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Media Presence of Presidential Candidates and their Poll Performance

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Abstract

The rise in the popularity of electoral polls in France, both among media outlets and their viewers/readers, has made candidates and their supporters increasingly aware of the dangers they represent. In this study, I detail the setting of the 2022 French presidential election, and study the relationship between the media presence of candidates and their performance in polls using R. The method used is a linear mixed-effects model as it enables the differentiation of candidates. I find that French media retain a large say in deciding to which extent they want to feature candidates during the electoral period, thanks to the design of French electoral law, and that their influence on the media presence of candidates is felt in the polls. This effect is small, but statistically significant. Considering the close gap between Le Pen and Mélenchon in the results of the 1st round, this effect cannot be dismissed as it could have played a role in determining the 2nd round of the election.

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Introduction

Every election cycle, French media channels share one common objective: accurately predicting the outcome of the election. Analysts base their forecasts on current opinion polls, and in the 2022 presidential election, a record number of polls tracking candidates' popularity among the electoral base were conducted. In 2017, forty-seven polls were conducted in the 1st round, after the candidates were confirmed. This year, this number more than doubled, reaching one hundred and six polls. Such a high frequency of polls implies that every little shift in the French political climate would be reflected in polls, as not a day went by without a poll release. Trends were constantly analysed and candidates' winning chances were updated daily. As such, small increases or decreases in candidates' polling results were immediately discussed and journalists were quick to jump to conclusions, even months before the 1st round of the election. Presidential candidates including Mélenchon accused media outlets requesting and reporting on these polls of influencing the electorate's voting decisions, by designing their polls and reporting their results with bias.[1] Shortly after the 1st round of the election, it became clear that these accusations had been a fair concern, as voters were found to have primarily voted strategically, based on candidates' chances of getting to the 2nd round, and not based on their campaigning or political programs. This was reported in a OpinionWay poll which found that for the two frontrunners—Macron and Le Pen—34% voted by taking their winning chances in consideration, and for the candidate in third—Mélenchon—50% of his voters did the same, the highest percentage of all candidates. To vote strategically, voters would have to base their decision on who the polls were predicting had a chance of getting to the 2nd round. In the weeks preceding the 1st round, supporters of candidates with low polling results felt defeated and that they would be better off voting for other candidates.[2] Thus, there is a concern that polls skewed voters' opinions, harming the democratic integrity of the election.

In the French electoral system, candidates have to be featured on radio and TV channels for an equitable amount of time during two months prior to the election, and for an equal time in the last few weeks before the 1st round of voting. However, the equitability criteria of airtime are remarkably flexible, and give established political personalities a large head start compared to less established candidates. Media companies also exert influence in how they cover candidates' programs and proposals. During the 2022 election, media channels were accused by politicians and journalists of pushing the narrative that Macron would surely be qualified for the second round, months before the

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[1] In a 2021 post on his blog, Mélenchon claimed that the polling agencies were trying to create a *useful vote* effect for Macron, by putting the scenario of Le Pen going against him in the second round in their polls, months before the start of the election period.

[2] An article by Le Parisien published on the 9th of March reported that even within Hidalgo's own party, supporters already felt defeated and would vote for other left-wing candidates.

election period started and before he was even officially a candidate. As reflected in polls on media trust, neither the politicians nor their voters trust French media and its reporting. According to a 2022 report by the Reuters institute, only 29% of the French population trusts the media 'most of the time', significantly below the 51% and 50% of France's neighbours Belgium and Germany.[3] The main concern of this paper is therefore that an unequal media presence of candidates leads to poll effects that influence electoral results. This paper thus aims to use candidates' airtime as a predictor for their poll results, and subsequently, for their electoral results.

The first section of this paper covers the social and scientific background of this analysis. Its first part consists of an overview of the political debate over the media coverage of French presidential elections, and a description of the setting. Its second part consists of a literature review of polling effects on electoral results and the effects of media coverage of elections. The second section describes the data used and its sources. The third section goes through the methodology used for the analysis. The fourth section describes the results of statistical and predictive analyses. And the last section concludes and discusses the findings and their implication for future research and election coverage in France.

Background

Setting

French media's influence on the electorate's opinion has previously been a concern raised by candidates, and this remained the case this election. Mélenchon for instance, already in 2015 criticised the French press for their choice of "rotten pictures" for him, compared to the "beautiful ones" used for far-right candidate Le Pen (Martin, 2022). In a similar manner, French media has contributed to Le Pen's attempt to "undemonise" her far-right party with French Nazi origins.[4] During the campaign before the second round of the 2022 election, channels including BFMTV, CNEWS, LCI and France Info asked if "Le Pen really is far-right?"[5]. While the answer to that question is undeniably yes, as shown by

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[3] Reuters Institute: France polled the lowest media trust of its neighbouring countries, Belgium: 51%, Germany: 50%, Switzerland: 46%, Austria: 41%, Italy: 35%, UK: 34%, Spain: 32%, France: 29%. See Appendix.
[4] The term "dédiabolisation" is frequently used regarding her attempts to distance herself from her party's past.
[5] See screenshots in the Appendix.

her historical and current positioning on many issues, asking the question with such phrasing contributes to giving her and her party (whose founders had Nazi ties) a broader political appeal.

A related concern is the media's tendency to try to predict the outcome of the election—despite lacking data to back their claims—and thus influencing it, eventually leading to their prediction being correct. Journalist Pauline Bock analysed French media coverage of the 2022 election in March, finding numerous articles claiming or giving a platform to the idea that Macron had already succeeded in his re-election campaign, months before he even started it. Pollster Céline Bracq even claimed in a televised interview that the election was already "over" ("C'est plié"). This reflects pollsters' bias which was made even more evident in their inclusion of 2nd scenarios involving Macron much before the official candidate list for the first round was even confirmed. Even back in 2019, pollster Ifop already only considered a 2nd round dispute between Macron and Le Pen. Until March 2021, polls only considering the 2nd round scenario of Macron facing Le Pen.[6] Past that date, some would still only include Macron and Le Pen, but other scenarios could be found, however they were still usually Macron or Le Pen v a third candidate. This has a clear negative impact as it establishes the Macron v Le Pen outcome as the predicted outcome years in advance, thus forming this expectation for audiences. This can demotivate supporters of other candidates as they are made to believe that their candidate won't make it past the 1st round before the start of their campaign. Polls before the 1st round have reported that a considerable percentage of these supporters would not vote in the 2nd round in case of the Macron v Le Pen scenario. A post-1st round poll by BVA indicated that only a quarter of 1st round abstentionists thought that no candidate suited them. A quarter of abstentionists also indicated that they could not vote due to personal circumstances.[7] This suggests that potentially at least half of abstentionists—or over 6 million citizens—felt like a candidate suited them, but decided not to vote. One can therefore assume that a large part of these abstentionists were likely potential voters who believed their vote wouldn't matter as the outcome was overwhelmingly forecasted to be a 2nd round duel between Macron v Le Pen, and that it had been the main scenario considered for 3 years. This analysis therefore serves to study whether the media has an impact on poll results, in an effort to address the concern that the traditional media's tendency to try to predict the election has an impact on the election itself. In the next paragraph follows an overview of the existing law regulating the media's coverage of elections.

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[6] In a February 2019 poll, pollster Ifop only considered the second-round scenario of Macron v Le Pen. In a March 2021 poll, it considered 3 scenarios: Le Pen v Hidalgo, Le Pen v Macron, and Le Pen v Bertrand.
[7] The question allowed for multiple answers, hence the quarter of abstentionists who found no candidate suitable can have some overlap with the quarter that could not vote due to personal circumstances.

This law, most recently updated in 2016 with the '*LOI organique n° 2016-506*', mandates equitable speaking time (airtime) prior to the campaign period, and equal speaking time during the campaign. The main difference with its previous version is that equal airtime started from the official publication of the candidate list—on the 8th of March 2022, whereas it is now pushed back to 28th of March—the campaign period. Between these two dates is a period of reinforced equity, meaning in practice that candidates can't be exclusively shown at off-peak hours if others are only shown at peak hour. Airtime between candidates could then be vastly different in the first period, when some candidates already declared their candidacy, while others haven't—but could still be treated by the media as presumed candidates. This only depends on what is defined as equitable time. The airtime is measured by the Autorité de Régulation de la Communication Audiovisuelle et Numérique (ARCOM), which issues warnings and fines for media outlets that do not respect this rule. It bases its measure of equity as coming from two things: candidates' contribution to the electoral debate and candidates' representativity. The first aspect considers candidates' public reunions, visits and events organised to meet the public, any form of exposition to the public including social media presence, and participation to debates. This seems to indicate that if a candidate is invited to participate in a televised debate, channels will be allowed to show them—or their support—more following that debate. This potentially gives the media control over which candidate they give more publicity to. The second aspect is measured by how well candidates have performed in past elections, how many elected officials or parties support a candidate, and crucially, their poll results. Unfortunately, the law does not specify which poll results are used, so it is not clear if it's based on polls from past elections or the current one. However, it is clear that there is a risk of reverse causality, as a candidate's poll results may influence their airtime, influencing their poll results in return. This could potentially create upward or downward momentum for candidates. The current legislation on the airtime of candidates aims to give equitable time between candidates. This study therefore aims to give legislators a starting point to measure the efficacy of the legislature on achieving its declared goals—that of political pluralism in radio and TV channels during the electoral period.

Literature: Poll Effects

As this study aims to look at the relationship between media and polls, it is important to understand why the media's impact on polls matters—that is—understanding how polls themselves have an impact on electoral results. In her 2012 meta-analysis of the impact of electoral polls, Sibylle Hardmeier focusses on two dependent variables that polls can affect: the turnout rate, and the voting behaviour of voters. For the turnout rate, she identifies two potential effects: *mobilizing* and *demobilizing* effects.

All-in-all, she finds that polls have a marginal effect on voter participation, with only one result suggesting a *demobilizing* effect. For the voting behaviour of voters, she identifies three potential effects, the *bandwagon* effect, the *underdog* effect, and the *tactical voting* effect. The *bandwagon* effect is used to describe the trend of polls increasingly favouring one candidate over others, as a consequence of previous polls favouring them.

According to Phillippe Villemus, professor at the Montpellier Business School, the *bandwagon* effect has had a decisive role in French politics at least three times. In the 1974 presidential election, this effect would explain the expansion of Giscard d'Estaing's lead from a 1% lead in the first poll to his victory by a margin of 1.6%. In 2006, in the Socialist Party's primary, it would have given Ségolène Royal the victory in the same manner—at that time, the PS was the largest left-wing party, and Royal thus had to lead the opposition. For the 2017 election, Villemus suspects that it would explain why a large part of left-wing voters backed Emmanuel Macron—then seen as a centre candidate—as he came first in the polls, and was therefore more likely to win against a right-wing candidate. The second mechanism is the *underdog* effect, which functions as the opposite effect of the *bandwagon* effect, as it designates the tendency of voters to support the candidate predicted by polls to come in last or to be losing in popularity. Therefore, polls showing a candidate falling behind other candidates can lead voters to choose to support said candidate "in an effort to prove the polls wrong" (Villemus, 2022). In France, this effect is expected because only candidates with ≥5% of votes get their campaign (partially) reimbursed by the state, leading to voters to vote for candidates polling under 5% in an effort to help them get reimbursement.

The last mechanism was the most discussed in the coverage of the 2022 French election, the "vote utile"—*tactical vote*. This mechanism describes the propensity of a voter to vote not for their preferred candidate, but for one they believe are likely to move on to the 2nd round of the election. As previously mentioned, this effect would be the driving factor behind 50% of Mélenchon's support in the 1st round of the election, as polls predicted other left-wing candidates to be trailing behind.[8] In her meta-analysis, Hardmeier (2012) finds no strong effect of polls on voting intentions. Both the *bandwagon* and *underdog* effects are conventionally very weak—above the 5% threshold—but she argues that they are not insignificant as they could still change the outcome of a close election.

Another important aspect of the impact of polls is that they do not impact every voter to the same degree. Studies by Hardmeier and Roth (2003), Mutz (1992), and Kaplowitz et al. (1983) show that polls have a stronger impact when people have weak or no predispositions towards the polled issue.

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[8] Jadot with 5%, Hidalgo with 2%, and Roussel with 2.8% in the aggregate polling data computed for the period starting on the 4th to the 8th of April, a day before the 1st round.

For electoral polls, this implies that poll-induced effects are predominantly found among undecided voters more than among decided voters, or voters with strong beliefs.

<u>Literature: Media Coverage of Elections</u>

Past research has shown that the media coverage of elections has a direct impact on their outcome, without necessarily involving poll effects. This literature is covered in this part. Researchers from the SNS Centre for Business and Policy Studies, noted that the 2002 Swedish election had seen the media fulfil its own predictions (Petersson et al., 2006). When polls started showing a slight upturn for the Liberals party, this relatively small increase garnered a lot of media attention as it originated from an "unexpected" proposal. The authors of this paper bring attention to the fact that following this slight upturn in polls, the increased media attention for the Liberals led to better number in the polls, in turn leading to even more media coverage, and so on. The Liberals came in third, winning 48 seats, 31 more than in the previous election. Past research therefore hints at the possibility that media coverage has a significant impact on polls, and later, on electoral results.

Past studies have looked at the function and form of televised debates to determine what viewers find important when assessing candidates. Researchers have studied the differences between primary and general election debates, with Steward (2015) finding that viewers' assessment of candidate performance takes the center stage in debates compared to candidates' policy positioning. Viewers' assessment is also found to play a larger role in primary debates than in general election debates. The first finding originates from candidates' performance as orators being displayed in comparison to one-another only in debates. Of course, candidates' communication skills are also visible when they hold speeches or have interviews, but it is only during debates that they are pitted against one-another. The second finding can be expected as parties often hold established positions and candidates participating in a primary debate generally have similar positions, and thus must differentiate themselves using their oratory skills. Whereas in a general election debate, candidates from all sides of the political spectrum are present, and their aim is therefore to convince viewers that their position is more valid, or that their solution to a problem would be more effective. This suggests that candidates with similar political positions and similar airtime could still get vastly different results in polls.

Other studies have looked at the impact of different media on electoral poll results. Cameron, Barrett, and Stewardson (2015) found that social media can be used to predict election results, however as the size of the effect is small, it can only be used to predict the outcome of keenly contested elections. Nonetheless, the effect is statistically significant, indicating that having a larger social media account (in terms of friends/followers) signal better electoral results.

Previous research suggests that, in the setting of the 2022 French presidential election, large candidates should be expected to not see significant effects of airtime on their poll results, as the effect is likely too small to be significant (Cameron et al., 2015). Previous research also indicates that for small candidates, using a strategy akin to that of the Liberals in the 2002 Swedish election could lead to a gradual rise in poll performance and airtime thanks to an initial small but significant increase in 'contribution to the electoral debate'. This study will therefore look at candidates, big and small, and the impact their airtime has on their poll results.

Research Question

The aim of my Bachelor's Thesis is therefore to raise and answer the following question: *How can the media presence of presidential candidates predict their poll results?*

Data

The first source of data necessary to conduct this research is the poll results of presidential candidates. A repository of past polls can be found on Wikipedia, listing all polls conducted by trustworthy pollsters—those that follow the government's recommendations for electoral polling. It sources every poll, making potential collection error less likely, as the percentages attributed to each candidate can be checked on the official pollster's release. For the 2022 election, most polls were conducted over a period of two or three days, and the entire election period from the 1st of January to the last legal polling day is covered. A notable limitation is that some early polls do not include every candidate on the official list as it was only released on the 8th of March. These are the candidates that qualified for the election by having five hundred elected officials' signatures before the 4th of March. As it was difficult to predict who was going to successfully be a candidate before the deadline, different scenarios were considered by pollsters. For cases where polls don't have the full candidate list, the missing candidate(s) won't be affected by a lower aggregate polling score because the missing poll will only be used for the candidates on it. In addition, polls will be weighted by their sample size. To do so, polls will be aggregated, effectively creating a dataset representing what the poll results would have been if a pollster would have run polls with the aggregated sample of other pollsters.

The second necessary data is the airtime of candidates. This data is collected and analysed by the ARCOM. It is publicly available on their website which contains airtime for the largest French TV and radio channels for every recognized candidate and their support—such as members of their campaign team or party—during the electoral period. For the 2022 election, this data starts on the 1st of January,

ends on the 22nd of April, and is split in four periods of unequal length. The 1st period considers 21 potential candidates, whereas the last period only looks at the two frontrunners qualified for the second round, Macron and Le Pen. For this study, only data considering the official twelve candidates prior to the 1st round is used. These periods are divided in 10 smaller segments—still of unequal length—based on how the data is reported by the ARCOM. Future research could collect data points prior to the start of the electoral period to differentiate how media behaves with and without the threat of fines by the ARCOM. To conduct this analysis, the airtime of each candidate will be expressed as a percentage of the total airtime of candidates for every period separately. As such, cross-period comparisons can be made.

Other data for controls and robustness checks are taken from a variety of sources. For data on political leaning of candidates, as there is strong contention and debate about whether a politician is more or less right- or left-leaning, this study will instead take a look at their position on the 2 axes of the political compass. For this election, the Centre of Political Research of Sciences Po (Cevipof) released a political compass formed based on their team's interpretation of candidates' political programs. It has for X-axis the degree of redistribution of riches—opposing state intervention to the left to economic liberalism to the right. And it has for Y-axis candidates' cultural values—opposing cultural liberalism at the top to cultural conservatism at the bottom. To extract candidates' positions on these axes, it will be necessary to convert it to linear scales, ranging from 0 to 10. For the X-axis, the scale starts to the left, and for the Y-axis, the scale starts from the top-most position of the figure. For instance, Hidalgo is given a 25% for interventionism, which translates to a 3.75/10 on our scale for the X-axis, as it ranges from full state intervention at 0, to full liberalism at 10. Her cultural liberalism is given as 54%, which translates to a 2.3/10 on our scale, as it ranges from full liberalism at 0 to full conservatism at 10. An extreme candidate in both axes like Zemmour is thus given an 8.75 and 9.6 for the X and Y axes respectively as he is judged to be very economically liberal and culturally conservatism according to the Cevipof team. A table with the converted values can be found in the Appendix.
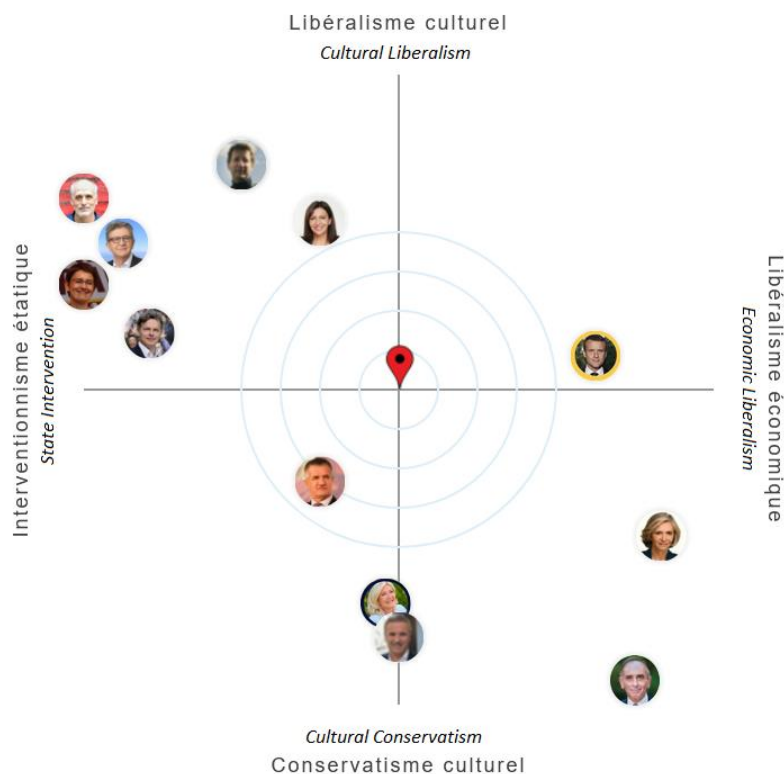
Figure 1. *Cevipof political compass for the official 2022 French presidential candidates*

Methodology

Part of what defines the equitability principle is candidates' representativity, which includes poll results. As the main question of this paper looks at poll results as an outcome variable, there is a concern of reverse causality. The law is not explicit in what polls matter for this measure—only stating that legal polls are valid, which is a given. It also fails to state how important the polls are compared to other indicators of representativity. As such, this study will proceed with the consideration that polls affect airtime, which in response may affect polls.

To proceed with the analysis, a model will be created, featuring controls in an effort to improve its robustness. The simplest model considered to analyse the relationship between two variables, one dependent and the other independent, is the simple linear regression model. To use a simple linear regression model, the assumptions to be verified are that of no autocorrelation, normality of the dependent variable—poll results, linearity of the relationship between the dependent and the independent variable—airtime, and homoskedasticity of the data. The data clearly has autocorrelation of variables as there are multiple observations for every candidate and the relationship between airtime and poll results also suffers from heteroskedasticity, as will be shown in Figure 6. Therefore, a simple linear regression for the aggregate data will not suffice.

A first alternative is to do a separate regression for each candidate. This would however ignore the potential of an overall (fixed) effect that would influence every candidate's poll performance invariably. It would also mean that limited external conclusions could be drawn from this study, as every separate regression would only inform us on their respective candidates. This study would—at best—have social value if the same candidates were to present themselves in a future presidential election.

<u>Linear Mixed-Effects model</u>

A second alternative is to include the benefits of aggregating all candidates and separating them by using a linear mixed-effects model, following the recommendations of the UCLA: Statistical Consulting Group (2022). This method of analysis aims to capture the benefits of conducting individual and aggregate analysis. It includes both fixed and random effects, and can thus catch the variation within- and between-candidates. Here, the fixed effect is the overall impact of airtime on poll performance—regardless of candidate. The random effects allow to capture the varying effects caused by candidates having different starting airtime—the intercept, and different changes in airtime—the slope. Controls are added to the fixed element of the model, as they serve to measure how much of poll performance can be predicted from factors outside of airtime. These controls need to be expected to have an impact on candidates' poll performance. The ones used are candidates' sex, their seniority in French politics, and their position on the political spectrum. The model is as follows.

$$Y_C = \beta_1 * X_C + \beta_2 * S_C + \beta_3 * A_C + \beta_4 * R_C + \beta_5 * CV_C$$

The fixed effect, noted as β_1, is the coefficient of interest which reveals the effect of a candidate having an increase in airtime on their poll results. The difference with a linear regression is that it is no longer assumed that parameters are all fixed effects, but rather that parameters are random variables at the candidate level, and fixed at the highest level—the aggregate level. The fixed effect β_1 will therefore have thirteen estimated coefficients—one for every candidate, and one at the aggregate level. The grouping variable is the nominal variable candidates, C. The grouped variable is the candidates' airtime, X_C, a continuous variable ranging from 0 to 100, and the outcome variable is the poll results of candidates, Y_C, in the same range. There are obviously factors aside from candidates' airtime that have an effect on their poll results, so controls have to be implemented. There will only be fixed effects controls, and there will therefore only be one β per control—every candidate will share the same. In this study, these will be sex (S_C), age—as a proxy for political experience (A_C), and political leaning as two variables on a scale of 0 to 10: R_C—the degree of redistribution, and CV_C—cultural values of candidates. Note that the above equation holds as a formula for the aggregate prediction of poll results using airtime, and for the individual predictions per candidate. Controls will be included in the fixed

effect part of the formula, and the airtime will be alone in the random effect. The controls could theoretically improve our model, but they might also lead to under- or over-fitting. Therefore, some may not be included in our model.

To determine the best model, several forms of LME modelling are considered, using reference models from Kristoffer Magnusson (2015). To compare these various models, we run ANOVA tests. These tests compare the over- and under-fitting of models with AIC and BIC criteria. As such, we select the model that does the least of over- and under-fitting based on the ANOVA tests' outputs. This model has the following formula:

$$Y_C = \beta_1 * X_C + \beta_2 * S_C + \beta_3 * A_C + \beta_4 * R_C + \beta_5 * CV_C$$

As a formula, this model does not differ from the previous formula because no controls had to be dropped, as none of them drastically increased either the AIC or BIC values. Next, let's have a look at the R code used to better understand the specifics of this model. The code is as follows:

lme(Y ~ X + S + A + R + C, random = list(Candidate = pdDiag(~ X)), correlation = corARMA(q = 3), method = "ML")

The first part, *Y ~ X + S + A + R + C* is simply the same as in the equation above. It is the fixed component of the linear mixed-effects model. The random component is: *random = list(Candidate = pdDiag(~ X))*. This part says that the airtime variable, X_C, has a separate relationship per candidate, and the *pdDiag* command removes the intercept-slope covariance of this relationship, improving the model's predictive output, as found through testing different commands. The next part, *correlation = corARMA(q = 3)*, is introduced because the data is a time series, hence there was autocorrelation between the periods. For this study, I chose the 'moving average' class, assuming that the first five lags (*q = 3*) exhibit non-zero correlations, following the recommendations in Crawley (2007). The next bit of code is the method chosen, *method = "ML"*. This method was chosen to be able to perform cross-model comparisons, again following Crawley's advice (2007). It is important to note, however, that the variance estimator of MLs tend to be biased downwards (Oskolkov, 2020). The same model using the REML method is featured in the Appendix. Crucially, this model will not include the last 2 periods (those of equality), as they only bring candidates to an equal level for a short time, making it difficult for the model to fit this change, and it only comes in at a time when the vast majority are decided. Indeed, over three quarters of the electorate declared being decided in an IFOP poll on the 28th of March.

Results

Statistical analysis

Before proceeding with any relationship analysis, the statistics behind the data can already inform us about the 2022 French presidential election. One of the first elements to look at is the variance in airtime between candidates, regardless of polling differences. As can be seen in Figure 2, the airtime is vastly unequal. This may seem concerning for the integrity of the democratic debate in France, but it is legal, as the rules had changed in 2016, favouring equitable time over equal time. It is necessary to recall that the enforcing of these rules only starts when the official candidate list is released on the 8th of March. It would be unrealistic to expect TV and radio channels to try to give every (potential) candidate equal representation on their channel before the enforcing period begins. Indeed, Macron only declared his candidacy at the last minute, on the day of the deadline, the 3rd of March, only 4 days before the enforcing period starts, yet the media still had to air and report on his many speeches to the nation. But this raises another concern. As the authorised airtime during the campaigning period for each candidate is based on their contribution to the political debate, if they have already been awarded a platform to participate in this debate prior to the enforcing period, they will certainly receive more airtime since they are starting with a head start. As such, the law may benefit candidates with pre-established media presence, and so this hypothesis will be considered in the following paragraph.
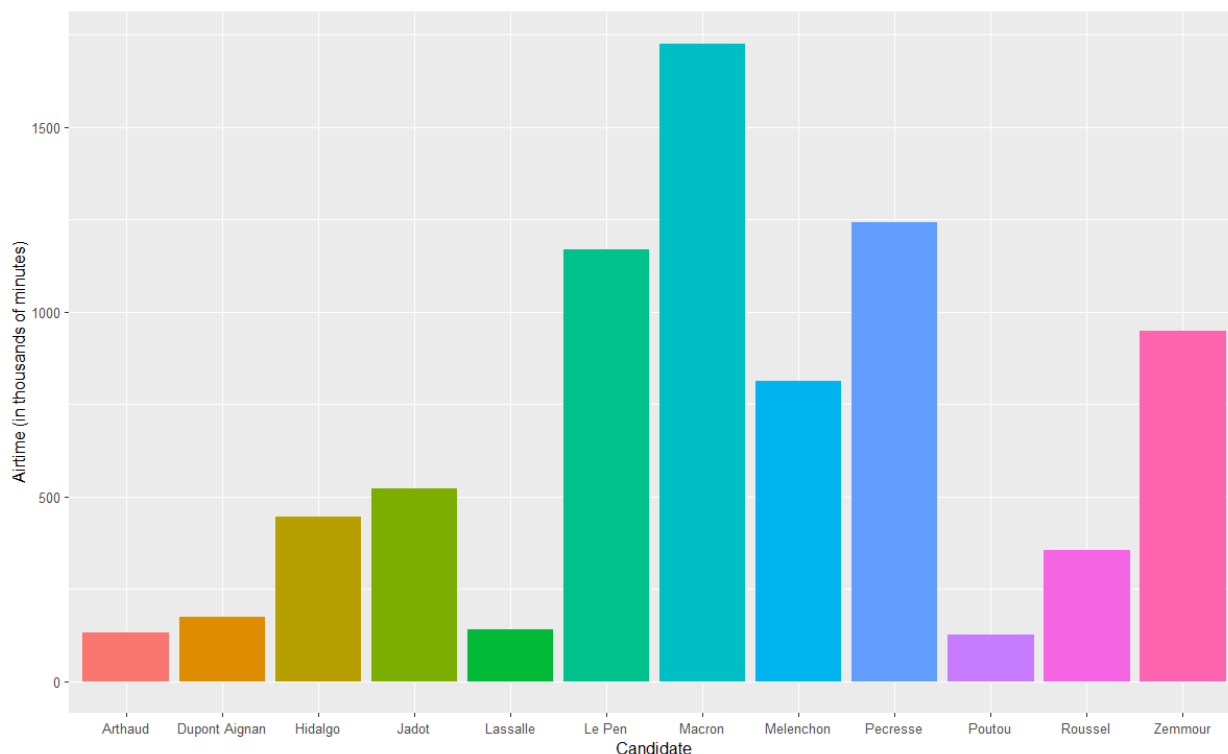
Figure 2. *Bar graph of candidates' total airtime in the 2022 French presidential election, from January 1st to April 8th*

One of the key components of the law is the measure of a candidate's contribution to the electoral debate. This component is, however, not well-defined. This gives the media some wiggle-room for interpretation. One of the points of measure is candidates' participation to debates which, in-and-of-itself, depends on the media inviting them to participate. This partially explains why Zemmour still received so much airtime—coming in fourth overall—despite having no pre-existing party or previous electoral results, therefore not validating two of the conditions of representativity. Indeed, Zemmour regularly appeared on the TV channel CNEWS as a political expert, covering the French political debate, and he started polling at 13% in January. He therefore fit the criteria of contribution and was also high in the polls. Looking ahead at Figure 3, at the start of the electoral period, Zemmour was the first candidate the French electorate wanted to see less of, with only a fifth satisfied with his airtime or wanting more—these likely consisting mostly of the 13% supporting his candidacy. From this, it seems that candidates' 'contribution to the electoral debate' holds a lot of weight in deciding their attributed airtime, while being arguably the hardest component of their political weight to define, and the one the media has the most impact on. The law may therefore create a condition for TV and radio channels to control who they want to show more than others—despite the condition of equitable time, as they hold a lot of weight in contributing to a candidate's political weight.

Considering the stated goal of the legislature of having political pluralism, Figure 2 also shows a failure in that respect. Indeed, the first four candidates can be qualified of right-wing, as they all appear on the right or lower sections of the Cevipof political compass. When looking at voters' opinion regarding the airtime attributed to candidates prior to the electoral period's start, these four are also found to be overrepresented—along with Mélenchon and Hidalgo, as seen in the Cevipof poll below. The poll shown in Figure 3 reinforces the concern that the media willingly gave a platform to candidates prior to the election, to enable them to have more attributed airtime during the electoral period—against the French electorate's wishes. The candidates with a majority of "Not enough [presence]" are also those that have the largest shares of "Do not really know". This implies that they are candidates with whom the public was least familiar. As such, they were not given a fair chance to campaign, even before the media was forced to give them equitable airtime. From this alone, it seems that the French media holds much power in deciding who gets to be a contender for the French presidency.
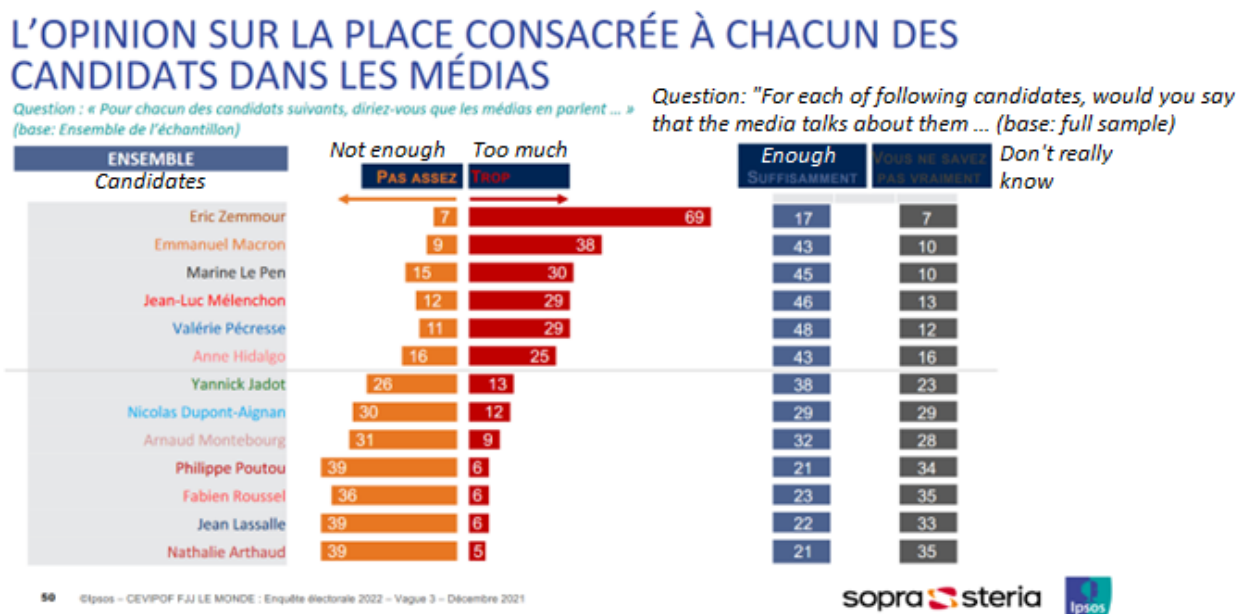

Figure 3. *The public opinion regarding candidates' media presence, Cevipof poll for journal Le Monde, December 2021*

Another important observation is regarding the gender composition of the political debate in France. As seen in Table 1 below, female candidates only compose about a third of the airtime. Women remain underrepresented in the French political debate. This entails that political issues regarding women are less discussed and less attention is brought to them. To give a recent example of the how this manifests itself in France, consider endometriosis. Endometriosis is a medical condition affecting about one in ten women that can lead to severe pain during menstrual periods. This disorder was only recognized as a long-term condition in France this January, hundreds of years after it was first discovered, and only after strong pushes by elected women representatives to make it enter the French political scene.

Before then, getting a diagnosis was difficult, and getting proper treatment even more so, as doctors were known to underestimate the pain reported by women (Santi, 2015). An increased presence of women in the French political scene is needed, as it's only once they are present in the discussion that they can be heard.

Table 1. Airtime in minutes and in proportion of total airtime, by sex

Sex	Airtime (in minutes)	Percentage of total airtime
Female	2,987,138	38.34%
Male	4,803,235	61.66%

Next, we will visualise the trends found in the data. This will serve as a preliminary analysis of the relationship between airtime and poll results. In the figure below, the progress in poll performance progress for every candidate can be observed. As evident, candidates at the bottom of the graph hardly experienced any variation, plausibly due to their lack of publicity to potential voters.
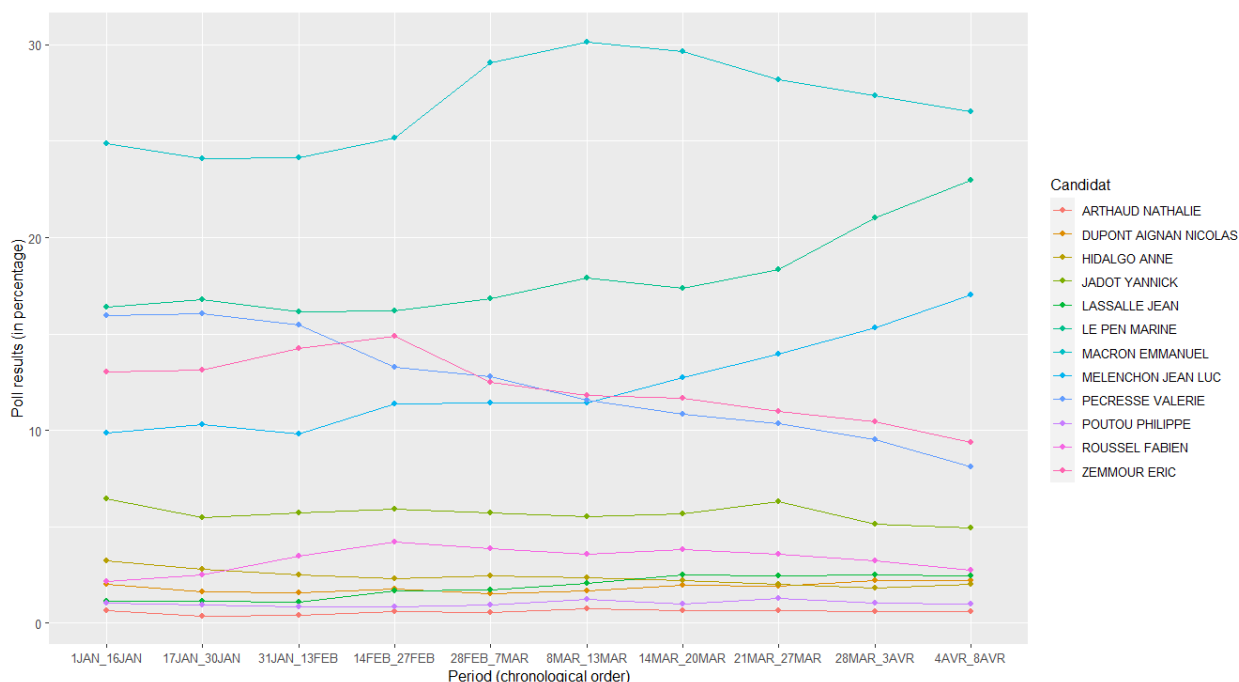

Figure 4. *Line graph of the poll results of candidates for the 2022 French presidential election, by period*

The next figure displays how the airtime of candidates progressed over the same period.
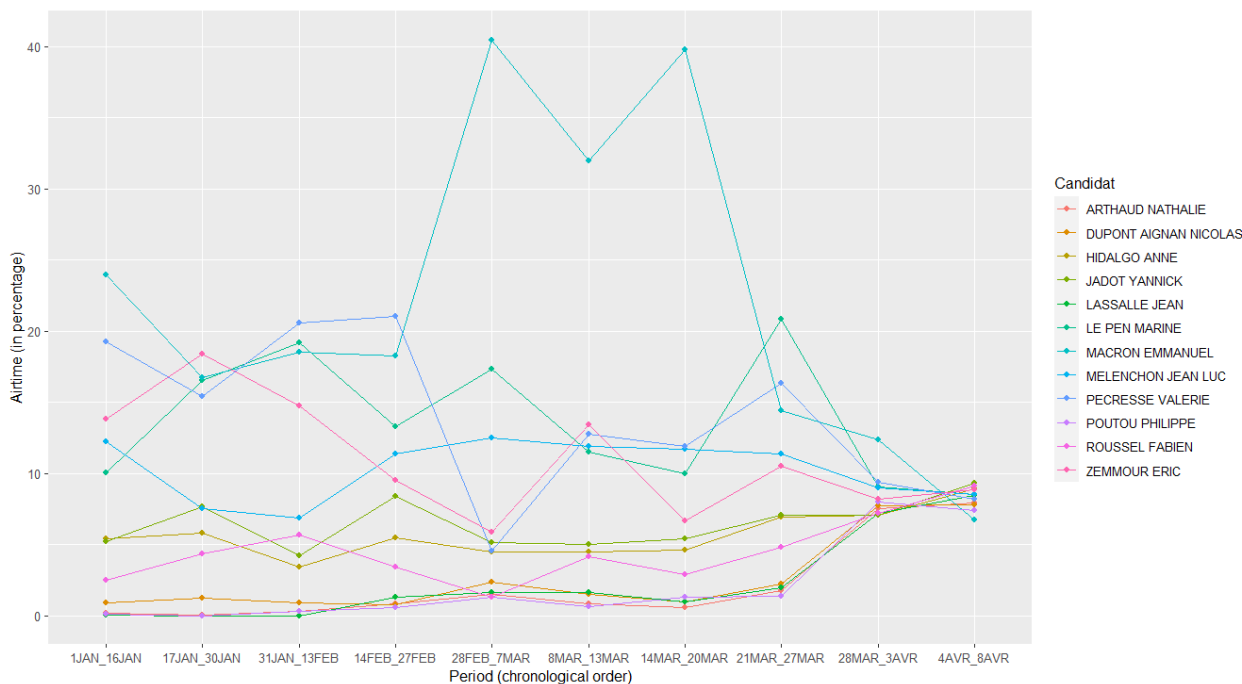
Figure 5. *Line graph of the airtime of candidates for the 2022 French presidential election, by period*

From these two figures, it is hard to tell if there truly is an association. But it can already be observed that Macron was awarded much more airtime than others from the 28th of February to the 20th of March, a period where he also had his best results in polls. Note that the last two periods are supposed to be periods of equal airtime, and from the 8th of March, there already starts a period of "reinforced equity". This period of reinforced equity—although hardly noticeable on the second figure, seems to be when Le Pen and Mélenchon experience a steady rise in polling, whereas Macron experiences a steady decrease. The overall airtime trends of Le Pen and Mélenchon however, seem to be relatively static, as they remain in the same range. But when looking directly at the association between airtime and poll performance using a smooth line plot, a positive association between airtime and poll results can be observed as the blue line goes up in Figure 6. This graph also makes the heteroscedasticity of the relationship apparent. In the next section, we will use the model defined in the methodology section to make this relationship more explicit.
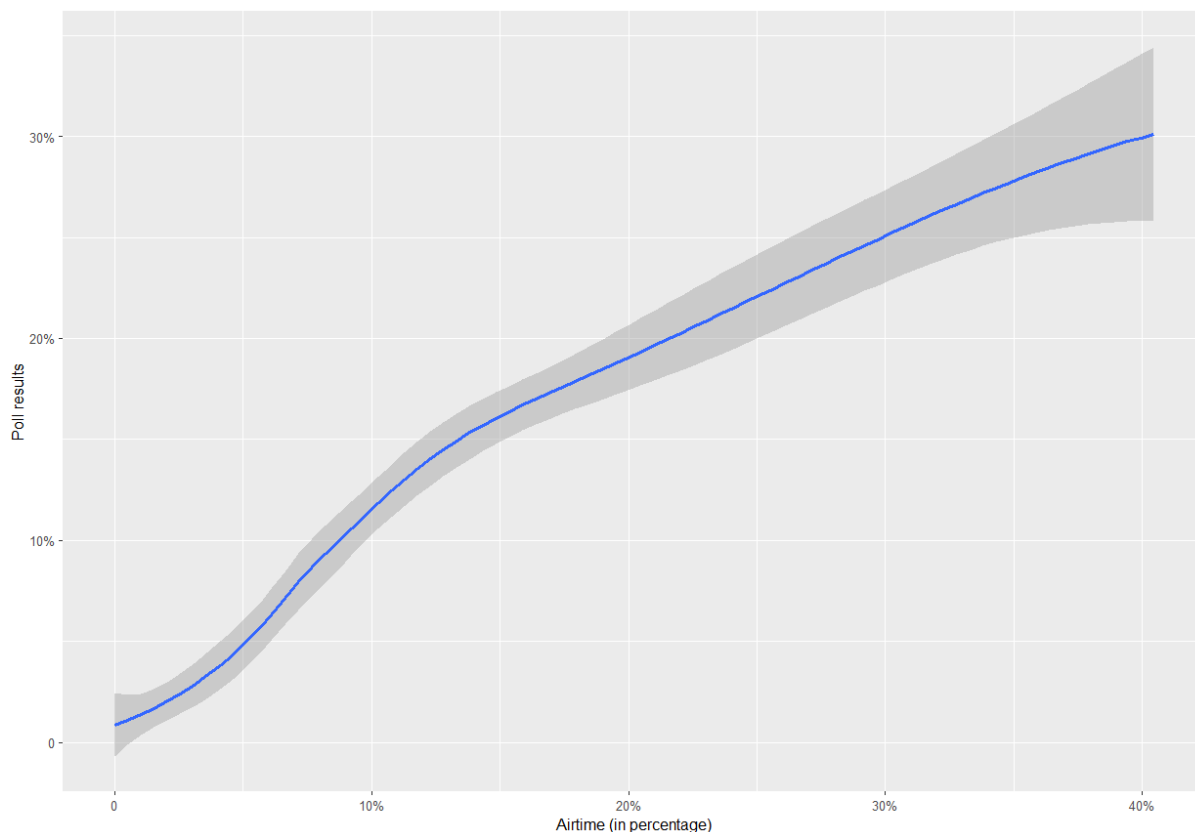
Figure 6. *Line plot of the association between airtime and poll results of 2022 French presidential election candidates*

Relationship analysis using an LME model

1. Verifying assumptions

Firstly, we can check the assumptions that hold for linear models as they also apply for linear mixed-effects models. As such, our first check is regarding the linearity of the relationship using residual plots. A first assumption of the linear mixed-effects model is that the residuals are (approximately) normally distributed. A Q-Q plot can be used to verify this assumption, as done in Vasishth et al. (2022). A Q-Q plot is a scatterplot that plots a sampled set of quantiles from the data to the theoretical quantiles of the normal distribution—the X-axis of Figure 7 below. In this case, as the Q-Q plot forms a sufficiently approximate diagonal line, the assumption can be verified.

Normal Q-Q Plot
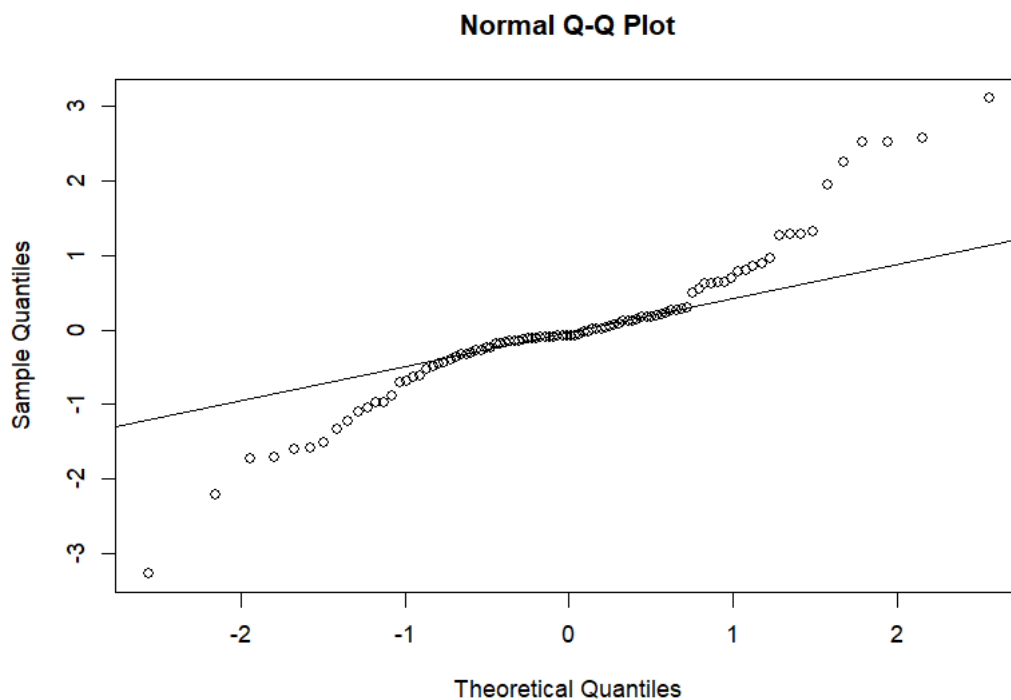
Figure 7. *The residuals of the model plotted against the quantiles of a standard normal distribution with a diagonal*

Next, the normality of random effects is verified, with a method from Crawley (2007). The random effects are quite far from normal, as they do not form a diagonal. This does not go against the expectations as the random effects of this study are not meant to be informative, and they are at a low level—only the candidate level.
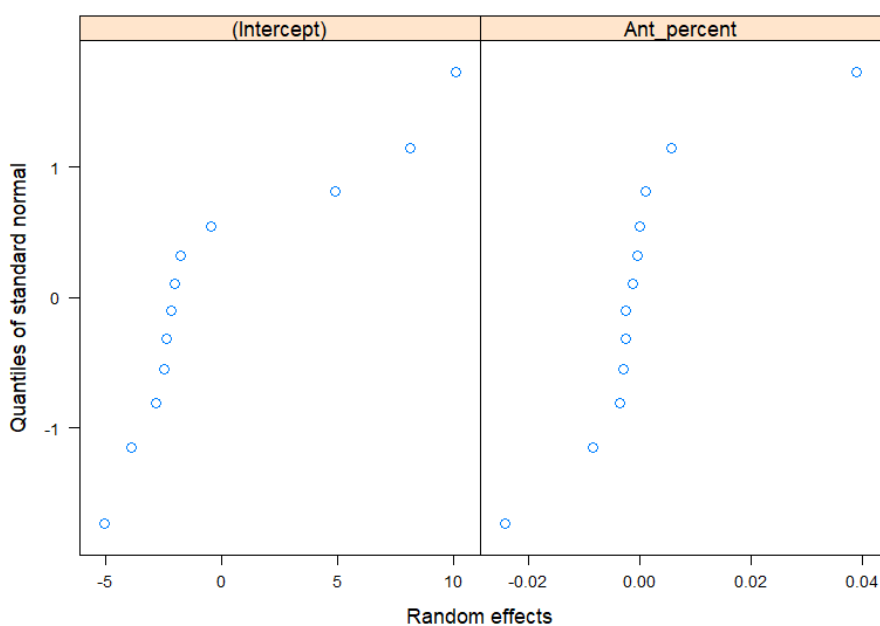
Note: Ant_percent is the name of the airtime variable.

Figure 8. *The random effects of the model plotted against the quantiles of a standard normal distribution*

2. Analysis of the Linear Mixed-Effects Model

Now that we have verified that the assumptions of the model are sufficiently valid, we can continue with the analysis. First, let's take a look at the coefficient estimates for the intercept and the random effect of this model.

Table 2. *Intercept and coefficients of the random effect of airtime from the LME model by candidate*

Candidate	(Intercept)	Airtime
Arthaud Nathalie	15.5682	0.1210
Dupont Aignan Nicolas	12.2362	0.1189
Hidalgo Anne	13.4258	0.1184
Jadot Yannick	15.1450	0.1131
Lassalle Jean	14.4763	0.1226
Le Pen Marine	25.4640	0.0972
Macron Emmanuel	22.2199	0.1605
Mélenchon Jean Luc	27.4247	0.1202
Valerie Pécresse	14.8401	0.1272
Poutou Philippe	14.9400	0.1215
Roussel Fabien	15.2819	0.1191
Zemmour Eric	16.8721	0.1180

Note: Four decimals are shown to make it clear that candidates do not share the same coefficients for airtime.

The intercept value marks the estimate of what would be the candidate's polling performance had they had no airtime at the start of the election period. At first, it seems that these estimates are far from accurate but that is only because the fixed effect coefficients still need to be added. Indeed, this table only gives the first part of a two-part model. In the next table, the estimates for the fixed effect coefficients of airtime, sex (male), age, the redistribution factor, and the cultural values factor are given.

Table 3. *Summary statistics of the coefficients of the fixed effects from the LME model*

Variable	Value	Std.Error	DF	t-value	p-value
(Intercept)	17.324	12.39	83	1.40	0.1657
Airtime	0.121	0.03	83	4.44	0.0000***

Sex (Male)	1.327	3.06	7	0.43	0.6772
Age	-0.265	0.22	7	-1.21	0.2667
Redistribution	1.549	0.63	7	2.45	0.0441**
Cultural Values	-0.399	0.72	7	-0.55	0.5972

Note: *p-value <0.1, **p-value<0.05, ***p-value<0.01.

As seen in the table above, in general, additional airtime increases candidates' poll results by 0.12%, and the effect is found to be highly significant. Being a male gives a positive effect on poll performance of 1.33%. This effect is highly insignificant however, as its p-value is 0.68, vastly above the 5% threshold. Hardly any conclusions can be drawn from this estimate. French voters also seem to prefer younger—or less politically experienced candidates, as age has a negative coefficient of -0.26%. It is not significant, however, with a p-value of 0.27. For every additional point in the redistribution factor— that is, the less a candidate's program features redistributive proposals, their poll results will increase by 1.55%. This effect is significant at the 5% mark. This implies that French voters care most about the economic proposals of candidates, as it is the biggest effect, and the most significant after airtime. More conservative cultural values, on the other hand, are associated with a 0.4% decrease in poll results, but this is estimate is far from significant, with a p-value of 0.597. Now, we can compute every candidate's intercept, adjusted by these coefficients, to find the model's estimate of their starting poll results—when their airtime is equal to 0. The formula for this computation is simply Intercept + Sex (Male)* 1.327 + Age*(-0.265) + R*1.549 + CV*(-0.399). This is done in the table below.

Table 4. *Prediction of the 2022 French presidential election candidates' starting poll results using the LME model's intercepts and candidates' descriptive statistics*

Candidate	Intercept	Sex (Male)	Age	R	CV	Prediction	Poll result	Difference
Arthaud	15.568	0	52	0	3.35	0.47%	0.70%	-0.23%
Dupont Aignan	12.236	1	61	5	8.95	1.60%	1.90%	-0.3%
Hidalgo	13.426	0	62	3.75	2.3	1.91%	4.33%	-2.42%
Jadot	15.145	1	55	2.5	1.45	5.21%	6.67%	-1.46%
Lassalle	14.476	1	66	3.75	6.45	1.58%	0.60%	0.98%
Le Pen	25.464	0	53	4.8	8.4	15.53%	15.70%	-0.17%
Macron	22.220	1	44	8.15	4.45	22.75%	24.60%	-1.85%
Mélenchon	27.425	1	70	0.6	2.7	10.08%	11.20%	-1.12%

Pécresse	14.8401	0	55	9.15	7.3	13.27%	16.20%	-2.93%
Poutou	14.940	1	55	0	1.95	-1.29%	1.00%	-2.29%
Roussel	15.282	1	52	1.05	4.1	3.36%	2.90%	0.46%
Zemmour	16.872	1	63	8.75	9.6	11.26%	15.80%	-4.54%

If we compare those estimates to an aggregate of real polls conducted just before the start of the election period, we see that they are overall very close. However, we get unrealistic predictions like the negative 1.29% for Poutou, obviously impossible in practice. This difficulty of my model to fit past poll results can simply be explained by the fact that, at that time, candidates already had airtime, it just wasn't tracked. It also seems that these estimates already predict the fall and success of some candidates (Pécresse has the largest underestimation, because the model knows she finished in the polls much lower than where she started). This can be expected as it uses future data to predict past results, essentially cheating. What is more interesting is to see how good its estimates are when compared to the final election results, data that it did not have access to. To do so, we will use the airtime of the last period with equity in airtime. Note that both the fixed effect for airtime and the random effect (different coefficient per candidate) were used to compute the predictions.

Table 5. *Prediction of the 2022 French presidential election candidates' 1st round results using the LME model's intercepts and candidates' descriptive statistics*

Candidates	Intercept	Airtime	Redi	Age	Sex (Male)	Prediction	Election Result	Difference
Arthaud	15.347	1.80	0	52	0	0.70%	0.56%	0.14%
Dupont Aignan	11.728	2.22	5	61	1	2.08%	2.06%	0.02%
Hidalgo	15.030	6.95	3.75	62	0	2.85%	1.75%	1.10%
Jadot	16.624	7.05	2.5	55	1	5.96%	4.63%	1.33%
Lassalle	14.667	2.00	3.75	66	1	2.02%	3.13%	-1.11%
Le Pen	27.650	20.83	4.8	53	0	19.01%	23.15%	-4.14%
Macron	24.233	14.43	8.15	44	1	26.34%	27.85%	-1.51%
Mélenchon	29.724	11.38	0.6	70	1	13.06%	21.95%	-8.89%
Pécresse	14.630	16.34	9.15	55	0	13.32%	4.78%	8.54%

Poutou	15.416	1.39	0	55	1	1.06%	0.77%	0.29%
Roussel	15.422	4.80	1.05	52	1	3.60%	2.28%	1.32%
Zemmour	17.500	10.55	8.75	63	1	12.83%	7.07%	5.76%

Using this method, the sum of absolute difference is 41.99. When using the data from the very last period—a period with equal airtimes, this value is 48.00. Using data from the last period of equity gives more accurate results than using the data closest to the election date. This makes sense, as the model wasn't trained with this data.

Candidates low in the polls were easier for the LME model to predict compared to candidates fighting for second place—Le Pen, Mélenchon, Pécresse, and Zemmour—who experienced a lot of variation in polls. Looking at the model's fit by candidate in Figure 9 on the next page, we can observe with which candidates the model struggled most to fit its predictions to the data. Looking at the four candidates just mentioned, it is made clearer that their fitted values remain too static compared to their real variation in poll results. Macron, however, has a pretty good fit. But the best fit is certainly for the candidates that performed the worst. These 'fringe' candidates are easier to predict as less variation is expected since they attract less voters in the first place, perhaps due to extreme political positioning or lack of media presence. But to be able to infer whether the model as a whole fits the data, it is best, in this case, to look at the observed values vs the fitted values, without separating candidates as in Figure 9. This is done in the second figure of the next page. As you can see, the fit is good for low and high poll results, but quite poor for values around 10 to 20%, where there was the most competition during the election period.
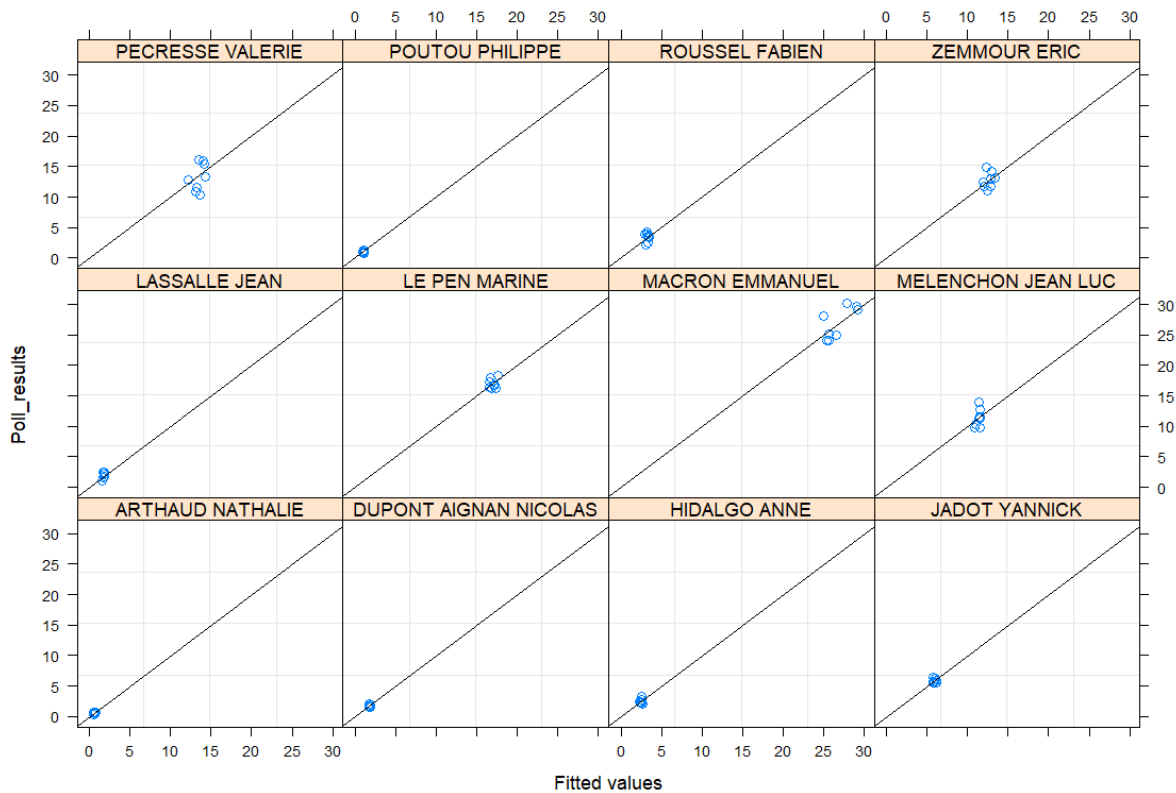
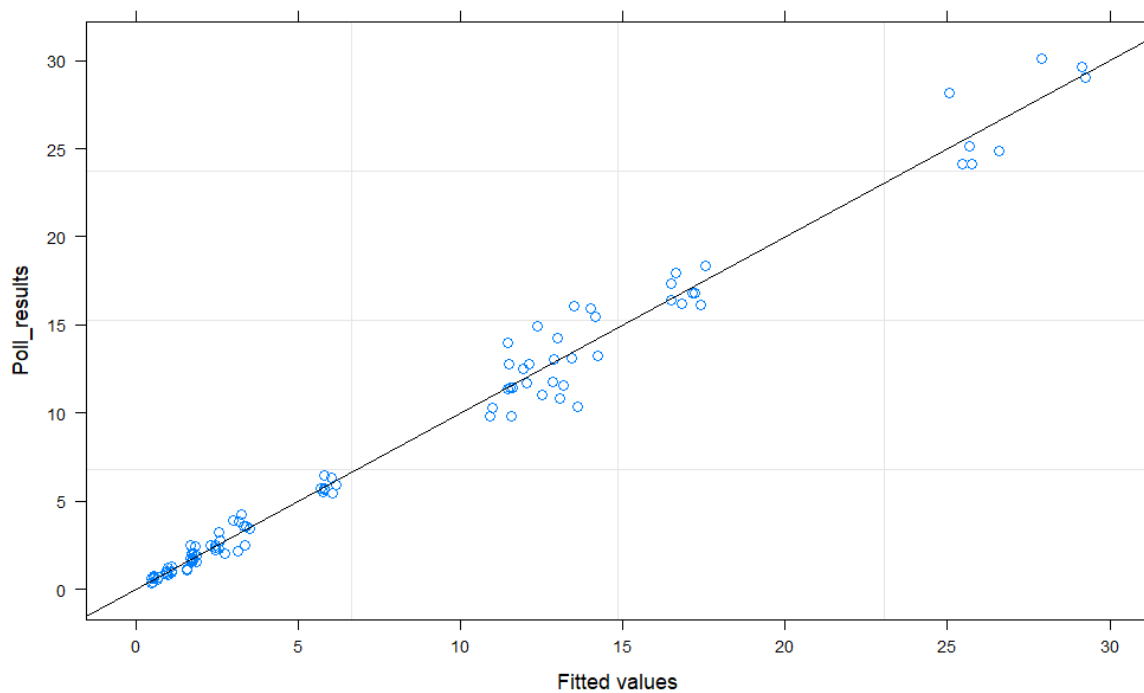Figure 9. *Plot of fitted values to poll results, by candidate*

Figure 10. *Plot of fitted values to poll results, aggregated*

Looking at the standardised residuals of the model below, it is clearer that the largest variation comes at midrange and high fitted values. Looking at the difference by sex in Figure 11 does not communicate any additional information. This is expected as the variable for sex clearly did not have a significant impact on the model, with its p-value being far from the 5% threshold.
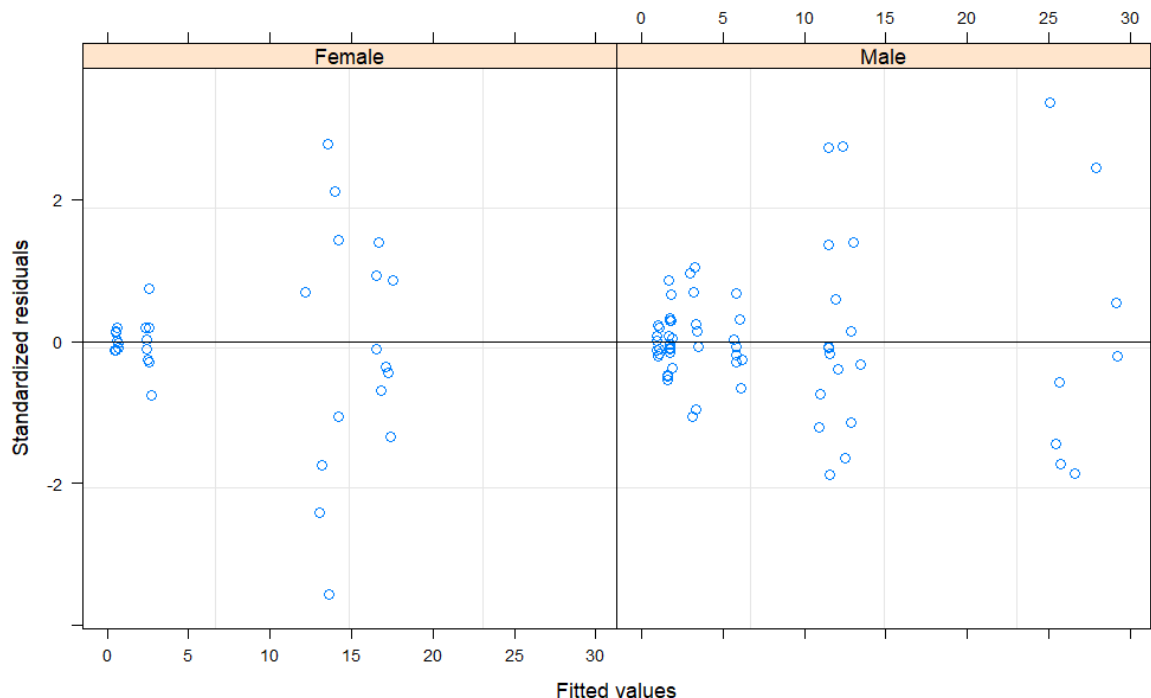

Figure 11. *Plot of fitted values by standardised residuals, by sex*

So why was the model so inaccurate for some candidates, and much more for others? This last figure will help us answer this question by plotting the range of candidates' fitted values and residuals. As can be seen, the fitted values varied most for Macron and then Pécresse. This figure shows that the model was too static in its predictions, only varying for candidates whose airtime varied a lot. To give an example of how the model did not work, recall Figures 4 and 5: Mélenchon had a large increase in poll results but barely any in airtime. Therefore, the model fails to capture the source in Mélenchon's success. Indeed, even if the average residuals were close to 0, the second panel clearly shows that the model struggled with candidates with steady airtime, and with Macron, whose airtime was, on the other hand, not following an increasing or decreasing pattern. As such, even though the model gives airtime a highly significant effect, this effect remains small, and the model still cannot explain the success of candidates who campaigned outside of traditional media.
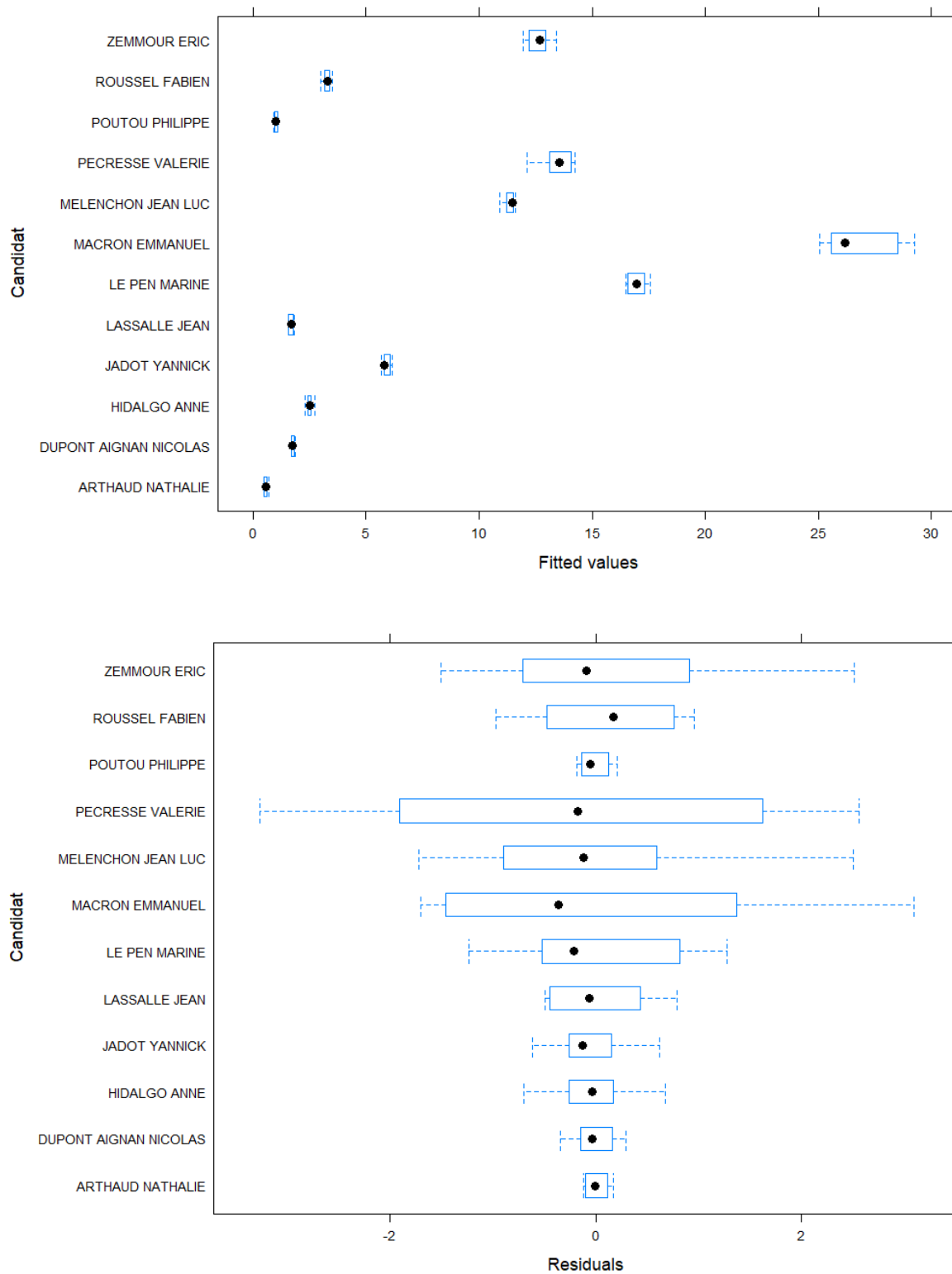
Figure 12. *Two-panel plot of the range of fitted values and residuals by candidate for the 2022 French presidential election*

Conclusion and Discussion

Firstly, we will consider what caused this study's LME model to lack in predictive strength. Including controls for political experience, age, and political positioning did improve the model's accuracy, but as all were fixed effects, they could not capture variation between periods that did not come from airtime. Including lags also helped improve the accuracy in predicting this periodical variation, but still the model fails to capture it all. As such, one can only conclude that there are other variables missing from this model that explain why candidates in the midrange had so much variance in poll results, but not in airtime. Future research could aim to find the sources of this unaccounted variance. Let us consider potential responsible variables. The first of which is candidate's social media growth. Indeed, this research only used data from traditional media, despite it being known that social media plays an important role in elections (Cameron et al, 2015), a role that has also caused certain platforms to be accused of tampering with the democratic integrity of elections. Shortly after the 2022 election, news came that GAFAM companies were implied with Macron's 2017 presidential campaign.[9] This news exacerbated the concern that social media influence potential voters. Additionally, this is also where legislation is the most lacking, as was shown by the widely publicised Facebook Cambridge Analytica case. There is both a lack of research and a lack of data on this topic. For the 2022 French election, the only publicly available data was compiled by the radio channel France Inter and Visibrain, but it was only at a monthly basis. This data showed that there were massive online movements for candidates, unaccounted for in this study's LME model. For instance, Mélenchon was the third most-discussed candidate every month, indicating large online support not visible in the airtime variable, for which he had no noticeable variation. This data from France Inter also points out that in March, Mélenchon was discussed mostly for his large in-person and online meetings. Meetings and other events organised by candidates are theoretically already part of what determines their airtime—as they are included in the law—but perhaps adding a measure of monthly attendance for meetings could have improved the model's validity, as it may have caught some of the periodical variance. Generally, the model lacks other measures of candidate exposition to the public. Additionally, this paper does not distinguish between airtime with and without viewership. Clearly, this factor is expected to have an influence on candidates' success. In the legislature, it is included that starting on the 8th of March, candidates can't be discriminated by only being awarded airtime at off-peak hours. This aspect was also featured in the data, but as it was only featured for data post-8th March, so I decided not to include it. The model was accurate in predicting candidates that were relatively easy to predict, but it struggled with candidates

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[9] GAFAM stands for Google, Apple, Facebook, Amazon, Microsoft—tech giants with control of major social media platforms (Youtube, Facebook, Instagram, Twitch, Linkedin)

in the midrange, where traditional predictive tools—such as using past polls to predict future polls, also struggle, but to a much lesser extent.

The model's lack of accuracy makes it difficult to analyse whether the hypothesised airtime and poll effects where seen, but they can still briefly be discussed. Firstly, it can safely be said that no smaller candidate had a rise in popularity akin to that of the Liberals in the 2002 Swedish election, as they all remained at a low airtime and polling percentage. This is likely because they failed to create enough stir in the media, possibly because they did not have enough of the media's attention to make their controversial claims and suggestions hotly debated topics like the Liberals did. Indeed, even candidates that rose in polls did not see an increased media attention, as seen by relatively static airtimes. For instance, as the French media did not award Mélenchon more airtime when he was more popular in polls, my model failed to predict his increased popularity. This shows that the awarding of airtime was not based on the most recent poll results—otherwise the model would have more accurately predicted Mélenchon's trend, as it included a 3-period lag. It is therefore plausible that—as seen with Zemmour at the start of the electoral period—what matter are pre-electoral period polls. Hence, to justify changes in airtime during the electoral period, French media has to use the 'contribution to the electoral debate' criterion. This criterion is the hardest to define and therefore the one that gives media the most flexibility in airing the candidates they want to air. As such, the original concern that the media can still control who it wants to air still holds.

The main concern of this paper was that an unequal media presence of candidates leads to poll effects that influence electoral results. The model showed that airtime had a significant impact, but it was quite small. This would of course play a role in a close election, and as the final results of the 1st round had a gap of less than 1% between the 2nd and 3rd place candidates—Le Pen and Mélenchon, a more equal media presence of candidates could have impacted the outcome of this election's 1st round. In an effort to level the playing field, and to give TV and radio channels less agency in deciding which candidates to broadcast more over the others, I would suggest bringing the period of equal airtime to the release of the official candidate list, on the 8th of March—20 days earlier. This would enable the French electorate to get familiar with this cast of candidates long enough in advance. As it currently is, having more airtime is clearly not enough to make a candidate win, but it is enough to prevent candidates with much less airtime from having a chance. The current system is unpopular among voters, who have shown in polls that they want to hear what smaller candidates have to say, even before their candidacy has been made official.[10] So, I suggest to policymakers to change the law to

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[10] See the lower half of Figure 3. As it is a poll from December 2021, none of the listed candidates were official, as they did not have 500 signatures yet.

base less of the airtime attribution on previous contribution to the electoral debate, as this forms a self-fulfilling barrier to entry for lesser-known candidates.

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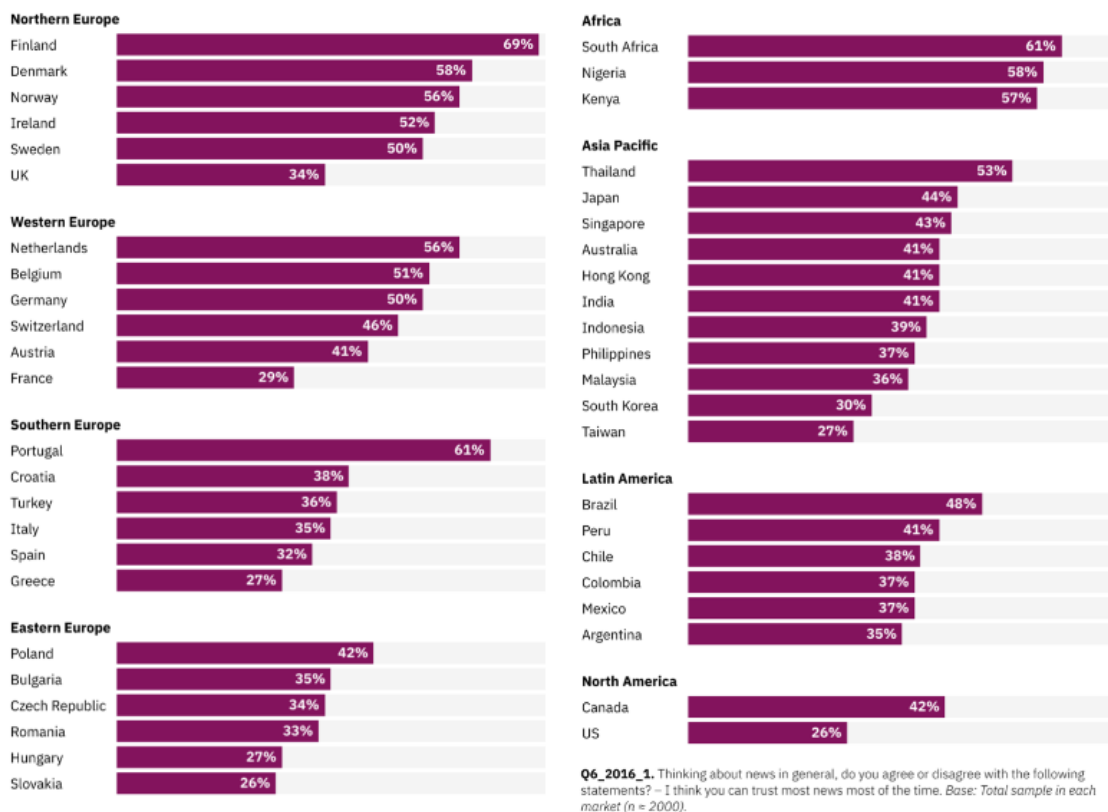
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Appendix

Proportion that trusts most news most of the time
All markets

Northern Europe
- Finland — 69%
- Denmark — 58%
- Norway — 56%
- Ireland — 52%
- Sweden — 50%
- UK — 34%

Western Europe
- Netherlands — 56%
- Belgium — 51%
- Germany — 50%
- Switzerland — 46%
- Austria — 41%
- France — 29%

Southern Europe
- Portugal — 61%
- Croatia — 38%
- Turkey — 36%
- Italy — 35%
- Spain — 32%
- Greece — 27%

Eastern Europe
- Poland — 42%
- Bulgaria — 35%
- Czech Republic — 34%
- Romania — 33%
- Hungary — 27%
- Slovakia — 26%

Africa
- South Africa — 61%
- Nigeria — 58%
- Kenya — 57%

Asia Pacific
- Thailand — 53%
- Japan — 44%
- Singapore — 43%
- Australia — 41%
- Hong Kong — 41%
- India — 41%
- Indonesia — 39%
- Philippines — 37%
- Malaysia — 36%
- South Korea — 30%
- Taiwan — 27%

Latin America
- Brazil — 48%
- Peru — 41%
- Chile — 38%
- Colombia — 37%
- Mexico — 37%
- Argentina — 35%

North America
- Canada — 42%
- US — 26%

Q6_2016_1. Thinking about news in general, do you agree or disagree with the following statements? – I think you can trust most news most of the time. *Base: Total sample in each market (n ≈ 2000).*

Q6_2016_1. Thinking about news in general, do you agree or disagree with the following statements? – I think you can trust most news most of the time. *Base: Total sample in each market (n ≈ 2000).*

Figure A.1. *Screenshot of the Reuters Questionnaire regarding media trust*

Figure A.2 *Four screenshots of French TV channels featuring the debate topic "Is Marine Le Pen far-right?"*

Table A.1. *The conversion of the Cevipof political compass to 2 linear scales*

Candidate	State Intervention	Economic Liberalism	Redistribution	Cultural Liberalism	Cultural Conservatism	Cultural Values
Arthaud	100%	0%	0	33%	0%	3.35
Dupont Aignan	0%	0%	5	0%	79%	8.95
Hidalgo	25%	0%	3.75	54%	0%	2.3
Jadot	50%	0%	2.5	71%	0%	1.45
Lassalle	25%	0%	3.75	0%	29%	6.45
Le Pen	4%	0%	4.8	0%	68%	8.4
Macron	0%	63%	8.15	11%	0%	4.45
Mélenchon	88%	0%	0.6	46%	0%	2.7
Pécresse	0%	83%	9.15	0%	46%	4.1
Poutou	100%	0%	0	61%	0%	7.3
Roussel	79%	0%	1.05	18%	0%	1.95
Zemmour	0%	75%	8.75	0%	92%	9.6

Table A.2. *Summary statistics of the coefficients of the fixed effects from the LME model using the REML method*

Variable	Value	Std.Error	DF	t-value	p-value
(Intercept)	17.236868	15.840616	83	1.088144	0.2797
Airtime	0.112954	0.030114	83	3.750839	0.0003
Sex (Male)	1.269579	3.908799	7	0.3248	0.7548
Age	-0.26198	0.280377	7	-0.934382	0.3812
R	1.539796	0.807943	7	1.905822	0.0984
CV	-0.385642	0.920773	7	-0.418824	0.6879