Timothy, Jose G Montalvo and Marta Reynal-Querol. 2011. “Do Educated Leaders Matter?”, *The Economic Journal*, 121 (554): 205-227.
- Champoux-Paillé Louise and Anne-Marie Croteau. 2020. “Why women leaders are excelling during the coronavirus pandemic”, *Conversation*. <https://theconversation.com/why-women-leaders-are-excelling-during-the-coronavirus-pandemic-138098> (accessed 20/05/2020)
- Charness, Gary, and Uri Gneezy, 2012. Strong Evidence for Gender Differences in Risk Taking, *Journal of Economic Behavior & Organization*, ISSN 0167-2681, <http://dx.doi.org/10.1016/j.jebo.2011.06.007>. Volume 83 (1): 50-58.
- Chin Jean Lau. 2003. “Division 35 presidential address: Feminist leadership: feminist visions and diverse voices”, *Psychology of Women Quarterly*, 28 (2004), 1–8.
- Christov-Moore, Leonardo, Elizabeth A. Simpson, Gino Coudé, Kristina Grigaityte, Marco Iacobonia, Pier Francesco Ferrari. 2014. Empathy: Gender effects in brain and behaviour, *Neuroscience and Biobehavioral Reviews*, 46: 604–627.
- Croson, Rachel, and Uri Gneezy. 2009. Gender differences in preferences. *Journal of Economic Literature*, 448-474.
- Durrant, Gabriele B. 2009. Imputation methods for handling item-nonresponse in practice: methodological issues and recent debates, *International Journal of Social Research Methodology*, 12:4, 293-304.
- Eagly, Alice H. and Blair T Johnson. "Gender and Leadership Style: A Meta-Analysis" 1990. *CHIP Documents*. 11. https://opencommons.uconn.edu/chip_docs/11 (accessed 02/05/2020)
- Eagly Alice H. Mary C. Johannesen-Schmidt and Marloes L. van Engen. 2003. “Transformational, Transactional, and Laissez-Faire Leadership Styles: A Meta-Analysis Comparing Women and Men”, *Psychological Bulletin*, 129(4): 569–591.
- Eckel, C. Catherine., and Grossman, J Philips., 2002. “Sex differences and statistical stereotyping in attitudes toward financial risk”, *Evolution and Human Behavior*, 23, 281–295.

- Ertac Seda, Mehmet Y. Gurdal. 2012. "Deciding to decide: Gender, leadership and risk-taking in groups", *Journal of Economic Behavior & Organization*, 83:24-30.
- Finucane, Melissa L., Paul Slovic, C. K. Mertz, James Flynn, and Theresa A. Satterfield. 2000. "Gender, Race, and Perceived Risk: The 'White Male' Effect." *Health, Risk and Society*, 2(2): 159–72.
- Ford Jackie. 2005. "Examining leadership through critical feminist readings", *Journal of Health Organization and Management*, 19(3): 236-251.
- Fujita, Frank, Ed Diener, and Ed Sandvik. 1991. "Gender Differences in Negative Affect and Well-Being: The Case for Emotional Intensity." *Journal of Personality and Social Psychology*, 61(3): 427–34.
- Gallagher, James. 2020. <https://www.bbc.co.uk/news/health-51963486>(accessed 20/05/2020)
- Gemmill, Gary and Judith Oakley. 1992. "Leadership: An Alienating Social Myth?" *Human Relations*, XLV, 113–129.
- Gneezy, Uri., Kenneth L. Leonard and John A. List. 2009. "Gender Differences in Competition: Evidence From a Matrilineal and a Patriarchal Society", *Econometrica*, 77(5): 1637-1664.
- Goodall, Amanda H, Lawrence M. Kahn and Andrew J. Oswald. 2011. "Why do leaders matter? A study of expert knowledge in a superstar setting." *Journal of Economic Behavior & Organization*, 77(3): 265-284.
- Henley, Jon and Eleanor Ainge Roy. 2020. Are female leaders more successful at managing the coronavirus crisis?, *Guardian*, 25th April <https://www.theguardian.com/world/2020/apr/25/why-do-female-leaders-seem-to-be-more-successful-at-managing-the-coronavirus-crisis> (accessed 25/05/2020)
- Human Development Report. 2019 "*Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century*", United Nations Development Programme.
- Jones, Benjamin and Benjamin A. Olken. 2005. "Do Leaders Matter? National Leadership and Growth Since World War II" *The Quarterly Journal of Economics*, 120(3): 835-864.
- Keegan, John. 2003. "Winston Churchill," *Time Magazine*, World Wide Web: <http://www.time.com/time/time100/leaders/prole/churchill.html>. (accessed 10/05/2020)
- Kring, Ann M and Albert H. Gordon. 1998. "Sex Differences in Emotion: Expression, Experience, and Physiology," *Journal of Personality and Social Psychology*, 74(3): 686-703
- Lerner, Jennifer S., Roxana M. Gonzalez, Deborah A. Small, and Baruch Fischhoff. 2003. "Effects of Fear and Anger on Perceived Risks of Terrorism: A National Field Experiment." *Psychological Science*, 14(2): 144–50.
- Lemoine G. James, Aggarwal Ishani, Laurens Bujold Steed. 2016. "When women emerge as leaders: Effects of extraversion and gender composition in groups", *The Leadership Quarterly*, 27(3): 470-486.
- Lewis Helen. 2020. The Pandemic has Revealed the Weakness of Strongmen, *The Atlantic*, 6th May. <https://www.theatlantic.com/international/archive/2020/05/new-zealand-germany-women-leadership-strongmen-coronavirus/611161/> (accessed 20/05/2020)
- Marcus, Leonard J., Barry C Dorn and Joseph M. Henderson. 2006. Meta-Leadership and National Emergency Preparedness: A Model to Build Government, Biosecurity and Bioterrorism, 4(2): 128-134.
- McLean, V. 2020. Coronavirus is showing yet again why the world needs more strong female decision-makers, 12th April, <https://www.euronews.com/2020/05/12/coronavirus-showing-yet-again-why-the-world-needs-more-strong-female-decision-makers-view> (accessed 20/05/2020)
- Moore Evan and Catherine Eckel. 2006. "Measuring ambiguity aversion", *Research Gate*. https://www.researchgate.net/publication/228790553_Measuring_ambiguity_aversion (accessed 05/05/2020)
- Nelson A Julie. 2015. "Are women really more risk-averse than men? A re-analysis of the literature using expanded methods", *Journal of Economic Surveys*, 29(3): 566-85.
- Niederle, Muriele and Lise Vesterlund. 2007. Do women shy away from competition? Do men compete too much? *The Quarterly Journal of Economics*, 122(3):1067-1101
- Nikolich-Zugich, Janko., Kenneth S Knox, Carlos Tafich Rios, Natt Bhupinder, Deepta Bhattacharya and Mindy J. Fain. 2020. "SARS-CoV-2 and COVID-19 in older adults: what we may expect regarding pathogenesis, immune responses, and outcomes", *GeroScience*, 42:505–514.
- Rost, Joseph C. 1991. *Leadership in the 21st Century*. New York: Praeger
- Sandberg, Sheryl. 2013. "Lean in — Women, Work and the Will to Lead", Random House.
- Schubert, Renate, Martin Brown, Matthias Gysler, and Hans Wolfgang Brachinger. 1999. "Financial Decision-Making: Are Women Really More Risk-Averse?" *American Economic Review*, 89(2): 381–85.
- Stuart Elizabeth A. , 2010. Matching Methods for Causal Inference: A Review and a Look Forward, *Statistical Science*, 25, (1):1-21.
- Taub Amanda. 2020. "Why Are Women-Led Nations Doing Better With Covid-19?", *New York Times*, 15 May. <https://www.nytimes.com/2020/05/15/world/coronavirus-women-leaders.html> (accessed 25/05/2020)
- Van Wart, Montgomery and Naim Kapucu. 2011. "Crisis Management Competencies: The case of emergency managers in the USA", *Public Management Review*, 13 (4): 489-511.
- Waugh, William L. and Gregory Streib. 2006. Collaboration and Leadership for Effective Emergency Management, *Public Administration Review*, 66(1): 131-140.
- Wittenberg-Cox, Avivah. 2020. "What do countries with best coronavirus responses have in common?", *Forbes*. 13/04/2020. <https://www.forbes.com/sites/avivahwittenbergcox/2020/04/13/what-do-countries-with-the-best-coronavirus-reponses-have-in-common-women-leaders/#3ce529813dec> (accessed on 10/05/2020)

Zhang, Juanjuan, Maria Litvinova, Yuxia Liang, , Yan Wang, Wei Wang, Shanlu Zhao, Qianhui Wu, Stefano Merler, Cécile Viboud, Alessandro Vespignani, Marco Ajelli, Hongjie, Yu. 2020. “Changes in contact patterns shape the dynamics of the COVID-19 outbreak in China”, *Science*, 29 April.

Zheng Wei., RonitKark, Alyson L.Meister. 2018. “Paradox versus dilemma mindset: A theory of how women leaders navigate the tensions between agency and communion”, *The Leadership Quarterly*, 29(5): 584-596

Appendix

Table A1: OLS results for COVID-cases and deaths

Covariates	Total cases	Total deaths
Female-led	-57,264.744* (32,266.790)	-4,290.402* (2,240.180)
GDP/pc	1.948*** (0.566)	0.134*** (0.039)
Population (ln)	23,163.657*** (4,979.229)	1,672.671*** (366.874)
Population density	-6.172 (5.210)	-0.702 (0.734)
Population 65 years and over	1,344.805 (1,701.372)	186.337 (118.567)
Constant	-378,016.156*** (81,636.534)	-28,256.830*** (6,062.164)
Observations	171	155
R-squared	0.191	0.224

Note. Standard errors in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Table A2: Summary statistics for COVID-19 tests by gender of leaders

Study variable	Female-led countries					Male-led countries				
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Tests per million	18	33,053	40,232	268	166,818	155	20,587	32,421	4	181,466

Source: Dataset constructed by authors from various sources.