Ora et Guberna.
The Economic Impact of the Rule
of St Benedict in Medieval England

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Within the turmoil of the Norman Conquest, did religious institutions affect the economic outcomes of their land? Exploiting historical data about the changes in holdings' lordship that occurred after the Conquest, we compare the economic performance of estates controlled by different types of lords. Holdings controlled by Benedictine monasteries (vis-à-vis secular lords) experienced a better performance, although, once accounting for the unchanging upper level of the feudal structure, we cannot fully disentangle this effect from the persistence of Benedictine Overlordship. A comparison with Celtic monasteries, with a different organizational structure, suggests a role for the governance structure of Benedictine monasteries.

The Norman Conquest (1066) has been acknowledged as a turning point in the history of England, affecting many dimensions of its subsequent history, from the societal structure (Barlow 1999) to the military organization (Hollister 1961). Further, the huge land reallocation that followed the Conquest was accompanied by a considerable variation

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in land value between 1066 and 1086 (Loyn 2013, p. 333). Within this political, social, and economic turmoil, did religious institutions play a role in affecting the economic outcome of the lands they controlled? In particular, did Benedictine monasteries, which controlled about one-sixth of the land in 1066 (Burton 1994), perform differently from their secular counterparts, given their peculiar institutional and governance structures?

In the English countryside of that period, two types of land ownership prevailed. One is where the land was owned by the secular gentry, in some cases the King himself or people connected to him. The second is where the land was owned by religious figures, who can be further divided into two categories: the first includes Benedictine monasteries (the set of monasteries that are committed to following the Rule written by Benedict of Nursia in the early Middle Ages; see Quartiroli (2002)) as well as Celtic monasteries;[1] the second includes other ecclesiastical landlords such as bishops, canons, and deacons.

The structure of landownership was complex. The upper layer of the institutional structure were the Overlords (in 1066) or Tenants-in-Chiefs (in 1086). The lower layer consisted of lords. We use "ownership" in an extensive way, including both levels of the structure (hence both the Tenant-in-Chief and the lord holding land from him are "owners"). In this paper, when we refer to changes in lordship, we mean changes in the lower level of the feudal structure only. All combinations of lordship and Overlordship are possible (Benedictine Overlord and secular lord, secular Overlord and secular lord, and so on).

In this paper, we exploit the historical consequences of the Norman Conquest in medieval England to study the effect of the different institutional arrangements, both religious and secular, on economic outcomes. We use fine-grained data from England around the time of the Norman Conquest (1066) that allows us to exploit institutional variation at a local level. We compare the productivity of estates controlled by different types of landlords.

Using for identification purposes the biggest change in land control in British history that followed the Norman Conquest and running our analysis at the lowest possible level of the feudal structure, that is, "lords,"[2] we show that in the sample of holdings whose lord was secular in 1066, land owned by Benedictine monasteries after the Conquest performed better economically than land under secular ownership. However, results are not robust in the reduced samples where we exclude ambiguously

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[1] Monasteries of Celtic tradition are excluded from our main analysis and only included in the direct comparison with Benedictine, as they usually do not have two data points for their valuation.
[2] We typically use "lord" and "landlord" interchangeably.

identified lords or where we exclude holdings whose upper level of the feudal structure remained unchanged. In contrast, our analysis also shows that estates governed by non-monastic ecclesiastical lords did not outperform those with a secular lord. An analysis of the heterogeneity of our results across the different levels of the feudal structure suggests that the effect we find is driven by holdings whose upper level of the feudal structure was already Benedictine in 1066 and became a direct lord in 1086, suggesting a role for institutional persistence at the Overlord level that cannot be fully disentangled from Benedictine identity. Finally, we provide suggestive evidence showing that Benedictines tended to perform better than monastic communities of Celtic tradition (i.e., not subject to Benedict's Rule) and to use better "technology" (plows and mills). Benedictine monasteries had a unique governance structure, different from both secular and other ecclesiastical landlords: their head was an elective office, and monks held regular meetings through an assembly, called "Chapter," to discuss important matters without the need to be summoned by the Abbot. We suggest that this "democratic" organizational structure provided a managerial advantage to the Benedictine monasteries.

Our dataset merges information from the Domesday Book (henceforth DDB),[3] the English Monastic Archive, and a variety of other sources for geographic and historical controls. Our basic units of analysis are holdings.[4] As we have information on the economic performance of these holdings (in terms of their productive capacity) and the landlord's name, we can compare the productivity of land controlled by secular landlords with that of the land controlled by Benedictine monasteries and other types of landlords.

We focus on the subsample of holdings whose lordship in 1066 was secular and whose lordship changed between 1066 and 1086 (moving to a new secular lord or a religious one). Applying a difference-in-difference (DID) approach, we find that holdings controlled by religious lords tended to perform better, but the estimated coefficient is not always statistically significant. Consequently, guided by the different institutional structures that differentiated Benedictine monasteries from the other religious lords, we run the comparison for the two subgroups separately. In this way, we find that holdings switching from a secular lord to

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[3] An extensive survey of productivity and land allocation during its reign was commissioned by William in 1086. More in the Historical Background section and Online Appendix G.

[4] Most of these holdings are manors, *id est* the smallest administrative unit and the basic unit of inquest in the DDB (Finn 1963), but there are also dependencies and non-manorial units. Online Appendix E provides a detailed description of how units of analysis are defined. They are identified in the DDB dataset as "Entries" through a unique Entries StructIdx code.

a Benedictine one experienced a higher 20-year growth rate in productive capacity, compared with holdings controlled by secular landlords. This result is robust to the inclusion of time-invariant covariates interacted with time-fixed effects and to alternative estimations with matching techniques, but not to the exclusion from the sample of holdings whose upper level of the feudal structure did not change (almost all of them having a Benedictine monastery as Overlord/Tenant-in-Chief), or whose lordship attribution in 1066 was ambiguously defined.

The aforementioned caveats on the "Benedictine" effect suggest that observations with an ambiguous lord in 1066 and whose Overlord was already Benedictine are driving the result. Hence, it is hard to assess whether the governance of those holdings has really changed and whether this change was strategic. To shed some light on this issue, we conduct a heterogeneity analysis exploiting information on the different levels of the feudal structure contained in the DDB, using information on the upper level of the feudal structure (the one above the lord and below the King, defined in the data as Overlord and Tenant-in-Chief for 1066 and 1086, respectively. Note that the lord may or may not coincide with the Overlord/Tenant-in-Chief). This analysis shows that the "Benedictine" effect is driven by holdings whose monastic lord in 1086 was also the upper level of the feudal structure both in 1066 and in 1086. In this subsample, the credibility of the parallel trend assumption is weaker: these holdings did not change the upper level of the feudal structure and the change in the lower level of the feudal structure may be due to the strategic initiative of the higher level, rather than to the Conquest. To alleviate this concern, we first introduce in the regression a "Benedictine Overlord" fixed effect showing that, reassuringly, our results are robust. Second, we show that these Benedictine holdings were better than those switching from a secular landlord to the Crown, having the Crown as the upper level of the feudal structure both in 1066 and in 1086: for those holdings, the possibility of a strategic re-claim of the land was probably even stronger. One limitation of this test is that it does not allow us to separate a "Benedictine" effect with the effect of institutional persistence, as the Crown violently changes hands after Hastings.

The correlation we find in the least restrictive subsample may be due to several factors. To support our claim that the Benedictine organizational structure played an important role, we first provide several tests to rule out alternative potential explanations. Second, we provide positive evidence suggesting that Benedictine monasteries were different, in terms of land performance, from monasteries that did not share the same organizational rule. In particular, we exploit the contemporaneous presence of

two different monastic traditions in medieval England: Benedictine and Celtic (Dell'Omo 2011).[5] The latter were monks living in monasteries, but the most ancient rule coming from this tradition is silent (as far as we know) in terms of governance and organization. Using newly coded data from Knowles and Hadcock (1971), we were able to find holdings arguably controlled by Celtic monasteries (existing in 1066) mentioned in the DDB, comparing their performance with holdings controlled by Benedictine houses. Due to data limitations, this comparison relies on a different and noisier sample and employs only the outcome variable referring to 1086. Still, land controlled by Benedictine monasteries seemingly performed better in most of the specifications. Overall, if we focus our attention only on changes in lordship, it seems that Benedictine monasteries were better landlords than their secular counterparts. We argue that any positive effect of Benedictine control on economic outcomes was not just due to the presence of monks. Benedictine monasteries performed better when compared to monastic communities of different traditions. Although we are not able to fully distinguish between the effect of organizational continuity and the organizational and governance structures in a full sample, our results indicate that Benedictine monasteries had better outcomes compared to Celtic monasteries, suggesting that the Benedictine organizational structure might have contributed to that. It was probably able to guarantee institutional persistence through the difficulty of replacing abbots and their strong legitimization, and to create incentives for a better decision-making process.

Our paper makes two contributions. First, our analysis finds some evidence of a Benedictine advantage in economic performance. In a period of intense political turmoil, such as the Norman Conquest, Benedictine monasteries may have protected institutional persistence and created the conditions for better decision-making. In this sense, we are consistent with Roehl (1986), who stresses the importance of the "corporate character" of Benedictine monasteries. This may have been important beyond England in the eleventh century. Grzymala-Busse (2020) highlights the role of the medieval Catholic Church as a "template for institutional innovation." Doucette and Møller (2021) highlight how the proximity to Cluniac monasteries facilitated the "imitation" of their institutional features by local political communities, promoting the emergence of self-governance within an age of the collapse of state institutions. Again, our contribution particularly fits the age of political transition we are observing. Second, we contribute with a case study of the interaction between religious legitimacy, political power, and economic outcomes, the importance

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[5] We are grateful to Sascha Becker for suggesting this comparison.

of which has been suggested by Iyer (2016). We analyze the historical economic impact of religious institutions acting as economic and political players, stressing the importance of looking at the interaction between religious legitimacy and the specific governance structure of those institutions.

RELATED LITERATURE

Some papers have looked at the impact of monasteries (or their suppression) on economic outcomes from a long-term perspective. Heldring, Robinson, and Vollmer (2021) look at the impact of the dissolution of monasteries on the industrial revolution in England. They find that places strongly affected by their dissolution are associated positively with innovation and agricultural yields, industrialization, and the number of gentries in a parish, and negatively with the share of labor force in agriculture. Our research question is different from theirs, and they look at a different time frame. Andersen et al. (2017) use county-level English data to show the long-term impact of Cistercian monasteries on cultural values and population growth. We use variation at a much finer level to test the contemporaneous impact of different institutional structures, looking at an earlier historical period. Differently from them, we find weak evidence of a larger population stock on Benedictine estates, and we show that there is a strong and positive effect on productive capacity, observable in the short term (less than 20 years). As the "work-ethic factor" takes time to develop, our results suggest that other mechanisms were at play, such as a different institutional decision-making process. We are also not the first to compare the outcomes of secular and ecclesiastical holdings, but other studies focus on much smaller and less representative samples (McDonald and Snooks 1986) or look at a different period (Heldring, Robinson, and Vollmer 2021). Results are very mixed. Heldring, Robinson, and Vollmer (2021) note that monastic land was characterized by "inefficient types of customary tenures," pointing toward a lower productivity of ecclesiastical holdings. Campbell (1983) finds no significant differences between ecclesiastic and secular holdings, and Campbell (2006) points to two competing effects. On the one hand, "on conventual and collegiate estates inertia rather than enterprise could all too easily rule" (p. 421). On the other hand, "such landlords were also in a uniquely privileged position to develop the management of their estates on a long-term sustainable basis" (p. 421).

A few other recent papers use data from the DDB. Angelucci, Meraglia, and Voigtländer (2017) look at the long-term effect of farm grants (*id*

est self-governing municipalities) on political support for more inclusive institutions. They also use data from the DDB, but they focus only on boroughs, while we look at countryside holdings. Moreover, the Norman Conquest is the starting point for their long-term analysis, while we look at short-term impact before and after that event. Delabastita and Maes (2023) use the whole depth of the DDB to analyze the economic effects of the feudal structure of the society, modeled as a network, finding evidence of its importance. Wieland (2022) studies the effect of Viking settlements in Eastern England on economic outcomes, using data from the DDB as an outcome variable. We see those papers as complementary to ours, leading to a better quantitative understanding of institutions in medieval England and their economic role. In our work, we use the entire DDB for an analysis of the economic effects of secular and religious landlords.

In terms of religion and economic history, we contribute to the literature by studying the political and economic role of the Catholic Church in the Middle Ages (Belloc, Drago, and Galbiati 2016; Richardson 2005; Blaydes and Paik 2016; Becker, Rubin, and Woessmann 2021). Specifically, we look beyond the role of the Church as a "legitimizing agent" (Greif and Rubin 2024; Rubin 2017), and we focus on its economic performance as a local landlord compared to its secular counterparts. Moreover, we highlight differences between religious rulers and suggest the importance of the internal organization of religious institutions. Further, Doucette and Møller (2021) related the proximity to Benedictine monasteries of Cluniac tradition to the emergence of self-governance at an age of collapse of state institutions, as they promoted religious autonomy from secular lords and lord-bishops. Our paper complements these findings by suggesting the importance of Benedictine monasteries as elements of institutional persistence through political and social turmoil and transitions.

Finally, few papers in the management literature (Inauen et al. 2010a; Rost et al. 2010; Inauen et al. 2010b; Rost and Graetzer 2014) looked at Benedictine monasteries, finding that their high survival rate may be due to their better governance structure (including, among other things, the election of the abbot and the participation of their members in the decision-making process). Our findings are consistent with their analysis. However, those papers focus mainly on one or, at most, a few case studies and only look at comparisons within Benedictine monasteries, rather than between monasteries and other types of landlords, or between Benedictine monasteries and other types of monasteries, as we do in this paper.

HISTORICAL BACKGROUND

The Norman Conquest and the DDB

In 1066, William, Duke of Normandy, invaded England, conquering it at the Battle of Hastings. He claimed he was the legitimate heir of the Anglo-Saxon King Edward,[6] who was his cousin once removed. Upon Edward's death, however, the kingdom passed to his brother-in-law, Harold, triggering the Norman invasion and the end of the Anglo-Saxon era. William's arrival was not good news for Benedictine monasteries: they were historically well aligned with the Anglo-Saxon monarchy (Knowles 1963; Barlow 1979).

Having seized power, William replaced the Anglo-Saxon elite with his own noblemen in order to secure his position (Finn 1963). Land belonging to Anglo-Saxons was re-distributed, mainly to Norman noblemen loyal to William and, in some cases, to monasteries or other ecclesiastical rulers. Fleming (1991) and Thomas (2008) discuss the methods behind the redistribution. According to Thomas (2008, ch. 3), the four methods were the following. First, direct succession, *id est* William appointed a Norman landlord as the successor of a dispossessed Anglo-Saxon land-lord. Second, military protection. Third, "in some areas, William lumped together all or most of the lands of minor landholders that were 'left over' after the redistribution of major estates and gave them to a single Norman lord." Finally, "Norman nobles, particularly sheriffs, also simply grabbed new lands."

The redistribution process that started after the Conquest was not limited to the highest level of the feudal structure, but it kicked off a further process of "subinfeudation" at lower levels of the hierarchy (Barlow 1999, p. 92). The upper level of the feudal structure was composed, in Norman times, by "Tenant-in-chiefs." They received the land from the King, sometimes keeping it under their direct control (hence the Tenant-in-Chief is also the direct lord of an estate), sometimes granting it to other people (McDonald and Snooks 1986). In those cases, the lord of an estate is different from its Tenant-in-Chief. Given the complexity of the DDB, lordship attribution is not always unambiguous. Some holdings are shared between multiple lords, hence the need to find a rule to harmonize those observations, as explained later. In some cases, the lordship is unclear (i.e., "20 freemen"). Finally, there are dependencies of manors and "non-manorial units," which are typically "vills" without a manor

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[6] Interestingly, the DDB collected data for 1086 as well as for 1066, *id est* the last moment in time when King Edward was alive, precisely for this reason.

in them (Palmer 1987). In all those cases, the degree of autonomy of the local lord (or lords) in terms of governance with respect to the Tenant-in-Chief is unclear.

Twenty years after the Conquest, William commissioned a complete survey of the land ownership under his reign, grouping the counties into seven circuits with groups of commissioners responsible for each one of them. The result is known as the DDB, "because its decisions, like those of the last judgement, are unalterable."[7] Several scholars (Darby 1977; McDonald and Snooks 1987; McDonald 1997) have looked at the content of the DDB and how the data were gathered. The objective of this data collection is still debated, but according to McDonald and Snooks (1986), it was a combination of two elements: an assessment of the ability to pay taxes and a clarification of the feudal structure of the kingdom. William dispatched royal commissioners throughout his kingdom, and the data they gathered (a holding's "value to its owner," *id est* our measure of productive capacity, in 1066 and 1086, name of its landlord in 1066, and 1086 and so on and so on) were then verified in open court (McDonald and Snooks 1987). Valuations of a holding's productive capacity were collected in pounds and shillings, which, at the time, existed only as units of accountancy (Finn 1963). Overall, the DDB seems to provide a reliable measure of land "value" and tax assessment (McDonald and Snooks 1986), and its data are suitable for cliometrics analysis (McDonald and Snooks 1987).

Other Ecclesiastical and Secular Landlords

The manorial economy that prevailed in Western Europe, as well as in England, in the tenth and eleventh centuries was essentially based on private contracts between landlords and peasants. In such a system, the most efficient way for the King to enforce political power lay in granting large estates "to be organised as petty kingdoms" (North and Thomas 1973, p. 32). In exchange for protection, peasants provided some fixed labor to the landlord through a form of serfdom that was alternative and different from pure slavery: landlords (of all types) were the supreme local authority of the estate, monopolizing the use of force to administer justice and secure protection for all the people living there (North and Thomas 1973). According to Postan (1973, p. 82), "manors functioned as a local police authority." However, while the governance of Benedictine houses was constrained by Benedict's Rule, secular lords did not face such a constraint, neither in their selection process nor in the obligation to listen to an "advisory board."

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[7] Richard Fitz Nigel (treasurer of Henry II), Dialogus de Scaccario, cited in Roffe (2000, p. 5).

Large manors were also held by bishops. They enjoyed a powerful religious legitimacy that ultimately rested on the authority of the Pope, and a more structured organization. Importantly, the roles of bishops as heads of Dioceses and as landlords did not necessarily overlap, meaning that bishops could hold land in places that were not part of their Diocese. Those religious figures, however, were also free from the constraints of the Rule.

Benedictine Monasteries and Their Governance

The Benedictine order was (and still is) composed of a set of monasteries that are committed to following the Rule written by Benedict of Nursia in the early Middle Ages (Knowles 1963). They quickly became the most important monastic order in Europe, at least until the Cistercian reform in the twelfth century. They arrived in England in 597 AD and built a monastery at Canterbury. English Benedictine monasteries grew rapidly and acquired control of several holdings (Aston 1958; Ayton and Davis 1987). Importantly, the management of those holdings was highly centralized and was kept controlled by the monastic community until the twelfth century (Knowles 1963).

Each individual monastery was an autonomous entity run by an abbot (there was no "head of the order"); therefore, common membership in the same order was granted by adherence to the Rule. As Knowles (1963, p. 101) notes, by the time of the Conquest, monastic houses were substantially independent from each other, with no kind of federation or formal interdependence in place.

Even though the main purpose of the Rule was ascetic, it contained detailed and comprehensive instructions for the community of monks (prayer times, kitchen duties, and so forth). Its importance for the efficiency of monastic life has been noted by scholars of management science (Rost and Graetzer 2014; Ehrmann, Rost, and Inauen 2013; Rost 2017). Inevitably, some of the rules were dedicated to the way the community was governed (Rost 2017). Chapter 64 of the Rule explains that the abbot is an elective office (elected for life by the monks) and that unanimity in the community is not necessary.

Peasants were not allowed to vote or to participate in the political decision-making process, and the accountability of the abbot to the community was limited, as he was expected to be in charge for the rest of his life. However, the selection method mentioned earlier seems quite different from the standard feudal institutional arrangements, where a lord was not elected but simply appointed by the King or by the Tenant-in-Chief. This is also different from the way in which bishops were chosen. It is

important to note, however, that we should not think about abbatial elections as we conceive them in the twenty-first century. They were not always free from external interference, especially by different kings (Burton 1994). More details in Online Appendix G. William was able to impose abbots of his choice, but the process was longer and more difficult than in the case of secular lords or bishops (Knowles 1963, pp. 103, 106). Another important feature of monastic governance was the Chapter, the assembly of all the monks in the community. The Rule of St. Benedict (ch. 3) already mentioned it, although it stated that the final decision lied with the abbot. Consent of the Chapter was important, especially for the acquisition or alienation of properties, to avoid future controversies (Knowles 1963, p. 413). King William's appointees "no doubt disposed of all things within and without their houses with very little reference to the wishes of their subjects" (Knowles 1963, p. 412), but the formal consent of the Chapter was already required, on some matters, before the Conquest (p. 412). Unlike ancient Parliaments, the Chapter did not need formal consent from the Abbot to meet.

Celtic Monasteries

Although most of the monasteries in our sample are Benedictine, a few of them belong to a different tradition: the Celtic one. According to Dell'Omo (2011), both traditions were present at the same time on English soil, although eventually virtually every monastery became Benedictine. The Celtic monastic tradition developed in Ireland during its Christianization. According to Dell'Omo (2011), this monastic tradition had important differences with respect to the "Benedictine" one in terms of liturgy and calendar, clothing, and architecture. We do not know the exact content of the rules that were followed in individual Celtic monasteries, but something can be learned from the most ancient rule of this tradition: the Rule of St. Columbanus, which was completely silent about how an abbot should be chosen; there was no explicit mention of elections nor of monastic Chapters and their advisory roles.[8]

DATA

We assembled an original dataset (Rossignoli and Trombetta 2024) by gathering information from a variety of different sources, as briefly outlined

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[8] If anything, the Rule of St. Columbanus seemed to discourage discussion: "But if someone contradicts [the superior], he is guilty of insubordination, and therefore he is not only guilty of disobedience but is to be reckoned the destroyer of many because he opened the door of contradiction to others" (Ch. 1 of the rule, Kardong 2018).

in Table E1 (Online Appendix E), creating a dataset consisting of more than 9,000 observations at the level of holdings.[9] The main source of information is the DDB.[10] The most important information included in the DDB is the name of the lord of the holding in 1066, during the reign of King Edward (i.e., *before* the Norman Conquest), and the name of the lord in 1086, at the time the DDB was compiled during the reign of King William. As carefully studied in Delabastita and Maes (2023), the feudal structure described in the DDB is quite complex and has multiple levels. For every holding, the data allow us to identify two levels of the feudal structure: the upper one, immediately below the King (defined as Overlord in 1066 and Tenant-in-Chief in 1086), and the lower one, defined as "lord" in both time periods. We run our analysis at the lord level, to attribute performance to whoever was managing the land. More specifically, by "lord" or "landlord" in this analysis, we mean what Palmer (2008) codes as "Lord 66" and "Lord 86," respectively, that is, "lord of the estate in 1066, in receipt of the profits of the holding" (for Lord 66) and "the immediate lord of the peasantry, either the Tenant-in-Chief himself or a tenant to whom he had granted the estate" (for Lord 86). This implies that, when we define whether an estate changed its landlord or remained with the same one, we look at the "lord" name only. Overlords and Tenant-in-Chiefs, the upper levels of the feudal structure (in his codebook, Palmer (2008) defines them as "Overlord of the 1066 estate; Overlord of the 'men' in possession in 1066" and "Tenant-in-Chief of the estate, holding directly of the Crown"),[11] may or may not coincide with the Lord, and may or may not change after the Conquest. The King himself appears both as Overlord/Tenant-in-Chief and as lord. To keep track of the full structure without losing many observations, we use the "lord 66" name (if available) to replace missing Overlords' names. The DDB reports 48 different landlord names referring to a monastery in 1066 (before the Conquest) and 80 in 1086 (after the Conquest).[12] To identify whether the landlord is a Benedictine monastery, we matched landlord names, as recorded in the DDB, with the names of Benedictine houses retrieved from the English Monastic Archive (D'Avray 2015). Through the investigation of landlord names, we also identified holdings held by bishops and other non-monastic ecclesiastical landlords.

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[9] The actual number of observations in the analysis depends on sparse missing data within each individual variable.

[10] The DDB has been digitized by Palmer and colleagues, and a downloadable version is freely available at the Hydra repository of the University of Hull. Please see http://www.domesdaybook.net/ and https://hydra.hull.ac.uk/resources/hull:domesdayDisplaySet.

[11] The similarities between the Norman and Anglo-Saxon feudal structures are debated. However, there may have been some continuity (Roffe 2007).

[12] In our analysis, we use 31 and 43 monasteries as we had to restrict the sample to observations where the outcome variable is available for both 1066 and 1086.

Thus, we classify all the entries in our dataset according to the following three types, at two points in time (before and after the Norman Conquest): Benedictine, when the landlord is a Benedictine monastery; Other Ecclesiastic, when the landlord is a bishop, the canon of a cathedral church, a deacon, or other non-monastic ecclesiastical figure; Secular, when the landlord is none of the ones previously noted, mostly a nobleman or the King himself. We also identified a few non-Benedictine monasteries of Celtic tradition, that are excluded from our main analysis and only included in the direct comparison with Benedictine as they usually do not have two data points for their valuation.

Note that the structure of the DDB is very complex and entails both holdings shared by multiple landlords and holdings spanning different locations.[13] Therefore, we needed to devise a rule to obtain a unique observational unit for our analysis. Since our focus is on holdings, we decided to collapse multiple observations based on the largest value attributed to a single landlord in the holding. The DDB reports this value for both 1066 and 1086. When this information is not available, or in the event of ties, we assign the land to the landlord who has not changed between 1066 and 1086. In case of further ties between landlords of different types, in 1086 we assign the holding to a secular landlord or an "Other ecclesiastical" landlord if a secular is not present. In 1066, we assign priorities in reverse order, that is to a monastery, or an "Other ecclesiastical" landlord if no lord is a monastery; in the event of further ties, we assign a random number to rows and pick the landlord with the lowest random number attached. We keep the "randomized" holdings in the sample, showing robustness checks for their exclusion in Online Appendix D (Tables D5–D9). Benedictine coefficients are somewhat smaller and sometimes lose statistical significance, but the broad picture is consistent with the main result.

In attributing landlords to holdings, we assign a missing value to a landlord whose name, for the year 1086, is a general expression such as "one Englishman," "two thanes," or the like, rather than an actual name. Although we include these holdings in our dataset, unambiguously attributing their "type" and attaching to them all the relevant control variables, we did not compute a landlord-specific identifier for such items. Hence, we coded those cases as "ambiguous landlords in 1086" and excluded them from the sample in the main analysis. However, including them does not affect the results, as shown in Online Appendix D. Lords ambiguously defined in 1066 are typically included in the sample.

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[13] In this case, when attributing the control variables, we usually take the average across the locations. See Online Appendix E for a detailed description.

We always exclude from the sample holdings codified as boroughs to get a homogeneous sample of rural holdings. We exclude from the sample about 0.4 percent of holdings attributed to Benedictine nuns to obtain a homogeneous "treatment" group composed of male Benedictine monasteries.[14] We further exclude from our sample 90 observations (about 0.5 percent of total "raw" observations) that we classify as outliers, whose difference in the log-transformed value is larger than 4, *id est* larger than the 99th percentile in the distribution of "raw" observations.

A few monastic houses were created toward the end of our observation range (e.g., Shrewsbury or Durham). We exclude these holdings from the main specification, as it is hard to attribute the change in performance between 1066 and 1086 to their ownership. However, their inclusion does not affect the results (Online Appendix D).

Figures 1a and 1b provide a graphical representation of the geographical distribution of holdings by type of lord before (1066) and after (1086) the Conquest.

Outcome Variable

As explained previously, some of the information in DDB is available at two points in time: the first refers to the last moment before the Norman Conquest, thus we label it 1066; the second refers to the time the DDB was written, after the Conquest, thus we label it 1086.[15] Exploiting this feature, we obtain from the DDB the main outcome variable of our analysis, *id est* the holding's "value" in 1066 and 1086, from which we calculate the overall growth rate.[16] Historians have widely debated the actual meaning of the information on "values" recorded in the DDB (McDonald and Snooks 1986; Roffe 2000). We interpret them as measures of income or productivity, similarly to Delabastita and Maes (2023),[17] as these data have been shown to be highly consistent with all the related variables reported in the DDB (McDonald and Snooks 1987), as well as when

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[14] "Other ecclesiastic" are all men. Only two nunneries would be relevant for our DID, accounting for eight observations. Excluding female secular landlords would only marginally change our coefficients (Online Appendix Table D13). The inclusion of Benedictine nunneries slightly reduces the magnitude of the "Benedictine" coefficient. P-values are below 0.1 in most of the specifications and 0.106 in the main one (Online Appendix Table D14).

[15] The original dataset sometimes codes as "Value 1066" entries that are not precisely dated but refer to an "unspecified date before 1086." In our analysis, we assign those observations to 1066. Adding a fixed effect for those ambiguous cases only marginally reduces the magnitude of the coefficients, as shown in Table C4.

[16] The actual approximate growth rate is computed as $Growth = log(Value1086 + 1) - log(Value1066 + 1)$.

[17] Unlike them, we do not divide "values" by the number of non-slave workers, as this information is available for only one point in time.

Landlord types
● Benedictine
● Other eccl.
● Secular

(a) 1066

Landlord types
● Benedictine
● Other eccl.
● Secular

(b) 1086
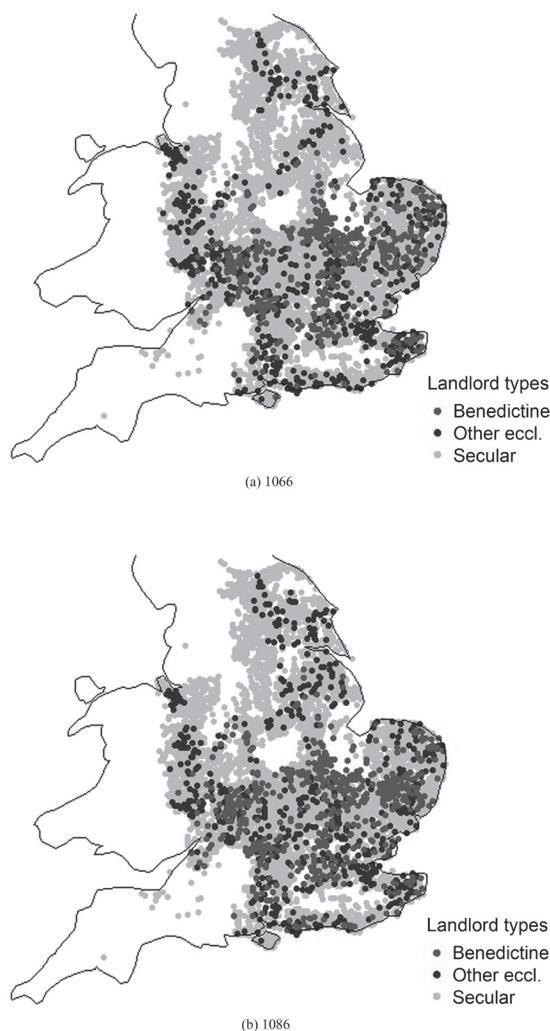
FIGURE 1
LORD TYPES IN ENGLAND BEFORE AND AFTER THE CONQUEST

Sources: See text and Online Appendix E.

compared to subsequent historical surveys of some regions of England (Wareham 2000). Roffe (2007, p. 241), instead, interprets them as cash payments from the tenants to the owner, hence excluding other forms of payments.

To study additional economic and social mechanisms, we also include information about the estate's total population. This information is available only at one point in time and only for a limited subsample; therefore, it cannot be used to fully replicate our main analysis. Population is calculated as the sum of all categories of people living on the estate,

namely: villagers, smallholders, freemen, cottagers, slaves, burgesses, and cases listed as "other population." Furthermore, we include information about the presence of mills and plows. The source is always the DDB.

Controls

The most important difference between holdings is likely to depend on their geographical location. The digitized version of the DDB includes important geographical information related to each entry: Ordinance Survey Grid positions that we converted into Latitude and Longitude; County and Hundred (local district). Using this information, we can also match our holdings with data on various features that may influence the outcome. As summarized in Table E1, we group those controls into three sets: geography (latitude, terrain quality, and so on), history (distance to Roman road, Viking influence, and so on), and market access (distance to boroughs, fairs, and so on). A more detailed description of all the controls is in Online Appendix E.

EMPIRICAL STRATEGY

The objective of this paper is to study the role of religious institutions, and Benedictine monasteries in particular, and their economic impact on the land they controlled. The first explanatory variable is a dummy equal to 1 if a holding was controlled by a religious landlord (either a Benedictine monastery or an "Other Ecclesiastic"). Then we consider the two types of religious lords separately, comparing them with the same benchmark (secular lords). The outcome variable is the holding's value in 1066 and 1086. The relationship between these two variables is likely to be spurious for many reasons. Monasteries (and hence their estates) tended to be located in the southern part of England, and in the most ancient settled areas (Postan 1973). Moreover, monasteries or bishops may have been granted systematically better (or worse) holdings. Indeed, historical evidence has shown that some of the most strenuous opponents William faced after he landed in England were Benedictine monasteries, since most of the monks were part of the Anglo-Saxon aristocracy (Knowles 1963). Furthermore, monasteries remained active both before and after the Conquest, while the secular aristocracy was almost entirely replaced. To isolate the effect of the institutional structure, we employ two different strategies. The first uses the post-1066 change in control of holdings formerly owned by the Anglo-Saxon nobility as a historical
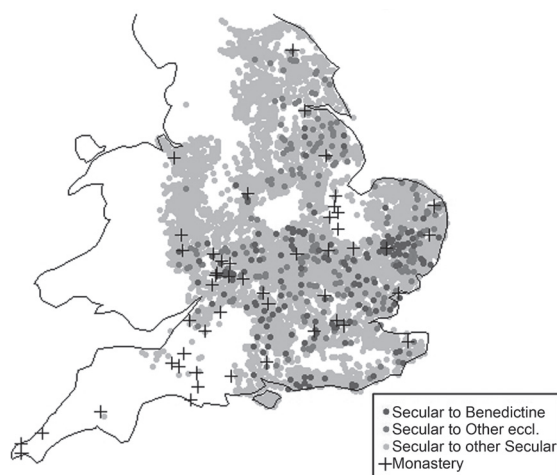
FIGURE 2
CHANGE IN LORD TYPES

Notes: Holdings with changing lords between 1066 and 1086 are depicted. Gray dots: secular to secular lords (likely Anglo-Saxon to Norman nobleman). Blue dots: secular to "Other ecclesiastic." Maroon dots: secular to monastery. Black crosses: monasteries. Map excludes holdings with missing value and outliers.
Sources: See text and Online Appendix E.

caesura, comparing holdings whose direct lord changed from secular to one of the several types of owners (secular, religious, Benedictine, "other ecclesiastical") between 1066 and 1086. The second consists of the application of a matching estimation technique to focus the analysis on the most similar holdings, as outlined in Online Appendix B. Furthermore, we exploit the geographical information contained in our dataset, which allows us to compare holdings of different ownerships located in the same small administrative area. This further strategy is reported in Online Appendix A.

Changes in Direct Management and DID Estimation

Following the Norman Conquest, many holdings belonging to Anglo-Saxon landlords were re-assigned by King William and by his Tenants-in-Chiefs. Of course, land could change ownership for other reasons during the same period. In this specification, we focus on the sub-sample of holdings owned by Anglo-Saxon lords that changed their lord after the Norman Conquest, using those that ended up under the control of religious lords (and then by Benedictine monasteries and by "Other ecclesiastic" in separate models) as the "treatment group" and the rest as the "control group."

The fact that the lordship of every holding in this sample has changed allows us to disentangle the effect of a change in direct control from the effect of being controlled by a religious ruler.

Using the panel structure of the dataset, we are estimating a DID specification, where we compare pre- and post-Conquest (log of one plus) value for holdings moving from an Anglo-Saxon secular landlord to a religious ruler and holdings moving from an Anglo-Saxon secular landlord to a Norman landlord.[18] In practice, we estimate

$$Y_{i,t} = \tau_t + \mu_i + \varphi Religious_{i,t} + \lambda' \boldsymbol{x}_{i,t} + \in_{i,t} \tag{1}$$

where $Y_{i,t}$ is the log of one plus the annual value of holding i at time t, τ_t is the time fixed effect, μ_i is the holding fixed effect, $Religious_{i,t}$ is a dummy equal to 1 if holding i is controlled by a religious lord at time t, and $x_{i,t}$ is a vector of time varying and time invariant controls interacted with the time fixed effect. Note that in our sample, $Religious_{i,t}$ is always equal to 0 in 1066. Under the assumptions of parallel trends and that nothing else happens at the same time that affects the treatment and control groups differently, φ captures the causal effect of being controlled by a religious landlord on our measure of land productive capacity. Note that we are taking account of every time invariant holding-specific characteristic. A similar model is used to compare separately holdings whose new landlord was a Benedictine monastery or an "Other ecclesiastic" with those whose new landlord was secular. $Religious_{i,t}$ is replaced by $Benedictine_{i,t}$ or by $OthEccl_{i,t}$, respectively, and holdings ending up with the other religious landlord type are excluded from those samples. Standard errors are clustered at the "Lord 1086" level, but all our results are robust to different clustering strategies (Online Appendix A).

Threats to Identification

Given that we are using historical data and we have only two time periods, unfortunately, we cannot test the parallel trend assumption directly. However, as explained in the historical background section, we are not aware of any historical evidence that reports King William systematically favoring religious figures, especially monasteries, when he re-assigned land. Looking at the balance tests, which we summarize in Figures A1, A2, and A3, reported in Online Appendix A, we note that

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[18] We do not have information about the exact origin of all the 1066 and 1086 landlords. We assume that those in control before the Conquest were much more likely to be Anglo-Saxon, and those appearing after the Conquest were much more likely to be Normans.

most of the observables are not statistically different between the treatment (however this is defined) and control groups. Table 2 displays the coefficients and p-values of the balance tests for Benedictine and Other Ecclesiastic. In both cases, most of the control variables are balanced. Among those that are different, those related to agricultural productivity and pasture suitability, if anything, work "against" estates owned by religious landlords; some others (latitude, but also distance to Roman settlements, Roman roads, Anglo-Saxon settlements, and London) arise from the well-known tendency of monasteries to be in Southern England. This is clearly due to pre-existing historical reasons (as pointed out earlier, Fleming (1985) shows a difference in ecclesiastic landholding above and below "Viking Street") that are time invariant and hence unlikely to induce a systematic bias in the coefficient. New monasteries spread all over England, starting in Canterbury, maintaining cultural and religious ties with Rome and the continental European application of the Rule of St Benedict. Distance to markets is also lower in all the treatment groups. To deal with those unbalances, we interact all the controls with the time dummy, adding them to the estimation. Finally, the levels of the holdings' values pre-Conquest are never statistically different between groups.

While the re-assignment procedure was clearly not random, it is possible that the King could have chosen not to re-assign holdings with a higher growth prospect to his allies. Historians seem to agree that the main reasons driving the land reshuffle were internal and external security, something that was already a concern in Anglo-Saxon times (Fleming 1985). On top of that, the King could have assigned those high-prospect estates directly to himself. We do not find conclusive evidence in support of this case, as a comparison between the King's and secular landlords' holdings, summarized in Table A5, shows a figure that is most of the time negative (or close to zero) and just once weakly positive. This noisy outcome does not provide conclusive evidence supporting the claim of a systematic pattern in William's land reassignment to himself. Furthermore, if we look at the holdings whose Tenant-in-Chiefs were the most important followers of the King, we do not observe a stable pattern, especially in terms of agricultural productivity (graphic summaries of these tests are reported in the Online Appendix; see Figures A4–A8). Overall, the data are consistent with the idea that William conducted the re-assignment without discriminating in favor of religious rulers.

Although some of the changes in the identity of those controlling the land are probably direct or indirect consequences of the re-assignment procedure put in place by William, we can only observe whether the direct lord of the estate is the same in 1066 and 1086 or not. We do not have

full information about the reasons behind this change, and sometimes the lordship changes without modifications in the name of the Overlord/ Tenant-in-Chief. In those cases, the upper level of the feudal structure remained unchanged, while the lower level changed. This may have been a strategic choice of the Overlord/Tenant-in-Chief. If this is the case, this could be a violation of the parallel trend assumption. Moreover, holdings experiencing this type of lordship change typically had a Benedictine Overlord/Tenant-in-Chief, as very few secular Overlords remained in place in 1086. Furthermore, when the attribution of the 1066 lordship is unclear, it is particularly challenging to assess whether a change in governance has actually happened. To deal with this, we do four things. (1) We run the basic DID, excluding from the sample holdings whose lordship in 1066 is ambiguously attributed. The effect is no longer statistically significant, except for the first column. Hence, the effect is not robust to this more restrictive sample, but it remains significant if, instead of removing observations with an ambiguous lord in 1066, we add a fixed effect interacted with time fixed effect (FE). (2) We perform a heterogeneity analysis by interacting our main "treatment" dummy with a dummy equal to 1 if the Lord in 1086 was different from the one in 1066 but was the same as the Overlord in 1066 and the Tenant-in-chief in 1086 (including those remaining under the Crown). This analysis shows that the positive effect of Benedictine control is mostly driven by those estates. (3) We show that the main result is robust to the introduction of a dummy equal to 1 if the Overlord (pre-determined at the time of the treatment) was a Benedictine monastery, interacted with time fixed effect. (4) We show that those specific monastic holdings driving the result are better than those experiencing a similar pattern in ownership change, that is, those whose 1086 landlord became the Crown, which was also the Overlord and the Tenant-in-chief, but not the 1066 landlord. This last result is robust to the exclusion of holdings whose lord in 1066 was ambiguously defined, although it is driven by very few observations in this restricted sample. It does not allow us to disentangle the "Benedictine effect" from the fact that they do not change across the Conquest (while the person holding the Crown changes).

Another potential threat to the identification may come from a differential effect in the tax treatment of the land. In this respect, the analysis from Pratt (2013) is reassuring. Land tax was introduced in Anglo-Saxon times to pay for tributes and, more generally, for the war effort against the Danish invaders (Wareham 2012). In Norman times, it seems that all the demesne land of Tenant-in-Chiefs, both secular and ecclesiastical, was exempt (Pratt 2013, p. 2). We use this fact as a robustness check,

showing that our results are still true in the subsample of "demesne only" land, based on observations where tax treatment was the same.[19] Finally, we are not aware of other events that systematically affected one of the two groups of holdings.[20]

RESULTS

Change of Landlord Types and DID Estimation

RELIGIOUS VERSUS SECULAR LANDLORDS

Table 1 describes in detail the sample we use for our main empirical strategy (our DID analysis), showing group-specific summary statistics, while statistics for the full sample are shown in Table E2. As mentioned, we keep only estates that were held by secular landlords in 1066 and whose owners changed between 1066 and 1086. In this case, we are exploiting the panel structure of our dataset, and the outcome variable is the log of one plus value in 1066 and 1086. Therefore, we can interpret the results as the differential effect on the (approximate) productive capacity growth rate calculated over 20 years. As most of the control variables are time-invariant, we add them to the specification after multiplying them by the time fixed effect. Table 1 shows that Benedictine holdings display on average a positive growth rate in their value between 1066 and 1086, "secular" holdings have a negative growth over the same period, and "Other ecclesiastic" holdings experience a small decrease.

The results of Model (1) are reported in Panel A of Table 2. We report only the estimated values for φ.

All the coefficients are positive, although not all the specifications are significant, suggesting the existence of heterogeneous effects that need to be explored. Therefore, guided by the important institutional differences described, we divide the analysis of religious properties into two groups: holdings controlled by Benedictine monasteries and those controlled by non-monastic figures, such as bishops, deacons, and canons. The formers were constrained by the Rule of St Benedict and its institutional structure. The latter were not.

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[19] It is important, however, to keep in mind that Palmer (2008) codes as "demesne" holdings where the lord coincides with the Tenant-in-Chief. We do not have information on further subdivisions within each estate.

[20] A few Viking raids are known to have hit the northwestern part of England around 1070, but the potential detrimental effects of these events are already captured by the geographical control variables. Furthermore, we control explicitly for the area of land that ended up under direct Danish control in Anglo-Saxon times.

TABLE 1
SUMMARY STATISTICS (SUBSAMPLE) BY GROUPS

Lordship Changes to:	Secular Mean	Secular SD	Oth. Eccl. Mean	Oth. Eccl. SD	Benedictine Mean	Benedictine SD	Diff Ben-Sec	t-stat	Diff Ben-Ecc.	t-stat
Outcome Variables										
Holdings' value, 1066 (log (1+x))	1.227	0.798	1.351	0.941	1.461	0.925	0.234	(1.25)	0.124	(1.10)
Holdings' value, 1086 (log (1+x))	1.169	0.853	1.336	1.029	1.519	0.914	0.350**	(2.11)	0.167	(1.32)
Geography										
Latitude	52.363	0.867	52.397	0.757	51.941	0.569	−0.422***	(−3.71)	0.033	(0.27)
Longitude	−0.630	1.165	−0.262	1.065	−0.334	1.068	0.296	(1.03)	0.368	(1.59)
Latitude*Longitude	−33.126	61.109	−13.753	55.677	−17.292	55.590	15.834	(1.05)	19.374	(1.59)
Terrain altitude (median)	121.020	323.002	87.168	247.668	115.575	329.193	−5.445	(−0.15)	−33.852	(−1.51)
Crop yield, cereals, value	4.068	1.386	4.089	1.442	4.125	1.317	0.057	(0.29)	0.021	(0.12)
Ruggedness	15.335	20.616	9.884	10.298	11.966	15.995	−3.369	(−1.50)	−5.452***	(−5.89)
Agricultural suitability	1.363	8.406	0.722	1.895	0.616	0.867	−0.747***	(−3.07)	−0.641**	(−2.21)
Pasture suitability	562.003	6156.054	170.513	1877.896	24.949	222.902	−537.054***	(−3.56)	−391.490*	(−1.83)
Animal husbandry suit.	44.742	284.696	24.974	220.537	40.635	291.577	−4.107	(−0.13)	−19.768	(−0.86)
Dist. mining site	62.025	37.627	68.107	37.508	61.802	31.622	−0.223	(−0.03)	6.082	(0.78)
Holdings size (log (1+x))	1.422	0.921	1.544	1.098	1.563	0.994	0.141	(1.06)	0.122	(1.13)
History										
Dist. Roman settl.	4.381	3.079	4.427	3.042	3.780	2.309	−0.601***	(−3.02)	0.045	(0.16)
Dist. Roman roads	6.079	5.349	6.356	4.508	5.355	4.310	−0.724	(−1.62)	0.277	(0.57)
Dist. Anglo-Saxon settl.	22.151	17.609	17.038	9.976	14.890	8.492	−7.261***	(−6.32)	−5.113***	(−4.94)
Viking influence in 10th c.	0.537	0.499	0.623	0.486	0.506	0.502	−0.031	(−0.25)	0.086	(1.17)
Market										
Dist. rivers	39.917	33.530	42.285	36.373	42.237	30.220	2.319	(0.38)	2.367	(0.28)
Dist. coast	40.169	28.294	37.849	27.495	40.476	25.919	0.308	(0.10)	−2.320	(−0.50)
Dist. London	142.935	76.666	131.553	71.747	100.829	43.825	−42.105***	(6.67)	−11.381	(−0.96)
Dist. borough	37.666	24.156	37.884	25.455	34.604	19.278	−3.062	(−1.12)	0.218	(0.03)
Dist. market	19.663	12.403	16.483	10.138	15.409	7.517	−4.254***	(−4.36)	−3.180**	(−2.67)
	7,151		244		160		7,311		7,395	

Notes: Summary statistics by treatment group. The t-stats for differences are computed by clustering standard errors at landlord level (1086).
*p < 0.10, **p < 0.05, ***p < 0.01
Sources: See text and Online Appendix E.

TABLE 2
HOLDING VALUE:
DIFFERENT RELIGIOUS LEADERS RELIGIOUS VS. SECULAR LANDLORD

	(1)	(2)	(3)	(4)	(5)
Panel A					
Religious	0.072**	0.032	0.026	0.052	0.026
	(0.032)	(0.025)	(0.022)	(0.032)	(0.023)
Obs.	15,110	15,110	15,110	15,110	15,110
Panel B					
Benedictine	0.117***	0.062***	0.053**	0.087***	0.058**
	(0.033)	(0.024)	(0.025)	(0.033)	(0.022)
Obs.	14,622	14,622	14,622	14,622	14,622
Panel C					
Oth. Eccl.	0.043	0.014	0.009	0.028	0.006
	(0.047)	(0.036)	(0.031)	(0.046)	(0.033)
Obs.	14,790	14,790	14,790	14,790	14,790
Common to both panels:					
Holding FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Included controls:					
Geography*time ctrls1	No	Yes	No	No	Yes
Market*time ctrls2	No	No	Yes	No	Yes
History*time ctrls3	No	No	No	Yes	Yes

Notes: Diff-in-Diff analysis, two periods (1066, 1086). Sample: 7151 secular holdings, 404 Religious holdings (Panel A); 160 Benedictine holdings (Panel B), 244 Oth. Eccl. Holdings (Panel C). Dependent variable: log(1+value). Standard errors clustered at 1086 landlord level. Excluded: ambiguous lords (1086), female monasteries, non-Benedictine monasteries, post-1076 monasteries, outliers (growth rate > 4). Panel B: "Other ecclesiastic" lords (1086) estates excluded. Panel C: Benedictine lords (1086) estates excluded.
[1] Geography controls include geographic/agriculture related features, namely: latitude, longitude, latitude×longitude, median altitude, crop suitability, ruggedness, pasture suitability, agricultural suitability, animal husbandry suitability, distance to mines, and (log of) size.
[2] Market access controls include proxies for access to markets: distance (in km) to: rivers, coast, London, nearest borough, and markets.
[3] History controls include proxies for the ancientness of the settlement, namely: distance (in km) to Roman settlements, to Roman roads, and to Anglo-Saxon settlements; Viking influence in tenth century.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$
Sources: See text and Online Appendix E.

DIFFERENT RELIGIOUS LANDLORDS

In this section, we estimate the same model described in Equation (1), but we change the "treatment" dummy comparing Benedictine monasteries and Other ecclesiastical landlords with secular rulers in separate estimations.

Panel B of Table 2 reports the results of the comparison between holdings whose new landlord was a Benedictine monastery and those whose

new landlord was secular. The estimates are broadly consistent across all the columns: holdings that end up being controlled by Benedictine monasteries experienced a higher 20-year productive capacity growth rate (approximately 5 to 12 percentage points more). As shown in Table A10, results are similar if we use the doubly robust DID estimator proposed by Sant'Anna and Zhao (2020). Hence, our parallel trend assumption needs only to be satisfied conditional on covariates.

In Panel C of Table 2, we report the estimates of the same model, but here the "treatment" dummy is equal to one when the land owned by an Anglo-Saxon nobleman (secular) in 1066 was controlled by a non-monastic other ecclesiastical landlord in 1086. Interestingly, we find no statistically significant difference, meaning that changing landlord and being controlled by an "Other ecclesiastic" landlord did not lead to a statistically significant change in productive capacity growth rate. The dimension of the coefficients is about one-third of those associated with monasteries, but the difference between the two is not statistically significant. Note that bishops and other non-monastic ecclesiastical landlords were usually educated, and their authority was based on a religious element, as in the case of abbots.

Results in Table 2, Panel B, are robust to a wide range of checks (e.g., different levels of clustering, exclusion of "randomized" holdings, etc.), as discussed in the Online Appendix. They are not, however, fully robust to a few sample restrictions. In particular, the coefficient is smaller and remains statistically significant only in the baseline specifications if we exclude holdings that changed lord but not Overlord/Tenant-in-Chief, or holdings whose lord in 1066 was "ambiguous" (Tables D10 and D12, Online Appendix D. Those groups partially overlap). If instead we add an "ambiguous lord 1066 fixed effect" interacted with time, the Benedictine coefficient remains significant (Table D11, Online Appendix D). In the restricted samples, the number of "Benedictine" observations is reduced by roughly one-third. Taken together, those restrictions seem to suggest that the effect we find is mostly driven by holdings that do not change Overlord/Tenant-in-Chief and whose lordship attribution is partially unclear. As the credibility of the parallel trend assumption is lower in this subsample, we explore these heterogeneities in greater detail.

Heterogeneity across Overlordship

In this section, we explore the heterogeneity of the Benedictine effect across different levels of the feudal structure. We define the dummy variable "Stable OL/TC" equal to 1 for those holdings where the lord in 1086

TABLE 3
HOLDING VALUE: BENEDICTINE VS. SECULAR LANDLORD,
HETEROGENEITY ANALYSIS

	(1)	(2)	(3)	(4)	(5)
Panel A					
Benedictine	0.069**	0.025	0.018	0.036	0.025
	(0.029)	(0.027)	(0.028)	(0.029)	(0.028)
Benedictine*Stable OL/TC	0.255***	0.348***	0.321***	0.337**	0.319***
	(0.056)	(0.055)	(0.039)	(0.141)	(0.079)
Obs.	14,622	14,622	14,622	14,622	14,622
Panel B					
Benedictine	0.072**	0.028	0.022	0.040	0.030
	(0.030)	(0.026)	(0.027)	(0.029)	(0.027)
Benedictine*Stable OL/TC	0.252***	0.344***	0.316***	0.333**	0.314***
	(0.056)	(0.056)	(0.039)	(0.143)	(0.078)
Obs.	14,436	14,436	14,436	14,436	14,436
Common to both panels:					
Holding FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Included controls:					
Geography*time ctrls[1]	No	Yes	No	No	Yes
Market*time ctrls[1]	No	No	Yes	No	Yes
History*time ctrls[1]	No	No	No	Yes	Yes

Notes: Diff-in-Diff analysis, two periods (1066, 1086). Sample: 7,151 (Panel A), 7,058 (Panel B) secular holdings, and 160 Benedictine holdings (both panels). Panel A: main results. Panel B: excludes observations with Crown holding same estate in 1066 and 1086. Dependent variable: log(1+value). Standard errors clustered at 1086 landlord level. Excluded: ambiguous lords (1086), female monasteries, non-Benedictine monasteries, post-1076 monasteries, outliers (growth rate > 4), and "Other ecclesiastic" lords (1086).
[1] Geography, Market, and History control variables are the same as listed in the note to Table 2. All specifications also include Stable OL/TC *time and control variables are also interacted with Stable OL/TC.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$
Sources: See text and Online Appendix E.

was the same as the Tenant-in-Chief in 1086 and the same as the Overlord in 1066, but different from the lord in 1066. Importantly, for this variable (and for this section), we consider the stability of the institution of the Crown, rather than of the actual person who holds it. Hence, holdings whose Overlord was King Edward and whose lord and Tenant-in-Chief in 1086 was King William are coded as 1. Extending this notion to the "lord" level changes the definition of the sample we are using, as holdings whose landlord was King Edward in 1066 and King William in 1087 would now be considered "stable," and hence excluded. To show what happens when we consider the "Stable OL/TC" variable irrespective of changes in the definition of the sample, we present our results in Table 3 in two panels. In Panel A, we add "Stable OL/TC" using the same sample

as in the earlier analysis. In Panel B, we exclude from the sample holdings whose lord was Edward in 1066 and William in 1086. Results remain very similar. In Table 3, we perform the usual DID analysis, but we add "Stable OL/TC" interacted with the time dummy, with the *Benedictine*$_{i,t}$ dummy and with all the controls. From this analysis, we can learn two lessons. First, the "Benedictine" effect is stronger among holdings whose lord was secular in 1066 and ended up being controlled by a landlord (and Tenant-in-Chief) in 1086, who was already the Overlord in 1066. Second, the "Benedictine effect" among holdings where Stable OL/TC is equal to 0 is always positive, although it loses significance once we introduce the usual set of controls. Hence, the overall effect we find in Table 3, Panel B, is driven mainly by holdings with a secular lord and a Benedictine Overlord in 1066 that ended up being controlled (both at lord and TC level) by the same Benedictine house in 1086. For this subgroup, the parallel trend assumption is questionable: the highest level of the feudal structure remained the same before and after the Conquest; hence, the change in the lower layer may be due to its strategic initiative rather than to the Conquest. To alleviate this concern, we perform two more tests, whose results are shown in Tables 4 and 5.

Table 4 shows that our main results, presented in Table 2, Panel B, hold when we add to all regressions a dummy equal to 1 if the Overlord was a Benedictine Monastery of any gender[21] interacted with the time dummy. This alleviates the concern described previously, as we are now conditioning on the monastic identity of the upper level of the feudal structure as defined before the Conquest. As shown, "Benedictine" coefficients are a bit smaller, but they maintain their statistical significance.

Table 5 shows a comparison, within "constant Overlordship," between holdings whose landlords were secular in 1066 (excluding those already having the King as 1066 lord) and those that ended up in Benedictine or royal hands in 1086, both at lord and Tenant-in-Chief levels.[22] This is done to partially address the concern that the effect captured by the interaction term in Table 3 is driven by the possibility of strategically choosing which holdings to control in 1086. This possibility may have occurred for estates whose Overlord/Tenant-in-Chief has always been the same monastery, while it surely was present for estates whose Overlord/Tenant-in-Chief was the Crown. Despite this, the coefficient of *Benedictine*$_{i,t}$ is positive, significant (with the exception of the last column, probably due to the large number of controls with few observations), and

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[21] Either a male or female monastery, hence without excluding female Benedictine Overlords.
[22] This sample almost overlaps with the "Stable OL/TC=1" sample in Table 3.

TABLE 4
HOLDING VALUE: BENEDICTINE VS. SECULAR LANDLORD,
ADDING BENEDICTINE OVERLORD DUMMY

	(1)	(2)	(3)	(4)	(5)
Benedictine	0.095***	0.056**	0.050**	0.071***	0.055**
	(0.024)	(0.022)	(0.024)	(0.026)	(0.022)
Benedictine OL*time	0.102***	0.030	0.012	0.080***	0.011
	(0.025)	(0.024)	(0.022)	(0.025)	(0.023)
Holding FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Included controls:					
Geography*time ctrls[1]	No	Yes	No	No	Yes
Market*time ctrls[1]	No	No	Yes	No	Yes
History*time ctrls[1]	No	No	No	Yes	Yes
Obs.	14,622	14,622	14,622	14,622	14,622

Notes: Diff-in-Diff analysis, two periods (1066, 1086). Sample: 7151 secular, 160 Benedictine holdings. Dependent variable: log(1+value). Standard errors clustered at 1086 landlord level. Excluded: ambiguous lords (1086), female monasteries, non-Benedictine monasteries, post-1076 monasteries, outliers (growth rate > 4), and "Other ecclesiastic" lords (1086).
[1] Geography, Market, and History control variables are the same as listed in the note to Table 2.
*p < 0.10, **p < 0.05, ***p < 0.01
Sources: See text and Online Appendix E.

fairly sizeable. Furthermore, this result is robust, in most of the models, to the sample restriction that excludes lords ambiguously defined in 1066, where the main coefficient of Table 2 loses significance. However, note that this result is driven by very few observations.

Of course, this analysis presents several limitations: the sample size is quite small; the identity of the Overlord could correlate with the outcome through unobservable confounders; and, of course, the person holding the Crown changes between 1066 and 1086. Figure A9 in Online Appendix A shows the balance between "treated" and "control" observations in this further subsample. They tend to be different on many dimensions, but it is reassuring to note that the outcome variable for 1066 is smaller for the treatment group than for the control group, hence they were not better *ex ante*.

Other Mechanisms

In this section, we try to shed light on what additional mechanisms might explain the overperformance of monasteries. As discussed in the second section, there are a few possible reasons that have been highlighted. However, we can rule out those that are not related to the institutional structure of the Rule. More specifically, we control for the historical presence of Roman settlements in the area and for a wide range of

TABLE 5
HOLDING VALUE: BENEDICTINE VS. ROYAL LANDLORD,
STABLE OL/TC HOLDINGS SUBSAMPLE

	(1)	(2)	(3)	(4)	(5)
Benedictine	0.328***	0.378***	0.325***	0.405**	0.161
	(0.072)	(0.135)	(0.079)	(0.176)	(0.169)
Holding FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Included controls:					
Geography*time ctrls[1]	No	Yes	No	No	Yes
Market*time ctrls[1]	No	No	Yes	No	Yes
History*time ctrls[1]	No	No	No	Yes	Yes
Obs.	126	126	126	126	126

Notes: Diff-in-Diff analysis, two periods (1066 and 1086). Sample: 26 secular, 37 Benedictine holdings. Sample: Tenant-in-Chief same in 1086 as 1086 landlord, but not 1066 landlord. Overlord/Tenant-in-Chief: King or Benedictine monastery. Dependent variable: log(1+value). Robust standard errors clustered at the holding level, due to limited number of 1086 landlords. Excluded: ambiguous lords (1086), female monasteries, non-Benedictine monas number of 1086 teries, post-1076 monasteries, outliers (growth rate > 4), and estates with "Other ecclesiastic" lords (1086).
[1] Geography, Market, and History control variables are the same as listed in the note to Table 2.
*p < 0.10, **p < 0.05, ***p < 0.01
Sources: See text and Online Appendix E.

other geographic characteristics. Hence, the effect we find is not due to those elements. The availability of cheap labor as a channel for prosperity, stressed by Ekelund et al. (1996), plays no role here, as *conversi* were not yet present in the period we are observing. We also show that geographical proximity to a monastery (as a proxy for its "hard work ethic" suggested by Andersen et al. 2017) had no effect on economic growth. Furthermore, older monasteries did not overperform more recent ones (as a proxy for human capital), and Benedictines performed better than holdings that did not change their lord between 1066 and 1086 (hence it is not just a matter of stability in lordship). Finally, excluding holdings close to their Benedictine lord or focusing only on holdings whose lord was also their Tenant-in-Chief in 1086 does not change our baseline result, ruling out the possibility that it is explained by the monks working directly on their land or by a different fiscal treatment. All those tests are discussed in detail in Online Appendix F.

Table 6 explores whether holdings with a Benedictine landlord in 1086 were different from holdings with secular landlords in 1086 in terms of population, plows, and mills. We use the same sample as in Equation (1), but in this case, we cannot estimate a DID because the outcome variable is referring to 1086 only (and only for a subset of observations). Consequently, we run an ordinary least squares (OLS) regression with

TABLE 6
ALTERNATIVE OUTCOMES, BENEDICTINES VS. SECULAR LANDLORDS

Panel A	Population	Plows	Mills
Benedictine (1086)	3.260*	0.788*	0.300*
	(1.926)	(0.458)	(0.177)
Obs.	7,308	7,282	1,823
Panel B			
Benedictine (1086)	3.610*	0.889*	0.288
	(2.013)	(0.471)	(0.187)
Obs.	7,308	7,282	1,823
Panel C			
Benedictine (1086)	3.788*	1.014**	0.287
	(2.027)	(0.474)	(0.190)
Obs.	7,215	7,189	1,770
Common to both panels:			
Hundred FE	Yes	Yes	Yes
Included controls:			
Geography[1]	Yes	Yes	Yes
Market[1]	Yes	Yes	Yes
History[1]	Yes	Yes	Yes

Notes: OLS cross-section. The number of observations is different due to limited availability of alternative dependent variables. Panel A: main results. Panel B: adds "stability" control (1066 Overlord same as 1086 Tenant-in-Chief). Panel C: excludes observations where King holds estate in both 1066 and 1086. Col (1): 7148 (Panels A and B), 7,055 (Panel C) secular, 160 Benedictine holdings. Col (2): 7,123 (Panels A and B), 7,030 (Panel C) secular, 159 Benedictine holdings. Col (3): 1,780 (Panels A and B), 1,727 (Panel C) secular, 43 Benedictine holdings. Dependent variables per column headings. Standard errors clustered at 1086 lord level. Excluded: ambiguous lords (1086), female monasteries, non-Benedictine monasteries, post-1076 monasteries, outliers (growth rate > 4), and holdings with "Other ecclesiastic" lords (1086).
[1] Geography, Market, and History control variables are the same as listed in the note to Table 2.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$
Sources: See text and Online Appendix E.

Hundred fixed effects, like the exercise we describe in Online Appendix A. Given that the dependent variable is, at least partly, an outcome of who oversaw the land, we are not truly testing a "mechanism" here. Moreover, since we do not know the level of those outcome variables in 1066, it is impossible to know whether this result is due to pre-existing conditions or not. Despite this, Table 6 shows that on average, Benedictine holdings in 1086 had a larger population, number of plows and mills. We believe these results, and the latter, although based on a limited sample, are consistent with previous historical evidence, especially White's (1958) and Knowles' (1963) idea of monasteries as "agricultural capitalists" (Knowles 1963, p. 441). Furthermore, mills have been proven to be important determinants of growth in human capital and industrialization (Mokyr, Sarid, and van der Beek 2022). As shown in Panels B and C, results are broadly robust to controlling for "Stable OL/TC" (both

without changing the subsample (Panel B) and excluding holdings where the King is the landlord in 1066 and 1086 (Panel C)).

Having ruled out all the channels that are not related to the institutional structure and the way leaders were chosen, we try to provide a more direct test of the institutional mechanism. One way to do so is to compare the performance of Benedictine-controlled holdings with those whose lord belongs to different monastic orders. Unfortunately, there was not much variation at the time of the Norman Conquest. However, Knowles and Hadcock (1971, p. 356) list a few non-Benedictine houses active in England around 1066 that belonged to the Celtic monastic tradition. The precise history of those houses is complicated. Knowles and Hadcock (1971) clarify that their list includes houses "thought to have existed until after 1066" and includes both Celtic monasteries and "Clas," that is, communities of canons living under an abbot. Some of them became parochial soon after the Norman Conquest; others were re-founded as Benedictine monasteries, and so on. Given the restriction in our dataset, we code as "Celtic" all the houses mentioned as such (at any point in time between 1066 and 1086) in Knowles and Hadcock (1971) that we could find in our data, even when they are described as "canons" in the DDB. Unfortunately, for the vast majority, "values" are available only for 1086; hence, we cannot use panel data methods. Therefore, we run a simple OLS on a cross-sectional dataset where we compare them to holdings of Benedictine monasteries in 1086. To avoid losing any observations and given the fact that missing values for "Holding value (1066)" are not an issue in this specification, we use all the available observation with non-missing values recorded in 1086, including holdings that do not change landlord. We obtain a sample of 892 Benedictine holdings and 24 "Celtic" holdings. Given the small number of "control" observations, we decided not to include fixed effects for Hundreds nor Counties. Results are described in Table 7. They are somehow noisy because of the very small sample, but Benedictine holdings outperform those whose lords were Celtic monasteries both in the basic and in the full specification. Despite being weakened by the limitations in the available data, we interpret this result as suggesting that Benedictine monasteries tended to perform better than non-Benedictine monasteries, hence in some sense "controlling for" everything that makes monks a selected sample. As explained previously, one important point about the Rule of St. Benedict is its attention to the internal governance structure of a monastery, which is different from the Rule of St. Columbanus. Hence, we argue that this organizational structure may have been one of the reasons behind Benedictine's success. Finally, note from Panel B that

TABLE 7
HOLDING VALUE: BENEDICTINES VS. CELTIC MONASTIC LANDLORDS

	(1)	(2)	(3)	(4)	(5)
Panel A					
Benedictine (1086)	0.749***	0.196	−0.269	0.693***	0.339**
	(0.168)	(0.143)	(0.485)	(0.170)	(0.156)
Panel B					
Benedictine (1086)	0.754***	0.162	−0.264	0.744***	0.252
	(0.178)	(0.139)	(0.491)	(0.177)	(0.170)
Common to both panels:					
Included controls:					
Geography[1]	No	Yes	No	No	Yes
Market[1]	No	No	Yes	No	Yes
History[1]	No	No	No	Yes	Yes
Obs.	916	916	916	916	916

Notes: OLS cross-section based on 1086 outcomes. Sample: 892 Benedictine holdings and 24 Celtic monastery holdings, regardless of 1066 status. Panel A: main results. Panel B: adds control for Overlord stability (same in 1066 and 1086) in all columns. Dependent variable: log(1+value in 1086). Standard errors clustered at 1086 landlord level. Excluded: ambiguous lords (1086), female monasteries, post-1076 monasteries, outliers (growth rate > 4). Stability control added in Columns (2) and (5).
[1]Geography, Market, and History control variables are the same as listed in the note to Table 2.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$
Sources: See text and Online Appendix E.

our results do not change much if we also control for a dummy variable equal to 1 if the Overlord and the Tenant-in-Chief do not change.[23] The p-value of Column (5) Panel B is 0.142.

DISCUSSION AND CONCLUSION

Our results indicate that, conditional on a change in lordship between 1066 and 1086, holdings held by a secular lord in 1066 that end up being controlled by Benedictine monasteries performed significantly better than those that end up in the hands of a (different) secular lord. This result, however, is not fully robust to different ways of dealing with ambiguous lordship attribution in 1066 and is driven by holdings whose Overlord was already Benedictine in 1066, and remained such in 1086. As this choice can be strategic and it is unclear the extent to which the actual governance changed in these holdings, we compare these holdings with those whose Overlord was the Crown and that ended up under

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[23] We control for this one, rather than for the full "Stable OL/TC" (which is 1 only if, on top of having the same Overlord and Tenant-in-Chief, the landlord in 1066 is different from the Overlord), because the latter would always be 0 for "Celtic" observations.

direct control of King William in 1086 (without having King Edward as landlord in 1066). Even in this case, where, in a sense, we control for the (realized) strategic choice, Benedictines performed better. The limitation of this case is the fact that we cannot separate Benedictine control from the absence of institutional change at the upper level of the feudal structure. Finally, we provide suggestive evidence showing that Benedictines tended to perform better than monastic communities of Celtic tradition.

Taken together, these results suggest that, in the most restrictive sample, a positive causal effect of Benedictine governance on productive capacity is statistically different from zero in the baseline specification, while significance is mostly lost in more demanding model specifications. A robust correlation exists in a less demanding sample, where we cannot fully disentangle Benedictine control from a higher probability of institutional persistence at the upper level of the feudal structure. By comparing Benedictine holdings with those of Celtic traditions, our results also suggest that the institutional structure of Benedictine monasteries could have played a role in driving our results.

This could have mattered in two ways. First, in protecting institutional stability in a period of great turmoil. Replacing a living abbot was not an easy task, as the position of abbots was legitimized by the Rule, and they had to interact with the Chapter. In fact, as stressed by Knowles (1963), the "normanization" of monastic houses took longer than for bishops or secular landlords. In many cases, William had to wait for the death of an abbot before being able to impose one of his choices. The best example is given by the Abbey of Bury St Edmunds, which turns out to be the major contributor to the group of Benedictine holdings driving the result. Here, the abbot, Baldwin, was in power since before the Norman Conquest and survived King William as head of his monastic house. Second, better-selected or better-advised abbots may have been able to make better choices. As discussed, the decision-making power of an abbot was relevant and may have been translated into better economic outcomes or choices leading to those outcomes (e.g., in terms of technology, agricultural organization, and so on).

This paper sheds new light on the active role of the Catholic Church as a big landlord and a local political player in the aftermath of the Norman Conquest and assesses the economic results of "early democratic" institutional arrangements within the Catholic Church in the Middle Ages. Some of those practices have sometimes been adopted as a model by secular institutions (Stasavage 2020; Grzymala-Busse 2020). Moreover, we focus on the development of countryside areas, which are considerably less studied than cities and villages (Becker, Rubin, and Woessmann 2021).

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