# From Investiture to Worms: European Development and the Rise of Political Authority

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The endogenous consequences of competition between the Roman Catholic Church and lay political rulers set into motion by the Investiture Controversy contribute new insights into European economic, political, and religious development. The resolution of the Investiture Controversy in the concordats of London (1107), Paris (1107), and Worms (1122) resulted in an increase in the bargaining power of lay rulers over the selection of bishops in wealthier dioceses relative to poorer dioceses. Empirical evidence exploiting the timing of the adoption of the concordats interacted with a variety of time-invariant measures of diocesan wealth yields results consistent with this account—adoption of the concordats led bishops to become more aligned with lay political authorities in wealthier dioceses relative to poorer dioceses. These findings suggest the incentives created by the concordats played a role, hundreds of years before the Protestant Reformation, in the rise of lay political authority and its association with economic prosperity.

At least since Weber (1930), discussions of Europe's political and economic development have sought to understand the link between economic prosperity, the rise of lay political authority, and the Catholic Church's decline as a political power.[1] We shed new light on these issues by focusing on the strategic implications of the resolution of the Investiture Controversy through the concordats of London and Paris (1107), signed by the Catholic Church and the kings of England and France, and the concordat of Worms (1122), signed by the pope and Holy Roman emperor (Baldwin 1986; Chodorow and Sweeney 1989).

The Investiture Controversy and the concordats that ended it are understood to be of great economic, political, and religious importance (e.g., Cantor 1993; Grzymala-Busse 2020; Spruyt 1994; Weber 1978). For instance, Cantor (1993) and Spruyt (1994) note that the Investiture Controversy influenced lay political authority. And Weber (1978, 1160–62) argues that these agreements facilitated the formation of an enduring alliance between the bourgeois and religious powers against feudal powers. But existing accounts provide little by way of an explanatory mechanism and largely miss the linkage the concordats created between Europe's economic development and the rise of lay political power. Our analysis specifies a mechanism that directly links variation in economic prosperity to the declining political role of the church in much of Europe.

We focus on the concordats' rules for the appointment of bishops, the most important local religious officials. Under the concordats, lay political leaders had the right to veto a bishop-nominee. Moreover, if a nominee was vetoed, then during the interregnum where no bishop was in office, the often substantial local church revenues belonged to the lay political leader, whereas before the concordats those revenues belonged to the church. This rule change shifted the bargaining power of lay and church leaders. And, most importantly for our account, it did so in a way that depended on the wealth of the diocese because diocesan wealth affected how much revenue the church stood to lose if a bishop-nominee

1. We use "lay" rather than "secular" to avoid misunderstanding given that the contemporary meaning of secular suggests stronger nonreligious or nonbeliever orientation than was true in the Middle Ages.

were rejected. In particular, the concordats caused an increase in lay bargaining power relative to the church in wealthier dioceses compared to poorer sees (which need not imply they caused an overall increase in lay bargaining power). This fact, in turn, affected the incentives of lay and church leaders to foster local economic development since such development was expected to increase lay leader's political power at the expense of church power.

To explore these ideas, we develop a formal model that captures the institutional incentives introduced by the concordats and show that the model's predictions are consistent with diocese-level data on the relationship between the rise of lay political authority and economic development. The model elucidates the implications of lay political leaders' newly extracted power to reject bishops and, in so doing, temporarily retain control of local economic resources that would otherwise belong to the church. The model predicts that this feature of the concordats increased the bargaining power of lay political leaders vis-à-vis the church in wealthier relative to poorer dioceses. This caused an endogenous rise in lay power in wealthier bishoprics. We test this implication quantitatively. Using three different time-invariant measures of diocesan wealth (trade exposure and the presence of large settlements before the concordats and agricultural caloric potential of the land), we show that bishops became more aligned with lay political authorities in wealthier dioceses compared to poorer ones in places where the concordats were in effect compared to where they were not.

The model also shows that the incentives institutionalized in the concordats created at least one force that meant lay leaders benefited politically from economic development while the church was harmed politically. We explore both qualitative historical and quantitative evidence for such incentives, although of course there were many other forces at work in determining economic development (Grzymala-Busse 2020).

## RELATED LITERATURE

Much of the interest in European economic development revolves around claims by Smith (1904) and Weber (1930) that the rise of Protestantism explains variation in European economic development. Although substantial research challenges Weber's account (Andersen et al. 2017; Bueno de Mesquita 2022; Ladurie 1988; Tawney 1926), recent work has reignited the debate over Protestantism's causal importance. Becker and Woessmann (2009) present evidence that Protestantism's focus on literacy led to greater human capital accumulation and economic growth in Protestant countries. However, Cantoni (2015) finds no difference between Catholic and Protestant areas of Germany. Cantoni, Dittmar, and

Yuchtman (2018) show evidence that Protestantism's adoption in Germany led to a shift in resource investment away from the religious and toward the secular. The most relevant strand of literature for us argues that Protestantism might be, in part, a consequence of economic development. In particular, scholars argue that economically ambitious leaders in economically thriving locales were particularly likely to embrace the Reformation (Becker, Pfaff, and Rubin 2016; Cantoni 2015; Dimont 2004).

Our argument offers another possible twist on a reverse-causality story. We argue that, during the period that the concordats were in force, local economic development was associated with the rise of lay control over politics. It seems plausible that this growth in lay political control set the stage for the emergence of Protestantism. On this account, polities that were economically successful might have adopted Protestantism not only because Protestant ideas were conducive to their economic path but because their economic path had created the political preconditions for an assertion of lay control (Bueno de Mesquita 2022). In this sense, both economic and political factors that preceded the Protestant Reformation by 200 years may have played a role in its variable adoption.

Conceptually, our approach aligns with Bueno de Mesquita (2000), but our focus is on the concordats' effect on the relative political power of church and lay rulers rather than the origin of sovereign states. Moreover, because of the geographic and temporal breadth of our data, we can study comparative questions about the heterogeneous effects of the concordats on the distribution of bargaining power that Bueno de Mesquita's (2000) empirical analysis of France during the reign of King Philip Augustus (1179–1223) cannot address. Our study shares with Grzymala-Busse (2020) a belief that the rivalry between popes and monarchs is an important part of the story of the development of the lay-controlled state. However, following various historians, Grzymala-Busse argues that the concordats on net weakened lay leaders and points to the importance of a variety of other church institutions. Without challenging the importance of these other institutions, we argue that our model and evidence provide reason to re-evaluate the political impact of the concordats and, in particular, to consider the possibility that they had heterogeneous effects depending on local wealth.

Our study also complements research on economic secularization following the advent of the Protestant Reformation. Cantoni et al. (2018, 2045), noting a shift from the religious toward the secular, report that "surprisingly little evidence exists establishing a direct link from the Reformation to secularization." We propose to demonstrate that differential political secularization fostered by the crisis launched in 1046 and

resolved in the concordats was established in Europe's more prosperous regions by the time of the Avignon papacy in 1309, 200 years before the Protestant Reformation.

## BRIEF HISTORICAL BACKGROUND

The eleventh century saw conflict between Europe's religious and lay rulers over who had the power to appoint bishops. This Investiture Controversy began in 1046 when Pope Benedict IX sold the papacy to his godfather, Gratian, who became Pope Gregory VI. The German king, and soon-to-be Holy Roman emperor, Henry III deposed Gregory VI, installing in his place Suidger of Bamberg. In removing the pope, Henry raised the potential for lay authority to trump the ecclesiastical in the selection and removal of high church officials.

The conflict culminated in a treaty signed at Worms in 1122, with similar treaties signed in England and France 15 years earlier, establishing the method for appointing bishops. The concordat of Worms resolved that the right to nominate bishops belonged to the metropolitans (i.e., archbishops). The lay political authorities could accept or reject the nominee and, if the nominee were rejected, then during the interregnum between bishops, the dioceses' income would go to the lay political ruler.[2] This latter condition—which we argue played a critical role in European development—overrode a canon accepted in 451 that stated that during an interregnum, "The revenue shall remain with the œconomus"; that is, the church's chosen financial manager of the diocese's temporal accounts.[3] During the eleventh and twelfth centuries, the church was the largest landholder in Europe, so control over these revenues was consequential (Brown 2015).

These or equivalent terms were binding on the pope, the Holy Roman emperor, and the kings of Burgundy and Italy. The kings of England and France signed essentially equivalent concordats in 1107 (see Baldwin 1986, 62; Chodorow and Sweeney 1989, 14).

The loyalty of bishops was critical to the relative political power of the church and monarchs. As Gilchrist (1969, 22) notes, control of bishoprics had important implications for "control of church property and money." But the power of

bishops was not limited to siphoning revenue to the church or to the lay political ruler. The office of bishop could be and was used to muster the local community's loyalty on behalf of the pope or the lay ruler. By granting lay political rulers the newly institutionalized right to refuse bishop-nominees and making them residual claimants to diocesan income in the event of an interregnum, the concordats, we contend, institutionalized conditions that differentially affected the bargaining power of lay rulers in a way that depended on the wealth of their dioceses.

To illustrate the plausibility of our account of leaders' intentions, consider the behavior of England's Henry II toward vacant bishoprics a half century after his grandfather signed the concordat of London. As Warren (1973, 211) relates, "[Henry] would delay approving an appointment so that the revenues of the see could be drawn into the royal exchequer." And this incentive to retain diocesan revenues seems to have translated into differential bargaining power over bishops in wealthier dioceses. Warren describes Henry holding onto the revenues from wealthy dioceses until he could appoint loyalist bishops (here, describing the period following the assassination of Archbishop Becket): "The see of Bath received Reginald FitzJocelin, who had been one of Henry's trusted messengers to Rome. . . . John of Oxford was promoted . . . to the bishopric of Norwich. He had been . . . the king's envoy to the emperor's council at Würzburg. . . . Their presence on the episcopal bench gave Henry II the voice and vote which had so signally lacked in 1164." But, as Warren notes, "Not all the bishoprics . . . were filled by royal clerks: the obscure John of Greenford was appointed to Chichester, and Robert Foliot . . . to Hereford" (535). Importantly, by contrast to the wealthy dioceses where Henry II installed loyalists, "these were the less wealthy and less important sees."

Popes, of course, also had bargaining power. They had—and used—an arsenal of punishment tools, including harsh public declarations (Melve 2007), absolving subjects of oaths given on behalf of the ruler, and excommunication of the lay ruler. They could and did interdict territories (dioceses) controlled by the lay ruler, denying the people access to sacraments. Every lay ruler would have been mindful that the church was the monopoly provider of salvation, and so its support was essential for his political well-being.

In codifying the shifting relations between religious and lay leaders, the concordats altered the balance of power between these domains. By the early fourteenth century these power shifts culminated in the appointment of Clement V, a childhood friend of France's King Philip the Fair, as pope. Clement moved the papacy to Avignon in 1309, where it was subject to the political influence of French kings for

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2. The essential passage in the concordat of Worms establishing lay control over property and revenue that previously was controlled by the church is stated by Pope Calixtus II: "The one elected, moreover, without any exaction may receive the regalia from thee" ("Privilege of Pope Calixtus II," https://avalon.law.yale.edu/medieval/inv16.asp#:~:text=The%20one%20elected%2C%20moreover%2C%20without,these%20what%20he%20rightfully%20should). In the twelfth century, regalia referred to the properties of office, including land and its revenue. As Benson (1968, 314) reports, "During successive negotiations, . . . [Pope] Innocent III tried to limit the monarchical rights arising from the tenure of regalia by imperial bishoprics and abbeys. As a result, in 1209 Otto of Brunswick renounced his claims to the income from 'properties . . . of vacant churches.'"

3. See https://www.ccel.org/ccel/schaff/npnf214.xi.xviii.xxv.html.

decades. During that period (1309–76 and 1378–1417), as Stephen (1855, 240) observed, "Popes were little more than vassals of the French monarchs at Avignon." As such, from our perspective, the beginning of the Avignon papacy in 1309 marks the end of the period in which the concordats defined relations between religious and lay political authorities in an observable way (Gilchrist 1969).

### PRECONCORDAT BISHOP SELECTION

Before the concordats, bishop selection generally followed one of three patterns: (1) the local community and clergy nominated and elected a bishop who was then accepted or rejected by the local metropolitan bishop, (2) the metropolitan put a candidate forward who then had to be elected by the local clergy and Catholic community, or (3) a lay ruler nominated a candidate who was then accepted or rejected by the church leaders (Costigan 1966). Of course, there was the possibility of simony—the buying and selling of bishoprics.

The frequency with which these means of choosing bishops was used is hard to know. Importantly, under all three the revenues from the bishopric flowed to the church whether or not a bishop was in place. As such, there is no institutional reason to think that bargaining power and the alignment of the bishop should have been systematically related to diocesan wealth. This is why we focus on the change in bargaining power caused by the concordats in wealthy versus poor dioceses, not the change in absolute bargaining power.

### THE MODEL

We introduce a theoretical model that represents, in stylized form, some key institutional features created by the concordats. The model highlights the consequences of the church's power to nominate bishops, a lay ruler's right to accept or reject, and the lay ruler's status as residual claimant of local church resources. The model addresses the conditions under which the bishop (and, thus, local religious policy) could be expected to be aligned with the church or lay ruler, who ended up with control over the economic resources of the diocese, and the likelihood of a bishop being successfully appointed and approved.

There are two players: the church and the (lay) political ruler. The game occurs over an infinite number of periods. The game begins with no bishop in office. At the start of each period $t$ in which the bishopric is vacant, the church nominates a bishop with policy position $r_t \in [\underline{r}, \bar{r}] \subset \mathbb{R}$. The ruler either accepts or rejects the nominee. If the ruler accepts the nominee, that nominee serves as bishop for the remainder of the game. If the ruler rejects the nominee, there is no bishop in office in the next period.

In each period, the diocese generates income $y > 0$. If no bishop is accepted, a status quo policy $q \in [\underline{r}, \bar{r}]$ prevails and the ruler suffers an instantaneous cost $c > 0$, representing punishments imposed by the church.

Finally, we assume that, whenever a bishop is nominated in period $t$, there is a shock, $\varepsilon_t$, to the ruler's instantaneous payoff from accepting the bishop. The $\varepsilon$s are independently and identically distributed according to a cumulative distribution function, $F$, with full support on the real line and associated log-concave density $f$. This shock captures a variety of unforeseen local political, economic, and social conditions that may influence the ruler's willingness to accept a nominee in the short run. Equivalently, it could represent a shock to the costs the church can impose on the ruler for rejecting a bishop-nominee.[4]

All players discount the future with discount factor $\delta \in (0, 1)$. In each period in which a bishop of position $r$ is in office, the church's payoff is $\lambda_C r + (1 - \lambda_C)y$. In any period in which no bishop is in office, the church's payoff is $\lambda_C q$, where $\lambda_C \in (0, 1)$ is the weight the church puts on policy relative to income. In any period in which the ruler rejects the bishop, the ruler's payoff is $-\lambda_R q + (1 - \lambda_R)y - c$. If the ruler accepts a nominee of position $r$ in period $t$, his payoff in that period is $-\lambda_R r + \varepsilon_t$ and his payoff in all future periods is $-\lambda_R r$. The parameter $\lambda_R \in (0, 1)$ is the weight the ruler puts on policy relative to income.

### Equilibrium

We study pure strategy subgame perfect Nash equilibria (with the natural extension to games with moves by nature) in stationary strategies. Suppose the ruler conjectures that the church's strategy is $s_C$. The ruler's payoff from accepting a bishop of alignment $r_t$ in period $t$ is $-\lambda_R[r_t/(1 - \delta)] + \varepsilon_t$. The expected payoff from rejecting is $-\lambda_R q + (1 - \lambda_R)y - c + \delta\max_{s_R} V_R(s_R, s_C)$, where $\max_{s_R} V_R(s_R, s_C)$ is the ruler's discounted expected payoff for the continuation game under the best response to the church's strategy. Comparing these two payoffs, the ruler accepts if and only if

$$\varepsilon_t \geq \lambda_R \left( \frac{r}{1 - \delta} - q \right) + (1 - \lambda_R)y - c + \delta \max_{s_R} V_R(s_R, s_C). \tag{1}$$

This gives the following result.

**Lemma 1.** In any equilibrium, the ruler's strategy is a vector of cutoff rules $(\bar{\varepsilon}_t(\cdot))_{t=1,2,\dots}$ such that, if a bishop

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4. Without such a shock, the model would predict that a bishop-nominee is never rejected. The exact form the shock takes is unimportant for any of the model's conclusions.

of alignment $r_t$ is nominated in period $t$, the ruler accepts if $\varepsilon_t > \bar{\varepsilon}_t(r_t)$ and rejects if $\varepsilon_t < \bar{\varepsilon}_t(r_t)$.

*Proof.* Follows from the argument in the text. QED

Lemma 1 tells us that, no matter what strategy the church uses, the ruler uses a cutoff rule in every period. From this, it is straightforward that if the church uses a stationary strategy, the ruler does too. (All omitted proofs are in the appendix.)

**Lemma 2.** Suppose the church's strategy calls for proposing a bishop of alignment $r$ in every period. Then the ruler's best response is stationary. In particular, there is a function $\bar{\varepsilon}^*(\cdot) : [\underline{r}, \bar{r}] \rightarrow \mathbb{R}$ such that, if a bishop of alignment $r_t$ is nominated in period $t$, the ruler accepts if $\varepsilon_t > \bar{\varepsilon}^*(r_t)$ and rejects if $\varepsilon_t < \bar{\varepsilon}^*(r_t)$.

We saw that if the church uses a stationary strategy, then the ruler's best response is the stationary cutoff rule $\bar{\varepsilon}^*(\cdot)$. To establish that a stationary equilibrium exists, we must show that if the ruler uses that stationary strategy, it is a best response for the church to use a stationary strategy. This is straightforward, since the church faces the same optimization problem in every period.

**Lemma 3.** If the ruler's strategy, $\bar{\varepsilon}^*(\cdot)$, is a best response to a stationary strategy by the church, then the church has exactly one stationary best response, $r^*$. It has the following form: there exist numbers $\underline{y} < \bar{y}$ such that

$$
r^* = \begin{cases} \bar{r} & \text{if } y < \underline{y} \\ \hat{r} & \text{if } y \in [\underline{y}, \bar{y}] \\ \underline{r} & \text{if } y > \bar{y}, \end{cases}
$$

where $\hat{r}$ satisfies the following first-order condition:

$$
\frac{f}{(1-F)}(\bar{\varepsilon}^*(\hat{r})) = \frac{\lambda_C (1 - \delta F(\bar{\varepsilon}^*(\hat{r})))}{\lambda_R (1 - \delta)} \left( \frac{1}{\lambda_C(\hat{r} - q) + (1 - \lambda_C)y} \right).
$$

Putting these results together, we have:

**Proposition 1.** There exists a stationary equilibrium of the game, $(\bar{\varepsilon}^*(\cdot), r^*)$. In such an equilibrium, the church proposes $r^*$ as defined in the statement of lemma 3 in every period. The ruler accepts the bishop-nominee in any period in which $\varepsilon_t > \bar{\varepsilon}^*(r_t)$ and rejects in any period in which $\varepsilon_t < \bar{\varepsilon}^*(r_t)$.

*Proof.* Follows immediately from lemmas 2 and 3. QED

## Implications

For conceptual and empirical reasons, we focus on comparative statics with respect to income ($y$). We ask how this parameter affects the expected alignment of bishops ($r^*$) and the frequency and length of interregna (i.e., periods in which no bishop is in office). As income increases, the church's costs and ruler's benefits from having a nominee rejected increase. As a consequence, the church nominates a bishop more aligned with the ruler.

**Proposition 2.** In a stationary equilibrium, if $r^*$ is interior, it is strictly decreasing in $y$.

The model also has implications for the effect of income on the length and frequency of interregna. However, because there are competing effects, the direction of the relationship depends on the sign $\lambda_R - \lambda_C$, which is not observable in our data. Given this, we relegate this analysis to the appendix, where the formal result appears in proposition A.1.

Finally, it is important to know how wealth affects the players' overall welfare, since this will elucidate the wedge the concordats drove between the economic policy interests of lay rulers and church leaders. Rulers always benefit from increased diocesan wealth because any such increase improves both the ruler's outside option and the alignment of bishop-nominees. The church faces trade-offs. When an agreement is reached, the church controls the income and so would like it to be large. But, the greater the diocese's income, the less willing the ruler is to accept a bishop-nominee and, thus, the less bargaining power the church has. Consequently, the church's welfare is nonmonotone in diocesan wealth.

To better understand this nonmonotonicity, consider a diocese with wealth $y \in (\underline{y}, \bar{y})$, so that the bishop-nominee is not totally aligned with either the ruler or the church; that is, $r^* \in (\underline{r}, \bar{r})$. As $y$ goes up, proposition 2 shows that $r^*$ goes down—the church makes a better offer to the ruler. Proposition A.1 shows that if the ruler cares more about income than the church ($\lambda_R < \lambda_C$), then, despite this improved offer, the ruler rejects the offer more often. Because the church is therefore getting the increased income less frequently and getting a bishop-nominee who is less aligned with its interests, its welfare is decreasing. By contrast, if the ruler cares less about income than the church ($\lambda_R > \lambda_C$), then proposition A.1 shows that the ruler accepts the church's more generous offer more often. Hence, the church gets to consume the increased income more often and, despite getting a bishop who is less aligned with it, the church's welfare is increasing. Thus, the church's welfare can be increasing or decreasing in $y$, depending on $\lambda_R$ versus $\lambda_C$.

Now consider when the diocese is very rich or very poor so that the bishop-nominee's alignment is at a corner. If the diocese is sufficiently poor, then the ruler accepts the bishop-nominee almost with certainty. Thus, as $y$ increases, the church benefits because it gets to consume a larger income with virtual certainty. Hence, in sufficiently poor dioceses, the church's welfare is increasing in income, even if $\lambda_R < \lambda_C$. Similarly, if the diocese is sufficiently rich, then the bishop-nominee is rejected with virtual certainty, even though he is perfectly aligned with the ruler. As $y$ increases, the ruler becomes even less willing to accept the bishop-nominee, which makes the church less likely to get the income. Hence, in sufficiently rich dioceses, the church's welfare is decreasing in income, even if $\lambda_R > \lambda_C$.

**Proposition 3.** In a stationary equilibrium:

- The ruler's ex ante expected payoff from the game is strictly increasing in $y$.
- There is a unique $\hat{y}$ such that the church's ex ante expected payoff from the game is increasing in $y$ for $y < \hat{y}$ and decreasing for $y > \hat{y}$. Moreover, if $\lambda_R < \lambda_C$, then $\hat{y} < \underline{y}$ and if $\lambda_R \geq \lambda_C$, then $\hat{y} > \bar{y}$.

Proposition 3 suggests that the incentives created by the concordats drove a wedge between the interests of lay political authorities and the church. Lay rulers had unequivocal incentives to support policies that increased economic development because such policies increased the power of lay political authorities relative to the church. The church, by contrast, had at best mixed incentives. In sufficiently poor dioceses, lay rulers had little enough bargaining power that the church benefited from the increase in income it consumed when a bishop was in place. But as Europe became wealthier, the church's loss of bargaining power from increased local income, and the associated loss in political authority, more than offset the benefits. Moreover, thinking dynamically (slightly outside the model), the church could anticipate this loss of bargaining power and, thus, had incentives to limit economic development even in dioceses with wealth $y < \hat{y}$.

### Summing up

Our theoretical analysis provides two key testable implications:

i) In dioceses with the concordats in effect, lay rulers' bargaining power is increasing in diocesan wealth, so that, conditional on a bishop being in office, all else equal, the wealthier the diocese, the more likely the bishop was to align with the lay ruler.

ii) The concordats drove a wedge between lay rulers and church leaders with respect to economic development. Lay rulers had unambiguous incentives to foster economic development. By contrast, church leaders had incentives to limit economic development to curtail the loss of political power.

### THE DATA

Our data consist of information on as complete a set of Roman Catholic dioceses and their bishops as could be assembled for the years from 325 (Council of Nicaea) to 1309 (the Avignon papacy). Dioceses are recorded as long as they had their own bishop. Over the centuries some dioceses merged, some split, some ceased to exist, and new ones were created. The data include 427 unique dioceses of which 292 are covered by a concordat at some point (*covered* dioceses) and 181 never are (*uncovered* dioceses). There are 6,947 diocese-bishop pairs, with approximately 76% from covered dioceses.

### Bishop alignment

The outcome variable is the alignment of each bishop. Data about bishop alignment and their consecration dates are derived by scraping Catholic Church websites and Wikipedia in English, in German, and in a few cases French, Spanish, or Swedish.[5] We classified the alignment of bishop-nominees into two categories: church aligned or lay aligned. Thus, we define a variable Church Aligned$_{db}$ equal to 1 if bishop $b$ in diocese $d$ was aligned with the church and equal to 0 if he was aligned with the lay political authorities.

Bishops are coded as church aligned if their position before becoming bishop for the first time was a religious post such as abbot, deacon, or archdeacon or if the biographical information indicates they were specifically linked to the pope. Bishops are classified as lay aligned if their prior post was as an agent of the lay authorities, such as court ambassador, chancellor, and the like or if the biographical information indicates they were specifically linked to the secular ruler. We summarize the classification process in the appendix.

Our data collection yielded biographies for 1,580 bishops with sufficient detail to allow us to code their alignment. Of these bishops, 1,305 (83%) are from covered dioceses and 275 are from uncovered dioceses; 1,244 (79%) are classified

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5. Cross-checking showed that there was little information available in French, Spanish, or Swedish beyond that available in German.

as church aligned and 336 as lay aligned. Figure C.1 shows the number of bishops for whom we observe alignment by half century for both covered and uncovered dioceses.

## Diocese wealth

Diocesan wealth is measured using three distinct data sources: (1) trade route locations, (2) the land's potential to produce calories, and (3) the population size of large settlements. To avoid using any endogenous variation in wealth, in all cases we measure wealth as a fixed diocese characteristic, based on the state of a diocese before the signing of the concordats.

First, we measure wealth using the location of major trade routes, using data from the Old World Trade Routes Project (OWTRP).[6] The OWTRP "has a special focus on . . . geo/chrono-referenced electronic data-sets describing known land, river and maritime trade and pilgrimage routes of Eurasia and Africa between 10,000 BCE and approx. 1820 CE."[7] Because these data provide limited coverage in parts of Europe (e.g., today's United Kingdom), we supplement them with historical maps, economic histories, and Wikipedia's coverage for individual dioceses.[8] See the appendix for more information on how we collected the trade route data.

A diocese ($d$) is coded as having $Trade_d$ equal to 1 if in any year before the relevant concordat, the diocese's seat was within 25 km of a major trade or pilgrimage route, had a port or river route, or produced and exported goods. Of the 427 unique dioceses in our data, 356 (83%) are not on a trade route before the concordats and 71 are.

Second, we measure pre-Columbian agricultural caloric potential per hectare as estimated by the United Nations' Food and Agriculture Organization (FAO; Galor and Özak 2016). The caloric potential estimates are a fixed value per diocese over the entire time period, representing that geographic area's estimated potential for producing calories based exclusively on pre-Columbian, European crops. Because caloric potential is estimated by the FAO on a very small land scale, it is readily mapped to the diocese level.[9] For each diocese variable $Calorie_d$ takes the value 1 if that diocese (measured at the seat) has caloric potential above the European median and the value 0 if that diocese has caloric potential below the median.

Third, we use Buringh's (2021) data that expand on Bairoch's (1991) and Bairoch, Batou, and Chèvre's (1988) earlier research into the location and size of European cities. Buringh, like in earlier attempts, estimates populations once per century but fills in the map of Europe by estimating the size of each settlement with a population of at least 1,000 people. Buringh also extends the city data to begin in 700. Buringh's estimates come from a combination of censuses, past demographic and historical research, proxies such as the number of soldiers coming from a location and travelers' accounts, and model-based imputation. For each century, we assign each settlement to the diocese whose seat is closest to it. We then construct three binary variables: $Population5_d$, $Population10_d$, and $Population15_d$. If, at any time before the signing of the relevant concordat, diocese $d$ had a settlement with at least 5,000 inhabitants, then $Population5_d$ takes the value 1 for that diocese; otherwise it takes the value 0. The other two are coded analogously, for settlements of 10,000 and 15,000 inhabitants respectively. The cutoffs 5,000, 10,000, and 15,000 correspond roughly to the 75th, 90th, and 95th percentiles.

## Where and when the concordats apply

Different covered dioceses were bound by the concordats at different times. The variable $Concordats_{db}$ takes the value 1 if a concordat was in effect in diocese $d$ in the year that bishop $b$ was consecrated and the value 0 otherwise. For dioceses in England and France (excluding Burgundy), this variable is 1 for the years 1107–1309 and 0 otherwise. For dioceses in Ireland, it equals 1 for 1171–1309 and 0 otherwise because Ireland became subject to the concordat of London after its invasion by England's Henry II. For dioceses in the Holy Roman Empire, it is 1 from 1122 to 1309 and 0 otherwise. For dioceses that were never subject to the concordats—including in Spain, Portugal, southern Italy, Venice, and much of eastern and northern Europe—this variable is always coded as 0.

We drop the Papal States from our analysis since in those locales the pope was the civil authority and, thus, represents both sides of the "negotiation." We do not similarly drop the subset of bishops known as prince-bishops, where the identity of the civil authority and the identity of the bishop were one and the same, for several reasons. Most importantly, unlike in the Papal States—where the civil ruler was the pope and so there was no possibility of a loss of revenue for the church in the event of an interregnum—such was not the case for the dioceses' ruled by prince-bishops. Moreover, prince-bishops were elected (heredity played a part but did not assure election). As such, prince-bishops represented

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6. See http://www.ciolek.com/owtrad.html. The online replication folder includes a spreadsheet that identifies each of the individual trade route sources taken from the OWTRP.

7. See http://www.ciolek.com/owtrad.html#introduction. For studies using these data, see (among others) Harrower and Dumitru (2017), Pella (2014), and Yue, Lee, and Wu (2017).

8. See https://easyzoom.com/imageaccess/ec482e04c2b240d4969c14156bb6836f.

9. For a discussion of the use of the FAO data on caloric potential production, see Galor and Özak (2015, 2016, esp. 3078–81).

a variety of competing interests. And, indeed, the historical record reflects disputes between, for instance, popes, local nobility, and Holy Roman emperors over the choice of prince-bishops (e.g., the Bremen Diocesan Feud of 1258–59; Glaeske 1972; von Bippen 1880). Thus, there is no reason to think that the logic of our account does not apply to dioceses governed by prince-bishops.

## Other variables

We collect data on other relevant variables. Using geographic information systems (GIS) data from the Digital Atlas of Roman and Medieval Civilizations, we assign each diocese to a European kingdom for two snapshots in history: 1000 and 1200.[10] We treat the 1000 assignment as reflective of the years 800–1100 and the 1200 assignment as reflective of 1100–1309. We collected data on the monarchs of these kingdoms from Wikipedia. Of the 1,580 bishops whose alignment we are able to code, we know the monarch in power at the time of their nomination for 976 (61%). For the remaining bishops, it is typically the case that no kingdom-level monarch was in power, and it is historically ambiguous who the relevant lay authority was.

We use GIS data to code which dioceses were on the routes taken by crusader armies for each of four crusades.[11] We create four dummy variables that take the value 1 in any year after the start of the relevant crusade for dioceses whose seat is within 25 km of the crusade route and 0 otherwise.

Finally, we use GIS to lay a 400 km² grid over the map of Europe, assign each diocese to its grid cell, and create dummy variables for each of the 66 cells. This allows us to control for geographic characteristics in a way that is not endogenous to political boundaries. Figure 1 shows the geographic distribution of five key pieces of diocese-level data: concordat coverage, variability of bishop alignment, whether on a trade route before the concordats, pre-Columbian caloric potential, and presence of a settlement with at least 5,000 inhabitants before the concordats.

## EMPIRICAL STRATEGY

The key testable empirical implication of our model, given our data, concerns whether the effect of the concordats on bishop alignment was mediated by diocesan wealth. We expect that the concordats caused an increase in lay bargaining power in wealthier dioceses relative to poorer ones (which need not imply they caused an overall increase in lay bar-

gaining power), which should be reflected in the alignment of bishops.

A comparison of the alignment of bishops in dioceses that are more or less wealthy is, of course, subject to the concern that there may be persistent differences between wealthier and poorer bishoprics that have nothing to do with the incentives created by the concordats. To partially address such concerns, we (1) compare the period during which a concordat was in effect to the period in which it was not and (2) compare dioceses that were and were not subject to the concordats during a given time period. To implement these ideas, we estimate difference-in-differences style linear probability models of the following form:

$$
\begin{aligned}
\text{Church Aligned}_{db} = {} & \beta_0 + \beta_1 \cdot \text{Concordats}_{db} \\
& + \beta_2 \cdot \text{Concordats}_{db} \cdot \text{Wealth}_d + \gamma \cdot X_{db} \\
& + \psi \cdot \text{Diocese} + \xi \cdot \text{Half Century} + \varepsilon_{db}.
\end{aligned}
$$
$$(2)$$

$\text{Wealth}_d$ is one of our fixed measures of diocese $d$'s wealth (i.e., trade exposure, caloric potential, or city population). The variable $X_{db}$ represents time varying covariates, such as whether a crusade route passed through the diocese before the year bishop $b$ was consecrated. Because our wealth measures are fixed diocese characteristics, the main effect of the wealth variable is absorbed in the diocese fixed effect.

In equation (2) we show our basic specification, with diocese and half century fixed effects. But we actually consider five models in each analysis: (1) diocese and half century fixed effects; (2) diocese, half century, and monarch fixed effects; (3) diocese and kingdom by half century fixed effects; (4) diocese and grid cell by half century fixed effects; and (5) diocese and half century fixed effects and a linear time trend interacted with the wealth measure.

Specifications 2–4 try to compare dioceses at similar times in similar places facing similar political circumstances. Specification 2 does this by directly controlling for the identity of the monarch. However, because we only observe the monarch for approximately 60% of our diocese bishops, this specification comes at significant cost in terms of power and potential selection bias. As such, specification 3 makes comparisons within kingdom half centuries, without using the actual identity of the monarch, and specification 4 does the same, while avoiding the endogeneity of kingdom borders by looking within arbitrary grid cell half centuries (which also allows us to go back further in time in our data). Specification 5 adds separate linear time trends for poor and wealthy dioceses to our basic two-way fixed effects model to account for the possibility that poor and wealthy dioceses may have been on different trends before the concordats.

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10. See https://ags.cga.harvard.edu/arcgis/rest/services/darmc/roman/MapServer/126.

11. Crusade routes are available at http://www.arcgis.com/home/item.html?id=962cb96725354ce5aade45acd82982f5.

Figure 1. Map of the data showing variation in covered versus uncovered dioceses, church aligned versus lay aligned, trade, caloric potential, and settlements of at least 5,000 inhabitants.

In each specification, our hypothesis is that the coefficient on the interaction between the Wealth and the Concordats variables ($\beta_2$) is negative. That is, we expect the concordats to cause a decrease in church-aligned bishops in wealthy dioceses compared to poor dioceses.

## Some identification concerns

We discuss several identification concerns before turning to the analysis. One concern involves panel imbalance resulting from the spread of Catholicism across Europe over our sample period. The addition of new dioceses over time raises the possibility that our results are due to compositional changes. Our first line of defense against such concerns is the inclusion of diocese fixed effects. But to further address this issue, table C.2 replicates our results on a panel consisting exclusively of dioceses that existed continuously from 800 through 1309.

Second, because of the age and nature of our data, there are many bishop-diocese pairs for which we cannot classify bishop alignment. This missingness is of greatest concern if it is correlated with the interaction of Wealth and Concordats. To explore this possibility, table C.1 reports the results of regressions akin to the baseline specification of equation (2), using missingness of the alignment measure as the dependent variable. These regressions show no evidence of a systematic relationship between missingness and the interaction of any of our wealth measures and the concordats period.

A third concern involves other major events that happened around the same time as the concordats. Crusades occurred in 1096–99, 1145–49, 1189–92, and 1202–4. Because large armies moved across Europe to the Middle East, it is possible that those that went overland both affected local politics and caused the creation of new trade routes, as goods and services were needed to support these armies. For this

reason, we control for whether a crusade passed near a diocese. Starting around 950, Europe's economy was bolstered by the rise of the commercial revolution, sparked by a marked growth in trade. This is why it is important that we use a fixed measure of trade, rather than one that changes endogenously over time. That said, if secular rulers had differential bargaining power in different regions that was correlated with their ability to build trade capacity before the concordats, and that difference in bargaining power persisted into the concordats period, this could bias our estimates. This is why it is important that we use other measures of wealth, such as caloric potential, that are not subject to such concerns.

Finally, our key empirical findings compare the number of bishops with previous appointments in secular versus religious bureaucracies in wealthier versus poorer dioceses that were and were not subject to the concordats. If the secular bureaucracies in wealthier dioceses grew more robustly moving from the preconcordats period to the concordats period relative to poorer dioceses, then our results could mechanically reflect the greater availability of such candidates rather than a shift in bargaining power. We attempt to address this concern through a variety of fixed effect specifications. In particular, to explain our results, any correlation between the wealth of a diocese and the change in opportunities in the secular bureaucracy before and during the concordats period would have to hold within a kingdom half century or grid cell half century.

### Visualizing the raw data

Before turning to the regression analysis, figure 2 shows the raw data, focusing on covered dioceses. Each dot represents the percentage of bishops with observed alignment consecrated in that year who were classified as aligned with the church. Over that, we plot a moving average (running plus and minus 20 years). The dark points and curve show the share of bishops aligned with the church in poorer dioceses, and the light points and curve show the share of bishops aligned with the church in wealthier dioceses. Figure 2*A* measures wealth as preconcordat trade exposure; figure 2*B*, as caloric potential; and figure 2*C*, as having a settlement of at least 10,000 inhabitants before the concordats. Of course, these plots of the raw data do not take account of diocese and time period fixed effects, rulers, kingdoms, or the crusades. Nor do they compare covered to uncovered dioceses. Nonetheless, to different extents, they illustrate a basic pattern of interest. After the concordats take effect, there appears to be a dip in the church alignment of bishops in wealthier covered dioceses relative to those in poorer covered dioceses.

### RESULTS

To test our hypothesis, we must control for location and time characteristics and compare covered to uncovered dioceses. Table 1 reports results for regressions corresponding to equation (2). Each cell of the table reports the estimate of
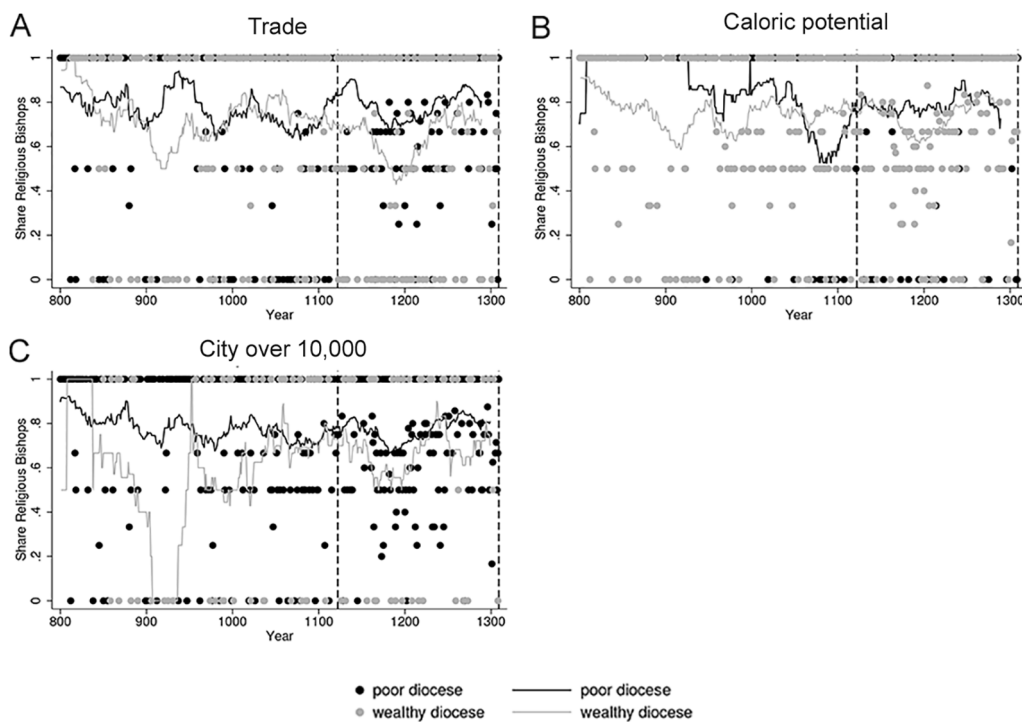


Figure 2. Average difference in bishop alignment for wealthier and poorer covered dioceses

Table 1. Estimates of the Difference in the Effect of the Concordats on Bishop Alignment with the Church Depending on Wealth ($\hat{\beta}_2$)

|  | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Wealth measure: |  |  |  |  |  |
| Trade | −.12** | −.10 | −.16** | −.14** | −.19** |
|  | (.06) | (.08) | (.07) | (.05) | (.07) |
| Caloric potential | −.06 | −.21*** | −.19*** | −.12* | −.04 |
|  | (.06) | (.06) | (.06) | (.07) | (.07) |
| City 5,000 | −.08 | −.09 | −.16** | −.12* | −.12 |
|  | (.06) | (.08) | (.07) | (.06) | (.08) |
| City 10,000 | −.13 | .00 | −.08 | −.16** | −.15* |
|  | (.09) | (.13) | (.12) | (.08) | (.09) |
| City 15,000 | −.31*** | .26* | −.26 | −.19 | −.27*** |
|  | (.08) | (.13) | (.17) | (.17) | (.08) |
| N | 1,508 | 853 | 1,208 | 1,391 | 1,508 |
| Half century FE | Yes | Yes | No | No | Yes |
| Diocese FE | Yes | Yes | Yes | Yes | Yes |
| Crusades | Yes | Yes | Yes | Yes | Yes |
| Monarch FE | No | Yes | No | No | No |
| Kingdom × half century FE | No | No | Yes | No | No |
| Grid × half century FE | No | No | No | Yes | No |
| Linear time trend × wealth | No | No | No | No | Yes |
| Sample years | 325–1309 | 800–1309 | 800–1309 | 325–1309 | 325–1309 |

Note. Rows correspond to different measures of wealth. Columns correspond to different fixed effects and controls. Entries are the coefficient estimate and standard error (in parentheses) for the interaction of wealth and concordats. Standard errors clustered by diocese. FE = fixed effects.

\* $p < .1$.

\*\* $p < .05$.

\*\*\* $p < .01$.

$\beta_2$ (the coefficient on the interaction of wealth and concordats) and its standard error. The rows correspond to regressions using our different measures of wealth, and the columns correspond to different fixed effects and other controls. The years covered and number of observations vary across columns for a few reasons. First, the kingdoms data are only available starting in 800. The monarchs data depend on, and are more limited than, the kingdoms data; hence column 2 has fewer observations than column 3. Column 4 has fewer observations than columns 1 and 5 because an observation is dropped if it is the only diocese in its grid cell.

Across the different specifications in columns 1, 3, 4, and 5, the findings are as predicted by the model and often statistically significant. Wealthier dioceses have bishops less aligned with the church than do poorer dioceses when they are subject to the concordats. This holds for each of our wealth measures. The results in column 2 are inconsistent with one another. With wealth measured as trade, caloric potential, or the presence of a settlement of at least 5,000 inhabitants, the results are in the predicted direction and sig-

nificant. However, for the presence of a settlement above 15,000 inhabitants (the 95th percentile), the estimate is significant but in the wrong direction. In our view, all the results in column 2 are the least reliable estimates we present. Although monarch fixed effects are conceptually appealing, using them costs almost 45% of our observations. The kingdom by half century and grid cell by half century fixed effect specifications in columns 3 and 4, respectively, use similar variation to the monarch fixed effects but with less dramatic loss of observations.

Since we are using a linear probability model and our treatment variables are binary, interpretation is straightforward. The coefficient represents the difference in the effect of the concordats on bishop alignment in wealthy dioceses compared to poor dioceses. So, for instance, consider the specification using grid cell by half century fixed effects and trade as a measure of wealth (table 1 col. 4, row 1). We estimate that being subject to a concordat makes a wealthy diocese 14 percentage points more likely to have a lay-aligned bishop than it would have been had it not been wealthy. In

our data, at baseline without the concordats, dioceses not on trade routes were about 3 percentage points more likely to have a church-aligned bishop (82% vs. 79%). Our estimate, then, suggests that the concordats caused more than a four-fold increase in that difference. And, indeed, in the raw data, we find that for dioceses that had the concordats in effect, about 79% of poor dioceses (as measured by trade) had church-aligned bishops, whereas only 64% of wealthy dioceses (as measured by trade) had church-aligned bishops. As table 1 shows, our estimates of the differential treatment effects of the concordats in rich versus poor dioceses are of similar magnitudes for the other measures of wealth. Tables C.2 and C.3 show that qualitatively similar results hold for a balanced panel of dioceses.

## TIMING

We have argued that the institutional incentives created by the concordats are key for understanding the increase in lay political authority in wealthier dioceses. Now we assess whether the timing of the divergence between wealthier and poorer dioceses is consistent with the claim that the concordats were critical. Of course, given the nature of our data and the process of bishop turnover (the average bishop stays in office for 15 years in our data), we cannot pin down the timing precisely. But we can offer some evidence.

Figure 3 reports the results of a series of placebo regressions using a moving window for the treatment period. The true concordats period runs for either the 202 years from 1107 to 1309 (in England and parts of France), 187 years from 1122 to 1309 (in the Holy Roman Empire), or 138 years from 1171 to 1309 (in Ireland). So, in each of our placebo specifications we reestimate our regression, but with a different starting date for the treatment window. We do so for each possible starting year from 800 to 1275. That is, for each placebo regression, we estimate the following linear probability model:
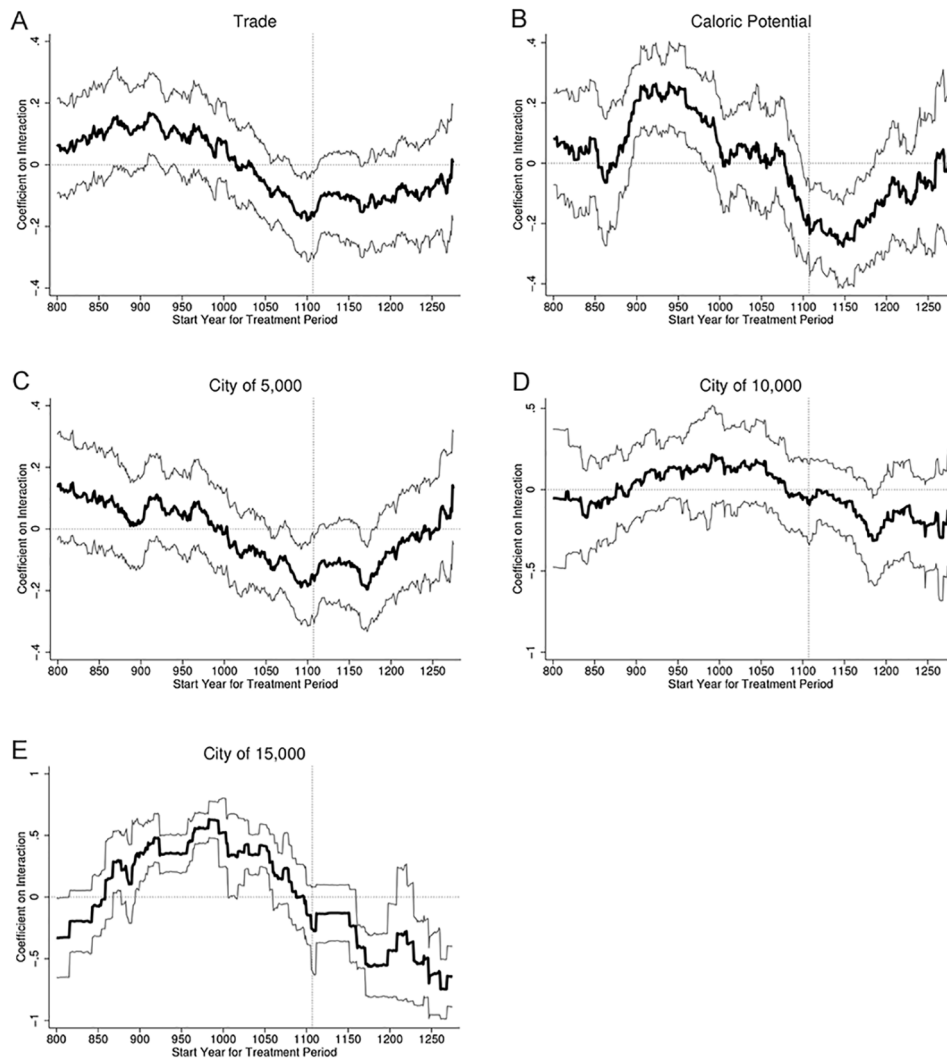


Figure 3. Reestimating equation (2) with diocese and kingdom by half century fixed effects, using moving treatment windows

$$\text{Church Aligned}_{db} = \beta_0 + \beta_1 \cdot \text{Window}_{db} + \beta_2 \cdot \text{Window}_{db} \cdot \text{Wealth}_{db}$$
$$+ \psi \cdot \text{Diocese} + \xi \cdot \text{Half Century} \cdot \text{Kingdom}_{db}$$
$$+ \nu \cdot \text{Crusades}_{db} + \varepsilon_{db}.$$

In our first placebo regression, the window is 800–1002 for England and non-Burgundian France, 815–1002 for the Holy Roman Empire, and 864–1002 for Ireland. In the second placebo regression, the window is 801/816/865–1003. The placebo regression with a treatment period of 1107/1122/1171–1309 corresponds to our actual regression. We continue past this start date all the way to 1275, although the treatment windows necessarily shorten, since we run up against the 1309 stopping point.

Figure 3 shows our estimate of $\beta_2$ for each placebo period, along with its 95% confidence interval, using each of our measures of wealth. The plots for trade, caloric potential, and the presence of a settlement of over 5,000 inhabitants show similar patterns—the timing of the divergence of the alignment of bishops between wealthier and poorer dioceses is consistent with the concordats having been a key event. The estimated effect, in these cases, is minimized right around the true treatment window. In figure 3B, there is persistence of the estimated treatment effect (and the point estimate even continues down very slightly). It is important to note both that the confidence intervals are relatively large and that bishops do not turn over all at once, so we do not expect the treatment effect to all be realized immediately. The estimated effect is not minimized in the regression reflecting the true concordats period when we measure wealth using the presence of settlements in the 90th percentile (10,000 inhabitants) or the 95th percentile (15,000 inhabitants). This could be for two reasons: settlements that large may be an inappropriately stringent measure of wealth, or the measure is appropriate and the evidence is inconsistent with our account. We do not have a way of adjudicating between these accounts, so we leave this as a question for the reader's judgment and future research.

### THE CONCORDATS AND INCENTIVES FOR DEVELOPMENT

We have shown quantitative evidence that the Investiture Controversy and its resolution in the concordats created a linkage between local wealth and lay political power. Now we explore the model's implication that the concordats drove a wedge between the incentives of church and lay political leaders with respect to economic development. (For a thorough treatment of this hypothesis, see Bueno de Mesquita [2022].) Lay political leaders benefited from economic prosperity, while, as localities became wealthier in ways that affected diocesan income, the church was harmed by the resulting loss of political control. Thus, church leaders had incentives to limit economic development or to find ways to shift the locus of resources away from local bishops and toward the center.

Of course, many factors contributed to the behavior of lay and religious leaders in this period. While the incentives we identify were not all that was going on, understanding these incentives may help clarify some important patterns of historical behavior.

The church sought to curtail economic development in various ways during the Lateran Councils (1123, 1139, 1179, and 1215). Perhaps most importantly, the council issued a crucial ruling forbidding usury (De Roover 1948, 1974; Le Goff 1982). The upshot was to make loans scarcer and costlier, thereby slowing economic development (and the rise of lay political power) relative to what it otherwise would have been. And, indeed, Brown (2015) argues that it was not until the fourteenth century (notably, after the end of the concordats period) that the church began to soften its views on merchants and usury.

Ekelund, Hébert, and Tollison (1989, 320), noting that the usury ban was bad for economic development, write that "paradoxically, the most outwardly economic directive of the medieval church, the doctrine of usury, has proven most resistant to purely economic explanations." Our account of the incentives created by the concordats provides an explanation: by banning usury the church used religious policy to pursue its political interests relative to lay leaders, curtailing economic development outside of ecclesiastical institutions.

The church also used religious policy to limit economic development and the attendant rise of lay authority in other ways. For instance, during the twelfth century, the church revised its views on (menial) labor to limit the spread of efficiency-enhancing machines, such as mills (Le Goff 1982). Relying on Proverbs 16:27–29, it promoted the view that idle hands are the work of the devil. Moreover, the church viewed more productive economic activity as base until well into the Middle Ages. As Le Goff observes of the church's attitude toward productive economic activity, "how often the Middle Ages must have witnessed the inner drama of men anxiously wondering whether they were really hastening toward damnation because they were engaging in a trade suspect in the eyes of the Church" (111). By opposing both the spread of machines and increased labor productivity, the church seems to have been trying to reduce a key driver of economic development.

The church had another strategy, besides curtailing economic development, for maximizing its bargaining power following the concordats. It shifted church revenues away

from dependence on local, diocesan money that was paid to the administrators in each bishopric, altering the revenue flow so that more of it was paid directly to the pope's administrators. By diverting funds away from bishops, the pope reduced the revenues he would lose in the event of an interregnum and, thus, weakened the lay political leaders' bargaining position. This realization helps explain a potentially puzzling move by the church, in light of our earlier argument about the incentives to curtail economic growth. While the church banned usury and resisted mechanization, it granted special papal privileges to new, entrepreneurial monastic orders that in fact contributed substantially to economic development. Why would the pope be willing to do this, given the incentives we have highlighted?

As long as the wealth these orders created flowed directly to the pope, rather than through the local bishops, they did not weaken the pope's bargaining position under the concordats. This was precisely the arrangement the pope reached with the entrepreneurial monastic orders. The Cistercians, for instance, secured favors and privileges from the papacy that isolated them from the local demands of bishops and lay leaders by the start of the French concordat. The Knights Templar were exempted by the pope from local taxation in 1139. The Knights Hospitaler were recognized by Pope Paschal II in 1113, just after he was compelled to back down on a potential resolution of the Investiture Controversy in 1111 that culminated in his facing the political wrath of both the Holy Roman emperor and his own bishops. These new orders were unlike most of their monastic predecessors both in their entrepreneurial mission and in their unusually direct financial ties to the papacy.

Secular rulers, the model suggests, had the opposite incentives from the church. They were no less innovative than the pope in erecting institutions to wrest political control and to increase wealth. The decades after the concordats, for instance, saw a dramatic flowering of secular institutions in England and France that were designed to encourage development. Consider the legal reforms introduced by Henry II (1133–89) in England during the mid-twelfth century. He countered papal economic strategies with four important writs. The first two improved a tenant farmer's commitment to the land he farmed and contributed to improving its productivity, helping tenant farmers secure the property rights that are essential to economic development while also enhancing the king's credibility as the person protecting the common man's interests (Barzel 1989; Taylor 1889; Van Caeneghem 1988). The third and fourth writs restricted ecclesiastical rights.

Further, the kings of England and France sought new ways to raise revenue, often at the expense of the resources the church tried to move away from localities and toward the center. Richard the Lionheart greatly increased his tax take from church property. His successor, John, went so far as to seize church lands. Philip IV followed a similar path in France, prompting a backlash from Pope Boniface VIII that led to war.

The evidence above, of course, does not speak to the key comparative implication of our model—that there was a divergence of incentives for growth between lay and religious leaders in places covered by the concordats compared to uncovered places. Our ability to shed light on that question is somewhat limited by a lack of visibility into the comparative enforcement of policies such as those highlighted above. We can, however, provide some (necessarily tentative) quantitative evidence on the question.

To do so, we must estimate economic growth and the relative strength of lay and religious authorities across dioceses. We estimate economic growth using the difference in the size of the population of the largest settlement in a diocese before and after the concordats took effect. (There is too little variation in trade route presence in our data to use this measure.) We estimate the relative strength of lay and religious authorities in three ways. We create a dummy variable—First Bishop Secular$_d$—that takes the value 1 if the first bishop in a diocese after the concordats took effect was aligned with the lay political leadership and the value 0 if he was aligned with the church. The idea is that the identity of this bishop gives us a sense of which side was dominating politics in a particular see, without using endogenous variation in the identity of bishops. We also measure the distance from the seat of a diocese to Rome in megameters. We create a dummy variable—Close to Rome$_d$—that takes the value 1 for covered (respectively, uncovered) dioceses if the diocese was closer to Rome than the median covered (respectively, uncovered) diocese and 0 otherwise. We also use the continuous measure of distance. The idea for both of these latter two strategies is that it was harder for the church to control and sanction dioceses that were further from Rome, which therefore strengthened the hand of lay political leaders. Table 2 reports the results of simple difference-in-differences style regressions. The estimating equation is

$$\text{Growth}_d = \beta_0 + \beta_1 \cdot \text{Covered}_d \times \text{Lay Strength}_d$$
$$+ \beta_2 \cdot \text{Covered}_d + \beta_3 \cdot \text{Lay Strength}_d + \varepsilon.$$

Our key hypothesis is that $\beta_1$ is positive—economic growth should be higher in covered dioceses when lay political leaders were strong relative to the church. While not statistically significant, the result using the alignment of the first bishop after the concordats to measure lay strength is directionally

Table 2. Estimates of the Difference in Economic Growth between Places Where the Church Was Stronger versus Weaker

|  | First Bishop Secular (1) | Far from Rome (2) | Megameters to Rome (3) |
|---|---|---|---|
| Covered × lay strength | 7.04 | .41 | −.82 |
|  | (4.60) | (2.58) | (1.77) |
| Covered | 2.03 | 2.35 | 3.46 |
|  | (2.12) | (1.77) | (2.50) |
| Lay strength | −1.20 | −.85 | −.21 |
|  | (3.92) | (2.10) | (1.20) |
| N | 157 | 307 | 307 |

Note. Columns correspond to different measures of church strength. Standard errors in parentheses.

consistent with our story. To get a sense of magnitudes, the average increase in population of the largest settlement among covered dioceses in our data is approximately 5 with a standard deviation of approximately 10. So the point estimate in column 1 suggests that a covered diocese whose first bishop was lay aligned experienced economic growth that was 0.7 standard deviations larger than a covered diocese whose first bishop was church aligned. This provides some limited, noisy evidence that places where the lay political leadership was stronger experienced more economic growth over this period. Using distance from Rome, we find one positive and one negative point estimate; both point estimates are close to zero and small relative to their standard errors.

## CONCLUSION

We studied the implications of the incentives created by the concordats of London, Paris, and Worms for the political, religious, and economic development of Europe. We did so in three steps. First, we offered a game theoretic model that elucidates those incentives and generates testable implications. Next, we quantitatively assessed one key implication—that the concordats differentially shifted bargaining power in the direction of lay political rulers in wealthier dioceses compared to poorer dioceses. Evidence from a difference-in-differences design proved consistent with this implication. Finally, we used qualitative historical information and some limited quantitative evidence to explore, in a more tentative way, another implication of the model—that, in places covered by the concordats, lay political leaders had incentives to stimulate the economy while the church had incentives to limit economic growth and move resources out of the control of local bishops.

The conclusions of our analysis deviate markedly from many claims in the literature. Most importantly, we show how the concordats provide a previously neglected mechanism causally linking economic development to the rise of lay political power. Much, of course, remains to be explored. The model also has implications about the length and frequency of interregna and suggests new ways of thinking about the timing of major historical events like the Avignon papacy, the Protestant Reformation, and the development of parliamentary government that are not explored here (Bueno de Mesquita 2022). Nevertheless, even the limited results examined here suggest a previously underappreciated role for these crucial agreements in the joint development of European economic, religious, and political life.

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