UNIVERSITY OF GHANA
(College of Humanities)

ACCOUNTING FOR PANDEMIC: ANALYSING (MIS)REPORTING, CRIME RATES, AND PREVENTIVE BEHAVIOUR

BY
PARRENDAH ADWOA KPELI
(10422486)

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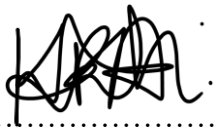
DECLARATION

I declare that this thesis is my original work and that all sources used have been duly acknowledged. This thesis has not been submitted for any degree or diploma award at any other institution.

I affirm that the information presented in this work is accurate to the best of my knowledge, and the opinions and conclusions presented herein are my own, based on the research conducted.



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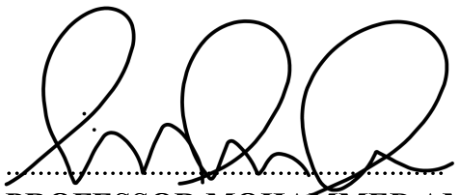
PARRENDAH ADWOA KPELI (10422486) **DATE**

CERTIFICATION

I certify that **PARRENDAH ADWOA KPELI** wrote this thesis under my supervision and guidance. This work represents original research conducted by the author. It has been presented in partial fulfilment of the requirements for the PhD degree in Accounting award at the University of Ghana.



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31/10/2025

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PROFESSOR WILLIAM COFFIE **DATE**

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PROFESSOR SAMUEL FOSU **DATE**

DEDICATION

I dedicate this dissertation to my Family, friends, and loved ones who have unwavering faith in me to complete this milestone successfully.

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CONTENTS

List of Abbreviations

Abbreviation	**Full Meaning**
ATP	American Trends Panel
BIS	Behavioural Immune System
EIU	Economist Intelligence Unit
FDA	Food and Drug Administration
GDP	Gross Domestic Product
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
OWID	Our World in Data
PBC	Political Business Cycles
PPE	Personal Protective Equipment
PWM	Prototype Willingness Model
SAH	Stay-at-Home
SARIMA	Seasonal Autoregressive Integrated Moving Average
UNODC	United Nations Office on Drugs and Crime
UNPD	United Nations' World Population Prospects
WHO	World Health Organisation
WISE	Well-Being, Inclusion, Sustainability, and Equal Opportunity

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Abstract

This thesis investigates the repercussions of the COVID-19 pandemic, providing three distinct yet interconnected essays. These essays examine political, social, and religious issues arising during a global health crisis. The first essay investigates the impact of electoral timing on the precision of COVID-19 mortality reporting across 94 countries in 2020. The study employs a quasi-natural experiment based on the staggered timing of national elections across the globe. The result suggests that incumbents were more inclined to provide accurate information because they were concerned about the potential for electoral repercussions and a decline in public trust. The policy implication is evident: electoral accountability can serve as a check on government transparency during crises, underscoring the importance of ensuring free and fair elections, even in the face of a pandemic.

The second essay of this thesis delves into the influence of political regimes on crime rates during the early stages of the COVID-19 pandemic, with a specific focus on the effects of stay-at-home policies. The study, which uses a quasi-experimental design to assess the impact of the pandemic and subsequent stay-at-home orders on crime rates—particularly theft and burglary—across 89 countries, reveals that these policies led to significant reductions in crime within the first three months of the pandemic in countries that implemented them. Importantly, these effects were more pronounced in less democratic regimes. This finding suggests that the effectiveness of public health measures can be bolstered in environments with stricter enforcement, providing policymakers with a valuable perspective on the role of governance in crisis management.

The final essay analyses the influence of religiosity on responses to COVID-19, particularly individual preventive behaviour in the United States. This study utilises a large longitudinal dataset from 2020 to 2022 to examine the actions of various religious groups, specifically born-

again and non-born-again Protestants, regarding COVID-19 safeguards and the subsequent effect on their likelihood of contracting the virus. The results show that born-again Protestants exhibit a reduced propensity to comply with preventive measures, including mask-wearing and vaccines. In contrast, non-born-again Protestants and Catholics are more inclined to adhere to these rules. As a result, born-again Protestants exhibit an increased likelihood of testing positive for COVID-19, which may facilitate the virus's spread in the United States.

These essays examine the pandemic's impact, demonstrating how political accountability, governance structures, and religious beliefs shape the outcomes of a global health crisis. The three essays are interconnected through an accountability lens, demonstrating how transparency, governance, and stewardship shape political, social, and religious responses during crises. The thesis provides practical policy recommendations, including the need for culturally sensitive public health communications, adaptive law enforcement strategies, and transparent governance. The thesis contextualises pandemic responses within the broader debates on accountability and governance in the accounting literature by situating these relationships within the stewardship perspective. These add to academic comprehension and offer practical insights for managing future public health emergencies by connecting these diverse strands.

KEYWORDS: *Accountability, Governance, Stewardship, Misreporting, Covid-19, Preventive Behaviour, Religiousity.*

CHAPTER ONE

INTRODUCTION

INTRODUCTION

1.0 Background

What is accounting about pandemics? Pandemics are not only medical or public health emergencies, but also crises of governance and accountability. In any crisis, the question of who is responsible, to whom, and for what becomes central. Accountability in these situations goes beyond financial records to include the open disclosure of events that affect public welfare (Akins et al., 2015; McKernan, 2012). According to stewardship theory, accountants' serving as stewards extends beyond financial transactions to include reporting on practices, outcomes, and shortcomings that affect community well-being. Pandemics, like other natural disasters, create a major accountability dilemma, with the disclosure of cases, deaths, and policies serving as the key test of stewardship (Yu, 2021; Costa et al., 2025).

Research in crisis scenarios illustrates the various roles of accountability. Accounting practices in Italy's 2010 floods promote trust and dialogue by involving victims in recovery (Lai, Leoni & Stacchezzini, 2014), whereas research in Ghana's 2015 floods found accountability to be upwardly focused, excluding victims from meaningful participation (Agyenim-Boateng & Oduro-Boateng, 2019). NGO reporting on Nepal's 2015 earthquakes portrayed as a spectacle for funders while ignoring victims' realities, presenting accountability as performative (Adhikari et al., 2025). During COVID-19, the Sri Lankan government implemented cremation policies that excluded minorities, but civil society mobilised counter-accounts, demonstrating accountability as resistance (Wickramasinghe et al., 2025). These works depict accountability as socialising, excluding, performative, resistant, or ethical (Yu, 2021), but they are primarily qualitative and country-specific, with limited causal scope.

Against this backdrop, the COVID-19 crisis presents a unique opportunity to investigate accountability. Unlike natural disasters, which have a limited duration, COVID-19 required daily, protracted disclosure of infections, deaths, and policies, allowing ongoing opportunities

for accountability and for failures to emerge. Existing research on pandemic governance reveals key dynamics. Annaka (2021) demonstrates how regime type influences data transparency in reporting COVID-19 deaths; Campedelli et al. (2021) show the immediate crime effects of containment policies in Los Angeles; and Nivette et al. (2021) provide global evidence of how stay-at-home restrictions influence crime patterns. These studies lay the groundwork but have limited integration with accountability systems. They do not go into detail on how accountability relationships between governments and citizens, regimes and the general public, or religious communities and health systems influenced crisis responses.

This thesis expressly positions COVID-19 as an accountability stress test in the political, institutional, and social domains. Electoral cycles increased pressure on governments to reveal or falsify mortality data, raising concerns about public accountability in health reporting. Containment measures shifted social order and crime patterns, emphasising concerns of government accountability and enforcement. Religious views influenced compliance with preventive behaviour, emphasising the need for social accountability within communities. Examining these factors together broadens the accounting discussion of stewardship, openness, and reporting to include crisis governance and public health.

By adopting an accountability perspective on these aspects —elections, governance, crime, and religiosity —this study fills gaps in crisis accountability research and pandemic literature. It deepens understanding of how accountability works in the face of uncertainty, governance, and social upheaval, benefiting not only crisis management but also broader accounting concerns of transparency, governance, and public confidence.

1.1 Problem Statement

Accounting research has long recognised that crises expose accountability gaps and modify interactions between states, institutions, and citizens (Lai, Leoni, & Stacchezzini, 2014; Agyenim-Boateng & Oduro-Boateng, 2019; Adhikari et al., 2025). However, existing research has primarily focused on natural disasters, frequently documenting how governments, agencies, and non-governmental organisations (NGOs) provide accounts of their responses after floods, earthquakes, or fires. While this research has produced important insights into the dynamics of upward, downward, and symbolic accountability, it is still limited to short-term, localised events. Prolonged and global crises, such as pandemics, have gotten far less attention in accounting research, leaving major gaps in our understanding of how accountability works in the face of uncertainty, politicisation, and societal disruption.

The COVID-19 pandemic provides just such an opportunity. Unlike discrete disasters, it was worldwide in scope, lasted several years, and featured continual reporting of infections, deaths, and government actions. This imposed unusual demands on accountability mechanisms. Information concerning the epidemic was not neutral; it had political implications, altered social order, and moderated community behaviour. The pandemic is an important case study for accounting research because it demonstrates how accountability connections are stretched and challenged when societies face long-term problems.

However, much of the empirical research on COVID-19 has been conducted outside the accounting profession. Political science research has examined how regime type and electoral cycles influence transparency in reporting (e.g., Annaka, 2021; Wigley, 2024). Criminology has looked into how lockdowns affected crime patterns (Nivette et al., 2021; Trajtenberg et al., 2024). Sociology and behavioural studies have looked into how religion and ideology influence health-related compliance (Allcott et al., 2020). While these studies shed light on important issues, they do not situate their findings within broader accounting debates over stewardship,

transparency, and responsibility. As a result, people may misinterpret data as descriptive facts rather than accounts offered by actors with interests, motivations, and responsibilities.

Three distinct gaps emerge. First, disaster accounting research has yet to be applied systematically to pandemics. While it is acknowledged that crises are periods of accountability, previous research has not examined how prolonged health emergencies, with daily and contested reporting, affect accountability practices across multiple domains. Second, pandemic-related research in other fields has not been theorised as accounting. Governments' disclosure of mortality numbers, implementation of containment measures, and involvement with communities are all examples of accountability, although they are rarely examined through this lens. Third, there is little cross-country and causal evidence in the accounting discipline. Much of the disaster-accounting work is qualitative and case-based, which, while valuable, fails to establish how accountability mechanisms differ systematically between contexts or over time.

The lack of accounting viewpoints in this field is considerable. Without accounting frameworks, crises like COVID-19 are reduced to technical or political events, rather than moments of negotiation and contestation over stewardship and transparency. This constrains our knowledge of how accountability failures undermine confidence, how governments balance upward and downward obligations, and how cultural and moral dimensions of accountability influence collective behaviour.

This thesis offers three interconnected additions to the literature on accounting and accountability. This analysis of the underreporting of COVID-19 mortality in relation to election timing expands the study of political business cycles, illustrates the purposeful manipulation of public health statistics, and prompts enquiries into transparency and public accountability. Second, by examining the impact of stay-at-home policies on crime rates across

different regime types, the study demonstrates how government responses to crises have unintended social consequences, broadening the accountability framework beyond financial disclosures to include social order and governance efficacy. Third, by investigating the impact of religion on adherence to preventive efforts, it emphasises the moral and cultural dimensions of accountability, suggesting that responsibility in crises is founded not only in institutions but also in community and identity.

This thesis tackles these issues by emphasising COVID-19 as an accountability event. By doing so, it takes accounting discussions into new territory, demonstrating that pandemics are not merely health or governance crises, but also accountability problems. The study examines the impact of political incentives, institutional actions, and societal commitments on accountability during the pandemic. Thus showing that accountability in a crisis extends beyond financial records to include broader responsibilities for information, representation, and public trust.

1.3 Research objectives

The primary purpose of this thesis is to analyse the extent to which the COVID-19 pandemic served as an accountability event via government reporting, institutional actions, and community compliance. More specifically, the study seeks to;

1. Assess the effect of election proximity on the under-reporting of COVID-19 mortality data.
2. Evaluate the impact of stay-at-home policies on street crime rates across political regimes.
3. Examine the role of religiosity on compliance with COVID-19 preventive behaviours in the United States.

1.4 Significance of the Study

By addressing critical issues related to the COVID-19 pandemic and its broader impacts, the thesis contributes to knowledge, policy, and practice. The results offer insights consistent with a range of Sustainable Development Goals (SDGs), particularly in health, governance, and social stability.

The thesis expands the body of knowledge on political cycles, data transparency, and integrity by examining the impact of election timing on COVID-19 reporting. This research enables the identification of patterns of misreporting, thereby fostering more transparent and robust governance. By improving our understanding of the influence of religiosity and preventive behaviours on COVID-19 mortality rates, the study contributes to SDG goal 3 (good health and wellbeing). It offers novel perspectives on public health strategies by providing empirical data on the role of cultural and religious factors in health outcomes. Additionally, examining COVID-19 containment policies and their influence on crime rates offers valuable insights into the social repercussions of public health measures, thereby facilitating comprehension of the equilibrium between social stability and public health.

Conceptually, the thesis contributes to the accounting discipline by advancing disaster accounting research to include global pandemics, thereby demonstrating that COVID-19 constituted not merely a health crisis but also an accountability event. It theoretically contributes to the discussion of stewardship and accountability by showing how transparency, governance, and moral duty work under times of prolonged uncertainty.

The study informs health policymakers on how to incorporate cultural and religious considerations into public health campaigns. It recommends strategies for involving religious leaders and communities to improve adherence to preventive measures. Policymakers are guided in developing strategies to protect data integrity during electoral periods by the findings

on the relationship between election proximity and COVID-19 reporting in the context of governance policy. This helps develop policies that encourage transparency and accountability in public health reporting. Furthermore, policymakers can develop balanced interventions by understanding the impact of containment policies on crime rates. Policies can be designed to mitigate the negative social consequences of lockdowns while simultaneously achieving public health objectives.

Health practitioners can use the study's results to develop culturally sensitive health promotion strategies. Practitioners can enhance adherence to preventive behaviours across communities by tailoring interventions to account for the influence of religiosity. Public officials and administrators can apply the insights from election-related misreporting to improve data management practices. Establishing training programs and protocols to guarantee the accuracy of health data reporting during politically sensitive periods is possible. Moreover, law enforcement agencies can leverage the study results to predict and respond to shifts in crime patterns during public health crises, thereby supporting sustainable peace and strong institutions (SDG 16). This knowledge is instrumental in effectively allocating resources and implementing crime prevention strategies during lockdowns and other restrictive measures.

1.5 Chapter Disposition

The thesis comprises five chapters, each concentrating on a distinct aspect of the research objectives concerning the influence of elections, religiosity, and containment policies on crime rates and COVID-19 outcomes.

This first chapter introduces the entire study. It comprises the background, problem statement, objectives, and significance of the entire thesis. This chapter establishes the foundation for the research by identifying the primary areas of investigation and the rationale for the study.

The second chapter examines the effect of proximity to elections on COVID-19 misreporting. It examines the likelihood that governments will misreport COVID-19 data to influence public perception in anticipation of upcoming elections. The chapter compares the accuracy of COVID-19 reporting in countries with varying election schedules and assesses the impact of electoral cycles on data transparency and reliability through data analysis.

The third chapter examines the impact of COVID-19 containment policies on crime rates across countries. It examines the impact of stay-at-home policies on crime rates. The chapter discusses the identification of assumptions, the empirical design, the findings, and the policy implications of the study.

The fourth chapter investigates the impact of religiosity on COVID-19 preventive behaviour. It employs a longitudinal study design to assess how various religious beliefs and practices influence adherence to preventive measures, including vaccination, boosters, and mask use.

The fifth chapter serves as a comprehensive summary of the thesis. It provides a concise overview of the results from the preceding chapters and, as appropriate, addresses policy implications and recommendations. This chapter also identifies opportunities for future research in the field of pandemic crisis accounting, emphasising areas that warrant further investigation in light of the study's findings.

CHAPTER II

ELECTIONS AND (MIS)REPORTING OF COVID-19 MORTALITY: A QUASI-NATURAL EXPERIMENT

Elections and (mis)reporting of COVID-19 mortality: a quasi-natural experiment

Abstract

We investigate the causal effect of elections on COVID-19 mortality reporting, measured as the difference between excess mortality and official statistics. Our identification strategy takes advantage of a natural experiment of the unanticipated onset of the Coronavirus pandemic in 2020 and the asymmetric electoral schedule of presidential elections around the world, in which some countries faced the pandemic with upcoming elections in the next two years, while others did not have this electoral pressure. Contrary to conventional wisdom that governments manipulate information downwards to enhance reelection probabilities, our results suggest that democratic governments facing elections in the following years report COVID fatalities more truthfully. Specifically, our analysis shows that this effect accounts for approximately 25% of the observed variance in data manipulation. Our analysis further indicates that democratic governments seek to avoid being exposed to underreporting; as for OECD countries, underreporting is strongly negatively correlated with trust in government, which would compromise reelection probabilities.

2.1 Introduction

Accurate reporting of information in any emergency is paramount to designing and implementing effective governmental policies and an adequate public response; yet, the coronavirus pandemic presents a vivid example of failures by numerous countries to provide such information. In reporting official COVID-19 mortality, many governments downplayed the actual severity of virus outbreaks (e.g., Karlinsky & Kobak 2021). Why do some governments underreport COVID-19 deaths, and by how much? Is there any discipline mechanism preventing excessive misreporting? A small emerging literature on this topic suggests that underreporting may be driven by economic factors, particularly the limited capacity of state agencies to compile accurate numbers, as many COVID-19 deaths remain unaccounted for (Knutsen & Kolvani, 2022). Moreover, the regime type may matter, as democracies are generally considered more truthful (Knutsen & Kolvani, 2022; Wigley, 2024). This study advances this literature by investigating the role of elections in (mis)reporting COVID-19 mortality.

This study views the reporting of COVID-19 mortality as a characteristic of public accountability. According to stewardship theory, governments are accountable not only for the information they provide but also for its social impact and financial outcomes (McKernan, 2012; Agyenim-Boateng and Oduro-Boateng, 2019). Shino et al. (2023) link misreporting to voting behaviours, while Wigley (2024) finds that regime type predicts COVID-19 data manipulation. Unlike earlier research, this paper views misreporting as an accountability issue and applies stewardship theory to health crisis reporting. Inaccurate reporting of mortality indicates a shortcoming in this accountability relationship. From this perspective, this study views mortality reporting as a mechanism for upholding accountability.

Our initial hypothesis derives from the literature on political business cycles, which shows that incumbents create favourable short-term economic conditions when elections are getting close

to winning more votes (Nordhaus, 1975; Dubois, 2016; Philips, 2016, and others). The logic applies to various policy instruments such as monetary policy (Aidt et al., 2020), tax and tax reform (Flores, Huysmans & Ferwerda, 2024), government spending in general (Alt & Lassen, 2006; Brender & Drazen, 2008), and specific items (Thomas & Darsey, 2024; Sjahrir et al., 2013), intergovernmental transfers (Gonschorek, 2024; Kitsos & Proestakis, 2021), declaration of natural disasters (Cooperman, 2022) and macroprudential regulation (Müller, 2024).[1]

If governments use available instruments to maximise their reelection probabilities, we could expect them to (mis)report COVID-19 fatalities differently during election periods than in off-election periods. But in which direction? Two conflicting hypotheses come to mind. First, the high COVID-19 numbers could be seen as an indication of ineffective disaster management. Thus, as an inherent failure, governments could seek to underreport COVID-19 cases more strongly during pre-election times. Alternatively, if non-truthful reporting were taken as a sign of dishonesty and weakness and punished by voters, governments would be incentivised to report more truthfully during election times.

Moreover, a disaster like the pandemic could trigger voters' "rally around the flag" response and thus benefit the incumbent (e.g., Yam et al. 2020). This effect may be stronger the more serious the reported death toll is. Which hypothesis has more explanatory power is an empirical question and the concern of this chapter.

Our identification strategy takes advantage of the natural experiment of an unanticipated onset of the Coronavirus pandemic in 2020 and the asymmetric electoral schedule of presidential elections around the world, making some countries face the pandemic with upcoming elections in the next two years, while others did not experience this electoral pressure. We study only the

[1] In principle, democratic and autocratic governments are both interested in favourable election outcomes and thus may create political cycles (Chen and Zhang 2021), even though the constraints under which governments operate are quite different. (Obviously, autocrats have additional means of manipulating elections.)

first pandemic year, 2020, as only the onset of the pandemic qualifies to be considered as a quasi-natural experiment for the following reasons: first, the arrival of COVID was unanticipated; second, it was the year when all the main decision were made on how to address the virus, most notably including the decisions on how to manage medical COVID-related statistics; third, the following years were contaminated by the autoregressive component (stemming from learning by doing or cross-regional spillovers); finally, election schedule would move for all countries altering our control group (either shifting treated countries in the control group or consecutively reducing the control group).

We find that governments with presidential elections in the following years report substantially more truthfully, with the official numbers converging to the true values. The magnitude of the effect is remarkable: electoral pressure accounts for about a quarter of the variation in underreporting. This effect is driven exclusively by relatively democratic countries, as we show in the analysis of heterogeneous effects conditional on various measures of democracy.[2]

To explain our results, we examine the relationship between underreporting of COVID-19 mortality and trust in the national government, as measured by the Centre for Well-Being, Inclusion, Sustainability and Equal Opportunity (WISE) across OECD countries. We find that higher underreporting is associated with stronger declines in trust in government after the onset of the pandemic, a result that is robust to placebo tests. A potential reason for minimising underreporting before elections is that incumbents seek to avoid an erosion of trust to secure reelection. Democratic elections, therefore, are an effective safeguard against government manipulation in situations of severe emergency.

[2] This result makes sense as only in democratic countries elections serve as meaningful accountability mechanisms (Hollyer et al., 2011).

Our analysis speaks to the emerging literature on COVID misreporting. While several early studies attempted to identify misreporting in official statistics (e.g., Raphson and Lipsitch 2024 for the case of China) or to detect patterns consistent with Benford's law (e.g., Kilani 2021), very few have examined the determinants of misreporting. Adam and Tsarsitalidou (2022) link Benford's law-based estimates of misreporting of COVID-19 mortality to regime types and show that autocratic regimes are more likely to misreport. Knutsen and Kolvani (2022) find that democracies and countries with higher capacities (i.e., richer, better-equipped countries) underreport COVID-19 deaths much less. Neumayer and Plümper (2022) suggest that autocracies underreport more strongly. To our knowledge, Kofanov et al. (2023) is the only within-country study of underreporting of COVID-19 mortality that provides evidence that proximity to gubernatorial elections in subnational regions of Russia is a determinant of data manipulation. However, it remains unclear whether their result is limited to the specific case of subnational governments in Russia or is more generally applicable.

The studies by Knutsen and Kolvani (2022) and Neumayer and Plümper (2022) are global in scope but consider only regime type and state capacity as determinants of misreporting, disregarding the central accountability mechanism that defines a democratic system. Our research also considers regime types and state capacity, but emphasises upcoming presidential elections as a factor in COVID-19 reporting outcomes. It sheds light on how governments communicate during crises and evaluates the role of elections in shaping the narrative around COVID-19 mortality, thereby presenting a crucial dimension of the discourse on governance and accountability. Moreover, the accounting literature has yet to examine the extent to which political cycles influence the disclosure of health information in crises, and this study opens a discourse on how misreporting of COVID-19 mortality becomes a form of contested disclosure in pandemic governance.

To a large extent, we contribute to the research on the manipulation of official statistics in different political regimes, which have so far mainly focused on the factors affecting the doctoring of economic indicators (e.g., Magee & Doces, 2015; Martinez, 2022; Briviba et al., 2024). Additionally, the study contributes to the accounting literature on accountability in crisis. By extending crisis accountability beyond the scope of stakeholder engagement (e.g., Agyenim-Boateng & Oduro-Boateng, 2019; Lai, Leoni, & Stacchezzini, 2014) to include how political cycles may influence information provision during a health crisis.

Our study also speaks to the literature on political business cycles (PBC) (see above). We thus enlarge the range of instruments studied in the literature on PBCs by an important new element —information provision —and show that, in a crisis, it is used cyclically. While we show the cyclical nature of information provision, we note an important difference to the existing PBC literature: in our context, governments react to an exogenous shock, the outbreak of the pandemic, depending on where they are in their electoral cycle, while the PBC literature analyses the entire cycles for the countries.

The chapter proceeds as follows: Section 2.2 presents the literature and theoretical overview, and Section 2.3 presents the data. Section 2.4 describes the empirical setup. Section 2.5 presents our empirical results, including various robustness checks; Section 2.6 provides evidence on potential mechanisms; Section 2.7 concludes.

2.2 Theoretical and Empirical Review

2.2.1 Theoretical Review

Stewardship theory plays a crucial role in this study, providing a framework for understanding the government's responsibility to report COVID-19 data accurately. According to this theory, public officials are entrusted with the welfare of their citizens and are expected to maintain transparent reporting, particularly during times of crisis. However, the study acknowledges that

political pressures during elections may create challenges, potentially leading to misreporting to secure reelection. From an accounting perspective, stewardship extends beyond truthful reporting of financial information to include non-financial information. The transparent disclosure of COVID-19 mortality data by Governments across the globe serves as a source of responsibility to stakeholders.

By examining the concept of stewardship, the study aims to determine whether governments fulfill their ethical duty to truthfully report COVID-19 mortality data despite the temptation to manipulate information for electoral gain, thus exploring the delicate balance between political self-interest and public accountability.

The stewardship role of governments may be compromised by electoral pressures, as outlined in the theory of Political Business Cycles (PBC). This theory, a significant area of research in political economy, examines how politicians manipulate economic policies to enhance their electoral prospects. Nordhaus (1975) introduced that governments, particularly those in power, are incentivised to influence the economy cyclically to improve their reelection chances. This theory assumes that voters have short memories and are more likely to base their voting decisions on recent economic conditions rather than the economy's long-term health. Consequently, politicians tend to implement expansionary fiscal or monetary policies in the lead-up to elections, which often results in short-term economic growth, sometimes at the expense of inflation or future deficits. Examining accountability, the political business cycle influences how governments present public assessments of crisis outcomes. As a result, election proximity may influence whether mortality figures are published straightforwardly or altered for political purposes.

Subsequent research has broadened the parameters of PBC theory to include various aspects of government interference during electoral seasons.

The manipulation of economic variables is often aimed at enhancing voters' short-term well-being, thereby improving the electoral prospects of the incumbent government. Further research has expanded the scope of PBC theory to include various aspects of governmental manipulation during election periods. Brender and Drazen (2008) and Alt and Lassen (2006) emphasise that political cycles extend beyond monetary policy to encompass government spending, tax policy, and fiscal stimulus, especially in democracies. The manipulation of these economic variables is often aimed at boosting voters' short-term well-being, thereby enhancing the electoral prospects of the incumbent government.

Recent studies have extended PBC analysis to specific policy areas. Aidt et al. (2020) explored how tax policies are manipulated for electoral advantage, while Müller (2024) and Cooperman (2022) examined political cycles in macroprudential regulation and the declaration of natural disasters, respectively. These studies suggest that governments employ various tools ranging from fiscal stimulus to emergency declarations to generate favourable political outcomes, further solidifying the connection between political decision-making and electoral cycles.

In the context of the COVID-19 pandemic, PBC theory offers a new perspective on how governments handle public health information. Just as incumbents manipulate economic factors, they may also aim to control information during a health crisis to improve their re-election chances. This study adds to the PBC literature by introducing "information provision" as a tool used regularly by governments, expanding the range of strategies available for electoral manipulation beyond traditional economic policies. Managing information during a crisis, especially regarding COVID-19 death reporting, is a crucial tool for governments trying to balance public health outcomes with political survival.

The literature on PBC also highlights differences between democracies and autocracies in how they manipulate information. While democracies are traditionally associated with greater

transparency and accountability, studies such as those by Knutsen and Kolvani (2022) suggest that electoral pressure can still affect the accuracy of government information. In democracies, the risk of public backlash from misreporting, especially during health crises, may incentivise more truthful reporting in the lead-up to elections. In contrast, autocracies, where electoral pressures are less salient, may continue to engage in greater data manipulation. This distinction aligns with this study's findings, which showed that democratic governments facing elections reported COVID-19 fatalities more accurately, driven by the fear of losing public trust and electoral credibility.

Moreover, the study adds a crucial layer to the PBC literature by demonstrating that electoral pressure can influence how governments respond to exogenous shocks, such as the pandemic. Whereas the traditional PBC literature emphasises endogenous manipulation of the economic cycle by governments, this study highlights that governments react to external crises differently depending on their electoral context. Governments facing imminent elections are more likely to prioritise transparency and truthful reporting, as voters' perceptions of honesty and competence during a crisis can significantly impact their electoral fortunes.

In sum, both Stewardship theory and PBC theory emphasise the conflict between accountability and opportunism. Stewardship emphasises the responsibility to disclose accurately, whereas PBC illustrates how electoral incentives can distort that duty. By framing mortality reporting through these ideas, the study can address misreporting as both a political strategy and an accountability failure.

2.2.2 The onset of the COVID-19 pandemic and data reporting

COVID-19 emerged in Wuhan, China, in late 2019. In the initial stages of the crisis, the Chinese government did not provide transparent information about the virus, sparking concerns about

potential concealment of its seriousness. The virus spread rapidly worldwide; on March 11, 2020, the World Health Organisation (WHO) officially declared the outbreak a pandemic. Interestingly, democratic governments were often accused of mishandling the pandemic, with some evidence of delays in adopting lockdowns and other anti-COVID measures (Jain & Beaney, 2022; Cheibub et al., 2020; Sebhatu et al., 2020; Dempere, 2021). The early research based on the official COVID-19 statistics commonly supported those accusations (Cepaluni et al., 2022; Yao et al., 2021); however, later studies (e.g., Neumayer and Plümper, 2022) showed that when employing excess mortality as a more reliable estimate of the pandemic death toll, the differences in COVID performance between autocratic and democratic countries were practically nonexistent. This debate highlights that COVID-19 information serves not only as epidemiological metrics but also as public records. The credibility of these accounts highlights how governments fulfilled or failed to fulfill their obligation to provide truthful disclosures during the crisis.

2.2.3 Empirical Review

The relationship between political cycles and government manipulation of data, particularly during crises, has long been a subject of investigation. Initial work on political business cycles (PBC) by Nordhaus (1975) demonstrated how incumbents manipulate economic conditions to win elections, a phenomenon that has since been expanded to various policy areas. These include monetary policy (Aidt et al., 2020), tax reforms (Flores et al., 2024), government spending (Alt & Lassen, 2006; Brender & Drazen, 2008), intergovernmental transfers (Kitsos & Proestakis, 2021), and even the declaration of natural disasters (Cooperman, 2022). The central thesis of this literature is that electoral pressures compel governments to strategically adjust public policies and data to maximise their chances of re-election. The applicability of

this theory to health data manipulation during the COVID-19 pandemic offers a new frontier for PBC studies.

The manipulation of official statistics has been widely examined, particularly in the context of political regimes and economic indicators. Magee and Doces (2015) examined how authoritarian regimes systematically overstate their economic growth figures by comparing reported GDP growth rates with satellite-based estimates of nighttime lights. Their findings revealed that autocracies overstated growth by 0.5–1.5 percentage points annually, highlighting the broader tendency of dictatorships to manipulate data for political gain. This research, along with Martinez (2022) and Briviba et al. (2024), underscores how regimes manipulate economic data, often driven by electoral incentives. These studies show that manipulating official data is a recurring feature of authoritarian rule; however, they focus predominantly on economic outcomes. The extent to which the same incentives apply to health data during crises, where precise reporting is vital for public accountability, remains insufficiently examined.

A key area of focus in the empirical literature has been the influence of regime type on data accuracy during crises. Studies by Knutsen and Kolvani (2022) and Neumayer and Plümper (2022) provide evidence that democratic regimes are less likely to underreport COVID-19 fatalities. Knutsen and Kolvani (2022) argue that democratic systems, by their institutional checks and balances, are more transparent and accountable to their citizens, leading to lower levels of misreporting. Similarly, Neumayer and Plümper (2022) demonstrate that autocratic regimes are more prone to manipulating COVID-19 mortality data, using their centralised control to distort public information to maintain political stability. These findings align with the broader theory that democracies, characterized by higher state capacity and more robust accountability mechanisms, exhibit greater transparency in health-related statistics. Collectively, these studies suggest that the institutional context significantly influences government disclosure of mortality data. However, they often treat regime type as the primary

explanatory variable, neglecting to account for how electoral incentives in both democracies and autocracies may also influence misreporting.

Building on these insights, Adam and Tsarsitalidou (2022) take a more quantitative approach, applying Benford's Law to detect anomalies in COVID-19 data. They found that autocratic regimes were significantly more likely to manipulate health data. These findings were corroborated by Kilani (2021), who similarly employed Benford's Law to detect patterns of misreporting in countries with weaker democratic institutions. Both studies suggest that underreporting is not merely a function of state capacity but also a result of political motivations driven by the desire to maintain control during crises.

At the subnational level, Kofanov et al. (2023) provide evidence from Russia showing that proximity to gubernatorial elections can lead to the misreporting of COVID-19 data. Their findings reveal that regional governments in Russia manipulated COVID-19 death counts to present more favourable public health outcomes ahead of elections. This study offers key insights into how electoral pressures operate at the national level and within subnational political structures, adding depth to the discussion of political incentives in data manipulation.

The global COVID-19 pandemic has prompted researchers to explore the extent to which governments have engaged in underreporting, particularly during election periods. DeFranza et al. (2021) contributed to this emerging body of work by showing that governments downplayed COVID-19 statistics to maintain public trust and political legitimacy. Their research highlights how election cycles can create incentives for governments to present more favourable health outcomes, potentially undermining public health efforts. Similarly, Karlinsky and Kobak (2021) found that underreporting was a common tactic used by numerous governments, particularly in countries facing upcoming elections, to minimise public perception of government failures in managing the pandemic.

Additionally, research by Raphson and Lipsitch (2024) has focused on how data manipulation during the pandemic could be detected through statistical models. They employed Benford's Law to uncover irregularities in the reported COVID-19 death counts, demonstrating that underreporting was widespread in countries with weak democratic structures or during periods of political contestation. Their findings emphasise the role of political stability and electoral pressures in shaping how governments report health crises.

In examining the broader relationship between political incentives and health data manipulation, Yam et al.'s (2020) study sheds light on how governments may benefit from the "rally around the flag" effect during crises. Their research suggests that high death tolls can sometimes lead to increased support for incumbents, as voters unite behind the government in times of national emergency. This dynamic complicates the relationship between data manipulation and electoral outcomes, as governments must balance the risks of being perceived as dishonest against the potential gains from presenting a more severe public health crisis. From an accountability approach, mortality reporting can be viewed as a sort of stewardship in which governments provide public updates on crisis outcomes. While these studies identify patterns of misreporting, they do not thoroughly investigate how election proximity affects governments' accountability requirements in crisis reporting. This study addresses that gap with two hypotheses. First, governments facing elections are less likely to underreport. Next, the effect of election proximity on COVID-19 mortality reporting varies by regime type.

2.3 Evaluating Methodology

To test our competing two hypotheses (see Section 2.1), we focus exclusively on the first pandemic year (2020), when the arrival of a novel coronavirus was an unanticipated exogenous shock for all national governments as they experienced high uncertainties about the infection rates and severity of the pandemic and, most notably for our research question, had not yet any

experience of the political effects of misreporting the COVID-19 statistics. Our data include all countries for which excess mortality data were available, that did not hold an election in 2020, and that are not categorised as closed autocracies (as they never hold elections), resulting in the same 94 countries. Our sample does not include countries that held elections during 2020 for several reasons: 1) since our data is only annual, these elections divide the year into the treated and nontreated periods; 2) elections themselves may cause an increase in COVID-19 spread (e.g., Palguta et al. 2022); 3) holding elections may decrease both state capacity to register COVID-19 statistics on time. A list of the countries is provided in Table A2.1 in the appendix.

2.3.1 Construction of key variables

Official COVID-19 Mortality[3]: Data on reported COVID-19 deaths is obtained from the World Health Organisation (WHO) database. The WHO collects data on COVID-19 mortality by continuously monitoring the official websites and social media accounts of Ministries of Health worldwide. This data is compiled at the WHO regional level and reported daily to the headquarters. We collect official COVID-19 mortality data from 1st of January to December 31st, 2020, and aggregate them to annual averages for each country. We then normalise this annual average by dividing it by the three-year average all-cause mortality from 2017 to 2019 for comparability. Using pre-pandemic years makes countries comparable while avoiding contamination from pandemic fatalities. It also accounts for variations in country size and baseline mortality. Hence, the variable is computed as:

[3] Official statistics refer to mortality and case data compiled and verified by the WHO and national health agencies. The term is used here to denote standardised, publicly reported datasets, even when normalised for analytical purposes.

$$Official\ Covid\ Mortality_i = \frac{Reported\ Covid19\ Deaths_{\ i}}{Average\ Past\ Total\ Deaths_i}\ , \qquad (2.1)$$

where *i* indicates a country.

Excess Mortality: In line with the literature (Msemburi et al., 2023; Kofanov et al., 2023; Karlinsky & Kobak, 2021), we proxy for the mortality caused by the pandemic using a measure of excess mortality. Excess mortality reflects the number of deaths from all causes during the pandemic that exceed the expected number based on previous years' data, capturing the broader impact of the pandemic. This contrasts with officially reported COVID-19 fatalities, which may be underreported or manipulated, as documented in various studies. The data is from the United Nations Population Division (2023). Following Kofanov et al. (2023), we first calculate the number of excess deaths as the difference between the current total number of deaths and the past total number of deaths, averaged over the last three years. We consider only positive excess deaths, as they reflect the actual death toll from the virus. We construct the variable for *Excess Mortality* as follows:

$$Excess\ Mortality_i = \begin{cases} 100 * \frac{Excess\ deaths_i}{Average\ Past\ Total\ Deaths_i}, & \text{if } Excess\ deaths_i > 0 \\ 0, & \text{if } Excess\ deaths_i < 0 \end{cases} \qquad (2.2)$$

Underreporting: We capture the level of underreporting by taking the difference between excess mortality and official COVID mortality (as in Knutsen and Kolvani, 2022):

$$Under\ Reporting_{\ i} = Excess\ Mortality_i - Official\ Covid\ Mortality_i \qquad (2.3)$$

Elections: We examine the most prominent type of election for a position of executive authority—presidential elections. Our empirical design takes advantage of the fact that presidential elections worldwide are held at different times; in any given year, all countries can be split into two groups: those that will soon hold presidential elections and those that will not. Using data from the V-Dem Institute (V-Dem Institute 2023), we construct an Upcoming Election variable that equals one if a country has presidential elections in the following two

years and zero otherwise. About one-quarter of countries (24 out of 94) in our sample expected presidential elections in the following two years.[4]

Democracy: Data on the country's democracy level also comes from the V-Dem Institute (V-Dem Institute 2023). The index is a continuous variable ranging from 0 to 1, with 0 indicating the lowest level of democratic governance and 1 the highest. This index aims to measure the responsiveness of governmental systems and political leaders to their citizens. An additional robustness measure of democracy is obtained from the Economic Intelligence Unit (EIU 2022). This index is scaled from 0 to 10, with the overall value representing an average of five scores. Both democracy measures are taken for a pre-pandemic year (2019) to avoid potential simultaneity bias.

State capacity: State capacity is proxied by gross domestic product (GDP) per capita (World Bank 2023), assuming that richer countries have greater capacity to record COVID data accurately. Additionally, we utilise data from the World Health Organisation on the number of doctors per 10,000 inhabitants (WHO, 2023) to control for the supply of health services. Again, the values of both variables are taken for 2019.

Demography: We supplement our analysis with estimates of population size and the share of older, and hence more vulnerable, population groups (>65 years old) from the United Nations' World Population Prospects (UNPD, 2023) for the pre-COVID year.

[4] Parliamentary elections, opposite to presidential, have been found to cause substantially smaller political cycles potentially due to their „individual vs. collective nature“ hold on power (e.g., Persson and Tabellini, 2003). Nevertheless, we estimate the effect of electoral pressure from the upcoming parliamentary election (in 2021-22) akin to our baseline model and provide the results in Appendix A, Table A2.2 (for the estimations), and Figure A2.1 with the plot for the conditional marginal effects. We find no effect of parliamentary elections on the underreporting of COVID-19 mortality.

2.3.3 Quasi-Randomisation

Our identifying assumption is that countries facing upcoming elections (the "treated" group) are no different in their inclination to misreport COVID-19 numbers from those that do not (the control group), except that they do face elections. We provide two pieces of evidence supporting this assumption. First, the onset of COVID-19 was completely unexpected and left no room in 2020 to change elections; it was an exogenous shock that affected countries differently and randomly across their asymmetric election cycles. Second, there are no differences in observables between the treated and control groups – we can effectively exclude selection on observables. Table 2.1 provides the results from balancing tests for all control variables, comparing countries with and without upcoming elections across key variables such as excess mortality, GDP per capita, and population. The p-values for each variable (e.g., 0.142 for excess mortality, 0.279 for GDP per capita) indicate that there are no statistically significant differences between the two groups. This suggests that, aside from the electoral context, the countries are relatively similar in terms of these characteristics.

Moreover, the joint significance test (Prob > F = 0.76) fails to reject the null hypothesis, implying that the combined set of variables does not differ significantly between the two groups. This supports the comparability of the countries with and without upcoming elections, ensuring that any differences observed in later analyses are more likely to be related to the effect of electoral timing rather than to differences in the covariates examined here.

Table 2.1: Balancing Tests

	Approaching elections			
	No	Yes	Total	Test (p-value)
N	70 (74.5%)	24 (25.5%)	94 (100.0%)	
Excess Mortality	10.060 (8.262)	13.338 (12.047)	10.897 (9.413)	0.142
GDP per capita, log	8.841 (1.506)	8.468 (1.252)	8.746 (1.448)	0.279
Democracy (V-Dem)	0.609 (0.220)	0.547 (0.241)	0.593 (0.226)	0.242
Democracy (EIU)	6.178 (2.082)	5.745 (2.070)	6.066 (2.076)	0.382
Population, log	9.532 (1.674)	9.269 (1.480)	9.465 (1.623)	0.498
Population over 65, %	15.083 (2.202)	14.546 (2.373)	14.946 (2.246)	0.314
Doctors per 10,000 pop log	2.427 (1.436)	2.059 (1.650)	2.331 (1.494)	0.302

The test of joint significance (OLS) does not reject the null hypothesis that all coefficients of the variables in a regression on the binary variable *Upcoming election* are equal to zero; Prob > F = 0.76.

2.4 Development of Model

Given the cross-sectional nature of the data, we employ ordinary least squares regression (OLS) with robust standard errors to estimate the following equation:

$$Y_i = \alpha + \beta\, Upcoming\ Election_i + \gamma\, Democracy_{i2019} + X_{i2019}\pi + \delta_i + \epsilon_i\,, \qquad (2.4)$$

Where i indicates the country, the dependent variable Y_i Is it either officially reported COVID-19 mortality, excess mortality, or underreporting. We run separate models for each dependent variable, displaying them in one table under different columns to ensure comparability. $Upcoming\ Election_i$ is an indicator of approaching presidential elections within the next two years. $Democracy_{i2019}$ is the lagged democracy index; X_{i2019} is the vector of control variables; ϵ_i is the error term.

We lag the variables to capture causal relationships better, accounting for potential endogeneity and mitigating reverse causality. Lagging control variables ensure that current outcomes are influenced by prior conditions rather than by simultaneous changes that could bias the results. This approach also captures the delayed effects of certain variables, such as economic conditions or demographic shifts, which may take time to impact the dependent variable. Therefore, lagging control variables enhance the robustness of the findings and help isolate the true effect of the explanatory variables(Wooldridge, 2010; Angrist & Pischke, 2008).

To test for heterogeneous effects, we interact election proximity with democracy: we surmise that elections will affect only countries that serve as effective accountability mechanisms.

$$Y_i = \alpha + \beta\, Upcoming\ Election_i + \gamma\, Democracy_{i2019} + \theta\, Upcoming\ Elections \times Democracy_{i2019} + X_{i2019}\pi + \delta_i + \epsilon_i . \quad (2.5)$$

2.5 Results

Table 2.2 shows descriptive statistics for the variables utilised in the analysis. These describe the sample's central tendencies and variation, which serve as a foundation for interpreting the regression estimates.

2.5.1 Descriptive Statistics and Pair-wise Correlation

Table 2.2: descriptive statistics

Official COVID-19 Mortality is COVID-19 deaths as a proportion of the three-year average of all-cause mortality from 2017 to 2019. Excess mortality measures the pandemic's actual death toll by comparing current total deaths to expected deaths based on the average of the past three years. Underreporting is the difference between excess mortality and official COVID-19 mortality. Upcoming Election is a binary variable set to 1 if a country has presidential elections within the next two years and 0 otherwise. Democracy measures a country's electoral democratic governance on a scale from 0 to 1. Higher values indicate stronger democratic institutions. A secondary measure from the Economic Intelligence Unit ranges from 0 to 10, providing an alternative robustness check. GDP per capita is the gross domestic product divided by mid-point population, and the doctors log is the log of the number of doctors per 10,000 people. Population is the log of the total population. Population and the proportion of the population over 65 years old. *** p<0.01, ** p<0.05, * p<0.1. The pairwise correlation presents variables used in the analysis, but not all the variables have been used in the same regression analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
Underreporting	98	6.679	7.737	0	42.328
Official covid-19 mortality	98	4.895	5.574	.015	18.811
Excess mortality	98	11.407	10.078	0	59.193
Elections-Presidential	98	.245	.432	0	1
Elections-Parliamentary	98	.541	.501	0	1
GDP per capita log	98	8.734	1.484	6.118	12.015
Democracy (VIDEM)	94	.593	.226	.176	.915
Democracy (EIU)	94	6.066	2.076	1.13	9.87
Populaion	98	9.295	1.833	3.657	14.149
Old age log	98	14.822	2.466	6.574	20.653
Doctors log	96	2.381	1.409	-.693	4.261

Table 2.3 displays the pairwise correlations between the main variables. This helps assess preliminary relationships and detect potential multicollinearity before generating regression models.

Table 2.3: Pairwise correlations

Official COVID-19 Mortality is COVID-19 deaths as a proportion of the three-year average of all-cause mortality from 2017 to 2019. Excess mortality measures the pandemic's actual death toll by comparing current total deaths to expected deaths based on the average of the past three years. Underreporting is the difference between excess mortality and official COVID-19 mortality. Upcoming Election is a binary variable set to 1 if a country has presidential elections within the next two years and 0 otherwise. Democracy measures a country's electoral democratic governance on a scale from 0 to 1. Higher values indicate stronger democratic institutions. A secondary measure from the Economic Intelligence Unit ranges from 0 to 10, providing an alternative robustness check. GDP per capita is the gross domestic product divided by the midpoint population, and doctorslog is the log of the number of doctors per 10,000 people. Population is the log of the total population. Population and the proportion of the population over 65 years old. *** p<0.01, ** p<0.05, * p<0.1. The pairwise correlation presents variables used in the analysis, but not all the variables have been used in the same regression analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Under-reporting	1.000									
(2) Covid Mortality	0.118	1.000								
(3) Excess Mortality	0.848*	0.625*	1.000							
(4) Election president	0.063	0.103	0.110	1.000						
(5) Election parliament	0.101	0.085	0.125	0.334*	1.000					
(6) GDP per capita log	-0.157	0.520*	0.148	-0.134	0.133	1.000				
(7) Democracy	-0.358*	0.468*	-0.045	-0.122	0.100	0.726*	1.000			
(8) Population	0.031	-0.098	-0.034	-0.004	0.110	-0.254*	-0.177	1.000		
(9) Old age log	-0.015	0.004	-0.017	0.032	0.134	0.100	0.204*	0.750*	1.000	
(10) Doctors log	0.054	0.545*	0.318*	-0.147	0.216*	0.848*	0.624*	-0.071	0.253*	1.000

2.5.2 Baseline regression results

We present the regression results in Table 2.4 using three specifications for each dependent variable. The first, the most parsimonious specification (Columns 1, 4, 7) includes only a dummy for upcoming elections, democracy, lagged GDP per capita as a capacity proxy, and excess mortality (only when dependent variables are official COVID-19 mortality or underreporting). Further, in Columns 2, 5, and 8, we add demographic variables and the number of doctors per capita. Finally, we estimate the model with the election variable interacted with the democracy index to test for heterogeneous effects (Columns 3, 6, 9).

Our main variable of interest is the indicator for upcoming presidential elections – quasi-randomised by the staggered electoral schedule. We find that the forthcoming presidential polls significantly increase the officially reported COVID-19 mortality (as shown in Columns 1 and 2), suggesting that governments may be more transparent in reporting COVID-19 deaths as elections approach. However, this effect does not extend to the actual death toll from the virus, as measured by excess mortality (reported in Columns 4 and 5), where no significant impact is

observed. This indicates that while reported mortality figures rise, the true extent of the pandemic, as measured by excess deaths, remains unchanged.

Moreover, in Columns 7 and 8, we observe that upcoming elections substantially reduce underreporting of COVID-19 deaths. This suggests that electoral pressures encourage governments to report more accurate figures, possibly to maintain public trust and secure electoral support. The effect size is statistically significant and economically meaningful, with upcoming elections accounting for approximately 26% of a standard deviation in underreporting. This indicates that upcoming elections play a notable role in ensuring more accurate reporting of pandemic-related fatalities, likely reflecting the incentives for transparency when governments face electoral accountability.

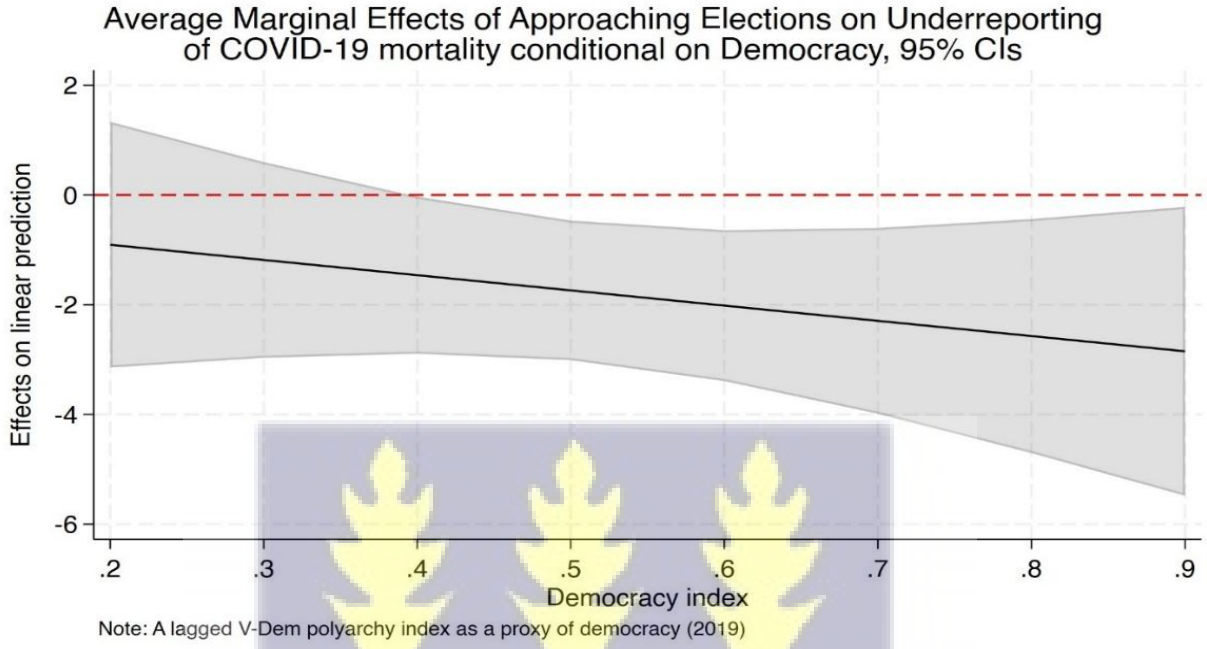
When we examine democracy in the context of upcoming elections (Columns 3, 6, 9), we observe that the effect becomes stronger the more democratic the country is. This nonlinear conditional relationship is best illustrated by a margins plot in Figure 2.1 (Column 9 estimation), with the effect on underreporting becoming different from zero when a country surpasses an index value of 0.5 – a threshold often used to categorise an electoral democracy. The findings advance Political Business Cycle theory. Rather than manipulation, democratic elections increased accurate disclosure. This reflects stewardship, in which incumbents are held accountable for accurate nonfinancial reporting.

The degree of democracy is associated with higher reported COVID-19 deaths and lower underreporting compared to nondemocratic countries. Still, it exhibits no statistically significant difference in excess mortality (this result is similar to the balance test in Table 2.1). This aligns with the literature (Neumayer & Plümper, 2022; Knutsen & Kolvani, 2022).[5] Earlier studies using official counts showed that democracies perform better, but utilising excess

[5] As democracy is endogenous we do not interpret the result as causal.

mortality narrows this disparity and demonstrates how election timing impacts disclosure. Data quality, not just outcomes, is crucial.

Figure 2.1:Conditional marginal effects (Column 9, Table 2.2)



We also observe interesting results for our other control variables. GDP per capita is associated with more reporting of COVID-19, more excess deaths, and less underreporting (Columns 1, 4, 7). However, this relationship is not robust to the inclusion of additional controls, particularly the number of doctors per capita as a proxy for healthcare capacity.

Table 2.4: Elections and reporting of COVID-19 mortality

Official COVID-19 Mortality is COVID-19 deaths as a proportion of the three-year average of all-cause mortality from 2017 to 2019. Excess mortality measures the actual death toll of the pandemic by comparing current total deaths to the expected deaths based on the average of the past three years. Underreporting is the difference between excess mortality and official COVID-19 mortality. Upcoming Election is a binary variable set to 1 if a country has presidential elections within the next two years and 0 otherwise. Democracy measures a country's electoral democratic governance on a scale from 0 to 1. Higher values indicate stronger democratic institutions. A secondary measure from the Economic Intelligence Unit ranges from 0 to 10, providing an alternative robustness check. GDP per capita is the gross domestic product divided by the midpoint population, and the doctor's log is the log of the number of doctors per 10,000 people. Population is the log of total population. population and the proportion of the population over 65 years old. *** p<0.01, ** p<0.05, * p<0.1. Note: Robust SE. p-values are in parentheses; * indicates p < 0.1, ** p < 0.05, *** p < 0.01.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable:	Official COVID-19 mortality			Excess mortality			Underreporting		
Approching elections	1.54**	1.91***	0.68	3.35	3.31	2.54	-1.58**	-1.93***	-0.35
	(0.03)	(0.00)	(0.69)	(0.21)	(0.16)	(0.54)	(0.02)	(0.00)	(0.83)
Elections * Democracy			2.17			1.37			-2.77
			(0.48)			(0.84)			(0.35)
Democracy	8.44***	9.47***	8.70***	-9.21	-8.63*	-9.11	-7.97***	-8.96***	-7.98***
	(0.00)	(0.00)	(0.00)	(0.10)	(0.06)	(0.12)	(0.00)	(0.00)	(0.00)
GDP per capita, log	0.72***	0.69	0.77*	1.75**	-3.55***	-3.50**	-0.63**	-0.58	-0.70
	(0.00)	(0.13)	(0.10)	(0.01)	(0.01)	(0.01)	(0.01)	(0.17)	(0.12)
Excess Mortality	0.32***	0.31***	0.31***				0.68***	0.68***	0.69***
	(0.00)	(0.00)	(0.00)				(0.00)	(0.00)	(0.00)
Population, log		0.19	0.18		0.55	0.53		-0.15	-0.13
		(0.57)	(0.62)		(0.41)	(0.43)		(0.64)	(0.70)
Population over 65		0.22	0.22		-0.36	-0.36		-0.22	-0.22
		(0.34)	(0.33)		(0.46)	(0.47)		(0.33)	(0.31)
Doctors per capita, log		-0.06	-0.13		6.12***	6.07***		0.06	0.15
		(0.91)	(0.80)		(0.00)	(0.00)		(0.91)	(0.77)
Observations	94	92	92	94	92	92	94	92	92
R2	0.62	0.67	0.67	0.06	0.31	0.31	0.83	0.85	0.85

Table 2.5: Robustness with an alternative democracy index (EIU)

Official COVID-19 Mortality is COVID-19 deaths as a proportion of the three-year average of all-cause mortality from 2017 to 2019. Excess mortality measures the pandemic's actual death toll by comparing current total deaths to expected deaths based on the average of the past three years. Underreporting is the difference between excess mortality and official COVID-19 mortality. Upcoming Election is a binary variable set to 1 if a country has presidential elections within the next two years and 0 otherwise. Democracy measures a country's electoral democratic governance on a scale from 0 to 1. Higher values indicate stronger democratic institutions. A secondary measure from the Economic Intelligence Unit ranges from 0 to 10, providing an alternative robustness check. GDP per capita is the gross domestic product divided by mid-point population, and the doctors log is the log of the number of doctors per 10,000 people. Population is the log of the total population. Population and the proportion of the population over 65 years old. *** p<0.01, ** p<0.05, * p<0.1. Note: Robust SE. p-values are in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01.

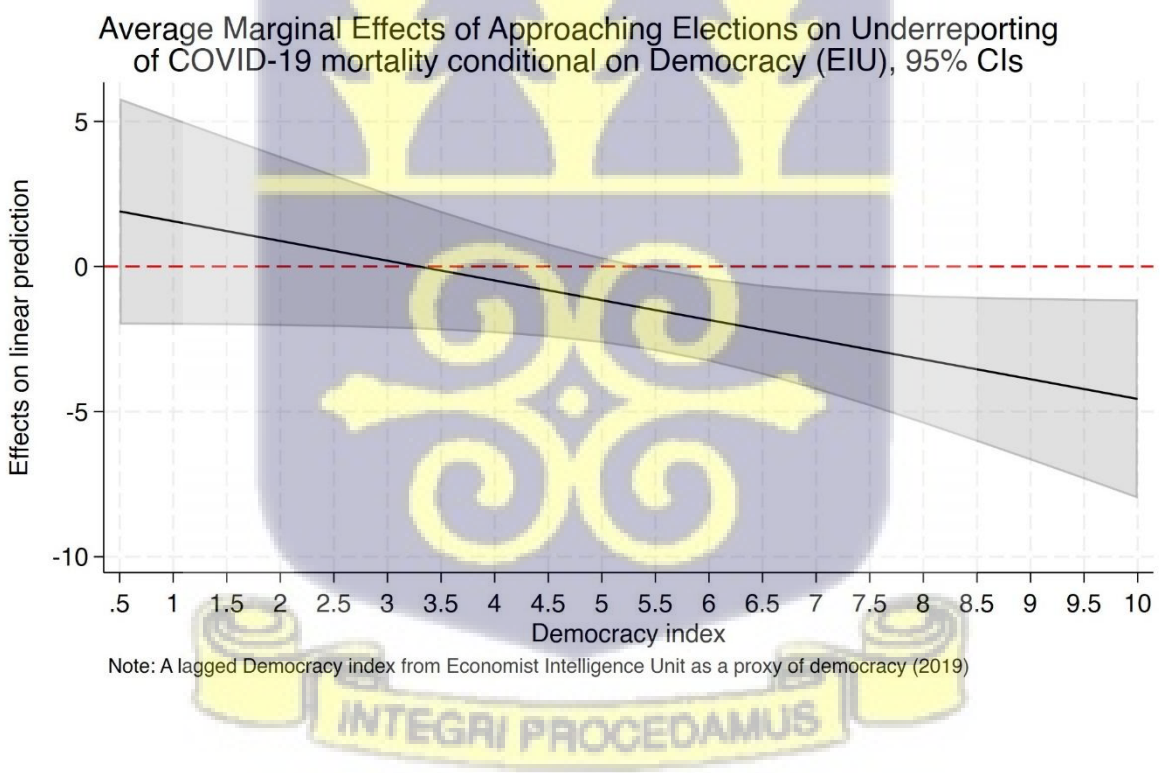
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable:	Official COVID-19 mortality			Excess mortality			Underreporting		
Approaching elections	1.38*	1.72**	-1.96	3.54	3.57	2.29	-1.43*	-1.75**	2.24
	(0.07)	(0.02)	(0.37)	(0.19)	(0.13)	(0.58)	(0.06)	(0.02)	(0.30)
Elections * Democracy (EIU)			0.63*			0.22			-0.68*
			(0.09)			(0.75)			(0.06)
Democracy (EIU)	0.51**	0.51**	0.30	-1.35**	-1.29**	-1.36**	-0.47**	-0.48**	-0.25
	(0.03)	(0.03)	(0.27)	(0.03)	(0.01)	(0.02)	(0.04)	(0.03)	(0.33)
GDP per capita, log	1.13***	1.00*	1.28**	2.20***	-2.97**	-2.87**	-1.02***	-0.88*	-1.19**
	(0.00)	(0.06)	(0.02)	(0.00)	(0.02)	(0.04)	(0.00)	(0.08)	(0.03)
Excess Mortality	0.31***	0.30***	0.30***				0.69***	0.70***	0.70***
	(0.00)	(0.00)	(0.00)				(0.00)	(0.00)	(0.00)
Population, log		-0.03	-0.06		0.74	0.73		0.06	0.1
		(0.93)	(0.87)		(0.28)	(0.28)		(0.85)	(0.78)
Population over 65		0.32	0.31		-0.39	-0.4		-0.32	-0.3
		(0.20)	(0.20)		(0.44)	(0.44)		(0.20)	(0.19)
Doctors per capita log		0.09	-0.12		6.02***	5.95***		-0.09	0.14
		(0.86)	(0.83)		(0.00)	(0.00)		(0.86)	(0.79)
Observations	93	91	91	93	91	91	93	91	91
R2	0.58	0.61	0.62	0.07	0.33	0.33	0.81	0.83	0.83

2.5.2 Robustness tests

To test the robustness of the baseline results, we introduce variations to the equations by using an alternate measure of democracy.

In Table 2.5, an alternative measure of democracy from the Economist Intelligence Unit (EIU) is used. The econometric estimates are very similar to Table 2.4. Approaching elections increases officially reported COVID-19 mortality but significantly reduces underreporting. The conditional marginal effects for the estimation of underreporting in Column 9 of Figure 2.2 show a picture similar to that in Figure 2.1: a significant negative impact of upcoming elections emerges only in relatively democratic countries.

Figure 2.2: Conditional marginal effects (Column 9, Table 2.3)



2.6 Discussion of the mechanisms

Our quasi-experimental setting has established a novel and causal relationship between upcoming elections and the underreporting of COVID-19 mortality at the onset of the pandemic. We acknowledge that a cross-country setting has limited potential for establishing

the exact mechanics of this effect (as opposed to a within-country design); in this section, we nevertheless attempt to give illustrative (*but not causal*) evidence on "why" and "how" governments engaged in data manipulation under the high uncertainty of the first pandemic year.[6]

2.6.1 Declining trust as a deterrent to underreporting.

Why do democracies report more truthfully in the light of upcoming elections? Previous research suggests two mechanisms. First, a higher number of COVID-19 deaths might trigger a "rally-around-the-flag" effect and increase support for the incumbent (e.g., Yam et al., 2020; van der Meer et al., 2023). The more severe the situation, the stronger the effect.[7] Therefore, a strategy to truthfully report the pandemic situation would be beneficial before the election. Second, voters might penalise the incumbent for underreporting when exposed; hence, politicians favour more truthful reporting to avoid this risk.

We shed light on those mechanisms utilising an annual nationally representative survey by the Centre for Well-Being, Inclusion, Sustainability and Equal Opportunity (WISE) for all OECD countries (n=31). The survey reports the share of respondents who trust the national government. We construct a measure of a change in trust in government between 2019 (pre-pandemic year) and 2021 as a simple difference in reported shares and regress it on our measure of underreporting or on both officially reported COVID-19 mortality and excess mortality, as depicted in Equations 2.6 and 2.7:

[6] While autocratic governments may simply forge COVID-19 numbers (Kofanov et al. 2023), democratic countries might establish specific data reporting standards which will inflate or deflate actual numbers. Anecdotal evidence supports this notion: Discombe (2020) reports that the relatively low mortality from COVID-19 in England can be explained by the omission of COVID-19 deaths from out-of-hospital locations such as nursing homes – which was in stark contrast to other countries such as France. Interestingly, both countries had another particular distinction: French political incumbents in 2020 were facing electoral concerns the following year, while English government did not experience such pressure.

[7] However, a recent study by Poma and Pistoresi (2023) that tests a rally-around-the-flag in the EU finds no evidence.

$$\Delta Trust\ in\ Government_i = \alpha + \beta\ Underreporting_{\ i} + \epsilon_i\ , \quad (2.6)$$

$$\Delta Trust\ in\ Government_i = \alpha + \beta\ Official\ COVID19\ mortality_{\ i} + \mu\ Excess\ mortality_{\ i} + \epsilon_i\ , \quad (2.7)$$

We present the results in Table 2.6, columns 1-2. Column 1 shows that underreporting is negatively correlated to the decline in trust in government, and the effect is statistically and economically significant: one standard deviation in underreporting decreases $\Delta Trust\ in\ Government_i$ By 60% of its standard deviation. Column 2 performs the estimation in Equation 2.2 and finds similar results: the coefficient for $Official\ COVID19\ mortality_{\ i}$ is positive and significant, implying an increase in trust due to more COVID reporting, while the coefficient of $Excess\ mortality_{\ i}$ It is negative but has a very similar magnitude to the former; hence, assuming that excess mortality is higher than official COVID death statistics, it represents the penalty for underreporting.

We conduct three placebo tests to exclude the possibility that (unobservable) variables correlated with underreporting are responsible for the decline in trust levels rather than the underreporting at the onset of the pandemic. First, we relate underreporting during the pandemic to changes in trust prior to the pandemic, i.e., between 2017 and 2019. Results are insignificant and positive (columns 3-4), indicating that governments that were underreported in 2020 were not already experiencing a decline in trust levels before the pandemic. Second and third, we relate underreporting to changes in corruption during the pandemic (2019-2021, columns 5-6) and before the pandemic (2017-19, columns 7 – 8), investigating whether countries that were underreporting in 2020 saw their governance quality deteriorating (prior to or during the pandemic) and therefore lost trust. This is not the case – estimates are nearly zero and highly insignificant.

Table 2.6: Change in trust in government and corruption (OECD countries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimation:	Main results		Placebo		Placebo		Placebo	
Dep. Variable:	Trust change 2019-2021		Trust change 2017-2019		Corruption change 2019-2021		Corruption change 2017-2019	
Underreporting	-0.59***		0.51		0.03		0.02	
	(0.01)		(0.22)		(0.61)		(0.57)	
Official COVID-19 mortality		0.77**		-0.38		-0.01		-0.04
		(0.03)		(0.54)		(0.92)		(0.75)
Excess mortality		-0.63***		0.52		0.02		0.03
		(0.00)		(0.18)		(0.67)		(0.54)
Observations	29	29	30	30	31	31	31	31
R2	0.20	0.24	0.08	0.11	0.01	0.01	0.00	0.01

Note: Robust SE. P-values are in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01.

Using data on trust in government across OECD countries, we show a strong negative correlation between changes in trust levels after the pandemic onset and COVID-19 mortality underreporting. This evidence suggests that the primary mechanism behind our central result is democratic governments' aversion to the costs associated with being exposed to underreporting. This would erode trust and compromise reelection probabilities. Thus, Trust levels influence the outcome. Near elections, the cost of lost trust forces incumbents to align reported fatalities with excess mortality.

2.7 Conclusion

This chapter contributes to the literature on the impact of approaching presidential elections on COVID-19 (mis)reporting across governmental regimes. We employ the quasi-natural experiment of the COVID-19 onset and show that approaching elections increases *reported* COVID-19 deaths causally, which is not mirrored by an increase in *actual* COVID-related deaths (as measured by excess mortality). This bears witness to a politically motivated information policy in the pandemic. As elections draw near, underreporting significantly decreases, only among democracies, supporting the notion that underreporting may compromise reelection probabilities, either because misreporting is seen as a weakness of the

government in the light of a fundamental exogenous crisis or because a "rallying around the flag" response of the voters may favour the incumbent the more, the more severe the reported crisis is perceived to be by the electorate. We provide suggestive evidence that misreporting erodes trust in democratic governments. Our findings highlight democratic elections as an effective mechanism for accountability against data manipulation. Mortality reporting around elections acts similarly to disclosure under audit. Stronger accountability structures reduce the scope for misreporting. The findings suggest that regime type plays a critical role in shaping the credibility of public health data during crises. In democracies, electoral pressure can strengthen accountability, making governments more likely to report health data accurately. By contrast, underreporting undermines public trust and weakens governments' long-term legitimacy. For policymakers, this means safeguarding transparency in health statistics is vital not only for crisis management but also for sustaining institutional credibility beyond the immediate emergency.

Appendix, Chapter 2

Table A2.1. List of countries in the baseline sample

Countries in the sample were selected based on the presence of upcoming presidential elections

No.	With no elections in 2021 or 2022	No.	With elections in 2021 or 2022
1	Afghanistan	1	Austria
2	Albania	2	Benin
3	Algeria	3	Bosnia and Herzegovina
4	Angola	4	Brazil
5	Argentina	5	Bulgaria
6	Armenia	6	Cabo Verde
7	Australia	7	Chad
8	Bangladesh	8	Chile
9	Belgium	9	Colombia
10	Botswana	10	Congo
11	Canada	11	Costa Rica
12	Cyprus	12	Djibouti
13	Czechia	13	Ecuador
14	Democratic Republic of the Congo	14	Equatorial Guinea
15	Denmark	15	France
16	El Salvador	16	Gambia
17	Estonia	17	Honduras
18	Ethiopia	18	Kenya
19	Fiji	19	Nicaragua
20	Finland	20	Philippines
21	Gabon	21	Portugal
22	Germany	22	Slovenia

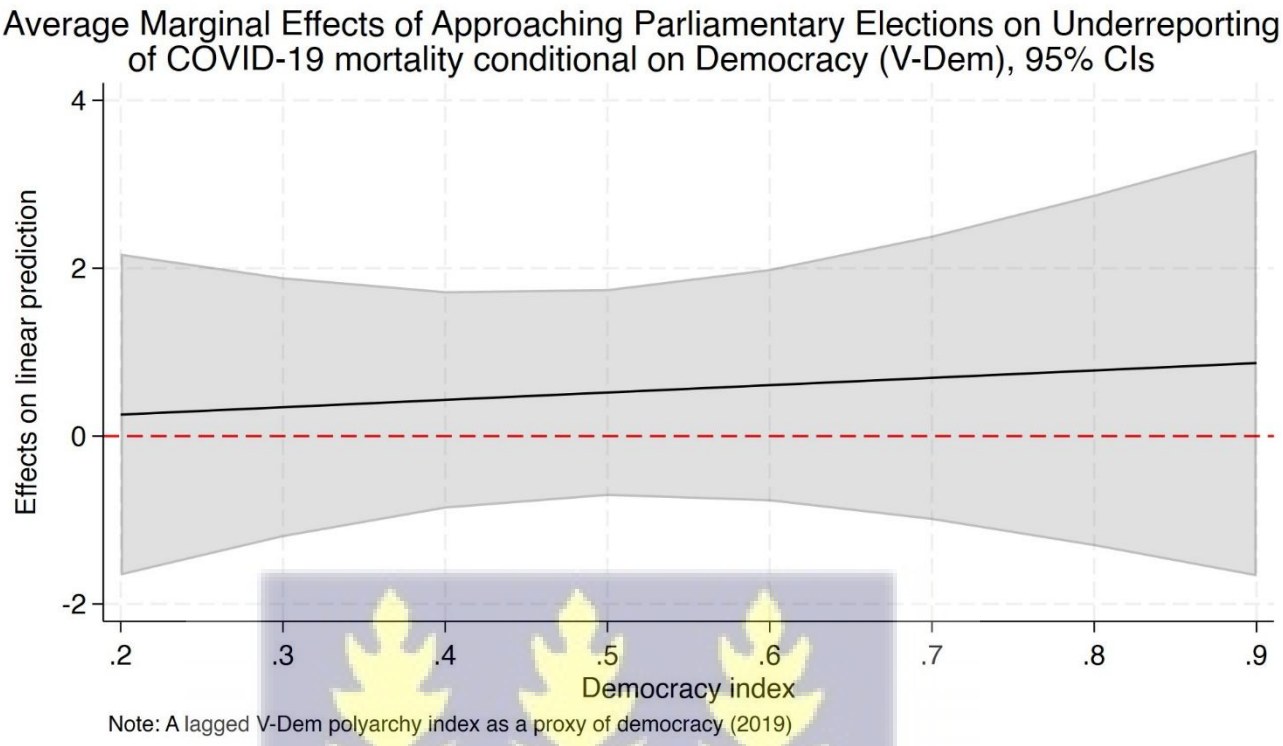
23	Greece	23	Uganda
24	Guatemala	24	Zambia
25	Guinea-Bissau		
26	Haiti		
27	Hungary		
28	India		
29	Indonesia		
30	Iraq		
31	Italy		
32	Japan		
33	Kazakhstan		
34	Latvia		
35	Lebanon		
36	Lesotho		
37	Liberia		
38	Luxembourg		
39	Madagascar		
40	Malaysia		
41	Maldives		
42	Malta		
43	Mauritania		
44	Mauritius		
45	Mexico		
46	Mozambique		
47	Namibia		
48	Nepal		
49	Netherlands		
50	Nigeria		
51	Norway		
52	Pakistan		
53	Panama		
54	Papua New Guinea		
55	Paraguay		
56	Russian Federation		
57	Rwanda		
58	Senegal		
59	Sierra Leone		
60	South Africa		
61	Spain		
62	State of Palestine		
63	Sweden		
64	Switzerland		
65	Tunisia		
66	TÃƒÂ¼rkiye		
67	Ukraine		
68	United Kingdom		
69	Uruguay		
70	Zimbabwe		

Table A2.2: Estimation results for approaching parliamentary elections (included in the baseline)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Variable:	Official COVID-19 mortality			Excess mortality			Underreporting		
Approaching (presidential) elections	1.85***	2.20***	0.87	2.29	2.83	0.77	-1.86***	-2.17***	-0.51
	(0.01)	(0.00)	(0.62)	(0.40)	(0.24)	(0.85)	(0.01)	(0.00)	(0.77)
Elections (presidential) * Democracy (V-Dem)			2.32			3.43			-2.9
			(0.46)			(0.61)			(0.35)
Approaching (parliamentary) elections	-0.86	-0.76	-0.11	2.73	1.23	5.25	0.76	0.64	0.08
	(0.27)	(0.33)	(0.94)	(0.15)	(0.46)	(0.22)	(0.29)	(0.36)	(0.95)
Elections (parliamentary) * Democracy (V-Dem)			-1.04			-6.57			0.88
			(0.72)			(0.32)			(0.74)
Democracy (V-Dem)	8.38***	9.31***	9.23***	-8.83	-8.33*	-4.8	-7.91***	-8.83***	-8.43***
	(0.00)	(0.00)	(0.00)	(0.11)	(0.06)	(0.54)	(0.00)	(0.00)	(0.00)
GDP per capita, log	0.80***	0.73	0.79	1.48**	-3.61***	-3.65**	-0.70***	-0.62	-0.71
	(0.00)	(0.12)	(0.11)	(0.05)	(0.01)	(0.01)	(0.01)	(0.16)	(0.13)
Excess Mortality	0.32***	0.31***	0.31***				0.67***	0.68***	0.68***
	(0.00)	(0.00)	(0.00)				(0.00)	(0.00)	(0.00)
Population, log		0.22	0.2		0.51	0.5		-0.17	-0.15
		(0.54)	(0.58)		(0.47)	(0.47)		(0.60)	(0.66)
Population over 65		0.2	0.21		-0.34	-0.31		-0.21	-0.21
		(0.39)	(0.37)		(0.50)	(0.55)		(0.36)	(0.34)
Doctors per capita log		-0	-0.08		6.00***	5.87***		0.01	0.11
		(0.99)	(0.88)		(0.00)	(0.00)		(0.98)	(0.84)
Observations	94	92	92	94	92	92	94	92	92
R2	0.63	0.67	0.67	0.08	0.32	0.32	0.83	0.85	0.86

Note: Robust SE. P-values are in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01.

Figure A2.1: Conditional marginal effects (Column 9, Table A2.2)



CHAPTER III

COVID-19 STAY AT HOME POLICY AND CRIME RATES

COVID-19 stay-at-home policy and crime rates

Abstract

The research question addressed in this study is: What is the effect of the COVID-19 stay-at-home policy on street crime levels? The study evaluates whether this policy significantly influences street crime levels by utilising a three-month stay-at-home policy from March 2020 to May 2020 in the selected countries. Additionally, the heterogeneous effects of these policies on crime rates among democratic economies are assessed. From an accountability standpoint, this study reveals that crisis policies shift state responsibilities beyond health outcomes to the larger social order. It indicates that accountability during a pandemic entails not only providing policy diagnoses but also examining how containment policies affect crime.

Data on crime rates and various social, geographic, and economic control variables at the country level are used in the analysis. The results indicate that while stay-at-home policies significantly reduce street crime rates, the interaction between the policy and democratic governance is positively significant. A placebo test is used to estimate 2020 crime rates under the hypothetical assumption of the absence of pandemic-related effects, using a Seasonal Auto-Regressive Integrated Moving Average (SARIMA) model. Regional and month-fixed effects are used to account for within-country variations in crime and differences in policy implementation. The study concludes that introducing the policy in the early months of the pandemic significantly reduced crime rates. However, the interaction with democratic governance shows a positive and significant effect. The placebo test results were statistically insignificant, suggesting that there were no preexisting trends in crime rates associated with the stay-at-home policy. For policymakers, the findings show that effective crisis governance necessitates acknowledging these broader obligations. Stay-at-home policies lower crime, although their effectiveness varies by regime type. Integrating accountability into crisis policy entails considering both health and social repercussions when assessing government responses.

3.1 Introduction

The COVID-19 pandemic, which began in early 2020, compelled governments worldwide to implement rigorous measures to prevent the virus from spreading. One of the most notable measures was the enforcement of stay-at-home policies. These policies restricted social interactions and movement and had far-reaching implications beyond public health, particularly regarding crime rates. In this way, the study places stay-at-home policies into accountability discussions, showing that governmental stewardship during crises covers both health and social order. This study examines the impact of the COVID-19 stay-at-home policy on crime levels, with a particular focus on whether the policy substantially impacted crime rates and how its effects varied across democratic economies.

The relevance of this research question lies in the need to conceptualise the broader societal implications of public health interventions in the accountability debates. Although the primary objective of stay-at-home policies was to reduce the spread of COVID-19, these policies also established distinctive circumstances that could potentially influence criminal behaviour. Shayegh and Malpede (2020) conducted research demonstrating substantial decreases in crime: 43% in San Francisco and 50% in Oakland, both due to early stay-at-home directives. This research underscores the direct impact of these interventions on urban crime rates. Similarly, Boman and Gallupe (2020) found a substantial decrease in overall crime, with a particular decrease in minor offenses such as vandalism and petty theft. This finding underscores that reducing social interactions due to stay-at-home orders has significantly reduced the opportunities for such crimes. Abrams (2021) corroborated these findings by observing substantial decreases in a variety of crime categories, such as larceny (28%), drug crimes (65%), simple assault (33%), and rape (39%). This suggests that the decrease in public activity was a significant factor in reducing crime rates. Estévez-Soto (2021) observed a reduction in

crime in Mexico City, which she attributed in part to reduced public transport use, which restricted the mobility and opportunities of potential offenders.

Additionally, Nivette et al. (2021) demonstrated a 37% average reduction in crime across 27 cities in 23 countries, demonstrating the widespread efficacy of stay-at-home policies in curbing crime. These studies demonstrate the substantial, unintended effects of public health measures, such as stay-at-home orders, on crime rates. This study is essential for policymakers, law enforcement, and public health officials striving to balance public health and safety.

This study addresses a critical gap in the literature by focusing on the effects of stay-at-home policies on crime rates and examining their heterogeneous impact across political regimes. Although the nexus between stay-at-home policy and crime has been examined in the literature, previous studies have primarily focused on weekly analyses of the policy's impact on crime rates (Shayegh & Malpede, 2020; Gerell et al., 2020; Felson et al., 2020; Asby, 2020; Pietrawska et al., 2020). Most of these studies have been conducted within a single city (Estévez-Soto, 2021; Campedelli et al., 2020; Felson et al., 2020) or across multiple cities within a single country (Meyer et al., 2022; Abrams, 2021; Asby, 2020), offering limited insight into cross-country variation. Additionally, while the relationship between political regimes and crime has been established (Cuesta, 2013; Fernandez & Kuenzi, 2010; Lin, 2007), the differential impact of stay-at-home policies across various political regimes during a pandemic crisis remains underexplored. Moreover, other studies have examined the effects of pandemic-related restrictions on crime at various levels of analysis. Trajtenberg et al. (2024) conducted a cross-city study across 45 cities worldwide to estimate the causal effects of lockdown stringency on various crime types. Pourshir et al. (2025) studied local authorities in England and Wales and demonstrated differences in how crime rates responded to limits within a single national context. Ceccato et al. (2022) employed spatiotemporal approaches to examine crime

patterns in three large cities (New York, São Paulo, and Stockholm), demonstrating how changes varied across cities and crime categories. While these studies contribute to our understanding of crime under pandemic settings, they mostly describe patterns of change in specific places. This analysis adds to the literature by utilising a cross-country approach and regressing crime outcomes on regime type, thereby positioning pandemic crime patterns within accountability debates about the broader social implications of crisis governance.

This study aims to fill these gaps by providing a comprehensive cross-country analysis of the relationship between stay-at-home policies, political regimes, and crime rates during the COVID-19 pandemic. This study is based on Stewardship Theory, which views governments as stewards responsible for ensuring public well-being amid crises. With respect to the pandemic, accountability evolves to include responsibility for broader social effects, such as criminality. To contextualise these effects, the study also draws on Routine Activity Theory, which explains how limitations on daily mobility alter the opportunities for crime. These viewpoints emphasise that policy restrictions rolled out by governments during a crisis must be examined for both their intended and unintended societal consequences.

This study employs a rigorous empirical strategy to isolate the effect of stay-at-home policies by using crime rate data from various countries and controlling for social, geographic, and economic factors. The analysis covers the period from March 2020 to May 2020, during which most countries implemented stay-at-home mandates. The results suggest that crime rates were generally reduced due to stay-at-home policies. However, the policy and democratic governance showed a positive, significant relationship, indicating that the policy's impact was contingent on the political context.

This investigation capitalises on a quasi-natural experiment framework, in which the stay-at-home policy serves as an exogenous disturbance independent of crime incidence. The sole

objective of this policy was to contain the pandemic and not to affect crime rates. This unexpected alignment enables a distinctive analysis of the policy's unintended consequences on crime. The homogeneity of the stay-at-home policy is further substantiated by including a placebo test that uses the Seasonal AutoRegressive Integrated Moving Average (SARIMA) model to estimate crime rates for 2020, assuming no pandemic occurred. Thus, reinforces the causal interpretation of the policy's impact on crime rates. The placebo test is statistically insignificant, implying that preexisting trends do not influence the observed policy effect.

The findings of this study extend beyond the immediate context of the COVID-19 pandemic. They underscore the importance of considering the broader social impacts of public health interventions and the need for context-specific policy designs. The positive interaction between stay-at-home policies and democratic governance highlights the complex dynamics influencing policy outcomes. In democratic countries, balancing individual freedoms and public safety may create different responses to policy interventions than non-democratic regimes. This study contributes to the current literature by offering empirical evidence on the unintended consequences of public health policies on crime. It emphasises the necessity of a comprehensive policy-making approach that incorporates public health objectives alongside social stability and safety considerations. Additionally, the results provide valuable insights for future policy responses to pandemics and other crises, underscoring the need for adaptive strategies that reflect diverse political and social contexts.

This chapter is divided into five sections: the first introduces the study and the gap; the second provides a concise literature review on crime, politics, and COVID-19; the third discusses the methodology; the fourth presents the findings; and the fifth concludes the chapter.

3.2 Theoretical and Empirical Overview

3.2.1 Democracy and crime

Stewardship theory views governments as caretakers of collective well-being, whose legitimacy is based on accountable, transparent governance (Davis et al., 1997; McKernan, 2012). During the COVID-19 pandemic, stewardship includes sustaining social order and public trust. Stay-at-home policies are an example of stewardship that protects citizens' health and safety. However, these efforts had unanticipated social consequences, including changes in crime rates. This research examines these variances through a stewardship lens, assessing whether democratic and non-democratic regimes fulfilled their stewardship commitments by balancing crisis control with accountability for social effects.

Moreover, Routine Activity Theory posits that crime results from the convergence of a motivated offender and a suitable target in the absence of a competent guardian. This convergence was disrupted by the stay-at-home orders, which increased security and reduced opportunities for crime by preventing potential offenders and targets from leaving their homes. Opportunity Theory also substantiates these findings, which posits that crime occurs when opportunities are both available and appealing. By restricting public gatherings and closing businesses, the pandemic diminished these opportunities.

Rational choice theory offers a valuable framework for understanding how crime shapes citizens' dispositions towards democracy. This theory proposes that individuals evaluate their social, political, and economic environments and form opinions regarding their satisfaction with these conditions. These opinions are subsequently translated into political preferences (support for the status quo, support for change, etc.). For democracy to flourish, many individuals must be convinced that it will enhance their lives and the prospects of their offspring (Moraski & Reisinger, 2003). The theory of rational choices predicts that political institutions will generate some utility, as it implies that individuals are comparable to

consumers in a market (Lane, 1995). This is in sharp contrast to previous scholarly traditions that either viewed political preferences as the results of a socialisation process or as being associated with social characteristics such as age, class, religion, and race (Hooghe, 2005; Van de Werfhorst & de Graaf, 2004).

The strength and stability of democracies are directly correlated with crime and social control. The legitimacy of democratic institutions and societal trust is compromised by high crime levels (Kleinfeld & Dancig-Rosenberg, 2022; LaFree, 2018; Grönlund & Setälä, 2012). In addition to exacerbating social cleavages and creating environments in which the affluent isolate themselves in protected communities, economic inequality, which often coincides with high crime rates, further threatens democratic stability (Fernandez & Kuenzi, 2010). The resulting societal divides are exacerbated. Economic growth and development can be directly affected by rising crime rates, which, in turn, pose a threat to the stability of democratic institutions (Koech, 2019; Fernandez & Kuenzi, 2010). The demand for resources dedicated to crime control and prevention has increased as a result of the high violent crime rates in certain regions of Latin America, Eastern Europe, and Africa, which have impeded economic development and discouraged direct investment.

Crime, crime control, and criminal punishment are critical national concerns. According to Garland (1991), how society addresses crime and penalises deviance indicates its fundamental principles. Globally, crime and public safety are of significant concern, as evidenced by public opinion research (Marivate & Moiloa, 2016; Quann & Hung, 2002). Crime rates frequently increase in countries undergoing democratic reforms, particularly in emerging democracies in Africa and Latin America, where they surpass global averages (Bergman, 2018; Bergman, 2006). Consequently, the consolidation of democracy in these countries is contingent upon

addressing crime and public safety concerns, which are frequently disregarded in the broader literature on political development.

Satisfaction with and support for democracy are diminished due to decreased trust in society and increased feelings of insecurity induced by high crime levels (Karstedt & LaFree, 2006). According to Caldeira and Holston (1999), citizens may perceive a direct correlation between democracy and rising crime rates, believing that democratic reforms safeguard criminals' rights and impede the criminal justice system. This perceived trade-off between public safety and democracy can lead to a preference for more authoritarian measures, as frequently observed in Latin America, where the public often supports "mano dura" (Seligson et al., 2003). Rational choice theory explains that citizens' support for democracy is substantially influenced by government performance, including crime control. Kitschelt (1992) observed that perceptions of economic performance significantly affect the degree of support for democracy in Central and Eastern Europe. Similarly, dissatisfaction with the economy has been associated with votes for authoritarian candidates, as evidenced in Russia (Seligson & Tucker, 2005), and a lack of trust in democratic institutions, as observed in the Andean region (Mainwaring, 2006).

In essence, while routine activity and opportunity theories describe how events shape the likelihood of crime, stewardship theory reframes such measures as part of the state's broader accountability commitments. The study uses criminological logic and accountability theory to analyse how different political regimes accounted for the social results of stay-at-home measures, expanding the concept of stewardship to the governance of crisis-induced social order.

3.2.2 Empirical Review: The Impact of COVID-19 Stay-at-Home Orders on Crime Rates

The COVID-19 pandemic and the ensuing stay-at-home orders have resulted in substantial changes in crime rates worldwide, offering a distinctive opportunity to test their impact across political institutions. This empirical review integrates results from numerous studies examining the influence of these governmental responses on various categories of crime across multiple cities worldwide. It emphasises common themes and connects the findings to produce a comprehensive analysis.

Research throughout the United States suggests that the pandemic has significantly decreased the overall crime rate. One of the earliest studies with the most striking results was conducted by Shayegh and Malpede (2020). Their findings indicated a 43% overall decrease in crime in San Francisco and an approximately 50% decrease in Oakland following the city's issuance of some of the most restrictive and earliest stay-at-home orders in the United States on March 16, 2020, and the two weeks that followed. Compared to 2019, Boman and Gallupe (2020) observed a substantial decrease in minor offenses such as vandalism and petty larceny during the lockdown period. Abrams (2021) also observed significant reductions in drug crimes, theft, simple assault, and rape in 25 major U.S. cities, with the reductions commencing before the full implementation of stay-at-home orders. Conversely, Ashby (2020) found that most crime changes in 16 U.S. cities were not statistically significant, suggesting that cities experienced different crime trends. Pietrawska, Aurand, and Palmer (2020) corroborate this variation and observe substantial differences in crime patterns across contexts, including an increase in retail larceny in Los Angeles and a decrease in restaurant crime in Chicago.

Although these studies indicate that lockdowns decreased public activity, which in turn reduced opportunities for minor offenses, they are limited to a single city or a group of cities within a

single country. A comprehensive cross-country analysis of the impact of the stay-at-home policies on crime rates is missing among these studies.

The impact on severe crimes, however, has been more intricate. In their 2020 study, Boman and Gallupe observed that homicides and intimate partner violence (IPV) either remained constant or increased, underscoring the unintended consequences of lockdowns that may have exacerbated domestic settings that were conducive to severe offenses. This discovery is consistent with Mohler et al. (2020), who found that domestic violence complaints in Indianapolis and Los Angeles increased despite overall crime reductions.

The influence of COVID-19 on crime is also highly variable among various communities within cities. In Chicago, Campedelli et al. (2020) highlighted that community-specific social, economic, health, and demographic factors influenced crime trends. Similarly, Felson, Jiang, and Xu (2020) discovered that burglary rates in Detroit decreased more in residential areas than in mixed-use areas, suggesting that the local context is a critical factor in the evolution of crime patterns during the pandemic. These results indicate that the effects of public health measures and their enforcement may vary across communities.

Similar patterns are observed worldwide in investigations, with some regional variations. Estévez-Soto (2021) reported that most crime categories in Mexico City experienced substantial decreases, partially attributable to a decline in the utilisation of public transportation. Nevertheless, there was no significant decrease in the number of severe violent crimes, and the number of calls to women's helplines remained constant. This indicates that, although some crimes decreased, others persisted due to underlying social dynamics.

Despite Sweden's relatively lenient regulations, Gerell, Kardell, and Kindgren (2020) observed an 8.8% decrease in overall crime. This encompassed substantial reductions in residential and commercial burglaries and pickpocketing. While assaults, sexual violations, and domestic

violence did not substantially deviate from predicted levels in Australia, Payne and Morgan (2020) caution against drawing firm conclusions based on early data.

Nivette et al. (2021) conducted a comprehensive international analysis, revealing a 37% average decrease in crime across 27 cities in 23 countries. Their research underscored the correlation between more stringent movement restrictions and greater crime declines, supporting that reduced urban mobility and increased guardianship were critical factors in reducing crime rates. The current study is significantly different from their work in three key ways. First, while Nivette et al. (2021) focused on a city-level analysis, this study includes a broader, country-level analysis across more countries, thus providing a wider scope. Second, this study specifically examines the effect of the stay-at-home (SAH) policy during the first three months of the pandemic, enabling a more precise investigation of the immediate policy impact. Lastly, this study adds to the literature by investigating the heterogeneous effects of SAH policies on crime rates among governmental regimes, an area unexplored by Nivette et al. (2021), thereby contributing novel insights into the interplay between governance and crime during the pandemic.

Additionally, recent research has improved our understanding of how stay-at-home rules influenced crime during the COVID-19 pandemic. Trajtenberg et al. (2024) studied 45 cities across five continents and found that rigorous lockdowns reduced short-term crime rates, such as robbery and burglary, but did not affect violent offences. Their work advanced cross-national analysis but did not look at how political factors influence these outcomes. Pourshir et al. (2025) examined local authorities in England and Wales and found that crime initially decreased but eventually returned to pre-pandemic levels as restrictions were relaxed. Their work focused on regional variance within a particular political system. Ceccato, Kahn, Herrmann, and Östlund's (2022) study of New York, São Paulo, and Stockholm found that

crime trends varied with national lockdowns and social adaptation. Together, these studies show that the impact of pandemic limitations on crime varies by geography and crime type.

Building on previous findings, this study goes beyond city- and region-level analyses to examine how regime type shapes the relationship between stay-at-home policies and crime rates. Existing research has not examined how democratic accountability shapes the enforcement and societal impacts of stay-at-home policies. By connecting political regime characteristics to crime patterns, the study proposes an accountability-based perspective that sees crisis management as a form of public stewardship. This approach builds on current research by demonstrating that the success and unintended effects of stay-at-home initiatives are determined not only by social norms, but also by how governments account for their impact on public safety.

The study outlines two main hypotheses: first, to examine the impact of stay-at-home policies on street crime rates. Second, to test the heterogeneous effect of stay-at-home policies on street crime rates across democracies.

3.3 Evaluating methodology.

3.3.1 Data Source

We focus on the first pandemic year (2020) to test the relationship between stay-at-home policy and crime. The arrival of COVID-19 was an unanticipated shock for all national governments. They faced high uncertainties about infection rates and severity. The WHO declared COVID-19 a pandemic in March 2020. We chose to study countries that implemented stay-at-home policies within the first three months following this declaration (March to May 2020). This approach provides a uniform starting point based on a globally recognised milestone, allowing

for a quasi-natural experiment as the policies were implemented primarily to contain the pandemic, not to control crime.

3.3.2 Dependent Variable

Crime Rates: Two types of crime rates are investigated, theft and burglary rates. Data on crime rates are obtained from the United Nations Office on Drugs and Crime (UNODC, 2024). We collect data on theft and burglary rates per 100,000 population. Our observations include 89 countries for 2020. The study is limited to theft and Burglary rates due to limited data availability on other crime patterns, which would have enriched the study if included.

Expected Crime Rates (Placebo Variable), SARIMA Model Design: To understand the relationship between COVID-19 and crime, it is necessary to estimate expected crime rates in the absence of the pandemic. The Seasonal AutoRegressive Integrated Moving Average (SARIMA) model was implemented to predict crime rates for 2020. The SARIMA model is well-suited for time series data exhibiting seasonal and non-seasonal patterns, rendering it suitable for our annual crime data. The SARIMA (Seasonal Autoregressive Integrated Moving Average) model is typically expressed as follows:

SARIMA (p, d, q) (P, D, Q) s 3.1

Where **p** is the number of autoregressive (AR) terms, **d is** the degree of differencing, **q** is the number of moving average (MA) terms, and **P** is the number of seasonal autoregressive (SAR) terms. **D**: The degree of seasonal differencing. **Q**: The number of seasonal moving average (SMA) terms. **s**: The length of the seasonal cycle (e.g., s=12 for monthly data with yearly seasonality). The generalised form of SARIMA is:

$$(1 - \sum_{i=1}^{P} \phi_i L^i)(1 - \sum_{i=1}^{P} \Phi_i L^{is})\ (1 - L)^d (1 - L^s)^D Y_t = (1 + \sum_{i=1}^{q} \theta_i L^i)(1 + \sum_{i=1}^{Q} \Theta_i L^{is}) \epsilon_i \quad 3.2$$

Where: Y_t is the time series value at time t, L is the lag operator, ϕ_i and Φ_i is are the autoregressive parameters for regular and seasonal components. θ_i and Θ_i are the moving-average parameters for the regular and seasonal components. $\epsilon_i$is the error term at time t

This model combines ARIMA (p, d, q) with seasonal components to account for both short-term dynamics and seasonal patterns in the time series data.

By incorporating seasonal variables, the SARIMA model augments the ARIMA model. The SARIMA model was implemented for each crime classification and country in our investigation. SARIMA models necessitate selecting the number of periods for calculating the seasonal and non-seasonal auto-regressive (A.R.) and moving-average (M.A.) terms. Using the algorithm described by Hyndman and Khandakar (2008), which is implemented in the fable package (O'Hara-Wild et al., 2020) in R version 3.6.1 (R Core Team, 2019), we automatically selected these terms. This algorithm estimates multiple models with varying SARIMA parameter values and selects the model that minimises the Akaike information criterion (AIC), an estimator of predictive error.

The analysis encompassed burglary and theft rates. To calibrate the SARIMA model for each country and crime type, we used historical crime data from 2015 to 2019. Subsequently, the crime rates for 2020 were predicted using the fitted model. This method ensures that forecasts are based on historical data and account for seasonal and non-seasonal fluctuations in crime rates. The SARIMA model effectively captures these temporal patterns and offers a dependable prediction of the effect of the COVID-19 stay-at-home policy on crime rates.

3.3.3 Explanatory Variables

Stay-at-home Policy: Data regarding the stay-at-home policy is obtained from Our World in Data (OWID, 2024). The data include daily indicators of whether a stay-at-home policy is in effect in each country. We focus on the country's stay-at-home policy from March to May 2020. We chose this period because the World Health Organisation declared COVID-19 a global pandemic in March 2020, even though some countries employed this policy before March 2020 and others after May 2020. This establishes a consistent reference point for our investigation.

Democracy: We use the Electoral Democracy Index from the V-Dem Institute (2023) to examine how government administrations affect crime rates during a pandemic. The democracy index is a continuous variable that spans from 0 to 1, with 0 representing the lowest level of democratic governance and 1 the highest. The V-Dem Index quantifies the degree to which political leaders and governmental systems are responsive to their constituents.

Economic Growth: The World Bank (2024) provides GDP per capita data, a measure of economic development.

Demography: We also use demographic data, including urban population and population density, sourced from the World Bank (2024).

3.4 Estimation methods and procedures

We use an ordinary least squares regression model with robust standard errors clustered at the country level, controlling for continent and month-fixed effects. We use the Ordinary Least Squares regression model because the dependent variables are continuous, and more so, our cross-sectional analysis captures crime rates for a single year (2020). Thus, OLS offers a good benchmark for interpreting the average cross-sectional effect of stay-at-home policy on street

crime levels. Month-fixed effects account for variations within the three-month policy window, reflecting the differing start dates for the SAH policy across countries. Using lagged control variables (from 2019) addresses potential reverse causality. It ensures that pre-existing socioeconomic factors (e.g., economic conditions, urbanisation, and unemployment rates) are not affected by the SAH policy, thereby isolating the policy's effect on crime rates in 2020. Including continent-fixed effects further controls for unobserved regional characteristics, while clustering standard errors at the country level accounts for heteroscedasticity and potential within-country correlation. The baseline equation is estimated as follows:

$$Crime\ Rate_i = \beta_0 + \beta_1 SAH_i + \beta_2 Demo_{it-1} + \beta_3 (SAH_i * Demo_{it-1}) + \tau X_{it-1} + \gamma_t + \delta_i + \epsilon_i \quad (3.3)$$

Where $Crime_i$ denotes the level of crime in country i for 2020, β_0 is the intercept. β_{n+1} Are the coefficients for the stay-at-home policy, democracy, and the interaction term prospectively? SAH_iIs the home policy of country i, X_{it-1} is the lag of a vector of control variables, τ is the vector of the coefficients of the control variables, δ_i is continent-fixed effects, γ_t are the month-fixed effects that capture any month-specific variation within 2020 due to the staggered implementation of the SAH policy across countries, δ_i are continent-fixed effects, addressing regional differences and $\epsilon_i$is the error term. Robust standard errors are clustered at the country level.

3.5 Empirical Results

In this study, we examined the impact of the COVID-19 stay-at-home policy on crime rates, specifically focusing on the log of theft rates in 2020 and on forecasted theft rates generated by the SARIMA model. The analysis includes ordinary least squares (OLS) regression with month and continent-fixed effects and standard errors clustered at the country level. Month and region-fixed effects are included to control for time-invariant characteristics and regional differences.

Including these fixed effects helps isolate the impact of the stay-at-home policy. Standard errors are clustered at the country level to account for within-country correlation over time. Control variables are lagged to account for temporal dependencies. The variables of interest are the policy within the first three months, democracy, and their interaction.

Table 3.1 presents the descriptive statistics for street crime levels and various economic and social indicators used as control variables for the 89 countries sampled.

Table 3.1 Descriptive Statistics

The log of theft rate is the log of the theft rate per 1000 people. The log burglary rate is the number of burglaries per 1000 people. Policy within the first three months of the pandemic is a binary variable that equals 1 if a country implemented a policy between March and May 2020 and 0 otherwise. *Democracy measures a country's electoral democratic governance on a scale from 0 to 1.* Policy* democracy lag is the interaction between policy and democracy. Unemployment is the share of the labour force that is without work and actively seeking employment. Population density is the number of people per square kilometer of land. Urban population is the share of people living in urban areas.

Variable	Obs	Mean	Std. Dev.	Min	Max
Burglary rate per 100,000	70	218.4	225.151	.041	1149.96
Burglary rate log	70	4.679	1.516	.04	7.048
Burglary rate forecast	76	289.821	290.481	.072	1401.692
Burglary rate forecast log	76	4.936	1.583	.07	7.246
Theft rate per 100,000	79	635.03	730.145	.318	3458.56
Theft rate log	79	5.712	1.493	.276	8.149
Theft Rate forecast	83	823.998	848.392	9.057	3660.471
Theft rate forecast log	83	6.077	1.33	2.308	8.206
Stay-at-home policy	89	.944	.232	0	1
Democracy Index	87	.637	.242	.04	.914
GDP per capita	89	23950.883	27365.325	1256.929	165287.19
GDP per capita log	89	9.513	1.112	7.136	12.015
Unemployment	83	8.098	5.56	.14	25.895
Unemployment log	83	1.86	.764	-1.966	3.254
Urban population	89	70.057	18.459	14.416	100
Population Density	89	312.402	1122.511	2.115	7918.951

The pairwise correlation, which provides a first-hand impression of potential multicollinearity, is presented in Table 3.2. The table presents how all the variables are correlated with each other, but they are not all employed in the same regression at the same time. Moreover, the control variables are lagged to address potential collinearity.

Table 3.2: Pairwise correlations

The log of theft rate is the log of the theft rate per 1000 people. The log burglary rate is the number of burglaries per 1000 people. Policy within the first three months of the pandemic is a binary variable that equals 1 if a country implemented a policy between March and May 2020 and 0 otherwise. *Democracy measures a country's electoral democratic governance on a scale from 0 to 1.* Policy* democracy lag is the interaction between policy and democracy. Unemployment is the share of the labour force that is without work and actively seeking employment. Population density is the number of people per square kilometer of land. Urban population is the share of people living in urban areas. All control variables are lagged to address potential reverse causal relationships among them. Robust standard errors in parentheses are clustered at the country level *** p<0.01, ** p<0.05, * p<0.1. The pairwise correlation presents variables used in the analysis, but not all the variables have been used in the same regression analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) log of theft rate	1.000									
(2)log of burglary rate	0.700*	1.000								
(3)burglary forecasted	0.349*	0.336*	1.000							
(4) theft rate forecasted	0.337*	0.133	0.778*	1.000						
(5) SAH policy	-0.088	0.027	-0.097	-0.155	1.000					
(6) democracy	0.706*	0.645*	0.298*	0.249*	-0.068	1.000				
(7) population density	-0.053	-0.245*	-0.092	-0.083	-0.276*	-0.157	1.000			
(8) GDP per capita	0.656*	0.454*	0.290*	0.231*	-0.148	0.540*	0.182	1.000		
(9) Urban population	0.329*	0.113	0.278*	0.311*	-0.143	0.207	0.249*	0.438*	1.000	
(10) Unemployment log	0.166	0.195	-0.016	0.029	0.026	0.269*	-0.152	-0.224*	-0.076	1.000

3.5.1 Theft Rate

The dependent variable in regression table 3.3 is the log of theft rates in 2020, represented in columns 1-3. The results suggest that the stay-at-home policy significantly reduces theft rates during the first three months. This implies that implementing the stay-at-home orders significantly decreased theft rates during the initial months of the pandemic, supporting the evidence of comparable studies (see Meyer et al., 2020; Abrams, 2021). In addition, the relationship between the policy and democracy indicates that the reduction in theft rates due to the stay-at-home policy is less pronounced in more democratic countries. This suggests that the efficacy of these policies may fluctuate with the degree of democracy, possibly due to differences in policy compliance or enforcement.

We use a margins plot to illustrate the nonlinear relationship. From Figure 3.1, the effect of the stay-at-home policy is statistically significant at lower levels of democracy. The confidence interval is below zero for democracy index values, with a range of approximately 0.01 to 0.45. We imply that the policy reduced theft rates more effectively in autocratic governments than in democracies. We associate this effect with lower compliance among citizens in democratic

states, due to freedom of movement and a cultural system that emphasises personal freedom and autonomy, which may conflict with collective efforts to enforce strict stay-at-home policies.

Table 3.3:Baseline Results-Theft Rate

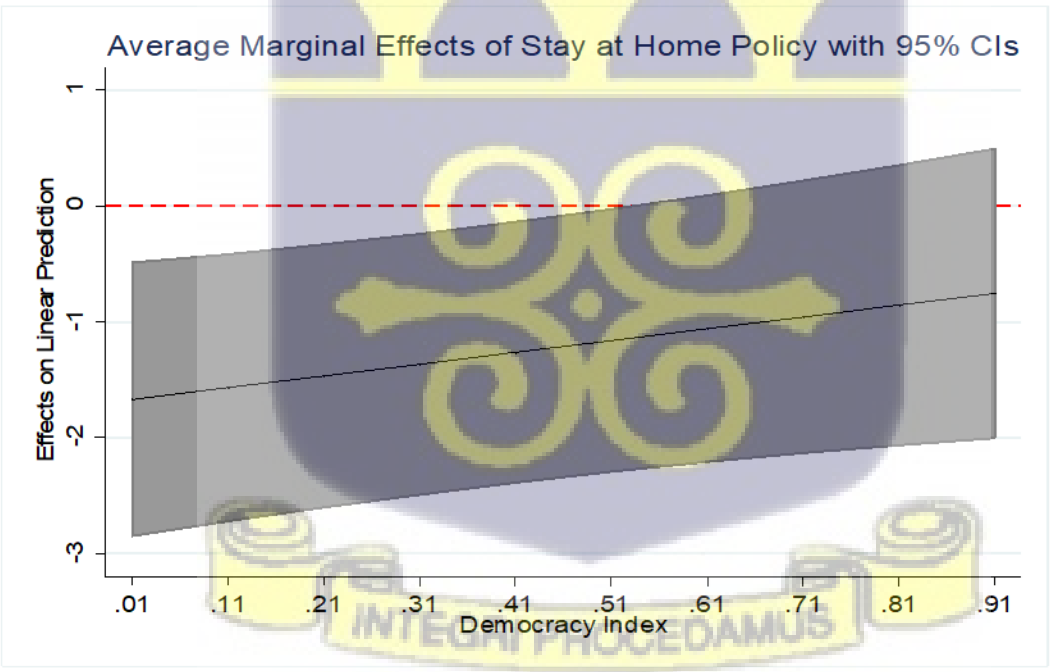
The dependent variable is the Log of the Theft rate and its forecast. Policy within the first three months of the pandemic is a binary variable that equals 1 if a country implemented a policy between March and May 2020 and 0 otherwise. *Democracy measures a country's electoral democratic governance on a scale from 0 to 1.* Policy* democracy lag is the interaction between policy and democracy. Unemployment is the share of the labour force that is without work and actively seeking employment. Population density is the number of people per square kilometer of land. Urban population is the share of people living in urban areas. All control variables are lagged to address potential reverse causal relationships among them. Robust standard errors in parentheses are clustered at the country level *** p<0.01, ** p<0.05, * p<0.1.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES		Log of theft rate		Forecast of	Theft Rate	
policy within the first three months of the Pandemic	-1.15448***	-1.08820*	-1.68038***	-0.90823	0.74039	2.50479
	(0.29403)	(0.56917)	(0.59142)	(0.77928)	(0.79211)	(1.66097)
Democracy lag		0.88834	-0.10808		-0.78831	2.20344
		(1.11172)	(1.23260)		(1.11323)	(2.87466)
Policy* democracy lag			1.01659**			-3.03130
			(0.50125)			(2.63717)
Population Density lag		-0.00008	-0.00011		-0.00034**	-0.00025*
		(0.00010)	(0.00010)		(0.00015)	(0.00012)
Log of GDP per capita lag		0.56227**	0.56607**		0.17860	0.16192
		(0.27791)	(0.28166)		(0.20330)	(0.20716)
Urban Population lag		0.01414*	0.01398*		0.01911**	0.01959**
		(0.00780)	(0.00786)		(0.00802)	(0.00814)
Log of Unemployment lag		0.12734	0.13448		0.04238	0.01893
		(0.19066)	(0.19471)		(0.25318)	(0.25333)
Constant	4.26355***	-1.64739	-1.02872	0.50936	-1.90603*	-3.71562*
	(0.34056)	(1.47295)	(1.33074)	(0.78165)	(1.03525)	(1.89773)
Observations	71	65	65	77	67	67
R-squared	0.493	0.745	0.746	0.104	0.274	0.287
adj.R^2	0.454	0.680	0.675	0.0405	0.0954	0.0950
Month Fixed Effect	No	Yes	Yes	No	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

The forecasted theft rates are presented in Columns 4-6 using the SARIMA model, which serves as a control experiment or placebo test. Assuming there was no pandemic, we projected the 2020 theft rate using data from 2015 to 2019. The results are not statistically significant, as presented in Table 3.1(columns 4-6). The insignificance of the policy variable in these models illustrates the absence of pre-trends. This finding indicates that the observed decrease in crime rates in 2020 was primarily due to the implementation of the stay-at-home policy rather than preexisting trends.

The regressions incorporate several control variables with lagged values to mitigate potential endogeneity. Population density has a negative, though not consistently significant, impact on theft rates, whereas GDP per capita and urban population have positive, significant effects in some specifications. This suggests that theft rates may be related to increased economic activity and urbanisation, as economic theories of crime predict.

Figure 3.1:Average Marginal Effect(Column 6, Table 3.1)



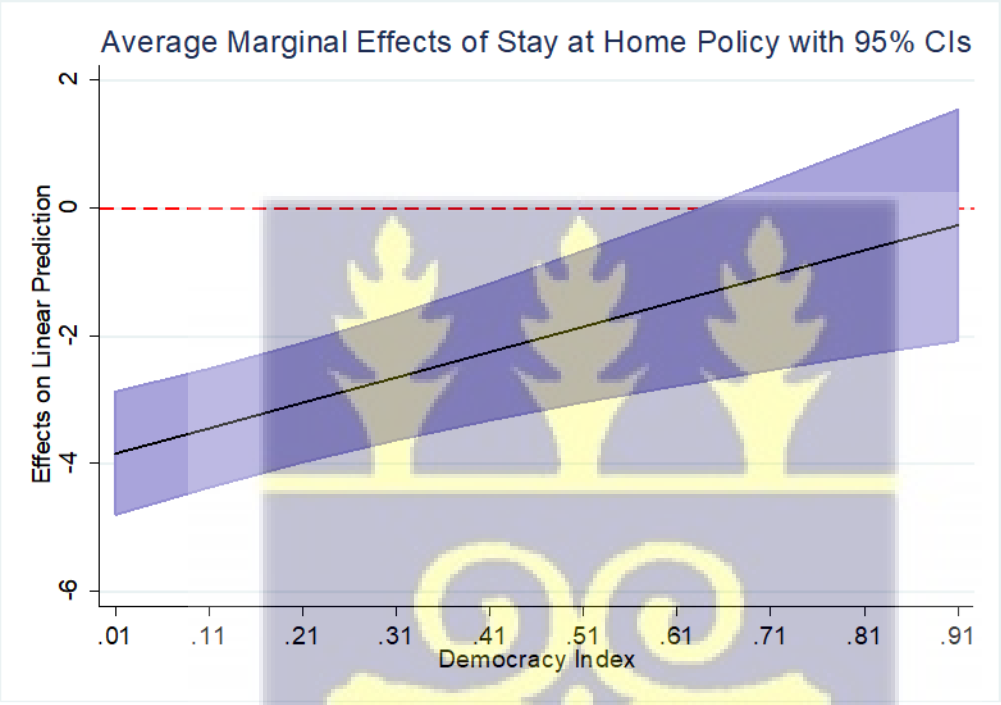
3.5.2 Burglary Rate

The burglary rate and forecasted burglary rate are presented in Table 3.5. The findings indicate that implementing the stay-at-home orders substantially decreased burglary rates during the

early months of the pandemic. In addition, studies conducted at the city level during the initial weeks of the stay-at-home policy revealed decreased burglary rates (Asby, 2020; Mohler et al., 2020; Gerell et al., 2020).

The interaction between the policy and democracy suggests that reducing burglary rates through the stay-at-home policy is less effective in more democratic countries. In Figure 3.2, a margins plot is used to illustrate this nonlinear condition.

Figure 3.2Average Marginal Effect (Column 6, Table 3.2)



The SARIMA model, presented in Columns 4-6, forecasts burglary rates. This model functions as a control experiment or placebo test by utilising data from 2015 to 2019 to predict the burglary rate in 2020, presuming that there is no pandemic. The policy variable's insignificance in these models illustrates the absence of pre-trends. This finding indicates that the observed decrease in burglary rates in 2020 was primarily due to the implementation of the stay-at-home policy rather than preexisting trends.

The consistent negative impact of population density on burglary rates suggests that more densely populated areas may have experienced fewer burglary incidents, potentially due to

increased neighborhood surveillance or faster police response times. In certain specifications, GDP per capita and urban population have positive and significant effects. Conversely, burglary rates are positively and significantly influenced by GDP per capita and urban population in certain models. This is consistent with economic theories that posit wealthier, more urbanised regions may be more profitable targets for burglary, thereby encouraging more criminal activity.

Table 3.4:Variance Inflation Factor

	Theft Rate		Burglary rate		Burglary Forecast		Theft Forecast	
Variable	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
GDP per Capita	2.59	0.386706	3.01	0.332255	2.67	0.374875	2.32	0.431651
Democracy Index	2.27	0.439691	2.43	0.410972	1.95	0.512061	1.87	0.533857
Urban Population	1.84	0.542229	1.88	0.532269	1.93	0.519104	1.8	0.554817
Population Density	1.68	0.596017	1.85	0.541529	1.55	0.64522	1.48	0.67552
Unemployment log	1.25	0.802905	1.13	0.882353	1.23	0.809719	1.26	0.794637
Stay-at-home policy	1.09	0.918415	1.11	0.899912	1.12	0.895456	1.09	0.916486
Mean VIF	**1.79**		**1.9**		**1.74**		**1.64**	

Table 3.5: Baseline Results-Burglary Rates

The dependent variable is the Log of the Burglary rate and its forecasted estimate. Policy within the first three months of the pandemic is a binary variable that equals 1 if a country implemented a policy between March and May 2020 and 0 otherwise. *Democracy measures a country's electoral democratic governance on a scale from 0 to 1.* Policy* democracy lag is the interaction between policy and democracy. Unemployment is the share of the labour force that is without work and actively seeking employment. Population density is the number of people per square kilometer of land. Urban population is the share of people living in urban areas. All control variables are lagged to address potential reverse causal relationships among them. Robust standard errors in parentheses are clustered at the country level *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Log of burglary rate			Forecast of Burglary Rate		
policy within the first three months of the Pandemic	-1.19947*	-1.52717**	-3.88136***	-0.88313*	-0.37401	1.05262
	(0.64716)	(0.68670)	(0.48435)	(0.51172)	(0.48662)	(1.14045)
Democracy lag		-0.92266	-4.72188***		-0.28900	2.06046
		(1.05237)	(1.29781)		(1.24637)	(1.98529)
Policy* democracy lag			3.97408***			-2.39808
			(1.01528)			(1.66433)
Population Density lag		-0.00039***	-0.00050***		-0.00020*	-0.00013
		(0.00013)	(0.00011)		(0.00012)	(0.00010)
Log of GDP per capita lag		0.84467***	0.84549***		0.17811	0.16785
		(0.23661)	(0.24405)		(0.18883)	(0.19272)
Urban Population lag		0.00309	0.00223		0.01282*	0.01332*
		(0.00926)	(0.00943)		(0.00683)	(0.00695)
Log of Unemployment lag		0.64790**	0.67465**		-0.15643	-0.16819
		(0.26876)	(0.27261)		(0.22877)	(0.23299)
Constant	3.74135***	-3.91474**	-1.56962	0.39118	-1.66118	-3.04229**
	(1.02356)	(1.64809)	(1.51226)	(0.51177)	(1.09609)	(1.42798)
Observations	64	57	57	72	63	63
R-squared	0.472	0.686	0.701	0.171	0.244	0.253
adj.R^2	0.427	0.600	0.611	0.108	0.0625	0.0550
Month Fixed Effect	No	Yes	Yes	No	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

3.6 Conclusion

This chapter examines the relationship between COVID-19 stay-at-home policies and crime rates, focusing on 89 countries and emphasising the initial three months of implementation from March 2020 to May 2020. The result suggests that the stay-at-home policy substantially reduced the crime rates during this period. Nevertheless, the interaction between the policy and democratic governance shows that the crime-reduction effect of the SAH policy was less effective in more democratic countries.

The results indicate that the policy's effectiveness in reducing crime rates depended on the country's political context. The positive and significant interaction with democracy may suggest discrepancies in public trust in government directives, enforcement, and policy compliance in democratic societies.

The SARIMA model was essential in validating these results as a placebo test. The study verifies that the observed reduction in crime was directly attributable to the stay-at-home policy and not due to preexisting trends by estimating what the crime rates would have been in 2020 without the pandemic. The robustness of the study's findings is underscored by the policy's insignificance in the SARIMA models, which further supports this conclusion.

Consistent with Routine Activity and Opportunity theories, the findings indicate that decreases in theft and burglary during stay-at-home periods reflect disruptions in opportunity structures. When movement was restricted, daily encounters between potential offenders and targets were minimised, thereby limiting the convergence points where crime typically occurred. At the same time, differences among regimes suggest that offenders respond to perceived risks, consistent with Rational Choice Theory, where stronger enforcement in autocracies and voluntary compliance in democracies affect behavioural outcomes differently. These patterns together extend Stewardship Theory by viewing government crisis solutions as accountability

mechanisms that protect both health and social order. In this sense, the study connects behavioural explanations of crime reduction to institutional responsibility, demonstrating that public safety outcomes depend on how stewardship is implemented across different governance contexts.

Regarding policy implications, the findings indicate that stay-at-home policies have short-term spillover effects on crime that vary across political systems. In democracies, compliance is voluntary and influenced by trust, whereas in autocracies, it is compelled and controlled. These distinctions underscore that the effectiveness of stay-at-home policies depends on institutional context and accountability structures, which shape how governments manage public safety during crises.

CHAPTER IV

RELIGIOSITY AND COVID-19 PREVENTIVE BEHAVIOUR

Religiosity and COVID-19 preventive behaviour

ABSTRACT

This study examines the impact of religiosity on preventive measures during the COVID-19 pandemic in the United States, specifically on mask usage, vaccine administration, booster doses, and the probability of testing positive for COVID-19. This study employs a longitudinal dataset from 2020 to 2022 to analyse the behaviours of many religious groups, focusing specifically on the differences between born-again and non-born-again Protestants. The results indicate that born-again Protestants exhibit a lower propensity to adhere to preventive measures, such as mask-wearing and immunisations. In contrast, non-born-again Protestants and Catholics demonstrate a higher likelihood of compliance with these guidelines. Consequently, born-again Protestants exhibit an increased propensity for testing positive for COVID-19 and are, therefore, more likely to have contributed to its heightened spread in the US. This research is essential for understanding the relationship between religiosity and health behaviours, as it emphasises the significant influence of religious identity on public health outcomes. It provides new insights into adherence to health directives, addressing substantial gaps in the research by distinguishing among religious subgroups, analysing various preventative behaviours, and monitoring changes over an extended period throughout the United States. The study examines religiosity as a form of moral accountability that shapes individuals' adherence to public health interventions during a pandemic crisis.

4.1. Introduction

Faith and health have historically been intertwined, with religious convictions shaping individuals' perceptions of illness, healing, and protection. During crises, such as a global pandemic, these beliefs can significantly affect individuals' attitudes towards preventive measures, including vaccination, mask-wearing, and social isolation. Religiosity significantly influences these behaviours through a profound faith in divine protection or a moral obligation to protect others. These activities are not merely individual decisions but are often shaped by overarching religious frameworks that encourage or obstruct adherence to public health norms. Studies indicate that religious beliefs and practices might influence health-related choices, with certain populations prioritising faith, divine will, and spiritual interpretations of health outcomes (Kranz et al., 2023; Martens & Rutjens, 2022; Bentzen, 2021). This may result in resistance to scientific advice, especially among factions that value personal liberty or divine safeguarding more than governmental initiatives.

In contrast, religious doctrines emphasising collective responsibility and altruism often promote adherence to public health protocols, thereby enhancing the likelihood of participating in preventive actions. The frequency of religious engagement and the authority of spiritual leaders either enhance or reduce compliance with these measures, as religious authorities wield considerable power over their adherents (Martens & Rutjens, 2022; Wiltse, 2021; Stein et al., 2020). The convergence of faith, social responsibility, and health research is crucial for explaining the diverse reactions to preventive behaviour within society, as religiosity shapes public health responses through its impact on cultural values, doctrines, and community interactions.

The study applies Stewardship Theory and Social Identity Theory to explain how accountability and group belonging influence crisis-prevention behaviour. Accountability, according to Stewardship Theory, is a moral imperative to act in collective interest, particularly

in uncertain settings. Social identification Theory adds to this by explaining how religious group membership establishes shared norms that govern compliance, making faith-based identification an important route for moral accountability.

Accountability in accounting encompasses moral and social duties that affect individual and institutional behaviour during crises, as well as financial reporting. In this environment, religiosity serves as an informal system of accountability through moral responsibility and societal standards, influencing how people respond to public health recommendations. By defining compliance as an expression of stewardship towards others, the study links preventive behaviour to broader discussions in accounting research on accountability and ethical responsibility. In this regard, the study analyses how variations in religiosity influence individuals' adherence to COVID-19 preventive practices, from the perspectives of moral and social accountability.

In the United States, religion is a fundamental component of social identity, and religiosity often interacts with cultural and geographic factors to shape health behaviours. It combines a wide range of religious beliefs with accurate survey data that tracks both religious affiliation and preventive activity across time. During the pandemic, the United States witnessed significant political and cultural conflicts, providing an opportunity to examine how moral and institutional accountability intersect to shape compliance. Because of its diversity and data availability, the United States is an ideal context for studying how religious identity influences accountability for health emergencies.

The impact of religiosity on preventive behaviour in the U.S. has been studied in multiple ways, highlighting several challenges to public health compliance. DeFranza et al. (2021) noted that persons in devout religious communities exhibited lower compliance with shelter-in-place mandates, perceiving these restrictions as infringements on their freedom of worship. Similarly,

Hill et al. (2020) demonstrated that states with a stronger religious presence experienced slower reductions in movements during the initial phases of the pandemic, highlighting the conflict between faith-based practices and compliance with public health directives.

A further aspect of this subject is the convergence of religion and national identity. Perry, Whitehead, and Grubbs (2020) investigated the influence of Christian nationalism on behaviours such as mask aversion and social gatherings; they identified that Christian nationalism was the strongest predictor of incautious behaviours and resistance to public health guidelines, driven by distrust in science, a belief in divine protection, and political allegiance to Mr. Trump. This finding suggests that the response of far-right religious groups to the pandemic was shaped by ideological factors, particularly Christian nationalism, rather than religious faith itself. Jacobi et al. (2022) investigated the impact of reported alterations in religiosity during the pandemic on psychological well-being at an individual level. Their findings demonstrated that reductions in religious participation were associated with diminished levels of psychological well-being, which may partially explain the hesitance to comply with preventive measures. Pirutinsky et al. (2020) explored an alternative psychological pathway, finding that religious coping strategies, such as faith in God, alleviated stress and promoted a more favourable mental state. However, this did not consistently result in adherence to health measures.

Vaccine hesitancy represents an additional dimension of the correlation between religiosity and health behaviour. Martens and Rutjens (2022) found that areas with higher religiosity had lower COVID-19 immunisation rates, suggesting that strongly held spiritual convictions may hinder vaccine adoption, despite extensive public health initiatives. Wiltse (2021) emphasised the capacity of religious leaders to positively impact health outcomes, revealing that individuals were more inclined to accept vaccines when motivated by religious leaders rather than by political officials or medical professionals.

Significant disparities exist among various religious groups about vulnerability to the virus. Stein et al. (2020) reported a notable increase in excess mortality within Amish and Mennonite communities, attributing this trend to their hesitance to embrace preventive measures due to their closed religious backgrounds. Kranz et al. (2023) introduced a psychological dimension, revealing that extremely religious individuals frequently exhibited increased emotional worry and tended to engage in impulsive rather than deliberate preventive behaviours, such as hoarding instead of practicing social distancing or handwashing.

While previous studies have examined faith in government and science as predictors of compliance, others have also examined how religiosity influences preventive behaviour. However, prior research rarely interprets religion as a mechanism for moral accountability that modifies behavioural responsibility during crises, thereby creating a gap that this study seeks to fill. This study contributes to the existing literature in several respects. The existing research has a limited focus on how diverse religious affiliations shape preventive health behaviours during the COVID-19 pandemic. While much of the literature either focuses narrowly on a single religious group or examines specific religious attributes (Kranz et al., 2023; Martens & Rutjens, 2022; Bentzen, 2021; Perry et al., 2020), this study uniquely introduces all relevant religious affiliations. Additionally, it distinguishes between born-again and "traditional" (non-born-again) Protestants. By focusing on these distinctions, the study sheds new light on how religious identity influences compliance with preventive measures such as mask-wearing, vaccination, and booster uptake —a topic underexplored in the literature.

Additionally, this research breaks new ground by going beyond mere adherence to preventive measures to examine actual health outcomes. Specifically, it assesses which religious groups are more likely to test positive for COVID-19, a connection that has been largely overlooked. While prior studies (Perry et al., 2020; Martens & Rutjens, 2022) have documented the reluctance of certain religious groups to comply with public health directives, few, if any, have

directly linked this non-compliance to concrete health outcomes. By correlating religious affiliation with COVID-19 infection rates, this study establishes a direct connection between religious behaviour and tangible health risks, offering a more comprehensive understanding of the consequences of non-compliance.

The use of a large, longitudinal dataset from 2020 to 2022 across all U.S. states underscores the thoroughness of this study. Unlike previous studies often limited by short time frames or regionally confined data, this comprehensive approach allows for an in-depth analysis of how religious behaviour and health outcomes evolved throughout the pandemic. The broad temporal and geographical range provides a comprehensive picture of the US's relationship between religiosity and preventive health behaviour. This thorough approach, including diverse religious affiliations and distinctions within Protestantism, fills a critical gap in the literature and offers valuable insights for both public health policy and academic discourse.

The study identifies variations in the influence of religious beliefs on preventive behaviour. Born-again Protestants exhibit a significantly lower propensity to adhere to preventive health measures, demonstrating a lower likelihood of wearing masks, obtaining vaccinations, or receiving booster doses. This reduced compliance is associated with an increased probability of testing positive for COVID-19. Conversely, Protestants who are not born again, along with Catholics, are more inclined to adhere to health rules, especially regarding vaccinations and boosters. This suggests that their religious beliefs may align more closely with public health guidelines, thereby contributing to their increased compliance.

These findings directly enhance several significant areas of literature. First, they advance research on the impact of religiosity on public health behaviours, demonstrating that religious views and affiliations affect the propensity to comply with preventive measures. The study elucidates significant distinctions among religious groupings by differentiating between born-

again and non-born-again Protestants, a distinction previously neglected. This enhances understanding of religious diversity and its influence on behaviours such as mask-wearing, vaccination, and booster shot administration.

Secondly, the study contributes to the literature on vaccination reluctance, particularly regarding cultural and religious influences on vaccine attitudes. The diminished probability of vaccine acceptance among born-again Protestants corresponds with established studies on religious skepticism regarding medical treatments. However, the increased acceptance among non-born-again Protestants and Catholics contests the idea of homogeneous resistance across religious sects.

Third, the study establishes a direct correlation between religious affiliation and the probability of testing positive for COVID-19, elucidating the relationship between adherence to public health measures and health outcomes, thereby offering new perspectives on how religious practices affect behaviour and the consequences of non-compliance during a public health emergency.

Lastly, although the study differs in significance from other studies on COVID-19 in the US and beyond that have focused on issues of misreporting and the factors that account for it (Kpeli et al., 2024; Kofonov et al., 2023; Knutsen., & Kolvani, 2022), it contributes to the literature on the likelihood of religiosity enhancing the spread of the covid-19 virus. By emphasising the role of religiosity in shaping health behaviours and potentially influencing disease spread, the study adds to the broader discourse on cultural and religious factors in pandemic response and public health strategy. This study, along with the two previous essays on pandemic reporting and stay-at-home policy, concludes the thesis by showing the extent to which moral and social accountability impact individual behaviour in crises.

The chapter is structured as follows: Section 4.2 provides a literature review and theoretical framework. Section 4.3 describes data sources, dependent variables, and controls. Section 4.4 presents the empirical setup. Section 4.5 discusses the results, first for the determinants of preventive behaviour and then for the determinants of testing positive for COVID-19. Section 4.6 presents the robustness test. Section 4.7 concludes.

4.2 Theoretical and Empirical Review

4.2.1 Theoretical Review: Social Identity Theory

This study employs Stewardship Theory and Social Identity Theory to explain variation in preventive behaviour among religious groups during the COVID-19 pandemic. Stewardship Theory offers a moral framework for seeing compliance as an act of responsibility to the greater good. Social Identity Theory extends this by demonstrating how individuals' religious group connections shape behavioural expectations and shared accountability for collective well-being.

Stewardship theory explains how governments are held accountable for the policy consequences of their actions. It is assumed that public authorities function as stewards who are responsible for protecting residents' well-being, particularly during emergencies. From this vantage point, preventative health behaviour becomes an extension of the government's responsibility structure. The state's communication and coordination efforts reflect its stewardship responsibilities, whereas individuals' compliance demonstrates their trust in those responsibilities being met. When compliance falls, it indicates a breach in the state's accountability relationship with the public.

In this study, stewardship theory is used to evaluate how religious affiliation promotes public adherence to health-related indicators. Religious institutions frequently mediate interactions between the state and citizens, shaping how government statements on health policies are

received and acted on. The concept connects governance, accountability, and social behaviour by identifying the state as a steward of public health and religious actors as mediators of moral responsibility. This connection takes stewardship theory beyond organisational settings, demonstrating how accountability for public welfare occurs during crises through moral and institutional trust.

Social Identity Theory (SIT), first developed by Tajfel and Turner (1979), provides a crucial framework for understanding group behaviours, including the collective actions of religious communities during the COVID-19 pandemic. According to SIT, individuals derive part of their self-concept from their membership in social groups, including religious, political, and cultural affiliations. These group memberships significantly influence attitudes, beliefs, and behaviours as individuals strive to align their actions with their in-group's norms, values, and expectations.

In the context of COVID-19 preventive behaviours, Social Identity Theory helps to explain why individuals from different religious affiliations exhibit varying levels of adherence to public health measures. For religious communities, particularly in the U.S., group identity can be a powerful motivator that shapes behaviours related to health and safety.

Religious identity is a core component of personal and social identity for many Americans. Research has demonstrated that religiosity is critical in shaping perceptions of health risks and responses to public health guidelines (DeFranza et al., 2021). Social Identity Theory posits that when individuals strongly identify with a religious group, their behaviour is influenced by that group's norms and beliefs. For instance, born-again Protestants, who often prioritise faith in divine protection, may resist public health measures like mask-wearing and vaccination, viewing these actions as incongruent with their belief in spiritual safeguarding (Perry, Whitehead, & Grubbs, 2020).

In this framework, group norms around faith, divine intervention, and skepticism towards government interventions become central to the decision-making process. SIT explains that individuals are more likely to adopt behaviours that reinforce their group's identity, even if those behaviours conflict with broader societal recommendations (Tajfel & Turner, 1979). This is particularly relevant when the group's identity is intertwined with beliefs that challenge the validity of scientific guidelines, as is the case with Christian nationalism (Perry et al., 2020).

Social Identity Theory also underscores the role of in-group and out-group dynamics in shaping behaviour. Religious groups that perceive public health authorities or government mandates as part of an out-group may experience greater resistance to preventive behaviours. This dynamic is evident in studies that highlight how certain religious communities viewed COVID-19 restrictions as infringements on religious freedoms or as political overreach (Hill et al., 2020). In this context, adherence to public health measures could align with the out-group's values, thus weakening the individual's religious and social identity.

Conversely, religious groups that emphasise communal responsibility and care for others, such as Catholics and non-born-again Protestants, may be more inclined to follow public health guidelines as part of their religious and social duty (Jacobi et al., 2022). SIT helps explain this divergence by recognising that different religious groups hold distinct values and norms that guide their collective behaviour.

Religious leaders play a pivotal role in reinforcing group identity and guiding behaviour. Social Identity Theory posits that leaders within a group exert significant influence over their followers' actions and beliefs (Hogg, 2001). During COVID-19, religious leaders who advocate adherence to public health measures may influence their congregations to comply with guidelines such as mask-wearing and vaccination (Wiltse, 2021). On the other hand, leaders who express skepticism toward government interventions or emphasise faith in divine

protection may foster resistance to such measures, as seen in some evangelical Protestant communities (Perry et al., 2020).

Social Identity Theory provides a comprehensive lens for understanding variation in preventive behaviours across different religious groups during the pandemic. SIT explains that behaviours such as vaccine hesitancy, mask-wearing, and social distancing are not merely individual choices but are deeply influenced by group identity. This aligns with empirical findings that religiosity, particularly when tied to strong in-group norms like Christian nationalism, can lead to resistance to public health measures (Martens & Rutjens, 2022).

By understanding how social identity shapes behaviour, public health efforts can be better tailored to address the specific concerns and values of different religious communities. For example, framing public health messages that resonate with religious groups' communal and moral values could increase compliance with preventive behaviours.

Together, these two theories provide a comprehensive account of compliance. Stewardship Theory frames accountability as a moral duty that leads individual action in times of crisis, whereas Social Identity Theory explains how belonging to a religious community strengthens those duties through shared norms and expectations. The intersection of moral stewardship and collective identity thus clarifies how religiosity can translate into sustained preventive behaviour. By merging moral and societal components of responsibility, these theories broaden the thesis's accountability framework. They shift the focus from institutional forms of accountability discussed in previous articles to personal and communal accountability, as represented by faith-based standards. In this way, the study connects religious belief and behaviour to the moral evaluation of actions during public health crises.

4.2.2 Empirical Review

Empirical research has highlighted the significant role of religiosity in shaping adherence to COVID-19 preventive behaviours in the United States. DeFranza et al. (2021) observed that individuals with higher levels of religiosity were less likely to comply with shelter-in-place directives, especially in U.S. metropolitan areas, suggesting that religious communities often perceive such mandates as infringements on their religious freedoms. Similarly, Hill et al. (2020) found that states with a stronger religious presence exhibited higher mobility and slower reductions in movement, reflecting resistance to public health guidelines among religious populations.

Perry, Whitehead, and Grubbs (2020) further contributed to this discourse by examining Christian nationalism, a form of religiosity that integrates national identity with religious beliefs. Their findings indicated that Christian nationalism was a major predictor of risky behaviours like resisting mask mandates and gathering in groups, in contrast to general religiosity, which was linked to more cautious behaviour. Jacobi et al. (2022) found that individuals who experienced a decrease in religiosity during the pandemic reported lower levels of well-being, potentially explaining resistance to public health measures. On the other hand, it was observed that highly religious individuals, despite heightened emotional anxiety, did not translate this into rational preventive behaviours like handwashing, instead displaying impulsive behaviours such as hoarding. Using responses from 2,856 people across eight managed care systems, Williams et al. (2025) found that frequent religious attendance was inversely associated with positive vaccine attitudes and trust in public health authorities such as the Centers for Disease Control and Prevention. Although service attendance did not significantly predict vaccine uptake, it was associated with increased hesitation towards the bivalent booster. The authors argue that increased religious engagement might alter perceptions of the trustworthiness of health information, emphasising the importance of redefining

collaborations between faith communities and public health organisations to boost vaccine confidence. One significant weakness is the study's low response rate (33%) and dependence on self-reported data, which may under-represent highly hesitant persons.

Several studies have examined broader psychological and social factors related to preventive practices during the pandemic**.** For example, Viswanath et al. (2021) emphasised that perceptions of risk and trust in scientists were critical determinants of vaccine uptake, noting that political affiliation and media consumption were also significant, with conservative media consumers less likely to accept vaccines. More so, Shook et al. (2020) highlighted the role of the Behavioural Immune System (BIS), in which traits such as germ aversion and pathogen disgust sensitivity strongly predict compliance with preventive behaviours such as handwashing and social distancing. Similarly, Smail et al. (2021) found that health beliefs, such as the perceived risk of infection, significantly influenced preventive behaviours, with older adults, women, and individuals with higher education more likely to adhere to such measures.

On the other hand, Peterson et al. (2021) applied the Prototype Willingness Model (PWM). They found that social norms and favourable prototypes played a key role in shaping individuals' intentions to engage in preventive behaviour, which, in turn, influenced actual compliance with public health guidelines. Using national surveys and local data, Laliotis, Mourelatos, and Lohtander (2025) found that conservative religious groups, such as Laestadians, were less inclined to trust science and more likely to refuse vaccination, leading to higher infection rates. The study shows how strong religious convictions can lead to "non-compliance hotspots" that undermine public health efforts. However, its environment is generally homogeneous and does not account for religious or political variation, limiting generalisation to more diverse societies such as the United States.

Using European Values Survey and World Values Survey data on excess deaths during the pandemic, Gavresi et al. (2025) found that areas with higher religiosity, particularly Protestant and Catholic areas, had higher COVID-19 mortality. They ascribe this to increased social contact at religious events, faith-based coping ("God will protect us"), and a decreased trust in science. The study also found that excessive religiosity typically hampered compliance with health requirements, whereas secular civilisations had lower death rates, which could be attributed to stronger institutional trust. However, their data are limited to Europe and precede the pandemic, limiting direct behavioural inference.

Studies have also examined the socio-cultural and political determinants of preventive behaviour. For instance, Grossman et al. (2020) demonstrated that political partisanship strongly affected social distancing, with Democratic-leaning counties showing greater reductions in mobility than Republican ones. Fullerton et al. (2022) highlighted that political factors, such as partisanship and occupational status (e.g., being an essential worker), were stronger predictors of behaviours like mask-wearing and social distancing than perceived risk alone. Raude et al. (2020) found that social cognitive factors such as subjective norms were the strongest predictors of compliance with preventive measures, suggesting that social and political dynamics are critical in shaping public health responses.

Building on psychological and social variables, other related studies have highlighted the importance of information flow and communication in moulding public compliance with pandemic prevention efforts. Shafiq et al. (2021) found that individuals who relied on trusted information sources, such as healthcare providers and television, were more likely to follow preventive measures, emphasising the role of reliable information in public health messaging. In a natural experiment, Goldberg et al. (2020) observed a significant increase in mask-wearing following the CDC's recommendation of face coverings, underscoring the impact of authoritative communication on public behaviour.

The challenge of addressing misinformation has also been widely studied. Malik et al. (2020) found significant disparities in vaccine acceptance across demographic groups, with lower acceptance rates among Black Americans and those with less education, further highlighting the need for targeted and tailored public health communication.

Beyond communication and information access, individual demographic features influence how individuals react to public health interventions during crises. Demographic factors such as age, gender, and race have also played a significant role in COVID-19 preventive behaviours. Korn et al. (2022) observed that older adults were likelier to engage in behaviours such as mask-wearing and avoiding social gatherings. However, stricter policies reduced the importance of age and risk perception while increasing the influence of trust in institutions. Campbell et al. (2023) focused on medically and socially vulnerable populations and found that characteristics such as age, health status, and prior vaccination history were key predictors of vaccine uptake, emphasising the need for public health strategies to address individual barriers.

Zhang et al. (2021) examined the influence of structural factors on lifestyle behaviours during lockdowns, finding that women, the unemployed, and those with anxiety were more prone to unhealthy changes, further emphasising the need to consider structural and mental health factors in public health interventions.

While these studies contribute to a better knowledge of the factors influencing COVID-19 preventative practices, some limitations remain. Much of the extant evidence is based on self-reported data from single-country or homogeneous groups, which limits generalisability across different institutional contexts. The study also frequently isolates behavioural, sociological, or demographic elements, ignoring how institutional responsibility, governance frameworks, and information trust interact to influence compliance. Furthermore, most studies view behaviour

as an individual response rather than a reflection of people's accountability relationships with the state. By incorporating these factors, the current study builds on previous research to demonstrate how religious identity, trust, and government responsibility influence preventive behaviours during crises.

4.2.3 COVID-19 in the United States

The COVID-19 pandemic significantly impacted the United States beginning in early 2020. The Centers for Disease Control and Prevention (CDC) confirmed the first documented case of COVID-19 in the United States on January 21, 2020, specifically in Washington state (Holshue et al., 2020). On January 31, 2020, the U.S. Department of Health and Human Services officially declared a public health emergency in response to the growing threat posed by the virus.

As the virus spread throughout the country, states acted. On March 19, 2020, California became the first state to issue a statewide stay-at-home order, mandating residents to stay indoors except for essential activities (Bornstein & Miller, 2023; Henson, 2021; Zanocco et al., 2021). Following California's lead, many other states imposed similar lockdowns to control the spread of the virus. However, the intensity and timing of restrictions varied from state to state.

The pandemic overwhelmed the U.S. healthcare system. Hospitals, particularly in heavily impacted areas like New York City, faced shortages of personal protective equipment (PPE) and ventilators. By April 2020, New York had emerged as the epicenter of the pandemic, with over 350,000 confirmed cases and more than 17,000 deaths (Gonzalez-Reiche et al., 2020; Storti et al., 2022). Throughout 2020, New York, alongside states like New Jersey and California, continued to report the highest number of confirmed cases and fatalities.

The development of vaccines in record time marked a turning point. In December 2020, the U.S. Food and Drug Administration (FDA) granted emergency use authorisation to the BioNTech-Pfizer vaccine, making it the first COVID-19 vaccine available to the American public (Tanne, 2021; Shimabukuro, 2021). The Moderna vaccine was also approved in the same month (Mahase, 2020; Ioannou et al., 2022). Vaccination efforts initially prioritised healthcare workers, elderly populations, and individuals with preexisting health conditions.

Despite widespread vaccine availability by mid-2021, vaccine hesitancy slowed the overall pace of inoculation. Political divisions and misinformation about the virus and vaccines fueled public resistance in many parts of the country. Some states saw a lag in vaccine rates, while others saw a spike in cases. (Bolsen & Palm, 2022; Burleigh, 2021)

The emergence of new variants, such as Delta and Omicron, led to spikes in cases throughout 2021 and 2022. Although the vaccines effectively reduced severe illness and deaths, new outbreaks forced states to reconsider restrictions, with some reintroducing mask mandates and other public health measures.

4.3 Methodology

4.3.1 Data sources

The study is based on data from the American Trends Panel (ATP) of the Pew Research Center, collected across seven waves —72, 74, 79, 83, 94, 108, and 114 —spanning 2020 to 2022. Waves 72, 74, and 79 were collected between August and November 2020. Waves 83 and 94 were collected in February and August 2021, respectively. Waves 108 and 114 were collected in May and September 2022, respectively. The dataset comprises 16,143 observations. Although each wave includes different questions, the dataset consistently covers inquiries regarding individuals' social and demographic characteristics, enabling a comprehensive longitudinal analysis.

4.3.2 Measurement of Key Variables

The ATP dataset contains three variables measuring preventive behaviour in response to COVID-19: *mask-wearing*. This binary variable indicates whether an individual has worn a mask at least once in the past month. *Vaccine uptake*: This binary variable indicates whether an individual has received a COVID-19 vaccine. *Booster adoption*: These variables indicate whether an individual has received a booster dose to prevent COVID-19. The dataset also contains information about COVID-19 incidents, which is used as an endogenous variable in Section 4.5.2. *Testing Positive for COVID-19*: This binary variable equals 1 if an individual has tested positive for COVID-19 since February 2020 and 0 otherwise. It is employed to examine the outcome of preventive behaviour.

Religiosity is captured using dummy variables, each representing different religious affiliations: born-again Protestants(made up of the Pentecostal and Charismatic Churches), not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." *Religious intensity* is characterised by the frequency with which an individual attends religious services. It is categorised into three levels: frequent attendance (at least once a week), infrequent (several times a month or year), and rare/no attendance. Each level is denoted as a binary variable, with infrequent attendance as the reference category.

This study also examines various social, political, economic, and demographic factors. Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high

school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities (Bennett, 2021). Party allegiance is classified into three groups: democratic, republican, and other political parties, with each political party serving as its own reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. The summary statistics are provided in Table 4.1. The table shows descriptive statistics for all variables included in the regression. The table displays the average, standard deviation, minimum, and maximum values for preventive behaviours, religious indicators, and control variables. Respondents report modest engagement in preventive behaviours, with some variation among religious affiliations and demographic categories. The variables are sufficiently dispersed, indicating that the data reflect relevant behavioural changes across individuals and survey waves.

4.4. Estimation Strategy

The impact of religiosity on preventive health behaviours is estimated using Ordinary Least Squares (OLS) regression, with robust standard errors to account for heteroskedasticity and potential autocorrelation within observations. This approach helps ensure that the estimated standard errors remain consistent even when error variances vary across individuals. The

analysis includes census division and wave-fixed effects to control for unobserved regional characteristics and time-specific factors that may influence health behaviours. We include census division*wave interaction fixed effects in some specifications, allowing us to capture more granular region-time variations. This setup enables a more accurate estimation of the relationship between religiosity and health behaviours by controlling for regional and temporal factors that might confound the results. The baseline equation is as follows:

$$P_i = \alpha + \beta RD_i + X_i\theta + \delta_i + \gamma_t + (\delta_i * \gamma_t) + \epsilon_i \quad (4.1)$$

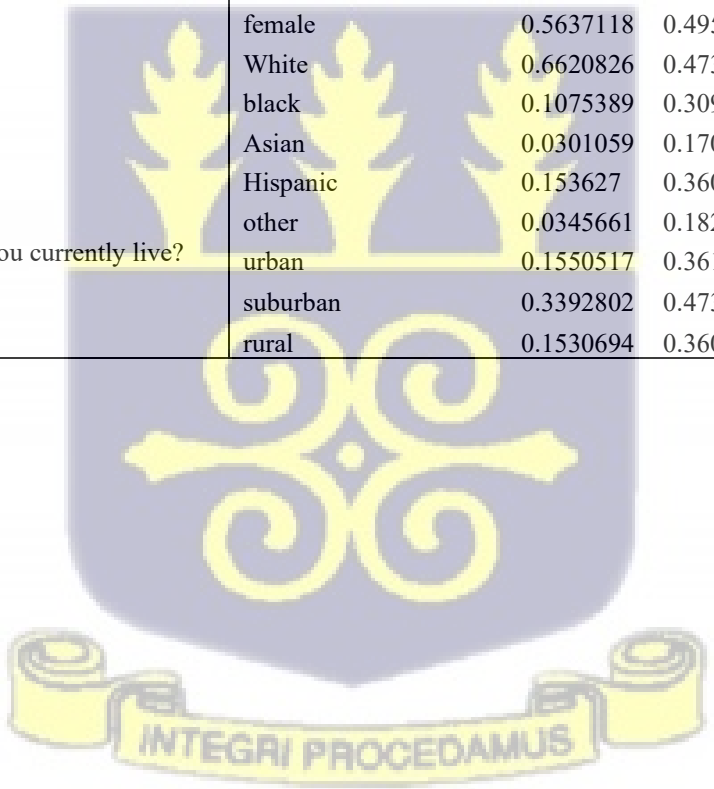
Where P_i Represents preventive behaviour (mask-wearing, vaccination, booster shot). Religious denomination (RD) is a vector of binary variables that takes the value one if a person belongs to a particular religious denomination. X_i is a vector of control variables, including age group, gender, education level, income level, race, and metropolitan area indicators. δ_i denotes census division fixed effects, γ_t is wave fixed effects. $\delta_i * \gamma_t$ is the interaction between wave and census division fixed effects, ϵ_i is the error term.

4.5. Empirical results

Table 4.1: Summary Statistics

Question	Variable	Mean	SD	Min	Max	Obs
In the past month, how often, if ever, have you worn a mask or face covering when in stores or other businesses?	Maskwear	0.7879576	0.4087674	0	1	16143
Have you received a vaccine to prevent COVID-19?	vaccine	0.800888	0.3993498	0	1	11486
Have you received a COVID-19 booster shot within the last six months?	Vaccine Booster	0.8579067	0.3491617	0	1	11035
Since February 2020, have YOU done or experienced the following? [NO ITEM a] b. Been pretty sure you have had COVID-19 even though you have not been officially diagnosed c. Tested positive for having COVID-19 NO ITEM d e. Tested positive for having antibodies to COVID-19	Testing Positive for Covid	0.1309546	0.3373611	0	1	16143
What is your present religion, if any? Would you describe yourself as a born-again or evangelical Christian? 1 Yes, born-again or evangelical Christian 2 No, not born-again or evangelical Christian	Born-again protestant	0.2358917	0.424568	0	1	16143
	Not Born Again protestant	0.1657684	0.3718842	0	1	16143
	catholic	0.1987239	0.3990521	0	1	16143
	Jew	0.0244069	0.1543135	0	1	16143
	Other Christians	0.0232299	0.1506375	0	1	16143
	Muslim	0.005761	0.0756847	0	1	16143
	Other religion	0.0121415	0.1095208	0	1	16143
	No religion	0.2617853	0.43962	0	1	16143
Aside from weddings and funerals, how often do you attend religious services	often	0.2744843	0.4462679	0	1	16143
	infrequent	0.2229449	0.4162346	0	1	16143
	seldom_never	0.4982965	0.5000126	0	1	16143
In politics today, do you consider yourself a	democrat	0.3826426	0.4860472	0	1	16143
1. Republican 2. Democrat	republican	0.2645729	0.4411192	0	1	16143

3. Independent 4. Something else	party_others	0.3424394	0.4745404	0	1	16143
What is the highest degree or level of school that you have COMPLETED?	highschool	0.1624233	0.3688501	0	1	16143
	College	0.3096079	0.4623463	0	1	16143
	postgrad	0.5256148	0.4993589	0	1	16143
Last year, what was your total family income from all sources before taxes?	upper-income group	0.2593074	0.4382682	0	1	16143
	middle-income group	0.4444651	0.4969217	0	1	16143
	lower_income	0.2031221	0.4023351	0	1	16143
AGE-65+	old_age	0.5509509	0.4974126	0	1	16143
Age 30-64	middle_age	0.3320325	0.4709572	0	1	16143
AGE 18-29	young	0.1095212	0.3123016	0	1	16143
Do you describe yourself as a man or a woman, or do you describe yourself in some other way?	male	0.4336245	0.4955901	0	1	16143
	female	0.5637118	0.4959396	0	1	16143
What is your race or origin?	White	0.6620826	0.4730149	0	1	16143
	black	0.1075389	0.3098067	0	1	16143
	Asian	0.0301059	0.1708841	0	1	16143
	Hispanic	0.153627	0.360602	0	1	16143
	other	0.0345661	0.1826837	0	1	16143
How would you describe the community where you currently live?	urban	0.1550517	0.3619652	0	1	16143
	suburban	0.3392802	0.4734797	0	1	16143
	rural	0.1530694	0.3600656	0	1	16143



4.5.1 Protective Behaviour

The regression results are presented in Tables 4.2, 4.3, 4.4, and 4.5, each comprising 6 specifications. Columns 1, 2, and 3 present a parsimonious model, while columns 4, 5, and 6 include additional control variables, extending the initial model. Moreover, these specifications consider regional variations and wave characteristics by incorporating wave and census division fixed effects and their interactions. Specifically, wave-fixed effects are included in columns 1 and 4, while columns 2 and 5 incorporate wave and census division fixed effects.[8] In columns 3 and 6, wave, census division, and wave-by-census-division interaction terms are all considered to ensure a comprehensive analysis.

Table 4.2 shows the regression results on religiosity and mask-wearing behaviour. A significant negative correlation is observed between mask-wearing behaviour and born-again Protestants, a finding that holds across all models. This suggests that born-again Protestants are significantly less likely to wear masks. Other Christians also show a consistently negative effect on mask-wearing behaviour, implying that Orthodox and Mormons do not wear masks compared to non-religious people.[9]

The findings from the control variables are noteworthy. It was observed that, compared with individuals with other political affiliations, Republicans are less inclined to wear masks, whereas Democrats are more likely to do so. This difference might partly reflect the political climate at the time, as the COVID-19 pandemic response was highly polarised along party lines. Given that the Democratic Party promoted stricter health guidelines, individuals identifying as Democrats might have felt more aligned with mask-wearing guidelines as a show

[8] These sets of fixed effects capture regionally diverse quality and quantity of medical facilities which may affect availability of information, vaccines and testing facilities; they may also capture regionally and temporally differing incidence prevalences which may affect protective behaviour as well as the likelihood of being tested positively for COVID-19.

[9] „Other“ Protestants show in some specifications also a significantly lower incidence of mask wearing (compared to the reference group), but the coefficient is consistently much lower in absolute value than for the “born again” Protestants and it is insignificant in my preferred specifications 5 and 6.

of support for their party's stance on pandemic management. Conversely, Republicans, perceiving less alignment with the mask mandates, might have been less likely to adhere strictly to mask-wearing guidelines.

Additionally, individuals with a postgraduate degree are more inclined to wear masks than those with a college degree. Moreover, older individuals are more likely to wear masks than those in the middle age bracket, while younger people are less likely to do so. This makes sense, as the risk of severe COVID-19 increases with age. Furthermore, males are less likely to wear masks compared to females. Blacks, Asians, and Hispanics are significantly more likely to wear masks compared to other races. In terms of location, urban residents are more likely to wear masks than rural residents, while suburban residents fall in between.

Table 4.2:Religiosity and Mask Wearing

The dependent variable is mask-wearing, a binary indicator of whether an individual has worn a mask at least once in the past month. *Religiosity* is captured using dummy variables, each representing different religious affiliations: born-again Protestants, not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." Each level is denoted as a binary variable, with infrequent attendance as the reference category. Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities. Party allegiance is classified into three groups: democratic, republican, and other political parties, with other political parties as the reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Mask wear					
Protestant born again	-0.0923***	-0.0848***	-0.0837***	-0.0488***	-0.0445***	-0.0434***
	(0.00744)	(0.00814)	(0.00812)	(0.00783)	(0.00849)	(0.00848)
Protestants not born again	-0.0326***	-0.0228***	-0.0219***	-0.0154**	-0.00902	-0.00819
	(0.00756)	(0.00831)	(0.00831)	(0.00756)	(0.00833)	(0.00833)
Catholic	-0.00354	-0.00683	-0.00535	0.00665	0.00707	0.00882
	(0.00663)	(0.00746)	(0.00744)	(0.00697)	(0.00780)	(0.00779)
Other Christians	-0.111***	-0.0983***	-0.0998***	-0.0622***	-0.0589***	-0.0607***
	(0.0210)	(0.0228)	(0.0229)	(0.0206)	(0.0224)	(0.0225)
Jewish	0.00355	-0.0110	-0.0109	-0.0207	-0.0366**	-0.0363**
	(0.0151)	(0.0169)	(0.0170)	(0.0151)	(0.0169)	(0.0170)
Muslim	0.0392	0.0303	0.0302	0.00804	0.00635	0.00609

	(0.0260)	(0.0270)	(0.0268)	(0.0270)	(0.0292)	(0.0291)
Other Religion	0.0418**	0.0196	0.0222	0.000340	-0.00586	-0.00236
	(0.0185)	(0.0215)	(0.0213)	(0.0201)	(0.0242)	(0.0240)
Democrat				0.0620***	0.0608***	0.0603***
				(0.00522)	(0.00582)	(0.00581)
Republicans				-0.0857***	-0.0931***	-0.0933***
				(0.00802)	(0.00857)	(0.00856)
High school				-0.0183**	-0.0164*	-0.0120
				(0.00874)	(0.00939)	(0.00937)
Postgraduate				0.0303***	0.0296***	0.0310***
				(0.00620)	(0.00686)	(0.00684)
Upper Income				0.0109*	0.0110	0.0115*
				(0.00601)	(0.00670)	(0.00670)
Lower Income				-0.00387	-0.00538	-0.00505
				(0.00725)	(0.00799)	(0.00795)
Old age				0.0336***	0.0384***	0.0380***
				(0.00568)	(0.00627)	(0.00626)
Young				-0.0245***	-0.0207**	-0.0211**
				(0.00899)	(0.00998)	(0.00997)
Male				-0.0331***	-0.0353***	-0.0352***
				(0.00522)	(0.00579)	(0.00578)
White				0.00865	0.0265*	0.0252
				(0.0133)	(0.0155)	(0.0155)
Black				0.0579***	0.0676***	0.0658***
				(0.0142)	(0.0162)	(0.0162)
Asian				0.100***	0.0946***	0.0920***
				(0.0174)	(0.0222)	(0.0223)
Hispanic				0.0624***	0.0699***	0.0673***
				(0.0142)	(0.0165)	(0.0165)
Urban				0.0170***	0.0158**	0.0161**
				(0.00639)	(0.00721)	(0.00722)
Rural				-0.0738***	-0.0724***	-0.0734***
				(0.00894)	(0.00953)	(0.00950)
Constant	0.916***	0.938***	0.942***	0.867***	0.873***	0.877***
	(0.00412)	(0.0109)	(0.0108)	(0.0147)	(0.0196)	(0.0194)
Observations	15,831	13,537	13,537	15,831	13,537	13,537
R-squared	0.352	0.362	0.368	0.395	0.403	0.409
Wave Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Census Division Fixed Effect	No	Yes	Yes	No	Yes	Yes
Wave*census division Fixed Effect	No	No	Yes	No	No	Yes
Adj.R^2	0.351	0.361	0.366	0.394	0.402	0.406

In Table 4.3, the findings indicate a correlation between religiosity and vaccine uptake behaviour. Across all models, there is a notable adverse correlation between being a born-again Protestant and vaccine uptake, suggesting a strong inclination against vaccination within this group. Conversely, non-born-again Protestants are more inclined to receive vaccines. Catholics consistently demonstrate a significant positive association with vaccine uptake. Other religious groups, including Buddhists and Hindus, also exhibit a favourable correlation with vaccine uptake compared to individuals without religion.

The data also suggests that political leaning significantly impacts vaccine acceptance. Democrats are considerably more likely to get vaccinated, whereas Republicans are less likely to do so. Additionally, individuals with postgraduate qualifications are more likely to receive the vaccine. On the other hand, those with a high school education or lower are less inclined to participate in vaccination, highlighting disparities in health-related behaviour.

Socioeconomic status is a significant factor: individuals in higher income brackets are more likely to get vaccinated, while those in lower income brackets are less inclined to do so. Age also plays a crucial role, as older individuals are more likely to receive the vaccine. Gender is another determining factor, with men more likely to be vaccinated than women. Moreover, vaccination rates are higher among White, Asian, and Hispanic populations compared to other racial groups. Furthermore, there is a notable difference in vaccination rates by residential location, with rural residents significantly less likely to be vaccinated than those in suburban areas.

Table 4.3: Religiosity and Vaccine Uptake

The dependent variable is Vaccine uptake, a binary indicator of whether an individual has received a COVID-19 vaccine. *Religiosity* is captured using dummy variables, each representing different religious affiliations: born-again Protestants, not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." Each level is denoted as a binary variable, with infrequent attendance as the reference category. Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities. Party allegiance is classified into three groups: democratic, republican, and other political parties, with other political parties as the reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Vaccine Uptake					
Protestant born again	-0.113***	-0.0835***	-0.0829***	-0.0491***	-0.0363***	-0.0367***
	(0.0109)	(0.0122)	(0.0122)	(0.0111)	(0.0123)	(0.0123)
Protestants not born again	0.0203*	0.0445***	0.0450***	0.0248**	0.0375***	0.0374***
	(0.0109)	(0.0119)	(0.0119)	(0.0104)	(0.0114)	(0.0114)
Catholic	0.0471***	0.0605***	0.0601***	0.0514***	0.0556***	0.0559***
	(0.00981)	(0.0110)	(0.0110)	(0.00980)	(0.0109)	(0.0109)
Other Christians	-0.0142	0.0156	0.0178	0.0355	0.0521*	0.0537*
	(0.0253)	(0.0283)	(0.0284)	(0.0246)	(0.0276)	(0.0278)
Jewish	0.0992***	0.110***	0.110***	0.00118	0.00323	0.00384
	(0.0194)	(0.0217)	(0.0217)	(0.0182)	(0.0201)	(0.0202)

Muslim	0.0145	0.0372	0.0354	-0.0283	-0.00410	-0.00558
	(0.0482)	(0.0535)	(0.0530)	(0.0481)	(0.0549)	(0.0541)
Other Religion	0.116***	0.134***	0.131***	0.0274	0.0636**	0.0603*
	(0.0234)	(0.0284)	(0.0285)	(0.0254)	(0.0310)	(0.0313)
Democrat				0.149***	0.153***	0.153***
				(0.00764)	(0.00843)	(0.00845)
Republicans				-0.101***	-0.0991***	-0.0981***
				(0.0103)	(0.0110)	(0.0110)
High school				-0.0426***	-0.0423***	-0.0432***
				(0.0118)	(0.0126)	(0.0127)
Postgraduate				0.0807***	0.0887***	0.0874***
				(0.00856)	(0.00937)	(0.00939)
Upper Income				0.0350***	0.0326***	0.0328***
				(0.00788)	(0.00871)	(0.00872)
Lower Income				-0.0657***	-0.0677***	-0.0688***
				(0.0105)	(0.0115)	(0.0115)
Old age				0.132***	0.139***	0.139***
				(0.00824)	(0.00905)	(0.00907)
Young				0.0107	0.00442	0.00591
				(0.0134)	(0.0148)	(0.0148)
Male				0.0382***	0.0354***	0.0359***
				(0.00720)	(0.00789)	(0.00789)
White				0.0531***	0.0700***	0.0693***
				(0.0205)	(0.0231)	(0.0231)
Black				-0.000240	0.0163	0.0177
				(0.0235)	(0.0261)	(0.0262)
Asian				0.156***	0.171***	0.169***
				(0.0241)	(0.0289)	(0.0289)
Hispanic				0.0674***	0.0840***	0.0801***
				(0.0225)	(0.0257)	(0.0257)
Urban				0.0104	0.00832	0.00898
				(0.00863)	(0.00970)	(0.00973)
Rural				-0.0629***	-0.0603***	-0.0594***
				(0.0102)	(0.0109)	(0.0109)
Constant	0.817***	0.866***	0.868***	0.617***	0.632***	0.632***
	(0.00695)	(0.0153)	(0.0163)	(0.0230)	(0.0283)	(0.0289)
Observations	11,178	9,618	9,618	11,178	9,618	9,618
R-squared	0.026	0.029	0.033	0.149	0.152	0.156
Wave Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Census Division Fixed Effect	No	Yes	Yes	No	Yes	Yes
Wave*census division Fixed Effect	No	No	Yes	No	No	Yes
Adj.R^2	0.0250	0.0271	0.0282	0.147	0.149	0.150

In Table 4.4, the findings reveal a positive and significant correlation between religiosity and vaccine booster adoption. Specifically, the data indicate that Protestants who are not born again and Catholics are more likely to receive vaccine boosters compared to individuals not affiliated with any religion.

The findings regarding the control variables demonstrate a consistent pattern similar to that observed with mask-wearing and vaccine uptake. The data indicate a clear preference among

Democrats for booster shots, while Republicans show less inclination to receive them. Moreover, postgraduate-level individuals are significantly more likely to obtain a booster shot, indicating that education is critical in shaping health-related behaviours. Income level also emerges as a significant factor, with higher-income groups showing a stronger propensity to receive booster shots than lower-income groups. Additionally, older individuals are more likely to choose to receive booster shots. Race and ethnicity also have a substantial impact, with individuals identifying as White, Black, Asian, and Hispanic displaying a significantly higher likelihood of receiving booster shots compared to individuals from other racial groups. Lastly, geographic location also influences booster uptake, with rural residents consistently less likely to receive boosters than their suburban counterparts.

Table 4.4:Religiosity And Vaccine Booster Uptake

The dependent variable is Booster adoption, which indicates whether an individual has received a booster dose to prevent COVID-19. *Religiosity* is captured using dummy variables, each representing different religious affiliations: born-again Protestants, not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities. Party allegiance is classified into three groups: democratic, republican, and other political parties, with other political parties as the reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Vaccine Booster Uptake					
Protestant born again	-0.0641***	-0.0479***	-0.0476***	-0.0238**	-0.0182	-0.0185
	(0.00985)	(0.0110)	(0.0111)	(0.0103)	(0.0114)	(0.0114)
Protestants not born again	0.0221**	0.0379***	0.0378***	0.0208**	0.0287***	0.0280***
	(0.00970)	(0.0106)	(0.0106)	(0.00966)	(0.0106)	(0.0106)
Catholic	0.0393***	0.0425***	0.0424***	0.0438***	0.0417***	0.0419***
	(0.00877)	(0.00987)	(0.00991)	(0.00900)	(0.0101)	(0.0102)
Other Christians	-0.00537	0.0160	0.0167	0.0302	0.0404	0.0406
	(0.0232)	(0.0253)	(0.0254)	(0.0228)	(0.0250)	(0.0251)
Jewish	0.0730***	0.0810***	0.0796***	0.00552	0.0114	0.0104
	(0.0173)	(0.0185)	(0.0186)	(0.0164)	(0.0173)	(0.0175)
Muslim	0.0640*	0.0576	0.0551	0.0282	0.0207	0.0181
	(0.0339)	(0.0404)	(0.0404)	(0.0344)	(0.0407)	(0.0403)

Other Religion	0.0722***	0.0750**	0.0739**	0.0233	0.0290	0.0281
	(0.0238)	(0.0301)	(0.0302)	(0.0253)	(0.0314)	(0.0315)
Democrat				0.114***	0.116***	0.116***
				(0.00685)	(0.00755)	(0.00757)
Republicans				-0.0665***	-0.0653***	-0.0651***
				(0.00958)	(0.0103)	(0.0103)
High school				-0.0180	-0.0135	-0.0145
				(0.0111)	(0.0119)	(0.0119)
Postgraduate				0.0702***	0.0743***	0.0735***
				(0.00782)	(0.00857)	(0.00861)
Upper Income				0.0330***	0.0331***	0.0328***
				(0.00708)	(0.00784)	(0.00785)
Lower Income				-0.0271***	-0.0270**	-0.0278***
				(0.00988)	(0.0108)	(0.0108)
Old age				0.0930***	0.101***	0.102***
				(0.00767)	(0.00845)	(0.00848)
Young				0.0197	0.0258*	0.0267*
				(0.0126)	(0.0138)	(0.0138)
Male				0.0261***	0.0253***	0.0252***
				(0.00661)	(0.00727)	(0.00728)
White				0.0595***	0.0792***	0.0777***
				(0.0197)	(0.0225)	(0.0226)
Black				0.0699***	0.0887***	0.0893***
				(0.0218)	(0.0246)	(0.0248)
Asian				0.116***	0.140***	0.139***
				(0.0234)	(0.0281)	(0.0282)
Hispanic				0.0695***	0.0879***	0.0856***
				(0.0214)	(0.0248)	(0.0249)
Urban				-0.00462	-0.00623	-0.00737
				(0.00792)	(0.00894)	(0.00898)
Rural				-0.0401***	-0.0364***	-0.0355***
				(0.00924)	(0.00989)	(0.00989)
Constant	0.862***	0.893***	0.909***	0.680***	0.676***	0.691***
	(0.00629)	(0.0139)	(0.0139)	(0.0223)	(0.0272)	(0.0276)
Observations	10,731	9,241	9,241	10,731	9,241	9,241
R-squared	0.014	0.018	0.020	0.099	0.102	0.104
Wave Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Census Division Fixed Effect	No	Yes	Yes	No	Yes	Yes
Wave*census division Fixed Effect	No	No	Yes	No	No	Yes
Adj.R^2	0.0131	0.0155	0.0151	0.0968	0.0988	0.0984

4.5.2 The outcomes of Covid-19 Preventive Behaviour

Table 4.5 displays the correlation between religiosity and the probability of testing positive for COVID-19. The study seeks to determine whether different types of religious beliefs predict an individual's likelihood of testing positive for COVID-19 and to elucidate the association between religiosity and adherence to preventive measures. Born-again Protestants are more

likely to test positive for COVID-19. A possible explanation for this outcome is that, as indicated in the previous results, they are less compliant with preventive behaviours than other religious denominations.

The analysis of the control variable indicates that Republicans, males, and rural and urban dwellers are more likely to test positive for COVID-19. In contrast, individuals with postgraduate degrees, older individuals, and Asians are less likely to test positive for COVID-19. Unsurprisingly, this broadly adheres to the patterns of preventive behaviour.

Table 4.5: Religiosity And testing positive for COVID-19

Testing Positive for COVID-19 is a binary variable that takes a value of 1 if an individual has tested positive for COVID-19 since February 2020 and 0 otherwise. It is employed to examine the outcome of preventive behaviour. Religiosity is captured using dummy variables, each representing different religious affiliations: born-again Protestants, not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." *Religious intensity* is characterised by the frequency with which an individual attends religious services. It is categorised into three levels: frequent attendance (at least once a week), infrequent (several times a month or year), and rare/no attendance. Each level is denoted as a binary variable, with infrequent attendance as the reference category. Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities. Party allegiance is classified into three groups: democratic, republican, and other political parties, with other political parties as the reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Tested positive for COVID					
Protestant born again	0.0314***	0.0246***	0.0247***	0.0262***	0.0237***	0.0239***
	(0.00730)	(0.00801)	(0.00803)	(0.00784)	(0.00853)	(0.00855)
Protestants not born again	-0.000159	-0.00431	-0.00425	0.0112	0.00835	0.00871
	(0.00770)	(0.00840)	(0.00842)	(0.00787)	(0.00861)	(0.00863)
Catholic	0.0149**	0.00922	0.00981	0.0129	0.0103	0.0107
	(0.00760)	(0.00835)	(0.00837)	(0.00793)	(0.00875)	(0.00876)
Other Christians	0.0260	0.0290	0.0290	0.0226	0.0291	0.0293
	(0.0190)	(0.0215)	(0.0215)	(0.0186)	(0.0211)	(0.0211)
Jewish	-0.0175	-0.0247	-0.0245	0.0170	0.00846	0.00875
	(0.0164)	(0.0181)	(0.0181)	(0.0163)	(0.0179)	(0.0179)
Muslim	-0.0347	-0.0280	-0.0323	-0.0377	-0.0281	-0.0327
	(0.0290)	(0.0338)	(0.0343)	(0.0293)	(0.0341)	(0.0345)
Other Religion	0.00866	0.00501	0.00575	0.0241	0.0255	0.0262
	(0.0247)	(0.0302)	(0.0300)	(0.0259)	(0.0316)	(0.0315)
Democrat				-0.0161***	-0.0121*	-0.0123*
				(0.00625)	(0.00687)	(0.00689)
Republicans				0.0210***	0.0218***	0.0214***
				(0.00752)	(0.00810)	(0.00812)

High school				0.00389	0.00604	0.00466
				(0.00858)	(0.00916)	(0.00918)
Postgraduate				-0.0274***	-0.0243***	-0.0238***
				(0.00652)	(0.00711)	(0.00712)
Upper Income				0.00132	0.00316	0.00268
				(0.00648)	(0.00716)	(0.00718)
Lower Income				0.0103	0.0102	0.0112
				(0.00765)	(0.00832)	(0.00832)
Old age				-0.0634***	-0.0613***	-0.0607***
				(0.00618)	(0.00674)	(0.00676)
Young				0.0139	0.0150	0.0154
				(0.0103)	(0.0112)	(0.0112)
Male				0.0205***	0.0222***	0.0227***
				(0.00549)	(0.00602)	(0.00602)
White				-0.0118	-0.0190	-0.0193
				(0.0131)	(0.0149)	(0.0149)
Black				0.0208	0.0182	0.0183
				(0.0154)	(0.0171)	(0.0171)
Asian				-0.0364*	-0.0572**	-0.0578**
				(0.0192)	(0.0239)	(0.0238)
Hispanic				0.0243	0.0223	0.0236
				(0.0152)	(0.0172)	(0.0172)
Urban				0.0268***	0.0266***	0.0272***
				(0.00789)	(0.00875)	(0.00878)
Rural				0.0271***	0.0257***	0.0255***
				(0.00793)	(0.00846)	(0.00849)
Constant	0.147***	0.131***	0.125***	0.180***	0.174***	0.167***
	(0.00478)	(0.0124)	(0.0141)	(0.0147)	(0.0198)	(0.0208)
Observations	15,831	13,537	13,537	15,831	13,537	13,537
R-squared	0.030	0.033	0.036	0.049	0.051	0.053
Wave Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Census Division Fixed Effect	No	Yes	Yes	No	Yes	Yes
Wave*census division Fixed Effect	No	No	Yes	No	No	Yes
Adj.R^2	0.0296	0.0318	0.0320	0.0474	0.0482	0.0485

4.6. Robustness tests

Additionally, the study investigates the impact of religiosity intensity, as measured by the frequency of attending services, on preventive behaviour as a robustness test. The findings are detailed in Table 4.6-4.9, which includes 9 different specifications. Columns 1, 2, and 3 outline a simplified model focusing on the core variables, while columns 4, 5, and 6 introduce additional control variables to provide a more comprehensive analysis of the relationships. The final set of models in columns 7, 8, and 9 incorporates interaction terms for religious service attendance and affiliation, along with the control variables. These models also account for

regional and temporal variation by including fixed effects for wave and census divisions, as well as their interactions. Specifically, wave-fixed effects are applied in columns 1, 4, and 7, while columns 2, 5, and 8 include wave and census division fixed effects. The most comprehensive models in columns 3, 6, and 9 account for wave, census division, and their interactions, ensuring a thorough and robust analysis.

The robustness tests confirm that the results are largely consistent with the initial findings in Tables 1 to 4, with only minor variations in religious service attendance. Regular attendance at religious services generally does not significantly affect preventive behaviour. However, the interaction between service attendance and religious affiliation is not significant, with two key exceptions: other Christians who frequently attend services are slightly more likely to wear masks. In contrast, Jews who regularly attend services are marginally less likely to take vaccines, both at the 10% significance level.

A notable observation from the robustness analysis is that born-again Protestants and Jews who regularly attend services are more likely to test positive for COVID-19. This result is particularly significant for born-again Protestants because, in the initial findings, this group showed no strong adherence to preventive behaviours like mask-wearing or vaccination. The interaction result reinforces this pattern, suggesting that, even when they are more engaged in religious services, born-again Protestants remain unlikely to adopt preventive health measures, which may explain their higher likelihood of contracting the virus.

Table 4.6: Religiosity and Mask Wearing

Mask wearing is a binary variable that indicates whether an individual has worn a mask often in the past month. *Religiosity* is captured using dummy variables, each representing different religious affiliations: born-again Protestants, not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." *Religious intensity* is characterised by the frequency with which an individual attends religious services. It is categorised into three levels: frequent attendance (at least once a week), infrequent (several times a month or year), and rare/no attendance. Each level is denoted as a binary variable, with infrequent attendance as the reference category. Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities. Party allegiance is classified into three groups: democratic, republican, and other political parties, with other political parties as the reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES					mask wear				
Protestant born again	-0.0935***	-0.0897***	-0.0879***	-0.0484***	-0.0474***	-0.0457***	-0.0336***	-0.0312***	-0.0283**
	(0.00888)	(0.00968)	(0.00966)	(0.00903)	(0.00980)	(0.00979)	(0.0111)	(0.0120)	(0.0120)
Protestants not born again	-0.0340***	-0.0255***	-0.0244***	-0.0157*	-0.0106	-0.00964	-0.0220**	-0.0155	-0.0150
	(0.00816)	(0.00893)	(0.00893)	(0.00811)	(0.00891)	(0.00891)	(0.00894)	(0.00980)	(0.00980)
Catholic	-0.00510	-0.00997	-0.00819	0.00647	0.00518	0.00715	0.00158	0.000323	0.00227
	(0.00741)	(0.00827)	(0.00826)	(0.00766)	(0.00854)	(0.00854)	(0.00829)	(0.00924)	(0.00925)
Other Christians	-0.112***	-0.103***	-0.104***	-0.0618***	-0.0618***	-0.0630***	-0.0949***	-0.113***	-0.114***
	(0.0216)	(0.0235)	(0.0236)	(0.0212)	(0.0230)	(0.0231)	(0.0347)	(0.0368)	(0.0371)
Jewish	0.00224	-0.0131	-0.0128	-0.0211	-0.0378**	-0.0375**	-0.0184	-0.0313*	-0.0308*
	(0.0152)	(0.0170)	(0.0171)	(0.0152)	(0.0171)	(0.0172)	(0.0161)	(0.0179)	(0.0180)
Muslim	0.0377	0.0265	0.0269	0.00803	0.00422	0.00430	-0.0116	-0.00591	-0.00259
	(0.0263)	(0.0273)	(0.0271)	(0.0271)	(0.0294)	(0.0293)	(0.0353)	(0.0386)	(0.0390)
Other Religion	0.0405**	0.0176	0.0202	3.56e-05	-0.00700	-0.00343	0.00162	-0.00173	-0.000813
	(0.0187)	(0.0217)	(0.0215)	(0.0202)	(0.0243)	(0.0242)	(0.0212)	(0.0253)	(0.0252)
Often attend service	-0.00413	0.00265	0.00139	-0.00310	0.00146	0.000379	-0.0222	-0.00447	-0.00419
	(0.00777)	(0.00840)	(0.00838)	(0.00755)	(0.00818)	(0.00815)	(0.0247)	(0.0267)	(0.0269)
Seldom or never attend service	-0.00526	-0.00489	-0.00495	-0.00196	-0.00314	-0.00321	-0.00175	-0.00266	-0.00260
	(0.00706)	(0.00777)	(0.00776)	(0.00688)	(0.00757)	(0.00756)	(0.00694)	(0.00764)	(0.00763)
Democrat				0.0620***	0.0610***	0.0605***	0.0620***	0.0611***	0.0605***
				(0.00523)	(0.00583)	(0.00582)	(0.00523)	(0.00582)	(0.00581)
Republicans				-0.0857***	-0.0932***	-0.0935***	-0.0850***	-0.0925***	-0.0927***

	(0.00802)	(0.00857)	(0.00856)	(0.00804)	(0.00859)	(0.00857)
High school	-0.0183**	-0.0162*	-0.0119	-0.0180**	-0.0159*	-0.0115
	(0.00874)	(0.00939)	(0.00937)	(0.00874)	(0.00938)	(0.00936)
Postgraduate	0.0304***	0.0294***	0.0308***	0.0309***	0.0299***	0.0313***
	(0.00621)	(0.00687)	(0.00686)	(0.00621)	(0.00688)	(0.00686)
Upper Income	0.0109*	0.0111*	0.0115*	0.0105*	0.0108	0.0112*
	(0.00601)	(0.00671)	(0.00670)	(0.00601)	(0.00671)	(0.00670)
Lower Income	-0.00388	-0.00538	-0.00506	-0.00425	-0.00572	-0.00543
	(0.00725)	(0.00799)	(0.00795)	(0.00726)	(0.00799)	(0.00795)
Old age	0.0338***	0.0383***	0.0379***	0.0336***	0.0381***	0.0378***
	(0.00572)	(0.00631)	(0.00630)	(0.00572)	(0.00631)	(0.00630)
Young	-0.0245***	-0.0207**	-0.0212**	-0.0243***	-0.0204**	-0.0208**
	(0.00899)	(0.00997)	(0.00997)	(0.00899)	(0.00998)	(0.00998)
Male	-0.0331***	-0.0352***	-0.0351***	-0.0333***	-0.0353***	-0.0352***
	(0.00523)	(0.00579)	(0.00578)	(0.00523)	(0.00579)	(0.00578)
White	0.00868	0.0267*	0.0254	0.00813	0.0263*	0.0252
	(0.0133)	(0.0155)	(0.0155)	(0.0134)	(0.0155)	(0.0155)
Black	0.0580***	0.0673***	0.0656***	0.0578***	0.0670***	0.0655***
	(0.0142)	(0.0162)	(0.0162)	(0.0142)	(0.0162)	(0.0162)
Asian	0.100***	0.0944***	0.0919***	0.0991***	0.0935***	0.0915***
	(0.0174)	(0.0222)	(0.0223)	(0.0175)	(0.0223)	(0.0224)
Hispanic	0.0623***	0.0700***	0.0674***	0.0623***	0.0704***	0.0679***
	(0.0142)	(0.0165)	(0.0165)	(0.0142)	(0.0166)	(0.0166)
Urban	0.0170***	0.0159**	0.0161**	0.0170***	0.0162**	0.0164**
	(0.00639)	(0.00721)	(0.00722)	(0.00638)	(0.00720)	(0.00721)
Rural	-0.0738***	-0.0724***	-0.0733***	-0.0740***	-0.0727***	-0.0736***
	(0.00894)	(0.00953)	(0.00951)	(0.00894)	(0.00954)	(0.00951)
Protestants born again*often attend service				-0.00590	-0.0202	-0.0233
				(0.0270)	(0.0291)	(0.0292)
Protestants not born again*often attend service				0.0430	0.0262	0.0272
				(0.0274)	(0.0297)	(0.0298)
Catholics* often attend service				0.0334	0.0211	0.0202
				(0.0264)	(0.0287)	(0.0288)
Other Christians*often attend service				0.0722	0.0931*	0.0915*
				(0.0485)	(0.0516)	(0.0519)
Jewish*often attend service				-0.00225	-0.0373	-0.0394

							(0.0496)	(0.0562)	(0.0563)
Muslim*often attend service							0.0702	0.0310	0.0217
							(0.0569)	(0.0613)	(0.0610)
Other religions* often attend service							0.00465	-0.0286	-0.0121
							(0.0629)	(0.0743)	(0.0737)
Constant	0.921***	0.943***	0.947***	0.868***	0.876***	0.879***	0.869***	0.877***	0.880***
	(0.00752)	(0.0132)	(0.0131)	(0.0158)	(0.0207)	(0.0206)	(0.0159)	(0.0209)	(0.0207)
Observations	15,831	13,537	13,537	15,831	13,537	13,537	15,831	13,537	13,537
R-squared	0.352	0.362	0.368	0.395	0.403	0.409	0.395	0.404	0.410
wave Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
census division Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
wave*census division Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
adj.R^2	0.351	0.361	0.366	0.394	0.401	0.406	0.394	0.402	0.407

Table 4.7: Religiosity and Vaccine Uptake

Vaccine uptake is a binary variable indicating whether an individual has received a COVID-19 vaccine. *Religiosity* is captured using dummy variables, each representing different religious affiliations: born-again Protestants, not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." *Religious intensity* is characterised by the frequency with which an individual attends religious services. It is categorised into three levels: frequent attendance (at least once a week), infrequent (several times a month or year), and rare/no attendance. Each level is denoted as a binary variable, with infrequent attendance as the reference category. Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities. Party allegiance is classified into three groups: democratic, republican, and other political parties, with other political parties as the reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Vaccine uptake								

Protestant born again	-0.118***	-0.0943***	-0.0932***	-0.0530***	-0.0431***	-0.0431***	-0.0379**	-0.0302*	-0.0300*
	(0.0130)	(0.0143)	(0.0144)	(0.0129)	(0.0141)	(0.0141)	(0.0160)	(0.0173)	(0.0173)
Protestants not born again	0.0186	0.0397***	0.0404***	0.0211*	0.0323***	0.0323***	0.00886	0.0201	0.0201
	(0.0117)	(0.0128)	(0.0128)	(0.0111)	(0.0122)	(0.0122)	(0.0121)	(0.0132)	(0.0132)
Catholic	0.0447***	0.0544***	0.0543***	0.0475***	0.0499***	0.0503***	0.0546***	0.0565***	0.0569***
	(0.0110)	(0.0122)	(0.0122)	(0.0108)	(0.0120)	(0.0120)	(0.0115)	(0.0128)	(0.0128)
Other Christians	-0.0193	0.00506	0.00776	0.0315	0.0449	0.0469	-0.00990	0.00728	0.0112
	(0.0264)	(0.0293)	(0.0295)	(0.0255)	(0.0286)	(0.0287)	(0.0406)	(0.0432)	(0.0434)
Jewish	0.0981***	0.107***	0.107***	-0.00216	-0.00130	-0.000678	0.0104	0.0204	0.0208
	(0.0195)	(0.0219)	(0.0219)	(0.0184)	(0.0203)	(0.0205)	(0.0180)	(0.0192)	(0.0194)
Muslim	0.0113	0.0291	0.0276	-0.0321	-0.0104	-0.0116	-0.00656	0.0118	0.0121
	(0.0485)	(0.0539)	(0.0534)	(0.0483)	(0.0551)	(0.0544)	(0.0597)	(0.0699)	(0.0692)
Other Religion	0.115***	0.131***	0.127***	0.0241	0.0585*	0.0552*	0.0257	0.0575*	0.0535
	(0.0238)	(0.0289)	(0.0289)	(0.0256)	(0.0313)	(0.0316)	(0.0262)	(0.0329)	(0.0334)
Often attend service	0.00826	0.0120	0.0109	-0.00706	-0.00490	-0.00626	0.0214	0.0191	0.0187
	(0.0110)	(0.0117)	(0.0118)	(0.0105)	(0.0112)	(0.0112)	(0.0371)	(0.0420)	(0.0419)
Seldom or never attend service	-0.000344	-0.00549	-0.00562	-0.0116	-0.0143	-0.0147	-0.00989	-0.0130	-0.0134
	(0.0103)	(0.0112)	(0.0112)	(0.00966)	(0.0105)	(0.0105)	(0.00973)	(0.0106)	(0.0106)
Democrat				0.149***	0.153***	0.153***	0.149***	0.153***	0.153***
				(0.00764)	(0.00844)	(0.00846)	(0.00765)	(0.00844)	(0.00846)
Republicans				-0.101***	-0.0996***	-0.0985***	-0.100***	-0.0987***	-0.0977***
				(0.0103)	(0.0110)	(0.0110)	(0.0103)	(0.0110)	(0.0110)
High school				-0.0424***	-0.0419***	-0.0429***	-0.0424***	-0.0419***	-0.0428***
				(0.0118)	(0.0126)	(0.0127)	(0.0118)	(0.0126)	(0.0127)
Postgraduate				0.0806***	0.0883***	0.0871***	0.0809***	0.0886***	0.0874***
				(0.00858)	(0.00940)	(0.00941)	(0.00859)	(0.00941)	(0.00942)
Upper Income				0.0348***	0.0324***	0.0326***	0.0340***	0.0314***	0.0316***
				(0.00789)	(0.00872)	(0.00873)	(0.00790)	(0.00873)	(0.00874)
Lower Income				-0.0658***	-0.0678***	-0.0688***	-0.0659***	-0.0677***	-0.0688***
				(0.0106)	(0.0115)	(0.0115)	(0.0106)	(0.0115)	(0.0115)
Old age				0.133***	0.139***	0.140***	0.132***	0.139***	0.139***
				(0.00827)	(0.00909)	(0.00911)	(0.00827)	(0.00909)	(0.00911)
Young				0.0104	0.00426	0.00574	0.0102	0.00413	0.00563
				(0.0134)	(0.0148)	(0.0148)	(0.0134)	(0.0148)	(0.0148)
Male				0.0383***	0.0356***	0.0361***	0.0385***	0.0359***	0.0364***
				(0.00720)	(0.00789)	(0.00789)	(0.00720)	(0.00789)	(0.00789)
White				0.0535***	0.0706***	0.0699***	0.0553***	0.0727***	0.0720***
				(0.0205)	(0.0232)	(0.0232)	(0.0205)	(0.0232)	(0.0232)

Black				-0.000568	0.0157	0.0171	0.000207	0.0166	0.0181
				(0.0235)	(0.0262)	(0.0262)	(0.0236)	(0.0262)	(0.0262)
Asian				0.156***	0.170***	0.169***	0.158***	0.172***	0.171***
				(0.0241)	(0.0289)	(0.0289)	(0.0241)	(0.0289)	(0.0290)
Hispanic				0.0670***	0.0835***	0.0796***	0.0678***	0.0847***	0.0809***
				(0.0225)	(0.0257)	(0.0257)	(0.0226)	(0.0257)	(0.0257)
Urban				0.0105	0.00843	0.00906	0.0110	0.00916	0.00981
				(0.00862)	(0.00969)	(0.00973)	(0.00862)	(0.00968)	(0.00971)
Rural				-0.0628***	-0.0601***	-0.0592***	-0.0632***	-0.0604***	-0.0595***
				(0.0102)	(0.0109)	(0.0109)	(0.0102)	(0.0109)	(0.0109)
Protestants born again*often attend service							-0.0496	-0.0421	-0.0433
							(0.0400)	(0.0448)	(0.0447)
Protestants not born again*often attend service							0.0315	0.0347	0.0337
							(0.0397)	(0.0445)	(0.0444)
Catholic* often attend service							-0.0462	-0.0418	-0.0424
							(0.0393)	(0.0442)	(0.0441)
Other Christians*often attend service							0.0414	0.0418	0.0377
							(0.0613)	(0.0676)	(0.0677)
Jewish*often attend service							-0.103	-0.151*	-0.150*
							(0.0740)	(0.0816)	(0.0818)
Muslim*often attend service							-0.0884	-0.0729	-0.0772
							(0.104)	(0.116)	(0.114)
Other religions* often attend service							-0.0333	-0.00750	-0.00317
							(0.0886)	(0.0979)	(0.0961)
Constant	0.817***	0.871***	0.873***	0.627***	0.645***	0.645***	0.623***	0.643***	0.643***
	(0.0116)	(0.0185)	(0.0193)	(0.0246)	(0.0299)	(0.0304)	(0.0248)	(0.0301)	(0.0306)
Observations	11,178	9,618	9,618	11,178	9,618	9,618	11,178	9,618	9,618
R-squared	0.026	0.029	0.033	0.149	0.152	0.156	0.150	0.154	0.157
wave Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
census division Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
wave*census division Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
adj.R^2	0.0249	0.0271	0.0282	0.147	0.149	0.150	0.148	0.150	0.151

Table 4.8:Religiosity and Vaccine Booster Upatake

Booster adoption measures whether an individual has taken a booster to prevent COVID-19. *Religiosity* is captured using dummy variables, each representing different religious affiliations: born-again Protestants, not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." *Religious intensity* is characterised by the frequency with which an individual attends religious services. It is categorised into three levels: frequent attendance (at least once a week), infrequent (several times a month or year), and rare/no attendance. Each level is denoted as a binary variable, with infrequent attendance as the reference category. Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities. Party allegiance is classified into three groups: democratic, republican, and other political parties, with other political parties as the reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Vaccine Booster Uptake								
Protestant born again	-0.0660***	-0.0550***	-0.0544***	-0.0237**	-0.0210	-0.0210	-0.0229	-0.0196	-0.0193
	(0.0117)	(0.0130)	(0.0130)	(0.0119)	(0.0130)	(0.0130)	(0.0148)	(0.0161)	(0.0161)
Protestants not born again	0.0223**	0.0360***	0.0361***	0.0205**	0.0274**	0.0269**	0.0165	0.0230*	0.0226*
	(0.0104)	(0.0114)	(0.0114)	(0.0103)	(0.0113)	(0.0113)	(0.0112)	(0.0122)	(0.0122)
Catholic	0.0391***	0.0394***	0.0396***	0.0436***	0.0401***	0.0405***	0.0458***	0.0436***	0.0435***
	(0.00982)	(0.0109)	(0.0109)	(0.00990)	(0.0110)	(0.0111)	(0.0106)	(0.0118)	(0.0118)
Other Christians	-0.00721	0.00932	0.0104	0.0304	0.0376	0.0382	0.0671**	0.0753**	0.0769**
	(0.0238)	(0.0259)	(0.0260)	(0.0234)	(0.0255)	(0.0257)	(0.0316)	(0.0328)	(0.0329)
Jewish	0.0735***	0.0799***	0.0786***	0.00519	0.0103	0.00951	0.0142	0.0225	0.0219
	(0.0174)	(0.0186)	(0.0187)	(0.0165)	(0.0175)	(0.0176)	(0.0160)	(0.0169)	(0.0171)
Muslim	0.0633*	0.0529	0.0508	0.0281	0.0186	0.0162	0.0382	0.0319	0.0308
	(0.0342)	(0.0408)	(0.0407)	(0.0347)	(0.0410)	(0.0406)	(0.0441)	(0.0533)	(0.0528)
Other Religion	0.0728***	0.0744**	0.0734**	0.0230	0.0281	0.0274	0.0361	0.0394	0.0392
	(0.0240)	(0.0303)	(0.0305)	(0.0254)	(0.0315)	(0.0316)	(0.0239)	(0.0302)	(0.0304)
Often attend service	0.00832	0.0151	0.0150	-0.00217	0.00279	0.00276	0.0193	0.0309	0.0309
	(0.00989)	(0.0106)	(0.0106)	(0.00962)	(0.0103)	(0.0103)	(0.0338)	(0.0369)	(0.0372)
Seldom or never attend service	0.00426	0.00240	0.00286	-0.00156	-0.00197	-0.00147	-0.000750	-0.000983	-0.000465
	(0.00924)	(0.0100)	(0.0101)	(0.00889)	(0.00965)	(0.00966)	(0.00896)	(0.00972)	(0.00973)
Democrat				0.114***	0.116***	0.117***	0.114***	0.116***	0.116***

	(0.00686)	(0.00757)	(0.00759)	(0.00686)	(0.00757)	(0.00759)
Republicans	-0.0665***	-0.0655***	-0.0652***	-0.0662***	-0.0652***	-0.0649***
	(0.00958)	(0.0103)	(0.0103)	(0.00958)	(0.0103)	(0.0103)
High school	-0.0180	-0.0133	-0.0143	-0.0183*	-0.0136	-0.0146
	(0.0111)	(0.0119)	(0.0119)	(0.0111)	(0.0119)	(0.0119)
Postgraduate	0.0702***	0.0740***	0.0732***	0.0702***	0.0740***	0.0732***
	(0.00783)	(0.00858)	(0.00862)	(0.00784)	(0.00860)	(0.00864)
Upper Income	0.0330***	0.0332***	0.0329***	0.0327***	0.0327***	0.0325***
	(0.00710)	(0.00785)	(0.00786)	(0.00711)	(0.00786)	(0.00787)
Lower Income	-0.0271***	-0.0270**	-0.0278***	-0.0272***	-0.0270**	-0.0278***
	(0.00989)	(0.0108)	(0.0108)	(0.00989)	(0.0108)	(0.0108)
Old age	0.0932***	0.101***	0.101***	0.0928***	0.101***	0.101***
	(0.00771)	(0.00850)	(0.00852)	(0.00770)	(0.00849)	(0.00852)
Young	0.0197	0.0258*	0.0268*	0.0190	0.0253*	0.0263*
	(0.0126)	(0.0138)	(0.0138)	(0.0126)	(0.0139)	(0.0138)
Male	0.0261***	0.0254***	0.0253***	0.0262***	0.0256***	0.0255***
	(0.00661)	(0.00727)	(0.00728)	(0.00661)	(0.00728)	(0.00729)
White	0.0595***	0.0794***	0.0779***	0.0599***	0.0801***	0.0786***
	(0.0197)	(0.0225)	(0.0226)	(0.0197)	(0.0226)	(0.0226)
Black	0.0700***	0.0884***	0.0890***	0.0698***	0.0885***	0.0891***
	(0.0219)	(0.0247)	(0.0248)	(0.0219)	(0.0247)	(0.0248)
Asian	0.116***	0.140***	0.138***	0.117***	0.141***	0.139***
	(0.0234)	(0.0281)	(0.0282)	(0.0234)	(0.0281)	(0.0282)
Hispanic	0.0694***	0.0880***	0.0857***	0.0697***	0.0885***	0.0863***
	(0.0214)	(0.0248)	(0.0249)	(0.0215)	(0.0249)	(0.0250)
Urban	-0.00464	-0.00614	-0.00729	-0.00440	-0.00577	-0.00692
	(0.00793)	(0.00894)	(0.00899)	(0.00792)	(0.00894)	(0.00898)
Rural	-0.0401***	-0.0363***	-0.0355***	-0.0398***	-0.0360***	-0.0351***
	(0.00924)	(0.00989)	(0.00990)	(0.00925)	(0.00990)	(0.00991)
Protestants born again*often attend service				-0.0210	-0.0278	-0.0282
				(0.0366)	(0.0397)	(0.0400)
Protestants not born again*often attend service				-0.000145	-0.00278	-0.00321
				(0.0364)	(0.0393)	(0.0396)
Catholic* often attend service				-0.0255	-0.0350	-0.0337
				(0.0356)	(0.0389)	(0.0392)
Other Christians*often attend service				-0.0798	-0.0908	-0.0925

							(0.0541)	(0.0590)	(0.0593)
Jewish*often attend service							-0.0759	-0.0966	-0.0981
							(0.0680)	(0.0700)	(0.0699)
Muslim*often attend service							-0.0430	-0.0551	-0.0581
							(0.0747)	(0.0858)	(0.0852)
Other religions* often attend service							-0.112	-0.103	-0.107
							(0.0992)	(0.121)	(0.120)
Constant	0.858***	0.890***	0.907***	0.681***	0.678***	0.692***	0.680***	0.676***	0.691***
	(0.0105)	(0.0167)	(0.0167)	(0.0236)	(0.0287)	(0.0289)	(0.0239)	(0.0289)	(0.0292)
Observations	10,731	9,241	9,241	10,731	9,241	9,241	10,731	9,241	9,241
R-squared	0.014	0.018	0.020	0.099	0.102	0.105	0.100	0.103	0.105
wave Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
census division Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
wave*census division Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
adj.R^2	0.0130	0.0155	0.0152	0.0967	0.0986	0.0982	0.0966	0.0985	0.0981

Table 4.9:Religiosity and Testing Positive for Covid-19

Testing Positive for COVID-19 is a binary variable that takes a value of 1 if an individual has tested positive for COVID-19 since February 2020 and 0 otherwise. It is employed to examine the outcome of preventive behaviour. Religiosity is captured using dummy variables, each representing different religious affiliations: born-again Protestants, not born-again Protestants (comprised of the Methodists, Lutherans, Presbyterians, Episcopalians, and members of the Church of Christ), Catholics, Jews, other Christians (Mormons and Orthodox), Muslims, other religions (Buddhist and Hindu), and no religion (agnostic or nothing in particular). Each variable is binary, taking 1 if the individual identifies with that denomination and 0 otherwise. The reference category for religious affiliation is "no religion." *Religious intensity* is characterised by the frequency with which an individual attends religious services. It is categorised into three levels: frequent attendance (at least once a week), infrequent (several times a month or year), and rare/no attendance. Each level is denoted as a binary variable, with infrequent attendance as the reference category. Age is divided into three groups: old (65+), middle-aged (30-64), and young (18-29), with the middle-aged group serving as the reference category. Gender was a binary variable, with females as the reference category. The educational level is categorised into three groups: less than high school or high school, college (or equivalent), and postgraduate, with a college education as the reference group. The income levels are divided into lower-, middle-, and upper-income categories, with middle income serving as the reference group. Individuals are classified as lower-income if their family income falls below two-thirds of the median adjusted income, middle-income if between two-thirds and double the median, and upper-income if above double the median. This classification accounts for household size and geographical differences in cost of living, ensuring a more accurate reflection of economic realities. Party allegiance is classified into three groups: democratic, republican, and other political parties, with other political parties as the reference group. Race is categorised based on an individual's racial heritage, including White, Black, Asian, Hispanic, or other, with "other race" as the reference group. Geographic location is determined by whether an individual resides in an urban, suburban, or rural area, with suburban as the reference category. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

VARIABLES	Tested positive for COVID								
Protestant born again	0.0349***	0.0304***	0.0302***	0.0271***	0.0265***	0.0265***	0.0131	0.00781	0.00763
	(0.00872)	(0.00941)	(0.00943)	(0.00908)	(0.00977)	(0.00979)	(0.0111)	(0.0119)	(0.0119)
Protestants not born again	-0.00191	-0.00468	-0.00464	0.00986	0.00817	0.00855	0.00841	0.00835	0.00875
	(0.00826)	(0.00897)	(0.00900)	(0.00840)	(0.00916)	(0.00919)	(0.00915)	(0.01000)	(0.0100)
Catholic	0.0134	0.00950	0.01000	0.0118	0.0106	0.0110	0.0164*	0.0144	0.0150
	(0.00827)	(0.00902)	(0.00904)	(0.00860)	(0.00942)	(0.00943)	(0.00954)	(0.0105)	(0.0105)
Other Christians	0.0292	0.0339	0.0336	0.0235	0.0316	0.0316	0.0362	0.0418	0.0415
	(0.0196)	(0.0221)	(0.0221)	(0.0192)	(0.0217)	(0.0217)	(0.0303)	(0.0324)	(0.0324)
Jewish	-0.0200	-0.0260	-0.0258	0.0153	0.00781	0.00815	-0.00253	-0.00944	-0.00890
	(0.0165)	(0.0182)	(0.0182)	(0.0164)	(0.0181)	(0.0181)	(0.0166)	(0.0184)	(0.0184)
Muslim	-0.0350	-0.0260	-0.0302	-0.0381	-0.0268	-0.0314	-0.0331	-0.0156	-0.0208
	(0.0293)	(0.0341)	(0.0345)	(0.0295)	(0.0344)	(0.0347)	(0.0391)	(0.0472)	(0.0479)
Other Religion	0.00596	0.00332	0.00406	0.0228	0.0249	0.0257	0.0134	0.0159	0.0170
	(0.0247)	(0.0301)	(0.0300)	(0.0259)	(0.0316)	(0.0315)	(0.0271)	(0.0336)	(0.0334)
Often attend service	-0.0248***	-0.0251***	-0.0242***	-0.0111	-0.0116	-0.0107	-0.0538**	-0.0681***	-0.0664***
	(0.00807)	(0.00860)	(0.00861)	(0.00804)	(0.00858)	(0.00859)	(0.0221)	(0.0229)	(0.0230)
Seldom or never attend service	-0.0159**	-0.0130	-0.0126	-0.00777	-0.00526	-0.00486	-0.00923	-0.00741	-0.00701
	(0.00750)	(0.00807)	(0.00809)	(0.00746)	(0.00805)	(0.00806)	(0.00752)	(0.00811)	(0.00813)
Democrat				-0.0163***	-0.0123*	-0.0126*	-0.0160**	-0.0120*	-0.0122*
				(0.00625)	(0.00688)	(0.00689)	(0.00626)	(0.00687)	(0.00689)
Republicans				0.0211***	0.0220***	0.0215***	0.0209***	0.0215***	0.0210***
				(0.00752)	(0.00810)	(0.00812)	(0.00752)	(0.00811)	(0.00812)
High school				0.00381	0.00584	0.00448	0.00396	0.00603	0.00465
				(0.00859)	(0.00917)	(0.00918)	(0.00858)	(0.00916)	(0.00917)
Postgraduate				-0.0271***	-0.0237***	-0.0233***	-0.0275***	-0.0243***	-0.0240***
				(0.00654)	(0.00713)	(0.00714)	(0.00654)	(0.00713)	(0.00714)
Upper Income				0.00108	0.00289	0.00243	0.00125	0.00315	0.00269
				(0.00649)	(0.00717)	(0.00718)	(0.00650)	(0.00718)	(0.00719)
Lower Income				0.0103	0.0102	0.0112	0.0107	0.0108	0.0118
				(0.00766)	(0.00832)	(0.00833)	(0.00766)	(0.00832)	(0.00833)
Old age				-0.0626***	-0.0605***	-0.0600***	-0.0621***	-0.0599***	-0.0594***
				(0.00620)	(0.00677)	(0.00679)	(0.00619)	(0.00676)	(0.00679)
Young				0.0137	0.0148	0.0152	0.0135	0.0145	0.0149
				(0.0103)	(0.0112)	(0.0112)	(0.0103)	(0.0112)	(0.0112)
Male				0.0205***	0.0222***	0.0226***	0.0205***	0.0221***	0.0226***
				(0.00549)	(0.00602)	(0.00603)	(0.00549)	(0.00602)	(0.00603)
White				-0.0117	-0.0190	-0.0193	-0.0125	-0.0204	-0.0207
				(0.0131)	(0.0149)	(0.0149)	(0.0131)	(0.0149)	(0.0149)

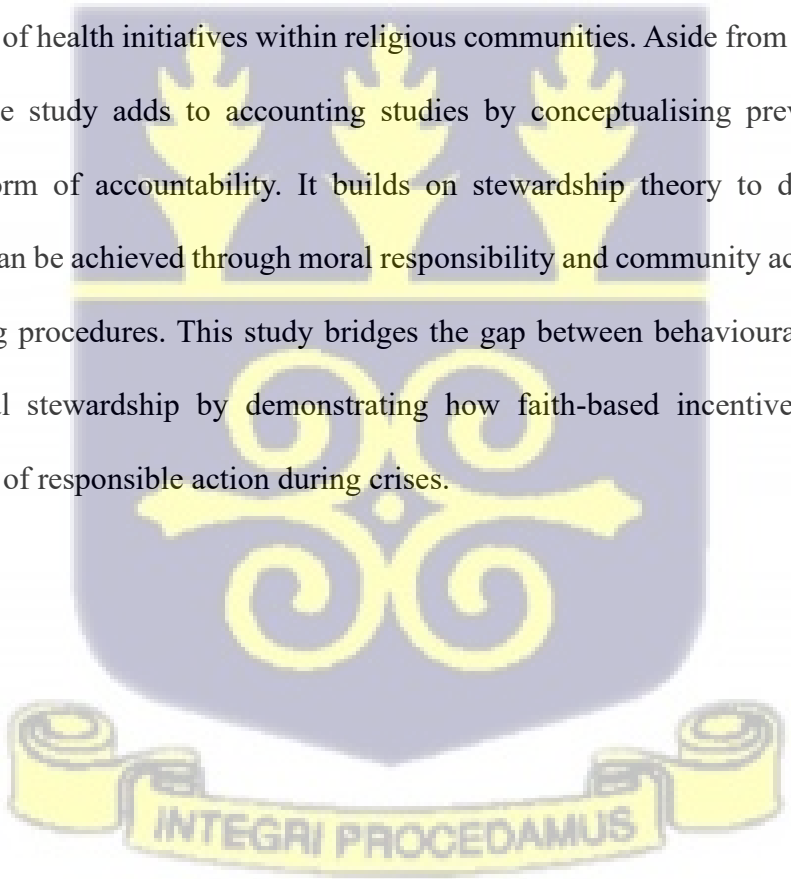
Black				0.0210	0.0186	0.0187	0.0206	0.0178	0.0179
				(0.0154)	(0.0171)	(0.0171)	(0.0154)	(0.0171)	(0.0171)
Asian				-0.0367*	-0.0573**	-0.0580**	-0.0375*	-0.0589**	-0.0596**
				(0.0192)	(0.0239)	(0.0238)	(0.0192)	(0.0239)	(0.0239)
Hispanic				0.0240	0.0219	0.0232	0.0221	0.0193	0.0206
				(0.0152)	(0.0172)	(0.0172)	(0.0152)	(0.0173)	(0.0173)
Urban				0.0266***	0.0264***	0.0270***	0.0262***	0.0261***	0.0267***
				(0.00789)	(0.00875)	(0.00878)	(0.00787)	(0.00873)	(0.00876)
Rural				0.0272***	0.0256***	0.0255***	0.0273***	0.0256***	0.0255***
				(0.00793)	(0.00846)	(0.00849)	(0.00793)	(0.00846)	(0.00849)
Protestants born again*often attend service							0.0614**	0.0812***	0.0807***
							(0.0243)	(0.0253)	(0.0254)
Protestants not born again*often attend service							0.0398	0.0439*	0.0430
							(0.0255)	(0.0265)	(0.0266)
Catholic* often attend service							0.0209	0.0358	0.0344
							(0.0247)	(0.0258)	(0.0258)
Other Christians*often attend service							0.0184	0.0341	0.0337
							(0.0429)	(0.0465)	(0.0465)
Jewish*often attend service							0.151***	0.153**	0.151**
							(0.0581)	(0.0613)	(0.0614)
Muslim*often attend service							0.0235	0.0212	0.0221
							(0.0609)	(0.0695)	(0.0702)
Other religions* often attend service							0.101	0.103	0.0996
							(0.0799)	(0.0885)	(0.0885)
Constant	0.161***	0.143***	0.137***	0.186***	0.178***	0.171***	0.190***	0.182***	0.174***
	(0.00823)	(0.0144)	(0.0157)	(0.0159)	(0.0208)	(0.0217)	(0.0161)	(0.0210)	(0.0219)
Observations	15,831	13,537	13,537	15,831	13,537	13,537	15,831	13,537	13,537
R-squared	0.031	0.034	0.036	0.049	0.051	0.053	0.050	0.052	0.054
wave Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
census division Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
wave*census division Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
adj.R^2	0.0301	0.0323	0.0325	0.0474	0.0482	0.0485	0.0479	0.0488	0.0490

4.7. Conclusion

This chapter investigates the impact of religion on preventive health behaviours during the COVID-19 pandemic, specifically regarding mask use, vaccination, booster doses, and the likelihood of testing positive for the virus. Using a longitudinal dataset from 2020 to 2022, it emphasised significant distinctions among religious groupings, particularly differentiating between born-again and non-born-again Protestants. The results indicate that born-again Protestants exhibit a lower propensity to comply with public health measures and, consequently, a higher likelihood of testing positive for COVID-19. Simultaneously, "non-born-again" Protestants and Catholics demonstrate greater adherence to preventive behaviours.

These results highlight the need for public health initiatives that consider the diversity of religious beliefs and practices. For instance, health campaigns could benefit from partnerships with religious leaders who can advocate for health measures within their communities, particularly in denominations with low compliance. This approach can foster trust and encourage adherence to public health guidelines among groups that might otherwise be resistant due to cultural or religious perspectives. Understanding the impact of religious identity on health behaviour enables the development of more effective and culturally attuned public health programs, particularly during crises such as the COVID-19 pandemic. Additionally, targeted interventions, such as tailored communication and education campaigns, may help address the unique concerns of born-again Protestants and other groups showing lower adherence. By understanding the nuanced role of religious identity in shaping health behaviours, policymakers can create culturally sensitive strategies that are more likely to gain acceptance across diverse communities, especially in times of crisis.

While this study provides valuable insights into the role of religion in shaping public health responses during the pandemic, it has limitations. First, the analysis is limited to the United States. While it offers insights applicable within the U.S. context, the findings may not generalise to other countries with different religious compositions, health policies, or cultural norms. Additionally, the observational nature of the data limits causal inference, as other unobserved factors may influence religious affiliation and health behaviour. Finally, while the dataset appropriately captures the period from 2020 to 2022, future research could expand this work to examine post-pandemic shifts in religious attitudes and health behaviours as the public health landscape evolves. Despite these limitations, this study underscores the significance of religious identity in public health and offers practical recommendations to improve the implementation of health initiatives within religious communities. Aside from its public health implications, the study adds to accounting studies by conceptualising preventative health activity as a form of accountability. It builds on stewardship theory to demonstrate that accountability can be achieved through moral responsibility and community action, rather than formal reporting procedures. This study bridges the gap between behavioural accountability and institutional stewardship by demonstrating how faith-based incentives influence the implementation of responsible action during crises.



CHAPTER V

SUMMARY, RECOMMENDATIONS, AND CONCLUSION

Summary, conclusion, and policy recommendations

5.1 Introduction

This chapter presents the summary and conclusion of the entire study. It proceeds with an overview of the results obtained from previous chapters and subsequently provides policy recommendations consistent with the summary. The chapter concludes with a discussion of the study's limitations and opportunities for future research.

5.2 Summary of Findings

The thesis provides a comprehensive analysis of the implications of the COVID-19 pandemic, which is presented in three essays that focus on three distinct yet interrelated topics: misreporting, crime, and preventive behaviour. Each essay provides a comprehensive examination of how the pandemic's outcomes were shaped by various factors, thereby facilitating a deeper understanding of the crisis's broader implications. From an accounting standpoint, the three essays together broaden our knowledge of accountability during crises. Each essay demonstrates how institutional and behavioural accountability mechanisms operate beyond traditional financial contexts, including government openness, policy enforcement, and moral responsibility. Together, they broaden stewardship theory by presenting accountability as a political and ethical obligation during times of uncertainty.

The first empirical chapter examines the correlation between the precision of COVID-19 mortality reporting and the proximity of national elections. Leveraging the variations in electoral schedules among the 94 countries in the dataset, the study employs a quasi-natural experiment. The results indicate that countries approaching elections within two years of the pandemic's start reported COVID-19 mortality figures more precisely. The reason for this outcome is the heightened political accountability incumbent governments face. If voters perceive that critical public health data is being misreported, they are likely to impose penalties.

The research suggests that governments are strongly motivated to maintain transparency in their reporting to avoid electoral repercussions.

The second empirical chapter redirects attention to the impact of stay-at-home policies on crime rates, particularly emphasising the role of political regimes during the early phases of the pandemic. The study utilises a quasi-natural experiment approach to analyse data from 89 countries. The impact of stay-at-home orders on crime rates was a natural setting to investigate, as the timing of these orders varied across countries. In addition, a placebo model is employed to forecast potential crime rates in the absence of the pandemic, thereby ensuring that the observed effects are due to the stay-at-home policies rather than pre-existing trends. The analysis indicates that countries that implemented stay-at-home orders within the first three months of the pandemic experienced substantial decreases in crime, particularly theft and burglary. Furthermore, the investigation reveals that the influence of these policies on crime reduction was more pronounced in less democratic regimes, where stricter enforcement mechanisms may have been in place, compared to democratic governments.

The third essay delves into the factors that influenced preventive behaviours during the pandemic, particularly emphasising the role of religiosity. It subsequently investigates outcomes of preventive behaviour by looking at who is likely to test positive for the virus. The study employs ordinary least squares (OLS) regression analysis to analyse longitudinal survey data from the United States, controlling for census division- and wave-fixed effects. The study includes various religious affiliations and distinguishes between born-again and non-born-again Protestants, thereby advancing understanding of religiosity among these groups. Mask-wearing, vaccine, and booster uptake comprise the primary preventive behaviours examined. The results suggest that religious denomination significantly influences preventive behaviour. In particular, born-again Protestants do not comply with preventive measures and are more

likely to test positive for COVID-19. On the other hand, not born-again protestants and Catholics comply more with these measures and, hence, are less likely to contract the virus or increase its spread. This implies that religious beliefs affect compliance with health measures and safety protocols, thereby contributing to the rapid spread of COVID-19.

The first essay adds to the accounting literature by conceptualising political accountability as a sort of stewardship. It connects electoral incentives to the accuracy of public disclosures, demonstrating how accountability demands, similar to those in corporate reporting, influence information transparency in public government. The second essay relates the concept of accountability to governance and control systems, demonstrating how institutional enforcement is analogous to the organisational compliance mechanisms studied in accounting. It highlights how the regime's enforcement institutions are responsible for maintaining social order during crises, and how control and monitoring mechanisms vary across institutional contexts. The third essay adds a behavioural component to accountability by demonstrating how religious identification promotes compliance with public orders. By connecting moral responsibility to stewardship theory, it broadens accounting studies to explore how ethical and belief-driven incentives influence responsible behaviour during crises. When taken together, the essays show that accountability during crises has multiple dimensions: political, institutional, and moral. They extend accounting theory by demonstrating how stewardship and accountability frameworks may explain a wide range of crisis behaviours, from transparent reporting to ethical compliance, putting accounting at the heart of interdisciplinary crisis governance research.

5.3 Conclusion

The thesis examines the varied impacts of the COVID-19 pandemic through three focused essays on mortality reporting, crime, and health behaviours, revealing significant insights into how political, social, and religious factors shaped these outcomes. Each chapter provides clear evidence of the role of these factors during the pandemic, uncovering how they influenced government transparency, crime reduction, and public health compliance.

The first essay underscores how upcoming elections motivated governments to report COVID-19 mortality figures more accurately. It suggests that political accountability, driven by electoral pressures, can compel governments to maintain transparency in health data, particularly when voters are likely to penalise misreporting.

The second essay addresses the effectiveness of stay-at-home orders in reducing crime, with a special focus on theft and burglary. Findings reveal that these policies significantly reduced crime rates, especially in countries with lower democratic governance, where enforcement mechanisms were likely stricter. The study suggests that the success of such measures is affected by governance structures, highlighting a stronger impact in more authoritarian settings.

The third essay assesses the role of religious beliefs on health behaviours such as mask-wearing, vaccination, and booster uptake. Results indicate that born-again Protestants were less likely to follow preventive measures and had a higher chance of contracting COVID-19. In contrast, other groups, including Catholics and non-born-again Protestants, showed greater compliance. These findings illustrate how religious affiliation can impact health behaviours, with implications for public health interventions targeting religious communities.

In conclusion, this research provides critical insights into the pandemic's effects on governance, crime, and health behaviours, emphasising the importance of context-specific

factors. Policymakers could use these findings to address health crises better, ensure accountability in health reporting, tailor enforcement measures to governance structures, and adapt public health messaging to diverse cultural and religious contexts. This study thus contributes to a deeper understanding of the intersection between crisis management and sociopolitical dynamics, offering practical implications for future public health preparedness.

Generally, the thesis contributes to accounting literature by defining accountability as a multi-level process that governs information disclosure, institutional control, and moral responsibility during crises. It combines stewardship theory with insights from political and behavioural research to demonstrate that accountability is incorporated not only in financial reporting but also in how governments, corporations, and citizens explain their actions in the face of uncertainty. In doing so, the study places accounting at the centre of crisis governance, providing a paradigm for understanding how organisations and individuals render accounts during times of global pandemics.

5.4 Recommendation

The results of the three essays in this study have several significant policy implications and recommendations.

The first essay, which examined the correlation between the accuracy of COVID-19 mortality reporting and proximity to elections, posits that political accountability is essential to maintaining transparency during public health crises. The finding that countries with imminent elections were more truthful in reporting COVID-19 fatalities suggests that electoral pressure can compel governments to provide accurate information. This has substantial implications for enhancing political accountability mechanisms. Public health data should be monitored and verified by international and domestic regulatory bodies that encourage governments to

maintain transparency, particularly during periods that do not coincide with election cycles. A valuable policy instrument could be electoral safeguards that incentivise truthful reporting, such as independent public health audits that can influence electoral outcomes. Furthermore, the transparency and trust in government reporting could be further improved through public awareness campaigns that inform citizens about the significance of precise health data and the methods by which they can hold their governments accountable.

The second essay, which investigated the influence of stay-at-home policies on crime rates across different political regimes, found that the success of these policies is closely associated with the political context. In less democratic regimes, where enforcement is typically stricter, stay-at-home orders substantially reduced crime, particularly theft and burglary, according to the study. This implies that crime-reduction strategies during public health crises should be tailored to the country's political environment. Stay-at-home orders can effectively reduce crime in less democratic contexts, where strict enforcement is more feasible. Nevertheless, in more democratic environments where enforcement may be less stringent, alternative crime-prevention strategies should be developed to complement stay-at-home orders. In democratic regimes where traditional enforcement may be more challenging, maintaining order during public health crises can be facilitated by strengthening community policing and developing crime prevention programs that address socio-economic factors that contribute to crime.

The third essay, which examined the impact of religiosity on COVID-19 preventive behaviours, including mask use and vaccination, underscores the substantial influence that religious beliefs and practices have on health behaviours. The research revealed that compliance with preventive measures varied across religious groups. Specifically, born-again protestants and Catholics were more likely to adhere to safeguard measures, while born-again Protestants were less likely to do so. Consequently, born-again protestants were likely to

spread the virus as they had a higher likelihood of testing positive for it. This emphasises the need for public health information tailored to the beliefs and practices of various religious communities. Public health campaigns should be developed to align with religious principles and involve religious leaders as collaborators in promoting adherence to preventive measures. Public health initiatives can be more effective in reaching and influencing religious communities by framing health messages within a religious context and involving religious leaders in disseminating accurate health information.

These principles apply to accounting and governance practice, emphasising transparent information systems, ethical disclosure, and stewardship of both financial and non-financial data. Implementing accountability reporting systems across election processes, crisis management, and faith-based outreach ensures that institutions are held accountable for both outcomes and societal impacts. Contextual restrictions, such as political opposition or cultural diversity, may limit the implementation of these ideas. However, modest institutional reforms, capacity building, and collaboration with civic and religious organisations might provide viable avenues for enhancing accountability mechanisms over time.

5.5 Limitations of the Thesis

This thesis explains three key facets of the COVID-19 pandemic: reporting accuracy, crime rates, and public health compliance. However, several limitations should be considered, and the study's distinctive strengths should be balanced.

The first study, examining the link between election timing and COVID-19 mortality reporting, is limited to 2020 data. While this focus strengthens the quasi-natural experiment by isolating the pandemic's initial impact, it restricts the ability to evaluate potential shifts in reporting practices in subsequent years. Nonetheless, the study's unique design, leveraging cross-

national differences in election timing, allows for a compelling investigation into the influence of electoral accountability on public health data reporting, highlighting the broader implications of political motives in health crises.

The second study on crime rates also focuses solely on the first three months of 2020, when stay-at-home orders were widely enacted. While essential for capturing the immediate effect of these policies, this narrow timeframe limits the analysis of potential long-term impacts on crime trends post-2020. Additionally, by focusing only on early policies, the study does not capture the varied durations or modifications of these policies over time. However, the study's use of a placebo model to project 2020 crime rates under a no-pandemic scenario significantly strengthens the findings, offering an empirical distinction between genuine pandemic effects and pre-existing crime trends. This focus is valuable for understanding how abrupt shifts in social behaviour, particularly in varied political regimes, impacted crime in unprecedented ways.

The third study, examining religious influences on public health behaviour in the United States, is constrained to 2020–2022. While this period captures the pandemic's unique dynamics, the findings may still offer insights into similar behaviours among individuals with comparable religious beliefs in other contexts. However, caution is needed when generalising to periods or settings with differing cultural, social, or institutional factors that could influence behaviour. Additionally, focusing on the U.S. reduces its international applicability, given the country's unique religious and sociopolitical dynamics. Nevertheless, the study's nuanced examination of religious affiliation, distinguishing between born-again and non-born-again Protestants, offers an unprecedented view of how varying levels of religiosity can shape public health responses. This analysis contributes to public health literature by offering specific insights that could inform culturally sensitive approaches in public health communication.

5.6 Opportunity for Future Research

The research presented in this dissertation presents numerous promising opportunities for future research, particularly in public health behaviour during crises, criminal dynamics, and political accountability. Despite its unique focus on distinct aspects of the COVID-19 pandemic, each study reveals fundamental dynamics that warrant more research.

The first study reveals a complicated relationship between political cycles and crisis management. It examines how election timing affects government transparency in reporting COVID-19 mortality rates. This raises questions about how electoral timing influences other dimensions of government behaviour during crises. Future research could delve deeper into how electoral pressures affect resource allocation, policy enforcement, and public communication strategies during various emergencies. Moreover, extending this research to include different political systems, such as comparing the effects in democracies versus autocracies, could provide a richer understanding of how political contexts shape governmental responses to crises.

The second study examines the influence of stay-at-home policies on crime rates across various political regimes, revealing substantial disparities in how these policies affect public safety. This discovery encourages additional investigation into the long-term repercussions of these policies, particularly whether they result in permanent decreases in crime or merely transient dips that reemerge after restrictions are lifted. It is also possible to investigate how political regimes interact with other factors, such as economic relief measures and community policing efforts, to influence crime during and after crises. Designing these dynamics could facilitate more effective crime prevention strategies specifically tailored to specific political and social contexts.

The third study, which focuses on the impact of religiosity on COVID-19 preventive behaviours, underscores the importance of religious affiliation and intensity in shaping public health responses. This provides an opportunity for future research to investigate the impact of religiosity on health behaviours in other contexts, including the adoption of vaccines for diseases other than COVID-19, compliance with nutritional guidelines, and participation in preventive health screenings. Furthermore, researching the influence of religious leaders and institutions on health behaviours could be a critical area, offering valuable insights to improve the efficacy of public health interventions. Comparative studies conducted in regions or countries with diverse religious landscapes could provide additional insight into how cultural and religious factors affect public health outcomes.

The interconnected nature of the three studies demonstrates the value of interdisciplinary research that connects political science, criminology, sociology, and public health. Future research could design integrated models that account for the parallel influence of political, social, and religious factors on crisis management outcomes. These models would be especially beneficial for forecasting and fully understanding responses to future global crises, whether they involve health, economic instability, or environmental challenges.

Finally, as research around the COVID-19 pandemic continues to develop, there is a substantial opportunity for longitudinal studies that monitor the long-term consequences of the pandemic on public health practices, crime rates, and government behaviour. These investigations could evaluate the extent to which the initial responses identified in this dissertation have evolved and the enduring impact that the pandemic may have had on these regions. Future research could offer critical insights into how societies adapt to crises and how these adaptations can be leveraged to enhance policy responses in future emergencies by analysing these long-term effects.

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