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TRUST ISSUES: A MULTI-METHOD ANALYSIS OF THE EFFECTS OF POPULISM AND TRUST IN INSTITUTIONS ON CONFIDENCE IN VACCINES

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ABSTRACT

This thesis seeks to disentangle the complex relationship between confidence in vaccines, populism and institutional trust. The scarce literature on vaccine hesitancy in political science suggests that the former is fostered by the surge of populism. By employing a multi-method research design, the thesis challenges this claim and argues that confidence in vaccines is rather dependent on the level of institutional trust. Firstly, based on the sample of all EU countries, the thesis tests the hypothesis about the link of vaccine hesitancy to populism through regression analysis and shows that this relationship is not robust. Secondly, it utilizes analysis of variance of the individual-level survey data to demonstrate the effect of institutional trust on confidence in vaccines. The analysis finds that, while trust in politics, science and medicine all affect vaccine confidence individually, trust in science and medicine have a statistically significant joint effect. Finally, to explore the relationship between the variables more in-depth, through analyzing Ireland and Hungary as a typical and a diverse case, the study shows that the level of populist support indeed does not play a determining role in the strength of the anti-vaccination movement, discussing the effect of trust in different institutions as well as additional factors, such as country immunization policy.

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INTRODUCTION

In 2019, the World Health Organization declared vaccine hesitancy one of the major threats to global public health (*WHO*, 2019b). On the one hand, their experts reported that insufficient vaccine coverage is common for traditional societies due to weaknesses of healthcare systems as well as prevalence of conservative beliefs. On the other hand, the WHO also emphasized that voluntary refusal of vaccination became more and more widespread in the Western democracies, which are typically characterized by effective vaccine services and high immunization rates. This rising tendency has gained the attention of medical specialists, policy-makers and politicians, mainly because vaccine refusal endangers the 95% vaccination goal which assured the eradication of these dangerous, yet preventable diseases. More specifically, only recently in 2018, compared to the previous year, the European region experienced more than a threefold increase in measles – a contagious disease which has previously been almost fully prevented through childhood immunization (*European Parliament*, 2019). Moreover, during the same year, four European countries, namely Albania, Czech Republic, Greece and the United Kingdom, lost their 'measles-elimination' status due to severe disease outbreaks (*WHO*, 2019a). This salient change in the state of public health has underlined an issue of vital – with no exaggeration – importance, namely the rising distrust of vaccination.

While hesitation and skepticism about the effectiveness and side-effects of vaccines are not a novel phenomenon – in fact, they have existed since the invention of the first vaccine – the current trend is distinctive and scarcely researched. Most studies on the topic have been conducted within the discipline of public health focusing on determinants of vaccine uptake on the individual level. For example, multiple studies have emphasized the role of such factors as patients' age, ethnicity or race (Galarce et al., 2011; Kessels et al., 2012), relationship with their physician (Swennen et al., 2001), previous experience of medical treatment and, particularly, vaccination (Bish et al., 2011), satisfaction

with healthcare services and awareness about vaccines (Alonso et al., 2001). Yet, hitherto, insufficient research has been dedicated to examining vaccine hesitancy in a broader context – namely, in relation to other conspiracy theories and overall rise of distrust of formal institutions.

Furthermore, in the field of political science research of vaccine hesitancy is particularly scarce and leaves much room for improvement. Some scholarly work has established a link between vaccine hesitancy and populism, claiming that the two phenomena are essentially driving on the same logic of anti-establishment and anti-elitism (Kennedy, 2019). Moreover, other studies have also suggested that populism, in fact, fosters anti-vaccination movements, appealing to *volonté générale* over the authority of science (Żuk et al., 2019). However, the reliability of these findings is questionable due to methodological flaws, as well as ambiguous grounds of causal inference. Kennedy's (2019) central claim that the share of populist votes is strongly and positively correlated with the level of vaccine hesitancy is fallacious, since it is based on a restricted and arbitrary case-selection. In like manner, the causal association between populism and vaccines distrust is barely explained beyond identifying some theoretical intersections. Thus, the relationship of the two phenomena is in need of further scholarly investigation.

Hence, in order to disentangle this relationship, in the present study I appeal to the burgeoning research in political science which explores the relationship between conspiracy beliefs and profound distrust in institutions. In fact, political populism, one of the most prominent manifestations of distrust of mainstream political institutions, inherently incorporates conspiracy elements, as "conspiracy theories are rooted in and emerge from the very logic of populism itself" (Müller, 2016, p. 27). Yet, medical denialism – a form of conspiracy – is no different as it also rests on the idea of systemic distrust of formal institutions. Hence, those who distrust political elites are not substantially different from those who deny the authority of medical experts and scientists, as both phenomena are rooted in deep

distrust of the established institutions. Nonetheless, when it comes to vaccine hesitancy, negligible research has examined it through the lens of institutional distrust.

Therefore, the thesis addresses this gap in the literature and poses two questions aimed at untangling the theoretical and empirical relationship of vaccine hesitancy to populism and institutional trust. Firstly, I inquire what the relationship between political populism and vaccine hesitancy is, and, secondly, I seek to examine how institutional trust intervenes in this relationship.

In order to increase the validity of the study, I rely on a mixed-method research design, which entails statistical analysis and a qualitative comparative case-study. Firstly, the present research tests the hypothesis about the relationship between populism and vaccine hesitancy on aggregated country-level data by extending spatial scope conditions of the existing theory and utilizing a more recent database. Secondly, moving to individual-level data, the thesis examines the linkage between confidence in vaccines and trust in institutions of politics, science and medicine. Finally, it presents a comparative case-study of Ireland and Hungary, which analyzes and contrasts a typical and a diverse case for a more in-depth examination of the complex relationship between the three phenomena: vaccine hesitancy, populism and institutional trust.

In a nutshell, the central argument of the thesis is, that contrary to the claim established in the literature, vaccine hesitancy is not related to political populism but is rather linked to distrust of formal institutions, such as science and medicine. Hence, the contribution of the present work is threefold. Firstly, by employing a more refined methodology and an up-to-date dataset than the previous studies in the field, it challenges the prevalent claim of the strong linkage between populism and vaccine hesitancy and argues that the two phenomena are, in fact, not associated. Secondly, it constructs a novel interdisciplinary conceptual framework by reconciling theoretical backgrounds from other disciplines, such as public health, sociology of medicine and philosophy of science, which may be useful for further inquiries on the topic within the field of political science. Finally, while the research

findings generally suggest that confidence in vaccines is affected by the level of trust in institutions, diverse effects of trust in medicine and in science as opposed to political trust are pointed out and additional explanatory factors are proposed.

The structure of the thesis follows from the logic of the research. Chapter 1 presents the theoretical framework of the thesis, where a thorough literature review and conceptualization of variables are presented. Chapter 2 focuses on research design, where I define and justify the methodology of the study as well as introduce data sources for both quantitative and qualitative analyses. Additionally, the chapter includes the description of the data itself and the operationalization of the variables used. The statistical and qualitative analyses are unfolded in Chapter 3, which is followed by the presentation of the main results. Lastly, the Conclusion interprets, discusses and contextualizes the findings, defines limitations of the study and suggests that further research of medical denialism in political science may deepen our understanding of changes in public institutional trust in the established democracies.

CHAPTER 1 – ON INSTITUTIONAL (DIS)TRUST, POPULISM AND VACCINE HESITANCY

This chapter presents the theoretical framework of the thesis. Since a coherent theory incorporating the concepts of institutional distrust, populism and vaccine hesitancy in one framework is non-existent, I present, analyze and link them to each other in succession. In particular, after briefly reviewing the concept of institutional trust I examine the literature on populism focusing on the aspect of distrust of political institutions. Building on anti-elitist and anti-expertise narratives, I then discuss the surge of distrust of science and medicine, introduce the concept of scientific denialism and proceed with a detailed conceptualization of vaccine hesitancy. Last but not least, I revise the argument on similarity between political populism and medical denialism as well as explore their association. The chapter concludes with a summary of the main theoretical expectations of the thesis.

1.1. To Trust or Not to Trust: Institutional (Dis)Trust Conceptualized

Social scientists at all times emphasize the importance of trust – namely, an actor's belief that the other party will act in their interest or, at least, will not harm them (Newton, 2001) – for successful functioning of a society (e.g. de Tocqueville, 2000; Durkheim, 1893). Indeed, interpersonal, generalized and institutional trust are considered to be essential components for lower transaction costs, strong social ties and abundant social capital enabling easier, faster and more efficient repeated interactions between persons and institutions. In addition, high levels of trust are claimed to play crucial role in functioning of democracy, creation of democratic culture and establishment of quality democratic institutions (Putnam, 1994, 2000; Verba & Almond, 1963). This section elaborates on theoretical and empirical aspects of institutional trust and examines the recent decline of public trust in contemporary democratic societies.

In accordance with the new institutionalism approach in political science, this thesis adopts the definition of institutions suggested by North (1991), who conceptualized them as "*rules of the game*" established by individuals in order to structure political, social and economic interactions (p. 18). In turn, in conceptualizing institutional trust I follow the line of scholarship which states that the essence of trust in institutions rests in an *individual's normative expectations* that the former will function according to the established norms (Mishler & Rose, 2001; Warren, 1999). Hence, the object of institutional trust is a formal institution which is expected to act in subject's interest.

The research on the importance of institutional trust in democracies is plentiful. Economic development (Zak & Knack, 2001), democratic stability (Putnam, 2000), enhancement of law-compliance (Marien & Hooghe, 2011), effective taxation and support for welfare state policies (Habibov et al., 2018) – these are but a few outcomes of high level of institutional trust claimed in theoretical and empirical research. Yet, recent scholarship has widely emphasized that the level of institutional trust in the established democracies has been consistently declining over the last decades. A renowned "crisis of democracy" thesis asserts that public confidence and trust in the established institutions – in particular, in national government and state leaders – is rapidly declining, which undermines the very foundations of the organization of democratic societies and challenges their stability (Crozier et al., 2012). Similarly, Foa and Mounk (2017) claim that in contemporary Western democracies the loss of public trust in democratic institutions and norms has launched the process of "deconsolidation", i.e. decline of democratic values, surge of authoritarian preferences and rise of anti-establishment political forces. All in all, the signs of decline in public trust are generally assessed by scholars as worrisome, inducing multiple societal challenges.

Nevertheless, political scientists who follow an alternative approach to institutional trust argue against such a pessimistic view regarding the recent decline. The concept of a "critical citizen" suggests that by demonstrating lack of unconditional trust in the established institutions, individuals, on the

contrary, contribute to enhancement of the quality of democracy, as they ensure better accountability, responsiveness of authorities and more effective checks-and-balances system (Norris, 2011). For example, according to Rosanvallon and Goldhammer (2008), lack of trust in democratic institutions and norms may potentially induce "*counter-democracy*", namely a novel form of citizen's control over government based on ideals of responsible citizenship, political participation and involvement in public matters. Thus, decline in institutional trust may as well indicate a more skeptical, evaluative and, hence, responsible position of citizens in requiring qualitative services from the established institutions, which does not necessarily involve disruptive force to democracy.

Yet, some scholars go further with the conceptualization of decline in institutional trust and suggest distinguishing between "lack of trust" and "distrust" of institutions, which are argued to incorporate essentially different sentiments (Walle & Six, 2014). While stating lack of trust simply implies the absence of a certain part of normative expectations towards institutions which originates in a dynamic and iterative nature of social interactions, distrust has an entirely different meaning with both value-based and behavioral aspects. More specifically, it encompasses an inherent expectation of *harm* and *dishonesty* from an institution, which can only be dealt with by adopting a particular form of social behavior, namely retreat, protection and sometimes active aggression (Bertsou, 2019). Distrust, as Bertsou (2019) rightfully remarks, entails an emotional state, which substantially differentiates it from lack of or decline in trust – as it inevitably incorporates feelings of fear, anxiety and resentment against an unfair system (p. 226). Thus, while lack of trust may be potentially fruitful for reforming democratic societies and bringing in new formats of bottom-up control, distrust is indeed likely to undermine system stability by promoting non-compliance and resentment.

Now, as the conceptual divergences between the two definitions are clarified, I shall emphasize that this thesis primarily focuses on the symptoms of institutional distrust in different spheres of social

life. The following sections, therefore, examine how distrust in different institutions is manifested in disparate social phenomena, such as political populism and scientific denialism.

1.2. Distrust of Mainstream Politics and the Rise of Populism

Burgeoning literature on populism has emphasized the relationship between the rise of public distrust in mainstream politicians and the surge of populist forces both on theoretical (Mudde & Kaltwasser, 2017) and empirical (Algan et al., 2017) levels. As famously noted by Taggart (2004), "populism is one of the most widely used but poorly understood political concepts of our time" (p. 62) which results in conceptual 'cloudiness' (Barr, 2009). Yet, in the times of populist *zeitgeist* (Mudde, 2004), when populist forces have acquired significant political support, defining and understanding populism has become one of the central contested topics in political science. Hence, due to the scope limitations of this thesis, in this section I do not intend to present an exhaustive overview of literature on political populism, but rather focus on such inherent aspects of populism as anti-establishment, anti-elitism and anti-expertise, which are important in the light of institutional distrust.

While structural, economic and institutional conceptualizations of populism regard it as a political strategy or leadership style, in this thesis I follow the *ideational* approach which defines populism as a particular discourse combining elements of ideology and rhetoric (Hawkins, 2009). Rather than analyzing populism as a set of actions, ideational framework approaches it as a set of ideas and beliefs manifested in distinct linguistic forms that political actors utilize in order to gain support of the voters (Canovan, 1999; Hawkins, 2009). This definition allows to examine which kind of ideas and sentiments populism incorporates and encourages.

Within the ideational framework, populism is usually conceptualized as a 'thin' ideology, implying that it may be easily combined with full 'thick' ideologies (Mudde, 2004). Consequently, scholars emphasize 'chameleonic nature' of populism which appears to be context-specific and, hence,

makes it hard to encompass all the varieties of its meanings in one concept (Taggart, 2000). Nevertheless, following Sartori's 'minimal definition' approach, students of populism identify a set of necessary and sufficient conditions which constitute core attributes of populist discourse and, therefore, may be applied across diverse cases (Mudde & Kaltwasser, 2013). These attributes include anti-establishment rhetoric (Barr, 2009), majoritarianism (Mény & Surel, 2002) and Manichaean discourse (Hawkins & Kaltwasser, 2017).

Firstly, populist discourse is based on the assumption that there exist two homogenous units: the elites, i.e. those groups which have direct access to power in a broad sense – whether political or economic – and the people, i.e. ordinary citizens who do not possess direct power (Barr, 2009). Moreover, populists portray these two entities in rival opposition to each other, organizing the discourse around the cleavage between 'the rulers' and 'the ruled' (Schedler, 1996). This antagonism is primarily evoked by the suspicion of elites' unwillingness or failure to represent citizens' interests which manifests in a strong anti-establishment narrative.

Moreover, in order to bring citizens' power back, populists claim to speak in the name of the 'sovereign people' who are argued to be the one and only holders of the right to constitute political will (Bozoki, 2012). Hence, populist rhetoric relies on highly majoritarian, Rousseauian understanding of people's sovereignty as the sole source of political power (Barr, 2009, p. 36). Furthermore, *volonté générale* is depicted as a primary authority even beyond the political sphere as "the consciousness of people [is] generally referred to as common sense" (Mudde, 2004, p. 547). Thus, while the ultimate promise of populists is the return of the unrestricted political sovereignty of people understood as a homogenous and consolidated political entity, populist rhetoric may also encompass a strong anti-intellectual potential posing the supremacy of people's will over expertise beyond the sphere of politics.

Finally, populism essentially has a moralistic rather than a programmatic understanding of politics attributing a normative distinction to the antagonism between 'us' (the people) and 'them' (the

elite) (Mudde, 2004; Müller, 2016). In particular, populist discourse is to a large extent characterized by the Manichaean outlook at the cosmic struggle between "the rulers' and 'the ruled', where the former are portrayed as evil – dishonest, conspiring against public interests and corrupt, hence, enemies– while the latter are depicted as victims yet associated with the images of good, purity and virtue (Hawkins, 2009). Due to such a strong emphasis on moral polarization of the two political units as well as an apparent element of system distrust, some researchers pointed at the inherent 'paranoid' feature of populism (Hofstadter, 1965) implying that perpetual suspicion of deceit and corruption of elites and experts reveals its inherent inclination towards conspiracy theories (Hawkins & Kaltwasser, 2017). Accordingly, conspiratorial thinking is claimed to be an intrinsic element of populist discourse (Müller, 2016).

Therefore, the essential element shared by all the three core components of populism is inherent distrust – to mainstream politics, political institutions and elites of the establishment. That being said, populism is often discussed as one of the manifestations of strengthening of political distrust in the established democracies. Nonetheless, even though research in political science has mainly focused on examining the reasons and implications of institutional distrust in political sphere, the trend of expanding distrust goes far beyond politics. The following section, therefore, elaborates on rising distrust of institutions in other fields, namely science and medicine.

1.3. Scientific Authority in Decline? Distrust of Science and Medicine

I am not a doctor. But I have common sense.

–Donald Trump, *The New York Times*, 2020

To begin with, while skepticism about the supremacy of scientific knowledge has always existed, today, in times of unprecedented scientific progress, the saliency of distrust of science – which is argued to be stronger than ever before (Maddox, 1995) – seems puzzling. On the one hand, the rise

of negative attitudes towards science may be related to certain characteristics of postmodernist societies. In particular, the latter are prone to creation of feelings of risk, uncertainty and anxiety due to the technological and social complexity of contemporary world (Pavić, 2013). Consequently, searching for coping mechanisms to overcome these anxieties, people aspire to explain the occurring events with simple and clear cognitive models which, unlike the overly perplexed language of science, provide the feeling of safety. Therefore, people may turn away from science seeking alternative – more comprehensible – explanatory frameworks.

Another explanation of the rise of distrust in science is its discreditation as a social institution. The literature suggests that the tendency of decline of public confidence in undisputable authority of scientific expertise has been gradually occurring since the middle of the 20th century (Holton, 1993). The post-war period – particularly, the times of the Cold War – clearly demonstrated how other institutions may turn science into a servant of their own specific interests, be it political, economic, strategic or other, and undermine the autonomy and impartiality of scientific evidence (Bauer, 2014). Particularly, researchers emphasize the phenomenon of politicization of science which also undermined public confidence in the objectivity and credibility of scientific knowledge due to suspicion of the conspiracy between power elites (Gauchat, 2012).

Finally, researchers also emphasize the adverse impact of the Internet on trust in scientific authority. Although scholars tend to agree that it is unlikely that the Internet may be regarded as the cause of distrust in science per se, unlimited public access to information has undoubtfully contributed to changing the status of expertise and credibility of scientific knowledge in contemporary societies (Uscinski et al., 2018). The bourgeoning literature on 'post-truth' frequently points out the downsides of the Internet's democratic nature, such as the spread of misinformation, false facts and scientific denialism (e.g. McIntyre, 2018). The popularity of these anti- and pseudoscientific ideas among online

users worldwide appears to be a worrisome manifestation of the overall crisis of trust in scientific authority (Hansson, 2017c).

In this sense, rising distrust in medical science appears to be particularly alarming. The importance of a high level of trust in healthcare has always been emphasized as it not only ensures effective medical treatment on the individual level (Mechanic, 1996) but also contributes to public health and well-being by promoting development of medical science through easier introduction of new cure methods and medications (Gilson, 2006). For a long time, a high level of trust in medicine had been sustained through the strict requirements of professional medical education as well as strong ethical values of prioritizing patients' interests inherent in professional philosophy (Freidson, 1988). However, while generally trust in medicine remained high compared to the declining trust in other social institutions, numerous studies report that the level of trust in healthcare providers and systems has decreased sharply over the past decades worldwide (Mechanic, 1996; Imber, 2008; Shea et al., 2008). Indeed, according to the recent Edelman Trust Barometer, trust in healthcare declined in 17 out of 28 Western countries where the surveys were conducted, which certainly seems to be a disturbing signal (*Edelman Trust Barometer: Trust in Healthcare Global*, 2018).

Generally, research in public health identifies two dimensions constituting distrust in medicine, namely lack of interpersonal trust between a doctor and a patient and, more generally, decline of social trust in medicine as an institution. On the one hand, scholars point out that interpersonal trust between patients and medical providers, which is crucial in any doctor-patient interactions, is affected by multiple factors, such as a patient's prior experience of receiving healthcare, their feeling of being heard, cared about and respected by a doctor (Goold & Lipkin, 1999); by demographic characteristics, for example, age (Croker et al., 2013); by cultural, philosophical or religious beliefs (Larson et al., 2015); or by preferences towards alternative medicine (Banerjee & Sanyal, 2012). All in all, factors which may account for distrust in medicine and healthcare providers on the individual level are numerous,

however, since this thesis primarily focuses on institutional level of distrust, I leave the aforementioned factors without a more detailed examination.

Institutional distrust in medicine is also a complex phenomenon shaped by factors related to other social institutions. Firstly, it certainly depends on the quality of healthcare delivery and available medical services (Thom et al., 2004). Secondly, trust in medicine is strongly conditioned by the portrayal of physicians and healthcare systems in the media (Tokuda et al., 2009), as the latter plays a crucial role in creating a certain image of credibility of doctors and reliability of healthcare (Leask et al., 2010). In this respect, the Internet and social media again come into play, as numerous studies demonstrate that web searches and public forums have become a primary source of medical advice which people trust and rely upon greatly (Hesse et al., 2005). Moreover, free and unlimited access to all the medical information online challenges patients' reliance on and confidence in physician's indisputable authority as patients now have an opportunity to question doctor's prescriptions online both by investigating medical information on their own and by publicly discussing it with others.

Thirdly, distrust in medicine may also be shaped by a broader institutional distrust of other social institutions, in particular – of science (Kabat, 2017; Pearson & Raeke, 2000). Indeed, the relationship between confidence in the medical expertise of doctors and overall trust in scientific authority is quite apparent. Finally, as in many countries healthcare is at least partially – if not mainly – delivered by state-financed facilities and sustained by a government, researchers also emphasize the effect of the rise of political distrust on trust in medical institutions (Gilson, 2003). Not surprisingly, some empirical studies demonstrate evidence of an association between distrust in government and hesitation about medical services, such as vaccination (Lee et al., 2016), however, this field is still not thoroughly researched.

All in all, distrust of medicine, as well as distrust of science in general, are grounded on a broader institutional distrust which is similarly observed in the political sphere. This complex

phenomenon manifests itself differently in different spheres: one of such manifestations – political populism – has already been discussed in the previous section. The next section examines manifestations of distrust in science and medicine, such as scientific denialism and medical conspiracies.

1.4. HIV is a Myth: Scientific Denialism and Medical Conspiracies of Our Times

The term "*scientific denialism"* is usually used in the literature in order to refer to a particular type of anti- or pseudo-scientific ideas which is specifically aimed at overthrowing the authority of one scientific theory and promoting an alternative theory of their own instead (Hansson, 2017a). As a rule, this theory is based on a false controversy – its proponents claim that there exists a dispute regarding a particular issue in the scientific community whereas in fact there exists none or it has been solved. Alternatively, those promoting scientific denialism suggest their own theoretical framework which is based on false facts, misrepresentation of data, logical fallacies, cherry-picking of evidence and false expertise (Diethelm & McKee, 2009). Denial of climate change is but one example of a popular scientific denialism.

One of the inherent elements of science denialism is profound distrust in the established institutions (Hansson, 2017b). Unlike other anti- or pseudo-scientific theories, scientific denialism incorporates an idea of fundamental distrust of institutions in possession of power to establish a particular piece of knowledge as objective and true. Let us compare, for instance, astrology and denial of climate change. While the former is a trivial example of a pseudoscientific theory which aims to suggest an alternative explanation of one's fate by interpreting movements of celestial bodies, it does not necessarily reject other theories. Climate change denial, on the other hand, specifically seeks to discredit the mainstream scientific theory by presenting it as untrue and providing false evidence against it. This example of scientific denialism implies that intellectual elites – scientists, experts, state

representatives – who have an authority to claim some scientific evidence to be true, are driven by their own interests, rather than public ones, and are hiding the real truth from the general audience (Pigliucci & Boundry, 2013).

In this regard, abundant research has emphasized a conspiracy element in scientific denialism which is incorporated in its idea of distrust in institutions of the establishment. In particular, empirical studies show a strong relationship between conspiracy ideation and scientific denialism suggesting that conspiracy thinking largely determines rejection of science (Lewandowsky et al., 2013). Indeed, these theories have a lot in common – more specifically, they both intend to disclaim the existent authority of the establishment by proposing an alternative non-falsifiable theory of explaining facts. Moreover, their underlying ground is profound systemic distrust of institutions in power, and the major message that a conspiracy or a science denial theory aspires to send is an expression of this distrust and rejection of what is regarded as established and objectively true (Barkun, 2013). In addition, both theories articulate strong anti-intellectualist attitudes framing the debate in emotional rather than rationalist terms (Boudry et al., 2014). For instance, ideas of elites' dishonesty, betrayal of public interests and corruption gain a significant importance in conspiracy and denialist rhetoric.

Among all scientific denialism theories, those related to medical issues are particularly hard to tackle. First of all, denialism of medical science and conspiracies about health pose a serious threat to public health as, along with seeking to express disbelief and opposition to mainstream science, they also actively promote a deviant behavior of non-compliance with medical treatment (Oliver & Wood, 2014). A devastating example of the impact of medical denialism on public health is the case of HIV-denialism in South Africa, where roughly 330.000 people died under the decade-long presidency of Tabo Mbeki (1999-2008) due to a state-run policy of AIDS-denialism despite the ongoing epidemic (Chigwedere et al., 2008). Another example may be found in the recent events during the COVID-19 pandemic, which, as researchers report, has revealed how distrust in medicine is directly associated

with non-compliance with prevention guidelines, hence, resulting not only in a severe risk for one's individual health but also compromising others' safety and efforts to mitigate the pandemic (Plohl & Musil, 2020).

One of the most prominent theories of medical denialism concerns vaccination. The next section presents a detailed overview of the concept of vaccine hesitancy which is the central focus of this research.

1.5. Vaccine Hesitancy Defined

While incomplete vaccine coverage remains a significant obstacle to preventing the spread of infectious diseases, up until recently, it has been mainly explained by structural problems characterizing low-income countries, such as weakness of healthcare systems, shortages of qualified medical workforce or lack of access to healthcare facilities (Restrepo-Méndez et al., 2016). In addition, experts emphasize the negative affect of such factors as lack of parental knowledge or traditional and religious beliefs on immunization uptake, and suggest that comprehensive information campaigns aimed at improving public awareness about the importance of vaccination are required in order to increase vaccine coverage (Donadiki et al., 2014; Frew & Lutz, 2017).

Meanwhile, the majority of middle- and high-income Western states were reported to achieve or, at least, approximate the goal of 95% in immunization rates and demonstrated successful results in a large-scale prevention of infectious diseases (Bechini et al., 2019). However, recent statistical data from a number of European countries indicates an unforeseen growth of some infectious diseases normally prevented by immunization, such as measles which has, at least, doubled in the number of cases (WHO, 2019a).

The startling dynamics demonstrated by such empirical evidence stimulated the attention of researchers as well as policymakers at national and international levels. The investigation of

immunization statistics showed a drastic decline in vaccination rates across the European region, which was soon claimed to be the major reason of the recent infectious diseases outbreaks (Kmietowicz, 2018). However, further research also revealed an unprecedented decrease in the level of people's trust in vaccination and of confidence in their safety. Indeed, according to a recent Eurobarometer, over a half of the surveyed European Union (EU) citizens are somewhat concerned about the risk of severe side effects of vaccination while about a third of the respondents are disturbed by vaccines' adverse impact on the immune system (Eurobarometer, 2019). Another recent survey similarly reports that, while the majority of the EU public tends to agree about the importance of vaccination, the level of confidence in vaccine safety and effectiveness has significantly decreased over the past few years, as exemplified by such countries as Poland, Czech Republic, Finland and Sweden (European Commission, 2018, p. 43). All in all, the downturn of vaccination rates in Europe and, hence, the recent outbreaks of infectious diseases are likely to be related to a general decline in trust in vaccines in different parts of the European region.

Although the described phenomenon may be classified as one of the forms of non-compliance with medical treatment (Donovan & Blake, 1992; Goldberg et al., 1998), it also seems to be essentially different from the former. On the one hand, patients may indeed fail to receive immunization on time due to diverse factors related to their personal life (MacDonald, 2015) – for example, simply being busy at work or preoccupied with family issues. In this case, delay or failure to receive vaccination falls under the category of non-compliance caused by patients' forgetfulness or inconvenience of receiving treatment at a particular time (Buston & Wood, 2000).

On the other hand, – and this is precisely the tendency occurring in the European states – patients may make a deliberate decision to refuse to get vaccinated. Under this scenario, failure to receive a vaccine appears to be an active and conscious action, which is not determined by any immediate circumstances preventing one from adhering to immunization but is rather aimed at

expressing one's attitude towards the vaccination procedure. In particular, one's intentional refusal of a vaccination may be stating their disbelief in the effect and the safety of the former. This phenomenon was defined as **vaccine hesitancy**, namely "*the reluctance or refusal of vaccination despite the availability of vaccine services*" (MacDonald, 2015), which was claimed to be one of the major threats to global health in 2019 (WHO, 2019b).

However, the presented definition of vaccine hesitancy appears to lack precision and clarity. In particular, while it does point out the intentional character of refusal of a vaccination by emphasizing the availability of vaccine facilities, it does not, though, explicitly refer to the aspect of distrust in vaccines which is inherent in vaccine hesitancy. Hence, it results in the conceptual looseness, as vaccine hesitancy may then occur anywhere "on the continuum between high vaccine demand and vaccine refusal, i.e. no demand for available and offered vaccines" (MacDonald, 2015, p. 4162). Indeed, distrust in the safety and effectiveness of vaccination cannot be omitted from the definition of this complex phenomenon. Therefore, I suggest to follow the line of research which approaches vaccine hesitancy more narrowly, as a voluntary and conscious refusal of vaccine uptake aimed at expressing distrust of the procedure and denial of the importance of vaccination (e.g. Smith, 2017; Yakub et al., 2014).

A more comprehensive conceptualization of vaccine hesitancy was suggested by the WHO expert group which introduced the so-called "3Cs model", by identifying the three conditions shaping the phenomenon (SAGE Vaccine Hesitancy Working Group, 2018). Firstly, vaccine hesitancy is affected by a patient's *confidence*, i.e. the level of trust in a particular vaccine or its provider; secondly, it is determined by *complacency,* i.e. one's perception of a vaccine as needed and valuable; and, finally, *convenience*, i.e. having access to vaccine services (Larson et al., 2014, p. 2151). Vaccine hesitancy, hence, is an outcome produced by the low indicators on the first two components in the presence of the third.

A complex three-dimensional model of determinants of vaccine hesitancy encompasses numerous vaccine-specific issues (e.g. vaccination schedule, mode of administration, mode of

delivery), individual, social group (e.g. knowledge about why vaccines are needed, beliefs about health, trust in healthcare system and vaccine provider) and contextual influences (e.g. media environment, cultural and religious practices, historical influence, politics and policies) (Larson et al., 2014, p. 2150). Along these lines, it is apparent that the phenomenon of vaccine hesitancy is highly context- and vaccine-specific, which results in a sharp cross-country variation (Dubé et al., 2014; Larson et al., 2014; MacDonald, 2015). However, researchers generally tend to agree that the aspect of distrust of different institutions associated with vaccination is a necessary component of refusal to vaccinate (Yakub et al., 2014). Nevertheless, this relationship is not emphasized enough among all the other factors of vaccine hesitancy often explored by public health literature.

Although the trend of vaccine hesitancy currently observed in Europe is relatively new, hesitation about vaccines as such is not a novel phenomenon. Despite abundant scientific evidence of the effectiveness of vaccination in preventing the spread of infectious diseases (e.g. Christenson et al., 2001), skepticism about vaccines has existed ever since their invention due to a large number of the related medical and ethical concerns. However, it was in 1998 when these views acquired scientific foundation as *The Lancet* published an article by Andrew Wakefield, which suggested there existed a linkage between children immunization and behavioral and physical regression, i.e. loss of the skills possessed prior to vaccination (Wakefield et al., 1998). Although the paper did not establish a causal link between vaccination and autism, it did claim that vaccination had an adverse effect on a child's development, which became a core argument of proponents of the anti-vaccination movement. Even though the paper was retracted by the journal in 2010 due to methodological flaws and evidence of researchers' academic misconduct (Eggertson, 2010), it had colossal public resonance as it was shortly picked up by the media and fostered vaccine conspiracies which asserted that governments and pharmaceutical companies were withholding the truth about vaccination side-effects (Wolfe & Sharp,

2002). Vaccine conspiracies, thereafter, expanded in popularity fostering distrust in medical services and suspicion of the medical scientific community (Heller, 2016).

As hesitation about vaccines gained more and more supporters across the established democracies, some social scientists suggested to approach this phenomenon in a broader perspective. Drawing a comparison with the rise of political populism, Lasco and Curato (2019) introduced the concept of *medical populism*, which approaches the former not only as a non-compliant behavior expressing one's distrust of medical institutions, but also as a broader phenomenon of fundamental systemic opposition of "common sense of the people" to the authority of the medical, scientific and political elites. The authors emphasize a strong conspiratorial element of denialism of medical science, namely suspicion and distrust of elites in power, such as medical professionals, pharmaceutical entrepreneurs, scientists and researchers and, finally, government officials. In particular, they claim that both political and medical populism pit power-*ful* elites against power-*less* people accentuating an irreconcilable antagonism between the two. Moreover, mainstream scientific knowledge is portrayed as discredited – serving the interests of dishonest elites – and even harmful to the health and well-being of people – due to scientists' deceitful plot with the political establishment. Meanwhile, the voice of the common people is argued to be the one and only holder and defender of truth.

Consequently, the question arises whether the proposed analogy between political populism and medical denialism – in particular, vaccine hesitancy – is indeed well-grounded. The next section examines this relationship in more detail.

1.6. Populism and Vaccine Hesitancy: Correlation Not Causation?

Numerous studies have claimed that populism and different sorts of conspiracy thinking and denialism of science are interrelated (e.g. Prooijen 2018). For instance, the recent study by Oliver and Wood (2018) empirically demonstrates that rejection of the established scientific explanations and advice of medical experts, low levels of interpersonal and social trust, subscription to conspiracy

theories and attraction to populist rhetoric are all strongly related to each other (p. xviii). Overall, these phenomena are united by a common type of argumentation and thinking which authors call "intuitionalism". As opposed to rationalist reasoning, intuitionalism asserts the priority of inner feelings, emotions and intiutive beliefs regarding the external world over observable facts, scientific evidence and professional expertise. For example, within the logic of these theoretical frameworks, emotions of despair and frustration evoked by the suspected dishonesty of elites are granted a superior reliability than the established scientific evidence. Another empirical study by Silva et al. (2017) observes that two out of three essential elements of populist attitudes, namely people-centrism and anti-elitism, are indeed strongly and significantly correlated with a conspiratorial mentality.

As mentioned previously, researchers also point out a particular similarity in the logic of populist rhetoric in politics and medical science denialism in their emphasized anti-intellectual and anti-elite narrative. This resemblance led some scholars to hypothesize that the two phenomena are, in fact, associated. For example, in their analysis of the anti-vaccination movement in Poland, Żuk et al. (2019) draw a link between vaccine conspiracies and the rise of right-wing political populism in Eastern Europe, claiming that both tendencies represent an overall anti-Enlightenment and anti-Western shift in the public sphere. Similarly, Kennedy (2019) theorizes that vaccine hesitancy, as a representative case of scientific populism, is not only a result of discreditation of the authority of science but also a manifestation of a broader anti-establishment turn in social life, which is demonstrated by a strong surge of populist forces in Western democracies. In alignment with the proposed argument, he observes a strong positive association between the level of support for populist parties in Western Europe and the popularity of anti-vaccination ideas, i.e. beliefs that vaccines are not important and ineffective. His findings are robust to different measures of vaccine hesitancy attitudes as well as populist party support. Kennedy therefore, concludes that political populism contributes to

the spread of vaccine hesitancy through "profound distrust of elites and experts among disenfranchised and marginalized people" (2019, p. 4).

In addition, researchers of vaccine hesitancy also emphasize anecdotal evidence of the linkage between political populism and vaccine controversies. Indeed, a number of populist leaders and parties actively promote vaccine denialism in their public campaigns. One of the prominent examples are the two anti-establishment populist parties in Italy – namely "Five Star Movement" and "Lega Nord" – which have been strongly encouraging cancellation of mandatory vaccination and supporting the anti-vaccination movement (Broder, 2019). Another example is the French "National Rally" which actively opposed the introduction of mandatory immunization for children which followed the measles outbreaks (Boseley, 2018). Finally, the current U.S. president's notorious statements about the causal relationship between vaccines and autism – which, right in accordance with the examined theory, are mostly made online – also well exemplify the aforementioned association between political populism and medical conspiracies (*Donald Trump: Twitter Archive*, n.d.).

That being said, the examined literature on the topic suggests that political populism and vaccine hesitancy are indeed correlated and the former, in turn, fosters the spread of the latter. Nevertheless, there arises a question whether there is a causal relationship between the two phenomena. As obvious as it sounds, this question may be best answered by a conventional wisdom of statistical analysis that correlation does not imply causation. Indeed, despite the apparent intersections between political populism and conspiracy theories about science and medicine – namely, anti-intellectualism, supremacy of people's will and common sense, as well as moralization of the antagonism between 'the rulers' and 'the ruled' – political populism per se does not cause medical science denialism. Alternatively, both of these phenomena are evoked by a common confounder, namely institutional distrust, yet by its different dimensions. While political populism mainly resides on distrust of political forces of the establishment – e.g. mainstream parties or incumbent leaders

– science denialism and medical conspiracies mostly rely on distrust in science and medicine respectively. Hence, although political populists may benefit from citizens' suspicion towards scientific elites in their overall anti-elitist appeal, it is unlikely that populism may directly cause scientific denialism.

In alignment with the proposed argument, Silva et al. (2017) demonstrate that, while populist attitudes are strongly predicted by conspiracies about governmental or other state-related activities, there is no significant association between political populism and conspiracies about personal well-being which include denial of diseases and hesitancy about vaccines. The authors explain this finding by the specificity of medical conspiracies. In particular, they hypothesize that medical denialism may be appealing not to average populist supporters, i.e. those dissatisfied with the establishment politics and feeling voiceless and powerless, but rather to people with higher social status who may, on the contrary, hold more elitist views (Silva et al., 2017, p. 433). Whether this speculation is accurate for the European context may be questioned, however, it highlights the idea that despite the correlation between political populism and conspiracies about medicine, the former does not in fact cause the latter. Therefore, the main theoretical expectation of this thesis states that, even though it is indeed plausible to expect a correlation between populist support and vaccine hesitancy, there are insufficient grounds to expect the causal relationship between these two phenomena, as the essence of both rather lies in the profound distrust of the established institutions.

CHAPTER 2 – RESEARCH DESIGN

Based on the presented overview of the relevant literature, this chapter outlines research design of the empirical analysis of the thesis. In particular, I commence with the formulation of research hypotheses, presentation of the research design and justification of the chosen methodology. Next, I introduce data and sources consulted and then discuss variables and their operationalization.

2.1. Hypotheses

As follows from the presented overview of the relevant literature, the research questions of this thesis are: *What is the relationship between vaccine hesitancy and political populism? How does institutional trust intervene in this relationship?* In order to answer these questions, the two hypotheses are tested in the empirical analysis.

As mentioned previously, there exists both empirical and theoretical arguments that political populism and vaccine hesitancy are strongly related. On the one hand, real-life anecdotes about populists using anti-vaccination agenda in their campaigns, such as "Five Star Movement", are well-known. On the other hand, populism and vaccine denialism appear to have similar ideational ground, as both are based on anti-establishment, anti-elite and anti-expert rhetoric which is supposedly representing the will of the majority. Taking this approach, some studies have claimed that there exists a strong correlation (Kennedy, 2019) as well as causal (Żuk et al., 2019) association between the two phenomena.

However, both of these accounts may be challenged. First of all, the study by Kennedy (2019), which asserts a significant positive relationship between beliefs in anti-vaccination ideas and support for populist parties, is focused only on Western European countries. It is, therefore, subject to further scientific inquiry to test whether the correlation observed on such a small number of observations is robust to the inclusion of more cases. Therefore, I intend to extend the spatial conditions of the theory

suggested by Kennedy (2019) and increase the number of countries in the analysis. In particular, in the first part of my analysis, I examine whether the identified relationship between vaccine hesitancy and populism holds across all the states of the EU. Thus, the first hypothesis follows from the aforementioned study and tests the theory on correlation between populism and vaccine hesitancy.

H1: In countries with stronger support for political populism more people are hesitant about vaccines.

On the other hand, the claim about the causal linkage between populism and vaccine hesitancy appears to lack clarity. Mainly grounded in the ideational similarity of the two narratives – namely, the fact that both are driven by people's deep disenchantment with the ruling elites, the argument does not, however, suggest how exactly populism may foster vaccine hesitancy and how the causal path goes. Meanwhile, as the presented literature demonstrates, the foundation of both populism and medical science denialism is profound distrust of the institutions of the establishment. Therefore, it appears that, contrary to what the literature suggests, the link lies not from political populism to vaccine hesitancy, but rather from institutional distrust to each of these two variables. In other words, institutional distrust is a confounder evoking both of these phenomena. This relationship is tested in the second hypothesis of the research.

H2: Vaccine hesitancy is not causally related to political populism but is rather evoked by institutional distrust.

Figure 1 summarizes the causal argument of the thesis. In short, the empirical analysis incorporates two *theory-testing* parts related to association between populism, vaccine hesitancy and institutional distrust, as the formulated hypotheses propose.

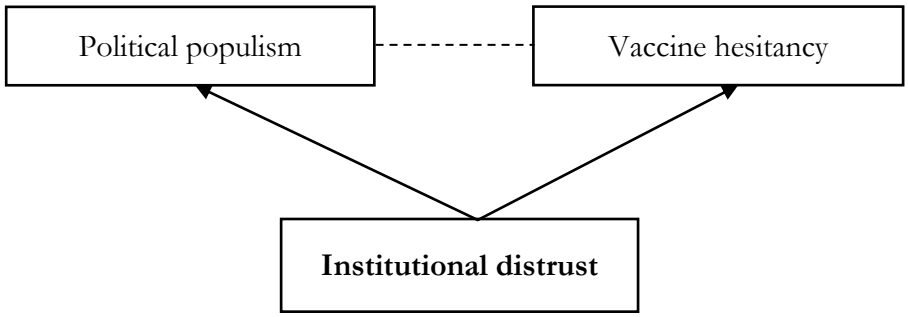

Figure 1. The causal argument of the thesis

2.2. Research Design and Methodology

As the logic of the research suggests, the thesis pursues a *mixed-method* research design comprised of the two – quantitative and qualitative – parts. One of the main advantages of this methodological strategy is that combining the two approaches not only allows to present a multifaceted view on the issue and analyze it from different perspectives, but also bridges the methodological traditions in such a way that the limitations of the two are compensated by mutual reinforcement of each other's strengths (Ahmed, 2019). Accordingly, the quantitative part is focused on examining a relationship of data on country-level as well as analyzing a large number of observations (~28.000) on individual-level while the qualitative part is dedicated to a more in-depth exploration of the relationship.

The research is designed as follows. Firstly, hypothesis-testing, namely, examining the correlation between vaccine hesitancy and populist support for all the EU countries, is conducted through regression analysis on the country level. Secondly, the Principal Component Analysis (PCA), the construction of indexes and a three-way analysis of variance (ANOVA) are employed in order to further investigate the relationship between confidence in vaccines and institutional trust on the individual level. PCA is used in order to identify the underlying structure of the data on attitudes to vaccines. ANOVA is chosen as the most appropriate method of multivariate statistical analysis to solve

a regression-type problem in the situation when a response variable is continuous while explanatory variables are of discrete nature (Rudas, 2018).

Finally, the argument is further tested in a qualitative analysis. In accordance with the distribution-based case selection strategy (Rohlfing, 2012, p. 62), a *typical* and a *diverse* case is chosen in order to more closely investigate how vaccine hesitancy, populism and institutional trust are related. Comparing the cases allows to assess the role of political populism in the anti-vaccination attitudes as well as that of the level of institutional trust and, possibly, other factors that may not be captured through quantitative analysis.

As the scope of the present study is limited, I do not seek to prove the causal linkage between institutional trust and political populism but, instead, take it as an assumption relying on the literature presented in the theoretical chapter. The main objective of this study, in turn, is to shed light on the effect of institutional distrust on vaccine hesitancy and suggest that, oppositely to the argument currently prevalent in the literature, vaccine hesitancy should not be viewed as a consequence of political populism per se but is rather a symptom of institutional distrust, similarly as populism.

2.3. Data and Sources

As the first part of the analysis comprises the replication of the study by Kennedy (2019) on a larger sample, I follow his approach fully and consult the same sources for data collection. In particular, I collect the country-level data on vaccine hesitancy from Vaccine Confidence Project (European Commission, 2018), which is a large-scale EU survey on the topic. I am using the most recent available data from 2018, which updates the findings of Kennedy (2019) who relies on the survey of 2014. The sample includes all the 28 countries of the EU (including the United Kingdom). Meanwhile, the data on support for populist parties is provided by the Timbro Authoritarian Populism Index (2019), which keeps track of electoral data of populist parties across the European region over the last 40 years.

For the second step of quantitative analysis, I rely on the data from Wellcome Global Monitor (2018), which is the world's largest survey on public trust in science. There are two major reasons why I utilize this dataset. Firstly, unlike the Vaccine Confidence Project, which has a specific focus on the issue of trust in vaccines, Wellcome Global Monitor uses a more detailed questionnaire which not only explores people's opinions regarding vaccines per se (using the same questions as their counterpart), but also measures levels of institutional trust, including trust in science, medicine and politics. This allows to examine the linkage between confidence in vaccines and different dimensions of institutional trust. Secondly, the dataset comprises the individual-level data and consists of, at minimum, 1000 observations for each country ensuring representativity of the sample and generalizability of the findings.

Finally, the ultimate – qualitative – part of the research relies on the analysis of secondary sources, such as the existing scientific literature, national and local legislature, reports of international organizations and the media as well as country-specific survey data.

2.4. Variables and Operationalization

The response variable is ***confidence in vaccines*** which demonstrates the degree of people's trust in the importance, safety and effectiveness of vaccination (Larson et al., 2015). For the first part of quantitative analysis, I construct the variable ***vaccine hesitancy,*** which, as stated in the theoretical chapter, is defined as "*the reluctance or refusal of vaccination despite the availability of vaccine services*" (MacDonald, 2015). Following the trending line of research on vaccine hesitancy, I operationalize this variable by aggregating the data from the survey responses to the three questions about people's trust to vaccines from Vaccine Confidence Project, namely:

1) *How much do you agree that vaccines are important for children to have?*
2) *How much do you agree that vaccines are safe?*

3) How much do you agree that vaccines are effective?

As the survey data is discrete with response categories ranging from 1 to 5 (Strongly agree – Somewhat agree – Neither agree nor disagree – Somewhat disagree – Strongly disagree), the two latter categories are merged into "Disagree" and are used as indicators of vaccine hesitancy, i.e. distrust to vaccination. Figure 2 demonstrates a cross-country variation of the dependent variable based on one of the measurements.

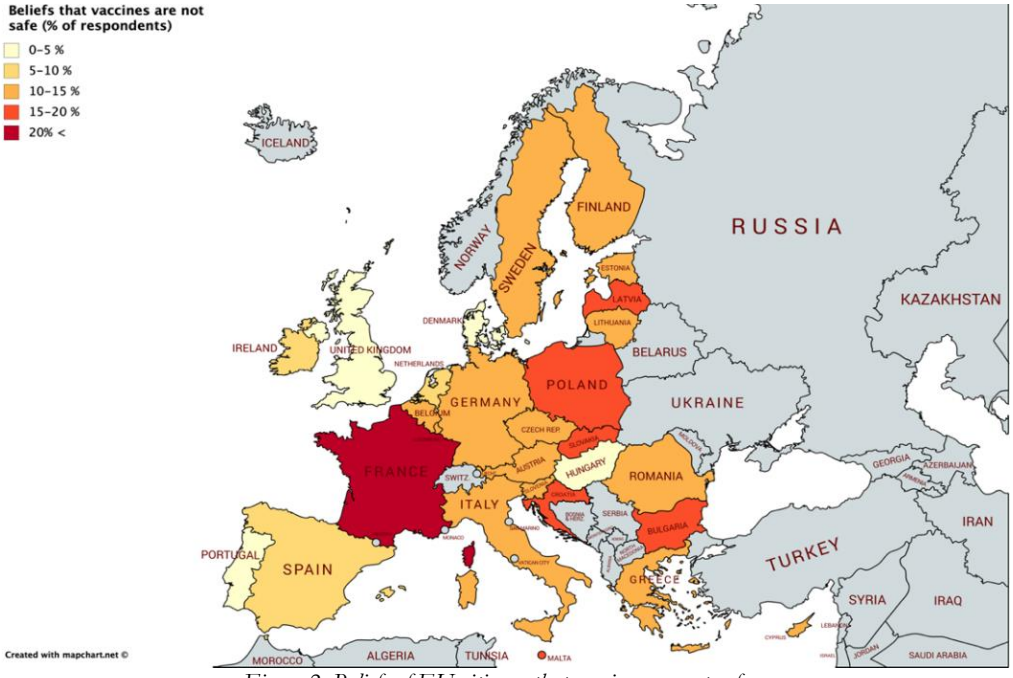

Figure 2. Beliefs of EU citizens that vaccines are not safe.
Source: Vaccine Confidence Project (European Commission, 2018)

The explanatory variable utilized in the first part of the quantitative analysis is *populist support* which is measured by aggregate vote share of populist parties in a country's latest parliamentary elections. The vote share is calculated for each of the EU countries. In this analysis, due to the scope and time limitations, I do not make a distinction between left- and right-wing populist parties, although this could become a subject of future research.

In the second part of the quantitative analysis, I conduct the PCA in order to identify the underlying structure of the data on confidence in vaccines and construct a continuous response variable. A step-by-step description of the PCA is presented in the following chapter of the thesis.

The explanatory variable in the second part of the analysis is *institutional trust*. Due to the scope limitations of this thesis, in operationalizing this variable I focus only on those institutions, trust in which is theoretically related to confidence in vaccines. These, as I showed in the theoretical chapter, are such institutions as science, medicine and national government. Although this is certainly a limitation of the present research, I rely on the literature which emphasizes the primary role of trust in these institutions in shaping people's attitudes to vaccination.

In order to operationalize different dimensions of institutional trust, based on the survey data from Wellcome Global Monitor (2018), I construct the indexes of trust in science and medicine and, in addition, use a categorical variable on trust in government. The data is discrete and response categories range from 1 to 4 (Agree a lot – Agree some – Agree not much – Not at all agree). The indexes on trust in science and medicine are constructed by, first, conducting reliability analysis in order to check the consistency of the index scale and, then, by summating and recoding the relevant survey items. A detailed explanation of the construction of the indexes is presented in the next chapter. Table 5A describing all variables, their types, measurements and transformations is included in Appendix A.

Survey responses such as "None/It depends" (97), "Don't know" (98) and "Refused to answer" (99) are treated as missing values. In total, the proportion of missing values in data is relatively high, especially compared to the categories with the least number of observations. This is an important limitation of the data as it, therefore, implies that one cannot assume it is random. However, this dataset appears to be the only available source of individual data on the topic. Hence, I proceed with the analysis acknowledging this limitation, yet the validity of the findings may be improved by replicating it once better data is available.

CHAPTER 3 – EMPIRICAL ANALYSIS

The following chapter presents and discusses the findings of the empirical analysis. Firstly, I introduce the results of testing the hypothesis on the relationship of populism to vaccine hesitancy proposed by Kennedy (2019). To test the second hypothesis, I then proceed with a detailed description of PCA, the indexes construction and ANOVA. Finally, I conclude the chapter with a qualitative cross-case analysis of Ireland and Hungary, which more closely examines the complex relationship between confidence in vaccines, populism and institutional trust.

3.1. Populism and Vaccine Hesitancy: Correlation Not Found?

In order to test the first hypothesis, I replicate the study of Kennedy (2019) on more recent data and on a larger sample of cases. While the author's findings suggest that there is a positive and statistically significant correlation between support for populist parties and hesitation about vaccines, his sample includes only Western European countries. Certainly, such a small sample of cases is not enough in order to establish a robust relationship. Therefore, I include all the EU countries in the sample seeking to extend the spatial boundaries of the theory.

Figure 3 presents a bivariate scatterplot in which vote share of populist parties in the latest parliamentary elections is plotted against one of the indicators of vaccine hesitancy, namely the aggregate percentage of responses that vaccines are not safe, for each EU country. The cases are marked with disparate colors in order to differentiate between the two samples – cases examined by Kennedy (2019) are colored black while those added in my analysis are red. The fitted lines are colored respectively.

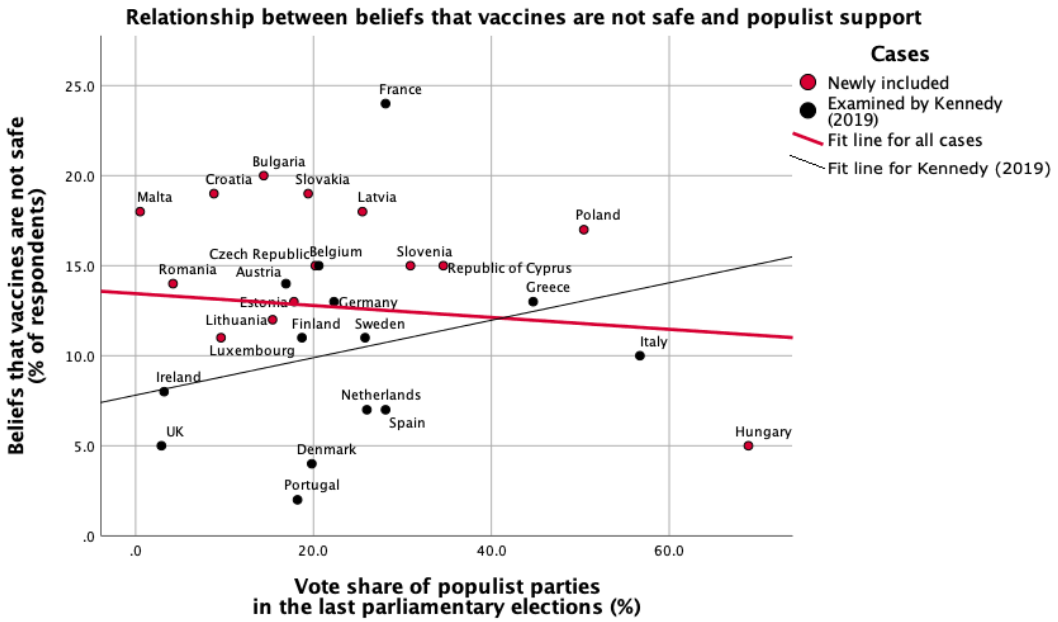

Figure 3. The relationship between political populism and vaccine hesitancy (beliefs that vaccines are not safe).
Sources: Vaccine Confidence Project (European Commission, 2018), Timbro Authoritarian Populism Index (2019)

As Figure 3 clearly demonstrates, the relationship between the two variables is not only different from the theoretical expectation but even opposite to it. While the fitted line for cases from Kennedy's (2019) sample suggests a moderate positive association between vaccine hesitancy and support for populist parties, it is apparent that this relationship does not hold after the inclusion of the new cases. On the contrary, the direction of the correlation changes to negative.

Such an unexpected finding may be explained by taking a closer look at Kennedy's (2019) sampling. Indeed, the observed values of the cases that he included seem to be close to the fitted line. However, it is not clear – and the author does not explicitly explain it in the study either – why Greece and Spain were included in the sample of Western European countries, while Luxembourg was not. Therefore, given such ambiguity of the original sample and considering the fact that the established correlation is not robust with the inclusion of more cases, it is feasible that the argument suggested by Kennedy (2019) is based on a case-selection bias. This statement is supported by creating similar plots with the other two indicators of vaccine hesitancy – beliefs that vaccines are not effective (Figure 8B) and not important (Figure 9B) – which may be found in Appendix B. In addition, the same is

demonstrated through conducting regression analysis for both samples and comparing beta coefficients and coefficients of determination. These analyses are presented in Table 1.

Response variable	**Beta-coefficient**		**Coefficient of determination (R^2)**	
	Sample of Kennedy (2019)	All the EU countries	Sample of Kennedy (2019)	All the EU countries
Vaccines are not important	0.044	0.005	0.055	0.0007
Vaccines are not safe	0.104	-0.033	0.069	0.0099
Vaccines are not effective	0.057	-0.002	0.073	0.00007

Table 1. Summary of regression analysis: the sample of Kennedy (2019) and the sample with all EU countries compared. Response variable as denoted in the table; explanatory variable – support for populist countries

As one can note, beta coefficients become not only substantially weaker after the sample extension but also change direction of the association, which asserts the aforementioned statement that the correlation between political populism and vaccine hesitancy is not robust. In addition, coefficients of determination demonstrate that models considerably lose explanatory power, as less than 1% of the variation in the response variable is explained in all three cases. All in all, the performed analyses suggest that, based on the examined data, there is not enough evidence to accept the first hypothesis. In fact, the analysis shows that the relationship between vaccine hesitancy and political populism is either extremely weak or non-existent at all. Therefore, contrary to the theoretical expectation based on the prevalent claim in the relevant literature, the hypothesis that vaccine hesitancy is positively associated with political populism should be rejected.

Having said that, I proceed to the next part of the analysis which seeks to examine whether people's attitudes to vaccines is rather dependent on the degree of trust in institutions.

3.2. Confidence in Vaccines: Does Institutional Trust Matter?

In order to test the second hypothesis, I first conduct exploratory data analysis to construct a response variable which could serve as a reliable measure of confidence in vaccines. As the Wellcome Global Monitor (2018) survey contains three questions on individual attitudes towards vaccines – beliefs whether the latter are important, safe and effective – the principal component analysis is performed in order to identify the data's inner structure for creation of a single measurement. The basic assumptions essential for the PCA to produce valid results (Shlens, 2014) are satisfied, i.e. the three variables are initially included in a principal component, there exists a linear relationship between them and the sample is large enough.

Table 2 presents a summary of the PCA. As the extracted communalities indicate, all the variables participate to a large extent in the principal component, although the variable "vaccines are important" has a slightly weaker value. Nevertheless, I do not exclude this variable from the principal component due to its conceptual importance in the analysis. The component matrix, an essential part of the PCA output, shows that the weight of each variable in the principal component is over 0.8. Finally, the principal component explains over 72% of the data in all three variables. Hence, the principal component is strong enough to be used as a measurement of confidence in vaccines.

Variable Name	**Extraction of Communalities**	**Component Matrix**
Vaccines are important for children to have	0.6893	0.8628
Vaccines are safe	0.7296	0.8542
Vaccines are effective	0.7444	0.8302
Total variance explained	72.1101 %	

Table 2. Summary of the Principal Component Analysis for the variable "confidence in vaccines"

As a next step, I construct indexes for trust in science and trust in medicine to be used as explanatory variables. As the Wellcome Global Monitor (2018) comprises multiple questions which measure the degree of people's trust in these institutions, constructing an index appears to be a logical methodological step which requires a step-wise process. In order to ensure that the questions included

in the index are indeed consistent measures of the same concepts, the reliability analysis is performed. As Table 3 demonstrates, Cronbach's alpha, namely the coefficient of reliability indicating the strength of consistency between measurements, is strong in both cases, implying that items have high covariances and, hence, measure the same concept. As the coefficient would only weaken in case one of the items is excluded, the chosen survey questions are a good fit for constructing indexes.

Index	Survey Questions	Cronbach's Alpha
Trust in Science	*How much do you trust scientists in this country?*	0.774
	In general, do you trust science?	
	How much do you trust scientists to find accurate information about the world?	
Trust in Medicine	*How much do you trust doctors and nurses in your country?*	0.704
	How much do you trust medical advice from medical workers, such as doctors and nurses?	

Table 3. Summary of the reliability analysis for constructing the indexes of trust in science and trust in medicine

Following Babbie (2015), indexes are constructed by summating response items, which are later recoded into three-level categorical variables ranging from "Trust" (1) to "Distrust" (3). Hence, in the further analysis I use trust in science, trust in medicine as well as trust in government (a categorical variable ranging from "Trust a lot" (1) to "Not at all" (4)) as measurements of different dimensions of institutional trust.

The final – and the main – part of the quantitative analysis is a three-way analysis of variance. This statistical method compares differences in means between groups and allows to determine whether there is a significant interaction of explanatory variables on the response variable. Hence, the null hypothesis of ANOVA is that there is no difference between the group means. In order to perform the analysis, I compute seven models – the first three models test whether there is an individual effect of trust in government, science or medicine on confidence in vaccines; the next three models examine whether there exists a joint effect of any of the two explanatory variables on the response; finally, the last model presents the third order interactions. Table 4 summarizes the essential part of ANOVA output.

The highest order interaction	*Model formula*	*F-value of the model*	*P-value of the highest order interaction*	*Eta Squared*
Main effects	***V, G******	157.78	**2.76e-101*****	0.02
	V, S***	482.13	**8.15e-206*****	0.04
	V, M***	698.37	**1.09e-295*****	0.054
2nd-order interactions	*V, G, S, GS****	107.07	0.575	0.049
	*V, G, M, GM****	140.48	0.354	0.061
	V, S, M, SM***	195.68	**0.037***	0.064
3rd-order interactions	*V,G,S,M,GS,GM,SM,GSM****	48.28	0.209	0.07

Table 4. Analysis of variance (response variable – confidence in vaccines).
Variables abbreviations: Confidence in Vaccines (V), Trust in Government (G), Trust in Science (S), Trust in Medicine (M).
*Significance codes: 0.001 '***' 0.01 '**' 0.05 '*' 0.1 ' '*

While models are overall significant, there are differences in the strength of effects. As one can see from Table 4, the analysis suggests that there is a strong statistically significant individual effect of each of the explanatory variables on the response (p-value < 0.001), which implies that there is a significant difference between group means in each of the three combinations and, thus, the null hypothesis of the analysis should be rejected. In other words, trust in government, science and medicine have separate effects on confidence in vaccines. Among models with the second order interactions, there is a statistically significant effect of the interaction between trust in science and trust in medicine on confidence in vaccines (p-value <0.05), which also provides evidence for rejecting the null hypothesis. Figure 4 graphically illustrates that trust in science and medicine affect the level of confidence in vaccines both individually and jointly (see Table 6C of Appendix C for the full ANOVA output).

To clarify the interpretation of the presented Figure 4, the principal component is standardized by z-scores, namely standard deviations (SD) from the mean, which is denoted by zero. Therefore, the Y axis shows relative distance from the mean. The line in Figure 4 should be interpreted as the change in the level of vaccine confidence between groups in relation to the mean.

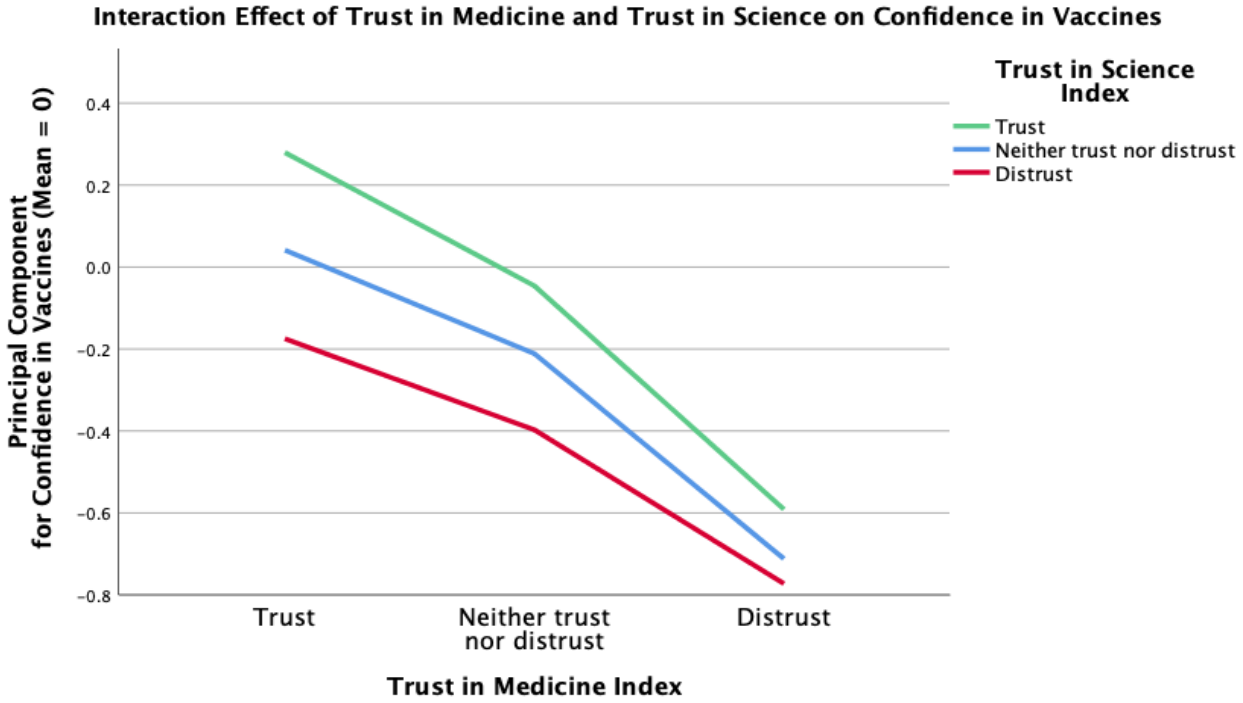

Figure 4. The interaction effect of trust in science and medicine on confidence in vaccines: ANOVA results

Individual effects imply that higher trust in science as well as trust in medicine correspond to stronger confidence in vaccines. More specifically, the stronger people trust science the more confident they are in vaccines: people who trust science are on average 0.2306 SD above the mean in vaccine confidence compared to those who neither trust nor distrust (-0.09398 SD below the mean) and to those who distrust science (-0.4186 SD below the mean). Similarly, the higher the trust in medicine, the higher the trust in vaccines. On average, those who trust, who neither trusts or distrusts and those who distrust medicine are 0.1724 SD, –0.2002 SD and –0.7262 SD away from the mean, respectively.

The interaction effect implies that trust in science and in medicine affect confidence in vaccines jointly, because the impact of trust in science on confidence in vaccines depends on the level of trust in medicine. Those who trust science and medicine are 0,3252 SD more trusting of vaccines than those who neither trusts nor distrusts medicine. The same difference between those who neither trusts nor distrusts and those who distrusts medicine is 0,5454 SD. This effect – although in a slightly weaker fashion – holds for those who are neither trusting nor distrusting science. Here, the difference of effect

among those who trust and those who neither trust nor distrust medicine is 0,2526 SD, while the difference of the latter and those who distrust medicine is 0,5004 SD. Ultimately, those who distrust science but trust medicine are 0,2222 SD more confident in vaccines than those who neither trust nor distrust medicine, while the latter on average score 0,3755 SD higher than those who distrust medicine.

As also shown in Table 4 above, the model with the third-order interactions does not demonstrate statistical significance of the highest order interaction (p-value > 0.5) and is, therefore, disregarded. As denoted by Eta Squared, which is used as the measure of model fit, the explained variance of the response variable in the models is below 10%, which suggests that the size of the identified effects is relatively small. Nevertheless, there appears to be enough evidence to conclude that the analysis has identified a small yet statistically significant effect of institutional trust on confidence in vaccines. Particularly, the level of trust in science and medicine appear to have joint effect on trust in vaccination. In other words, the more people trust in these institutions, the more confident they are regarding the importance, safety and effectiveness of vaccination, and, vice versa, the stronger the distrust of science and medicine is, the stronger vaccine hesitancy becomes. Therefore, these findings partially confirm the second research hypothesis and show that vaccine hesitancy is indeed related to institutional distrust. In order to explore this association further, the next section presents a comparative case-study analysis.

3.3. Comparative Case-Study Analysis

The section presents an overview of the examined cases as well as their comparison. Initially, the case selection procedure was planned to be carried out based on the distribution of cases (Rohlfing, 2012, p. 62), where a typical case, with high scores in political populism and vaccine hesitancy, and a diverse case, with high level of populist support and low indicator of vaccine hesitancy, were to be compared. However, as the first hypothesis was rejected based on the results of the statistical analysis,

the logic of case selection had to be changed accordingly. Since no case displayed high scores on both variables to be considered typical, I decided to choose the cases based on variation in the explanatory variable, namely populist support, in order to explore whether the presence or absence of the latter affects the level of confidence in vaccines.

Hence, based on Figure 3 presented in the first part of the statistical analysis, two cases were chosen: Ireland, the typical, and Hungary, the diverse case. The case selection is justified for two reasons: first and foremost, since Ireland is low on both indicators, while Hungary is low on vaccine hesitancy despite the presence of strong populist support, I can assess whether populism has any effect on attitudes to vaccines and, furthermore, what other factors – and whether trust is one of them – account for the discrepancy. Furthermore, these cases also reflect on the analysis of Kennedy (2019), for which Ireland serves as a typical case located on the regression line, while Hungary, which is not included in his sample, is a diverse, outlying case. Employing this case selection strategy and comparing the two cases allows me to illustrate that political populism per se does not play a significant role in the degree of vaccine hesitancy. Rather, it is the high level of institutional trust, alongside other factors, which prevents the rise of distrust in vaccines.

In the overview of these cases, after briefly describing the healthcare system, I discuss the state of vaccine hesitancy in the country. I then take a closer look at the general situation of vaccine uptake and display the state of the field through analyzing the major events, policies and effectiveness of regulations. These are aimed at highlighting the specificities of the phenomena in Ireland and Hungary while also presenting it as representative of broader tendencies.

3.3.1. The Case of Ireland

The Irish healthcare system incorporates both public and private sectors. Based on the level of income, about 37% of the population have access to public healthcare free of charge, while others can

use public medical services at reduced costs (*HSE*, n.d.). Following the aftermath of the financial crisis of 2008, Ireland reduced healthcare expenditures from 10.7% of GDP in 2012 to 7.2% in 2017, which falls more than 2% below the EU average (*Healthcare Expenditure across the EU*, 2017).

Under the Irish public health legislation, vaccination is voluntary, meaning that vaccines are available to citizens upon their will, yet no sanctions are imposed in case of refusal or failure to receive a vaccine. Still, although immunization is not mandatory, it is strongly recommended to children and immunocompromised groups and is delivered free of charge by the national immunization service (*HSE: Immunization Schedule*, n.d.).

According to the data assembled by the Vaccine Confidence Project (European Commission, 2018), the Irish population's confidence in vaccines is high, given that 90.3% and 88.9% of respondents think that vaccines are important and effective, respectively. Accordingly, only 2.3% claims to openly distrust vaccines. However, alternative data provided by Wellcome Global Monitor (2018) suggests that about 15% of respondents in Ireland are unsure of the safety of vaccines, which indicates that some degree of vaccine hesitancy is present. Similarly, the growing tendency has been identified by experts of European Observatory on Health Systems and Policies (*State of Health in the EU: Ireland*, 2019).

Indeed, vaccine uptake data confirms the validity of these numbers, which is especially reassuring if one acknowledges that vaccination is not mandatory. According to Annual Epidemiological Report (2019), the uptake of the vaccine against measles, mumps and rubella (MMR) has slightly dropped in recent years: while 94% of the population was vaccinated in 2015, by 2019 this number has lowered to 89%. A more drastic decrease has been observed in vaccination against Human Papillomavirus (HPV) – which is suggested to twelve-year-old girls as a part of the school immunization program to prevent cervical cancer. The uptake of HPV vaccine has dropped from

89.6% in 2015 to 51% in 2017 (*AER*, 2019). In sum, the recent decline in vaccination rates may signal growing vaccine hesitancy.

A public debate related to hesitation about vaccines has recently occurred in Ireland, which may explain these results. A few parents – whose daughters received HPV vaccination – publicly claimed that soon after immunization their children developed chronic illnesses which they claimed to be caused by the vaccine (Fitzgerald, 2016). To prove their statement and advocate for the cause, they created a support group called R.E.G.R.E.T. (Reactions and Effects of Gardasil Resulting in Extreme Trauma) which set off to spread information online and filmed a documentary on the adverse consequences of the HPV vaccines which was broadcasted on national TV (Healy, 2015). Additionally, they also delivered a public report to the Joint Committee on Health and Children accusing the medical establishment of withholding the truth about the severe side-effects of the HPV vaccines (Fitzgerald, 2016). These events gained publicity, resonating with the public, which resulted in increasing number of refusals of vaccination, even though it had previously been widely welcomed as a means of prevention of cervical cancer.

Although the change was abrupt, a timely and fast response of state officials followed. In April, 2019 the Irish Minister of Health, Simon Harris, warned against the declining vaccination rate in the country and emphasized the danger behind *en masse* vaccine refusal. A warning reference was made to the example of the neighboring United Kingdom which has been experiencing unprecedented measles outbreaks in recent years. As a result of the severity of these events, Simon Harris proposed to make vaccination mandatory, following suit with Italy where – in attempts to tackle the alarming consequences of vaccine hesitancy – the legislation enacted a policy of mandatory childhood vaccination (Kelly, 2019). Although eventually the proposal was rejected by reason of potential conflict with the Irish constitution, the government showed great urgency to put a halt to the rising anti-

vaccination movement. To address the issue, the government bid to increase public awareness of the importance of vaccination and to confront vaccine conspiracies spreading online (McEnroe, 2019).

Firstly, with the support of five parliamentary parties – Sinn Féin, Labour, the Green Party, Independents4Change and Fianna Fáil – the Vaccine Alliance was established in order to launch a public vaccine awareness campaign (Fitzgerald, 2019). A network of medical professionals, policymakers, activists and other interest groups representatives, the alliance was set off to ensure the population has access to comprehensive and reliable information about the importance of vaccination. Secondly, to tackle anti-vaccination misinformation online, governmental efforts were made to cooperate with social media companies, such as Facebook, Twitter and Google, aiming to negotiate policies which, if necessary, would restrict activity of users spreading these views (Ryan, 2019).

The response by the government soon proved to be effective. Already by the end of 2019, less than a half year after the creation of the Vaccine Alliance, the uptake of the HPV vaccine increased up to 70%, asserting the effectiveness of the new policy (*HSE.Ie*, 2019). In Clare, one of the Irish counties, particularly due to an active pro-vaccination campaign run by Laura Brennan, a young lady diagnosed with cervical cancer, it reached 90% (Sunderland, 2020). All in all, the campaign on increasing awareness about vaccines has been considered effective in preventing the further rise of the anti-vaccination movement (Corcoran et al., 2018).

3.3.2. The Case of Hungary

Hungary offers universal health coverage to all citizens, meaning that everyone can use health services in public healthcare system free of charge (*State of Health in the EU: Hungary*, 2019). However, as a consequence of long waiting times and the lack of financial resources allocated to the public healthcare system, private healthcare is also prominent.

Regarding vaccines, Hungary has one of the strictest centralized mandatory immunization policies across the EU, which is enforced by law. Childhood vaccination against twelve infectious diseases – namely, tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, measles, rubella, mumps, Haemophilus influenzae type B, hepatitis B and Streptococcus pneumoniaeis – is mandatory and is delivered free of charge as a part of a nation-wide immunization program (Tokodi & Gaál, 2018). In addition, at-risk groups may also voluntarily receive vaccines – available free of charge through the national immunization program – when a risk of infection exists, for example, seasonal influenza or the HPV vaccine for girls over the age of twelve. Data on vaccine uptake is collected by the epidemiological surveillance database, which is maintained by the Ministry of Human Capacities (Tokodi & Gaál, 2018). In-person consultations with public health professionals is an established policy of tackling those who hesitate about vaccines (Mohai & Péndes, 2018). In turn, failure or refusal to receive mandatory vaccine is penalized - starting from fines to enforced vaccination of a child and, as a last resort, limitation of parental rights (*State of Health in the EU: Hungary*, 2019).

The robust and highly centralized system of vaccine delivery and public health control makes Hungary demonstrate excellency in vaccine coverage. Indeed, for over decades, the uptake of the MMR vaccine in the country has been over 99% (Tokodi & Gaál, 2018, p. 103), exceeding the goal of 95% immunization rate established by the WHO. Not surprisingly, the cases of measles have been extremely rare in Hungary, and those which occurred have been reported to be imported from abroad (WHO, 2019c). Similarly, the uptake of vaccines provided on a voluntary basis, such as seasonal influenza, is also relatively high, reaching about 65% of the population (*OEK*, 2019).

Moreover, Hungary is characterized by remarkably high scores of public confidence in the importance, effectiveness and safety of vaccination. As Vaccine Confidence Project (European Commission, 2018) reports, 95.2% of respondents agree that vaccines are important and 91.3% and 90.5% are certain concerning their safety and effectiveness. Meanwhile, the percentage of those who

actively distrust vaccines hardly reaches 1%. Therefore, according to the available data, the degree of vaccine hesitancy in the country is insignificant.

Nevertheless, a few incidents of vaccine rejection have taken place in Hungary. The most prominent case of vaccine refusal ended with a couple's conviction to suspended imprisonment, who were found guilty of negligent homicide of their newborn child (Presinszky, 2020). According to the expert committee involved in the trial, the death of the infant could have been prevented had the child received a vaccine with the essential dose of vitamin-K. The court ruling shows that the primary cause of the tragedy was the parents' intentional refusal to vaccinate the baby. However, the convicted couple were not an ordinary case: the father was the leader of the Hungarian anti-vaccination community, and the admin of the Vaccine Critics' Life Protection Association[1] Facebook group with over 6.000 followers (Hanthy, 2020). Moreover, both parents held strong medical denialist views and were decisively against delivering any medical treatment to their child.

In another case, a child was taken away from their parents who not only did not vaccinate the newborn, but also avoided all legal procedures regarding the registration of birth and other necessary documentation (Kolozsi & Bohus, 2020). These parents were not only upholders of radical conspiracy beliefs – that Hungary is only an Israeli company registered in New York which appropriates every registered child – they profoundly distrusted all state institutions in Hungary, including healthcare. This case is quintessential in presenting the relationship of anti-vaccination attitudes and utter institutional distrust.

Apart from the aforementioned – fairly extreme – cases, as of 2020, there has been no record of a more wide-spread anti-vaccination movement in Hungary. Not surprisingly, media has referred to Hungary as an isolated "island in the sea of vaccine denialism" in Europe (*Hvg.Hu*, 2019). In addition, recent research has demonstrated that, while a prominent anti-vaccination movement in Hungary is

[1] In Hungarian - Oltáskritikus Életvédők Szövetsége.

non-existent, those few cases of vaccine hesitancy that do emerge are successfully tackled by the policy of consultation of patients by a physician as well as the system of state control in public health (Mohai & Péndes, 2018).

3.3.3. The Cases Compared

Although examination of the two cases does not allow to draw any robust causal inference, a few important findings should be highlighted. First and foremost, looking at the examined cases in comparative perspective clearly demonstrates that in neither of the two has strength of populist support played any role in expanding the anti-vaccination movement. As exemplified by the case of Ireland, vaccine hesitancy may arise even in a country with an extremely low level of support for populist parties. During the last election populists who made it to the Irish parliament gained merely 2.6% of the votes, while other populist parties hardly got 0.3% combined (*Timbro Authoritarian Populism Index*, 2019).

On the other hand, in a country like Hungary, where populist support is the highest in the European region – with the ruling populist party Fidesz-KDNP having a parliamentary supermajority for the third consecutive time, with 49.3% of the votes, and Jobbik, the populist party in opposition having 19.1% support in the elections of 2018 (*Timbro Authoritarian Populism Index*, 2019) – a strong anti-vaccination movement is not at all observed. In addition, no evidence has been found of using anti-vaccination agenda by populist parties in these countries, contrary to what the existing studies suggest. Therefore, the results of the comparative case-study are in alignment with the findings of the statistical analysis and provide evidence against the first research hypothesis of this thesis. Hence, it seems that there is no positive relationship between vaccine hesitancy and political populism. In fact, populism does not appear to play any significant role in determining the strength of anti-vaccination attitudes within these cases.

However, the examined cases provide somewhat ambivalent results regarding the second hypothesis on the effect of institutional trust on vaccine confidence. On the one hand, compared to other European countries, Ireland is characterized by a high level of trust in the healthcare system and the medical profession in general. As a recent survey demonstrates, doctors, nurses and pharmacists are the most trusted professionals in the country, as over 95% of respondents trust that they tell the truth (*Ipsos MRBI*, 2020). Research similarly shows that – due to the system's decommodification – on average, the Irish trust in healthcare is stronger than that in the other Western states (Huang et al., 2018). Moreover, as summarized by Figure 5 and Figure 6 based on the individual-level data of Wellcome Global Monitor (2018), Ireland is characterized by high levels of trust both in medicine and science. Indeed, the proportion of people who strongly trust medicine and science is 80% and 60% respectively, while the percentage of people openly distrusting these institutions is minimal. Therefore, it may be concluded that the case of Ireland illustrates high trust in science and medicine corresponds to a high level of trust in vaccination.

On the other hand, the case of Hungary suggests somewhat unclear results. The data by Wellcome Global Monitor (2018) indicates that the majority of respondents in Hungary have rather moderate trust in science and medicine. While almost 60% the Hungarians surveyed are uncertain of their trust in medicine, only 40% have univocal trust. Meanwhile, the proportion of those trusting in science is even smaller – about 25%, as summarized in Figure 6. Therefore, based on the available data, it is not feasible to conclude that Hungary is characterized by a high level of trust in medicine and science.

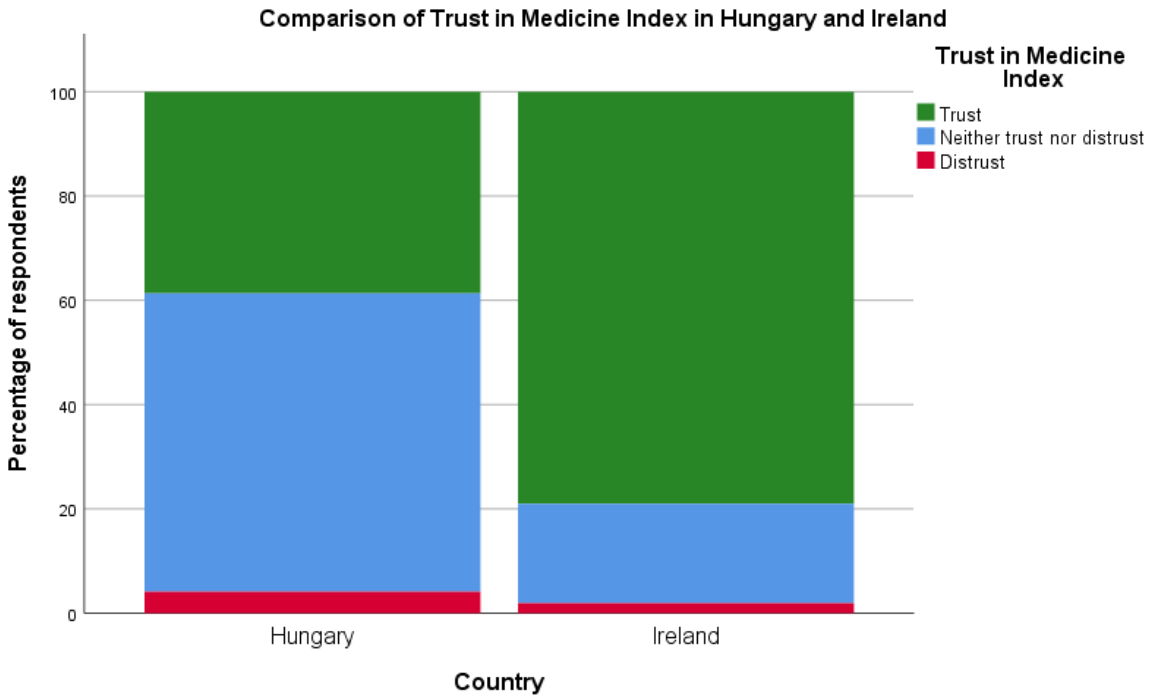

Figure 5. The comparison of trust in medicine in Hungary and Ireland.
Source: Wellcome Global Monitor (2018)

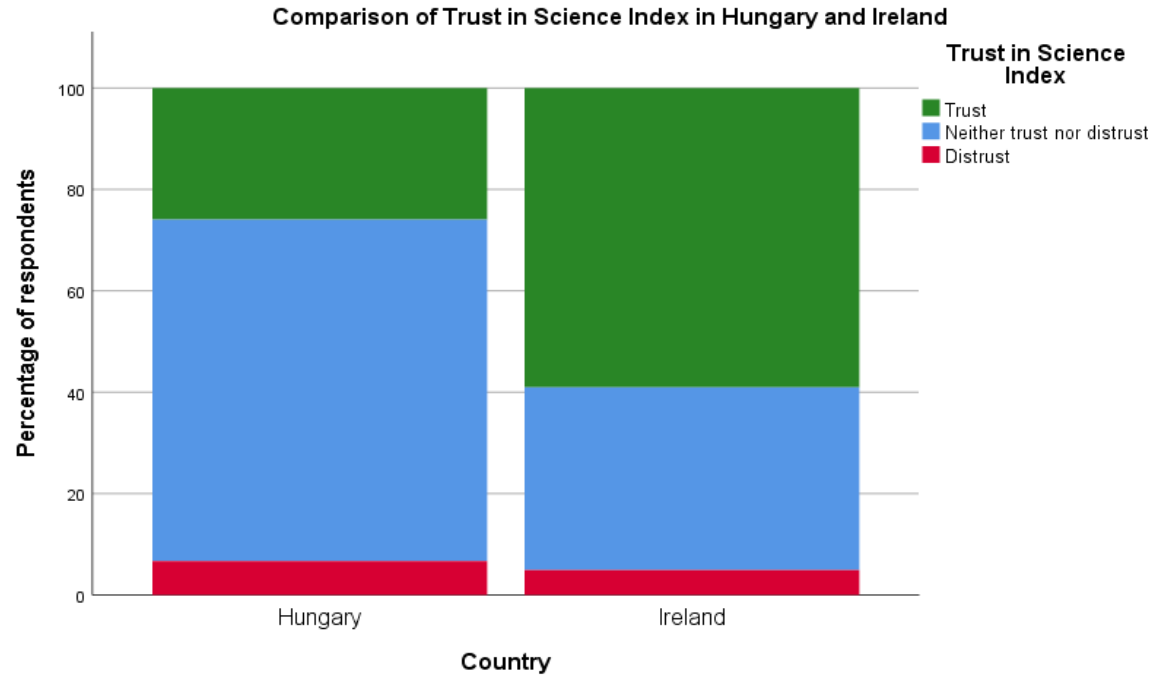

Figure 6. The comparison of trust in science in Hungary and Ireland.
Source: Wellcome Global Monitor (2018)

However, what is common between the two cases is the low percentage of respondents who firmly distrust medicine and science – although, again, it is higher in Hungary than in Ireland. As emphasized in the theoretical chapter, it is distrust – which is conceptually different from lack of trust – that characterizes denialist beliefs such as vaccine hesitancy. Therefore, the case-study analysis generally illustrates the results of ANOVA. In particular, it shows that low level of open distrust in institutions of science and medicine corresponds to low degree of vaccine hesitancy. However, strong inference cannot be made based on these descriptive results, as more in-depth analysis is needed examining cases characterized by high level of institutional distrust as well.

In addition, the analysis does not suggest that trust in political institutions corresponds to the level of confidence in vaccines. As demonstrated by Figure 7, Ireland and Hungary differ significantly in the level of trust in national government, as Hungarian respondents seem to be more distrustful of parliamentarians. This, however, logically fits into the framework of populism as manifestation of political distrust. Therefore, the most appropriate interpretation of such findings appears to be that further research of vaccine hesitancy should differentiate between diverse dimensions of institutional distrust, as the effect of distrust of political institutions appears to differ from that to medicine and science. Based on the analyzed data, political distrust is associated with populist support – as exemplified by the case of Hungary–, while vaccine hesitancy is rather related to distrust of science and medicine. Hence, the two phenomena are symptoms of related, yet disparate types of institutional distrust. However, to further investigate this claim, alternative data, refined operationalization of institutional distrust and testing on a larger sample of cases are needed.

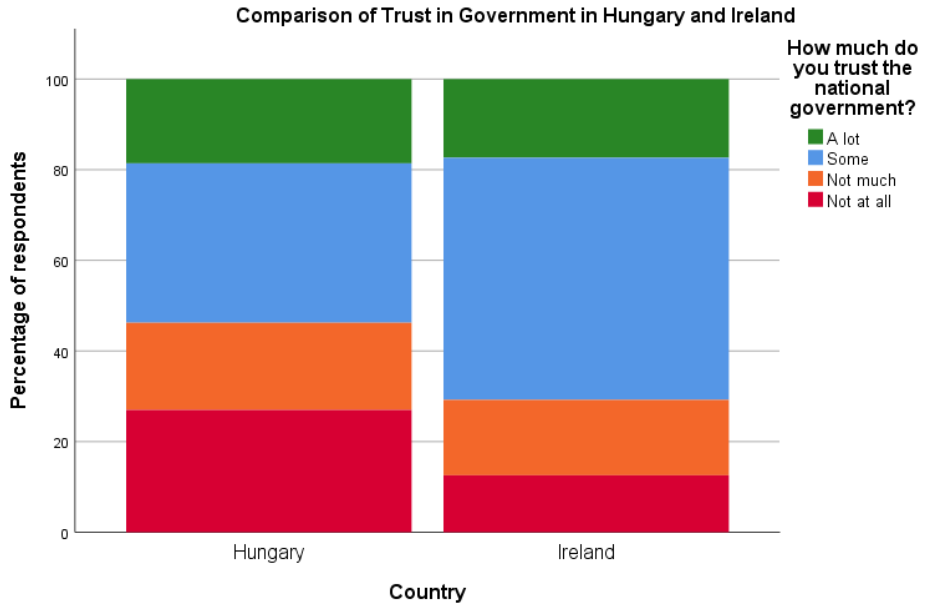

Figure 7. The comparison of trust in national government in Hungary and Ireland.
Source: Wellcome Global Monitor (2018)

Overall, major findings of the comparative case-study are generally in alignment with the previously obtained results of the quantitative inquiry, although strong inference cannot be made. The analysis does provide evidence against the first hypothesis about the positive relationship between vaccine hesitancy and populism and partially in confirmation of the second hypothesis on the effects of institutional trust, which, yet, needs to be treated with caution. In addition, the qualitative analysis of countries sheds light on additional variables that may come into play in preventing the rise of anti-vaccination movement, besides the level of trust in science and medicine. In particular, as Ireland well exemplifies, vaccine awareness campaigns may be an effective measure to restore public trust in vaccination, when the level of trust in medicine and science is high. Meanwhile, as demonstrated by the case of Hungary, even in the presence of higher proportion of people distrusting medicine and science, it is possible to avoid the emergence of the anti-vaccination movement via robust immunization policy and strong state control in the sphere of public health. Therefore, future research of vaccine hesitancy needs to account for such country-specific factors which may prevent the rise of vaccine distrust.

CONCLUSION

The primary objective of this thesis was to shed light on the complex relationship between confidence in vaccines, political populism and institutional trust. The results of the employed multi-method analysis demonstrate that, contrary to the prevalent claim in the literature on the topic (Kennedy, 2019), vaccine hesitancy is not associated with political populism. Rather, as concluded from the empirical inquiry, it is the level of institutional trust which serves as an important explanatory factor of vaccine confidence. According to the presented ANOVA, trust in science and medicine have a joint statistically significant effect on confidence in vaccines, although the size of the effect is rather small. Moreover, the findings of both quantitative and qualitative analyses suggest that the effects of trust in different institutions, namely in science and medicine as opposed to trust in politics, should be differentiated, as the effect of trust in politics appears to be somewhat ambivalent. Finally, the qualitative analysis suggests that, apart from institutional trust, additional factors – such as vaccine awareness campaign and country immunization policy – may play a role in preventing the rise of vaccine hesitancy and need to be considered in further research. Therefore, the present study has found evidence to reject the first hypothesis on the positive association between vaccine hesitancy and populism and to partially confirm the second hypothesis on the effect of institutional trust.

The research contributes not only to studies on vaccine hesitancy in public health, but also to the vast literature on political populism, trust in institutions and, more broadly, political culture in the discipline of political science. In particular, it challenges Kennedy's (2019) claim about the strong relationship between political populism and vaccine hesitancy and suggests a novel approach to the issue of medical denialism from the perspective of institutional trust. Additionally, these findings suggest that in order to understand the rising anti-scientific attitudes, further research needs to look at this issue in relation to a more general rise of distrust of formal institutions as opposed to merely treating it as a consequence of political populism. While both are the symptoms of the same cause, it

is also essential to further explore the complexity of the associations between distrust in different institutions.

However, the present study has limitations. Firstly, the lack of data on the topic restricts the options of operationalization of variables as well as the choice of methodology. Although, the conducted research utilizes the most appropriate methodology for analyzing the available data, collection of better-quality data on the topic is a vital step for further research. Secondly, while this thesis primarily focused on trust in institutions, confidence in vaccines is a complex phenomenon explained by a large number of factors – as ANOVA and the case-study also conclude – which further research has to account for. Thirdly, due to a small number of the examined cases, the qualitative analysis cannot draw a strong causal inference, moreover, the spatial scope conditions of the research are limited to the European Union only. Therefore, generalizability of the findings may be subject to further research inquiry.

Nevertheless, the findings of the thesis are important and relevant not only for future academic research, but also for contemporary policymaking. As the COVID-19 pandemic has clearly shown, in the situation of global crisis medical denialism becomes a matter of life and death. On the one hand, the health crisis has crystallized the crucial importance of public trust in the authority of formal institutions in fighting the pandemic. The cases of virus denial, which jeopardize the effectiveness of quarantine measures, have become the issue of worldwide concern (Heather, 2020). On the other hand, the pandemic has also reinforced the debate around vaccines. Amidst governments' and pharmaceutical companies' attempts to develop the vaccine against COVID-19, proponents of anti-vaccination agenda have capitalized on fear and uncertainty around the virus and fostered the spread of vaccine conspiracies (Tory, 2020). The latter deeply undermine the work done to halt the pandemic and to seek means of establishing herd immunity to the virus (Ball, 2020). Therefore, as the results of this study also imply, the success of fighting a pandemic depends not only on invention of a vaccine

per se, but also on vaccine uptake which is determined by public trust in immunization and in other formal institutions, such as science, medicine and politics.

APPENDIX

Appendix A: Description of Variables

Name of the variable	Description	Type and Measurement	Transformation
Confidence in vaccines *(response)*	Survey questions: *1) How much do you agree that vaccines are important for children to have?* *2) How much do you agree that vaccines are safe?* *3) How much do you agree that vaccines are effective?*	**Discrete** Strongly agree (1) – Somewhat agree (2) – Neither agree nor disagree (3) – Somewhat disagree (4) – Strongly Disagree (5)	**1) Vaccine hesitancy** (discrete) Disagree = Somewhat disagree (4) + Strongly disagree (5) **2) Principal Component Confidence in vaccines** (continuous)
Populist support *(explanatory)*	Aggregate vote share of populist parties in the last parliamentary elections (%)	**Continuous**	–
Institutional trust *(explanatory)*	- **Trust in Science** Survey questions: *1) How much do you trust scientists in your country?* *2) In general, would you say you trust science?* *3) How much do you trust scientists to find accurate information about the world?*	**Discrete** A lot (1) – Some (2) – Not much (3) – Not at all (4)	**Index** **Trust in Science** (discrete) Trust (1) – Neither trust nor distrust (2) – Distrust (3)
	- **Trust in Medicine** Survey questions: *1) How much do you trust doctors and nurses in your country?* *2) How much do you trust medical advice from medical workers, such as doctors and nurses?*	**Discrete** A lot (1) – Some (2) – Not much (3) – Not at all (4)	**Index** **Trust in Medicine** (discrete) Trust (1) – Neither trust nor distrust (2) – Distrust (3)
	- **Trust in Government** Survey question: *1) How much do you trust national government in your country?*	**Discrete** A lot (1) – Some (2) – Not much (3) – Not at all (4)	–

Table 5A. Variables used in the empirical analysis.
Sources: Vaccine Confidence Project, (European Commission, 2018), Timbro Authoritarian Populism Index (2019), Wellcome Global Monitor (2018)

Appendix B: Populism and Vaccine Hesitancy

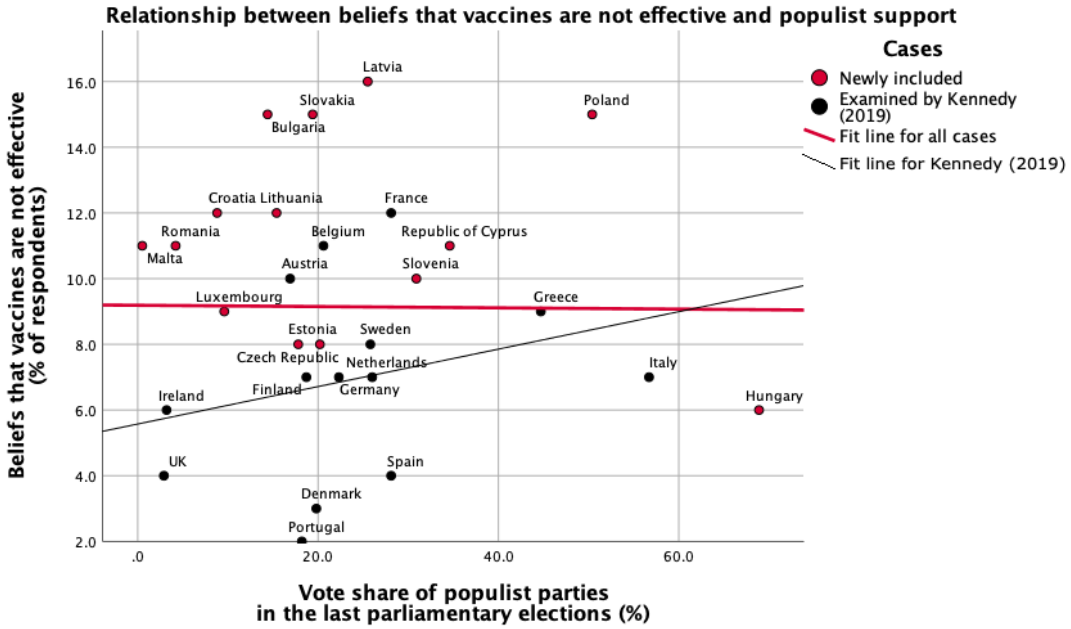

Figure 8B. The relationship between political populism and vaccine hesitancy (beliefs that vaccines are not effective). Sources: Vaccine Confidence Project (European Commission, 2018), Timbro Authoritarian Populism Index (2019)

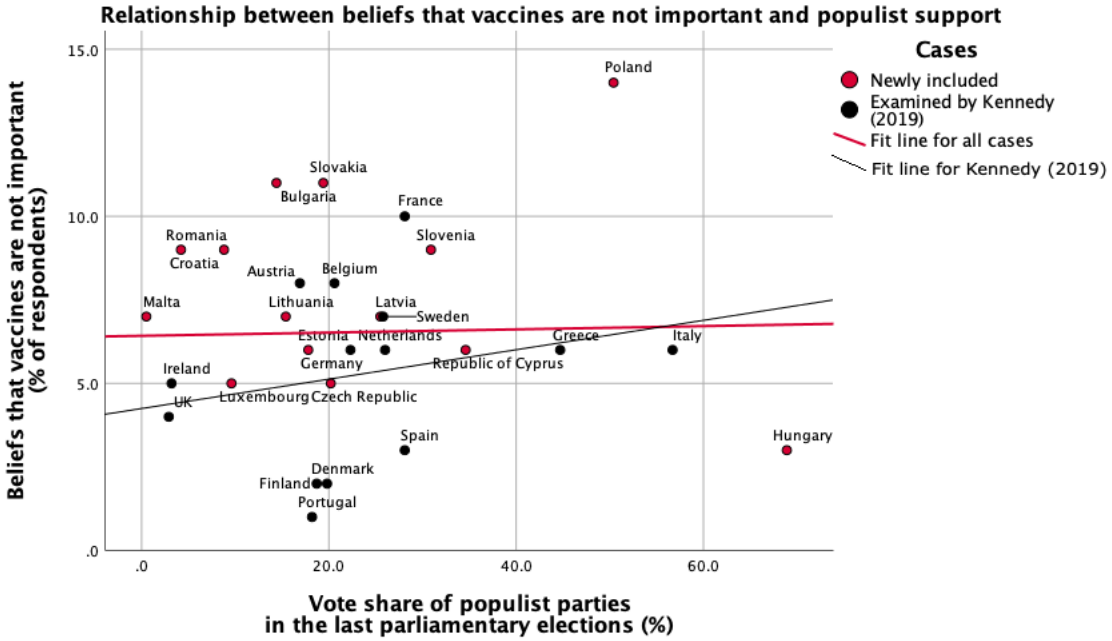

Figure 9B. The relationship between political populism and vaccine hesitancy (beliefs that vaccines are not important). Sources: Vaccine Confidence Project (European Commission, 2018), Timbro Authoritarian Populism Index (2019)

Appendix C: ANOVA

Trust in Science Index	Trust in Medicine Index	PC for Confidence in Vaccines	
		Mean	N
Trust	Trust	.2795363	8590
	Neither trust nor distrust	-.0457087	1284
	Distrust	-.5910708	80
	Total	.2305848	9954
Neither trust nor distrust	Trust	.0412307	5870
	Neither trust nor distrust	-.2113460	4920
	Distrust	-.7117779	350
	Total	-.0939785	11140
Distrust	Trust	-.1749593	433
	Neither trust nor distrust	-.3971741	728
	Distrust	-.7726609	342
	Total	-.4185962	1503
Total	Trust	.1723953	14893
	Neither trust nor distrust	-.2001810	6932
	Distrust	-.7262409	772
	Total	.0274006[a]	22597

a. Grand Mean

Table 6C. The interaction effect of trust in science and medicine on confidence in vaccines: ANOVA output

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