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The Role of Neighbourhood Relations in Confessionalisation

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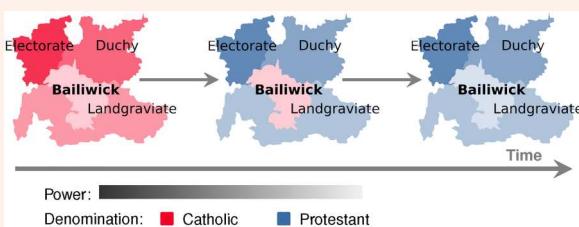
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ABSTRACT

By means of a statistical model we study the adoption of Protestantism during the Reformation for 262 territories of the Holy Roman Empire. Our unit of analysis is a territory and the dependent variable indicates whether and when the territorial ruler adopted Protestantism. The independent variables are based on seven theoretical factors that historiographical research has identified to be important for the adoption of Protestantism,¹ and on neighbourhood relations. We use an Event History Model to track changes in the variables over time and compute the importance of each driving factor. Our results reveal that geographic neighbourhood relations explain the adoption of Protestantism best. The more neighbours had become Protestant in the recent past, the more likely a territory was to become Protestant itself. This effect is strongest for weak territories, which may point towards a strategic hesitation to adopt Protestantism in politically uncertain times.

KEYWORDS

Confessionalisation;
Adoption of Protestantism;
Geospatial relations; Holy
Roman Empire; Event History
Model; Statistical modelling



1. Introduction

1.1. Characterising the problem

The adoption of Protestantism during the Reformation can be described from two different perspectives. The event perspective associates the adoption of Protestantism

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¹ Stievermann, "Evangelische Territorien im Konfessionalisierungsprozess," 47.



with specific events, such as the *Confessio Augustana* in 1530 or the Peace of Augsburg in 1555. In contrast, the process perspective sees the adoption of Protestantism as a socio-cultural process. Based on Zeeden's work on confessional formation (Konfessionsbildung),² Reinhard and Schilling extended this view to also account for political driving factors (cf. institutionalisation of Protestantism), captured in their theory of confessiona-lisation.³ Recently, Leppin characterised the Reformation as a transformation, and Kaufmann described it as in between radical change and continuity.⁴

Process-oriented studies have been conducted on a vast number of territorial states and cities of the Holy Roman Empire (HRE).⁵ Research has identified many different factors driving the adoption and rejection of Protestantism in the territories, such as the prince's claim to power (County of Lippe),⁶ continuity over time (Palatinate),⁷ close cooperation between the state and Reformers (e.g., Duchy of Württemberg),⁸ the breakup of societal and theological compartments (Low Countries),⁹ the influential role of the nobility (Poland),¹⁰ and confessional indifference on all social levels (county of East Frisia).¹¹

A limitation of this research is its focus on isolated and comparative case studies. By analysing individual territories, these studies only account for developments *within* territories but neglect developments *between* them on a larger scale. In fact, territories were not independent in their denominational choice but influenced each other. For example, marriages were strategically arranged between ruling families, ideas were exchanged via trade routes, and geopolitical neighbourhoods established power relations. To capture the interdependencies between territories, we need a systemic approach to analyse the effect of their relations and interactions on their denominational choice. This approach implies that the outcome of this denominational decision is explained by relations between many territories rather than by their individual characteristics. Therefore, combining case studies is not sufficient to achieve this overarching perspective.

1.2. Reflections on our methodological approach

To study the adoption of Protestantism in territories with a systemic approach, we propose an Event History Model.¹² This type of statistical model infers reasons for the adoption of Protestantism from the history and characteristics of territories in the HRE. It allows us to analyse the developments in and relations between a large number of territories simultaneously.

² Zeeden, *Die Entstehung der Konfessionen*, 32–46; Zeeden, *Konfessionsbildung*, 204–7.

³ Reinhard, "Reformation, Counter-Reformation, and the Early Modern State," 390; Schilling, *Religion, Political Culture, and the Emergence of Early Modern Society*, 205–45; Schilling, *Christentum und modernes Europa*, 129–209.

⁴ Leppin, *Transformationen*, 25–9; Kaufmann, *Der Anfang der Reformation*, 24–6.

⁵ Wolgast, *Reformation und Schicksal der Klöster*, 26–76, 85–122, 133–172, 188–197, 203–248; Brady, *Turning Swiss*, 43–138, 184–221; Heinz Schilling, "Konfessionskonflikt und Staatsbildung", 40–44; Heinz, ed Schilling, *Reformierte Konfessionalisierung in Deutschland*, 79–290; Swanson, *Sociological Account of Reformation*, 44–241; Ekelund Jr., Hébert and Tollison, "Economic Analysis of Protestant Reformation", 649–652, 657–668.

⁶ Schilling, "Konfessionskonflikt und Staatsbildung," 62.

⁷ Schilling, ed. *Reformierte Konfessionalisierung in Deutschland*, ch.2, 121.

⁸ Ibid., ch.3, 135.

⁹ Janse, "Protestant Reformation in the Low Countries," 181–6.

¹⁰ Wijaczka, "Reformation in Sixteenth-Century Poland," 10–12; Wijaczka, "Reformation in Private Towns in the Polish Crown," 29.

¹¹ Grochowina, "Confessional Indifference in East Frisia," 119–22.

¹² Box-Steffensmeier and Jones, *Event History Modeling*, 1–6.

The first step to develop this model is to operationalise existing historiographical theories. That is, we translate conceptual driving factors for the adoption of Protestantism that have been identified by historiographical research into quantifiable measures. For example, we operationalise the influence of Protestant Reformers with the number of letters they sent to territories. We formulate hypotheses to capture the expected effect of driving factors on the adoption of Protestantism which we test with our Event History Model.

Our contribution is not to add new driving factors to the list but rather to provide weights for existing ones, i.e., to quantify their importance in the adoption of Protestantism. Specifically, our statistical model tests to what extent these driving factors explain the adoption of Protestantism. Our results implicitly lend evidence to historiographical theories and help to differentiate between them.

To operationalise these factors, we use two data sets: one on epistolary correspondence of Reformers and the other on socio-economic and spatial characteristics of territories. As a measure of the adoption of Protestantism, we use the denominational decision of territorial rulers, i.e., whether and when the ruler became Protestant. The aim of our model is to weigh the importance of the driving factors for this decision in a statistical framework. We address the following research question: How can we measure the effect of the operationalised factors on the adoption of Protestantism?

Our results reveal that geographic neighbourhood relations explain the adoption of Protestantism best. The more neighbours had become Protestant in the recent past, the more likely a territory was to become Protestant itself. This effect is strongest for weak territories, which may point towards a strategic hesitation to adopt Protestantism in politically uncertain times.

1.3. Previous quantitative studies and our extensions

Previous research has quantitatively studied the effect of driving factors on the adoption of Protestantism in territories of the HRE.¹³ Initially, analyses focused on single factors, such as the Ottoman invasion,¹⁴ but quickly included several socio-economic, political, and spatial control factors introduced by Pfaff and Corcoran in their theory of religious disestablishment.¹⁵

In this theory, the authors use economic models for the collapse of monopolies to develop explanatory factors for the adoption of Protestantism during the Reformation. Results revealed that the number of monasteries (supply side) and the distance to Wittenberg (demand side) negatively influenced the adoption of Protestantism, whereas the status ‘free’ or ‘imperial’ city (political incentive) positively influenced it.

Subsequent studies adopted many factors of this theory as controls while focusing on other single explanatory factors, such as printing,¹⁶ the cult of saints,¹⁷

¹³ The HRE provides a useful research setting because it includes many territories corresponding to many observations of confessional decisions. In contrast, other sovereign states in Europe, such as France or England, only yield one observation, respectively, since the sovereign chose the confession for the whole state.

¹⁴ Iyigun, “Luther and Suleyman,” 1464–9.

¹⁵ Pfaff and Corcoran, “Piety, Power, and the Purse,” 767–70.

¹⁶ Rubin, “Printing and Protestants,” 275–6.

¹⁷ Pfaff, “True Citizens of the City of God,” 193–202.



competition between cities,¹⁸ agricultural potential,¹⁹ Hanseatic diets,²⁰ and travelling students.²¹ Recent studies have extended this work by testing multiplex relations, such as the influence of Luther's letters and travel routes,²² and by extending the unit of analysis from cities to territorial states.²³ Becker et al. provide a comprehensive overview of explanatory factors of the cause of the Reformation.²⁴

Our analysis builds on this work and extends it in three important ways. First, we do not adopt a 'Luther-centric' view but also account for other drivers of the Reformation, such as Zwinglian-Reformed and Calvinist movements. Specifically, we extend the selection of territories from Cantoni and also include territories in Switzerland (mainly Zwinglian-Reformed) and the Netherlands (mainly Calvinist).²⁵ We use the letters and whereabouts of several Reformers, not only those of Luther or his students, extending the works of Becker et al. and Kim and Pfaff.²⁶ We extend spatial relations beyond the distance to Wittenberg or Zurich, the places associated with Luther and Zwingli, extending the works of a range of scholars.²⁷

Second, we account for the volatile nature of the HRE by tracking temporal changes in dependent and independent variables in a fine-grained manner. Since territories gained or lost land and titles due to wars, marriage, or the division of estates, characteristics such as the titles of rulers, dynastic relations, and alliances changed over time. Rather than treating temporal variables as static (e.g., logistic, Poisson, and OLS regressions)²⁸ or only considering the previous time step (e.g., a temporal lag model),²⁹ we account for the full history of a territory, including changes in the independent variables, if data is available. We also measure the dependent variable, namely whether and when a territory adopted Protestantism, on a year-specific basis, rather than merging several years into 'decisive phases' of the Reformation.³⁰ This allows a more fine-grained view of adoption dynamics during the Reformation.

Third, we account for real-world spatial relations between territories by reconstructing their geopolitical borders.³¹ This enables us to compute real-world neighbourhood relations rather than relying on artificial measures based on direct distance,³² which

¹⁸ Dittmar and Seabold, *Media, Markets and Institutional Change*, 2–6.

¹⁹ Curuk and Smulders, *Malthus Meets Luther*, 4–11.

²⁰ Wurpts, Corcoran and Pfaff, "Diffusion of Protestantism," 226–9.

²¹ Kim and Pfaff, "Structure and Dynamics of Religious Insurgency," 193–7.

²² Becker et al., "Multiplex Network Ties and Spatial Diffusion of Radical Innovations," 859.

²³ Cantoni, "Adopting a New Religion," 506; Curuk and Smulders, *Malthus Meets Luther*, 18.

²⁴ Becker, Pfaff and Rubin, "Causes and Consequences of Protestant Reformation," 8.

²⁵ Cantoni, "Adopting a New Religion," 506.

²⁶ Becker et al., "Multiplex Network Ties and Spatial Diffusion of Radical Innovations," 866–71; Kim and Pfaff, "Structure and Dynamics of Religious Insurgency," 193–7.

²⁷ Pfaff and Corcoran, "Piety, Power, and the Purse," 267; Curuk and Smulders, *Malthus Meets Luther*, 21; Rubin, "Printing and Protestants," 275–6; Dittmar and Seabold, *Media, Markets and Institutional Change*, 23; Kim and Pfaff, "Structure and Dynamics of Religious Insurgency," 203; Wurpts, Corcoran and Pfaff, "Diffusion of Protestantism," 229–30.

²⁸ Dittmar and Seabold, *Media, Markets and Institutional Change*, 16; Pfaff and Corcoran, "Piety, Power, and the Purse," 769; Pfaff, "True Citizens of the City of God," 209; Curuk and Smulders, *Malthus Meets Luther*, 36; Rubin, "Printing and Protestants," 279; Kim and Pfaff, "Structure and Dynamics of Religious Insurgency," 203.

²⁹ Cantoni, "Adopting a New Religion," 521.

³⁰ Cantoni, "Adopting a New Religion," 519; Rubin, "Printing and Protestants," 277–8.

³¹ Roller, "Vectorizing Maps to Generate Geo-Spatial Data," 2–3.

³² Cantoni, "Adopting a New Religion," 515–8; Pfaff and Corcoran, "Piety, Power, and the Purse," 767; Curuk and Smulders, *Malthus Meets Luther*, 34–7; Rubin, "Printing and Protestants," 276–9; Dittmar and Seabold, *Media, Markets and Institutional Change*, 23; Kim and Pfaff, "Structure and Dynamics of Religious Insurgency," 202–3; Wurpts, Corcoran and Pfaff, "Diffusion of Protestantism," 229–30.

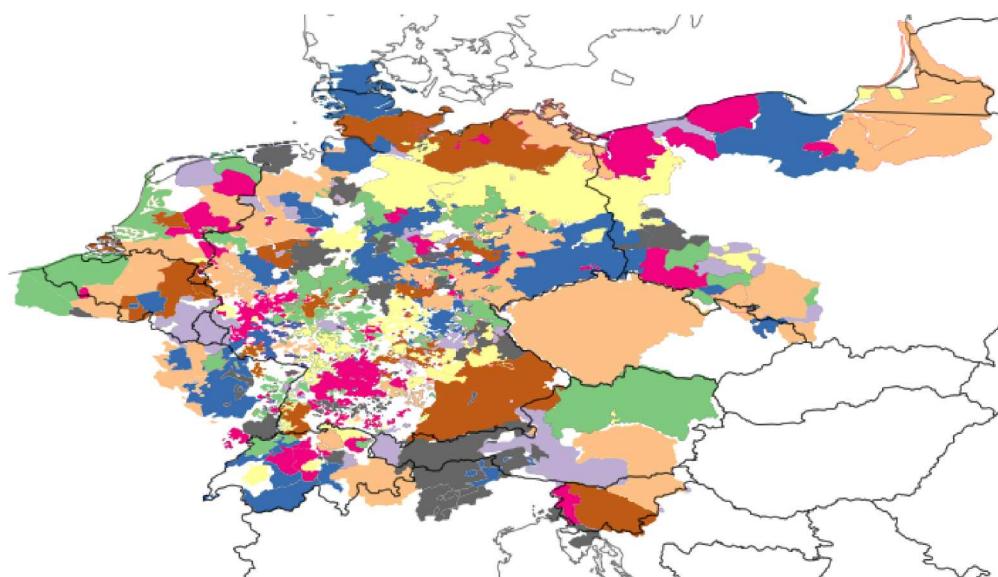


Figure 1. Territories of the Holy Roman Empire (HRE) in the data set. The map is aggregated over time since territories changed their borders over time (e.g., due to land losses during wars). Modern political borders are plotted to facilitate orientation. Adapted from Roller, "Operationalizing Territories", 164.

fail to capture spatial relations adequately.³³ Figure 1 shows territories of the HRE in the geographic space and illustrates that our data provide rich neighbourhood relations.

Historiographical research has already demonstrated that neighbourhood relations matter. For instance, the adoption of Protestantism in Strasbourg in 1523 quickly spilled over to neighbouring cities and territories, such as Ulm, Esslingen, and Constance.³⁴ On the one hand, Strasbourg Reformers, such as Martin Bucer, spread Protestant ideas to neighbouring places via letters and personal travels.³⁵ On the other hand, the university of Strasbourg attracted students from neighbouring places who carried the new ideas back to their home towns. Moreover, territorial rulers were inspired by successful implementations of the Reformation in neighbouring territories. They hired the responsible Reformers for their own services, as duke Ulrich of Württemberg did with the Reformers Martin Bucer (from Strasbourg) and Ambrosius Blarer (from Constance).³⁶ These examples motivate our research to study the role of neighbourhood relations in the adoption of Protestantism both in more detail and on a larger scale, using data from 262 territories of the HRE.

2. Methods

2.1. Aim and quantity of interest

This analysis aims to estimate how characteristics of and relations between territories (independent variables) affected the chance of territories to switch from Catholicism

³³ Small and Adler, "Role of Space in the Formation of Social Ties," 123.

³⁴ Rapp, "Strassburg," 72; Enderle, "Ulm und die evangelischen Reichsstädte," 194.

³⁵ Strohm, "Martin Bucer," 65–72.

³⁶ Ehmer, "Württemberg," 168.

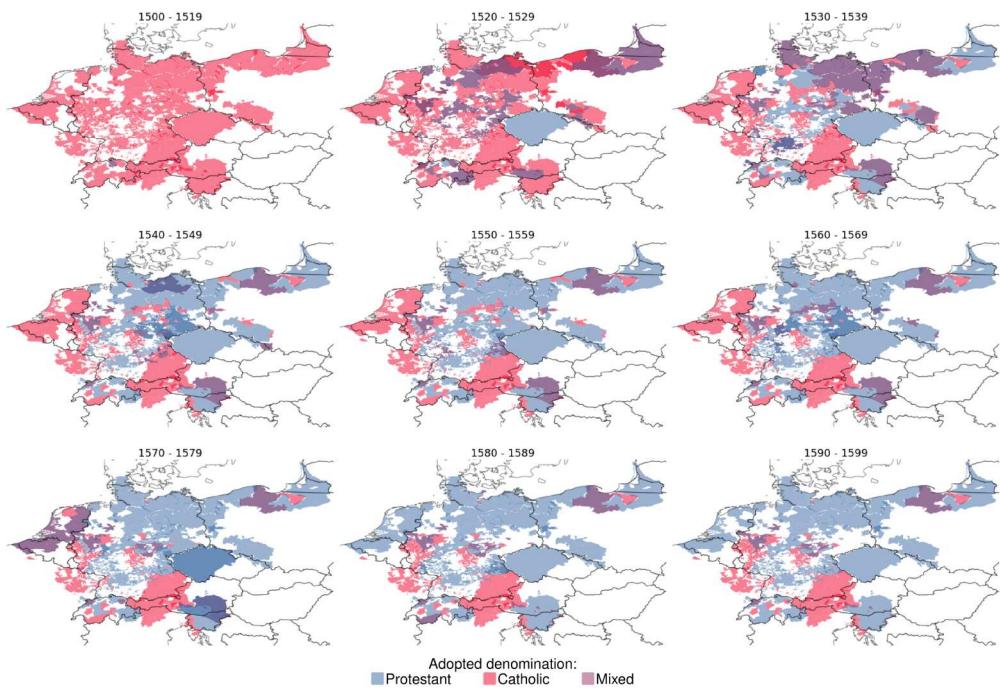


Figure 2. Adopted denomination of territories over time. By 1519 only Zurich had become Protestant, whereas by 1599 140 territories had become Protestant. Dark shading indicates geo-political changes or denominational changes within Protestantism during the observation period. Geo-political changes reflect border shifts from territorial unification (e.g., Liegnitz-Brieg and Wohlgau) or division (e.g., Pommern splitting into Pommern-Stettin and Pommern-Wolgast). Denominational changes represent shifts within Protestantism, such as from Lutheranism to Calvinism (e.g., Bohemia).

to Protestantism in the first place (quantity of interest; dependent variable).³⁷ Quantifying when a territory became Protestant is not straightforward since the adoption of Protestantism was a complex process that involved regular negotiations about peace on ecclesiastical, political, and social levels (see Supplementary Material).³⁸ For the sake of operationalisation, we simplify this process and assume that the denominational choice of the territorial ruler defines the territory's denomination.

Figure 2 provides a visual illustration of denominational switches of territories over time decades (subfigures) of the sixteenth century. Red and blue areas correspond to Catholic and Protestant territories, respectively. We see that more territories become Protestant over time. However, from this visualisation alone, we cannot distil any overarching pattern of why some territories became Protestant, and others remained Catholic. To discover these patterns, we use a statistical model.

³⁷ Schilling, ed. *Reformierte Konfessionalisierung in Deutschland*, 104–29. To keep the analysis tractable, we only consider the first switch from Catholicism to Protestantism of a territory. In contrast, in reality, many territories changed denominations several times, such as Electoral Palatinate becoming Lutheran in 1556, Calvinist in 1563, Lutheran again in 1576, Calvinist again in 1583, and Catholic again in 1622.

³⁸ Kaplan, "Religious Difference in Europe," 34–43.

2.2. Theory and hypotheses

We base our analysis on seven characteristics of territories that have been identified to explain the adoption of Protestantism in the territories.³⁹ We extend these characteristics by an eighth one to account for relations between territories. Of course, eight driving factors do not do justice to the complexity of confessionalisation during the sixteenth century. Numerous complex interdependencies between ecclesiastical, political and social aspects of society also contributed to the adoption of Protestantism, which in itself took different forms across geographic regions and parts of society.⁴⁰ However, since we lack data on these aspects, we cannot operationalise them and include them in our model. For example, the effects of negotiations between different denominations,⁴¹ of migrations of religious refugees,⁴² and of attitudes towards science and moral discourses⁴³ have all been shown to shape confessionalisation but cannot be operationalised at the moment. In the following, we describe these eight characteristics in detail and formulate hypotheses for three: political power, the influence of ‘top Reformers’, and neighbourhood relations, all of which we test in this analysis.

Resistance of Catholic forces from within the territory. The Catholic church was divided over the questions of what needed reform, how this reform should be implemented, and how critics should be regarded. Since Protestant Reformers mainly criticised the Church’s monopoly on mediating between God and the laypeople (according to Reformers, laypeople could directly communicate with God), and since territorial princes used Protestantism to gain greater independence from imperial rule as well as from the Catholic church, we assume that these attacks on the Church’s core roles threatened the Church’s powerful position in the lives of laypeople and politics. Since we lack data on the heterogeneity of positions within the Catholic church, we use the assumption above to reduce the numerous positions within the Church to one of opposition. Given this opposition of the Catholic church against the Reformation, Catholic forces, such as bishops and monasteries, also opposed territories in becoming Protestant. Therefore, stronger resistance from Catholic forces within a territory likely reduced the chances of that territory adopting Protestantism.

Political power. The adoption of Protestantism was not exclusively a question of faith but also a question of political power. Complex political interdependencies between territories, such as marriage relations, annexations, condominiums, and feudal duties, characterised the Holy Roman Empire. Powerful territories had more leverage to put into practice their preferred decision than weak territories, including denominational choices. Assuming that a territory wanted to become Protestant, it has a larger probability of doing so the more powerful it is. We formulate the following hypothesis:

Hypothesis 1 The larger the political power of a territory, the larger the chance of the territory adopting Protestantism.

³⁹ Stievermann, “Evangelische Territorien im Konfessionalisierungsprozess,” 47.

⁴⁰ Kaplan, “Religious Difference in Europe,” 34–43; Kaplan, “Legal Rights of Religious Refugees,” 87–90; Pettegree, *Reformation and the Culture of Persuasion*, 1–8; Rublack, “Protestantism and its Adherents,” 575; Terpstra, *Religious Refugees in the Early Modern World*, 157.

⁴¹ Pettegree, *Reformation and the Culture of Persuasion*, 6.

⁴² Kaplan, “Legal Rights of Religious Refugees,” 87–8; Terpstra, *Religious Refugees in the Early Modern World*, 11–15.

⁴³ Rublack, “Protestantism and its Adherents,” 572.



Dynastic relations. Marriages and division of estates created kin relations between rulers across territories. For example, Ernestine and Albertine Saxony originated from the division of the House of Wettin in 1485. Through these interdependencies, some dynasties could increase their range of influence, such as asking kin-related territories for support in a war or asking them to vote in the dynasty's favour at political diets. Stievermann states that the decision of a territory to either become Protestant or to remain Catholic is influenced by the opinion of territories from the same dynasty on that matter.⁴⁴ Territories would then be more likely to become Protestant if several others from the same dynasty had already done so.

Influence of 'top' Reformers. Reformers spread their ideas by travelling, preaching, printing, and exchanging letters. Often, Reformers were explicitly invited by the territorial ruler and were offered employment as advisors or preachers. By these means, Reformers could influence the acceptance of Protestantism in the population and of the ruler. We formulate the following hypothesis:

Hypothesis 2 The more a territory is exposed to the ideas of leading reformers, the larger its chance of adopting Protestantism.

Closeness to the emperor. During the Reformation, the emperors of the Holy Roman Empire belonged to the Catholic house of Habsburg in Spain. Charles V ruled from 1519 to 1556 and his brother Ferdinand I from 1556 to 1564. Charles especially opposed the Reformation because when he ascended to the throne, he was only 21 and therefore felt that he had to gain acceptance among the territorial princes and to rule with a hard hand. Since the emperors during the Reformation were supporters of Catholicism, territories which were ideologically close to the emperors are assumed to have supported Catholicism, too. Since we lack data to measure the ideological or social closeness of territorial rulers towards the emperor, we will exclude this factor from the analysis.

Characteristics of the ruler. In the sixteenth century, the choice of religion was made by the territorial ruler. He decided which religion his subjects should adopt and hence which official religion his territory should have. Due to this central role of the ruler, Stievermann assumes that the ruler's personal character traits influenced his decision to either remain Catholic or become Protestant.⁴⁵ Many character traits exist that may have contributed to the adoption of Protestantism, such as theological expertise, curiosity about new ideas and steadfastness. Since we lack data about character traits, we will not include this factor in the analysis. However, in a case study, we will examine the role of Philip of Hesse through the letters he sent to other territories.

Characteristics of the subjects. Although the official religious decision-making power lay with the territorial ruler, his subjects could also influence this decision. By expressing their (dis-)content with current religious practices, subjects could signal to their ruler whether they preferred to adopt Protestantism or to remain Catholic. Sometimes this signal was explicit with subjects rioting against a certain religious decision of their ruler (e.g., Reutlingen and Nuremberg⁴⁶). Usually, the signal was implicit with the

⁴⁴ Stievermann, "Evangelische Territorien im Konfessionalisierungsprozess," 47.

⁴⁵ Ibid.

⁴⁶ Urban elites were unhappy with the quality of the sermons and arranged for the employment of special preachers (Prädikanten) alongside the Catholic priests. For example, Andreas Osiander was hired in Nuremberg and Matthäus Alber in Reutlingen.

ruler being influenced by the cultural and economic developments in his territory, which in turn influenced his decisions. Territories may have been more likely to adopt Protestantism if their subjects were economically well-off.

Neighbourhood relations. So far, we have introduced historiographical factors that assume that territories adopt Protestantism independently of each other, i.e., without considering previous adoption choices of other territories.⁴⁷ However, in reality, religious choices of territories were likely to be interrelated over time. If a territory became Protestant, it might exert pressure on Catholic territories to also become Protestant. This influence may especially take place for neighbouring territories because neighbours were interrelated via geopolitical and economic relations.⁴⁸ So the choice to become Protestant (remain Catholic) of neighbouring territories is assumed to have affected the choice of the focal territory. These considerations represent a network effect where territories (nodes) are connected if they are geographic neighbours (edges) and influence each others' religious decisions among their direct neighbours. We formulate the following hypothesis:

Hypothesis 3 The more neighbouring territories have become Protestant in the past, the larger the chance of the focal territory adopting Protestantism.

2.3. Operationalisation

To estimate the effect of our driving factors on the adoption of Protestantism, we translate them into quantifiable measures. These measures serve as our independent variables in the Event History Model. An independent variable is a measurable factor examined to see how changes in it influence an outcome – the dependent variable – which, in this analysis, is the chance of a territory becoming Protestant. The Supplementary Material provides a detailed description on our operationalisations.

Resistance of Catholic forces from within the territory is operationalised as the number of monasteries located in a territory.

Political power of territories is operationalised by the rank of rulers indicating how important and influential the ruler's duties and rights were (e.g., electors are considered to be the most powerful and have the highest rank).⁴⁹ We distinguish between the absolute power of a territory, the ranking among all territories in the Holy Roman Empire, and the local power, which refers to the ranking among a territory's geographic neighbours.

Dynastic relations are operationalised as the number of territories that have the same root name as a focal territory (e.g., Anhalt-Bernburg and Anhalt-Köthen) and that have become Protestant in the past.

Influence of 'top' Reformers is operationalised as the number of letters Reformers sent to locations inside territories and as the number of days Reformers physically spent in territories.

⁴⁷ An exception is dynastic relations. Previous religious decisions of dynastic members are assumed to affect the religious decision of a territory of the same dynasty at present. However, only a few dynasties contain several territories in our data. So interrelations between choices of territories are not broadly captured.

⁴⁸ Epstein, "Transferring Knowledge and Innovating," 1–2.

⁴⁹ Holy Roman Empire Association, *Nobility of the Holy Roman Empire*.

Closeness to the emperor Since we do not have data about the ideological or social closeness of territorial rulers towards the emperor, we do not operationalise this factor. We reflect on ideas for potential measures in the Supplementary Material.

Characteristics of the ruler Since we do not have data about the character traits of territorial rulers, let alone about their names, we do not operationalise this factor. However, we examine the role of rulers by looking at the visits and letters of Philip of Hesse.

Characteristics of the subjects are operationalised with population-specific measures introduced by Becker et al.⁵⁰ These measures indicate whether a territory had a university or a printing press, the size of a territory's population in 1500, the territory's market potential in 1500 and whether or not a territory had access to waterways. Since only 28 out of 262 territories have non-missing values for population size, market potential, and access to water, we exclude these variables from the main analysis and examine them in sensitivity and robustness checks in the Supplementary Material.

Neighbourhood relations are operationalised as the number of geographic neighbours that have switched to Protestantism in the past.

One critique may be that our operationalisations are simplistic and do not capture the historical complexity of the underlying abstract concepts. Indeed, if data were available, we could improve the validity of our operationalisations and capture the historical situation in the sixteenth century more accurately. By revealing these limitations, this study can serve as a guide to prioritise future data collection efforts. Nevertheless, any operationalisation always simplifies the underlying abstract concepts, independent of the data quality. The aim is not a 'perfect' operationalisation but a suitable one that allows us to address the research question at hand.

2.4. Event History Model

An Event History Model checks how the dependent variable, the chance of a territory adopting Protestantism, changes in response to the history of a territory.⁵¹ This history comprises temporal changes in our independent variables and is examined from the year 1500 until the territory became Protestant or until it ceased to exist for other reasons (e.g., annexation). Through this model choice, we decrease the possibility of reverse causality, where the adoption of Protestantism would influence characteristics of the territory.

Figure 3 visualises the histories of five exemplary territories. Territories 2, 3, and 4 become Protestant in 1534, 1555, and 1570, respectively. We say that these territories experienced an *event* because they changed their status from being Catholic to being Protestant. Territories 1 and 5 always remained Catholic and ceased to exist in 1534 and 1618, respectively. These territories that never experienced the event are still included in the model since they provide important information for estimating the chance of adopting Protestantism (in contrast to other statistical models such as logistic regression).

In this analysis, we use a specific type of Event History Model: a Stratified Cox Model with Constant Event Times (from now on: Stratified Cox Model).⁵² For every year of the

⁵⁰ Becker et al., "Multiplex Network Ties and Spatial Diffusion of Radical Innovations," 873.

⁵¹ Box-Steffensmeier and Jones, *Event History Modeling*, 2.

⁵² Andersen and Gill, "Cox's Regression Model," 1100; Allison, "Discrete-Time Methods for Event Histories," 70–6; Box-Steffensmeier and Jones, *Event History Modeling*, 160.

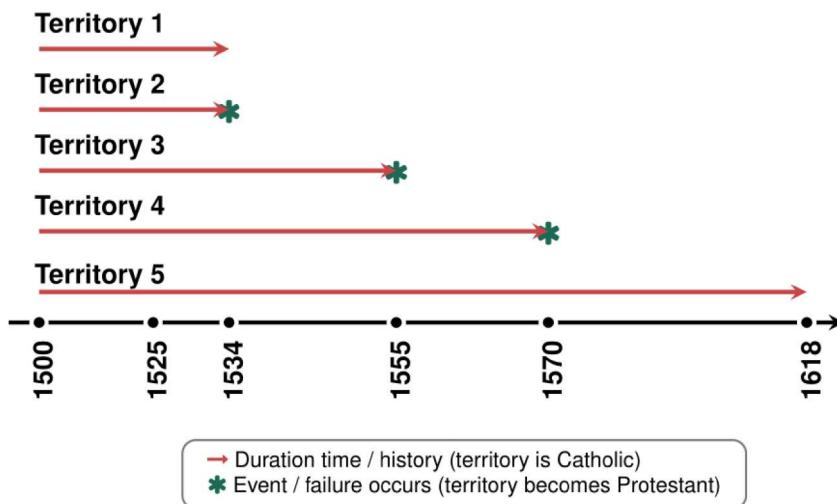


Figure 3. Schematic visualisation of events and histories in an Event History Model.

observation period (stratum), the Stratified Cox Model groups territories into an *event set* and *risk set*. Territories in the event set became Protestant in that year, whereas territories in the risk set are still Catholic but ‘were at risk’ of becoming Protestant since, in theory, they had the chance of changing denominations. For example, in 1536, the territory of Holstein became Protestant (event set) whereas Beuthen, Fribourg, and Lorraine (risk set) are still Catholic (Figure 4).

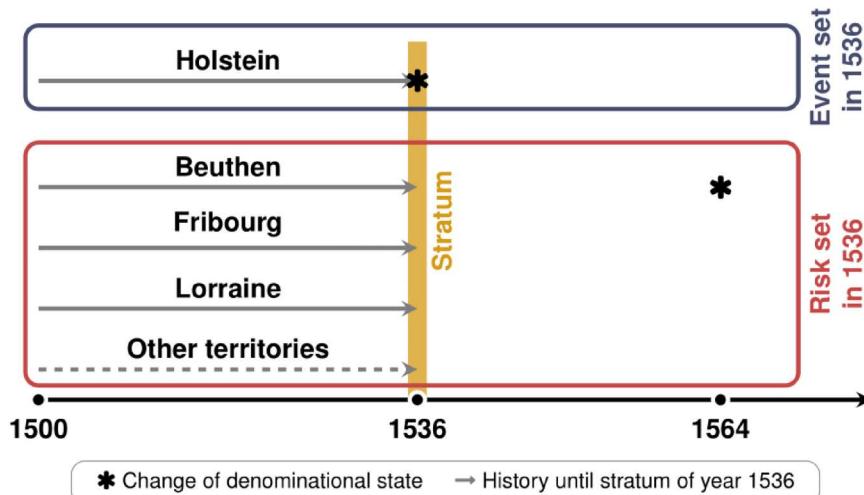


Figure 4. Schematic visualisation of a Stratified Cox Model. Territories are split into event and risk sets based on whether they have become Protestant by a specific year or are still Catholic. To estimate the effect of independent variables on the chance of adopting Protestantism, territories in the two sets are compared along the specified independent variables for every year of the observation period (stratum).

To estimate the importance of an independent variable on the chance of adopting Protestantism, the Stratified Cox Model compares territories in the event and risk sets along this independent variable. For example, to what extent are territories in the event set more/less powerful relative to their neighbours (*local power*) than territories in the risk set? The Supplementary Material provides a detailed explanation of this estimation and the Stratified Cox Model in general.

3. Results

Our contribution is twofold: First, we operationalised qualitative factors for the adoption of Protestantism in the Holy Roman Empire of the sixteenth century, which allows us to test them as independent variables in a quantitative setting. Second, we conduct such a test by estimating a Stratified Cox Model.

[Figure 5](#) compares the average estimates of two Stratified Cox Models. The ‘historiographical model’ (blue) estimates the effect of the theoretical factors proposed by Stievermann,⁵³ and the ‘neighbourhood model’ (orange) additionally estimates the effect of neighbourhood relations. Coloured dots correspond to the model estimates and indicate by how much the chance of adopting Protestantism would change on average if the respective independent variable increased by one unit. The larger these changes, the more important the independent variable is. The coloured lines crossing the dots are error bars and indicate how uncertain the model estimates are.⁵⁴ The larger the error bars the more unstable the effect of the independent variable across territories. If the error bars include zero, the model does not provide sufficient evidence for us to conclude that the respective independent variable has an effect on the chance of adopting Protestantism. We say that this independent variable is non-significant.

3.1. Historiographical model

In the historiographical model, local power has the largest effect on the adoption of Protestantism. If a territory increases its power in its neighbourhood by one rank, its chance of adopting Protestantism increases by 153% on average. This average effect is mainly driven by the most powerful territories, as the marginal effect across all local power values indicates ([Figure 6a](#)). This finding supports hypothesis 1. Interestingly, global power does not seem to drive the adoption of Protestantism as the non-significant effect for absolute power shows.

Leading reformers increase the chance of adopting Protestantism via the letters they write but not via personal visits. Each letter that a reformer sends to a territory increases the territory’s chance of adopting Protestantism by 1% on average. This effect scales up as the number of letters increases: For every 10, 20, and 50 additional sent letters, the chance increases by approximately 11%, 22%, and 65%, respectively. These results support hypothesis 2.

The remaining independent variables are non-significant. This means that the model does not provide sufficient evidence to claim that the chance of a territory adopting

⁵³ Stievermann, “Evangelische Territorien im Konfessionalisierungsprozess,” 47.

⁵⁴ In our analysis, error bars correspond to confidence intervals. If we ran our model on 100 different samples of territories the estimates of the model would fall inside the confidence interval 95 times.

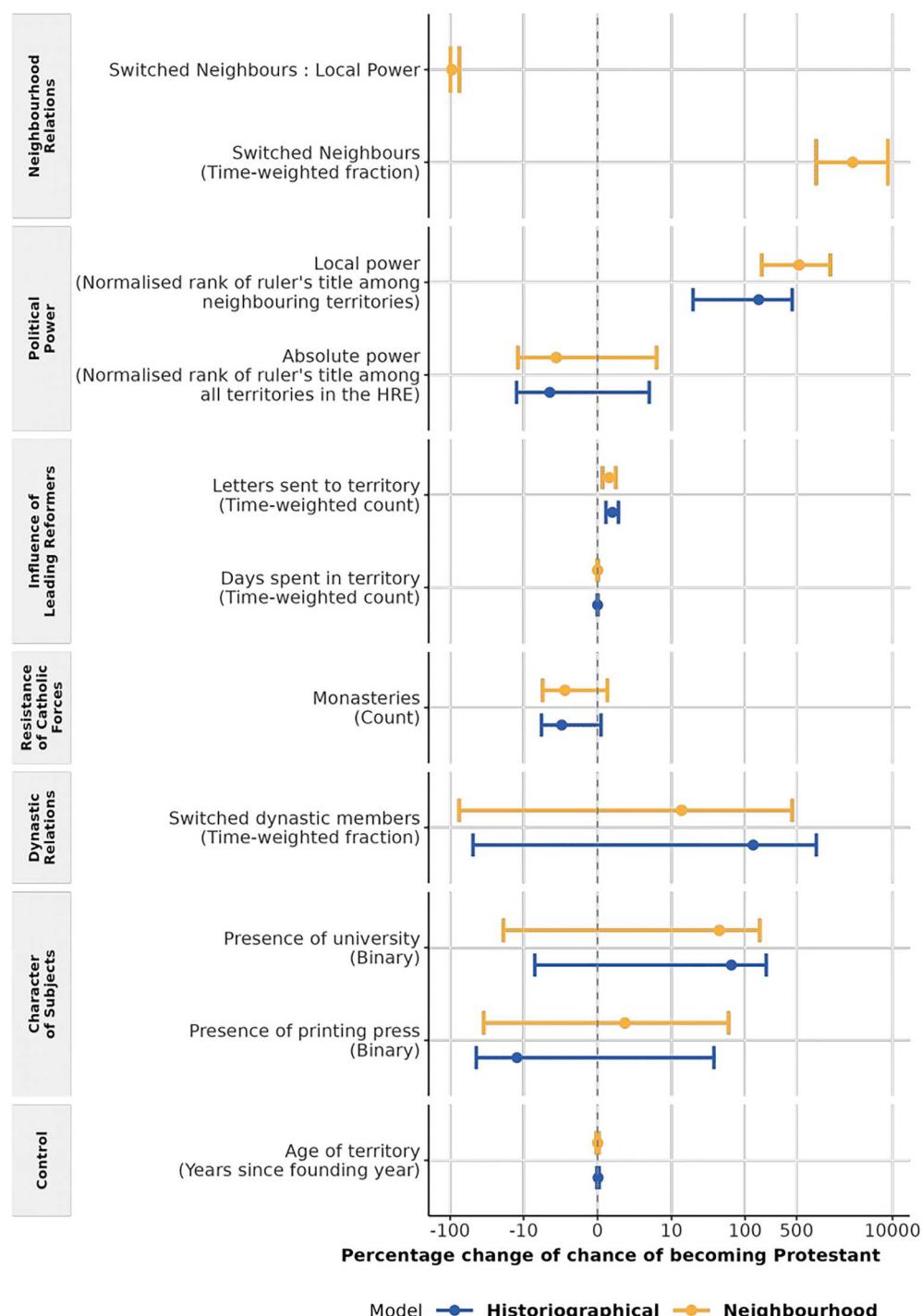


Figure 5. Estimates of the Stratified Cox Models. Dots correspond to the average percentage change of a territory's chance of adopting Protestantism if the independent variable increases by one unit. Bars correspond to the 95% confidence intervals.

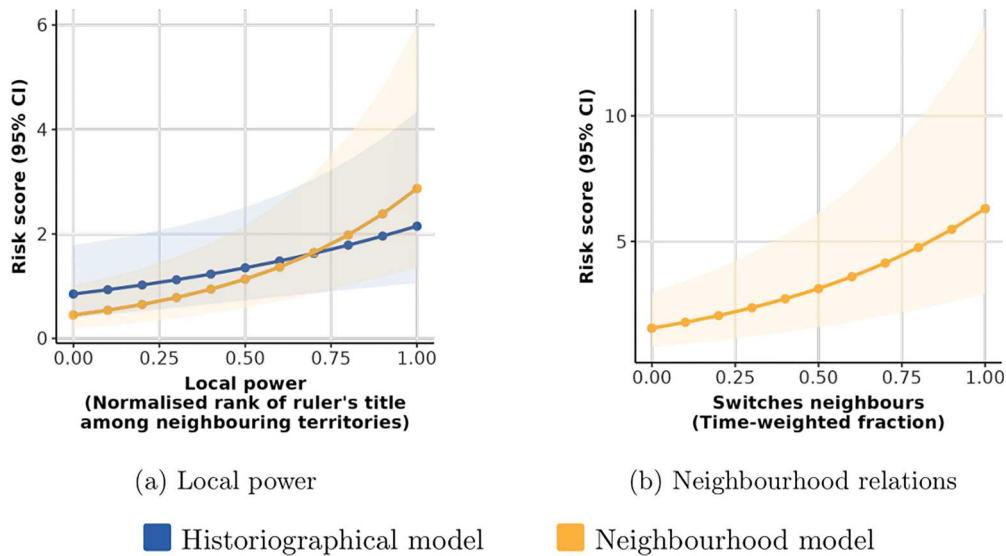


Figure 6. Marginal effects.

Protestantism is influenced by its number of monasteries, previous switches to Protestantism among other territories from the same dynasty, and whether or not at least one university or printing press was located in the territory.

3.2. Neighbourhood model

Results change in two ways once we move to the neighbourhood model. First, the added independent variable of neighbourhood relations has a large positive significant effect, which supports hypothesis 3. Territories are more likely to become Protestant the more of their neighbours have become Protestant in the past *and* the more recent these neighbouring switches occurred. This average effect is mainly driven by those territories where the majority of neighbours became Protestant in the recent past, as the marginal effect in Figure 6b shows.

Second, the effect size of four out of the previously tested eight independent variables decreases in comparison with the historiographical model. Neighbourhood relations ‘steal’ explanatory power from the other effects because they explain the chance of adopting Protestantism better than the other independent variables. This finding is crucial because it indicates how important geopolitical relations and the accompanying information transfer between territories were during the Reformation. Hence, understanding why territories became Protestant requires us to study territories together rather than in isolation.

3.3. Differentiating the neighbourhood effect

We further differentiate the explanation behind the neighbourhood effect by asking whether it is affected by local power relations. That is, does the local power of a territory change how neighbouring territories affect its chance of adopting Protestantism? To

answer this question, we examine the interaction effect *Switched Neighbours: Local Power*. In contrast to the positive individual effects, this interaction effect is negative, meaning that locally powerful territories benefit less from neighbouring switches than weak territories when adopting Protestantism.

[Figure 7](#) examines this effect in detail. It shows the effect of neighbourhood relations (x-axis) on the chance of adopting Protestantism (y-axis) for different levels of local power corresponding to weak and powerful territories (colour). Large x-values indicate that a large fraction of neighbours has recently switched to Protestantism. Large y-values indicate that the territory has a high chance of adopting Protestantism. The green and red lines correspond to specific groups of weak and strong territories, respectively, namely those with local power scores of 0.01 and 0.99.

We see that the green line is steeper than the red line, which is almost flat. This finding matches the main neighbourhood and interaction effects in [Figure 5](#): Weak territories are more likely to become Protestant once many of their neighbours have switched, whereas powerful territories become Protestant independent of the number of switched neighbours.

However, it is important to remember that the interaction effect in [Figure 5](#) is an average effect. That is, the effect on the adoption of Protestantism is averaged over all one-unit increases of the amount of switched neighbours and the local rank of a territory's rule title. In contrast, the effect in [Figure 7](#) only compares one increase in local power: the one from 0.01 to 0.99. We find that the confidence intervals (error bars) of both local power values overlap. This indicates that these specific groups of weak and powerful territories do not differ as much in their switching pattern as the significant

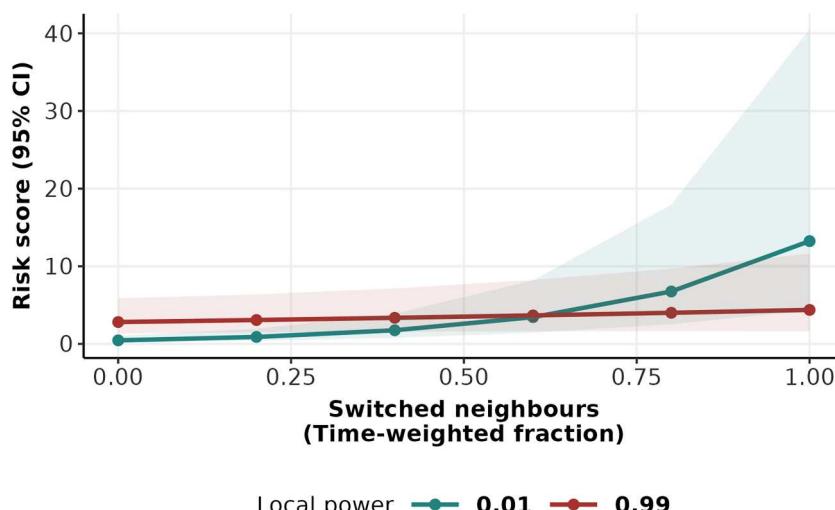


Figure 7. Interaction effect of neighbourhood relations (x-axis) and local power (colours) on the adoption of Protestantism (y-axis). Weak territories (green) are more likely to become Protestant than powerful territories (red) if a large fraction of their neighbours has already switched in the past (large x-values). The overlapping confidence intervals indicate that the effect between representatives of weak (0.01) and powerful (0.99) territories is not as large as the average interaction effect in [Figure 5](#) suggests.



average effect suggests. We conclude that there is a tendency for difference, rather than a clear separation, between weak and powerful territories in how they are affected by switched neighbours.

4. Discussion

4.1. Links to hypotheses

In this analysis, we examined why territories of the Holy Roman Empire (HRE) adopted Protestantism. We operationalised theoretical explanatory factors⁵⁵ and measured their effect on the adoption of Protestantism with an Event History Model, a type of statistical model. For the operationalisation, we used two novel data sets: one on the epistoloary correspondences of Protestant Reformers and one on territories of the HRE that captures their geopolitical boundaries and tracks temporal changes in other characteristics, such as the type of rule.⁵⁶ These temporal changes allowed us to account for the process-oriented character of the Reformation.

If we restrict ourselves only to the proposed historiographical factors, our model shows that local power relations and Reformers were the main factors affecting the adoption of Protestantism. However, when we additionally include geographic neighbourhood relations in our model, we find that these neighbourhood relations accounted for the largest effect, whereas the effect of many other driving factors became smaller. The finding that neighbourhood relations are most important in explaining the adoption of Protestantism supports our hypothesis 3. Succinctly, to understand the adoption of Protestantism, interdependencies between territories should be taken into account rather than analysing territories in isolation.

We further find from our model a positive effect of local power relations. This indicates that territories that were locally powerful relative to their direct geographic neighbours were more likely to become Protestant than locally weak territories. In contrast, global power relations did not show an effect in our model. This outcome highlights the importance of local structures for the spread of ideas in sixteenth-century Europe, a finding which has also been discussed for trade relations.⁵⁷ This supports our hypothesis 1.

Looking at the effect of Reformers, our analysis suggests that reformers mainly promoted the adoption of Protestantism via the letters they sent to territories and not via their physical visits. This supports our hypothesis 2. Since letters can be reprinted and passed on, using them to spread ideas is more scalable compared to personal visits, where an individual can only transmit ideas at a specific location and time.

4.2. Reflections on neighbourhood relations

Our analysis reveals that geographic neighbourhood relations between territories are the most important variable in explaining the adoption of Protestantism. The more

⁵⁵ Stievermann, "Evangelische Territorien im Konfessionalisierungsprozess," 47.

⁵⁶ Roller, "Operationalising Territories in 16th-Century Europe: A Critical Reflection on Spatial Concepts", 151–153.

⁵⁷ Epstein, "Transferring Knowledge and Innovating," 11.

neighbours have become Protestant in the recent past, the more likely it is for a territory to become Protestant at present. In combination with the local power of a territory relative to its neighbours, the results showed that mainly weak territories profited from neighbourhood effects. Only once strong neighbours had become Protestant, weak territories were more likely to adopt Protestantism.

Adopting Protestantism was especially risky for weak territories because they were not prepared to offer resistance against a potential military intervention of imperial troops. This risk was reduced once powerful neighbours of these weak territories had already adopted Protestantism. Our geographic neighbourhood effect, therefore, captures a strategic neighbourhood alliance between strong and weak neighbours. This finding may be caused by the vague legal context in the HRE surrounding the adoption of Protestantism. The stance of the emperor towards Protestantism was often ambiguous, making it difficult for rulers to assess how adoptions of Protestantism would be handled in practice.⁵⁸ The legal situation was only clarified in 1555 when the Peace of Augsburg permitted rulers to choose the denomination for their subjects.

Our finding is in line with Cantoni,⁵⁹ although he operationalised neighbourhood effects differently, namely as the direct distance between each territory and Wittenberg. This resulted in a Luther-focused view of the Reformation, where Protestantism spread in concentric circles around Ernestine Saxony. In contrast, our analysis provides an alternative explanation showing that local neighbourhood relations rather than central dependencies to Wittenberg affect the adoption of Protestantism. Since our analysis also includes Calvinist territories (e.g. Dutch provinces) and Zwinglian-Reformed ones (e.g., Swiss cantons), and those which adopted Protestantism before Ernestine Saxony (e.g., Zürich (1519), Reutlingen (1519), Basel bishopric (1521))⁶⁰ we loosen the Luther focus and provide a more holistic view of the Reformation.

As Cantoni already noted, the neighbourhood effect could also be explained by spill-overs where Protestant ideas diffuse to neighbouring territories via trade routes.⁶¹ However, if spill-overs were the true underlying mechanism, weaker and stronger territories would adopt Protestantism to the same extent provided that they have the same amount of trade connections with their neighbours. However, this is not supported in the analysis. Therefore, because we find in agreement with Cantori that weaker territories profit more from neighbourhood effects, there is evidence that strategic alliances rather than spillovers account for the underlying mechanism of the adoption of Protestantism.

⁵⁸ In 1521, emperor Charles V had condemned Luther and Protestantism in the Edict of Worms. However, at the Imperial Diet of Speyer in 1526, Charles temporarily granted princes greater denominational freedom until an official church council would settle the denominational conflict. Princes were given the vague recommendation to behave in religious matters 'as they may hope and trust to answer before God and his Majesty'. Since the promised council did not come about, uncertainty increased. At the Peace of Frankfurt in 1533, Charles suspended the Edict of Worms and stopped all trials against Protestants at the Imperial Chamber Court (Reichskammergericht). However, in 1546 and 1547, Charles suppressed Protestants again. He defeated their troops in the Schmalkaldic War and tried to force them to sign the Augsburg Interim in 1549, a compromise creed aiming to reunify the churches.

⁵⁹ Cantoni, "Adopting a New Religion," 520–4.

⁶⁰ In these years, the sermon included Protestant elements, but many Catholic elements continued to exist. For example, the Mass had not been abolished, the cult of saints was still practised, and a Protestant church ordinance had not been adopted. These ambiguities show that nailing down the adoption of Protestantism to one date is difficult.

⁶¹ Cantoni, "Adopting a New Religion," 520.

4.3. Reflections on our operationalisation and modelling approach

Statistical models require concrete measures. Therefore, we have to operationalise abstract concepts, such as political power or neighbourhood relations, which always simplifies the underlying concepts. We do not claim that our operationalisation is the only or even the optimal one. Instead, we demonstrate in our paper that it is a possible one, leading to interpretable results.

One may pose the critique that our operationalisation is incomplete and insufficient. For we left out factors that may explain the adoption of Protestantism, and, for existing factors, we used only rough proxies rather than adequate representations of the underlying abstract concepts. Our choice of factors relies on existing research. If additional factors are theoretically unfounded we refrain from including them in our model since they can bias our results.⁶² The operationalisation quality of theoretically founded factors is restricted by the available data. Data for the sixteenth century are not as rich as for our modern times since digitisation requires extra resources. This study serves as a guide for future data collection and presents a first step towards an optimal operationalisation, which can be iteratively improved in future research.

A famous aphorism in statistics says: ‘All models are wrong, but some are useful.’ The usefulness of our model lies in the disclosure and quantification of large adoption patterns of Protestantism across 262 territories of the HRE. Only their simultaneous study could reveal the impact of their political and spatial relations on their denominational choice. We do not claim that our analysis reflects all historical details of the Reformation. We claim quite the opposite: We can achieve reasonable insights about the importance of certain factors without accounting for all of these details.

Our analysis presents one step towards better understanding the adoption of Protestantism. Future studies are encouraged to extend our methods and test them in other settings, possibly accounting for more complex spatial relations between territories and their impact on political decisions. Our findings can provide an impetus for further research. It pleads for a greater role of spatial factors and, in particular, suggests that neighbourhood relations during the Reformation should be explored in more detail.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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⁶² Head et al., “Extent and Consequences of P-Hacking,” 11–12.

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Data availability statement

The data that support the findings of this study are openly available in Harvard Dataverse at [doi:10.7910/DVN/CTJ0HP](https://doi.org/10.7910/DVN/CTJ0HP). The source code for the analysis is available upon request from the first author.

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