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COVID-19 Vaccination Rates and Political Party Affiliation in Norway

- An Empirical Analysis of Voting Patterns and Vaccine Rejection

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Abstract

Vaccines are widely accepted as one of the most effective means in combating contagious diseases due to their health- and economic benefits both on individual- and societal levels. As politicisation of vaccines has proven prominent throughout the COVID-19 pandemic in several Western countries, this paper examines the relationship between vaccination rates and political affiliation in Norway. Data on vaccination rates and votes measured on a municipal level are drawn from publicly available sources. The same can be said for socioeconomic factors which are included as control variables. With a theoretical foundation of social identity theory, we use Inglehart & Norris' (2016) heuristic model of party competition in Western societies to identify and classify Norwegian political parties into constellations of similar characteristics. We hypothesise that voters of different party constellations will show different COVID-19 vaccination rates.

By using OLS regression models, we find that voting for political parties with no governmental history is associated with significantly lower vaccination rates. We also find a negative relationship between vaccination rates and perceived political distance to historically governing parties amongst the non-governing parties. In particular on the political right this effect is significant and robust for controls. Although voting for the parties furthest to the political left show a negative relationship with vaccination rates compared to historically governing parties, this result is sensitive to precise party classification.

The results coincide with social identity theory and previous literature in other Western countries. If voters belong to what they perceive as an out-group to those in governing power, they are more likely to hold negative attitudes towards public recommendations from governing organs and -agencies, and thus vaccinate less. As this effect is stronger for voters of parties further away from the governing parties, we conclude that the degree of belonging to an out-group also matters.

Keywords - COVID-19, vaccines, political polarisation, socioeconomic costs, populism

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Abbreviations

Terminology	**Abbreviation**
Coronavirus Disease 2019	COVID-19
Norwegian Institute of Public Health	NIPH
Ordinary Least Squares	OLS
Brothers of Italy	FdI
Five Star Movement	M5S
Right-Wing Ideological Constraint	RIC
European Economic Agreement	EEA
European Union	EU
Stop the Islamification of Norway	SIAN
The Norwegian Defence League	NDL
United Nations	UN
The National Vaccination Register	SYSVAK
The Norwegian Labour and Welfare Administration	NAV

Political Parties in Norway	**Abbreviation**	**Norwegian translation**
The Labour Party	AP	Arbeiderpartiet
The Socialist Left Party	SV	Sosialistisk Venstreparti
The Centre Party	SP	Senterpartiet
The Christian Democrats	KRF	Kristelig Folkeparti
The Liberal Party	V	Venstre
The Conservative Party	H	Høyre
The Progress Party	FRP	Fremskrittspartiet
The Norwegian Communist Party	NKP	Norges Kommunistiske Parti
The Red Party	RØDT	Rødt
The Alliance – Alternative for Norway	AAN	Alliansen – Alternativ for Norge
The Democrats in Norway	DEMN	Demokratene Norge
The Christian Party/Conservative	KRISTNE	Partiet De Kristne/Konservativt
The People's Party FNB	FNB	Folkets Parti FNB
The Industrial- and Business Party	INP	Industri- og Næringspartiet
The Green Party	MDG	Miljøpartiet de Grønne
Focus on Patients	PF	Pasientfokus
The Health Party	HELSE	Helsepartiet
The Coastal Party	KYST	Kystpartiet
The Capitalist Party	LIBS	Liberalistene
The Pirate Party	PIR	Piratpartiet
The Pensioner Party	PP	Pensjonistpartiet
The Centrality Party	PS	Partiet Sentrum
Feministic Initiative	FI	Feministisk Initiativ
The Clean Nature Party	RN	Redd Naturen
The Generational Party – East-Norway	GENE	Generasjonspartiet for Østlandet
The Generational Party – West-Norway	GT	Generasjonspartiet for Vestlandet

1. Introduction

1.1 Motivation and purpose

Vaccination against infectious diseases is one of the most significant advances in human development (Unicef, u.d.). The success of vaccines has ensured that once deadly and debilitating diseases are contained or even eradicated, thus saving millions of lives every year (United Nations, 2019). Not only do vaccines provide increased protection against specific diseases for the vaccinated person, they also provide positive externalities through herd immunity, as spread among the population is minimised with increasing vaccination rates. During the global COVID-19 pandemic the development of targeted vaccines has therefore been a crucial mean of action for governments and health authorities in combating the spread and damage from the virus (Mayo Clinic, 2022).

Whilst vaccines are beneficial for the health of the population, they also have direct economic benefits (Ozawa & Stack, 2013). Vaccines can prevent life-long diseases. Hence, unnecessary healthcare spending worldwide is reduced, enabling a more optimal resource allocation where resources can be spent on education or necessities like food and water instead (Ozawa & Stack, 2013). To society at large, healthier people can attend school and learn more, or go to work and be more productive. An Israeli study during the COVID-19 pandemic estimated vaccines to be 125-175 times more economically effective than lockdowns for combating spread of the virus (Pliskin & Arbel, 2022). Thus, vaccines are not only positive for health, but they also provide other societal benefits (Ozawa & Stack, 2013).

Historical opposition towards vaccines

Scepticism and opposition towards vaccination are not new phenomena (Hussain, et al., 2018). Historically, opposition against vaccines has been manifested in numerous justifications ranging from theological-, to legal- and political reasons. Some examples include Reverend Edmund Massey in England who characterised vaccines against smallpox as diabolical operations and attempts to oppose God's punishments for peoples' sins (1722). In the 19th century, the formation of anti-vaccine journals, books, and organisations in countries like the US and Great Britain are early examples of politicisation of vaccines. In 1869 the Leicester Anti-vaccination Movement was founded, and in 1885 the organisation

attracted up to 100 000 protesters in an anti-vaccination protest in the city (Wolfe & Sharp, 2002; Ross, 1968). In 1898 the newly consolidated National Anti-vaccination League in Great Britain and its supporters compelled the British Parliament to remove penalties for not abiding by vaccination laws (Hussain, et al., 2018). Consequently, anti-vaccinationist parents who believed vaccination was unsafe or not beneficial for their children could let their children remain unvaccinated. On the movements in the US, Kaufman (1967) argues that improvements in medicine and increased acceptance of the state's role in public health caused the movements in the 19th and early 20th centuries to eventually fade and collapse.

Since the beginning of the 21st century, there have been new rises in anti-vaccination attitudes, with a growing number of parents in several Western countries refusing to vaccinate their children (Bjorvatn & Løøv, 2022; Hussain et al., 2018). With drops in vaccination rates, diseases once thought to be eliminated have had temporary upsurges. Perceived fears among anti-vaccinators and reasons for the rise are numerous, but spread of misinformation and lack of trust in governmental institutions and health authorities are believed to be crucial factors (Ozawa & Stack, 2013). Furthermore, publicly showing aversion towards vaccines is an effective way for individuals who are dissatisfied with public institutions to express their identity and political opinions (Mitchell, 2021). Thus, with the arrival of the COVID-19 virus and global measures to combat the pandemic, vaccine opposition and hesitancy have once again become top-of-mind as a major politicised issue in Western societies.

COVID-19 vaccines and politicisation in the Western world

Throughout the last decades, political polarisation in the US has increased significantly. While the Democratic Party on the one side has become more liberal and left-leaning, the Republican Party has turned more conservative and right-leaning (Desilver, 2022). Support in populist policies from both parties has also increased in the same time period, where in particular the Republicans have turned in a populistic direction, markedly after the election of Donald Trump (The Economist, 2020). As one's political stance has increasingly become a more important driver for one's identity expression, this increased division between right and left causes greater in-group biases where people are more likely to adhere to norms of

those who are similar to themselves (Chua, 2018). One such norm could be the likelihood of accepting a new medicine like the COVID-19 vaccine.

The 2020 US presidential election and vaccine rates in each US state reveal a distinct pattern between political affiliation and vaccination rates:

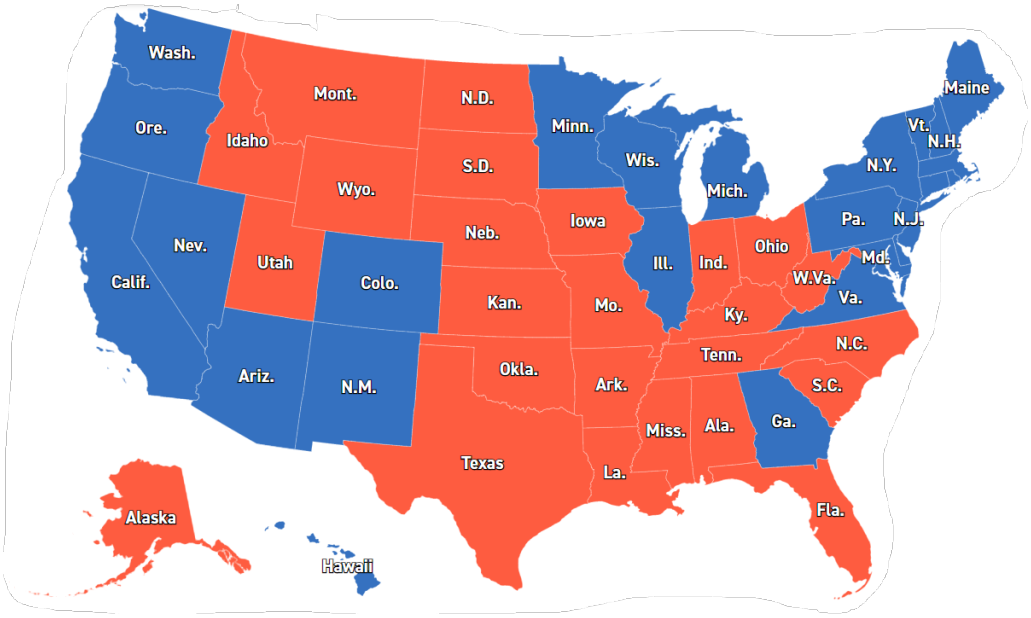

Figure 1: Results of the 2020 US presidential election by state (Vestal et al., 2022).

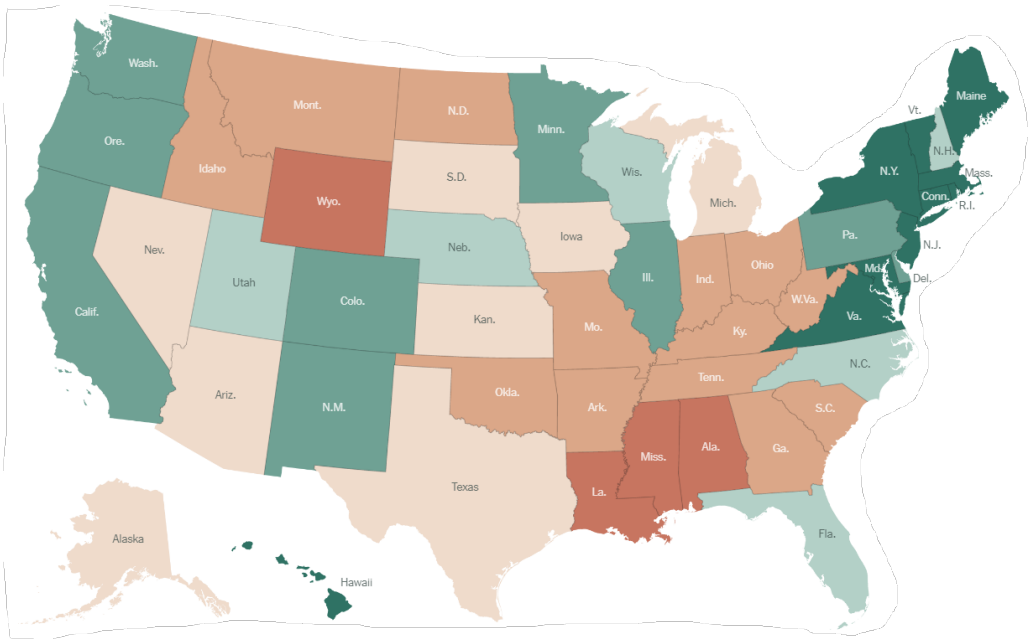

Figure 2: Fully vaccinated against COVID-19 by state (Ivory et al., 2022).

Figure 1 maps out the US presidential election in 2020 by state (Vestal et al., 2022). Blue states represent areas in which the Democratic party, led by Joe Biden won the majority, whilst red states represent areas in which the Republican party, led by Donald Trump had the highest support. Figure 2 maps out the percentage of the population by each state who were considered fully vaccinated by September 2022. Being classified as fully vaccinated against COVID-19 would require either 1 dose of the Johnson & Johnson vaccine, or 2 doses of either the Pfizer-BioNTech- or the Moderna shot. The 'greener' the state is, the larger the share of the population were fully vaccinated, while the 'redder' the state is, the lower the share of fully vaccinated inhabitants (Ivory et al., 2022). The maps seem to reveal a strong correlation between party affiliation and the decision to get vaccinated against COVID-19.

However, the US is far from a unique case. Patterns of COVID-19 vaccine hesitancy and political affiliation can be found in other Western countries as well. A French study from April 2020 shows that there is indeed a relationship between French voters' party affiliation and attitudes towards COVID-19 vaccines (Ward et al., 2020). While the US congressional system is dominated by only two parties, France has a parliamentary system which consists of multiple parties. The French study reveals that differences in attitudes do not simply stem from placement on the traditional horizontal political spectrum. In France, the respondents' perceived closeness to the governmental parties was decisive. Voters who were ideologically further away from the governing parties showed a markedly more negative attitude towards getting vaccinated relative to other voters, no matter if they were right- or left-wing leaning (Ward et al., 2020).

Somewhat similarly, a survey carried out throughout 2020 in Italy, revealed that voters of far-right populistic parties were more negative towards receiving a potential COVID-19 vaccine (Serani, 2021). At the time of the study, Italy was one of very few countries in Europe with populistic political parties represented in Parliament, both inside- and outside the ruling government. Interestingly, the researchers found voters of populistic parties outside of the government to be even more hesitant towards a COVID-19 vaccine than those who supported populistic parties within the government (Serani, 2021).

On the face of it, there seems to be several distinct patterns between vaccine hesitancy and party affiliation across Western countries. In the US, there is a clear tendency of the left leaning Democrat voters to be vaccinating more than the right leaning Republicans. In France the main determinant seems to be each individual's perceived closeness to the

governing parties. In Italy, findings suggest that populistic parties on the political right have more vaccine sceptic voters, in particular the populistic parties without governing power.

Findings from the Italian study are partly in line with findings from both the US and French studies. While voters on the political right in both Italy and the US are more vaccine hesitant, those who vote for populist right parties in the Italian opposition show more negativity towards the vaccine compared to voters of populist right parties in governmental power. Somewhat similarly, French voters who perceived themselves to be ideologically further away from the centrist government showed less intent to get vaccinated. Meanwhile, vaccine hesitancy was found to be present both on the left- and the right-hand sides of the French political landscape. The studies from France and Italy suggest voting for less mainstream parties is a good predictor for reduced intent to get vaccinated.

1.2 Research Question

In this thesis, we aim to add knowledge on causes of COVID-19 vaccine hesitancy in Norway by investigating if there are similar patterns between party affiliation and COVID-19 vaccine acceptance, as is found in the aforementioned countries. Similarly to France and Italy, Norway has a multiparty political system. Thus, investigating patterns between Norwegian vaccination rates and political affiliation among voters allows for a nuanced analysis. Norway is also of particular interest as the country is regarded as one of the most fair and equal societies in the world (Frankie, 2021). It is an egalitarian society high in trust, and consistently ranks in the top tier of world surveys on the matter with trust levels far higher than the aforementioned countries (Brezis, 2018; Oritz-Ospina & Roser, 2020). Trust has been found to be positively correlated with willingness to accept the COVID-19 vaccine (Adhikari et al., 2022). Furthermore, vaccination has not been politicised at the elite level in Norway, as it has been in other Western countries. Motivated by these facts, this has led us to the following research question:

Does political party affiliation affect COVID-19 vaccination rates in Norway, as has been found in patterns from other Western countries?

The topic is of great importance as findings could contribute with helpful information to governing organs and -agencies in Norway, including the Norwegian Institute of Public Health (NIPH). More precise information makes governing organs and -agencies better prepared to predict responses and attitudes among the people. Hence, findings could provide further guidance on how to carry out optimal policies when managing events which are dependent on behavioural responses from the public. As publicly announced, the NIPH recommends everyone from 16 years and above to be given a primary vaccination series (FHI, 2022a). Thus, mass vaccination on a large scale is found to be desirable, as it is a way of creating herd immunity and thereby minimise corresponding health- and socioeconomic costs.

In the study we will make a central assumption that by the time we obtained vaccination data (26.08.2022) citizens who have intended to get fully vaccinated already have chosen to get vaccinated by two doses, as vaccines have been available to the entire Norwegian population above 18 years since September 2021 (FHI, 2021).

1.3 Outline

To answer the research question, we have obtained complete vaccination data for people over the age of 18 years as of August 2022 at a municipality level. Furthermore, we use comprehensive data on votes cast for each registered political party in the 2021 Norwegian general election at a municipality level. We run multiple linear regression models in order to investigate relationships between party affiliation and COVID-19 vaccination rates, whilst controlling for relevant socioeconomic factors. The control variables we use include municipality level data on blank votes, voter turnout, unemployment, educational level, immigration, age distribution, income, gender distribution, as well as population density.

In the following section we will start off by presenting the theoretical framework used in this paper. First, we present social identity theory which mainly builds on the work by Henri Tajfel. Furthermore, findings from a number of studies regarding COVID-19 vaccine uptake and political party affiliation in Western countries will be presented. The countries of interest are the US, Italy, and France, as previous comprehensive research already has been conducted in these nations. A preliminary report on Norwegians' intention to vaccinate and

party affiliation and its findings will also be presented in short. Following the reviews of completed studies in Western countries, we will present the heuristic model of party competition in Western societies by Inglehart and Norris (2016). This model will then be used as a theoretical framework to classify Norwegian political parties into subgroups based on their degree of populism and placement on the horizontal economic axis.

Next, we introduce our obtained data in section 3. Furthermore in section 4, we present OLS-models used to estimate relationships between our dependent variable, vaccination rates per municipality in Norway, and our explanatory variables, which are different constellations of political affiliation. In section 5, we present our results and conduct an analysis based on the findings from the regression models. In order to examine the robustness of the results, we perform a sensitivity analysis where we alter the classification of one political party. Our findings will be discussed as well as possible limitations imposed on the study in section 6. As our results could have practical implications for the Norwegian society, we provide further suggestions for research and guidance for institutions and authorities in Norway in section 7. Finally we conclude the paper in section 8.

2. Literature review

2.1 Social identity theory

Social identity theory is largely based on the work of psychologist Henri Tajfel (McLeod, 2019), and has gained importance in the field of economics. Tajfel proposed the idea that people search for ways to categorise, identify, and compare groups of people to simplify a complex world (McLeod, 2019). This process leads to the creation of in-groups, in which people have similar traits as yourself, and out-groups, in which people have traits deviating from your own. Not only do people tend to exaggerate differences between groups in an 'us' versus 'them' mindset, people also tend to exaggerate similarities of those who are perceived to belong in the same group (McLeod, 2019).

When the COVID-19 pandemic hit, uncertainty- and stress levels rose worldwide due to the lack of reference points for such a profound global upheaval (Deloitte, 2020; Nikopolou, 2022). However, as Zhai (2022) argues, ideology can serve psychological needs, and offer a sense of certainty, security, and shared reality amongst those with a similar mindset. Furthermore, when daily life is restricted and threatened, in-group cohesion increases. This means that the perceived uncertainty and outside threats from the COVID-19 virus and the pending COVID-19 vaccine had the potential to affect different groups of the population disproportionally. As conservative people in general are more supportive of stability and the status quo, they are believed to be the group most at unease with major disruptions like the pandemic provided (Zhai, 2022).

In the US, as COVID-19 vaccines were becoming available to the public, a 2021 experimental study (N = 1480) demonstrated how in-groups and out-groups along a dimension of political identity had a significant impact on inclination to vaccinate against COVID-19 (Pink et al., 2021). Participants were randomly assigned to one of two treatment groups, or a neutral control group. Those in treatment groups received the same information about the importance of vaccination, not only for the health of all inhabitants, but also for economic concerns. However, the perceived source of information differed. While one group was shown a video of Joe Biden motivating vaccine uptake, the other was shown a video of Donald Trump doing the same. The participants' intention to get vaccinated was measured before and after exposure to the message.

In line with what social identity theory would predict, Pink et al. (2021) found statistically significant results of people complying more easily to the prompting message when information came from the leader of their preferred political party. On the contrary, being prompted by the leader of the participant's lesser preferred political party reduced the motivation to get vaccinated compared to prior to the experiment (Pink et al., 2021). This demonstrates that people are more willing to do actions they otherwise would not have done only to signal that they will not comply with the perceived out-group. It also shows how important perceived in- and out-groups can be, as people want to identify with their in-group while distancing themselves from 'the others'.

Social identity theory - Implications for this study

If similar mechanisms are applicable to Norway, we would expect certain groups of people to go against the NIPH's recommendations of getting fully vaccinated depending on their political affiliation (Helsenorge, 2022). Voters of political parties with no history of being in government could be an example of such a group. The reason is that increasing distance to the governing 'establishment' has the potential to alienate these voters and create in- and out-group divisions, where voters of such parties could consider themselves as an out-group to voters of political parties with a history of governmental power. We therefore aim to investigate whether or not similar results can be found in Norway as well.

2.2 Vaccination and voting - Findings from other Western countries

In the following subsections, we will review studies that analyse different patterns between political affiliation and vaccination rates in developed countries across the Western world. We will also discuss how each finding relates to the structure of our own analysis. The countries of interest are the US, Italy, and France as these are some of the countries where comprehensive studies have already been conducted. Furthermore, we will present findings from a previously conducted study in Norway. In this study the researchers investigated whether or not there existed correlations between the degree of agreement towards a certain set of populistic right-favouring statements and vaccine hesitancy early on in the pandemic.

Findings from the US

In the early days of the COVID-19 pandemic, the US President at the time, Donald Trump, downplayed the imposed threat from the virus (Bolsen & Palm, 2022). He labelled it a hoax and compared it to a regular seasonal flu, while blaming the Democrats for overreacting and politicising the virus.

As demonstrated by Pink et al. (2021) in their social identity theory study, cues from political leadership can influence voters notably. Hence, it is strongly believed that the blatant stances from Trump at the beginning of the pandemic contributed considerably in shaping the cleavage between Republican and Democratic voters respectively in their future COVID-19 vaccination rates (Bolsen & Palm, 2022). During the pandemic, republican voters have become increasingly more sceptical towards the measures needed to combat the virus compared to Democratic voters.

Even though Trump later on have become gentler in his expression of his own personal stance on COVID-19 vaccination, as well as getting the vaccine himself, there is still a substantial gap between Democrat and Republican voters when it comes to vaccine uptake. In the summer of 2021, 52% of Republican voters had either received or intended to get their first COVID-19 vaccine (Bolsen & Palm, 2022). Compared to a corresponding 88% of Democrats, the difference in intention to get vaccinated is remarkable. The same study also revealed that among the 20 US states with the lowest COVID-19 vaccination rates, 17 favoured Trump over Joe Biden in the 2021 presidential election.

Whilst intention to get vaccinated was significantly higher for Democrats, their average vaccination rate was still only 88%. Interestingly, surveys have shown that the rationale behind vaccine refusal are differing for Democrats and Republicans (Ivory et al., 2022). Among Democrats, the most prevalent reason for refusing vaccination was the speed at which the COVID-19 vaccine had been produced. Therefore, they wanted more time before making their final decision. For Republicans, a more adamant refusal of the COVID-19 vaccine or anti-vaccine stances in general were more widespread. Furthermore, it is theorised that identity affirmation and confirmation biases amongst the most conservative voters have been important in the politicisation of the COVID-19 vaccine by making the cleavage between the perceived in- and out-groups evident (Bolsen & Palm, 2022).

Findings from the US - Implications for this study

Studies of vaccine uptake and party affiliation in the US demonstrate an evident difference in vaccination rates amongst Democrats compared to Republicans, whereby more Democrats are fully vaccinated against COVID-19. The results provide interesting insights into US society. Hence, we would like to perform a somewhat similar analysis ourselves by investigating differences in COVID-19 vaccination and support for political parties on the left- and right hand-sides of the political landscape in Norway. In contrast to the US, where its political system is largely dominated by two parties, Norway has a multiparty parliamentary political system (Nordby, 2022). Thus, directly investigating patterns between Norwegian vaccination rates and political affiliation among voters allows for a more nuanced analysis. In the Data section we will justify bundling together parties on the far left- and right-hand sides of the traditional political spectrum to be used in the empirical analysis.

Findings from Italy

Italy, with its multiparty parliamentary system, is one of few countries in the EU which had populistic right-wing political parties of significant size both in the government and in the opposition during the COVID-19 pandemic (Serani, 2021). In October 2022, Giorgia Meloni, the leader of the far-right populistic party Brothers of Italy (FdI), became the first female prime minister of Italy after FdI's best election results ever (Roberts, 2022). Throughout the COVID-19 pandemic however, the Five Star Movement (M5S) was the only populistic political party in power. FdI and Lega, the two other populistic parties of significant size, now part of Meloni's coalition, were in the opposition (Serani, 2021).

The political strategies throughout the pandemic, leading up to the general election in October 2022 differed significantly amongst the populistic parties (Serani, 2021). M5S who were part of the government stressed the necessity of lockdowns and supported social distancing, whilst FdI and Lega in the opposition fuelled discontent amongst Italians by criticising lockdowns and blaming authorities for poor management. Such stances are not surprising in politics, as populistic parties in power often moderate their conduct in order to appear more as a reliable governmental partner (Serani, 2021). Meanwhile, populistic parties in the opposition want to incite and attract as many disaffected inhabitants as possible, and therefore often strengthen their populistic stances and radicalise their positions.

In a three-stage survey conducted in the second half of 2020, researchers mapped out connections between support for populistic parties and intention to get the COVID-19 vaccine in Italy (Serani, 2021). The study found statistically significant effects showing that those who intended to vote for populistic parties held stronger anti-vaccine attitudes. However, those who intended to vote for populistic parties in opposition held even stronger anti-vaccine attitudes than those with intention to vote for populistic parties in government. Furthermore, the study found supporters of the populistic parties in opposition to be significantly less trustful towards the government than other voters, including supporters of the populistic M5S in power. FdI and Lega voters were also found to believe more in conspiracy theories, and having less valid knowledge about established facts regarding COVID-19 (Serani, 2021).

Findings from Italy - Implications for this study

The findings from Italy demonstrate that voters of populist parties on the political right, in particular those outside of government, vaccinate less against COVID-19. In line with social identity theory, supporters of political parties outside of government may vaccinate less due to perceiving public institutions responsible for the vaccination programme as an out-group to themselves. If true, this effect might be present in Norway as well. While examining this in the empirical analysis, we will use a broader definition of the perceived in- and out-groups, and classify political parties with historical or present governmental power as one group, and all remaining registered political parties as another.

Findings from France

In April 2020, prior to the availability of COVID-19 vaccines, four online surveys (N = 5018) were carried out to map future COVID-19 vaccine inclination and political affiliation in France (Ward et al., 2020). Whilst France is one of the most vaccine-hesitant countries in the world historically speaking, scepticism towards vaccines in today's France is believed to be fuelled by a fundamental distrust in the French political system as well as in the current government led by Emannuel Macron and his party Renaissance (Ward et al., 2022).

While controlling for socioeconomic factors, the 2020 surveys revealed that party affiliation played an important role in respondents' intention to get vaccinated (Ward et al., 2020). The further away from the centre-oriented government the respondents identified themselves, the more likely they were to hold negative attitudes towards the COVID-19 vaccine. This was the case on both far-ends of the traditional political spectrum. Both far left- and far right-voters held more negative attitudes, and claimed to be less likely to get the vaccine.

However, contrasting causes of scepticism were found. Perceived harmlessness of the COVID-19 virus itself was dominated by voters on the left-wing, whilst opposition against vaccination in general was dominated by the right-wing (Ward et al., 2020). As the survey was carried out in the early stages of the pandemic, some respondents may not have been aware of the longevity and potential harm of the illness. However, at the time of responding, France was facing the first wave of a serious amount of COVID-cases with several hospitalisations, meaning the respondents at least should have had some knowledge of its potential for damage (Holder et al., 2020).

Findings from France - Implications for this study

The findings from France demonstrate higher vaccine hesitancy among supporters of political parties who identify themselves the furthest away from the governing parties. In Norway, two different governments have held power during the COVID-19 pandemic. The first, a centrist-right government consisting of H, V, and KRF, and the second, a centrist-left government consisting of AP and SP. Throughout Norwegian history SV and FRP are the only other existing political parties besides those in the two last governments who have held governmental power (Spence et al., 2021; Krekling et al., 2020).

Both SV and FRP are considered more left- and right-wing, respectively, than those who have been in governmental power throughout the COVID-19 pandemic. However, while studying whether similar patterns of vaccination and political distance to the government also exist in Norway, we investigate parties even further to the left or right on the horizontal political axis than SV and FRP. The reason is that both SV and FRP have previous recent histories of governmental power, and based on social identity theory we hypothesise that the further away from governmental power voters identify, the more likely they are to disregard recommendations from the public institutions and -agencies such as vaccines.

Main findings from the international studies

Thus far, this paper has reviewed studies conducted in the US, Italy, and France. Results from the US show that the left-sided Democrats vaccinate more against COVID-19 than the right-sided Republicans. In Italy, an important finding is that supporters of populist parties outside of the government had lower intention to vaccinate than voters of populist parties with governmental power. In France, researchers found perceived political distance to parties in government to be more important, whereby the further away from the governmental 'establishment' voters identified, the less likely they were to get vaccinated. In total, the studies suggest that voting for less mainstream parties is a good predictor for less intent to get vaccinated.

2.3 From an international to a Norwegian perspective

For the rest of section 2 our attention will shift from an international perspective to a focus on Norwegian vaccination rates and political affiliation. As discussed in section 1.2, Norway shares several characteristics with the aforementioned countries. For example, it is an advanced economy with a generally high standard of living (OECD, 2022). However, trust levels are considerably higher in Norway than in the aforementioned countries. In a 2020 survey, 94.3% of Norwegian inhabitants claimed that they can trust their national government, whilst the corresponding levels were 52.5% for the US, 52.3% in Italy, and 56.3% in France (Oritz-Ospina & Roser, 2020). Moreover, vaccination has not been politicised at the elite level in Norway, as it has been in other Western countries. Are these reasons enough to expect Norway to show unique patterns of correlation between political party affiliation and COVID-19 vaccine uptake? Or do we expect them to conform to either of the previously presented patterns?

Preliminary findings in Norway

In late 2020 and May 2021, surveys were carried out to study the relationship between intention to get the COVID-19 vaccine and individual ideological beliefs in Norway (Wollebæk et al., 2022). The survey (N = 2058) used a measure RIC (right-wing ideological constraint) to allocate respondents into groups based on their degree of compliance with six different political statements. Furthermore, the RIC-measure was used to estimate COVID-19 vaccine uptake intention.

Results from the study showed that people scoring high on the RIC, meaning their level of agreement with right-wing statements was high, had a lower intention to take the COVID-19 vaccine compared to the rest of the sample (Wollebæk et al., 2022). However, no evidence was found to imply that the same tendencies existed in those who disagreed the most with the right-wing statements, i.e., those who affiliated with the left-wing on the political spectrum. This means Wollebæk et al. (2022) found results aligning with the research on US citizens as there seems to be a clear left-right diversion amongst those who are willing and unwilling to get vaccinated. As the study used survey data, the researchers also found positive correlations between those furthest to the right-hand side of the political spectrum and belief in conspiracy theories, as well as distrust in medical research and institutions. Extensive use of alternative media was theorised to be a main contributor (Wollebæk et al., 2022).

Preliminary findings in Norway - Implications for this study

A potential issue with the study by Wollebæk et al. (2022) is the relatively low number of respondents. The researchers themselves also point out that the results may be biased since the survey was carried out electronically. At the time the surveys were carried out there were still months left before the 2021 Norwegian general election took place. This means that Wollebæk et al. (2022) did not have actual voting data available, but relied on the respondents' intended vote and their compliance with the RIC political statements. Moreover, by design, the study provides a less nuanced picture as their focus is only on the parliamentary parties, excluding PF. All other parties are simply pooled into the group 'other parties'. As we find these parties to be of particular interest for the topic on party affiliation and inclination to vaccinate, we will take the individual characteristics of each of these

parties into account when constructing constellations of parties with similar characteristics in section 2.5 and section 3.2.

As our analysis is conducted a year after the general election took place, we can use exact information on political affiliation rather than having to estimate ideological identity and affiliation through the extent of agreement with a limited number of statements. Thus, it can be argued that our analysis is more precise than that of Wollebæk et al. (2022) due to data availability.

2.4 Theoretical framework to identify populist political parties

To classify Norwegian political parties, we will resort to the heuristic model of party competition in Western societies by Inglehart and Norris (2016). While the classic left-right economic class cleavage has dominated Western European party competition during post-war decades, Inglehart and Norris (2016) argue that the cultural axis is a new cleavage which divides populism from cosmopolitan liberalism, and thus overlays the traditional economic cleavage. Furthermore, they argue that while populism in Western Europe has often been associated with the right reinforced by the use of terms such as 'the far right' or 'the extremist right', this fails to capture certain core features of populism around the world where populist parties for instance might advocate left-wing economic policies instead.

Figure 3 illustrates Inglehart and Norris' (2016) two-dimensional approach to model party competition in Western societies. The horizontal axis represents the traditional dimension of the economic stances of a party. This depicts how parties on the economic left typically favour state management of the economy, and a welfare state with higher levels of economic redistribution through progressive taxation. Meanwhile parties on the right typically favour free markets and private enterprise, low taxation, and deregulation. The vertical dimension, however, represents a cultural continuum on which populist values and cosmopolitan liberal values are located in opposite directions. This means a political party can be classified not only in a linear manner by its stance on economic issues**,** but two-dimensionally by also highlighting its emphasis on populist versus cosmopolitan liberal values.

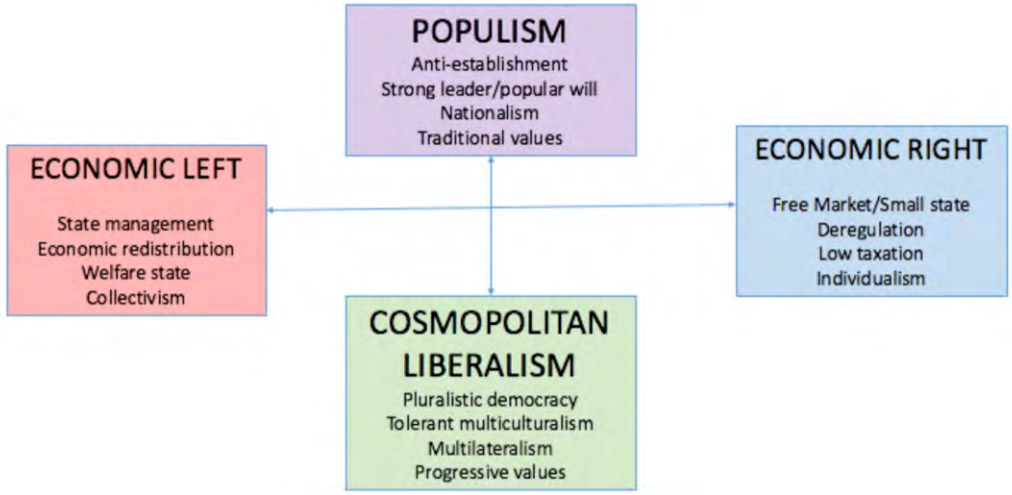

Figure 3: Heuristic model of party competition in Western societies (Inglehart & Norris, 2016).

Defining populism and cosmopolitan liberalism

Cas Mudde (2007) suggests that populist political philosophy is a loose set of ideas in which ***anti-establishment***, ***authoritarianism*** and ***nativism*** constitute its three core features.

Anti-establishment reflects the feature that populism sees politics as a conflict between the 'people' and the 'elite' (Jupskås, 2022). 'Ordinary people' are regarded as homogenous and inherently decent, while 'elites' such as big business and banks, multinational corporations, the rich, intellectuals and academics, scientific experts, elected politicians and government officials are regarded as dishonest (Inglehart & Norris, 2016).

Authoritarianism reflects how populists exhibit authoritarian leanings in that they typically favour the personal power of strong, charismatic leadership thought to reflect the true will of the people (Inglehart & Norris, 2016). Populist parties commonly also favour mechanisms through which direct democracy is exerted, such as referendums, opinion polls and plebiscites (Jupskås, 2022). This is opposed to "the institutional checks and balances and protection of minority rights built into processes of representative democracy" (Inglehart & Norris, page 7, 2016).

The third feature, ***nativism***, entails how populists typically favour "mono-culturalism over multiculturalism, national self-interest over international cooperation and development aid,

closed borders over the free flow of peoples, ideas, labour, and capital, and traditionalism over progressive and liberal social values" (Inglehart and Norris, 2016, page 7). In this, populists emphasize xenophobic nationalism in which the 'people' is viewed as a uniform whole which should exclude people from other cultures and countries.

Cosmopolitan values, on the other hand, represent a counterpole to populism (Inglehart and Norris, 2016). This includes valuing open national borders, multicultural values, and inclusive societies in which diversity of peoples and lifestyles is emphasised. Hence, cosmopolitan values challenge the ***nativism*** component of populism. Combined with liberal values, cosmopolitan ideas also challenge the ***authoritarian*** component of populism. These ideas, according to Inglehart and Norris (2016) include emphasising institutional checks and balances in the institutions in a representative democracy and pluralistic bargaining and compromise. Furthermore, they include emphasising the post-war architecture of international cooperation and global governance, the role of science in making rational policy, and tolerance of diversity, both politically, socially, and intellectually. Moreover, social liberalism is linked to supporting racial and gender equality, LGBTQ rights, environmental protection, and secular values.

2.5 Classifying Norwegian political parties

To investigate the research question about patterns of political affiliation and COVID-19 vaccination rates in Norway, classifying Norwegian political parties is imperative. As will be elaborated in the Data section, given the nature of the available data, parties sharing similar characteristics of interest are grouped together to form explanatory variables which will be used in the empirical analysis. Motivated by the findings from other countries, we will look at (1) parties with no history of governmental power, and (2) within the previous group, parties that can be classified as outer wing, and (3) more specifically, either left-wing or populist right. Where applicable, we will rely on already established political scientific literature. However, for a number of minor parties, existing literature is scarce or does not exist. Here we will resort to the heuristic model by Inglehart and Norris presented in the previous section, while using publicly available information such as party programmes.

Political parties represented in the Norwegian Parliament

As of 2022 the Norwegian parliament is composed of 10 political parties. These are the Red Party (RØDT), the Socialist Left Party (SV), the Labour Party (AP), the Centre Party (SP), the Green Party (MDG), Focus on Patients (PF), the Christian Democrats (KRF), the Liberal Party (V) the Conservative Party (H), and the Progress Party (FRP). In Figure 4, a visual representation provided by the Norwegian Parliament illustrates the parties' perceived placement on the traditional horizontal political landscape, including their respective current number of representatives in the Parliament (Stortinget, 2022):

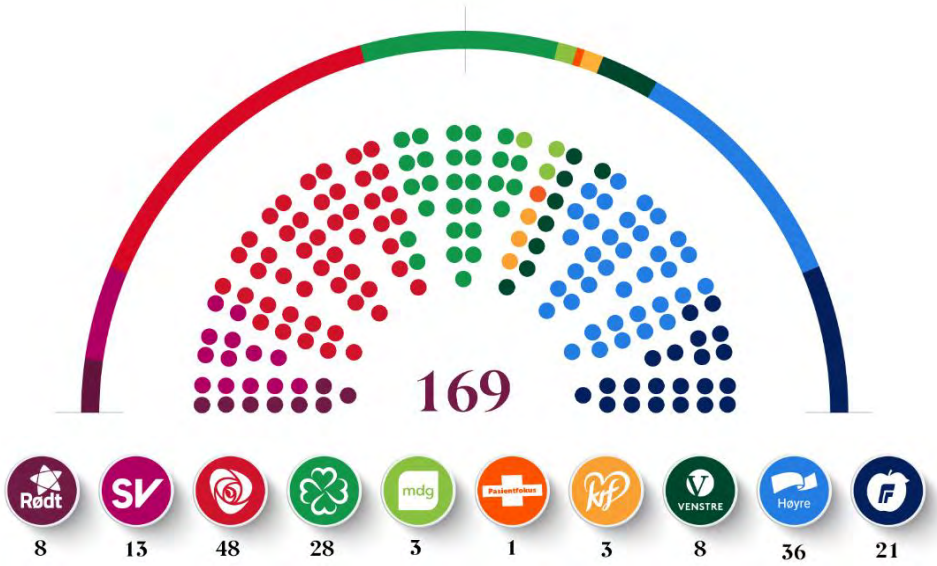

Figure 4: Political parties in the Norwegian Parliament and number of mandates after the 2021 general election (Stortinget, 2022).

Among present parliamentary parties, three have never taken part in any Norwegian government. These are RØDT, MDG, and PF. Of these three, RØDT is a socialist party created in the wake of the Worker's Communist Party and the Red Electoral Alliance (Garvik, 2022a). Hence, RØDT is clearly positioned on the outermost left, and can be classified as a left-wing party. Meanwhile, MDG classifies itself as a block-independent party in the centre (Stortinget, 2022), meaning it is ready to cooperate with both sides of the political landscape. However, in collaboration with other parties, MDG has mostly chosen to cooperate with centrum-left parties (NTB, 2020; Gauden-Kolbeinstveit, 2016). Still, MDG cannot be classified as left-wing or as populistic right. Nor the third party, PF, can be placed on either side of the ideological landscape as it is a regional, mainly single-issue party devoted to establishing a hospital in Alta, Finnmark (Stortinget, 2022).

These three parties also share another common trait, as it is only in recent history they have been represented in the Parliament. While MDG received their first seat in 2013 (Jupskås & Garvik, 2022) and RØDT in 2017 (Garvik, 2022a), PF received their only seat in 2021 (Garvik, 2021a). This, as well as the fact that neither RØDT, MDG, or PF have been in governmental power, strengthens the assumption that a considerable proportion of the voters of these parties could perceive themselves as an out-group to the voters of more established parties. If so, it would be in line with social identity theory. In the analysis, we will therefore make a clear distinction between the seven parliamentary parties with previous- or present governmental experience, and those without.

Political parties not represented in the Parliament

With a total of 10 parties represented in the Parliament, an additional 16 registered political parties, often referred to as 'other parties', are without any representation (Berg et al., 2021). To exceed the minimum threshold needed to receive levelling seats in the general election a national vote support of 4% must be reached (Holmøyvik et al., 2021). Therefore, a number of registered parties representing a substantial segment of voters are not represented in the Parliament. In total, the 'other parties' constituted approximately 3.4% of the total votes in the 2021 election, or a total of 101 674 votes cast (Valgresultat, 2021).

When investigating patterns of political affiliation and COVID-19 vaccination rates in Norway, the group of 'other parties' should be given careful attention. The 'other parties' group, in which none have ever been in government, is first categorised as historically non-governing parties. They constitute an out-group to the historically governing parties as discussed in section 2.1. Moreover, to get a more nuanced picture of the historically non-governing political parties, we further divide these parties into 'outer wing' parties and a residual group of non-governing parties identified as 'centrist' as inspired by findings from the French study by Ward et al., (2020). Finally, the parties who belong to the utmost endpoints on the economic dimension of the political spectrum is divided into the left- and right hand-side. In the left-wing group the Communist Party of Norway (NKP) should be included, as the party is fronting a communist ideology (Garvik & Tvedt, 2022). Together with RØDT, these are the only two parties we consider to be part of the left-wing group.

However, a number of the remaining non-governing parties have been largely neglected in literature, making a classification is necessary. In the following, by using the theoretical framework of party competition in Western societies by Inglehart and Norris (2016), we will identify parties we claim to be populistic or right-wing populistic based on their party programmes or other publicly available information. Parties we regard as not populistic right will not be included in the next subsection.

The Christian Party / Conservative (KRISTNE)

The Christian Party, now known as Conservative following their name change in November 2022, is a political party established in 2011 as a reaction to what the party founders saw as a shift away from traditional Christian values in the Christian Democratic Party (Bergersen, 2022; Garvik, 2021b). In the following, we will refer to this party as the Christian Party. On economic issues the party implies in its party programme that it is a strong proponent of the free market, and stresses the importance of a competitive business industry (page 28). Meanwhile the Christians opposes progressive income taxation, while also campaigning for a small state. Hence, the Christians can be regarded as a party to the right on the economic dimension.

It is evident that the Christians feature ***nativist*** political points of view. In their party programme, they claim their party was founded to "promote the fundamental values which have made Norway a safe, stable and prosperous society through generations", and describe their values as "deeply anchored in the Bible and the Judeo-Christian worldview" (page 1). In this, the party emphasises a strong preference for traditionalism and religious values over more secular, progressive and liberal social values. This includes a traditional view on genders as binary and the marriage as one between man and woman (page 6). The party also wants to step back on the 2008 liberalization of the marriage law which has allowed same-sex Norwegians to marry on same terms as other couples (page 6). Same-sex couples will not be allowed artificial insemination or to be used as foster homes for children (page 7).

The Christians also favour austerity measures in terms of immigration to Norway. This includes emphasising mono-cultural tendencies such as "prioritising pursued Christian asylum seekers above others" (page 60), and "placing asylum seekers with different religions and cultures in different asylums such that conflict and 'assault' is prevented". They claim

the following: “the national state works best with a relatively homogenous culture and few religious dividing lines” (page 17).

In several instances, the Christians favour the national self-interest of Norway above international cooperation. The party “does not want a development towards over-national government and political globalism” (page 16). This includes measures such as withdrawing from the United Nations’ migration platform (page 61), the Paris Agreement on climate (page 37), the European Economic Agreement including the Schengen Agreement (page 73), as well as expressing opposition to the European Union as a whole (page 72).

The Christians uses rhetoric which highlights their ***anti-establishment*** attitudes on several levels. In their party programme this includes the use of phrases such as “we will not conduct […] politics […] only suited to increasing the tax level or enrich corporations or organisations which live off of the environmental industry“ (page 37). The party displays a distrust in the scientific community when rejecting an all but unanimous scientific community on the matter of human caused climate change, claiming that “[…] the doctrine that CO2-emissions from fossil fuel leads to unfavourable heating of the atmosphere has empirical weaknesses” (page 36).

In line with the ***authoritarian*** feature of populism the Christians favour increased use of referendums compared to what is the norm in Norway today (page 17).

The Democrats in Norway (DEMN)

The Norwegian Democrats is a political party established in 2002 (Garvik & Tvedt, 2022). In its party programme, the Norwegian Democrats classifies itself as a centrum-oriented party on economic issues, stating it favours a mixed economic system (page 21). However, it also states it is largely a proponent of the free market. While claiming it wants to further develop the social democratic model, the Norwegian Democrats also wants to cut public sector spending extensively and eliminate public debt (page 24). On taxes, the party wants a flat income tax and they work to remove wealth and property taxes. Hence, the Democrats can be regarded as a party to the right on the economic dimension.

The party programme also gives further insight into the party's populist positioning on the cultural axis from Inglehart & Norris' (2016) heuristic model. On the front of their party programme, the ***nativist*** feature is clearly emphasised with the slogan "To the Best of Norway" on top of a picture of a Norwegian stave church in idyllic nature, in typical national romantic fashion (page 1). The party describes itself as an "anti-globalist, national conservative party, seeking to counteract the rapid and all-encompassing globalism" (page 9 & 11). The Norwegian Democrats wants to curtail Norwegian participation in international cooperation while emphasising Norwegian national self-interest. Actions include withdrawing from the United Nations, claiming the organisation has developed into a money waste, an invasive global actor without any democratic foundation, which through its Sustainable Development goals now promotes "a new global world order [...] which will undermine and destroy Western countries' freedom, culture and economy with compulsive equalisation, migration and moralism" (page 31). The party clearly rejects a Norwegian membership in the European Union and wants Norway to withdraw from the European Economic Area and the Schengen Agreement (page 13).

The Norwegian Democrats stands firm in its opposition towards immigration. Measures include a full stop in immigration, with only a few exceptions for specific groups or areas including labour immigration, family reunification, ethnic Europeans, and a limited number political refugees (page 39). However, in all areas they emphasise substantial austerity measures compared to current Norwegian immigration politics. The party's preference for mono-culturalism is evident in their stated intention to prioritise immigrants from countries with cultures similar to the Norwegian (page 42).

On several topics the party emphasises ***traditionalism*** over more progressive and liberal social values. The Norwegian Democrats states that Christianity is a cornerstone in Norwegian tradition, working as a foundation to "protect our cultural heritage and fundamental values on which our society is built" (page 49). Schools should teach students "old values such as hard work and discipline", and teachers should resurrect as an authority figure (page 49).

Moreover, the Norwegian Democrats uses an ***anti-establishment*** rhetoric in which elected politicians and government officials are portrayed as dishonest and corrupt. Politicians accused of wasting taxpayers' money on projects which never should have been

implemented (page 21) and of buying political goodwill by carrying out prestigious projects with the help of enormous state loans (page 24), are some examples of this rhetoric. 'Political correctness' as a motive for industry development "aided by lobbyism and networking, which often develops into corruption", is railed against (page 21).

The party rejects an all but unanimous scientific community on the matter of human caused climate change, claiming nobody knows how- or when climate is changing, and that we neither have full understanding- nor control over climate (page 62). The Norwegian Democrats consequently seek to withdraw from the Paris Agreement, as well as terminating any climate measures made in Norway.

As part of the populist ***authoritarian*** feature by Cas Mudde (2007), the party favours more use of referendums (page 13).

The Alliance - Alternative for Norway (AAN)

The Alliance - Alternative for Norway was founded in 2021 as a continuation of the Alliance, which was established in 2016. With its slogan "Norway First" the party's main objective, according to its brief values' programme, is for Norway to withdraw from the European Economic Area, stating that Norway was led astray when entering the EEA (Alliansen, 2017). On other topics, its candidates are free to have their own opinions. Since the party operates without any party programme, its economic stances are not openly defined. However, the party has among other things arranged a signature campaign against toll taxes (Frafjort, 2020). Additionally Garvik (2021c) considers the party to be right-wing radical on the economic dimension of the political spectrum.

In their stated values, the Alliance claims politics is not a choice between left and right, but rather a choice between globalism and nationalism (Alliansen, 2017). Norway is claimed to be threatened by outer globalist forces, and therefore the party wants to act to preserve Norwegian values and European cultural heritage. On immigration, the party leader Hans Lysglimt Johansen, has ranted on social media against "nigger-culture" and its "effect on Norwegian youth", including anti-semmitist conspiratorial statements about jewish power over Norwegian politicians, and how the "Holocaust narrative" is used to keep people under control (Krokfjord, 2017). Thus, the party embraces elements both from the ***nativist*** and the

anti-establishment features on the cultural axis. The party list of candidates includes conspiracy theorists, and people with backgrounds from Stop the Islamification of Norway (SIAN), and the Norwegian Defence League (NDL) (Færseth, 2017).

The People's Party FNB (FNB)

The People's Party FNB was established in 2014 (Garvik, 2022b). FNB is largely a protest party devoted to stopping the increase of road toll taxes, reducing the VAT, and removing property and wealth taxes (Garvik, 2022b). In its party programme it also favours the free choice of hospitals (page 37) and schools (page 32), and the access to private health care services (page 37). These are policies typically associated with parties on the economic right in Norway. Hence, the party can be placed to the right on the economic dimension.

FNB features ***nativist*** points of view in several aspects, with the most prominent being criticism towards Norwegian participation in international cooperation as it stands. On climate, the party alleges "domestic policy has been nearly disregarded and replaced by foreign policy about globalisation and focus on climate" (page 13). Regarding the United Nations, FNB claims the organisation "has deviated from their core missions, entering areas which threaten the uniqueness of nations" (page 13). As a result, the party wants to withdraw from the 'UN agenda' (page 13). FNB is also critical of the EU and the EEA, claiming that the EEA Agreement is weakening Norwegian sovereignty and the rights of Norwegian workers (page 73). The party wants to "ensure a balance between international free trade and national considerations" (page 73).

However, FNB is not solely an opponent of international cooperation per se. On some issues it speaks up for international cooperation, such as stating "Norway should be an active participant in the UN to strengthen international law and the multilateral order on which Norwegian security and sovereignty depends" (page 74). Essentially, the party wants to "secure Norwegian interests through international cooperation while ensuring the country keeps its autonomy" (page 73).

On immigration, FNB wants to strengthen emergency relief and foreign aid "where people live" (page 77). In Norway though, the party leans toward austerity measures. "A successful

immigration policy means we need control over borders and be able to decide for ourselves how many can come to Norway" (page 77). FNB also wants to end "perks" for immigrants (page 77), and calls for a rapid return of asylum applicants without legal residence.

In terms of ***traditionalism***, FNB refers to Christianity as a cornerstone in Norwegian tradition and culture (page 56). Hence, it wants Christianity to preserve its central position in Norwegian society, as it "builds on good values" (page 56). However, the party champions social liberal, progressive standpoints on LGBTQ rights, wanting LGBTQ people to have "equal rights as others in society" (page 75). It also stands for a repeal of restrictions to, or to strengthen rights regarding surrogacy and assisted reproduction.

FNB applies a populistic ***anti-establishment*** rhetoric portraying politics as a conflict between 'ordinary people' and the 'elite'. "We trust most people to know what works best in their own everyday life. We listen to the people" (page 5). The party calls for greater transparency into political processes which they claim to appear behind closed doors (page 63), and wants to "fight camaraderie and abuse of authority within public agencies" (page 64). On climate change, where the party wants Norway to not commit to agreements such as the Paris Agreement (page 13), the party also insinuates education on climate in school is politicised, stating education should be "based on science and not subject to influence by political or ideological points of view" (page 13).

In line with the ***authoritarian*** feature, FNB favours referendums claiming there are "weaknesses in our democracy" (page 65). They state that "on very important matters locally and centrally referendums should be used" (page 63).

The Coastal Party (KYST)

The Coastal Party was established in 1999 and had a single seat in the Parliament until 2005 (Garvik, 2021d). On economics, the party is in favour of a strong private industry, and through tax policies it wants to stimulate long-term private ownership and better terms for small- and medium-sized businesses, as stated in its party programme (page 12). The party also wants to abolish several taxes like the property and wealth taxes, and remove fees on fuel in districts (page 22). These are policies typically associated with the economic right.

On several issues the Coastal Party features ***nativist*** and ***traditionalist*** political points of view. The party views the family, the local communities, and the nation as the most important environments for the individual to thrive, and at the core of its ideology is to "preserve and further develop the values, cultural traditions, and institutions that generate safety in society" (page 3). On international cooperation the party is an opponent of Norwegian membership in the EU or the EEA, including the Schengen Agreement (page 3).

On the issue of immigration the Coastal Party wants to conduct a strict and controlled policy (page 27). The party wants to ease the regulatory framework for the return of immigrants who commit criminal acts, and will only make Norway obliged to receive quota refugees. To receive Norwegian citizenship strict conditions will be set, including demanding satisfactory knowledge of Norwegian language, culture, and society, and to comply with Norwegian culture and rules.

The Coastal Party also uses ***anti-establishment*** rhetoric. The Party proposes the creation of a 'Truth Commission' with the goal to "unveil corruption and abuse committed by Norwegian authorities" (page 30). Here, people who have committed "certain more closely defined actions" will be obliged to put forth for the 'Truth Commission' what they have taken part in. Failure to comply will be strictly punished (page 30).

In line with the ***authoritarian*** feature, the Coastal Party advocates referendums on Norwegian membership in the EEA, as well as the Schengen Agreement.

Merging parties to form the populistic right group

As evident, the Christians, the Norwegian Democrats, the Alliance, FNB, and the Coastal party display many similarities along both the economic- and the cultural dimensions of Inglehart & Norris' model (2016). Even though FNB and the Coastal party might not lean as heavily towards populism on the cultural dimension as the previous three, their politics are still undeniably characterised by populistic propensities. Hence, all parties should be placed in the populist direction as opposed to the cosmopolitan liberal direction on the cultural axis. Furthermore, there is a preponderance of documentation that the same parties can be

classified as leaning towards the political right on the horizontal axis, at least in a Norwegian setting. Consequently, these parties make up the constellation we will call populistic right.

Another political party of interest is the Industrial- and Business party which is presented in the following subsection.

The Industrial- and Business Party (INP)

The Industrial- and Business Party (INP) was established in 2020 as a counter to parties and organisations who want to end the Norwegian oil and gas industry (Garvik, 2021e). Its main objective is to maintain and develop oil and gas activity on the Norwegian Continental Shelf. In its party programme INP advocates a more socially just tax system for those with low income (page 19), and the introduction of production taxes for the aquaculture industry (page 5). Meanwhile it promotes a revision of current tax policies and reduced bureaucracy, in particular for entrepreneurs and small- or middle-sized firms (page 9-10). INP also favours reduced VAT on primary goods (page 20), and for road projects to not be financed by toll taxes (page 24). Thus, the party's placement on the economic axis is somewhat ambiguous. INP describes itself as a centrum-oriented moderate party (INP, u.d.).

INP emphasises ***nativist*** perspectives on Norwegian participation in international cooperation. The party is strongly opposed to the European Union and calls for termination of the EEA Agreement on Norwegian behalf (page 44). Their party programme states that "the EEA Agreement is imposing such strong guidelines on societal development, the welfare state and the labour market that it threatens the Norwegian model", thereby "destroying the good democratic debate in our country" (page 44). It is fundamental for INP that "no other nation or organisation will have the right to control Norwegian natural resources" (page 11).

On the issue of immigration INP calls for a "humane and fair labour immigration-, asylum-, and refugee policy" (page 46), and that "Norway should openly and warmly receive its part of the world's refugees in need" (page 46). In comparison to the aforementioned right-sided populist parties, INP calls for a less restrictive policy on this matter. The party still favours a somewhat stricter policy compared to current Norwegian policies including intensifying the return of asylum applicants who do not fulfil requirements for stay (page 46).

In terms of ***traditionalism*** INP's party programme incorporates nationalist nostalgic rhetoric. The party calls for the fundamental Norwegian cultural heritage, traditions, and religion to be "preserved also in a time where the world is closing in and affecting us on many levels" (page 38). Nostalgia is particularly present when discussing their central principles in phrases such as "the power-intensive industry has for years been the 'supporting beam' in many towns in Norway's elongated land and has had a fundamental meaning for Norway as an industrial nation and the making of our country" (page 11). However, INP takes a social liberal standpoint on social issues regarding LGBTQ-, religious-, and reproductive rights (page 31, page 38).

INP uses a populistic ***anti-establishment*** rhetoric. For instance, referendums on Norwegian membership in the EU are presented as a conflict between the Norwegian people and the 'political nobility' (page 17). Another example of such rhetoric includes "INP thinks retirement pensioners and older workers should be 'renounced' from being reduced to an item of expenditure and being characterised as burdens of society by political 'broilers' earning 4-5 times what a pensioner receives from social security" (page 29).

On the matter of climate change INP disregards an all but unanimous scientific community, claiming there are several legitimate sources of information with conflicting outcomes, and hence, no one can conclude on the matter (page 50). Meanwhile, claims are made that the earth will "most probably endure a global warming of 3-4 degrees, and all species will adapt to these changes" (page 50). Conspiratorially, it is claimed that "[…] the Green Shift […] has become a billion kroner industry for multinational corporations who have seen their chance to pump out governmental funds from […] countries' treasuries" (page 50). In their party programme rhetorical questions are asked about who has a hidden agenda, who has economic incentives in climate research, who gains politically from "scaring people", and who decides who the serious scientists are (page 50).

In line with the ***authoritarian*** feature, INP favours extended use of referendums "in any case where Norway hands over autonomy" (page 17).

As demonstrated, INP's politics is characterised by populistic tendencies in a range of areas. Regarding the placement on the economic dimension of Inglehart and Norris' model (2016), INP shows more centrum-oriented tendencies than the right-sided populist parties, by both

displaying right-sided views along with left-sided views. This means that even though the party can be defined as populistic and therefore belongs to the populist end of the cultural axis, INP only proves to be minorly right-leaning. Therefore, the party belongs more to the centre on the horizontal economic axis. Thus, INP will only be included in the *PopulisticRight* variable in a sensitivity analysis later in section 5.2 to investigate the robustness of the initial analysis.

3. Data

This section describes the data we have obtained and used to analyse the patterns between actual COVID-19 vaccination rates and party affiliation in the 2021 Norwegian general election. All data is drawn from publicly available sources, our main sources being Statistics Norway, the Norwegian Institute of Public Health, and the Norwegian Directorate of Elections. All observations are on a municipality level, meaning we have a total of 356 observations for all variables, except for a few instances of missing data. To combat omitted variable bias nine socioeconomic control variable categories are included: (1) blank votes, (2) voting attendance, (3) education, (4) immigration, (5) unemployment, (6) age distribution, (7) gender composition, (8) population density, and (9) income. All data except for population density are expressed in fractions [0, 1] either by default from source or by manipulation.

3.1 Dependent variable - Vaccination data

Statistics on vaccination are obtained from the Norwegian Institute of Public Health and its national vaccine register SYSVAK. The dataset contains the percentage share of the population older than 18 years per municipality who are registered with at least two doses of COVID-19 vaccines as of 26.08.2022 (FHI, 2022b). In this period the dataset used to be updated daily on weekdays. NIPH has calculated the vaccine coverage using population data from Statistics Norway as of 01.01.2021 (FHI, 2022b). As of 05.01.2022 the age of the vaccinated is set as their age by the end of the current year, meaning their age as of 31.12.2022 (FHI, 2022c). Health personnel administering the vaccines are responsible for registering accurate information to SYSVAK (FHI, 2020).

It is worth noting that having previously undergone registered COVID-19 infection is counted as the equivalent of 1 vaccine dose when it comes to being classified as ‘protected’ or not (FHI, 2022d). However, as it has been publicly recommended for a while now to get a third booster dose, we argue that using a measure for the share of people having taken the second dose of the COVID-19 vaccine is preferable, as even those who have undergone COVID-19 infection would need at least two shots to satisfy the recommendation

(Helsenorge, 2022). Therefore, we would argue that those who intend to become fully vaccinated would have gotten at least two doses within our time of collecting data in August 2022.

Descriptive statistics for the vaccination data are presented in Table 1:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Vaccine rate	356	.909	.027	.779	.95

Table 1: Descriptive statistics on vaccination rates in Norway.

3.2 Explanatory variables - Election data

We have drawn the results for the Norwegian 2021 general election from the Norwegian Directorate of Elections. The party distribution dataset contains the number and percentage of votes cast in each municipality for each registered party as well as blank ballot papers (Valgresultater, 2021). A complete overview of all registered political parties, including abbreviations used in this paper is presented at the beginning of this study.

In the following, political parties of similar characteristics will be grouped together to form constellations which will be used in various regressions. This is based on party characteristics as analysed in the Literature review section. Grouping together similar political parties is imperative, as many of the minor parties have received few, or no votes at all in several municipalities. It is also a critical measure to avoid overfitting the model, and thereby making the results less applicable outside of a Norwegian context, for example in comparison to other countries (Frost, 2022). The first constellation, which will function as the reference group, is the group of historically governing parties. This consists of political parties with seats in the current Parliament, but who also have a current or previous history of being in governmental power. As is demonstrated in the study from France, perceived distance to the ‘establishment’ appears to be a determinant for vaccination. Hence, a positive correlation between voting for the well-established parties and vaccination rates is expected. Political parties in the *HistoricallyGoverningParties* variable are SV, AP, SP, V, KRF, H, and FRP.

The remaining political parties are merged into a parent group, *NonGoverningParties*. These are currently active and registered political parties who have never been in government, and the majority have never held seats in the Parliament. The parties included in this group are therefore: NKP, RØDT, AAN, DEMN, KRISTNE, FNB, KYST, INP, MDG, PF, HELSE, LIBS, PIR, PP, PS, FI, RN, GENE, and GT.

To capture nuances of the research question, a closer examination of these historically non-governing parties is necessary. The *NonGoverningParties* variable will therefore be split into subsets to investigate more detailed patterns of political affiliation and vaccine hesitancy. These subsets are:

(1) OuterWing = (1.1) LeftWing + (1.2) PopulisticRight, and (2) OtherSmallParties.

(1) The *OuterWing* variable, a subset of historically non-governing parties, consists of parties which in the Literature review section were highlighted as of particular interest. The outer wing parties are defined as parties without present- or historical governmental power and located furthest away from the 'established elite'. As mentioned in section 2.5, we hypothesise that implicit distance to the political centre which in general has ruled Norway throughout history is negatively correlated with intention to get the COVID-19 vaccine.

(1.1) The parties defined as outer wing are made up of two separate entities. The first one deals with the left-hand side of the political spectrum and is therefore labelled left-wing. These are the political parties which do not have any history of governmental power and are identified as furthest to the left on the economic dimension of the political spectrum. As explained in section 2.5, the Norwegian Communist Party (NKP), and the Red Party (RØDT) are the two political parties which make up the *LeftWing* variable. Based on the findings from France we could expect a negative effect from this variable's coefficient.

(1.2) On the right-hand side, we find the political parties which we define as *PopulisticRight*. A more thorough discussion of these parties is found in section 2.5 of this paper. We find these parties to show similar levels of populistic traits and distance to the more established parliamentary parties in Norway. To recap, the political parties we define to be populistic and right-sided are: The Alliance - Alternative for Norway (AAN), the Democrats in Norway

(DEMN), the Christian Party (KRISTNE), the People's Party FNB (FNB), and the Coastal Party (KYST). Due to the correlation between populistic right-voting and vaccine scepticism in countries like the US, we expect a more negative effect from this variable's coefficient.

(2) The remainder of the political parties with no governmental history are denoted as *OtherSmallParties*. In order to avoid too much repetition, we will avoid listing them all, but this group will consist of the 12 political parties which are listed last in the paragraph explaining the contents of the *NonGoverningParties* variable. Though we expect to see some negative effect from these parties due to relative lack of political influence, we expect it to be lower than for the outer wing parties due to political proximity to the 'established elite' on the horizontal axis. We consider neither of these parties to be close to either of the end-points on the economic dimension.

Descriptive statistics for the election data are shown in Table 2 and Table 3:

Variable	Obs.	Mean	Std. Dev.	Min	Max
AP	356	.264	.068	.077	.58
SV	356	.055	.022	.012	.152
RØDT	356	.037	.015	.005	.098
SP	356	.26	.117	.03	.559
KRF	356	.041	.042	0	.272
MDG	356	.021	.013	0	.113
V	356	.022	.015	0	.118
H	356	.141	.067	.026	.403
FRP	356	.124	.053	.022	.326
AAN	356	.001	.001	0	.012
DEMN	356	.013	.006	0	.046
FNB	356	.001	.001	0	.005
HELSE	356	.002	.002	0	.014
INP	356	.004	.004	0	.021
KRISTNE	356	.004	.004	0	.027
KYST	356	0	0	0	.002
LIBS	356	.001	.001	0	.006
NKP	356	0	0	0	.002
PIR	356	.001	.001	0	.004
PP	356	.005	.005	0	.044
PS	356	.002	.001	0	.01
FI	356	0	0	0	.001
GENE	356	0	0	0	.001
RN	356	0	0	0	.007
GT	356	0	0	0	.003
PF	356	.002	.026	0	.405

Table 2: Descriptive statistics on election data for individual political parties.

Variable	Obs	Mean	Std. Dev.	Min	Max
Historically governing parties	356	.906	.037	.487	.977
Non-governing parties	356	.094	.037	.023	.513
Outer wing	356	.055	.016	.008	.112
Left-wing	356	.037	.015	.005	.098
Populistic right	356	.019	.008	0	.058
Other small parties	356	.038	.03	.007	.447

Table 3: Descriptive statistics on election data for defined party constellations.

3.3 Control variables

Blank votes

Data on blank votes are drawn from the same dataset as the results for the Norwegian 2021 general election by the Norwegian Directorate of Elections (Valgresultater, 2021). Voting blank can be interpreted as a sign of dissatisfaction- and mistrust in today's governing powers. As Dahlback (2021a) argues: “If you do not like the system as it is, you may also have less trust in elections and your own opportunity to make a political difference”. Therefore, we would hypothesise that blank voters may be more inclined to perform protesting actions like refusing to get vaccinated against COVID-19 when it is recommended by the Norwegian Institute of Public Health.

Voting blank naturally has a perfectly negative correlation with voting for a political party in Norway as each individual only can cast one vote each. As blank votes are theorised to correlate with both vaccination rates and party affiliation, it is important to control for this factor in the coming regression models.

Descriptive statistics on blank votes are presented in Table 4:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Blank votes	356	.006	.002	0	.013

Table 4: Descriptive statistics on blank votes.

Share of election attendance

Share of election attendance is drawn from the same dataset as the results for the Norwegian 2021 general election by the Norwegian Directorate of Elections (Valgresultater, 2021). Using the number of eligible voters and number of votes cast, we find the fraction of voter turnout in each municipality.

Oyler (2006) finds a relationship between voter turnout and trust in government. High-trusting and low-trusting individuals tend to vote less than those who have moderate levels of trust towards the governing 'establishment'. Thornton (2022) also finds a positive relationship between COVID-19 vaccination rates and trust in government in a cross-national study of 177 countries. Furthermore, Ward et al., (2020) found COVID-19 vaccine attitudes to significantly correlate with engagement towards the political system.

Devine (2022) also found trust to relate to party preference. Thus, since Oyler (2006) found a relationship between trust and voter turnout, we argue that there exists a relationship between voter turnout and party preference. The fact that different individuals show different likelihood of attending the voting process makes it necessary to control for this variable.

Descriptive statistics on the election attendance are presented in Table 5:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Share of attendance	356	.771	.037	.657	.898

Table 5: Descriptive statistics on election attendance.

Education

Statistics on educational level are drawn from Statistics Norway. The dataset contains percentage wise data on a municipality level from 2021 where the population is grouped into having completed (1) primary- and lower secondary school, (2) upper secondary school, (3) vocational school, and (4) university- and college education with less than four years of education, or (5) university- and college education with more than four years of education (SSB, 2022a). In the empirical analysis we merge (4) and (5) together to create a single variable for higher education to be used as a reference group. Since Statistics Norway lacks

information about the level of education for many immigrants, data for immigrants is based on estimates (SSB, 2022a).

As research shows, more years of education improves critical thinking skills (Huber & Kunsel, 2015). Higher levels of critical thinking are essential for evaluating the validity of different sources of information, and recognizing fake news (Machete & Turpin, 2020). Thus, people who have completed less years of education could be more inclined to read alternative media due to lacking a critical perspective on informational sources. As opposed to more traditional news outlets, Norwegian alternative media outlets like Steigan.no and Document.no repeatedly post articles with undocumented or misleading information. This includes conspiratorial and negative attitudes towards the COVID-19 vaccination programme (Sørensen, 2022; Westall, 2022; NTB-AFP, 2022).

People with different levels of education also vote differently on average (Statista, 2022). Hence, not controlling for levels of education is a potential source of omitted variable bias.

Descriptive statistics for the education data are shown in Table 6:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Primary/Lower secondary	356	.278	.052	.159	.517
Upper secondary	356	.425	.046	.246	.525
Vocational school	356	.034	.008	.01	.076
Higher education short	356	.206	.036	.124	.319
Higher education long	356	.057	.03	.014	.227
Higher education total	356	.263	.063	.148	.546

Table 6: Descriptive statistics on completed educational levels in Norway.

Immigration

Data on immigration is obtained from Statistics Norway. This dataset groups together immigrants and Norwegian-borns with immigrant parents and shows the percentage share of immigrants in each municipality in 2021 (SSB, 2022b). Furthermore, the data is organised into two categories based on nationality of origin. The first category includes the EU/EEA-areas, Great Britain, the US, Canada, Australia and New Zealand, and the second includes Asia, Africa, Latin America, Oceania except for Australia and New Zealand, and Europe except the EU/EEA-areas and Great Britain.

In the UK, minority immigrant groups were found to be significantly less inclined for COVID-19 vaccine uptake (UK Government, 2021). A published review article of UK studies claims misinformation, mistrust, safety- and efficacy concerns, as well as structural and systemic inequities to be the main drivers of less inclination to take the COVID-19 vaccine amongst UK minority immigrant groups (Hussain et al., 2022).

Even though information about the COVID-19 vaccination programme in Norway has been readily available in Norwegian, health authorities have had a harder time reaching immigrants who do not speak Norwegian (Archer & Juva, 2020). Haualand et al., (2022) found language barriers amongst certain immigrant groups to be an important barrier for vaccination. As communicational problems are especially harmful in regard to health messages, authorities' ability to give advice and convince people to alter behaviour is limited if the recipient struggles with the language (Koinig & Kohler, 2021). Therefore, if immigrants perceive communication from health authorities as poor, they may be less inclined to get the COVID-19 vaccine.

Another important factor is that immigrants who have taken the vaccine abroad may not make the effort to have their vaccination registered in Norwegian registers (Asvall, 2021). Immigrants from the first category, which includes countries in the EU and UK live in closer proximity to their respective home countries, meaning they may have a higher probability of travelling to their country of origin and getting vaccinated there instead.

As many immigrants also are not eligible for participation in the general election, they are only accounted for in the variable for vaccination rate, and not in the voting variables. Thus, not controlling for immigration would violate the zero conditional mean.

Descriptive statistics for immigration are presented in Table 7:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Immigration total	356	.127	.05	.026	.338
Immigration EU/EEA…	356	.068	.034	.007	.238
Immigration Asia/Africa…	356	.059	.031	.013	.237

Table 7: Descriptive statistics on immigration rates in Norway.

Unemployment

Statistics on unemployment for each month in 2021 are obtained from the Norwegian Labour and Welfare Administration (NAV) and contains the unemployment as a percentage of the labour force for all municipalities. The source of this data is a register of all people who fulfil the requirements to be registered as fully unemployed (NAV, 2022).

For some municipalities, 23 in total, data is missing, which means there is a lack of reporting for one or several months. To find the average 2021 unemployment rate in each municipality, we have added up each available monthly unemployment rate and divided it by the number of months with reported data. For one single municipality, Vevelstad, reporting to Statistics Norway has been absent for several years. However, several other sources have reported no unemployment both before and after the pandemic (ranablad, 2014, Guttormsen & Danielsen, 2022, & Vevelstad kommune, 2022). Therefore, as an estimate for Vevelstad, an average unemployment rate of 0% is assumed.

Being unemployed increases the risk of developing mental health issues, and reduces social participation in society (Paulsen & Gundersen, 2020). As the COVID-19 virus spreads through social interactions, we would therefore expect unemployment to play a role when deciding whether it is necessary to vaccinate or not.

Using US data from 1994-2010, Wright (2012) found a positive correlation between voting for Democrats and unemployment rates. As unemployed people might benefit more from the policies of some political parties, it is likely to find similar patterns in Norway. Thus, it is important to control for this variable in order to avoid a potential omitted variable bias.

Descriptive statistics on unemployment are shown in Table 8:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Unemployment rate 2021	356	.024	.01	0	.089

Table 8: Descriptive statistics on unemployment rate in Norway.

Age distribution

Data on age distribution for all residents in each municipality in 2021 is gathered from Statistics Norway. The dataset contains the number of people of each age in every municipality, ranging from 0 to 105+ years (SSB, 2022c). We have manipulated the data to find the percentage share of total residents of a certain age for every age in each municipality. Furthermore, the data is adjusted to contain each age as a percentage share of the total adult population, i.e., those above 18 years old. This means all ages sum up to 100%, even though we ignore inhabitants aged 17 or younger.

We have grouped together ages to form the control variables 18-29 (young adults), 30-49 (middle-ageing), 50-67 (well-established adults), 68-79 (early pensioners) and 80+ years (elderly). We expect a negative relationship between age and underlying health condition. Younger people, who in general are of better overall health, are less at risk of becoming severely ill from a COVID-19 infection. Since the beginning of August 2022, all inhabitants aged over 75 have been recommended to get a fourth COVID-19 vaccine in order to lessen the likelihood of infection and the possible serious effects infection can lead to (FHI, 2022e). We would also argue that in the case of a faulty vaccine, young adults will suffer more as they risk having to live with negative side effects for a significantly longer period of time than the elderly, thereby increasing the perceived risk of a vaccine for young people.

Another reason to control for age is that different generations have grown up in different time periods. This makes controlling for age distribution important for two reasons. First, a considerably larger portion of the Norwegian population completes a longer education today (Regjeringen, 2016). As having higher levels of education in general is correlated with healthy criticism of informational sources, there may exist an inherently different approach to collecting and interpreting information across age groups (Thommesen & Strønen, 2019). Secondly, the time of birth could also affect the level of trust you have in the government. Growing up under uncertain conditions, or in a notably different community which makes you feel alienated in today's society may influence your trust in the current governmental institutions (Norris, 2022).

Finally, voting patterns are also expected to vary with age distribution. In the UK 2019 general election younger generations clearly voted more for the social democratic Labour party, while older age groups voted more for the Conservative party (Armstrong, 2019).

Based on the arguments above, including age distribution as a control variable is therefore important to prevent omitted variable bias.

Descriptive statistics on age distribution are presented in Table 9:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Age: 18-29 Years, %	356	.167	.023	.113	.255
Age: 30-49 Years, %	356	.295	.042	.197	.407
Age: 50-67 Years, %	356	.305	.022	.227	.374
Age: 68-79 Years, %	356	.161	.027	.092	.235
Age: 80+ Years, %	356	.07	.017	.032	.123

Table 9: Descriptive statistics on age distribution in Norway.

Gender composition

We have obtained data on gender composition in each municipality from Statistics Norway. The gender composition is relatively stable across all municipalities (SSB, 2022c). However, there is some variation, and since men generally consulate doctors more seldom than women, we might observe a similar positive relationship between the share of women in a municipality and vaccination rates (Eusébio, 2022). In the French study by Ward et al., (2020) there was found evidence for women showing less intent to get vaccinated compared to men.

Grindheim (2019) who bases his research on the municipal- and county council election in 2015 shows that Norwegian women tend to vote more for parties on the political left, whilst men vote more for right-oriented parties. This pattern is also consistent in the general elections, where women favoured socialist parties and men favoured the more conservative political parties (SSB, 2022d). These aspects make gender composition an important factor to control for in our regressions.

Descriptive statistics on gender composition are presented in Table 10:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Share of males	356	.511	.011	.485	.557
Share of females	356	.489	.011	.443	.515

Table 10: Descriptive statistics on gender composition in Norway.

Population density

Data on inhabitants per km^2 is obtained from Statistics Norway (SSB, 2022e). Increasing population density is associated with increased COVID-19 infection risk (Iderus et al., 2022). This is due to the fact that in denser areas it is harder to keep social distancing rules, despite more frequent lockdowns which were implemented to prevent infection. As transportation costs to get to a vaccination centre in general are lower in denser areas, these are reasons which could make people in denser areas more motivated to get vaccinated.

Kvale, (2021a, b, c) shows that voting patterns differ significantly between the districts and the urban areas. Amongst parliamentary parties, SP stands out as a party with significantly more support in areas with less dense population, whilst RØDT and H have their voters come from more urban areas. As place of residence and political party affiliation correlates, it is important to include population density as a control in order to avoid biased results.

Descriptive statistics on population density are presented in Table 11:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Population density	356	50.596	131.758	0	1636

Table 11: Descriptive statistics on population density in Norway.

Income quintiles

Finally, to control for differences in income distributions between municipalities we have obtained data on households, by size of income from Statistics Norway. The statistics contain the percentage level of households in each income quintile for all municipalities. The quintile-intervals are based on the national level income distribution (SSB, 2022f).

In the beginning of the vaccination process in the US, wealthier individuals showed higher intent to get vaccinated compared to those of lower income levels (Funk & Tyson, 2021). In March 2021, the number of high-income individuals who had been vaccinated were almost twice as large as those who belonged to the poorest third. These results are not that surprising as the alternative cost of missing days from work due to COVID-19 infection or imposed isolation could be more detrimental for the wealthiest households due to missing out on higher wages.

Different income levels are also found to correlate with party preference in politics. In Norway Kvale, (2021a, c, d, e) finds that voters of H have a higher income than voters of other parties in general. FRP, SP, and MDG on the other hand show some evidence of gaining support amongst those with lower levels of income.

Descriptive statistics on income quintiles are presented in Table 12:

Variable	Obs.	Mean	Std. Dev.	Min	Max
Income quintile 1	352	.213	.038	.134	.359
Income quintile 2	354	.204	.021	.153	.262
Income quintile 3	352	.201	.015	.145	.257
Income quintile 4	354	.206	.023	.138	.278
Income quintile 5	356	.177	.042	.079	.354

Table 12: Descriptive statistics on income distribution in Norway.

4. Empirical strategy

4.1 Methodology

To perform statistical inference and estimate the effects of party affiliation on vaccination rates we use an Ordinary Least Squares (OLS) approach where estimates are interpreted as level-level. Through multiple linear regression analysis, we use a number of explanatory- and control variables, as described in the Data section, to estimate how the regressors are associated with the dependent variable of interest, vaccination rates.

OLS is used to find the best-fitting line for observed data points. We assume the Gauss-Markov assumptions 1-4, (1) linearity in parameters, (2) random sampling, (3) no perfect collinearity, and (4) the idiosyncratic error term u is evenly distributed and random N~(0,σ_u^2), to be satisfied. In addition, robust standard errors are applied to control for potential heteroskedasticity, thereby giving us efficient results as well. In total we receive the best linear unbiased estimator (BLUE) for our data.

4.2 Model specification

First we run a simple linear regression model which is specified with the dependent variable vaccination rate for adults (Y) and the main regressor *NonGoverningParties* (X). In this we investigate the following: Are voters of historically non-governing parties less likely to vaccinate against COVID-19 compared to the reference group; voters of historically governing political parties? This simple OLS-model can be expressed as:

Model 1.1:

$$SecondDoseShareAbove18Years = \alpha + \beta \cdot NonGoverningParties + u$$

We examine several specifications with different explanatory variables throughout the paper. The next specification involves splitting up the historically non-governing parties into *OuterWing* and *OtherSmallParties*. To examine these two groups more closely, we will

perform an F-test which will tell us to what extent we can be certain that the estimated effect on vaccination rates are different between the party constellations' respective voters:

Model 2.1:

$$SecondDoseShareAbove18Years = \alpha + \beta_1 \cdot OuterWing + \beta_2 \cdot OtherSmallParties + u$$

Our last specification involves splitting up the *OuterWing* variable into *LeftWing* and *PopulisticRight*. F-tests will be performed to investigate whether there are statistically significant differences across the estimates for voters on the far left, voters of populist right parties, as well as voters of the remaining small parties with no governmental history.

Model 3.1:

$$SecondDoseShareAbove18Years = \alpha + \beta_1 \cdot LeftWing + \beta_2 \cdot PopulisticRight + \beta_3 \cdot OtherSmallParties + u$$

In all three specifications we also run regressions where we include all control variables as they are presented in the Data section. These are attempts to avoid omitted variable bias. We add the control variables to all the previously presented models in this subchapter, giving us the following regression models:

Model 1.2:

$$SecondDoseShareAbove18Years = \alpha + \beta_1 \cdot NonGoverningParties + \beta_2 \cdot BLANK + \beta_3 \cdot ShareOfAttendance + \beta_4 \cdot Unemployment2021 + \beta_5 \cdot PrimLowSecondary + \beta_6 \cdot UpperSecondary + \beta_7 \cdot VocationalSchool + \beta_8 \cdot Age3049Years + \beta_9 \cdot Age5067Years + \beta_{10} \cdot Age6879Years + \beta_{11} \cdot Age80Years + \beta_{12} \cdot ImmigrationEU\ldots + \beta_{13} \cdot ImmigrationAsia\ldots + \beta_{14} \cdot PopulationDensity + \beta_{15} \cdot ShareOfFemales + \beta_{16} \cdot IncomeQuintile2 + \beta_{17} \cdot IncomeQuintile3 + \beta_{18} \cdot IncomeQuintile4 + \beta_{19} \cdot IncomeQuintile5 + u$$

Model 2.2:

$$SecondDoseShareAbove18Years = \alpha + \beta_1 \cdot OuterWing + \beta_2 \cdot OtherSmallParties + \beta_3 \cdot BLANK + \beta_4 \cdot ShareOfAttendance + \cdots + \beta_{20} \cdot IncomeQuintile5 + u$$

Model 3.2:

$$SecondDoseShareAbove18Years = \alpha + \beta_1 \cdot LeftWing + \beta_2 \cdot PopulisticRight + \beta_3 \cdot OtherSmallParties + \beta_4 \cdot BLANK + \beta_5 \cdot ShareOfAttendance + \ldots + \beta_{21} \cdot IncomeQuintile5 + u$$

In particular, the models estimate the share of people over the age of 18 (Y) who is fully vaccinated through a constant term α, explanatory- and control variables multiplied with their corresponding coefficient ($X_k \cdot \beta_k, \in [1, k]$), as well as an error term u. The error term, or the residual, is the remaining unexplained variance in Y after controlling for different explanatory- and control variables.

When computing a linear regression model we want to know approximately how precisely the explanatory variables explain the variation in the dependent variable. A common estimate for this is the R^2 which is defined as the fraction of sample variation in Y that is explained by X (Fernando et al., 2021). A higher R^2 is often seen as beneficial as more of the variation in the dependent variable is picked up by the explanatory variables. Maximising R^2 should however not be the main objective as every added explanatory variable will increase R^2 even though the variable in fact might be irrelevant. The control variables have therefore been selected by careful consideration to only include relevant controls, in order to avoid imprecise results.

4.3 Empirical predictions

Prediction 1: Model 1.1 and Model 1.2 will show that increased support for historically non-governing parties result in lower vaccination rates, as they are perceived as an out-group to the historically governing parties. This prediction is in line with the Italian findings.

Prediction 2: Model 2.1 and Model 2.2 will show that voters of political parties near the endpoints of the economic dimension of politics have a lower inclination to vaccinate. Degree of feeling like an out-group to the historically governing parties is expected to increase with distance to those in power. This prediction is in line with the French findings.

Prediction 3: Model 3.1 and Model 3.2 will show that voters of political parties on the populist right are less inclined to vaccinate compared to voters on the furthest left. This prediction is in line with the findings from the US.

5. Empirical analysis

5.1 Main results

Column (1) in Table 13 presents the estimated results for Model 1.1. The coefficient for the variable containing the share of votes for non-governing parties is negative and significant on a 1%-level when regressed on our variable of interest, the COVID-19 vaccination rate for individuals older than 18 years. The interpretation of the results is that a 1 percentage point increase in the share of votes for non-governing parties is associated with a 0.177 percentage point decline in vaccination rates.

Column (2) presents Model 2.1, and shows the results when splitting the historically non-governing parties into outer wing parties (*OuterWing)* and into other small parties (*OtherSmallParties)*. Both coefficients are negative and significant on a 1%- and 5% level respectively. The results are interpreted as a 1 percentage point increase in votes for outer wing parties is connected to a 0.459 percentage point decrease in vaccine uptake. The remaining non-governing parties have the following interpretation: a 1 percentage point increase in votes for these parties is associated with a reduction in vaccine uptake by 0.0790 percentage point. The estimates for each party constellation are statistically different on less than a 1% level (Prob > F = 0.0007).

Model 3.1 is presented in column (3) of Table 13, where the outer wing parties have been further split up into left-wing parties *(LeftWing)* and populist-right parties (*PopulisticRight)*. This has a slight effect on the remaining small parties, which is now associated with a decrease in vaccination by 0.115 percentage point when votes for the respective political parties is increased by 1 percentage point. The estimate is also significant on a 1% level. The coefficient for the left-wing parties NKP and RØDT tells us that a 1 percentage point increase in votes for these parties in total is associated with a 0.218 percentage point decrease in vaccination. Even though the estimate for left-wing parties is significantly different from the historically governing parties (t = -2.65), the estimate cannot be deemed significantly different from the estimate for other small parties (Prob > F = 0.2573). For the populist right parties, we observe an association which is more than six times as large: A 1 percentage point increase in votes for populist right parties in total is associated with a decrease in vaccine uptake of 1,347 percentage points (t = -7.21). This estimate is

significantly more negative than the estimates for both the left-wing parties (Prob > F = 0.0000) and the remaining small parties (Prob > F = 0.0000).

Of the three simple models presented in Table 13, we see that Model 3.1, expressed in column (3) explains the largest share of the variation in outcome of interest. An explanatory power of R^2 = 18.2% is twice as large as for Model 2.1 (R^2 = 9.1%), and more than three times as large as for Model 1.1 (R^2 = 5.9%).

	(1) Vaccine Rate	(2) Vaccine Rate	(3) Vaccine Rate
Non-governing parties	-0.177*** (-5.60)		
Outer wing		-0.459*** (-4.84)	
Other small parties		-0.0790** (-2.31)	-0.115*** (-5.00)
Left-wing			-0.218*** (-2.65)
Populistic right			-1.347*** (-7.21)
N	356	356	356
R^2	0.059	0.091	0.182

t-values in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

Table 13: Regression models for political affiliation and vaccination rates.

In Appendix I, we have included all relevant control variables, as presented in the Data section. In Model 1.2, presented in column (1), we control for blank votes, election attendance, average unemployment in 2021, educational level, age distribution, immigration levels, population density, gender distribution, and income distribution. We still find the coefficient of the historically non-governing parties to be negative and significant on a 1% level. A 1 percentage point increase in votes for these historically non-governing political parties is now associated with a reduction in vaccine uptake of 0.122 percentage point.

Model 2.2, presented in column (2) of Appendix I shows what happens when we split the historically non-governing parties into outer wing parties and other small parties, whilst also introducing control variables. The coefficients of both variables remain negative. However both variables are now significant on a 1% level. Meanwhile, their individual effects are reduced. The estimate for outer wing parties is significantly more negative than the estimate for the remaining non-governing parties (Prob > F = 0.0112) and shows that a 1 percentage point increase in votes for the outer wing parties is associated with a 0.285 percentage point decrease in vaccine uptake. The same increase for the remaining non-governing parties is only associated with a reduction of 0.0773 percentage point in vaccine uptake.

In Model 3.2, presented in column (3) of Appendix I, the variable *OuterWing* is once again split up into left-wing and populistic right, this time including control variables. Both estimates keep their negative signs, but only the effect from voters of populistic right parties is statistically significant on a 1% level. The estimated effect from voting for left-wing parties has a t-value of -1.66, meaning that we can only conclude with it having a significantly lower effect than the reference group at a 10% level. However, with this in mind, a 1 percentage point increase in votes for right-sided populist parties is associated with a 0.956 percentage point decrease in vaccine uptake. The same increase for left-wing parties is associated with a decrease of 0.119 percentage point in vaccine uptake. These estimates are statistically different on less than a 1% level (Prob > F = 0.0000). The coefficient for the remaining non-governing parties is statistically different from the estimate for the rightist populist parties (Prob > F = 0.0000) but not the left-wing-estimate (Prob > F = 0.7397). It also expresses that a 1 percentage point increase in votes for these remaining non-governing parties is associated with a decrease in vaccination uptake by 0.0937 percentage point, whilst also being significant on a 1%-level.

All the models in Appendix I are able to explain similar amounts of the variation in the vaccination rate. Model 1.2 expressed through column (1) are awarded an $R^2 = 63.0\%$, and Model 2.2 which is found in column (2) has an $R^2 = 63.8\%$. Slightly above these two models is Model 3.2 which has an $R^2 = 67.4\%$, and thus is able to explain approximately 4% more of the variation in the variable interest compared to the two other models.

Throughout the regressions in Appendix I, we have omitted variables for collinearity reasons. This includes the historically governing parties, namely AP, SV, SP, KRF, V, H, and FRP. As primary school and lower secondary school attendance is mandatory in

Norway, 100% of the Norwegian inhabitants above 18 years old are expected to have at least this level of education (SSB, 2022a). The group of people with any completed level of college- or university education is therefore omitted in the regression. For age distribution we have omitted the age group 18-29 years, which is also the youngest age group found relevant for this study. The share of males in each municipality is also omitted in order to avoid perfect collinearity with the share of females. Finally, we have also excluded the poorest income quintile from our regressions for the same reason.

Some control variables show interesting results and seem to have an individual effect on vaccine rates. The coefficient for voting attendance is positive and significant on at least a 5% level in all model specifications. In addition, municipalities with a large share of people who have only completed lower levels of education (upper secondary school or lower) are associated with lower vaccination rates. The negative coefficients for this control do however vary in significance, as neither result can be deemed significant in column (3).

The oldest age group, 80+ year olds, also seems to have some effect on vaccination rates by always having a positive coefficient and being significant on at least a 10% level. In Model 1.2 and 2.2, the 80+ year olds show even greater intention to get vaccinated than 18–29-year-olds, by being significant on a 5% level. Municipalities with high immigration from the EU/EEA-areas, Great Britain, USA, Canada, Australia, and New Zealand also show lower vaccine rates whilst also being very significant (column (1): t = -8.16, column (2): t = -8.13, column (3): t = -9.61). Municipalities where the female share of inhabitants is relatively large show signs of greater vaccination uptake. All the estimated effects are positive, and significant on a 5% level in Model 1.2 and 2.2, and on a 1% level in Model 3.2. Finally, municipalities where a larger share of the population coincide with the second, fourth-, or fifth-income quintiles indicate a higher intention to get vaccinated. The coefficients for all these variables are positive in all columns and significant on a 1% level in all of them.

A fully detailed overview of all regressions with controls are presented in Appendix I.

Summary of the main results

Our findings suggest that (1) Norwegian voters of historically non-governing parties are significantly less willing to take the COVID-19 vaccine compared to the rest of the

population. Moreover, (2) within this group of historically non-governing parties, voters of outer wing parties, i.e., left-wing and populist right parties pooled together, show a significantly higher hesitancy towards COVID-19 vaccination than voters of parties with no governmental history. (3) When examining the effect from left-wing- and populistic right voting separately, only populistic right voting is significantly more negative for vaccination rates compared to voting for the remaining parties with no governmental history. The same is not true for the left-wing group. This means we cannot determine if the estimated negative effect on vaccination rates from left-wing voting is a result of affiliation with left-wing parties per se. However, left-wing voting is still associated with reduced vaccination rates when compared to historically governing parties, at the 10% level.

5.2 Sensitivity analysis

The estimated results thus far have been interesting. However, they rely heavily on our classification of Norwegian political parties in the heuristic two-axis model from the Literature review section. The definition of historically governing parties is clear-cut, due to the set criteria of having previous or present history in government. The same can be said about the left-wing parties. As discussed in section 2.5, many parties outside of the Parliament are either newly established, or have been largely neglected in political scientific literature. They are therefore harder to classify. Amongst the non-governing parties we have classified as populistic, their placements on the economic axis are harder to determine. So far, the analysis has been completed with a precondition of the *PopulisticRight*-variable consisting of the political parties AAN, DEMN, KRISTNE, FNB and KYST. Another non-governmental party was identified as populistic, however unlike the other populistic parties they were considered to be only slightly more right-leaning than left-leaning on the economic axis. This is the Industrial- and Business Party (INP).

Based on the discussion above, we would therefore like to perform a sensitivity analysis on our previous findings. By running the same regressions once more, now defining INP as part of the *PopulisticRight* variable and not the *OtherSmallParties* variable, we get to examine the robustness of our results. This is shown in Table 14.

INP ∈ PopulisticRight

	(1) Vaccine Rate	(2) Vaccine Rate	(3) Vaccine Rate
Non governing parties	-0.177***		
	(-5.60)		
Outer wing		-0.445***	
		(-4.95)	
Other small parties		-0.0813**	-0.128***
		(-2.47)	(-5.93)
Left-wing			-0.193**
			(-2.28)
Populistic right			-1.091***
			(-7.35)
N	356	356	356
R^2	0.059	0.092	0.162

t-values in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

Table 14: Models for political affiliation and vaccination rates, INP in PopulisticRight.

Model 1.1 in column (1) remains the same as before, as it is independent of the reclassification of INP. It is only included in the printout as a reference point for the other model specifications.

Model 2.1, presented in column (2) shows only small deviations from the original model presented in Table 13. Both the party constellation estimates are negative, and -0.445 for the outer wing parties and -0.0813 for the remaining non-governing parties respectively. The estimates are significant on a 1% and 5% level accordingly (t = -4.95, t = -2.47). Both estimates are also significantly different from one another, whereby voting for outer wing parties show a more negative relationship with vaccination rates (Prob > F = 0.0005).

Model 3.1 presented in column (3) show contrasting results when INP is included in the *PopulisticRight* variable. The coefficient of the variable is reduced by 0.256 in absolute value as compared to the previous regression in Table 13. The estimate, however, is still significantly different from the estimate for left-wing parties (Prob > F = 0.0000) and from

other small parties (Prob > F = 0.0000). It is also worth noting that the t-value for left-wing parties decreases when defining INP as populistic right, now only making the left-wing variable significant on a 5% level. The coefficient -0.193 is also not statistically different to the estimate for the remaining non-governing parties, -0.128 (Prob > F = 0.4810). Finally, one can also note that when defining INP as populistic right, we get an $R^2 = 0.162$ in column (3). This means that the model is able to explain 2% less of the variation in in the vaccination rate, as it previously was 0.182 in the original model in Table 13.

Moving on, it is necessary to include the previously presented control variables for these regressions as well. The results are shown in Appendix II. We regress Model 1.2, Model 2.2, and Model 3.2, now defining INP as part of populistic right parties. Again, column (1) is only included as a reference since the reclassification of INP does not affect Model 1.2.

Model 2.2 represented in column (2) in Appendix II shows negligible changes in the results depending on the reclassification of INP. All coefficients have the same direction and remain of similar magnitude as in Appendix I. However, whilst the estimate for outer wing parties remains significant on a 1% level, the coefficient for other small parties has a t-value of -2.52. Despite this, the estimates are still significantly different from each other (Prob > F = 0.0065). R^2 is also almost of the same magnitude as before (approximately 64%). This indicates our findings from Model 2.2 in Appendix I are robust and independent of the classification of INP.

Model 3.2 in Appendix II however, shows interesting results when reclassifying INP as a right-sided populist party. The estimated effect for populistic right parties increases from -0.956 in Appendix I to -0.838 in Appendix II. The negative coefficient is still significant on a 1% level, however. Perhaps more intriguing is the fact that the estimate for left-wing parties increases from -0.119 in Appendix I to -0.0721 in Appendix II. The estimate is still significantly different to the estimate for the right-sided populist parties (Prob > F = 0.0000). However, it now becomes notably insignificant when compared to the reference group, historically governing parties, moving from a t-value equal to -1.66 in Appendix I to -1.03 in Appendix II. This means, compared to model 3.2 in Appendix I where we could interpret the effect of left-wing voting on vaccine rates with approximately 90% confidence, the estimate becomes way more uncertain in Appendix II. This effect of decreased significance could occur due to INP and the variable left-wing parties being correlated with different types of the same control variables. The estimate for other small parties remains exactly as before,

-0.0937. The t-value moves from -3.82 in Appendix I to -3.48 in Appendix II, but the significance level of 1% remains the same. The estimate is also still significantly different from the estimate for right-sided populist parties (Prob > F = 0.0000), but not significantly different from the estimate for left wing parties (Prob > F = 0.7734).

The discussion above shows that the results are somewhat sensitive to the classification of INP. There is no considerable effect on the estimates for the outer wing- or the remaining non-governing parties, meaning that these results are robust independent of INP's classification. In column (3), where the outer wing variable is split into left-wing and populistic right, there is, however, an effect that makes the estimate for left-wing parties considerably insignificant. This result shows that when we are talking about outer wing parties in general, our results are not sensitive to the classification of INP. However, when talking about each specific side of the economic dimension of the political spectrum (left versus right), our results show that the classification of INP becomes a more important issue. Even though our initial regression from Table 13 and Appendix I includes what we find to be the most correct classification of the political parties, we must acknowledge that a possible misclassification of INP would alter the results when discussing the left- and right hand-side in isolation.

6. Discussion

Our findings suggest that party affiliation and vaccination rates in Norway coincide with several patterns found in other Western countries such as the US, Italy, and France. In the following we will discuss the findings in relation to existing literature, possible explanatory mechanisms, and shortcomings in the dataset. Limitations imposed as a result of the theoretical framework and the empirical strategy will be presented as well. Finally, we discuss how the study can contribute to existing literature.

6.1 Results in relation to existing literature

The first finding is in line with what we would expect according to social identity theory and findings from the study by Pink et al. (2021). As our first empirical prediction suggests, voting for historically governing or non-governing parties in Norway is associated with higher- and lower levels of vaccination, respectively. We therefore find similar patterns of vaccination as Serani (2021) who found statistically significant differences in vaccine uptake between voters of governmental and non-governmental populistic parties in Italy.

As is the case with far left- and far right voting in France as presented by Ward et al. (2020), our second finding shows that voting for outer wing parties in Norway is associated with a reduction in COVID-19 vaccination rates. Our second empirical prediction is therefore supported by Model 2.1 and Model 2.2.

Lastly, the third finding is in line with our third empirical prediction. Voters of populist right parties in Norway vaccinate significantly less against COVID-19 than those who support left-wing parties. This is in line with the US findings by Bolsen & Palm (2022), which demonstrated that right-sided Republicans vaccinate far less than left-sided Democrats.

The results from this study add to existing research on the topic in Norway. While Wollebæk et al. (2022) found that voters who agreed more with right-wing statements showed less intention to vaccinate against COVID-19, they found no such effect from voters with left-wing ideological attitudes. Hence, the findings from our study align only partly with those of Wollebæk et al., (2022). We find that voting for populistic right parties is associated with far

lower vaccination rates than for the reference group of historically governing parties, but our results also suggest that left-wing voting is associated with reduced vaccination compared to the reference group. Moreover, our results suggest that voting for historically non-governing parties in general is a good predictor for lower vaccination rates.

6.2 Potential explanatory mechanisms

"Misperceptions of COVID-19 vaccine safety, efficacy, risks, and mistrust in institutions responsible for vaccination campaigns have been reported as factors contributing to vaccine hesitancy" (Lazarus et al., 2022). Misinformation about the COVID-19 pandemic and vaccines are most commonly spread through social media (Skafle et al., 2022). On an international level, the extent of misinformation being spread was so substantial that WHO in September 2020 declared COVID-19 not only to be a pandemic, but an *infodemic* as well (Serani, 2021).

Alternative media and misinformation

Alternative media is progressively gaining support in Norway (Brandtzæg, 2018). Brandtzæg, chief scientist at SINTEF digital, argues that despite alternative media is not a new phenomenon, we do not have good terms to describe what is entailed in the concept, only what alternative media runs contrary to. Today, alternative media in Norway is typically understood as counterpoints to traditional media such as NRK, VG and Aftenposten, Brandtzæg argues.

The Norwegian media barometer from 2021 revealed that 39% of the population now consumes news in social media on any given day (Foss, 2022). According to Dahlback (2021b), the alternative media outlets now dominate social media discussions, with more interactions such as likes, comments, and shares than many of the largest traditional Norwegian media outlets. This is enabled with only a fraction of the funds and resources available to traditional media. Alternative media articles go viral through networks of Facebook groups in which common topics include how Norwegian culture is threatened by immigration, the untrustworthiness of politicians, and international constellations of power (Dahlback, 2021b). These are themes which align remarkably with the core features of

populism: ***nativism***, ***anti-establishment*** and ***authoritarianism*** as defined by Cas Mudde (2007), as well as policies of the parties in our defined populistic right-constellation. As alternative media outlets often define themselves to be in direct opposition to traditional news outlets, i.e., as an out-group to the established media, this underpins our hypothesis that social identity theory is an important mechanism for people who choose to not vaccinate.

Distribution of misinformation and conspiracy theories regarding the COVID-19 pandemic and vaccination are also common themes in alternative media posts and articles spreading through social media echo chambers (Dahlback, 2021b). While COVID-19 vaccines in general are considered safe, there is inevitably an element of risk involved. Though rare, faulty vaccines do occur on a small-scale level (ImmunizeBC, 2022). However, adverse effects in COVID-19 vaccines have only occurred on a microscopic scale. In total COVID-19 vaccines have been associated with preliminary reports of death amounting to 0.0027% of all COVID-19-vaccinated in the US (CDC, 2022a). Moreover, these numbers are not to be interpreted causally, as only some reports might represent true vaccine reactions, while others may be coincidental adverse health events completely unrelated to vaccination (CDC, 2022b).

Among the parties in the populistic right constellation, AAN, DEMN, and KRISTNE all publicly displayed their dissatisfaction when the Norwegian COVID-19 vaccination pass was implemented (Stoksvik et al., 2021; Konservativt, 2021). On the vaccination programme itself, Hans Jørgen Lysglimt Johansen, the party leader of AAN, took the most intrusive approach by showing up uninvited at a Norwegian upper secondary school with posters of "STOP THE DEATH VACCINE", while handing out money to students who promised to abstain from getting vaccinated (Stoksvik et al., 2021).

Whilst the political right flourishes with alternative media outlets, the alternative media on the utmost left in Norway is mainly represented through Steigan.no (Dahlback, 2021b). Compared to right-wing alternative media, Steigan.no typically writes more about international politics, influenced by Russian propaganda, and has been a contributor in spreading misinformation and conspiracy theories on COVID-19 vaccines (Dahlback, 2021b; Flem & Molnes, 2022; Westall, 2022).

Pål Steigan, the founder and editor of Steigan.no, also happens to be the former party leader of both the Workers' Communist Party and Red Electoral Alliance, predecessors of the

current left-wing party RØDT (Garvik, 2022a; Tvedt 2020). A review of Steigan.no revealed that eight politicians from RØDT are among the owners of the outlet (Suvatne, 2022). In April 2022, after public pressure, the current party leader of RØDT, Bjørnar Moxnes, publicly distanced the party from Steigan.no stating that RØDT's political project was not compatible with Steigan's (Røsvik et al., 2022). The National Board of RØDT did the same and encouraged party representatives to get rid of any ownership in the outlet (NTP, 2022).

In the empirical analysis, the estimated coefficient for the parties in the left-wing constellation is not significantly different from the estimated coefficient of the more centrist-oriented non-governing parties. This means we cannot determine if the estimated negative effect on vaccination rates from left-wing voting is a result of affiliation with left-wing parties per se. The estimate for populistic right-parties however is significantly lower than the estimate for the centrist non-governing parties. This means that the negative effect on vaccination from voting for populistic right-parties is significantly more negative than voting for the left-wing group.

Official statements from several populistic right-parties suggest these parties share a more uniform negative attitude towards COVID-19 vaccination. Meanwhile RØDT appears more internally divided where a smaller fraction of the leadership seems to affiliate with stances advocated by Steigan.no, whilst others adopt more moderate stances similar to those advocated by Moxnes. This division might be reflected in attitudes among RØDT's voters as well. As RØDT makes up approximately 99.8% of the votes in the left-wing-parties constellation, it represents the vast majority of the variable's variance. Hence, this could potentially explain why we see a lower, but still statistically significant effect from left-wing voting compared to voting for parties in the reference group on vaccination rates.

Who benefits from lower vaccination rates?

As voting for populistic parties is positively correlated with dissatisfaction in political institutions, populistic parties benefit from failures by the political establishment (Recio-Román et al., 2022). Thus, populistic parties outside the government have a self-interest in slowing down or sabotaging the process of combating COVID-19. In order to stop the virus from spreading, a threshold value of immunisation must be reached to obtain herd immunity (World Health Organization, 2020). Critically however, is that this threshold value of

immunisation tends to be high, meaning that considerable portions of the population simultaneously must be protected by vaccines or a recent undergone infection. Therefore, populistic parties only need to convince a minority of citizens to not vaccinate in order to achieve their destabilising goals (Recio-Román et al., 2022). Not reaching the threshold value of immunisation further prolongs the pandemic, leading to less trust in governmental measures to combat the virus, possibly resulting in increased support for populistic parties. Trying to adopt new members to your political in-group through non-falsifiable conspiracy theories could therefore be an attractive strategy to gain support for Norwegian populist parties.

6.3 Limitations of the theoretical framework and empirical strategy

Limitations of the empirical strategy

In this paper we have defined linear regression models by using an OLS-approach. The main inherent issue with OLS is that causal effects cannot be identified. Knowing for certain all variables which exist in the error term is impossible, and if variables in the error term are correlated with any of our explanatory variables, this will lead to biased estimates. As we will mention in the dataset limitations, there are variables and data we would like to control for which are unobtainable. Hence, the zero conditional mean could be violated.

Estimation by OLS is also sensitive to extreme values. In the dataset we have certain outliers: PF who received 40.526% and 28.571% of the votes in Alta and Kautokeino respectively, while only receiving an average of 0.221% support and a corresponding median value of 0.000% on a national level. This means that these two observations have a disproportionately high effect on the relationship between voting for PF and vaccination rates as OLS aims to minimise the squared distance between all data points and the regression line.

Limitations of the theoretical framework

To our knowledge, comprehensive work on the placement of all registered political parties in the Norwegian political landscape has not been conducted. This is natural since many of the

smaller or non-parliamentary parties are newly established or lack the support to reach attention by academia. Where applicable, we have relied on already established literature. While we would have preferred the entire classification to rely on work done by political science experts, we have instead resorted to the heuristic model by Inglehart and Norris (2016) to classify relevant parties based on qualitative measures on both the economic- and cultural dimensions. Hence, we have to acknowledge that the classification is a potential weakness in this study.

Moreover, a larger basis of information used for the classification would be favourable. For many of the parties their party programmes offer the sole or best source of information. This also raises the question of how important party programmes are for the average voters' election choices. Thus, we also need to acknowledge that the basis of information is limited and could represent a weakness.

The classification of political parties plays a critical role in the empirical analysis. Thus, we have included a sensitivity analysis for INP, a party found to be high in populistic traits but less right-leaning on the economic axis than the other populistic right parties. The sensitivity analysis indicates that most results are robust even for a possible misclassification of INP in our initial analysis. However, in Model 3.2 in Appendix II, the estimated effect of voting for left-wing parties on vaccination turns insignificant. This demonstrates that the estimated effect for the left-wing parties is sensitive to a potential misclassification of parties.

6.4 Limitations of the dataset

Underlying conditions in the municipality you live in could directly affect the political party you vote for. For example, the proximity between a household and vaccination centres could affect people's intention to get vaccinated. Living far away from vaccination centres would increase costs of transport, thereby possibly decreasing people's motivation to get vaccinated.

Due to the argument above we would have preferred to obtain a centrality index in order to control for this concern. Since a relevant high-quality centrality index for each municipality in Norway has proven unattainable, we have instead used population density. This variable, however, does not capture all the same information. Ideally we would also have wanted to

include control variables on people's beliefs in conspiracy theories and trust levels towards the government on a municipal level as these are factors found to be correlated with party voting in Norway and the inclination to believe in misinformation on vaccines (Wollebæk et al., 2022). Since we have not been able to control for any of the aforementioned variables there is a risk that our results suffer from omitted variable bias. Hence, municipal-level data on these variables could possibly improve this study. Thus, we would motivate future research to obtain this data when researching vaccination rates and political party affiliation.

7. Future guidance and further research

Vaccine scepticism, distrust in governments and misinformation are complex issues without easy solutions (Deshpandé et al., 2021; Eggers et al., 2021; Leeatru, 2016). Hence, the answers to how governments, agencies and the Norwegian society can deal with these problems are not straight-forward.

As already mentioned in section 3.3, there has been found a positive relationship between worldwide COVID-19 vaccination rates and trust. Since our results suggest that voters of historically non-governing parties vaccinate less, this implies that these voters have lower levels of trust. This is also supported by findings from Wollebæk et al. (2022) as presented in section 2.5, and by Ward et al. (2020) in section 2.2 about findings from France. To ensure the success of policies dependent on behavioural responses from the public in the future, it is therefore imperative for Norwegian governing organs and -agencies to raise trust amongst those with less faith in public institutions. Precisely how this is to be done however, will be left for further research as it falls outside the scope of this paper.

As opposed to the more widely held view that economic insecurity is the main cause of rising populism in Western countries, Inglehart and Norris (2016) find evidence supporting the cultural backlash theory instead. This means that populism is more the result of a reaction against progressive cultural change (Inglehart & Norris, 2016). Hence, support for populism is believed to originate from people feeling alienated in places they have previously considered familiar (Norris, 2022). In Norway, immigration has more than doubled in the last 30 years, resulting in a more multicultural society and a steady increase in the share of inhabitants with minority backgrounds (SSB, 2022g; IMDi, 2021). Globalisation has also brought along progressive social liberal values. As discussed in section 2.4, populist values run contrary to such values. Since our results suggest that voters of populist parties vaccinate far less than voters of historically governing parties, extending the knowledge of what drives populism in Norway specifically could be of great importance for the public.

In section 6.2, we discussed the role and importance of alternative media on vaccine hesitancy. However, knowledge on alternative media so far is limited. Thus, more research on the phenomenon is needed. Moreover, identifying underlying mechanisms and extending knowledge on who is prone to believe in misinformation and conspiracy theories, and as a result loses trust in government, are also important topics for further research.

8. Conclusion

This study investigates patterns between political party affiliation and inclination to vaccinate against COVID-19 in Norway. Motivated by findings in studies from the US, France, and Italy, we examine the following research question:

Does political party affiliation affect COVID-19 vaccination rates in Norway, as has been found in patterns from other Western countries?

Using social identity theory and the heuristic model of party competition in Western societies by Inglehart and Norris (2016) as theoretical frameworks, we group together Norwegian political parties based on individual party characteristics. The groups are historically governing parties; existing political parties with a history of governmental power in Norway, and non-governing parties; the remaining registered Norwegian political parties. The group of parties with no governing history is then split up into outer wing parties; the political parties furthest away from the centre on the economic dimension of the political spectrum, and other small parties*;* the remainder of the non-governing parties. Finally, the group of outer wing parties is further split up into left-wing, and populistic right, mainly depending on the parties' economic stances.

Based on these groups of parties we have three main model setups and use an OLS approach to examine the research question. By running OLS-models we find support for our first empirical prediction: voting for parties without governmental history is associated with lower vaccination rates than voting for parties with governmental history. This is in line with the Italian findings, where voters of populistic right parties showed significant difference in vaccine uptake depending on whether their party were in the government or not.

We also find support for our second empirical prediction, as our findings suggest that voters of outer wing parties are less inclined to vaccinate compared to voters of the remaining non-governing parties. This result also supports the findings in France, where those identified to belong the furthest away from the political 'establishment' were more hesitant to get the COVID-19 vaccine. It is worth noting that our results in this instance are dependent on the historically non-governing parties only being split into the subsections of outer wing parties and other small parties. We also perform a sensitivity analysis, where INP, a party with a

somewhat ambiguous classification, is moved from other small parties to populistic right. We find that the results still hold after reclassifying this party.

Our final regressions support our third empirical prediction as the results suggest that voters of right-leaning populistic parties vaccinate significantly less than voters of left-wing parties. In addition, the inclination to vaccinate amongst voters of left-wing parties is not significantly different from voters of non-governing parties classified as more 'centrist' on the economic dimension. The results support findings from the US. Again, we perform a sensitivity analysis reclassifying the ambiguous party INP. The estimate for the populistic right parties is robust for the reclassification. However, the left-wing parties variable is more sensitive, as reclassifying INP in the sensitivity analysis results in the coefficient of left-wing parties becoming statistically insignificant.

In total, this study contributes with new and interesting findings on the research of vaccination, the COVID-19 pandemic and political affiliation in Norway. The findings could provide useful insights for governing organs and -agencies in Norway, particularly in policymaking which depends on behavioural responses from the population. The results show that voters of political parties with no governing history, hereunder predominantly parties located further away from the political centre, and in particular parties on the right hand-side of politics are more inclined to reject recommendations to vaccinate.

As demonstrated in this paper, social identity theory is an important concept in economics. Receiving messages from people who are perceived to belong to one's out-group is way less effective - it may even be harmful - compared to receiving the same message from one's perceived in-group. Hence, public figures and institutions recommending vaccination, which could be perceived as the sceptics' out-groups, have to find other methods to convey their information. Which specific measures to implement in order to reach lesser complying individuals are left for further research to answer as this does not fall under the scope of this paper.

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10. Appendices

10.1 Appendix I

	(1) Vaccine Rate	(2) Vaccine Rate	(3) Vaccine Rate
Non-governing parties	-0.122***		
	(-5.73)		
Outer wing		-0.285***	
		(-3.81)	
Other small parties		-0.0773***	-0.0937***
		(-2.80)	(-3.82)
Left-wing			-0.119*
			(-1.66)
Populistic right			-0.956***
			(-6.57)
Blank votes	-0.395	-0.403	-0.241
	(-0.74)	(-0.78)	(-0.49)
Share of attendance	0.0829**	0.0830**	0.110***
	(2.08)	(2.07)	(2.77)
Unemployment rate 2021	0.0454	0.0509	0.149
	(0.31)	(0.35)	(1.08)
Primary/Lower secondary	-0.0682*	-0.0647*	-0.0113
	(-1.96)	(-1.86)	(-0.34)
Upper secondary	-0.0758**	-0.0867***	-0.0421
	(-2.31)	(-2.64)	(-1.34)
Vocational school	-0.185	-0.137	-7.07e-04
	(-1.48)	(-1.09)	(-0.01)
Age: 30-49 Years, %	-0.0398	-0.0358	0.00566
	(-0.48)	(-0.44)	(0.07)
Age: 50-67 Years, %	0.0940	0.113*	0.107*
	(1.42)	(1.74)	(1.75)
Age: 68-79 Years, %	0.131	0.129	0.0945
	(1.54)	(1.54)	(1.27)

Age: 80+ Years, %	0.261**	0.253**	0.190*
	(2.24)	(2.20)	(1.69)
Immigration EU/EEA…	-0.361***	-0.370***	-0.409***
	(-8.16)	(-8.13)	(-9.61)
Immigration Asia/Africa…	-0.0389	-0.0273	-0.0349
	(-0.93)	(-0.66)	(-0.85)
Population density	$4.77e^{-06}$	$5.54e^{-06}$	$8.11e^{-07}$
	(0.62)	(0.70)	(0.11)
Share of females	0.364**	0.332**	0.361***
	(2.51)	(2.40)	(2.77)
Income quintile 2	0.303***	0.308***	0.241***
	(3.32)	(3.44)	(2.60)
Income quintile 3	0.122	0.135*	0.1000
	(1.51)	(1.70)	(1.26)
Income quintile 4	0.286***	0.283***	0.241***
	(4.01)	(4.00)	(3.44)
Income quintile 5	0.196***	0.180***	0.146***
	(3.97)	(3.69)	(3.07)
N	352	352	352
R^2	0.630	0.638	0.674

t-values in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

Appendix I: Regression models for political affiliation and vaccination rates.

10.2 Appendix II

INP PopulisticRight

	(1) Vaccine Rate	(2) Vaccine Rate	(3) Vaccine Rate
Non-governing parties	-0.122***		
	(-5.73)		
Outer wing		-0.280***	
		(-4.09)	
Other small parties		-0.0746**	-0.0937***
		(-2.52)	(-3.48)
Left-wing			-0.0721
			(-1.03)
Populistic right			-0.838***
			(-6.91)
Blank votes	-0.395	-0.429	-0.349
	(-0.74)	(-0.83)	(-0.70)
Share of attendance	0.0829**	0.0808**	0.0998**
	(2.08)	(2.01)	(2.51)
Unemployment rate 2021	0.0454	0.0525	0.145
	(0.31)	(0.37)	(1.06)
Primary/Lower secondary	-0.0682*	-0.0642*	-0.0148
	(-1.96)	(-1.85)	(-0.44)
Upper secondary	-0.0758**	-0.0803**	-0.0200
	(-2.31)	(-2.46)	(-0.61)
Vocational school	-0.185	-0.108	0.0807
	(-1.48)	(-0.86)	(0.64)
Age: 30-49 Years, %	-0.0398	-0.0347	0.00495
	(-0.48)	(-0.43)	(0.07)
Age: 50-67 Years, %	0.0940	0.108*	0.0872
	(1.42)	(1.67)	(1.41)
Age: 68-79 Years, %	0.131	0.128	0.0978
	(1.54)	(1.53)	(1.27)

Age: 80+ Years, %	0.261**	0.254**	0.203*
	(2.24)	(2.21)	(1.81)
Immigration EU/EEA…	-0.361***	-0.372***	-0.411***
	(-8.16)	(-8.16)	(-9.66)
Immigration Asia/Africa…	-0.0389	-0.0278	-0.0389
	(-0.93)	(-0.68)	(-0.96)
Population density	4.77e−06	5.79e−06	1.93e−06
	(0.62)	(0.74)	(0.28)
Share of females	0.364**	0.325**	0.339***
	(2.51)	(2.35)	(2.60)
Income quintile 2	0.303***	0.298***	0.210**
	(3.32)	(3.34)	(2.29)
Income quintile 3	0.122	0.138*	0.112
	(1.51)	(1.75)	(1.45)
Income quintile 4	0.286***	0.279***	0.234***
	(4.01)	(3.96)	(3.33)
Income quintile 5	0.196***	0.180***	0.153***
	(3.97)	(3.73)	(3.36)
N	352	352	352
R^2	0.630	0.639	0.673

t-values in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

Appendix II: Regression models for voting patterns and vaccine rates, INP in populistic right.