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Is country leaders' education relevant for policy making? The case of the Covid-19 pandemic

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Abstract

This paper examines the impact of a country leader's education on policy responses and policy outcomes during the onset of the Covid-19 pandemic. Relying on a quasi-experimental event-study approach, I find that political leaders with a graduate education responded more stringently to the first nationally registered infection than political leaders with lower educational attainment. Subsequently, political leaders with a graduate education reported fewer Covid-19 infections and Covid-19 related deaths at the onset of the pandemic. The results suggest that the education of political leaders can explain policy differences, particularly in countries with low electoral accountability. The low level of accountability allowed political leaders with a graduate education to implement stringent, evidence-based policies to contain the pandemic without fear of electoral punishment.

Keyword Covid-19, political economy, political leadership, education

JEL Classification D78 · H11 · H12 · I18

1 Introduction

The onset of the Covid-19 pandemic in early 2020 forced political leaders around the world to make controversial decisions. In particular, political leaders had to decide on non-pharmaceutical interventions to contain the pandemic in the absence of a vaccine. While stringent non-pharmaceutical measures slowed down the spread of the virus (Flaxman et al., 2020; Hsiang et al., 2020), restrictive policies depressed the economy (Forsythe et al., 2020; Albanesi & Kim, 2021). Taking into account the trade-off between the health and economic consequences of the pandemic, political leaders responded with substantial variation in the stringency of non-pharmaceutical interventions to the onset of the pandemic. Consequently, recent research attempts to explain differences in non-pharmaceutical interventions focusing on personal characteristics of the political leaders (e.g., Bayerlein et al., 2021; Bruce et al., 2022). However, little attention has been paid to the education of

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political leaders, even though anecdotal evidence suggests that the education of political leaders may explain policy differences during the first wave of the pandemic. The Atlantic, for example, praised former German chancellor Angela Merkel, who has a PhD in physics, for her policy response at the onset of the pandemic, stating that “scientific thinking [...] remains integral to Merkel’s daily decision-making process and her political persona” (Miller, 2020).

Existing literature provides several rationales why political leaders with different educational attainment might handle the Covid-19 pandemic differently. Educated politicians might have higher competencies and skills (e.g., Besley et al., 2011; Peveri, 2022; Sørensen, 2023) that incorporated into daily decision-making during the onset of the pandemic (Forster & Heinzel, 2021). Alternatively, electoral incentives might induce political leaders with different levels of education to implement different policies at the pandemic’s onset. Politicians seeking reelection might adjust their pandemic strategies based on voters’ perceptions about politicians. Since voters perceive politicians with lower levels of education as less competent (van Noord et al., 2023), they might choose different policies than political leaders with higher educational attainment when facing reelection concerns. Relatedly, Chauvin and Tricaud (2023) rationalize the relationship between voters’ perceptions about the politician’s competencies, electoral incentives, and policy choices during the Covid-19 pandemic in a model of political agency. Finally, politicians with higher educational attainment might have different policy preferences, attitudes, or beliefs (e.g., Besley & Coate, 1997; Dreher et al., 2009) as well as a different dedication to serving the public interest (Besley et al., 2011) that influenced policy making at the onset of the pandemic.

In this paper, I examine whether political leaders with higher educational attainment (political leaders who hold at least a degree from a graduate or professional school) managed the Covid-19 pandemic differently than political leaders with lower educational attainment. First, I investigate whether political leaders with a graduate education were associated with fewer Covid-19 infections and Covid-19 related deaths compared to political leaders with lower levels of education. In a second step, I focus on Covid-19 policies and investigate whether political leaders with higher educational attainment responded more stringently to the onset of the pandemic than politicians with lower educational attainment.

To conduct the analysis, I construct a panel dataset that tracks Covid-19 infections and Covid-19 related deaths (Dong et al., 2020) as well as the stringency of non-pharmaceutical interventions (Hale et al., 2021) from January to June 2020. I enrich the dataset with biographical information about the political leader’s age, gender, tenure in office, and highest educational degree. Further, I add information about country characteristics that may shape the stringency of non-pharmaceutical interventions at the onset of the pandemic. The final sample consists of 147 countries covering the period from January to June 2020.

Running ordinary least square regressions, the results indicate that political leaders with higher educational attainment reported fewer Covid-19 infections and Covid-19 related deaths. This effect was particularly prevalent in May and June 2020.

Subsequently, I examine whether political leaders with higher educational attainment imposed more stringent policies at the onset of the pandemic. The challenge of the empirical analysis is to isolate the effect of political leaders’ education on the stringency of Covid-19 policies. Since the selection of political leaders is not random, unobserved preferences and country characteristics may explain the endogenous selection of politicians with higher educational attainment. To address this issue, I estimate an event-study model with treatment heterogeneity. In particular, I compare the stringency of policies before and after a country detected its first national Covid-19 infection (first difference) between countries that experienced their first infection at different points in time (second difference). To

account for the heterogeneity between politicians with different educational attainment, I compare changes in the stringency of non-pharmaceutical interventions in response to the first nationally registered infection between politicians with higher educational attainment and politicians with less education. This set-up is widely used in economics to analyze institutional differences regarding the stringency of the policy response at the onset of the pandemic (e.g., Ferraresi et al., 2020; Chiplunkar & Das, 2021). The identification relies upon the assumption that political leaders followed similar trends regarding the stringency of policies prior to the first infection, irrespective of their educational attainment.

The estimation results show that political leaders with higher educational attainment responded more stringently to the first nationally detected infection than politicians with less education. The results are stable across specifications including country-specific time trends to control for confounding treatments. Further, the results are robust towards alternative specifications: On the one hand, I estimate an event-study model enabling a different evolution of the stringency of pandemic policies depending on time-invariant country characteristics. On the other hand, I consider the (lagged) Covid-19 infection and death incidence as control variables. Yet, the results remain qualitatively unchanged.

To explore the mechanisms, I examine the effect of the political leader's education on the stringency of non-pharmaceutical interventions when faced with either high or low electoral accountability. Electoral accountability determines the ability of political leaders to implement the policies they believed were best suitable to address the consequences of the pandemic. The results suggest that political leaders, regardless of their level of education, adopted policies of similar stringency when electoral incentives are high. The result supports the median voter theorem (Downs, 1957), which suggests that any politician seeking re-election will align his or her policies with the preferences of the decisive voter. When electoral incentives are low, political leaders with higher levels of education implemented more stringent policies to contain the pandemic than political leaders with lower levels of education. The low level of accountability provides an opportunity for political leaders to incorporate information, such as expert advice, into the decision-making process about Covid-19 containment policy (Pulejo & Querubín, 2021). However, political leaders with higher levels of education are expected to be more likely to follow expert advice due to their technocratic mentality than political leaders with lower levels of education (Forster & Heinzel, 2021). As a result, political leaders with higher levels of education adopted more stringent policies at the onset of the pandemic, as recommended by early scientific evidence (e.g., Al Saidi et al., 2020; Hsiang et al., 2020).

The remainder of the paper is organized as follows. Section 2 discusses the relevant literature and describes the contribution of this paper. Section 3 explains the data, while Sect. 4 examines the correlation between a country leaders' education and Covid-19 infections and deaths. Section 5 provides results for the influence of a country leader's education on the stringency of Covid-19 policies. Section 6 explores the role of electoral incentives to explain the relationship between a country leader's education and the stringency of Covid-19 policies. Section 7 concludes.

2 Contribution to the literature

This paper contributes to three strands of literature. First and foremost, the paper contributes to research exploring the impact of political leaders on policy outcomes (e.g., Jones & Olken, 2005; Moessinger, 2014; Yao & Zhang, 2015). Among others, the influence of

political leaders' age (Alesina et al., 2018), gender (e.g., Besley & Case, 2003; Chattopadhyay & Duflo, 2004; Clots-Figueras, 2011), religion (Bhalotra et al., 2014), and occupational background (e.g., Jochimsen & Thomasius, 2014; Jacqmin & Lefebvre, 2016; Pilny & Roesel, 2020) on policy outcomes has previously been analyzed.¹ Besides, the literature has given special emphasis to the education of political leaders. Political leaders with higher educational attainment are, for example, found to promote economic growth (Besley et al., 2011; Jain et al., 2023), to foster education (Diaz-Serrano & Pérez, 2013; Lahoti & Sahoo, 2020), and to reduce corruption (Pelzl & Poelhekke, 2023).

Yet, literature about the influence of a political leader's education on policy outcomes in high-stake situations is scarce. Dreher et al. (2009) find that politicians trained in economics are more likely to implement market-liberalizing reforms. The authors argue that economists in office behave more rational when taking decisions relevant for economic development. Gift and Krcmaric (2017) show that political leaders who received education in Western countries are more likely to promote democracy, presumably because Western education socializes to appreciate democratic norms and values. In line with the idea of Western socialization, Barceló (2020) finds that Western-educated politicians are less likely to initiate militarized conflicts. I add to this strand of literature by providing evidence that politicians with different educational attainment pursue different policies (as measured by the stringency of Covid-19 policies) and reach different outcomes (as measured by Covid-19 infections and Covid-19 related deaths) in the context of a severe health crisis. Accordingly, my paper responds to a call from Leeson and Thompson (2023) for intensified research regarding the political economy of public health.

Second, this paper contributes to research examining the political determinants of Covid-19 policies and Covid-19 outcomes. Along with the literature showing that democratic institutions matter for Covid-19 policies and outcomes (e.g., Ferraresi et al., 2020; Chiplunkar & Das, 2021; Karabulut et al., 2021), few studies address political leaders' characteristics to explain the policy divergence at the onset of the pandemic. Those studies focus primarily on the gender of the political leader with less conclusive evidence. Among others, Piscopo (2020) and Aldrich and Lotito (2020) use cross-country data to explore gender differences regarding Covid-19 policies and mortality but report insignificant results. Contrary, Bruce et al. (2022) exploit close elections in Brazilian municipalities to show that female majors reduced Covid-19 related deaths and hospitalizations by enforcing stricter policies to contain the pandemic. Chauvin and Tricaud (2023) further disentangle gender differences for Brazilian municipalities over time: While female majors performed worse during the first wave of the pandemic, they reduced Covid-19 related deaths during the second wave of the pandemic.

Less attention has been devoted to other characteristics of political leaders such as partisanship (Adolph et al., 2021; Baccini & Brodeur, 2021), popularity among the electorate (Chiplunkar & Das, 2021), or populist attitudes (Bayerlein et al., 2021). Only Forster and Heinzl (2021) analyze the role of education in pandemic policy making. They show that political leaders with PhD education adopted policies to contain the Covid-19 pandemic more quickly than political leaders with lower educational attainment. Due to their technocratic mentality, political leaders with a PhD were more likely to follow expert advice and, hence, take policies to counteract the virus earlier.

¹ See Krcmaric et al. (2020) for a review.

My paper improves on this literature in two critical ways. First, I follow Forster and Heinzel (2021) who specifically demand to empirically investigate the relationship between the education of political leaders and the stringency of Covid-19 policies. Therefore, I focus on the *stringency* of pandemic policies rather than on the *speed of implementation* of pandemic policies. Though quick implementation of non-pharmaceutical policies helped to contain the Covid-19 pandemic, the stringency of policies was key to contain Covid-19 infections and Covid-19 related deaths (e.g., Flaxman et al., 2020; Hsiang et al., 2020). Subsequently, the second contribution to this literature is to examine not only the influence of the education of political leaders on policy making (Covid-19 policies), but also on policy outcomes (Covid-19 infections and Covid-19 related deaths). Covid-19 policies are by definition targeted to reduce Covid-19 infections and Covid-19 related deaths. Therefore, the performance of political leaders during the pandemic ought to be judged by their ability to contain Covid-19 infections and Covid-19 related deaths.

Finally, the results lend empirical support for models that emphasize elections as a disciplining device (e.g., Downs, 1957; Barro, 1973; Ferejohn, 1986). A burgeoning body of literature documents how different degrees of electoral accountability influence political decision-making (e.g., Ferraz & Finan, 2021; de Janvry et al., 2012; Lopes da Fonseca, 2020). In the context of the Covid-19 pandemic, Pulejo and Querubín (2021) show that politicians enforce less stringent policies when seeking re-election. Because politicians are held primarily accountable for economic well-being, they fear the negative electoral consequences of imposing stringent measures that depress the economy. Chauvin and Tricaud (2023) show that electoral incentives may induce different policy choices for male and female politicians during the pandemic. Since voters are biased against the competence of female politicians, they may adopt less stringent policies to avoid the electoral consequences of “over-reaction”. In this respect, I exploit the Covid-19 pandemic as a unique natural experiment and provide a first test of how politicians with different levels of education adapt policy making to different degrees of electoral accountability.

3 Data and variables

My aim is to examine whether political leaders with higher educational attainment were associated with fewer Covid-19 infections and Covid-19 related deaths and responded more stringently to the onset of the pandemic compared to political leaders with less education. Accordingly, I require data on Covid-19 infections and Covid-19 related deaths, data about the stringency of policies to combat the pandemic, and data about the educational attainment of the political leader in office at the onset of the pandemic. Subsequently, I describe the main data and explain important characteristics.

Data on Covid-19 infections and Covid-19 related deaths are provided by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (Dong et al., 2020). The CSSE consolidates Covid-19 data from official sources such as the World Health Organization and national health authorities as well as from local newspapers and social media. The daily data report cumulative infections and deaths for more than 200 countries and territories starting from January 22, 2020. The period under consideration comprises the first wave of the pandemic and spans from January 22, 2020, to June 30, 2020. For the analysis, I restrict the sample to countries reporting their first infection no earlier than January 22, 2020, since countries with earlier infections neither identify treatment effects nor

act as a valid control group under the parallel trends assumption (Callaway & Sant'Anna, 2021).

Data on the stringency of policies to counteract the pandemic come from the Covid-19 Government Response Tracker provided by the Blavatnik School of Government at Oxford University (Hale et al., 2021). Daily stringency data are available for more than 180 countries and territories. Various fields of research use this data, among others, to investigate the institutional determinants of lockdown policies (see, e.g., Ferraresi et al., 2020; Chip-lunkar & Das, 2021) and to assess the effectiveness of non-pharmaceutical interventions (see, e.g., Flaxman et al., 2020; Wibbens et al., 2020). The stringency index comprises nine items relating to containment and health policy and ranges from 0 to 100.² Since stringency data start as of January 1, 2020, I have full information for the period under consideration.

Finally, data on the educational attainment of political leaders come from the Political Leaders' Affiliation Database (PLAD) (Dreher et al., 2021). Methodologically, PLAD researchers identify a political leader as the person who de facto exercises the power in a country. The data provide information on personal characteristics of political leaders from 1989 to 2020 and classify leaders' education using an eight-level ordinal variable ranging from illiteracy to doctoral qualification. For the analysis, I focus on leaders in office at the beginning of 2020 to rule out any issues regarding an endogenous leader change due to the onset of the pandemic.

I supplement these data with information about economic, institutional, health-related, and demographic time-invariant country characteristics that may influence the severity of the pandemic and the stringency of pandemic policies simultaneously. Table 5 in the appendix provides information about the data sources.³ After dropping all missing observations, the final sample comprises 147 countries tracked from January to June 2020.

4 Covid-19 infections and Covid-19 related deaths

To identify the correlation between a political leader's education and Covid-19 infections and Covid-19 related deaths, I take advantage of the high frequency of data and run ordinary least square regressions for both outcome variables separately. For the estimation, I consider the period from March to June 2020 since many countries have not yet experienced a serious pandemic outbreak earlier. The regression model reads as:

$$Y_c = \gamma + \beta Graduate_c + \eta X_c + u_c, \quad (1)$$

where Y_c is $\log(1 + outcome_c)$ for either Covid-19 infections or Covid-19 related deaths per 1,000,000 inhabitants in country c for any month from March to June 2020. I take the natural logarithm to account for the non-linear increase in infections and deaths and add a constant of 1 to consider countries reporting 0 deaths or infections per month. The vector X_c comprises country-specific control variables as outlined in the appendix, Table 5.

² Each item reflects the stringency on an ordinal scale. For a detailed explanation of how to compute the index from the items, see (Hale et al. (2021), 536–537).

³ I take the latest available value for each time-invariant country characteristic before the end of 2019 to prevent any endogeneity issues.

The variable $Graduate_c$ denotes the main independent variable and is an indicator variable taking the value 1 if a political leader has at least a qualification from a graduate or professional school and 0 otherwise. Accordingly, β is the coefficient of interest and captures the correlation between the politician leaders' education and Covid-19 infections and deaths. Formula 1 does not explicitly map the influence of containment policies on Covid-19 infections and Covid-19 related deaths. By definition, Covid-19 policies endogenously depend on the pandemic situation and are set by politicians to contain the pandemic. Hence, β captures the overall effect of political leaders' education on Covid-19 outcomes (partly) mediated by Covid-19 policies.

Table 1, panel [A] presents the regression results focusing on Covid-19 infections as outcome variable. The results indicate no correlation between the education of the political leader and Covid-19 infections in March and April 2020. However, political leaders with higher levels of education reported fewer Covid-19 infections in May and June 2020 when the Covid-19 pandemic was further advanced. A similar result emerges for Covid-19 related deaths. Results are presented panel [B] of Table 1. The results show no correlation between the education of the political leader and Covid-19 related deaths from March to May 2020, while higher educational attainment of the political leader is negatively correlated with the number of deaths in June 2020.

Table 1 Covid-19 infections and Covid-19 related deaths

	March	April	May	June
[A]: log(1+Covid-19 infections)				
Graduate	-0.068 (0.159)	-0.381 (0.266)	-0.710** (0.352)	-0.623* (0.360)
Controls	✓	✓	✓	✓
R^2	0.859	0.638	0.317	0.265
Observations	147	147	147	147
[B]: log(1+Covid-19 related deaths)				
Graduate	0.103 (0.114)	-0.171 (0.171)	-0.364 (0.239)	-0.473* (0.262)
Controls	✓	✓	✓	✓
R^2	0.655	0.733	0.458	0.314
Observations	147	147	147	147

Robust standard errors in parentheses. The dependent variable is either the logarithm of Covid-19 infections added with 1 [A] or the logarithm of Covid-19 related deaths added with 1 [B]. Graduate is a dummy variable taking the value 1 if the political leader of a country has at least a degree from a graduate or professional school and 0 otherwise. Controls: Political leader's age, gender, and tenure in office, World Governance Indicators, a dummy indicating whether the country is federally governed, unemployment rate, female employment rate, GDP per head, life expectancy, physicians per 1,000 inhabitants, health spending per head, health spending as % of GDP, population share aged above 65. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 2 Stringency of Covid-19 policies

	log(1+stringency)		
	(1)	(2)	(3)
First infection	0.187 (0.125)	0.189 (0.123)	0.070 (0.126)
First infection × Graduate	0.338* (0.172)	0.430** (0.177)	0.416** (0.179)
Country fixed effects	✓	✓	✓
Time fixed effects	✓	✓	✓
Country-specific linear time trends		✓	✓
Country-specific quadratic time trends			✓
Within R^2	0.803	0.908	0.940
Observations	1578	1578	1578

Country-level clustered standard errors in parentheses. The dependent variable is the logarithm of the stringency index added with 1. Graduate is a dummy variable taking the value 1 if the political leader of a country has at least a degree from a graduate or professional school and 0 otherwise. First infection is a dummy variable taking the value 1 if a country has registered its first Covid-19 infection and 0 otherwise. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5 Stringency of Covid-19 policies

The previous findings suggest that politicians with higher educational attainment reported fewer Covid-19 infections and Covid-19 related deaths. Still, the results do not unravel how this group of political leaders minimized Covid-19 infections and Covid-19 related deaths. Therefore, I focus on Covid-19 policies in the next step and examine whether political leaders with different educational attainment responded with different stringency to the first nationally registered Covid-19 infection. Therefore, I make use of an event-study model with treatment heterogeneity. Specifically, the model compares the stringency of Covid-19 policies before and after a country detected its first Covid-19 infection (first difference) between countries that experienced their first infection at different points in time (second difference). To account for policy heterogeneity, I compare changes in the stringency of non-pharmaceutical interventions between politicians with higher educational attainment and politicians with less education. The model reads as:

$$Y_{ct} = \beta Post_{ct} + \gamma Post_{ct} \times Graduate_c + \alpha_c + \delta_w + \epsilon_{ct}, \quad (2)$$

where Y_{ct} is $\log(1 + stringency_{ct})$ and captures the average logarithm of the stringency of non-pharmaceutical interventions in country c in week t . The subscript t indicates the week relative to the first reported Covid-19 infection in country c and can take values from -4 to 6. Accordingly, I restrict the analysis to four weeks prior and six weeks after a country reported its first Covid-19 infection. I aggregate the data based on calendar weeks to address any issues regarding misreporting of Covid-19 infections (see, e.g., Li et al., 2020; Hortaçsu et al., 2021). The main independent variable is the binary variable $Post_{ct}$ that takes the value 1 if country c has detected its first national infection (that is, $t \geq 0$) and 0 otherwise. The interaction term $Post_{ct} \times Graduate_c$ allows the effect of the pandemic's onset on the stringency of the policy response to differ between political leaders with

different levels of education. Therefore, the coefficient of interest is γ . Additionally, formula 2 maps country fixed effects (α_c) and time fixed effects (δ_w).

Table 2 displays the results for the stringency analysis at the onset of the pandemic. Column (1) reports the main results from specification 2. The results indicate that political leaders with higher educational attainment responded more stringently to the first nationally registered Covid-19 infection compared to political leaders with less educational attainment. The results correspond with the literature presented in Sect. 2, which suggests that political leaders with different educational background pursue different policies and reach divergent policy outcomes. Concurrently, the results provide a rationale why political leaders with higher educational attainment reported fewer Covid-19 infections and deaths than political leaders with lower educational attainment. Column (2) and (3) report further results including country-specific linear and quadratic time trends. Country-specific time trends may rule out some omitted variable bias at the country level (Friedberg, 1998). The results of both specifications point to a more stringent policy response of political leaders with higher educational attainment compared to political leaders with less education.

To disentangle policy differences at the onset of the pandemic over time, I estimate a dynamic event-study specification. This specification separately captures policy differences between political leaders with different levels of education for each week relative to the first nationally registered infection. The model reads as:

$$Y_{ct} = \sum_{t=-4}^6 \beta_t I_{ct} + \sum_{t=-4}^6 \gamma_t I_{ct} \times Graduate_c + \alpha_c + \delta_w + \mu_{ct}. \quad (3)$$

Formula 3 resembles the event-study model from formula 2 but includes lead and lag variables instead of a single dummy variable indicating whether a country has detected its first infection. Specifically, the variable I_{ct} is an indicator for week t relative to the first nationally registered Covid-19 infection. The coefficients γ_t display differences between differently educated political leaders prior ($t < 0$) and after ($t \geq 0$) a country experienced its first infection.

Figure 1 presents the regression results. The point estimates suggest that political leaders with different educational attainment followed parallel trends regarding the stringency of non-pharmaceutical interventions prior to the first nationally registered infection. Immediately after the pandemic's onset, the point estimates indicate that political leaders with higher educational attainment responded more stringently to the first nationally detected infection than political leaders with less education. This effect persisted for a total of four weeks after the first nationally registered infection.

I perform various robustness checks that build upon the event-study model from formula 2. First, I extend the specification with additional control variables and interaction terms. Column (1) of Table 3 provides estimation results considering the Covid-19 infection and death incidence as control variables. To account for potential issues regarding bad controls, column (2) includes Covid-19 infection and death incidence lagged by one week as controls. Both models consistently suggest that political leaders with higher educational attainment responded more stringently to the onset of the pandemic than politicians with lower educational attainment. Column (3) further adds interaction terms between the main independent variable and time-invariant characteristics mapping gender, age, and tenure of the political leader in office as well as economic, institutional, demographic, and health-related country characteristics. Angeli and Montefusco (2020) suggest that the effectiveness of Covid-19 policies crucially depended on initial country characteristics. Yet, results remain qualitatively unchanged.

Table 3 Stringency of Covid-19 policies including control variables

	log(1+stringency)		
	(1)	(2)	(3)
First infection	0.205 (0.130)	0.202 (0.131)	-1.294 (1.810)
First infection \times Graduate	0.339* (0.176)	0.320* (0.180)	0.298* (0.174)
Covid-19 infection and death incidence	✓		
Lagged Covid-19 infection and death incidence		✓	✓
First infection \times time-invariant characteristics			✓
Within R^2	0.802	0.798	0.824
Observations	1560	1512	1512

Country-level clustered standard errors in parentheses. The dependent variable is the logarithm of the stringency index added with 1. Graduate is a dummy variable taking the value 1 if the political leader of a country has at least a degree from a graduate or professional school and 0 otherwise. First infection is a dummy variable taking the value 1 if a country has registered its first Covid-19 infection and 0 otherwise. Covid-19 infection and death incidence: New Covid-19 infections and Covid-19 related deaths per 1,000,000 inhabitants. Lagged Covid-19 infection and death incidence: New Covid-19 infections and Covid-19 related deaths per 1,000,000 inhabitants one week before. Time-invariant controls: Political leader's age, gender, and tenure in office, World Governance Indicators, a dummy indicating whether the country is federally governed, unemployment rate, female employment rate, GDP per head, life expectancy, physicians per 1,000 inhabitants, health spending per head, health spending as % of GDP, population share aged above 65. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Second, I check whether the results are robust towards an alternative operationalization of the dependent variable. Chen and Roth (2024) discuss the problem of outcome transformation when the original variable ($stringency_{ct}$) includes values equal to 0 and hence typical log-transformation is not feasible but alternative transformations (e.g., $\log(1 + stringency_{ct})$) are. To address the problem, I re-estimate the event-study model as outlined in formula 2 and use levels of stringency instead of the logarithmic transformation as dependent variable. The results provided in the appendix, Table 6, are robust towards the alternative operationalization of the dependent variable. As an additional test, I use $\log(1 + stringency_{ct})$ as dependent variable but include an additional explanatory variable indicating whether a country has any non-pharmaceutical interventions in place. Results are consistent with the main findings of the paper and are presented in the appendix, Table 7.

Third, I conduct placebo checks to substantiate the parallel trends assumption. Therefore, I sequentially pick pre-infection periods ($t = -4$ to $t = -1$) as placebo time of the first infection.⁴ Table 8 in the appendix reports the results. I find no evidence of a significant coefficient on the interaction term between the placebo dummy indicating the first infection and the education of the political leader in pre-infection periods. The results suggest that political leaders were on parallel trends prior to the first infection, irrespective of their educational attainment.

⁴ Taking time period $t = -1$ as an example, I code a binary variable taking value 1 for that period and all subsequent periods. Prior periods are assigned the value 0.

Finally, I test whether the results are driven by the political ideology rather than the educational attainment of the political leader. Previous literature in educational as well as political economy reveals that higher educational attainment causes individuals to align with more liberal ideology and to move to the political left (e.g., Weakliem, 2002; Arzheimer, 2009; Dunn, 2011). Complementary research shows that the political leader's ideology, among others, accounts for differences in pandemic policy making. Specifically, left-leaning political leaders responded faster and with greater stringency to the onset of the pandemic as compared to right-wing political leaders (e.g., Adolph et al., 2021; Baccini & Brodeur, 2021; Wang et al., 2021). Taken together, political leaders with higher educational attainment might choose more stringent non-pharmaceutical interventions due to their left-wing ideology. This raises the question whether more stringent policies can be related to the politician's ideology rather than their educational attainment.

To quantitatively check this mechanism, I run the event-study as presented in formula 2 but include additional interaction terms between the binary variable indicating the first infection and the ideological orientation of the political leader. In the case that the ideological orientation accounts for policy differences between political leaders with different educational attainment, the coefficient γ should turn insignificant. Data for the ideological orientation of political leaders come from the Global Leader Ideology dataset (Herre, 2023). The dataset covers the period from 1945 until 2020 and classifies chief executive political leaders as either leftist, centrist, or rightist.

Table 9 in the appendix presents the regression results. The results imply that political leaders responded with similar stringency to the first detected infection, irrespective of their ideological orientation. However, the findings suggest that political leaders with higher educational attainment imposed more stringent policies at the pandemic's onset compared to political leaders with lower educational attainment. Accordingly, the results correspond with the main findings and emphasize that the educational attainment of the political leader was a driver of policy differences at the pandemic's onset.

6 The role of electoral incentives

To explore the mechanisms driving the results in Sect. 5, which suggest that politicians with higher levels of education adopted more stringent policies at the onset of the pandemic, I examine whether electoral incentives can explain these policy differences. In particular, I estimate the effect of a political leader's education on the stringency of non-pharmaceutical interventions separately for political leaders facing either high or low electoral accountability. Accountability refers to the ability of citizens to participate in the election of their government, freedom of speech and freedom of the media, and is captured by a measure from the World Governance Indicators.

Table 4 shows the effect of the political leader's education on the stringency of non-pharmaceutical interventions for political leaders facing above-average or below-average accountability. The results indicate that political leaders facing above-average accountability implemented policies with similar stringency at the onset of the pandemic, irrespective of their educational attainment. Accordingly, the results comply with the median voter theorem (Downs, 1957), which suggests that any politician, regardless of education, will align with the preferences of the decisive voter in order to win elections.

However, in the case of low accountability, the results suggest that political leaders with higher levels of education adopted more stringent policies at the onset of the pandemic

Table 4 Stringency of Covid-19 policies: The role of electoral incentives

	log(1+stringency)	
	below-median	above-median
First infection	0.094 (0.155)	0.231 (0.217)
First infection × Graduate	0.562** (0.230)	0.168 (0.274)
Country fixed effects	✓	✓
Time fixed effects	✓	✓
Within R^2	0.813	0.803
Observations	790	788

Country-level clustered standard errors in parentheses. The dependent variable is the logarithm of the stringency index added with 1. Graduate is a dummy variable taking the value 1 if the political leader of a country has at least a degree from a graduate or professional school and 0 otherwise. First infection is a dummy variable taking the value 1 if a country has registered its first Covid-19 infection and 0 otherwise. The accountability measures is taken from the World Governance Indicators and splits the sample equally into an above-median subsample and a below-median subsample. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

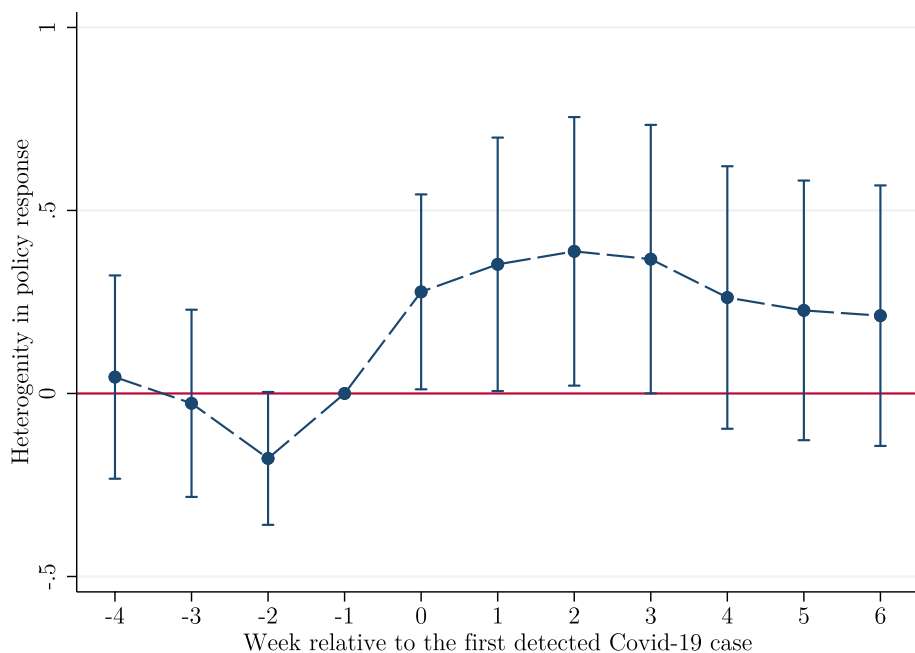


Fig. 1 Stringency of policies relative to first detected infection. Notes: The figure plots the point estimates γ_t from formula 3 and compares the stringency of the policy responses between politicians with different levels of educational attainment. Confidence intervals are set at the 95% level

than political leaders with lower levels of education. Low accountability provides political leaders with greater freedom for policy choices (e.g., Ferraz & Finan, 2021; de Janvry et al., 2012; Lopes da Fonseca, 2020). As a result, political leaders can rely on relevant information such as scientific advice, in addition to public preferences when deciding on containment policies at the onset of a pandemic (Pulejo & Querubín, 2021).

Since the onset of the Covid-19 pandemic was perceived primarily as a public health crisis (Lavezzolo et al., 2022), the medical consequences of the SARS-CoV-2 virus took precedence in scientific debates. Consequently, the onset of the pandemic created an increased demand for the expertise of public health scientists (Lavazza & Farina, 2020; Hodges et al., 2022), who overwhelmingly supported stringent non-pharmaceutical interventions to contain the pandemic (e.g., Al Saidi et al., 2020; Hsiang et al., 2020). Accordingly, at the beginning of the pandemic, political leaders largely had access to scientific evidence in favor of stringent non-pharmaceutical interventions.

However, political leaders with higher levels of education are expected to consider the scientific evidence more strongly in the policy making process. Due to their technocratic mentality (Forster & Heinzl, 2021), political leaders with higher levels of education ignore party constraints and implement evidence-based policies relying on currently available scientific findings (Pilny & Roesel, 2020). Thus, in the case of low electoral incentives, political leaders with higher levels of education adopted more stringent non-pharmaceutical interventions, as recommended by scientific evidence.

7 Conclusion

This paper examines the influence of the education of political leaders on Covid-19 infections and Covid-19 related deaths as well as on the stringency of non-pharmaceutical interventions targeted to contain the pandemic. For the analysis, I construct a dataset from various publicly available sources with a final sample of 147 countries observed during the first wave of the pandemic. OLS regressions show that political leaders with higher educational attainment reported fewer Covid-19 infections and Covid-19 related deaths. This effect was particularly prevalent at the end of the first wave of the pandemic, viz in May and June 2020.

Moreover, I show that political leaders with higher educational attainment responded more stringently to the first nationally registered Covid-19 infection than political leaders with lower levels of education. I estimate an event-study model with treatment heterogeneity to address issues regarding an endogenous selection of political leaders with higher educational attainment. The dynamic model specification indicates that political leaders were on parallel trends regarding the stringency of policies prior to the first nationally registered infection, irrespective of their educational attainment. However, in response to the onset of the pandemic, political leaders with higher education attainment enacted more stringent policies. This effect persisted in total for four weeks after the pandemic's onset.

Moreover, the results suggest that the education of political leaders is particularly relevant in explaining policy differences at the onset of the pandemic in countries with low electoral accountability. Because low electoral accountability provides political leaders with freedom of policy choice, those political leaders with higher levels of education adopted more stringent, evidence-based policies without fear of electoral punishment.

The findings advance recent research in three distinct ways. First, the paper contributes to a scarce literature examining the impact of political leaders' education on policy making in high-stake situations. To the best of my knowledge, this study is among the first to address the influence of politicians' education on policy outcomes in the context of a severe health crisis. Second, this paper contributes to a literature investigating the political determinants of non-pharmaceutical interventions at the onset of the pandemic. The results imply that the education of political leaders is essential to explain the different stringency of non-pharmaceutical interventions during the pandemic's onset. Finally, the paper provides empirical support for models that establish electoral accountability as disciplining device.

Nonetheless, the results are subject to several caveats. First, predetermined country characteristics might influence both the selection of educated political leaders and the stringency of the policy response at the onset of the Covid-19 pandemic. To address this issue, I estimate a flexible event-study model enabling a different evolution of the policy responses depending on economic, social, demographic, and institutional factors. Yet, the treatment (the first nationally registered infection) was not randomly assigned across countries to exclude any kind of bias. Second, the influence of the education of political leaders on the policy response to the pandemic might be changing over time. While political leaders' education was important for the policy response during the first wave of the pandemic, other factors might have become more relevant in later waves of the pandemic.

Therefore, an avenue for future research is to examine the impact of political leaders' education on policy outcomes during later waves of the Covid-19 pandemic. Besides, biographical characteristics of the political leaders next to education might be relevant for pandemic policy making. Plausible characteristics of political leaders relevant for pandemic policy making are age and political experience. Future research could explore those factors.

Appendix A: Additional tables

See Table 5, 6, 7, 8 and 9

Table 5 Data sources for country and leader characteristics

Variable	Source
Political leader	
Age	PLAD
Gender	PLAD
Tenure	PLAD
Institutional characteristics	
Voice and Accountability (WGI)	The World Bank Group
Political Stability and Absence of Violence/Terrorism (WGI)	The World Bank Group
Government Effectiveness (WGI)	The World Bank Group
Regulatory Quality (WGI)	The World Bank Group
Rule of Law (WGI)	The World Bank Group
Control of Corruption (WGI)	The World Bank Group
Federalism vs. centralism	IAEP (Wig et al., 2015)/
Economic characteristics	
Unemployment rate	The World Bank Group
Female employment rate	The World Bank Group
GDP per head (PPP)	The World Bank Group
Health-related characteristics	
Life expectancy	The World Bank Group
Physicians per 1,000 inhabitants	The World Bank Group
Health spending per head	The World Bank Group
Health spending as % of GDP	The World Bank Group
Demographic characteristics	
Population share aged above 65	The World Bank Group

Table 6 Stringency of Covid-19 policies: Non-transformed outcome variable

	Stringency		
	(1)	(2)	(3)
First infection	-1.186 (2.113)	-0.129 (2.043)	-3.380 (2.118)
First infection \times Graduate	4.316* (2.407)	5.743** (2.866)	5.024** (2.460)
Country fixed effects	✓	✓	✓
Time fixed effects	✓	✓	✓
Country-specific linear time trends		✓	✓
Country-specific quadratic time trends			✓
Within R^2	0.899	0.943	0.960
Observations	1578	1578	1578

Country-level clustered standard errors in parentheses. The dependent variable is the stringency index. Graduate is a dummy variable taking the value 1 if the political leader of a country has at least a degree from a graduate or professional school and 0 otherwise. First infection is a dummy variable taking the value 1 if a country has registered its first Covid-19 infection and 0 otherwise. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 7 Stringency of Covid-19 policies controlling for any policies in place

	log(1+stringency)		
	(1)	(2)	(3)
First infection	0.073 (0.080)	0.079 (0.093)	−0.005 (0.094)
First infection × Graduate	0.148* (0.087)	0.254** (0.116)	0.251** (0.116)
Country fixed effects	✓	✓	✓
Time fixed effects	✓	✓	✓
Country-specific linear time trends		✓	✓
Country-specific quadratic time trends			✓
Any policies	✓	✓	✓
Within R^2	0.926	0.953	0.967
Observations	1578	1578	1578

Country-level clustered standard errors in parentheses. The dependent variable is the logarithm of the stringency index added with 1. Graduate is a dummy variable taking the value 1 if the political leader of a country has at least a degree from a graduate or professional school and 0 otherwise. First infection is a dummy variable taking the value 1 if a country has registered its first Covid-19 infection and 0 otherwise. Any policies is a dummy variable taking the value 1 if a country has any Covid-19 policies in place and 0 otherwise. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8 Stringency of Covid-19 policies: Placebo tests

	log(1+stringency)			
	$t - 1$	$t - 2$	$t - 3$	$t - 4$
First infection	−0.139 (0.121)	−0.270** (0.124)	−0.337*** (0.123)	−0.288** (0.120)
First infection × Graduate	0.262 (0.162)	0.092 (0.146)	−0.011 (0.128)	−0.049 (0.122)
Country fixed effects	✓	✓	✓	✓
Time fixed effects	✓	✓	✓	✓
Within R^2	0.796	0.784	0.769	0.740
Observations	1560	1512	1436	1328

Country-level clustered standard errors in parentheses. The dependent variable is the logarithm of the stringency index added with 1. Graduate is a dummy variable taking the value 1 if the political leader of a country has at least a degree from a graduate or professional school and 0 otherwise. The period listed at the top of each column is the period of placebo infection assigned (i.e., that period and all subsequent periods are assigned value 1; the prior periods are assigned value 0). Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 9 Stringency of Covid-19 policies considering the ideological orientation of the political leader

	log(1+stringency) (1)
First infection	-1.821 (1.861)
First infection × Graduate	0.341* (0.118)
First infection × Leftist	-0.070 (0.201)
First infection × Centrist	-0.411 (0.408)
Country fixed effects	✓
Time fixed effects	✓
Lagged Covid-19 infection and death incidence	✓
First infection × time-invariant characteristics	✓
Within R^2	0.830
Observations	1325

Country-level clustered standard errors in parentheses. The dependent variable is the logarithm of the stringency index added with 1. Graduate is a dummy variable taking the value 1 if the political leader of a country has at least a degree from a graduate or professional school and 0 otherwise. First infection is a dummy variable taking the value 1 if a country has registered its first Covid-19 infection and 0 otherwise. Leftist is a dummy variable taking the value 1 if the political leader classifies as left-wing politician and 0 otherwise. Centrist is a dummy variable taking the value 1 if the political leader classifies as centralist politician and 0 otherwise. Political leaders who are classified as being right-wing serve as a reference category. Lagged Covid-19 infection and death incidence: New Covid-19 infections and Covid-19 related deaths per 1,000,000 inhabitants one week before. Time-invariant controls: Political leader's age, gender, and tenure in office, World Governance Indicators, a dummy indicating whether the country is federally governed, unemployment rate, female employment rate, GDP per head, life expectancy, physicians per 1000 inhabitants, health spending per head, health spending as % of GDP, population share aged above 65. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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