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DP16055

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DEVELOPMENT ECONOMICS

CEPR

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Discussion Paper DP16055

Published 19 April 2021

Submitted 14 April 2021

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www.cepr.org

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- Development Economics

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JEL Classification: N/A

Keywords: N/A

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Abstract

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Keywords: Church land, Agriculture, Industry, Gentry.

JEL classification: N43, N63, N93, O14, Q15.

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A remarkable economic transition took place in large parts of the world in the past 250 years. This “Great Divergence” (Pomeranz, 2000) led to the gap between poor and rich nations of the world expanding from a factor of 4 or 5, to as much as 100. It started with technological innovation, industrialization and urbanization in Britain. Critical to this process was a labor force that was mobile enough to move to the new factories and industrial cities such as Manchester and Birmingham and an agricultural surplus to feed them. The ability of factors of production to be allocated through the market, rather than via feudal regulation or custom, has long been hypothesized to be a major factor behind the success of Britain, and is one hypothesis for why the Industrial Revolution started there, rather than elsewhere (Pirenne, 1927, 1936, Polanyi, 1944, Hicks, 1969).

In this paper we empirically test this ‘commercialization’ hypothesis. We do so by focusing on the Dissolution of the English monasteries, which occurred during the English Reformation in the 1530s, as a natural experiment.¹ The most prominent historical hypothesis on the effects of the Dissolution is due to Tawney (1941a,b) who stressed that the expropriation, and subsequent fire sale, of the assets held by the monasteries in England, including about 1/3 of all land, led to the ‘rise of the Gentry’, a class of commercialized farmers. We build on his hypothesis in two ways. First, while Tawney emphasized the Dissolution as a shock affecting all of England, we study its impact *within* England, exploiting local variation in the incidence of the Dissolution. Second, while we directly test for a rise of the Gentry, we additionally hypothesize that the effect of the Dissolution extended beyond the rise of the Gentry to agricultural modernization and ultimately industrialization. This hypothesis motivates our use of the Dissolution as a natural experiment for studying the commercialization thesis.

Why would the expropriation of monastic assets create markets and impact subsequent development patterns? Before the Reformation, monastic land could legally not be

¹The Dissolution began in 1535 when Henry VIII expropriated all monastic assets in England. By doing so, he broke with the Catholic Church and founded the Anglican Church.

sold, thus inhibiting its efficient allocation to people who could use it best. The Dissolution changed this because the Crown rapidly sold off the expropriated monastic assets (Habakkuk, 1958). In terms of marketability of land, this put monastic land on a par with non-entailed non-monastic land.² Yet, a key difference between monastic and non-monastic lands that enabled higher subsequent development lies in the lower incidence of ‘feudal’ land tenure on monastic lands. Critically, few monastic tenures were perpetual, “customary”, copyholds (Kerridge, 1969).³ Feudal land tenure disincentivized investment and labor mobility. After the Dissolution, when monastic lands became marketable, the greater tenorial flexibility meant that both land and labor were now free to be reallocated through the market, allowing sale to whoever could use them best. In addition, more flexibility meant stronger investment incentives. To illustrate why perpetual copyhold tied farmers to the land and disincentivizes investment we develop a simple, historically grounded model of perpetual copyhold tenure in the Appendix. First, even though a copyholder, paying a fixed nominal rent, is the residual claimant of the returns on his investment, the investment is specific. This leads to inefficiently low rates of separation and labor mobility since the specific investments cannot be liquidated in the presence of potentially attractive outside options. Second, for the copyholder, the presence of such options naturally leads to under-investment, since a more attractive outside option may come along. Third, the presence of perpetual copyholding undermines the efficient allocation of land because those *owners* who could use it best are unable to benefit from any productivity increases they bring since such benefits would completely accrue to the copyholders.⁴

²As much as half of the land owned by the aristocracy (this is Habakkuk’s estimate, 1950, pp. 18-19), was held in entail and could not be sold - see Beckett (1984) for a discussion of the nature and importance of entail.

³Most important for us was a specific type of customary tenure known as copyhold of inheritance. This fixed the nominal rent of the tenant (and his heirs) in perpetuity. There were other forms of copyhold whose rents could be re-negotiated, usually after three lives, effectively 100 years.

⁴One can think of this in terms of “misallocation” in the sense of Hsieh and Klenow (2009). Restuccia and Santaeulalia-Llopis (2017) provide evidence on the relationship between this and the commercialization of land, though in a very different context.

The difference in the incidence of feudal tenure between monastic and non-monastic land was a direct consequence of the Black Death. The monasteries, and the Church more broadly, were powerful landlords, and whereas tenants negotiated perpetual leases at low fixed nominal rents after the Black Death with non-monastic landlords, monasteries were more effective at negotiating short leases. As a result, the incidence of perpetual copyhold tenure on monastic lands was 70% lower than on non-monastic lands. We therefore anticipate monastic lands to be relatively more commercialized after the Dissolution.

To test this hypothesis we collected data on the local impact of the Dissolution, on commercialization, as well as on the hypothesized social and economic changes that may have resulted from the commercialization of the English countryside across 15,000 parishes - the lowest administrative unit in England until about 1860.

To measure the impact of the Dissolution we digitized the Valor Ecclesiasticus, the survey of each monastic asset in the entire country with its annual income that Henry VIII commissioned prior to the expropriation in 1535. One very important feature of this data is that it records every manor each monastery owned, generating variation in where monasteries were landlords, rather than where the monks themselves lived. For our main explanatory variable we coded an indicator variable to measure the presence of monastic properties in a parish. This captures the discrete impact of the release of the monastic lands following the Dissolution. To validate our narrative on the local impact of the Dissolution we first use data on the presence of markets in 1600 and the survival of perpetual copyhold into the nineteenth century. We find that former monastic parishes are substantially more likely to have a recurring market, and are less likely to be unencumbered by 'feudal' copyhold tenure, validating our interpretation of the shock.

Our first main results focus on social change. Firstly, we directly test the rise of the Gentry hypothesis following Tawney (1941a,b). He argued that the Dissolution spurred social change, creating a class of commercialized farmers, the 'Gentry', in between the tradition-

ally feudal classes of Lords and the yeomen farmers (the model of Doepke and Zilibotti (2008) can be thought of as a microfoundation for this change). We use a unique census from 1700 that records the number of Gentry in each of 24,000 of the largest towns/cities and villages in England and Wales to measure the presence of the Gentry. The Reformation was not just about the breaking up of monastic assets of course. Potentially more profound was the religious conversion that scholars since Weber (1905) and Tawney (1926) have connected to entrepreneurship, human capital formation and industrialization (Becker and Woessmann, 2009, Cantoni, 2015, Barro and McCleary, 2003, McCleary and Barro 2019). To investigate the effect of the Dissolution on religion we digitized the 1767 Returns of papists, which was a government investigation reporting the number of Catholics in each parish. We find, consistent with Tawney, that Gentry are more likely to be present on formerly monastic lands. We also find that monastic lands experienced more rapid conversion and thus subsequently had fewer Catholics, a point to which we return below.

As our second set of main results we directly test the effect of the Dissolution on long-run development - specifically, structural change and industrialization. Using census data we show that monastic parishes employ a smaller share of the working age male population in agriculture in 1831 and a commensurately larger share in commercialized sectors, like trade and handicraft. Moreover, using data on all textile mills in England in 1838, we find that monastic parishes are more industrialized than non-monastic parishes. Figure 2 visualizes the relationship between the Dissolution and industrialization, and Figure 3 does the same for employment in agriculture.

Naturally, the pre-Dissolution distribution of monastic assets was not randomly assigned. Monasteries were endowed by rich patrons, who gave manors to support the monastery. Such monastic endowment occurred by and large in the two centuries following the Norman conquest of 1066 and ended around 1300. To capture the potential (dis)incentives to gift a particular plot of land, we control for a large number of potential

determinants of the location of monastic lands. Most importantly, we use a tax census from just before the Dissolution as a summary measure of pre-existing differences in development. Naturally, monastic parishes may still have been on different trends. To examine this whether this is the case we collected information on our outcome variables from before the Dissolution, and compare monastic to non-monastic parishes, before and after the Dissolution, in a two-period panel. We first verify that monastic parishes were in fact on parallel pre-trends, using four cross-sections of tax revenues before the Dissolution. Then, using data on markets and copyhold from the sixteenth century, the presence of Gentry and water mills from the fifteenth century, as well as data on occupational structure from the fourteenth century, we verify our main results: former monastic parishes are 35% more likely to be home to the Gentry, and have 33% fewer Catholics living in them. Employment in monastic parishes is 15% less agricultural, and 13% higher in commercialized sectors of the economy and, finally, monastic parishes are one percentage point more likely to be industrialized, relative to the mean of four percent.

Taken together, our results are consistent with the rise of the Gentry thesis, and with commercialization of the countryside as a precondition for industrialization. The final part of our paper aims to understand the mechanisms via which the changes in society (Gentry and Catholics) and economic institutions (markets) may have impacted structural change and industrialization.

To do so we use data on agricultural patents filed by parish residents, enclosure of commonly owned and governed land, the use of capital in agriculture and crop yields as proxies for productivity and measures of innovation and investment in agriculture.

Our theory suggests that the better allocative efficiency that arose from allowing those best able to use lands unencumbered by feudal tenures would spur investment. We measure investment using data recently compiled by Dowey (2013) on the number of agricultural patents registered in a parish between 1672 and 1850. We use data from Heldring, Robinson

and Vollmer (2020) on the universe of Parliamentary enclosures, an investment in the reorganization of property rights. We use data from Caprettini and Voth (2020) on where threshing machines were used between 1800 and 1830 to capture capital investment in agriculture. Finally, we use data on wheat yields per acre in 1836 from Kain (1986) to directly proxy agricultural productivity. We find that the presence of formerly monastic properties in a parish is positively and significantly correlated with patenting, enclosure, investment and agricultural yield. These results are consistent with our model of the adverse incentive effects of perpetual copyholding.

What was the role of the social changes we documented in these processes? It is plausible that the impact of Gentry or the persistence of Catholics on these investment outcomes were significant. The Gentry would have had greater investment incentives, a point we substantiate with a review of the case study literature, since they could enter into economically rational tenurial relations. They could also more effectively enclose common land because they had good connections to Parliament that had to enact this type of property rights rationalization. Catholics, on the other hand, were discriminated against, facing arbitrary expropriation of land and assets, higher tax rates, and exclusion from becoming Members of Parliament or state employees. The case study literature suggests this severely inhibited their incentives to invest as we discuss in the next section. We assess the relative importance of the Gentry and Catholics in a correlational mediation exercise, where we regress the presence of a textile mill on the share of Catholics in the population before the Industrial Revolution, and on the number of local Gentry. We find that Catholics are strongly negatively associated with industrialization, whereas the presence of Gentry is strongly positively correlated. These effects operate independently, as including both measures in a horse-race exercise does not change their estimated effects, nor the estimates' precision. Our results showing that places with more Catholics do worse economically are consistent with Cantoni, Dittmar and Yuchtman (2018) who show that, in Germany, expropriation of

monasteries during the Reformation led to university students moving into secular subjects, and building efforts being redirected towards more secular uses.

Taken together, our findings link the spread of the market, brought about by the Dissolution, to economic and social change. These changes have been hypothesized to be crucial preconditions for the Agricultural Revolution and ultimately industrialization, but have not been tested before. Our results suggest that the end of monastic restrictions on the marketability of 1/3 of the land in England and relative incidence of customary tenure, itself directly linked to feudalism, were important for fundamental changes within England. The lagged abolition of feudal land tenure in France and Germany may be behind why England pulled ahead on the world stage in the eighteenth century. Continental Europe only transformed after their political revolutions in the nineteenth century finally did away with servile labor and customary land tenure relationships (Acemoglu, Cantoni, Johnson and Robinson, 2011).⁵

Our paper is related to quite a few other contributions in addition to those we have discussed above. Our findings are consistent with the literature on the Agricultural Revolution which has stressed that this was due to changes in economic institutions, particularly the spread of markets often in connection with enclosures (Jones, 1974, Overton, 1996). Though our evidence does not speak to the issue of the extent to which the Agricultural Revolution helped to cause the Industrial Revolution (see Clark, 2014) they are consistent with them being connected. Our results are also consistent with Tawney's hypothesis and also with Catholicism being an impediment to industrialization.

⁵While our account restores a rather traditional theory of the prominence of England among Western European countries to the center of the discussion, our findings likely generalize outside this context. Pre-colonial Africa, for example, was characterized by an almost total absence of factor markets and land is not a marketable asset in most of the continent today. Though a labor market appeared in the colonial period, slavery also persisted until after World War II in large areas. Similarly, eastern Europe was relatively poor and characterized by serfdom until the middle of the nineteenth century. In Latin America, explicit restrictions on indigenous labor persisted in Guatemala until the 1940s and Bolivia until the 1952 revolution. Finally, scholars point to the development of factor markets in Song China as one of the reasons why it had higher living standards than England before the Industrial Revolution (von Glahn, 2016).

The paper proceeds as follows. The next section provides some important historical background including a discussion of the process of the Dissolution of the monasteries and what happened to monastic lands afterwards. Section 3 discusses the data in detail, particularly the collection of the Valor, and how we compiled this data. We also discuss the other variables we use in the analysis and present some of the descriptive statistics. Finally, we describe our econometric models. Sections 4-8 present our results. Section 9 concludes.

1 Setting: The monasteries and customary tenure

In this section, we provide the necessary background to the Dissolution of the Monasteries and our hypotheses. We discuss the initial establishment of monasteries in England, and their subsequent development. We focus on the crucial role of the Black Death and the Dissolution in determining the incidence of feudal tenure across parishes in England. We also discuss the key friction which made copyhold of inheritance, the relatively more common form of land tenure in non-monastic parishes, detrimental to productivity and labor mobility. Finally, we discuss how monastic regulations impeded transactions in monastic lands prior to the Dissolution.

Early monasteries. After the fall of the Western Roman empire, several large monasteries were founded, such as Glastonbury, Lindisfarne and Jarrow. Many of these Benedictine establishments were raided by the Vikings, resulting in the virtual, but not full, destruction of monasticism in England by the early ninth century. The fraction of land held by monasteries in the north, where raids were more frequent, fell to well below 10% (Fleming, 1985). On the eve of the Norman Conquest, there were a mere 35 monasteries in England (Douglas, 1964).

After the Norman conquest in 1066, there was a steep acceleration in monastic foundation. About 600 monasteries were founded in the century after 1066 (Knowles & Hadcock,

1994). At the time of the Dissolution in 1535, there were 825 monasteries in all of England and Wales. This boom in foundations was closely related to the process through which monasteries are founded, which we discuss now.

Monastic foundation. Monasteries were founded by a patron, usually the head of a wealthy landowning family. This person would endow the monastery with land to build the physical monastery on, and with lands that would generate income to support the monks. Over time, patrons from the same family could add land to the endowment of the monastery. In exchange, the patron was entitled to stay at the monastery, and it was understood that the monks would pray for their patron. Endowing a monastery was seen as an act of piety. After 1300 because of legal changes we discuss below, we see that new foundations drop considerably. Instead, endowing private chapels in churches, or ‘chantries’, becomes the popular expression of piety. Monastic patronage could be sold, but if a family died out, monastic patronage escheated to the crown (Stoeber, 2007).

Because patrons endowed monasteries with land from their own holdings, the pattern of monastic landholding was determined by where the patron owned land. We know a great deal about landownership around the conquest because it was recorded in the Domesday book. The Domesday book recorded the annual income, or ‘value’, of essentially all productive assets in England in both 1086, when it was collected, and retrospectively for 1066. It also records the name of the owner and their feudal overlords. In addition, it provides estimates of the annual income of each unit before the Conquest.⁶ William the Conqueror expropriated all Anglo-Saxon nobles save a handful, and redistributed their lands to his followers from Normandy. He deliberately scattered their landholdings. He did this because lords could raise militias in proportion to their landholdings, and William worried that if

⁶The original survey is not complete. It excludes London and Winchester, which were tax exempt, and Durham, where the bishop had the right to tax. In addition, Westmorland, Cumberland, and Northumberland are missing. It records for each tenant of the King, his subtenants, the productive assets they own, like land, ploughs, and salt pans. It then estimates the annual income, or ‘value’, these assets create. The Domesday online project aggregated the value of all assets, and has transcribed the location of each asset. This allows us to map the total value of productive assets in the Domesday to our parishes (Hull, 2018).

he gave consolidated landholdings a lord could raise a large army in one place and challenge him. He made an exception for the Welsh and Scottish borders, where he needed ‘marcher’ lords to defend the country (Douglas, 1964). We see the scattering of landholdings in our data. Many monasteries hold land all over England.

We can validate the claim that by and large monastic landownership was determined by the scattering of properties by William using data from the Domesday Book (Hull, 2018). We compute the total income generated in a parish in 1086, and in 1066, before the Conquest. For each manor in the Domesday book, we record whether it was owned by a monastery before the Conquest in 1066 and after, in 1086. We code an indicator equal to one if a manor was not owned by a monastery before the conquest, but was passed to a monastery after the conquest. We regress this indicator on the income generated by the manor before the conquest, in 1066, in a bivariate linear regression. Results are in table A-2 in the Appendix. If monasteries were endowed with particularly (un)productive land, we expect to see a correlation between income before the Conquest and our indicator. Absence of such a correlation would be consistent with the historical narrative in this section. We find a small and insignificant correlation. This suggest that where monasteries got land in the wave of monastic foundation after the conquest is uncorrelated with the economic output of a manor, and is consistent with the scattering of landholdings for political rather than economic purposes.

After this initial wave of establishment, monastic endowment effectively stopped after *Magna Carta* in 1215 and the passing of the Statutes of Mortmain in 1279 and 1290 (Raban, 1974). These documents prohibited donating land to monasteries because the feudal dues on the land were no longer payable to the Crown after donation.

The subsequent relevant history of the monasteries revolves around two massive events: the Black Death, which created variation between monastic and non-monastic landlords in the type of tenancies they had on their lands, and the Dissolution, which ended monasticism

in England, but bequeathed the difference in land tenure relationships to the new owners of the monastic lands.

The Black Death and the incidence of feudal tenure. The Black Death ended serfdom as the dominant way of organizing rural labor relationships. Due to the large drop in population, the ‘villeins’ enjoyed increasing bargaining power, and were able to negotiate advantageous leases at low fixed nominal rents, called copyholds. They sought to maximize the wedge between rental rate and the price they got for agricultural output (see Bailey (2016) for a comprehensive review of the evidence on the decline in serfdom and French and Hoyle (2007) for a clear discussion of the nature and importance of copyhold). There were two sorts of copyholds: ‘of inheritance’ which lasted forever, and ‘for lives’ usually three lives (or three generations). It was called copyhold because a copy of the agreement was kept in the local manor court. The link between villeinage and copyhold has been pointed out frequently by medieval historians. Vinogradoff (1923, p. 80) traces copyhold to norms that “a free man ... cannot be ejected by his lord against his will, providing he is doing the services due from the holding” arguing that this was the “germ of copyhold tenure”. Tawney (1912, pp. 46-47) observed “copyholders are the descendents of villeins ... copyhold tenure, is in fact, villein tenure to which the courts from the end of the fourteenth century have gradually extended their protection” and Overton (1996, p. 31) notes “villein tenure gradually changed its name to copyhold”. Villeins preferred such tenure because rents were lower. We can see this in an inquisition made in the early sixteenth century into ‘inclosures’ by the Tudor government. Rents are lowest for copyholders, lower than rents on the demesne, for leaseholders, freeholders or tenants-at-will (Davenport and Leadam, 1898, pp. 561-565).

Importantly, there was variation in the success of villeins in securing indefinite copyhold. Swanson (1989) notes that the Church was more aggressive in opposing the changes which were forced on landowners by the collapse in their labor supply arguing that after the

Black Death there was a “gradual decline (but not total abolition) of serfdom. Here again, ecclesiastics faced the same forces as their lay counterparts, but were seemingly less willing to give way” (Swanson, 1989, pp. 201-202). For example, Durham priory was drawing up lists of serfs until well into the 15th century, in 1497 Tavistock abbey was collecting servile dues and enforcing labour services and in 1502-3 the bishopric of Lichfield and Westminster Abbey demesne leases were still demanding customary labor services from serfs (see MacCulloch (1988) on the widespread persistence of serfdom into early Tudor England). These authors suggest that, because monasteries were better able to bargain with villeins, the incidence of the ‘feudal’ tenure which was most favorable to the ex-villein, copyhold of inheritance, was lower on monastic lands. Instead, the predominant forms of tenure were leasehold, or copyhold for lives, which usually expired every 99 years, though there was regional variation in what was considered a life.

How stark was the difference between monastic and non-monastic landlords? At the time of the Dissolution, as much as two thirds of all land in England was held as copyhold (Youings, 1967, p. 308). Although we are not aware of systematic medieval surveys of the extent of types of land tenure, we are able to reconstruct a partial picture.⁷ When a monastic property was expropriated as part of the Dissolution, surveyors would oftentimes draw up a final valuation which determined the tax base when its customary taxes reverted to the crown. In some cases, these records include additional information on the type of contract between the monastery and the tenant. These additional returns are published in the seven volumes of the *Monasticon Anglicanum* (Dugdale, 1693). For 2,136 tenure contracts we are able to ascertain whether it was a perpetual copyhold of inheritance contract or another type of contract. 13% of these contract were copyhold of inheritance contracts. Though it is not clear how representative this sample is, the number is consistent with the conventional wisdom amongst historians that copyholding of inheritance was relatively

⁷see French and Hoyle (2007) for a discussion of available sources.

rare on monastic lands. Youings' estimate is that 2/3 of land was under copyhold in all of England, with about half copyhold of inheritance and half copyhold for lives (Tawney, 1912, p. 26, Overton, 1996, p. 35). Therefore, our estimate of 13% for monastic lands implies that the incidence of copyhold of inheritance is almost 70% lower there.

Remarkably, copyhold tenure, a direct descendent of feudal tenure, lasted until it was finally abolished in 1925 by the Law of Property Act. In 1688 around 2/3 of the land remained under copyhold (Allen, 1992, p. 95). Even as late as the 19th century copyhold was widespread and Beckett and Turner (2004) document that the Copyhold Commission, formed in 1841 to convert copyholds into freeholds, had to deal with thousands of cases, nearly all, logically enough, copyholds of inheritance.

The frictions introduced by copyhold of inheritance. The difference between monastic and non-monastic tenancies is significant because copyholds of inheritance, relatively absent from monastic lands, had significantly negative effects on productivity, labor mobility and the efficient allocation of land. We make these points more formally in the Appendix with a simple model of the copyhold of inheritance tenure. We show three main results. First, compared to different types of contractual relationships, copyhold of inheritance led to lower investment. Second, it led to inefficiently low labor mobility. Finally, it was associated with inefficient matching between farmers and farms.⁸

The intuition for these results is simple. A tenant (and his dynasty) with a copyhold of inheritance pay a fixed nominal rent. They are thus the residual claimant on investment. However, the investment is specific in the sense that if they leave, they cannot liquidate it. In a world of increasing mobility and potentially attractive outside options this leads to inefficient under-investment relative to a situation either where the landowner farms the land or rents it out at market rents. Under copyhold of inheritance the landlord does not

⁸These results all necessitate some degree of financial market imperfections or liquidity constraints otherwise the landlord could buy the tenant out of the copyhold of inheritance contract which was legally possible.

want to invest, because the returns would accrue to the tenant. The fact that investment is specific leads not just to too little investment, but also inefficiently low mobility because individuals wish to stay to enjoy their investments. Finally, the nature of this contract means that there will not be efficient matching. In a world where some farmers can use the land more productively than others, there will be no tendency for matching to be efficient when all of the productivity gains accrue to a copyholder. These effects were less pronounced on copyhold for lives because, while nominal rents were also fixed at customary levels, after three lives, possibly 100 years, the copyhold contract lapsed and had to be renegotiated. At such a juncture landlords could adopt more market based contracts in order to claim part of the agricultural surplus which accrued to tenants under customary land relations. Such inefficiencies were even less prevalent on shorter leases, like freeholds.

The situation before the Dissolution. On the eve of the Dissolution, there were 825 monasteries in England and Wales.⁹ These monasteries, together with cathedrals and parish churches owned about a third of all land in England and Wales (see Table 1, Mingay, 1976, p. 44 and Woodward, 1966, p. 33). We saw that these lands were spread out all over England, and often were far away from where the monks lived. The largest monastic orders were the Benedictines and the Franciscans, but Cluniacs, Cistercians and Gilbertines operated several houses in England as well.

The Dissolution. Henry VIII, who had become King in 1509, declared himself head of the Church in 1534. His initial objective was to appropriate all taxes that churches and monasteries traditionally paid to the Pope. In order to assess the revenue potential of the Church, Henry ordered an assessment of the yearly income of all ecclesiastical possessions in England. The resulting reports are published in 1535 as the *Valor Ecclesiasticus*.¹⁰

⁹See Woodward (1966, p. 2). There were many types of monastic religious establishments, such as nunneries, friaries, abbeys and priories. We use the term monasteries throughout this paper. Much has been written on the Dissolution and the reformation more generally, see for instance Gasquet (1899), Woodward (1966), Youings (1971), Knowles (1979) and Duffy (2005). Savine (1909) deals exclusively with the *Valor Ecclesiasticus*. See Haigh (1993) and Bernard (2007) on the Reformation more broadly, Scarisbrick (1968) on Henry VIII and Elton (1953) on Henry's government.

¹⁰We list and describe the titles and specifics of the relevant acts, the state of the surviving Valor records,

Between 1536 and 1540 Parliament passed several acts that transferred the ownership of all monasteries in England to the Crown, effectively expropriating all assets of the entire monastic sector.¹¹ Expropriation often involved a peaceful handover of the monastic buildings and its assets to the Crown, and the pensioning off of the monks and nuns. Sometimes it was done forcefully and many important Catholic relics were destroyed in the fervor that accompanied ‘dissolution’. The Dissolution went hand in hand with Henry’s withdrawal from the Roman Catholic church and as such constituted the Reformation in England.

Initially, Henry had intended to manage the monastic lands and collect taxes. He instituted a new ministry for this purpose, the court of Augmentations, but he soon decided to sell all formerly monastic land to finance an escalating war with France. He sold some of his most coveted assets, like the monastic buildings that he left standing, to friends and followers, but individual manors were by and large sold at the fixed price of 20 years income. We do not have a full manifest of who bought what, but what is clear is that many of the former non-religious functionaries of the monasteries, like the bailiffs who collected rents for the monks, and the stewards, who represented the monasteries in civil society, were often among the buyers (Liljegren, 1924, Savine, 1909).

It is also clear that the Dissolution greatly thickened the land market. In 1603, one commentator remarks: “In these days there go more words to a bargain of ten-pound land a year than in former times were used in the grant of an earldom” (Youings, 1967, p. 304). By 1600, the land market had developed, and many buyers had consolidated small pieces of lands into estates. One commentator remarks in 1610: “lands pass from one to another

the methods of the Valor enumerators as well as our method of coding the Valor data in the Appendix. We also include a description of the Valor records for the manor of Helton, Lolbroke and Bell as an example.

¹¹Dissolution of church property was not without precedent in England. During the Hundred Years War and throughout the later Middle Ages, the alien priories, priories that were dependent on a monastery in France, were dissolved. In 1520 Cardinal Wolsey dissolved some twenty monasteries to pay for the foundation and endowment of an Oxford college and a school in Ipswich. On the continent, Swedish, German and Swiss rulers had successfully dissolved several Catholic monasteries in the early sixteenth century (Woodward, 1966, p. 49).

more in these latter days than ever before” (Youings, 1967, p. 303). In Devon, the number of transactions in the land market tripled in the years immediately after the Dissolution (Kew, 1970). The most comprehensive study of the land market after the Dissolution is Habakkuk (1958), who first documented the increased dynamism in land markets. These changes contrast with non-monastic lands, for which there had always been a land market, with the important exception that land held by the aristocracy was often held in entail. Habakkuk (1950) estimates that as much as half of the land owned by the aristocracy (pp. 18-19), was held in entail and could not be sold (see also Beckett (1984)).

The Rise of the Gentry. The most famous historical hypothesis about the effects of the Dissolution is Tawney’s Rise of the Gentry (Tawney 1941a,b). Tawney noted the emergence of a class of commercialized farmers in the sixteenth and seventeenth century who ‘rose’ relative to other groups in society. The Gentry rose but were not a new class (see for example Table 1 and see Coss (2005) on the origins of the English Gentry). Tawney related the rise of the Gentry to support for Parliament in the English Civil War and hypothesized that the Dissolution enabled their rise.¹² There is a large body of case study evidence that suggests that the people who bought the monastic land became members of the Gentry later on.¹³ For instance, of the leading Gentry families in Hertfordshire in 1642 less than 10% had been settled there before 1485. In Essex this figure stood at 18%,

¹²Tawney’s papers generated a large literature. This focused on a plethora of issues; whether or not the aristocracy had really declined in favor of a rising class of Gentry (Stone, 1965); whether or not Gentry really were more commercial or efficient than large landowners (Heal and Holmes, 1994, Chapter 3 for this literature); and whether or not the Gentry were the group who led the rebellion against Charles I (see Jha, 2015, for evidence on this). The consensus view of historians on these issues, as expressed by Clay (1984, 1985) and Overton (1996), now seems to be that indeed there was a big change in the distribution of land in 16th century England as a result of the Dissolution and, moreover, it makes sense to talk about the rise of the Gentry.

¹³Despite the preponderance of the term there is no one definition of “the Gentry”. Mingay (1976, p. 2) states that a gentleman was distinguished by “education, profession, military rank, wealth, freedom from manual labor, and the right to wear arms”. An often quoted contemporary definition is from Harrison in 1577: “Whosoever studieth the laws of the realm, whoso abideth in the university ... or professeth physic and the liberal sciences, or besides has service in the room of a captain in the wars, or good counsel at home, whereby his commonwealth in benefitted ... is able to bear the port, charge and countenance of a gentleman, he shall for money have a coat and arms bestowed upon him by the heralds ... [and be] reputed for a gentleman ever after” (Harrison, 1968 cited in Holmes and Heal, 1994, pp. 113-114).

in Norfolk at 42% and in Suffolk at 13% (Mingay, 1976, p. 9).¹⁴ Families such as the Knatchbulls from Kent and the Cholwicks from Devon were yeomen at the beginning of the sixteenth century but rose to be among the Gentry over the course of the century, rising to the peerage later. Overall, as noted in Table 1, the proportion of land owned by the Gentry increased from 25% in 1436 to 45-50% by 1688. The Church and Crown's share went from 25-35% in 1436 to 5-10% in 1688.¹⁵ The shares of land owned by great landowners and the yeomanry were relatively stable. The numbers in this table square with a great deal of other evidence. For example, the 1524 Lay Subsidy suggests that there were 200 knightly families and 4,000 to 5,000 esquires and gentlemen in England at that time. Thomas Wilson, in his book *The State of England Anno. Dom., 1600*, estimated that these numbers had increased to 500 and 16,000 respectively (Wilson, 1936). Gregory King's calculations of the social structure of England in 1688 (King, 1810) suggest there were 620 knights, 3,000-3,500 esquires and between 12,000 and 20,000 gentlemen (see Thirsk and Cooper, 1972, pp. 755, 766-8, Cooper, 1983, pp. 20-42). Even though the population of England approximately doubled over this period this suggests that the Gentry were indeed relatively rising. Micro estimates for different counties tell a similar story, for instance in Yorkshire heraldic evidence suggests that there were 557 Gentry families in 1558, 641 in 1603 and 679 in 1642 (Cliffe, 1969, pp. 5f). For Warwickshire a similar measure increases from 155 families in 1500 to 288 in 1642 (Carpenter, 1992, p. 90, and see Heal and Holmes, 1994, pp. 11-12, for more discussion).

In the introduction to the paper we suggested that even though this connection has not been explored much before, there is a great deal of case study evidence that suggests that the Gentry played important roles in the Industrial Revolution (see also Bogart and Richardson (2009, 2011)). For example, in his seminal study of the history of the British

¹⁴For additional evidence for Monmouthshire, see Gray (1987). For evidence on sales of monastic land around 1600, see Outhwaite (1971).

¹⁵For a detailed study of these patterns in Huntingdonshire, see Bedells (1990).

coal industry Nef pointed out the intensity with which Gentry were involved not just in mining the coal under their own lands but also renting other lands with coalfields. In Lancashire and the West Riding of Yorkshire there were

“the Andersons of Lostock, who had pits in Leeds and the surrounding manors, the Ashtons, a well-known Lancashire family with many branches who had pits in the lands around Oldham, the Hultons of Preston, who had pits near Bolton, the Listers, a West Riding family with colliery interest about Halifax and also at Colne, the Gascoignes of Gawthorpe, with colliery interests at Kippax and Barwick-in-Elmet, the Mallets of Normanton, who worked coal in the adjoining manor of Rothwell, and many others. Among the Lancashire families, the Listers alone appear to have been of yeoman extraction. In Durham and Northumberland many of the prominent local Gentry became interested during the sixteenth and seventeenth century in the coal industry” (Nef, 1966, p. 9).

The central role of the Gentry in the Lancashire coal mining industry is amply documented by Langton (1979a,b). He notes for the period 1590 to 1689 that in the coal industry “the landed Gentry provided most of the investment and ability” (1979a, p. 74). Though the Gentry suffered financial problems after this, his data indicates that for the period between 1690 and 1739 almost 50% of the collieries in central Lancashire were both owned and operated by landed Gentry while more were leased and operated by Gentry (1979a, Figure 28, p. 124).¹⁶

A fascinating case which brings together many of our arguments is that of the Hesketh family. The Hesketh family had lived in Rufford in Lancashire from around 1250. On the eve of the Dissolution, the family owned several manors around Rufford and leased lands from Chester Abbey. After the Dissolution, these lands were leased from the king. One

¹⁶Swain (1986, p. 197) concludes his study of Lancashire by noting “Thus we find that the Gentry predominated amongst colliery entrepreneurs.” See Jenkin (1983) for a similar conclusion in the case of South Wales.

member of the Hesketh family, Thomas, was knighted in 1553 and in 1561 he purchased the manor of Hesketh-with-Becconsall (around five miles from Rufford) that had until recently been part of the Priory of St. John of Jerusalem in England. His son, called Sir Robert Hesketh, was elected a member of Parliament for Lancashire. His will indicates that he had the right to 'dig and delve for coal and other materials'. Indeed, by the middle of the seventeenth century we find the Heskeths partnering with four local gentlemen and a yeoman to open a mine in Wrightington, some six miles from Rufford. Many years later, in 1761, a Thomas Hesketh acquired the title of baronet. The baronetcy is called 'the Hesketh baronetcy, of Rufford in the county palatine of Lancaster'. By this time, the Heskeths were not only regular members of Parliament but they were financing the Industrial Revolution, being involved in several mines in Shevington, a mere eight miles from Rufford (Farrer and Brownbill, 1908; Langton, 1979a, pp. 76, 126; Hasler, 2006).

Note that the importance of the Gentry was not simply that they themselves were involved in industry, but that they also played an important role in forming partnerships and financing the main entrepreneurs - for example the relationship between the gentleman Thomas Bentley and Josiah Wedgewood (McKendrick, 1964) (see Hudson, 2002, for more examples).

The Reformation The Dissolution was part of the much broader Reformation. In 1530, to a first approximation, 100% of people in England were Catholics. Initially the creation of the Church of England did not stop people maintaining their Catholic beliefs. In fact it was only during the reign of Elizabeth I, particularly after the Pope excommunicated her in 1570, that strong pressure was brought to convert. Already the 1559 English Act of Uniformity had required all men and women to attend Protestant churches on Sunday or pay a 12 shilling fine. A 1563 act levied a fine of 100 marks and up to a year in prison on anyone attending a Catholic mass. A 1581 Act raised the fine for failing to attend church to 20 pounds per month and equated the activities of priests with treason. This

latter decision was spurred by an influx of continental trained Catholic priests after 1574 aimed at re-converting the country. Over one hundred priests were executed. Penalties for refusing to convert, typically signalled by a refusal to attend a Protestant church on Sunday, became known as “recusancy”. In addition to the monthly fine a convinced recusant could be imprisoned (many were) and 2/3 of their lands and all their goods were potentially forfeit. In the reign of Charles I this was adjusted so that alternatively recusants would have to pay rent to the government on 2/3 of their land. As Charles himself put it, he wanted to make sure that “in the course of time they would [not] become mendicants” adding “we do not seek their ruin” (quoted in Havran (1962), p. 92). James I had previously strengthened the “recusancy laws” by barring Catholics from the professions and from holding public office. He also introduced an oath of allegiance which if refused, something which the Pope advocated, could be met with life imprisonment and the forfeiture of all property. Catholics were discriminated against until the Catholic Emancipation Act of 1829. After 1693 Catholics had to pay double the rate of the land tax and after 1700 were forbidden to buy land and Protestant next of kin could claim the inheritance of Catholics.

The net effect of these measures, amongst other things, was a sharp decline in the number of Catholics. An authoritative estimate, due to Bossy (1975, p. 192) is that in 1603 there were 40,000 Catholics in England (see Sheils, 2004, p. 257, 264, for an argument that is likely a serious under-estimate, probably by one half). For 1760, we see in our data that there are 64,300 recorded Catholics in England.

The literature has proposed various explanations for the different rates of conversion in different parts of England.¹⁷ From our perspective, however, the economic consequences of

¹⁷There are three main arguments in the historical literature. Bossy (1975) placed central emphasis on the role of Catholic missionary activity from the continent. He argued that more Catholics lived where the missionaries went. He also recognized however that Catholicism persisted longer in the north and west because there were “a variety of administrative barriers between oneself and hostile authority” (1975, p. 82). Effectively, people feared the implementation of the fines and penalties less and this reduced the opportunity cost of staying Catholic. Finally, Haigh (1975) argues that Catholicism persisted in places where religious beliefs were more intense and especially where there was a devotion of Mary and the Saints. See also Pfaff (2013) on the importance of saint’s cults, and Barro and McCleary (2016) on sainthood. As

remaining Catholic must have been highly significant. Undoubtedly the fines and penalties on the Gentry were imperfectly enforced with Cliffe (1969, p. 221) noting “the pressure applied was not so consistently heavy as to force them inexorably into bankruptcy and ruin”. Nevertheless, between 1600 and 1642 102 Yorkshire families had their main estates seized for recusancy (Cliffe, 1969, p. 224). Cliffe’s reconstruction of the finances of Philip Constable, a Catholic gentleman from Everingham shows in 1632-33 he paid about 20% of his income in recusancy fines (p. 222). He concludes “the potential dangers could not be lightly ignored and many Catholic landowners preferred to attend Protestant services rather than hazard their estates” (Cliffe, 1969, p. 181). Heal and Holmes’s (1994) conclusions are similar and they record that “Catholic families experienced financial difficulties, became enmired in debt, and sold up” (p. 150).^{18 19}

These facts have two important implications for our study. First, holding the intensity of people’s religious beliefs constant, whether or not one converted depended on the opportunity costs of doing so. In highly productive places, for example, the threat of losing one’s land is greater. Second, to the extent that one remained Catholic, the threat to property rights and excess taxes might plausibly reduce investment. Since our argument is that the Dissolution created better economic opportunities, one would then expect this first argument to imply that more Catholics converted in places impacted by the Dissolution. The second implies that the greater the number of Catholics in a parish, the worse long-run economic outcomes ought to be.

Sheils puts it “the distribution of Elizabethan Catholics reflected those areas with the strongest attachment to traditional forms in the early sixteenth century” (2004, p. 259).

¹⁸“Some figures suggest that financial embarrassment was suffered by a higher proportion of recusant than of Protestant gentry families: a disproportionate number of the gentry families in late Elizabethan Sussex and Surrey obliged to sell land were recusants; in early Stuart Yorkshire 51% of recusant families, as against 34% of their Protestant counterparts, were in financial difficulties” (Heal and Holmes, 1994, p. 150). Aveling (1966) and Manning (1969) contain many similar examples from Yorkshire and Sussex respectively.

¹⁹An alternative hypothesis would be that Catholics held back development through lower investment in education and human capital. Though we do not have historical sources to investigate this, the available evidence does not make this channel likely. Most Catholics were in the north and as Houston (1982) showed, if anything literacy was higher in northern early Modern England than the rest of the country.

In sum, we hypothesize that the Dissolution’s immediate impact was on markets and the allocation of factors of production. Following Tawney, we hypothesize that there was an intermediate impact of the Dissolution on social change. Finally, we hypothesize that ultimately there was a reduced form effect of the Dissolution on industrialization, in line with the commercialization explanation of the English Industrial Revolution.

2 Data and Empirical Framework

For our empirical specifications we use parishes as our unit of observation. There were about 15,000 parishes and parish-like units in England in the nineteenth century.²⁰ Parishes are the relevant local ecclesiastical and civil administrative unit for much of England’s history, and their boundaries changed very little between the Dissolution and the Industrial Revolution. Importantly, medieval manors, the relevant *economic* unit in the countryside, were often coincidental with parishes. Names of individual villages and manors within our parishes sometimes changed considerably over time. Section 3 in the Appendix describes the procedure we followed to assign observations in different datasets to the appropriate parish.²¹ We provide a full overview of all data sources in section 6 of the Appendix.

2.1 The Valor Ecclesiasticus

We obtain our main independent variable, an indicator for whether a monastery owned a manor within a parish, from the Valor Ecclesiasticus. We refer to such parishes as monastic parishes. We use a transcript of the surviving original returns made by the British Record Commission in the first half of the nineteenth century as our source (Caley and Hunter, 1810, 1814, 1817, 1821, 1825, 1831). We exploit the fact that each manor is located in

²⁰In some parts of England, territories were covered by hamlets, chapelries, extra-parochial tracts, or other local units. We use these instead of a parish if they are the relevant lowest level administrative unit.

²¹Kain and Oliver (2001) reconstructed the administrative map of parishes for England. Their map has been digitized as the *GIS of ancient parishes*, which we use in this paper.

a village and a parish and, therefore, has a place name. This enables us in principle to identify each unit and attribute it to a parish, even though the owner of the unit, such as a monastery, may be located elsewhere. This way we measure whether the local lord of the manor is a monastery, irrespective of where the monastery is located. Figure 1 maps the spatial distribution of Monastic properties across England, and shows that our data covers modern England almost entirely.²² In our Appendix, we discuss the Valor in detail and Figure A-1 of the returns for the manor of Helton, Lollbroke and Bell. We alternatively measure the impact of the Dissolution by the total revenue generated in a parish, with similar results.

2.2 Outcome variables

We record most of our outcome variables at two points in time, once after the Dissolution and once before. In this section we describe each data sources we use.

Markets. To measure the initial development of markets following the Dissolution we use the *Gazetteer of Markets and Fairs in England and Wales to 1516* (Letters et al., 2003). This source records medieval physical markets and fairs in towns and villages across England up to 1516, and their survival until 1600. Because the total number of markets fell over this period, we measure whether a market survived until 1600 with an indicator equal to one if a parish had a market in 1600, zero if it had one in 1516 but no longer in 1600 and missing otherwise. It is important to note that these are goods markets primarily, and we use these data instead of measures of the development of the land or labor market from the mid-sixteenth century, which are not available to us.

Copyhold. We record copyhold from two sources. Post-Dissolution, we rely on the annual reports of the Copyhold Commission which, between 1842 and 1883, published yearly

²²We restrict our attention to income from physical assets. This income is referred to in the records as ‘temporal income’. The Valor also records ‘spiritual income’, which are mostly customary duties payable to monastic or ecclesiastical officers.

reports detailing archaic, virtually all perpetual, copyhold contracts that were converted to freehold or leasehold, parish by parish. We observe 2421 parishes with surviving perpetual copyholds, and a total of 16,913 contracts. We use the total number of copyhold contracts converted over this period as our measure of the incidence of copyhold. Since we do not know if the Commission converted all copyhold, we focus on this intensive margin, and omit parishes that are not mentioned in the annual reports. For the pre-Dissolution period, we use the Tudor *Domesday of inclosures* (Davenport and Leadam, 1898), which records whether a copyhold was enclosed in the early sixteenth century, for Berkshire and Buckinghamshire counties. We record the count of copyholds in a parish in this data source. Since we have a smaller number of parishes available in this source (n=155), we manually verified that if one of these parishes does not appear in the Commission's records, no copyhold survived.

The Gentry. We collect data on the presence of the Gentry from John Adams' *Index Villaris, or an Alphabetical Table of all Cities, Market-towns, Parishes, Villages, Private Seats in England and Wales* (Adams, 1700) which is a systematic survey of the 24,000 largest cities/towns/villages in England published originally in 1680. We use the total number of Gentry living in a particular locality from the most up to date version published by Adams, from 1700. Data before the Dissolution come from the *Inquisitions post Mortem* (see Campbell and Bartley, 2006). The *inquisitions* are asset enumerations drawn up at the death of a tenant of the King to establish feudal inheritance and taxation. We compiled the universe of inquisitions between 1399-1477 which record whether a tenant of the King had a 'Sir', 'Knight', or 'Chevalier' title and where he or she owned manors. In total, about 9000 parishes are mentioned in these returns.²³ Since these data vary at the manor level, and we record the title of the landlord of each manor, we over-estimate the number of Gentry if an individual gentleman owned more than one manor. We return to this point

²³The source for these data is 'Mapping the Medieval Countryside [online]'. Available at <http://www.inquisitionspostmortem.ac.uk/> (accessed: November 2020).

in the results section.

Religion. In the eighteenth century, the English House of Lords initiated several surveys to document the extent of Catholicism in England. The most complete of such ‘Return of Papists’ is from 1767 and it documents 64,000 Catholics in nearly 2,500 parishes (Worrall, 1980, 1989). We digitized this source and count the total number of Catholics in each parish. We normalize the total number of Catholics by population in 1831.²⁴

Occupational structure. We use the digitized version of the 1831 Population Census (Gatley, 2005) to compute shares of the adult male population that is older than twenty employed in different occupational categories.²⁵ We focus on the share of adult males over 20 years of age employed in agriculture which, on average, equals 62 percent across our dataset of parishes, and the share employed in trade and handicraft. Other categories that are distinguished in the census data are people employed as laborers, people employed as bankers or in other skilled professions and a category for those not fitting one of these categories. There is a small category for manufacturing, employing two percent of adult males. Since we can not find a credible matching category in the fourteenth century for manufacturing, we focus on trade and handicraft. Results using just manufacturing for the nineteenth century are similar.²⁶ To measure occupation structure before the Dissolution we record the fraction of people employed in agriculture and in trade and handicraft from the 1381 poll tax, which was raised to fund the ongoing Hundred Year’s war (Gibbs, 2015 and Fenwick, 1998, 2001). In our data we observe about 33,000 individuals with their occupations, and we map each individual occupation to a category that matches the 1831 census categories. We report the conversion table of occupations to occupational categories

²⁴We assume that if a parish does not appear in the Return of Papists, there were no Catholics. Note that the normalization means that the number of observations we have for this variable is equal to the number of observations in the 1831 census.

²⁵The 1831 census is the first proper complete census in England, earlier returns in 1801, 1811 and 1821 are all incomplete and were collected indirectly (for example by asking local priests).

²⁶We have been able to reconstruct census data for about twelve thousand of our parishes. Regressions including variables based on the census will therefore have a lower number of observations than variables that do not include such variables.

in the Appendix, section 5.

Industrialization. In 1838 Parliament ordered a return of the “number of persons employed, of the description of the manufacture, and of the nature and amount of the moving power in all the Factories...” (Parliament, 1839, p. 3). This return records each industrial mill in England indicating its manufacture (cotton, wool, worsted, flax or silk), whether it was water or steam powered and the number of people employed. We coded an indicator variable equal to one if a parish contains at least one textile mill, and a variable measuring the number of mills in a parish. To capture the potential location of manufacturing mills before the Dissolution we record the presence of mills in the fifteenth century (1399-1477) from the Inquisitions post Mortem. Since these surveys record all assets with their manors, we can record whether a manor had a water mill in the fourteenth century.

2.3 Mechanisms

Agricultural Patents. We compute the number of patent holders from the returns of patent holders in Woodcroft (1854), which were previously used by Dowey (2013). These returns record the place of residence of the patent holders and we used this place to geographically locate the patents. We use the count of patents in a particular place, not the count of patentees (there can be multiple patentees on one patent). The variable we construct is the total number of patents that were registered to people living in a parish between 1872 and 1850.

Enclosures. We use data on the location of Parliamentary enclosures from *A Domesday of English enclosure acts and awards* by Tate and Turner (1978) as compiled and analyzed by Heldring, Robinson and Vollmer (2020). We record parishes mentioned in each enclosure act and code a dummy that is equal to one if land in a parish was enclosed between 1750 and 1840.

Threshing machines. Following Caprettini and Voth (2020) we use the presence of threshing machines in a parish as a measure of capital investment. We use their data, which records the number of threshing machines present in a parish between 1800 and 1830.

Agricultural yield. We record wheat yields from the 1836 tithe surveys, digitized by Kain (1986), as our proxy measure of productivity. As part of the tithe commutation act of 1836 which commuted the tithe into money payments, agricultural statistics were collected for large parts of England. After assigning parishes to individual yield observations in this dataset we obtain a sample of 4148 parishes for which we have wheat yield, measured in bushels per acre.

2.4 Control Variables

Lay Subsidies. We record a proxy for income from the lay subsidies at two points in time, 1332 and 1525, as a summary measure of development differences before the Dissolution. The Lay Subsidies taxed movable wealth, and the extant returns record, parish by parish, total tax revenue and the total number of taxpayers. For 1525, our source is the Tudor lay subsidies analyzed by John Sheail (Sheail, 1968, see Hoyle, 1994, for a useful introduction to interpreting Tudor tax subsidies) and for 1332 we rely on Glasscock (1975). The 1525 Lay Subsidy taxed, for each household, the most important source of income of the head of a household, defined as either personal property, landed incomes, or wages (Sheail, 1968, p. 111).²⁷ Tax rates were: a flat rate of four pence per pound if the primary source of income was wage income, one-fortieth (six pence per-pound) on goods and one-twentieth (one shilling per pound) on landed incomes. If the goods were valued at more than twenty pounds, the rate increased to one-twentieth as well. Hence taxation was to some extent progressive. If the household did not earn at least one pound in wages per year, had one

²⁷The returns cover the entire country except the counties Northumberland, Durham, Cumberland, Westmorland and Cheshire (all in the North). The Cinque Ports (Hastings, New Romney, Hythe, Dover and Sandwich) were also omitted. Sometimes there are several returns available (such as one for 1524 and one for 1525). In these cases, we average over the available returns.

pound in landed income per year, or possessed two pounds worth of goods, it was not recorded in the survey. From this data, we record total tax revenue normalized by the number of taxpayers in each parish. The Lay Subsidy for 1332 was similar. It taxed one-tenth of all movable wealth above a threshold, but excepted personal effects like household goods. We proceed similarly, and record total tax revenue, normalized by the number of taxpayers.

2.5 Other Data

We use several geographical covariates. To account for the different sizes of parishes, we control for parish area throughout. Using ArcGIS we compute the distance to London, the distance to the sea or the border with Scotland (whichever one is nearest) and the distance to the nearest river (we include here all rivers with year round water flow (perennial) since we care more about water as a source of power than transport). From the Food and Agricultural Organization we got data on wheat suitability and soil type.²⁸ In ArcGIS we then measure for each of our parishes the soil type and wheat suitability under the centroid in this parish. Ideally, we would like to average over the shape, but the granularity of the suitability and soil type grids is too coarse to enable us to do this. We also control for elevation and slope, again measured under the centroid. To obtain the distance to the nearest coalfield for each parish we digitized a map of the coalfields in England and Wales in 1912 (Strahan, 1912) and computed the distance in ArcGIS. Finally, we control

²⁸The FAO has classified the earth's land surface into 32 reference soil groups, based on observable characteristics such as accumulation of organic matter and porosity (for a full description, see IUSS, 2014). These classifications have been published as a GIS raster file. The most common soil types in our dataset are Cambisols ("Soils with at least the beginnings of horizon differentiation in the subsoil, evident from changes in structure, colour, clay content or carbonate content", p. 143), Gleysols ("Soils with clear signs of groundwater influence", p. 150), Luvisols ("Soils with a pedogenetic clay differentiation (especially clay migration) between a topsoil with a lower and a subsoil with a higher clay content, high-activity clays and a high base saturation at some depth", p. 156) and an "Urban, mining, etc." group. Soil groups differ in irrigation and drainage requirements, salinity, and fertility, and are therefore differentially suitable for agriculture. Cambisols, for instance, "generally make good agricultural land and are used intensively" (p. 144). For Gleysols, on the other hand, "the main obstacle to utilization is the necessity to install a drainage system to lower the groundwater table" (p. 150).

for distance to the nearest market town in 1680. The data come from John Adams' *Index Villaris* which is described above.

2.6 Descriptive Statistics

Table 2 contains the descriptive statistics of our outcome variables, and our variable of interest, an indicator equal to one if a parish was 'monastic'. The first two columns give means and standard deviations of all variables. Subsequent columns give means for parishes that were monastic and parishes that were not. The last two columns provide a t-test of the difference of means. In Appendix Table A-1 we provide summary statistics for all variables used in this paper.

There are several interesting patterns in this table. First, about a third of parishes are monastic, which is in line with the estimates cited in section 1 of the total share of land owned by monasteries being equal to about a third. Second, when we implement a simple difference of means exercise in panel I we see that monastic parishes have more markets, and fewer copyholds. We also see that the number of Gentry is higher, and the number of Catholics lower. Finally, monastic parishes are more likely to have a textile mill, and employment is lower in agriculture and higher in commercialized professions in monastic parishes. We now introduce our estimation framework for estimating the effect of being monastic on these outcomes studied in this section.

2.7 Estimation framework

In this section we present our main estimating equations, and discuss the nature of selection into monastic status.

Our starting point is a simple model which aims to estimate the cross-sectional relationship between the impact of the Dissolution of the Monasteries and our outcome variables.

We estimate the following model using OLS:

$$y_{pc} = \gamma_c + \alpha_M \cdot M_p + \mathbf{X}'_p \cdot \alpha_X + \varepsilon_p \quad (1)$$

Here y_{pc} is our dependent variable of interest in parish p in county c which could be, for instance, the proportion of the labor force employed in agriculture. M_p is an indicator if a monastery owned land in parish p so that α_M is the main coefficient of interest. γ_c is a vector of county fixed effects ($n=44$). The vector \mathbf{X}'_p always includes the physical area of parish p and Lay Subsidy revenues per capita in 1525, as a summary measure of development differences before the Dissolution. Finally, ε_p is a heteroskedasticity robust (White) standard error. We report Conley (1999) standard errors throughout as well, to understand whether spatial correlation affects inference.

In a series of robustness checks, we allow the level of fixed effects to vary, and include numerous covariates in \mathbf{X}'_p . These covariates capture the broad geographical attractiveness of a parish for attracting economic activity, such as the proximity of coal deposits, underlying soil productivity, and proximity to markets or London.

Cross-sectional selection. We naturally face the question of what determines whether a manor is owned by a monastery. Ultimately, as we described in section 2, this is the product of a long historical process, starting with the founding of early Benedictine monasteries after the collapse of the Roman empire. Because most of these early monasteries were destroyed in Viking raids, the most important defining event for the distribution of monastic properties was the Norman Conquest in 1066. William the Conqueror redistributed virtually all land in England to his knights and to abbots of new monasteries. This introduced the continental orders to England (e.g. Franciscans, Cluniacs), and reshaped the pattern of land ownership in England. We saw that in the immediate aftermath of the conquest, monasteries did not get particularly (un)attractive land. But, subsequent patterns of bequest of land to the monasteries may have favored land that was more desirable.

We approach this issue firstly through the use of covariates, the most important ones being differences in development as captured by income in the Lay Subsidies and county fixed effects. These covariates ensure that we make local comparisons. If historically monasteries were simply located in the richest or most productive parts of the country, we would not expect to see a relationship between the Dissolution and industrialization, conditional on our covariates. It may of course still be the case that there are unobservables that vary at the parish level that correlate with subsequent development, and are not captured by pre-existing income differences. We can not rule this out, but we think it is relatively unlikely in light of the overall development of the English economy between the late Middle Ages and the Industrial Revolution. Before the Dissolution, the richest and most developed part of England was the South, which was heavily involved in wool trade with the Continent. The Industrial Revolution made the North the richest part of the country (Darby et al, 1979). Our results are therefore more likely to be confounded by monastic and non-monastic parishes being on different *trends*.

Trends, and comparisons over time. The second part of our empirical analyses instead focuses on differences over time. For most of our outcome variables, we observe data at two points in time, after the Dissolution early on in the Industrial Revolution, and in the later Middle Ages. This allows us to estimate changes over time, comparing changes in monastic parishes to changes in non-monastic parishes. We do so by estimating the following model:

$$y_{pt} = \beta_M \cdot M_p \cdot T_{post} + T_{post} + r_p + \nu_{pt} \quad (2)$$

Where now y_{pt} is an outcome of interest for parish p either before or after the Dissolution, $t \in \{pre, post\}$. T_{post} is a time-period fixed effect and $M_p \cdot T_{post}$ measures the effect of a parish being monastic after the Dissolution. Since r_p is a vector of parish fixed effects, β_M measures the change over the Dissolution in monastic parishes, relative to the same change

in non-monastic parishes. ν_{pt} is a heteroskedasticity robust standard error, clustered at the parish level. For each outcome, we restrict the sample to create a balanced two-period panel. In practice this means we restrict to parishes for which we have pre-Dissolution data.

In order for a comparison of changes to be identified, we require monastic and non-monastic parishes to be on parallel pre-trends. We assess this assumption in Table 3, using data from the Domesday book for 1066, before the Conquest, and for 1086, after the conquest, and the Lay Subsidies of 1332 and 1525. We compute the changes in income or tax revenue per capita/tax payer in between each of these surveys, and estimate equation 1 using these measures as the dependent variable.²⁹ Columns report the different pairwise comparisons, and our indicator for a parish being monastic is the variable of interest. We report standardized coefficients (coefficients obtained after subtracting from each outcome and right hand side variable its mean and dividing by its standard deviation). Row 1 reports results. For example, column (1) uses the change in tax revenue per tax payer in between the 1332 and 1525 Lay Subsidies as the dependent variable. If we find that our monastic indicator is correlated with this measure this means that monastic parishes are growing differently than non-monastic parishes between 1525 and 1332. We find a small and insignificant coefficient. We find similarly small coefficients for each pairwise comparison. This suggests that, on average, monastic parishes were not on different trends prior to the Dissolution.

The Reformation as a simultaneous shock. When we estimate equation 2 we include parish fixed effects, accounting for any unobserved level differences between parishes. Because monastic parishes are not on different pre-trends, we capture the change in outcome variable due to the expropriation of Monastic parishes, subject to one important

²⁹Before we compute percentage changes, we min-max rescale each measure to obtain unit-free measures. We also omit the Lay Subsidy covariate from equation 1 since it is now part of the construction of the dependent variables.

caveat. An informal requirement for models like ours is that any effects are observed close in time to treatment. If this isn't the case, other shocks may have happened that correlate with the Dissolution. The most natural candidate for such a shock is the Reformation itself. The Reformation had two main effects that are relevant for our study: the conversion of Catholics to Anglicans, and the pensioning off of monks and nuns. We discussed the first shock at length in section 1, and we will test for a direct effect of the Dissolution on the presence of Catholics below. The effect of the removal of monks may be important, in light of previous contributions emphasizing the cultural importance of the presence of monks and nuns (Andersen et al., 2017). Note that, however, we measure the impact of the Dissolution using data on where the monks owned land and were landlords. This does include parishes with the monastic buildings themselves. In the Appendix, we implement a robustness check that restricts the sample to parishes that are far away from monastic buildings. It may also be the case that the Dissolution proxies for a future correlated shock. However, the consensus in the historical literature on agricultural development certainly is that the Dissolution was a watershed event, perhaps only rivalled by the Parliamentary Enclosure movement in terms of impact on the countryside, but we cannot rule out that there is some unmeasured other shock affecting our results. Subject to this caveat, we pursue our interest in the long-run effect of the Dissolution, and we refer to estimates from our model as 'long-diff' estimates, emphasizing this aspect of our study.

2.8 Markets and copyhold

We argued that the Dissolution had two early impacts. First, by making land available on the land market that was not previously tradable, the Dissolution facilitated matching of productive individuals to land. Monastic land, in addition, was less encumbered by perpetual copyhold tenure. This meant that land tenure contracts would lapse after the Dissolution and could be renegotiated.

In this section we attempt to measure both these impacts. We have no means to directly measure the depth of land markets, but we hypothesized that the greater levels of investment and productivity induced by the Dissolution should have spurred markets more broadly. We therefore use as an outcome variable presence of local goods markets from Letters et al. (2003). To measure copyhold, we count the number of copyholds that were converted in the nineteenth century. For the sixteenth century, we count the number of copyholds in a smaller set of parishes from Davenport and Leadam (1898).

Table 4 shows results. We find that monastic parishes are 9 percentage points more likely to have a surviving market, relative to a mean of 0.3. As we noted in the data section, the sample consists of parishes that had a market in 1516. The sample average therefore shows that one-third of parishes that had a market in 1516 still had a market in 1600. In monastic parishes, the survival rate is 9 percentage points higher. As a verification, we find an equal treatment effect in column (2), estimating equation 2. In column (3) and (4) we test for the presence of copyhold. In column (3), we find a negative treatment effect, indicating that between 1842 and 1883, monastic parishes had fewer surviving copyholds. This effect is negative, but imprecisely estimated. Importantly, however, we can compare changes over time in column (4). We find that in the balanced sample of parishes for which we have information before the Dissolution, the Dissolution is associated with a large reduction in the number of copyholds equal to about 23% of the sample mean of the nineteenth century copyholds (The overall sample mean is lower since the number of recorded contracts per parish is lower in the sixteenth century data). Since after the Dissolution, copyhold for lives contracts got converted into shorter leases on both monastic and non-monastic lands (Youings, 1967), we interpret the lower incidence of copyhold on monastic lands as consistent with our claim that perpetual copyhold - surviving into the nineteenth century - was lower on monastic lands before the Dissolution.

These results are consistent with the idea that the impact of the Dissolution was to

increase the dynamism of markets, and that, prior to the Dissolution, monastic lands were relatively less encumbered by perpetual copyhold tenure, and validate our use of the Dissolution as a shock to the legacy of feudal land tenure in England. In the rest of the paper, we test the long-run impact of the Dissolution.

3 Main Results

In this section we present the main results of our paper. We first focus on social changes brought by the commercialization of the countryside. Tawney’s famous ‘Rise of the Gentry’ thesis posited that the Dissolution facilitated the rise in income and social status of the Gentry, a social class of commercial farmers, in between the feudal lords and yeomen. We find that monastic parishes are home to more members of the Gentry in 1700. Due to the taxation and formal repression of Catholics, it was much less attractive to be Catholic in places that rapidly transformed after the Dissolution. As a result, we find fewer Catholics in monastic parishes in 1767. We then estimate the reduced form effect of the Dissolution on economic outcomes during the Industrial Revolution. We find that parishes that were impacted by the Dissolution employ fewer people in agriculture and more in trade and handicraft. Finally, these parishes were more likely to be industrialized in the nineteenth century.

3.1 The Rise of the Gentry and Catholic conversion

We study the effect of the Dissolution on the presence of Gentry and Catholics in Table 5. In column (1) we use the number of Gentry in 1700 as our outcome. Most parishes with Gentry are home to one gentleman, but some central London parishes have up to 12 gentlemen. On average, parishes have 0.67 gentlemen, and the median parish has none. In column (2) we use our data from the Inquisitions Post Mortem to understand the pre-

Dissolution distribution of Gentry. Here we rely on titles, such as ‘Knight’, to identify those who are precursors of the later commercial gentry (Coss, 2005). Parishes have a maximum of two gentlemen in the fifteenth century. However, we cannot distinguish between where a gentleman lives, and where he owns land. Therefore, the median parish in this data source has one gentleman. On average, parishes have 0.74 gentlemen. We do not think that this matters very much for our results. First, all Gentry-owned parishes are in the control group because they are not owned by monasteries. Therefore, if we over-estimate the number of Gentry in the control group, our estimates will be biased downwards. Second, we account for the period-specific mean number of Gentry through time fixed effects.

In column (3) we use the number of Catholics in 1767, normalized by population from the first reliable census, from 1831. The median parish does not have any Catholics. Some parishes have a large number of Catholics. East Lulworth, for example, is home to 114 Catholics in 1767 and was, from 1786 onward, also home to the first newly built Catholic chapel in England after the Reformation. As a validation, in column (4), we in addition assume that everyone was Catholic before the Dissolution estimate equation 2 using the share of Catholics as the dependent variable as well.

Columns (1) and (2) study the the presence of the Gentry. We find positive and significant effects in both our OLS and ‘long-diff’ models. We find that the effect of the Dissolution is associated with a 0.2 (s.e. 0.02) increase in the number of Gentry, relative to a sample mean of about 0.7. This result is as far as we are aware the first test of the connection made by Tawney between the Dissolution and the ‘Rise of the Gentry’ (Tawney, 1941a,b).³⁰ More broadly, this result is consistent with the case study evidence cited in section 2 on the Gentry being able to take advantage of the opportunities offered by the Dissolution.

In columns (3) and (4) we test for the effect of the Dissolution on the geographical

³⁰Jha (2015), using different sources of information, fails to find support for Tawney’s secondary claims about the Gentry’s role in the English Civil War.

spread of Catholics. We find that monastic parishes have a significantly lower share of Catholics in the cross-section (column (3)) as well as in our panel (column (4)). In Column (3), for example, we find that the fraction of Catholics is about one percentage point lower in monastic parishes, relative to a sample mean of 3 percent. We validate this result in column (4), subject to the caveat that the pre-period share of Catholics is artificially set to 1 everywhere.

Naturally, an important open question is whether having Gentry or Catholics is associated with improved or worse economic outcomes. We return to this point below.

3.2 Occupational structure

In Table 6 we directly study the commercialization thesis. The core of this thesis is the notion that as the technological changes that precipitated the Industrial Revolution unfolded, England was particularly well positioned to take advantage of its opportunities because factors of production, especially labor, were more mobile. In column (1), we use the fraction of the adult male labor force employed in agriculture to test this idea. In column (2) we estimate our long-diff model, using the share of individuals in agriculture in the 1381 poll tax as our pre-Dissolution observation. Note that due to the different divisors (adult male population, or total population), the share of the labor force employed is higher in 1831. Naturally, we difference these means out. In columns (3)-(4) we look at more ‘commercialized’ professions. In the 1831 census, these are individuals employed in ‘trade and handicraft’. We code professions in the 1831 poll tax to match this category.

In Table 6, as before, odd columns present estimates of equation 1 and even columns present estimates of equation 2. In column (1) we show the cross-sectional estimated effect of the Dissolution on employment in agriculture. We find a negative and statistically significant effect of being Monastic on the fraction of males over 20 in agriculture. This effect is virtually all absorbed by a commensurate increase in the fraction of males over 20

in trade or handicraft, which goes up. Monastic parishes see a 3 percentage point reduction in employment in agriculture, and 2 percentage point increase in employment in industry. Relative to its mean of 62%, the reduction in agricultural employment does not appear to be large. But, most of this decrease goes into an increase in employment in trade and handicraft. A 2 percentage point increase in employment in industry is about 11 percent of its mean. In columns (2) and (4) we instead estimate ‘long-diff’ effects. We find similar effects, especially for employment in trade and handicraft. We find a larger estimated negative effect for employment in agriculture, which may be due to the smaller sample size as a consequence of the lower number of parishes enumerated as part of the fourteenth century poll tax.

The commercialization thesis’ objective is to explain industrialization. In the next section, we therefore directly estimate the reduced form effect of the Dissolution on industrialization.

3.3 Textile mills

In this section we estimate the effect of the Dissolution on industrialization. We code an indicator equal to one if a parish was home to a textile mill in 1838 to capture the location of the Industrial Revolution. We also construct a count variable for the number of mills. When we show estimates of equation 1 we measure these variables in 1838. When we show estimates of equation 2 we instead measure mills in either the 14th century or in 1838, as described in section 2.

Column (1) of Table 7 provides estimates of equation 1 using the mill indicator as the dependent variable. The estimated effect of the Dissolution is in row 1. Column (2) provides estimates of equation 2, using the same outcome variable. The estimated effect of the Dissolution is in row 2. Columns (3) and (4) follow the same structure but use the number of mills as the dependent variable. We find a strong, positive relationship

between the Dissolution and the location of industrial activity, using either model. Take the estimated effect in column (1), $\hat{\alpha}_M = 0.01$ (s.e. 0.004). This estimate implies that monastic parishes are more likely to have a textile mill in 1838, with the effect size about equal to one quarter of the sample mean. In column (2), we re-estimate the effect of the Dissolution in our two-period panel, where we control for parish fixed effects. Since we have data on pre-Dissolution mills, we study whether the Dissolution differentially increased the presence of mills. We find a very similar treatment effect, 0.01 (clustered s.e. 0.006). Monastic parishes are about 25 percent more likely to have a textile mill than non monastic parishes. This estimate also suggests that the presence of ‘wrights’ in some parts of the country does not confound our results (Mokyr et al., 2020). When we look at the scale of industrialization in columns (3)-(4), monastic parishes are also more industrialized on the intensive margin, although these results are less precisely estimated.

Our results on textile mills and employment speak most directly to the hypothesis advanced by Pirenne (1927, 1936), Polanyi (1944) and Hicks (1969). Their argument was that the commercialization or ‘marketization’ of the English economy led to labor being able to freely be reallocated to new economic opportunities when they arose. Consistent with these ideas, we find that the Dissolution impacts the composition of the labor force and, ultimately, industrialization.

3.4 Robustness

In the Appendix we undertake a large number of robustness checks which we will only briefly mention here. In section 4 of the Appendix we discuss all robustness checks at length. The most important exercise we do is to vary our fixed effects. In our baseline tables we compare parishes within each of 44 counties. In Table A-3 and A-4 we vary this. In Table A-3 we report our results without any covariates. Not only do our results go through, but our estimated effects are very similar. In Table A-4 we first tighten our

fixed effects, using ‘hundred’ fixed effects (hundreds are an administrative unit in between counties and parishes; there are about 900 hundreds). Then we construct a grid which we overlay on England, and use to add 10 by 10 kilometer grid cell fixed effects and 5 by 5 kilometer grid cell fixed effects. In our full sample, there are about 5,100 5 by 5 kilometer grid cells which means that we have on average about three parishes in each cell. In all these exercises, our estimated effects are very similar to our baseline effects, showing that unobservables that vary above the parish level are unlikely to confound our results. This finding is consistent with the idea that the parish is a natural historical economic unit of analysis, as it coincides with historical manors.

In Table A-5 we include a large number of additional geographical covariates. Our results are unchanged, but some of our estimated effects are of independent interest. In line with the arguments made by Pomeranz (2000), Allen (2009), and Wrigley (2010), for example, we find that parishes closer to coalfields are more likely to industrialize. This effect operates independently from the effect of the Dissolution. In Table A-6 we show that we can substitute our monastic parish indicator with a continuous measure of the impact of the Dissolution without repercussions for our results.

In Table A-7, we follow Andersen et al., (2017) and study the Cistercians. They argue that the Cistercians were involved in human capital transmission which may have had a long-run effect. We expect this effect to be muted in our data because we focus on variation in where the monasteries owned land rather than where the monks lived. Nevertheless, we show that our results are robust to removing all manors owned by Cistercians from our sample.

4 Mechanisms

In the previous section we showed that the Dissolution is positively associated with the rise of the Gentry, with fewer Catholics present, and - ultimately - industrialization. In this

section we focus on several plausible mechanisms linking the Dissolution to these outcomes, and especially the Gentry to industrialization. Specifically, we study innovation, enclosure, capital investment, and agricultural yields. Each outcome captures a form of investment or innovation, which - in line with the case study evidence on the capital investment of the Gentry we cited in section 2 - is the type of change that would be facilitated by better developed factor markets or more commercially minded Gentry.

In column (1), we use the number of agricultural patents filed by residents of parish p in the period 1672-1850. In total we have 388 patents in our data, and 95% of patents are filed after 1780. The majority of the patents have to do with machinery. For example, we observe several patents for improved ploughs, seed drills, or for finishing wool. For 234 patentees we have occupation data, and 52 (22%) of these patentees are members of the Gentry, which constitute the largest single occupation group. This number is far larger than, for example engineers (16). When we aggregate smaller professions such as cloth manufacturer and cotton spinner into elite (nobility, lawyers, professors), Gentry, skilled artisans and farmers, the artisans constitute the largest occupational category. In column (2) we instead measure enclosure during the Parliamentary enclosure movement. Heldring et al. (2020) provide an introduction to these data. Enclosure was a legal procedure which assigned private property rights to commonly owned and governed lands. The enclosure process had to be initiated by landowners, and more commercially minded individuals, such as the Gentry, may be more likely to push for enclosure. Heldring et al. (2020) find that enclosure is associated with higher productivity in agriculture. Here we ask whether enclosure is more likely to occur on monastic parishes. In column (3), we directly measure capital investment, by measuring the number of threshing machines in a parish. We observe 409 parishes with threshing machines, and the median parish with a threshing machine has one. Finally, in column (4) we measure wheat yield in bushels per acre. We do not have pre-Dissolution observations for these variables, and we therefore estimate equation 1 for

these outcomes.

Table 8 reports results. In column (1) we use the number of agricultural patents as the dependent variable. We find a significantly higher number of patents filed by residents of monastic parishes. The increase, 0.02 (s.e. 0.007) is equal to the sample mean. In column (2) we use our enclosure indicator as the dependent variable, and find that monastic parishes are 8 percentage points more likely to be enclosed by Parliament, relative to a mean of 0.37. In column (3) we find that monastic parishes have more threshing machines. Finally, in column (4) we find that monastic parishes have higher wheat yields.

5 Comparing Catholics and Gentry

In Table 9 we take our intermediate results on the Catholics and the Gentry and study their correlation with industrialization. Both variables capture potentially important channels of transmission from the Dissolution to the Industrial Revolution, but they capture different aspects. We interpret the presence of Gentry, following Tawney, as a direct outcome of increased economic dynamism and commercialization of the countryside. The presence of Catholics plausibly also affects economic development through other mechanisms, such as discrimination, as we saw in section 2.

In column (1) we simply estimate equation 1 with our mill indicator as the dependent variable and the share of the population that is Catholic in 1767 as the right hand side variable. We find a negative and significant correlation with economic development. The mean share of Catholics is about 3 percent. This implies that in parishes with a share of Catholics which is higher by its mean is associated with a decline in the probability of having a mill of about 10% of its sample mean. This effect is consistent with both repression of Catholics, as well as arguments that put an emphasis on cultural attitudes of Catholics being less conducive to investment (Weber, 1905). For Gentry, we observe the opposite correlation (column (2)). Having an additional member of the Gentry is associated with

a higher probability of having a mill by about 25% of its sample average, consistent with the evidence in section 1 on the involvement of the Gentry in funding and engaging in industrialization. It is important to note that neither of these results are interpretable as causal.

An interesting question is whether these mechanisms operate separately, or that in parishes where people remained Catholic fewer Gentry ‘rose’. In column (3) we include both measures simultaneously. Both point estimates are unchanged and equally precisely estimated, suggesting that the presence of Catholics and Gentry are orthogonal correlates with industrialization. A final question we ask is whether the Catholics and Gentry jointly explain the full effect of the Dissolution. We do not expect this to be the case since our hypothesis is that the increased dynamism of the land and labor markets affected farmers as much as Gentry by ‘freeing’ them from the legacy of feudal land tenure relationships. In column (4) we include our indicator for monastic parishes as an additional regressor as well, and we find that it correlates with industrialization, even when we include the share of Catholics and number of Gentry.

6 Conclusions

In this paper we conducted what to our knowledge is the first empirical investigation of one aspect of the salient commercialization thesis about the causes of industrialization and the industrial revolution in England. Though we cannot test the idea that it was commercialization that caused the industrial revolution, we used the impact of the Dissolution of the monasteries in England between 1536 and 1540 as a source of variation in the extent of commercialization within England. Tawney (1941a,b) first proposed that the Dissolution and subsequent sell off of church land, representing around 1/3 of agricultural land in England, created a huge shock to the land market with profound consequences. We argue that this can be viewed as a natural experiment in the modernization of economic institutions

and we hypothesized that the subsequent thickening of the land market would have had a major positive impact on resource allocation and incentives. This was particularly because monastic lands were relatively free of customary perpetual copyhold tenancies which were a direct legacy of feudalism. To investigate this we digitized the 1535 Valor Ecclesiasticus, the census that Henry VIII commissioned on monastic incomes.

Using the presence of monastically owned land at the parish level as our main explanatory variable we showed that the Dissolution had significant positive effects on industrialization which we measured using data from the 1838 Mill Census, the first time the British government collected systematic data on this driving sector of the Industrial Revolution. We also showed the Dissolution was associated with structural change, specifically the movement of labor out of agriculture and into more industrialized sectors of the economy.

We then examined several channels which might link the Dissolution to these long-run outcomes. We showed that the Dissolution was associated, as Tawney hypothesized, with social change and the rise of a new class of commercially minded farmer. It was also associated with faster conversion from Catholicism, another factor plausibly linked to better economic performance.

We further found the Dissolution to be associated with greater agricultural investment, measured by parenting and land enclosures, and higher wheat yields.

All in all, our findings support a quite traditional theory of the industrial, and perhaps the agricultural, revolution; that it was at least partially caused by the increasing commercialization of the economy which had a series of institutional, social and economics effects.

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³¹Though it is not the focus of our analysis, our findings also support other channels, such as the importance of the presence of natural resources emphasized by Clark and Jacks (2007), Allen (2009), Crafts and Wolf (2014) and Fernihough and O'Rourke (2014).

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Figure 1: Spatial distribution of Monastic property. A cross indicates a location of a monastery around 1535. These we plot for both England and Wales, as well as a single monastery on the Isle of Man. Dots indicate at least one monastic manor in a parish in 1535. These we plot for England only.

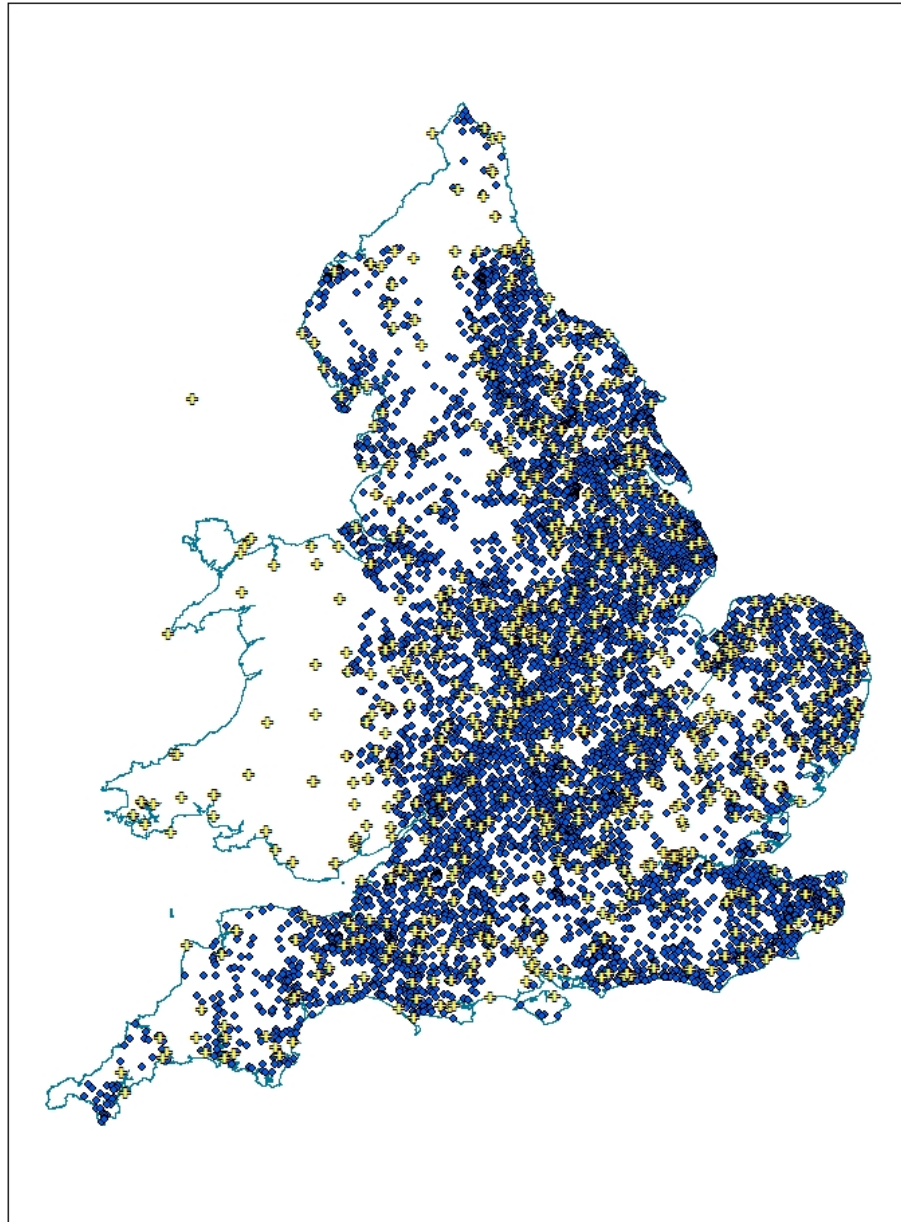
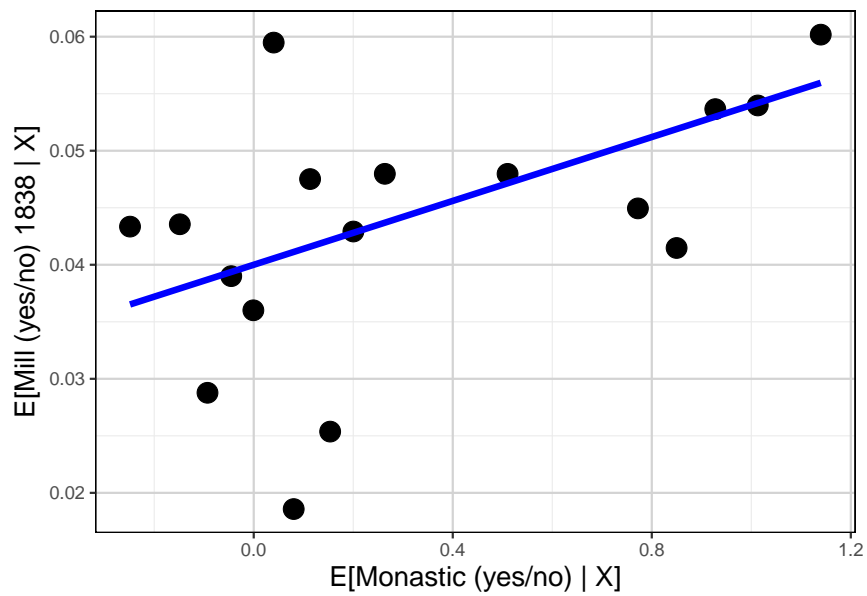
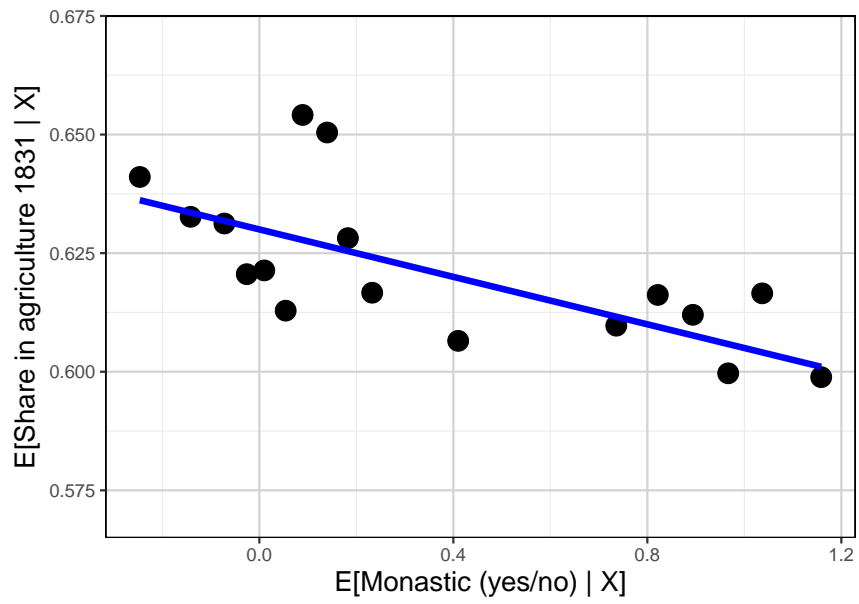


Figure 2: The Dissolution and industrialization in 1838



The regression line is fitted on our full dataset. The dots summarize the data by computing the mean of the monastic and mill indicators within 17 bins of values of the monastic indicator, after partialling out income per capita in the 1525 Lay Subsidies, parish area and a vector of county fixed effects.

Figure 3: The Dissolution and employment in agriculture in 1831



The regression line is fitted on our full dataset. The dots summarize the data by computing the mean of the monastic indicator and the share of males over 20 in agriculture in 1831 within 17 bins of values of the monastic indicator, after partialling out income per capita in the 1525 Lay Subsidies, parish area and a vector of county fixed effects.

Table 1: DISTRIBUTION OF LANDOWNERSHIP IN ENGLAND IN 1436 AND 1688: PERCENTAGES OF CULTIVATED LAND OWNED

	1436	1688
Aristocracy and greater Gentry	15-20	15-20
Middling and lesser Gentry	25	45-50
Yeomen, family farmers and other small owners	20	25-33
Church & Crown	25-35	5-10

Notes: Adapted from Clay (1986, p. 143)

Table 2: SUMMARY STATISTICS FOR SELECTED OUTCOME VARIABLES

	N	Mean	S.D.	Non-Monastic	Monastic	Difference	t-stat
<i>Panel I: Post-Dissolution</i>							
Monastic (yes/no)	16290	0.32	0.47				
Market (yes/no) 1600	2146	0.31	0.46	0.27	0.35	0.08	4.01
Copyhold count 1842-83	2075	6.75	15.75	7.13	5.95	1.18	1.60
Number of Gentry 1700	16290	0.67	1.00	0.58	0.87	0.29	17.61
Share Catholic 1767	12546	0.03	0.11	0.04	0.02	-0.01	-7.65
Share in agriculture 1831	12859	0.62	0.25	0.62	0.62	-0.01	-1.82
Share in trade/handicraft 1831	12859	0.18	0.13	0.17	0.19	0.02	7.86
Mill (yes/no) 1838	16290	0.04	0.20	0.04	0.05	0.01	2.26
Nr. of Mills 1838	16290	0.16	2.28	0.14	0.19	0.05	1.34
<i>Panel II: Pre-Dissolution</i>							
Monastic (yes/no)	16290	0.32	0.47				
Copyhold count 1520	155	0.41	0.88	0.34	0.54	-0.20	-1.33
Number of Gentry 1399-1477	9321	0.74	0.45	0.73	0.77	0.04	4.41
Share in agriculture 1381	1035	0.35	0.34	0.33	0.37	0.04	1.78
Share in trade/handicraft 1381	1035	0.12	0.18	0.12	0.13	0.01	0.91
Mill (yes/no) 1399-1477	9321	0.06	0.24	0.06	0.06	0.00	0.14
Nr. of Mills 1399-1477	9321	0.07	0.29	0.07	0.07	0.00	0.29

Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Market (yes/no) is an indicator if a parish had a market. Copyhold count is the number of copyhold contracts recorded in a parish. Number of Gentry is the number of members of the Gentry that live in a parish in 1700. For the fifteenth century, it is the number of Gentry either living in a parish, or owning the manor in a parish. Share Catholic is the number of Catholics that live in a parish in 1767 normalized by population. Before the Dissolution, we assume everyone was Catholic. Share in agriculture is the share of the population (male, over 20 years old) employed in agriculture, for 1831. For 1381, it is the share of the total working population employed in agriculture, male and female, in the 1381 poll tax. Share in trade/handicraft is the share of the population (male, over 20 years old) employed in trade or handicraft, for 1831. For 1381, it is the share of the total working population employed in trade or handicraft, male and female, in the 1381 poll tax. Mill (yes/no) is an indicator equal to one if a parish had a textile mill in 1838, or a water mill in the fifteenth century. Nr. of Mills is the number of textile mills a parish had in 1838, or the number of water mills in the fifteenth century.

Table 3: TRENDS BEFORE THE DISSOLUTION

<i>Dep. var: % change in income/revenue p.c. between</i>	1332-1525	1086-1525	1066-1525	1086-1332	1066-1332	1066-1086
	(1)	(2)	(3)	(4)	(5)	(6)
Monastic (yes/no)	0.0139 (0.0121)	-0.00844 (0.0125)	0.0149 (0.0129)	-0.0198 (0.0201)	-0.00879 (0.0242)	0.00145 (0.0126)
Control for parish area	Y	Y	Y	Y	Y	Y
County fixed effects	Y	Y	Y	Y	Y	Y
Conley Standard Error	0.0121	0.0125	0.0128	0.0200	0.0240	0.0125
Observations	6645	7105	5480	3928	2757	5480
Nr. fixed effects	34	40	40	28	28	40
R^2	0.04	0.01	0.03	0.02	0.05	0.06

Notes: All regressions are estimated using OLS. The unit of observation is a parish. The dependent variables are percent changes in tax revenue or income per capita or per tax payer between four surveys, the 1525 Lay Subsidy, the 1332 Lay Subsidy, which record tax revenue and the 1086 Domesday survey, and the 1066 Domesday survey, which record income. We min-max rescaled revenue or income recorded in each survey, by subtracting the maximum value, and dividing by the range (max-min). We compute percentage changes between surveys using these rescaled measures. Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table 4: THE DISSOLUTION, MARKETS AND COPYHOLD

<i>Dep. var.:</i>	Market (yes/no) 1600	Market (yes/no)	Copyhold count 1850	Copyhold count
	(1)	(2)	(3)	(4)
<i>Model:</i>	<i>OLS</i>	<i>Long-diff</i>	<i>OLS</i>	<i>Long-diff</i>
Monastic (yes/no)	0.09*** (0.021)		-0.18 (0.758)	
Monastic (yes/no) * Post-Dissolution		0.08*** (0.020)		-1.63** (0.678)
Control for Lay Subsidy revenue	Y	Y	Y	Y
Control for parish area	Y	Y	Y	Y
County fixed effects	Y	N	Y	N
Parish fixed effects	N	Y	N	Y
Post-Dissolution fixed effect	N	Y	N	Y
Conley Standard Error	0.021	0.020	0.750	0.674
Mean dep. var.	0.31	0.66	7.00	0.84
Observations	2144	4292	2394	310
Nr. fixed effects	43	2146	42	155
R^2	0.06	0.76	0.07	0.51

Notes: All regressions are estimated using OLS. The unit of observation is a parish. For our *long-diff* models, columns (2) and (4), we observe parishes twice, before and after the Dissolution. Market (yes/no) is an indicator if a parish had a market. Copyhold count is the number of copyhold contracts recorded in a parish. Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Post-Dissolution is an indicator equal to one for observations measured after the Dissolution. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Parish fixed effects are indicators for ancient parishes. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. In columns (2) and (4) these are clustered at the parish level. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table 5: THE DISSOLUTION AND SOCIAL CHANGE

<i>Dep. var.:</i>	Nr. Gentry 1700	Nr. Gentry	Share catholic 1767	Share catholic
	(1)	(2)	(3)	(4)
<i>Model:</i>	<i>OLS</i>	<i>Long-diff</i>	<i>OLS</i>	<i>Long-diff</i>
Monastic (yes/no)	0.23*** (0.018)		-0.01*** (0.002)	
Monastic (yes/no) * Post-Dissolution		0.20*** (0.025)		-0.01*** (0.002)
Control for Lay Subsidy revenue	Y	Y	Y	Y
Control for parish area	Y	Y	Y	Y
County fixed effects	Y	N	Y	N
Parish fixed effects	N	Y	N	Y
Post-Dissolution fixed effect	N	Y	N	Y
Conley Standard Error	0.018	0.025	0.002	0.002
Mean dep. var.	0.67	0.77	0.03	0.51
Observations	16243	18642	12522	25092
Nr. fixed effects	43	9321	42	12546
R^2	0.12	0.52	0.17	0.99

Notes: All regressions are estimated using OLS. The unit of observation is a parish. For our *long-diff* models, columns (2) and (4), we observe parishes twice, before and after the Dissolution. Number of Gentry is the number of members of the Gentry that live in a parish in 1700. For the fifteenth century, it is the number of Gentry either living in a parish, or owning the manor in a parish. Share Catholic is the number of Catholics that live in a parish in 1767 normalized by population. Before the Dissolution, we assume everyone was Catholic. Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Post-Dissolution is an indicator equal to one for observations measured after the Dissolution. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Parish fixed effects are indicators for ancient parishes. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. In columns (2) and (4) these are clustered at the parish level. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table 6: THE DISSOLUTION AND OCCUPATIONAL STRUCTURE

<i>Dep. Var.: Share of working population in</i>	Agriculture 1831	Agriculture	Trade/handicraft 1831	Trade/handicraft
<i>Model:</i>	(1) <i>OLS</i>	(2) <i>Long-diff</i>	(3) <i>OLS</i>	(4) <i>Long-diff</i>
Monastic (yes/no)	-0.03*** (0.005)		0.02*** (0.003)	
Monastic (yes/no) * Post-Dissolution		-0.07** (0.027)		0.02* (0.013)
Control for Lay Subsidy revenue	Y	Y	Y	Y
Control for parish area	Y	Y	Y	Y
County fixed effects	Y	N	Y	N
Parish fixed effects	N	Y	N	Y
Post-Dissolution fixed effect	N	Y	N	Y
Conley Standard Error	0.005	0.027	0.003	0.013
Mean dep. var.	0.62	0.47	0.21	0.16
Observations	12831	1754	12831	1754
Nr. fixed effects	42	877	42	877
R^2	0.10	0.63	0.11	0.71

Notes: All regressions are estimated using OLS. The unit of observation is a parish. For our *long-diff* models, columns (2) and (4), we observe parishes twice, before and after the Dissolution. Share in agriculture is the share of the population (male, over 20 years old) employed in agriculture, for 1831. For 1381, it is the share of the total working population employed in agriculture, male and female, in the 1381 poll tax. Share in trade/handicraft is the share of the population (male, over 20 years old) employed in trade or handicraft, for 1831. For 1381, it is the share of the total working population employed in trade or handicraft, male and female, in the 1381 poll tax. Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Post-Dissolution is an indicator equal to one for observations measured after the Dissolution. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Parish fixed effects are indicators for ancient parishes. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. In columns (2) and (4) these are clustered at the parish level. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table 7: THE DISSOLUTION AND INDUSTRIALIZATION

<i>Dep. var.:</i>	Mill (yes/no) 1838	Mill (yes/no)	Nr. mills 1830	Nr. mills
	(1)	(2)	(3)	(4)
<i>Model:</i>	<i>OLS</i>	<i>Long-diff</i>	<i>OLS</i>	<i>Long-diff</i>
Monastic (yes/no)	0.01*** (0.004)		0.11** (0.052)	
Monastic (yes/no) * Post-Dissolution		0.01** (0.006)		0.11** (0.052)
Control for Lay Subsidy revenue	Y	Y	Y	Y
Control for parish area	Y	Y	Y	Y
County fixed effects	Y	N	Y	N
Parish fixed effects	N	Y	N	Y
Post-Dissolution fixed effect	N	Y	N	Y
Conley Standard Error	0.004	0.006	0.052	0.052
Mean dep. var.	0.04	0.05	0.16	0.09
Observations	16243	18642	16243	18642
Nr. fixed effects	43	1	43	1
R^2	0.05	0.53	0.02	0.50

Notes: All regressions are estimated using OLS. The unit of observation is a parish. For our *long-diff* models, columns (2) and (4), we observe parishes twice, before and after the Dissolution. Mill (yes/no) is an indicator equal to one if a parish had a textile mill in 1838, or a water mill in the fifteenth century. Nr. of Mills is the number of textile mills a parish had in 1838, or the number of water mills in the fifteenth century. Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Post-Dissolution is an indicator equal to one for observations measured after the Dissolution. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Parish fixed effects are indicators for ancient parishes. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. In columns (2) and (4) these are clustered at the parish level. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table 8: MECHANISMS

<i>Dep. var.:</i>	Nr. Patents	Enclosure	Nr. of threshing machines	Wheat yield
	(1)	(2)	(3)	(4)
Monastic (yes/no)	0.02*** (0.007)	0.08*** (0.008)	0.01*** (0.004)	0.24* (0.134)
Control for Lay Subsidy revenue	Y	Y	Y	Y
Control for parish area	Y	Y	Y	Y
County fixed effects	Y	Y	Y	Y
Conley Standard Error	0.007	0.008	0.004	0.133
Mean dep. var.	0.02	0.37	0.03	21.71
Observations	16243	16243	16243	4025
Nr. fixed effects	43	43	43	42
R^2	0.00	0.19	0.05	0.30

Notes: All regressions are estimated using OLS. The unit of observation is a parish. Nr. of patents filed by residents is the number of agricultural patents filed by residents between 1750 and 1830. Enclosure (yes/no) is an indicator equal to one if a parish was enclosed at any point between 1750 and 1830. Nr. of threshing machines is the number of threshing machines in a parish between 1800 and 1830. Wheat yield (bushels per acre) is the number of bushels of wheat that a typical acre yields in 1840. Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table 9: MECHANISMS COMPARISON - INDUSTRIALIZATION

<i>Dep. var.:</i>	Mill (yes/no) 1838			
	(1)	(2)	(3)	(4)
Share Catholic 1767	-0.11*** (0.016)		-0.10*** (0.016)	-0.10*** (0.016)
Number of Gentry in 1700		0.01*** (0.002)	0.01*** (0.002)	0.01*** (0.002)
Monastic (yes/no)				0.01*** (0.004)
Control for Lay Subsidy revenue	Y	Y	Y	Y
Control for parish area	Y	Y	Y	Y
County fixed effects	Y	Y	Y	Y
Mean dep. var.	0.04	0.04	0.04	0.04
Observations	12522	16243	12522	12522
R^2	0.05	0.05	0.05	0.05

Notes: All regressions are estimated using OLS. The unit of observation is a parish. Mill (yes/no) 1838 is an indicator equal to one if a parish had a textile mill in 1838. Share Catholic is the number of Catholics that live in a parish in 1767 normalized by population. Before the Dissolution, we assume everyone was Catholic. Number of Gentry is the number of members of the Gentry that live in a parish in 1700. For the fifteenth century, it is the number of Gentry either living in a parish, or owning the manor in a parish. Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Appendix for: The Long-Run Impact of the Dissolution of the English Monasteries

This appendix contains supplementary material for the paper The Long-Run Impact of the Dissolution of the English Monasteries. We first provide a model of copyhold agriculture, which substantiates our claim that perpetual copyhold was inefficient. We then provide detail on the process of Dissolution and the Valor Ecclesiasticus as a source. After providing additional and robustness results, we provide a table that shows our recoding of professions in the 1381 poll tax to occupational categories and a table of data sources.

1: A model of copyhold agriculture

We now develop a simple model to illustrate the argument in the introduction that copyholding is economically inefficient and which provides a theoretical foundation for why the Dissolution of the Monasteries led to greater labor mobility and higher productivity. We then extend the model to deduce the implications for the efficient allocation of land. We focus on copyholding of inheritance because this was permanent. With copyholding for lives, at some point, often after three lives, a landlord could refuse to re-new the copyhold and could instead rent out the land under a different market based tenancy agreement. One could imagine therefore that as copyholding became less efficient, such copyholders vanished. Indeed, the gap between copyhold rents and market rents became increasingly large. Tawney (1912, p. 122) gives many examples of the divergence between customary and market rents. For example, “At Amble, in 1608, the surveyor gives the rent of the customary tenants as 16 pounds and five pence” while the market rent would be “93 pounds 4 shillings and 4 pence”. On the manor of Hexham, 314 copyholders paid a rent which was one quarter of the market rent. Thus we would expect copyhold for lives to vanish. This is exactly what Beckett and Turner’s (2004, p. 288) data suggest since they find that 95% of the cases dealt with by the Copyhold Commission in the nineteenth century were

copyholds of inheritance.

Copyholders of inheritance were a different matter. As Clay (1984, p. 88) puts it “the only way open to the lord of a manor to rid himself of copyholders of inheritance was to buy their farms if and when they were prepared to sell.” The data suggest that this by and large did not happen and this would be consistent with the type of imperfect capital markets story formalized by Galor and Zeira (1993) and particularly Banerjee and Newman (1993) where capital market imperfections stop efficient ownership structures emerging.

The key theoretical observation is that in a copyholding contract, while copyholders had the right to pay a fixed ‘customary rent’ (and a ‘fine’ which we abstract from since adding it into the analysis does not change anything of substance) and therefore were the residual claimants on their own investments, this can only lead to efficient outcomes in the case where the copyholder (or his dynasty) remains on the land forever. Yet in the period we consider, early modern and modern England, there was rapid socio-economic change, urbanization and industrialization, so it is very plausible that attractive outside options were emerging. In this case, while a copyholder may have a low fixed rent, he cannot liquidate or realize the value of any investment in the land, which is specific. This feature leads to two outcomes; under-investment relative to the social optimum; and a socially inefficient level of separations since the presence of the fixed investment leads the copyholder to stay on the land when, from the social point of view, they should be exercising the outside option. This is so since we assume that a landlord can hire someone else to farm the land should the copyholder quit. We show that copyholding was inefficient relative to both the farming of the land by the owner and “rack renting” which seem to have been the two most important alternatives. Our model also shows that various arguments in the economic history literature about the efficiency of copyholding are implausible.

The Model

Consider a farm with the land owned by a landowner which can be farmed by one tenant. The model is static and all agents have linear utilities. At the start of the period the tenant can make an investment i to increase productivity. After doing so he may receive an outside option $w \in \{w^H, w^L\}$ with $w^H > w^L$. We assume that the option w^H arises with probability p , w^L arises with probability q and with probability $1 - p - q$ there is no outside option. If the tenant does not take any of the outside options then he produces output which is a differentiable, strictly increasing and strictly concave function f of i , with derivative denoted f' .

We first consider the case of a copyholder. In this simplest of models, if the copyholder does not quit, he pays a fixed ‘customary’ rent r^c to the landowner, making him the residual claimant on his investments. We assume that if an agent quits then whoever is the owner of the land has the ability to hire another agent to farm the land and that person would be willing to accept a contract as long as $f(i) - r^c \geq 0$.³² Though the copyholder is the residual claimant if he does not quit, since he does not own the land, this investment is specific in the sense that the copyholder cannot realize its value unless he stays on the farm. It is immediate that the copyholder will quit if

$$w^s \geq f(i) - r^c \text{ for } s \in \{H, L\} \quad (3)$$

To focus on the case of interest we now state a sufficient condition on r^c so that when the outside option is high, the copyholder will find it optimal to quit, while when it is low he will not. This is

$$f(f'^{-1}(\frac{1}{1-p})) - w^L > r^c > f(f'^{-1}(1)) - w^H. \quad (4)$$

The second inequality in (4) implies that even if the copyholder invests at the surplus

³²It would be straightforward to allow for frictions in this process and it would not alter the basic conclusions of the analysis, though of course the details would change in important ways.

maximizing level, it is still optimal to quit if the outside option is high. The first inequality assures that it is not optimal to quit in the low state.

Such a copyholder therefore solves the maximization problem (folding in the optimal quitting decisions using backward induction)

$$\max_i -i + pw^H + (1 - p)(f(i) - r^c) \quad (5)$$

This problem has the first-order condition at an interior solution $1 = (1 - p)f'(i^c)$. Since $1 - p < 1$ and f is concave, investment is below the socially optimal level. This is for the intuitive reason that the investment is specific to the land. The copyholder has the right to farm the land and pay the fixed rent r^c , but he cannot realize the value of any investment if he leaves and this leads to under-investment. If the value of the outside option is extremely attractive, then the copyholder quits anyway.

Not only is investment inefficiently low here, but so are separations. The fact that in state w^L the copyholder does not quit is because he cannot realize the value of his specific investment. In this model, given the assumption about frictionless replacement, expected total surplus is $f(i) - i + pw^H + qw^H$ which is obviously maximized when the copyholder quits if an outside option materializes.

It is clear in this set-up that the landlord himself would not have any incentive to invest in the land, this is because all marginal rents would accrue to the copyholder. This is consistent with the historical record. Clay (1985, p. 206) observes “Inevitably customary tenants ... received less day-to-day attention from their landlords ... than did those let for rack rents” and in many cases they were “left to their own devices” since custom did not entitle “Landlords to regulate their tenants’ husbandry practices in detail in the way that owners of non-customary lands ... were able to do”. He also notes that copyholders “stood in the way of estate reorganization” (Clay, 1984, p. 87). French and Hoyle (2007, p. 9) describe copyhold as “fatal to the landowning interest” and Tawney describes it as “a

safeguard of the tenants' interest rather than of those of the manorial authorities" (1912, p. 132).

We now consider the polar opposite case where the agent owns the land. In this case if an attractive outside option appears then the agent can exercise it and sell the land. Denote the price of the plot of land by ℓ . To simplify notation, we fold in the fact that it will be optimal to sell the land in the case that the agent receives an outside option. Hence his optimization problem is

$$\max_i -i + p(w^H + \ell) + q(w^L + \ell) + (1 - p - q)f(i)$$

The price of land will be determined by its value. If the landowner has invested an amount i , then the plot will produce $f(i)$ and someone would be willing to pay up to that amount. Hence $\ell \leq f(i)$. For simplicity we assume that the landowner is on the short side of the market so that this inequality holds as an equality. In this case we can re-write the maximand

$$\max_i -i + p(w^H + f(i)) + q(w^L + f(i)) + (1 - p - q)f(i).$$

It is immediate that investment is efficient and $1 = f'(i^\ell)$ with $i^\ell > i^c$ and that with probability $p+q$ the landowner takes the outside option and sells his land. With probability $1 - p - q$ no outside option appears and the landowner works his own land.

In this model it is clear that separations are also socially efficient. Now that the tenant owns the land he can realize his specific investment by selling the land and thus take advantage of the outside option.

A third situation which arises frequently in the literature on British economic history is so-called "rack rent". The loose idea is that in such a contract the landlord is able to manipulate the rental rate on the land in order to extract all of the surplus from the tenant. A simple way of formulating this idea in the context of the present model would

be to assume that the landlord can set the rental rate and that he also himself decides on the amount of investment in the farm. Let r^R denote the rental rate. Let r^Q be the rental rate charged to a new tenant who is brought in if the initial tenant quits. Under the assumptions so far, $f(i) - r^Q \geq 0$.

Now the landlord chooses these rates and the amount of investment to maximize expected profits net of investment costs and taking into account the endogenous decision of the tenant to take the outside option. This maximization problem has to satisfy a participation constraint so that a tenant initially accepts the contract. Define $\mathbf{1}_{w^H \geq w^R}$ to be an indicator function such that $\mathbf{1}_{w^H \geq w^R} = 1$ if $w^H \geq w^R$ where w^R is the income a tenant receives if they stay on the farm and pay the rent r^R . If the tenant quits the landlord hires a new tenant and pays then r^Q . The participation constraint follows from the fact that if a tenant does not accept the contract we assume they get in expectation $pw^H + qw^L$. Hence it is

$$\begin{aligned} & p(\mathbf{1}_{w^H \geq w^R} w^H + (1 - \mathbf{1}_{w^H \geq w^R})(f(i) - r^R)) \\ & + q(\mathbf{1}_{w^L \geq w^R} w^L + (1 - \mathbf{1}_{w^L \geq w^R})(f(i) - r^R)) \\ & \quad + (1 - p - q)(f(i) - r^R) \geq pw^H + qw^L \end{aligned}$$

In considering the optimal level of r^R note that for the landlord to always stop the tenant quitting then it would have to be that $\tilde{r}^R = f(i) - w^H$. However, since, if we assume that a replacement tenants breaks indifference by accepting a contract, we have $r^Q = f(i) > \tilde{r}^R$. Thus it cannot be optimal to stop quitting. This implies that the participation constraint

collapses to

$$pw^H + qw^L + (1 - p - q)(f(i) - r^R) \geq pw^H + qw^L$$

$$\text{or } (1 - p - q)(f(i) - r^R) \geq 0.$$

Thus the rack-renting landlord maximizes

$$\max_i pf(i) + qf(i) + (1 - p - q)f(i) - i$$

imposing $r^Q = f(i)$ and from the participation constraint $f(i) = r^R$. Investment is again efficient with $1 = f'(i^R)$. Moreover, separations are also socially efficient.

We now make two simple additions to the model. Assume that farms have idiosyncratic factors that influence their productivity, plausibly related to the nature of the soil, availability of water, or micro-climatic variation, denote this A_j on farm j . Also assume that landowners have varying levels of human capital relevant for productivity, denote the human capital of landowner o by H_o . In the context this could be knowledge of new agricultural techniques like crop rotation or new mechanical devices like seed drills. The production function is now $f(i, A_j, H_o)$ and we assume all partial and cross partial derivatives are positive. A_j is fixed and cannot be accumulated and H_o cannot be hired but is a characteristic of the landowner. With these assumptions it is clear we are in a world where output will be maximized by positive assortative matching. If there is a distribution of levels of A_j and H_o then the efficient allocation of resources will match the highest A_j with the highest H_o and so forth. If all land were marketed and worked by the owner, or that owner could hire a tenant at rack rent then it is clear that matching would be efficient. This is because the landowner with the highest H_o can use the plot with the highest A_j more efficiently than any other landowner and therefore would be willing to pay more for it than the person with the next highest H . It is easy to put more structure on this argument

but the relation to Becker's (1973) paper is clear. Now consider the allocation of resources when there exist copyhold of inheritance. In this case the return to a landowner with H_o is r^c which is independent of not only H_o but also A_j . If the landowner has high human capital the benefits accrue entirely to the copyholder. Thus there is no incentive for the landowner whose human capital is most complementary with a farm to buy it and we would expect copyholding to break efficient matching.

We can sum up the results of this model in the following way with the addition of one further assumption which is that it is not the case that the initial matching of landowners to plots just happens to be efficient. Obviously if it were the case that initially the plots with the highest A_j happened to be owned by the people with the highest H then copyhold would not be an impediment to efficient matching - since the match would already be efficient. In our context this is equivalent to saying that at the time of the Dissolution it was not efficient that the Monks were the landowners and that there existed higher H people who could then buy the land and indeed had more incentive to do so than buying non-monastic lands encumbered with copyholds of inheritance. This re-matching is a critical part of our story as to why aggregate productivity and investment should increase.

Proposition: Compare two parishes with the same distribution of A_j , the same set of outside options, but one dominated by copyholding of inheritance and the other not. The parish with copyholding would be characterized by lower average productivity as a consequence of lower average investment and less efficient matching of farms to landowners. It would also have lower rates of exit from agriculture.

This is the main result which we use to interpret our data. It is worth emphasizing again that it does hinge on imperfect capital markets. If these were not present then the landowner would be able to buy out the copyholder of inheritance and move to either of the other options. However, as we have discussed, the assumption that capital markets were imperfect seems reasonable in early modern England and as a matter of fact, extensive

copyholds of inheritance persisted into the 19th century. Critically, as we discussed in the introduction, monastic lands seem not to have developed copyholds of inheritance which predominated in non-monastic lands. Hence the Dissolution made available land which was not encumbered by such contractual forms.

It is worth discussing a common argument in the literature about the efficiency of copyholding. French and Hoyle (2007, p. 11) state, for example, that “it is not clear why the survival of copyhold should have inhibited capitalist development, because copyholds could be bought, sold and let just like any form of freehold property”. Our model shows that this argument is not correct unless the transaction sold the land to the sitting copyholder. The fact that a landlord could sell a copyhold to someone else, who was not the copyholder, does not imply that copyhold was economically efficient. Anybody who bought such a copyhold would have a sitting copyholder with exactly the incentives that we have outlined. The new owner would anticipate that the copyholder might receive an attractive outside option in the way we have modelled it above and would tend to under-invest. Therefore, even if one bought a copyhold from an existing landlord, this does not stop the logic driving the inefficient under-investment derived above, or the socially inefficient quitting decision. Therefore, although an individual would be prepared to pay up to the maximized value of (5) to obtain a copyholding, the fact that they did so does not imply that the allocation of resources is efficient. Finally, the last argument we made shows that even if land subject to copyholds was transacted, there were no incentives for the person who could have used that land best to purchase it.

One final important conceptual issue to discuss is how, when the results of this section depend on imperfect capital markets, it was possible for a land market to emerge after the Dissolution. If people could afford to buy land why could they not buy out copyholders of inheritance? The reason seems to be related to the distribution of wealth. Landowners who had sitting copyholders of inheritance were outside the monastic sector. They got a very

poor return on their lands and would not have been in a position to buy out their tenants, nor purchase monastic lands. Instead these were likely bought and sold by others, both by favorites of the Crown who had received the lands on the cheap and by new Gentry who had made their money elsewhere, for example in commerce.

2: Further historical background

This section reviews the historical background to the Dissolution of the monasteries and the Valor Ecclesiasticus, the relationship between the expropriation of the monastic lands, institutional change in the land market and the rise of then Gentry.

Acts of Parliament leading up to the compilation of the Valor

In 1532 Parliament passed ‘An Acte concernynge restraynt of payment of Annates to the See of Rome’.³³ This act diverted the Annates payed by anybody with the rank of bishop or higher from the Pope to the Crown. Hunter (1834) argues that this act was meant to strengthen the King’s bargaining position with the Pope. A second act was passed in the Parliament that sat from January 15th 1534. This act made it ‘unlawful to make any payment on any pretence to the See of Rome, and severing the connection which had existed between the two states’ (Hunter, 1834, p.13).

Parliament next decided that all payments to the Pope were now to be paid to the King instead. This passed in the Parliament that sat from November 3rd 1534 in the act titled ‘An Acte Concerninge the payment of Firste Fruites of all dignities benefices and promocyons spirituall, and also concerning one annuell pencyon of the tenth parte of all the possessions of the Churche, spirituall and temporall, graunted to the Kinges Highnes and his heires’. This act also named the king as the head of the Church of England for the first

³³This section builds mostly on Hunter (1834). See also Youings (1971) and Knowles (1979). Annates are synonymous with first fruits or first year’s profits of every benefice, to be collected when the benefice changed occupier. A benefice is an ecclesiastical position, such as a parish priest.

time. In order to assess how much revenue Henry VIII could expect he sent out surveyors, called commissioners, to record the value of incomes generated by ecclesiastical property in England. The Valor Ecclesiasticus is the summary report of these commissioners.

How the Valor Ecclesiasticus was compiled

Every diocese received commissioners, at least three, tasked with assessing the value of all ecclesiastical possessions in that diocese. The survey started on January 30th 1535 and was to be finished by the Octaves of Holy Trinity (usually the 8th Sunday after Easter; Knowles (1979) cites the 1st of May). All commissioners were to be local notables, below the rank of Baron (Hunter, 1834, p. 19). These notables were usually the justices of the peace, mayors, sheriffs and the local Gentry (Savine, 1909, p. 17). The oath of the commissioners can be found in the second volume of the Valor. The commissioners then split up into parties of at least three, divided the diocese among them and administered the survey. The subsequent collection of the incomes was left to the bishops who were expected to collect the amount due by Christmas and deliver it to the Exchequer by April of the following year (Savine, 1909, p. 3).

After the survey, Henry decided to expropriate the English monasteries. He started with the monasteries that were valued under 200 pounds. In 1536, Parliament passed an act popularly known as the Dissolution of the Lesser Monasteries Act, which expropriated 453 monasteries (Jack, 1970, p.1). In 1539, The Second Act of Dissolution followed, expropriating all remaining monasteries.³⁴

The process of dissolution

There were three broad ways in which the Crown obtained ownership of a monastery. The first was outright expropriation. This method was most commonly used when dealing

³⁴For an exact chronology of the Dissolution of the lesser monasteries see Jack (1970) and Hoyle (1995). Gasquet (1899) includes in appendix I a list of monasteries that paid the Crown to not be dissolved.

with smaller monasteries. The abbot would sign a ‘deed of gift’ transferring ownership to the Crown. A second way was surrender. After the initial wave of dissolution, larger monasteries were charged with some crime and were given the choice to surrender and receive pensions or to be tried in court. The third way was dissolution by negotiation. Some of the larger abbeys managed to secure favorable arrangements for themselves before signing the deed of gift. The full procedure of dissolution is outlined in Youings (1971, p. 73).

After the Dissolution, some of the expropriated lands were given away as gifts by the King. Even before the first commission for the sale of lands was established in 1539 a total of 234 grants had been made (Youings, 1971, p. 117). Not coincidentally, one of the first grantees was the Chancellor of the Court of Augmentations (the government body in charge of the dissolution), Richard Rich.³⁵ Other grantees included Henry’s Chief Minister Thomas Cromwell and several members of the aristocracy. The total amount of land granted appears to have been relatively small. For Devon, it was about 25% of the expropriated monastic land and for Leicestershire around 15% (Youings, 1967, p. 343).

Although the Crown initially intended to lease out the remaining land, it quickly decided to sell the land because the task of managing vast tracts of land was beyond the bureaucratic capacity of the government. Additionally, in 1543 a war with France broke out which left the Crown in need of quick cash. It is therefore no surprise that although selling of the lands started as early as 1539, between 1543 and 1547 the Court of Augmentations oversaw the sale of two thirds of all expropriated land. By 1558 virtually land had been sold (Habakkuk, 1958).³⁶ Most sales of monastic land were concluded at the fixed price of 20 years income.

³⁵Richard Rich was originally a lawyer with no noteworthy background. He would be knighted and be styled Baron Rich during his lifetime. For three centuries his descendants would be part of the English peerage (Carter, 2004).

³⁶The process of obtaining land was as follows: Prospective buyers would need to obtain an updated assessment of the income of the lands they desired from the local augmentations officer. The request and the updated *valor* would then be submitted to the Court in London. If approved, the sale would be concluded. The prices were initially set at twenty years’ rent. Around 1560 the price had gone up to the equivalent of 30 years’ rent and by 1600 it was 40 (Habakkuk, 1958).

Who were the people that bought the monastic land? Although no comprehensive data source exists, the case study evidence suggests that monastic lands were often sold to people who were associated with the monasteries, either as employees or as tenants (Youings, 1971). This meant that monastic land was sold locally. From the perspective of the Court of Augmentations, under pressure to sell land fast, selling to local people was the expedient manner to dispose of the land. For instance, almost all religious houses had a steward, who would officially represent the monastery, acting as an ambassador, and one or more receivers, who would collect rents and other dues. Most houses also employed bailiffs, associated with the manor courts.³⁷ Once the Dissolution started, these officials often secured new leases on monastic land seeking to entrench their positions. After the Dissolution, they renewed these leases with the Court of Augmentations (Woodward, 1966, p. 328; Jack, 1965). Local people were also involved in the Dissolution as short-term employees of the court of augmentations. After the Dissolution, they were often the first to acquire former monastic lands (Youings, 1971, pp. 67, 70).

After the Dissolution of the Monasteries there were three remaining categories of church landholders: bishops, cathedrals, and colleges (both ecclesiastical and Oxford/Cambridge). Yet as Heal (2008) documents, by 1650 the lands of the bishops and cathedrals were sold off as a consequence of them siding with Charles I in the Civil War. Though after the Restoration the bishops got their land back it was generally leased out to the new occupant in very long leases (typically 99 years). At the end of this process, the only remaining lands in the hands of the Church were held by Oxford and Cambridge colleges and some cathedrals, and parish churches which owned the plot of land they were on.

We now discuss the *Valor Ecclesiasticus* in more detail.

³⁷For a description of the various offices associated with a early modern manor, see Levett (1927).

The Valor Ecclesiasticus

This section describes the state of the Valor Ecclesiasticus archival records, our method for coding the data and an example from the manor of Helton, Lolbroke and Bell.

The state of the Valor Ecclesiasticus records

The original returns of the Valor are held in the National Archives at Kew Gardens in London and consist of 22 volumes and 3 folios.³⁸ The Record Commission published a transcription of the records titled *Valor ecclesiasticus temp. Henr. VIII. : Auctoritate regia institutus*, consisting of six volumes that were published, respectively, in 1810, 1814, 1817, 1821, 1825 and somewhere between 1831 and 1834 (Caley and Hunter, 1810, 1814, 1817, 1821, 1825, 1831). One of the editors, Joseph Hunter, wrote a historical introduction to the survey (Hunter, 1834). He reports that some parts of the survey are lost. The most important ones are:

- The diocese of Ely.
- A substantial part the diocese of London.
- The counties Berkshire, Rutland, Northumberland.
- A substantial part of the diocese of York, including the whole of the deaneries of Rydal and Craven.³⁹

Smaller parts that were lost (such as an individual rectory, or some manors) were taken from third sources and printed in the Record Commission edition. The most important third source is the *Liber Valorum* (Ecton, 1711) which is a compilation of abstracts of the original records that were made for Henry VIII. These abstracts are usually referred

³⁸The dedicated website is at <http://www.nationalarchives.gov.uk/records/research-guides/dissolution-of-the-monasteries.htm>.

³⁹A deanery is an ecclesiastical administrative division, comparable to the hundred.

to as the King's Book (or Liber Regis). These compilations, however, record the total (net) taxable income for an ecclesiastical unit and don't specify the geographical source where the components of the income was generated which precludes us from getting a clean measure of the income of a unit, see below. When recording the data, we have tagged the observations that are taken from third sources. Excluding them from the analysis does not change the results (not reported).

The organization of the Valor

The Valor is recorded in a very systematic way. The main geographical unit by which the survey can be broken down is the diocese. Within every diocese there is a clear order in which the lower level units are coded, with the monasteries featuring most prominently. The exact order is given below. Next to this ordering of units, there is an ordering of the income data within each unit. All income is first of all divided into temporalities and spiritualities. Temporalities are all incomes that the monks/benefice holders receive from activities, like farming, that are not theirs by virtue of holding the specific benefice.⁴⁰ The most important parts of the temporal income are the incomes from demesnes *in manu* (farmed by the benefice holder) and from payments of tenants on Church lands (Savine, 1909, p. 85). Spiritualities are those incomes to which benefice holders are entitled by virtue of holding the benefice. It also includes income from glebe lands (lands designated to support the benefice holders) and from oblations (another church tax). The second distinction in the returns for individual ecclesiastical units is between gross and net income. Gross income represent total income, and net income represents income (*valet clare* or *Et remanclare* (clear value remaining) in the returns) over which sums payable to the king would be determined. The following deductions from gross income were allowed (Hunter, 1834):

⁴⁰A benefice is a position within the Church.

1. Rents resolute to the Chief Lords, and all other annual and perpetual rents and charges.
2. The alms which were due to the poor, according to any foundation or ordinance.
3. Fees to stewards, receivers, bailiffs and auditors.
4. Synodals and procurations,⁴¹ with which most abbeys and benefices were charged.

Monetary values in the Valor are recorded in *l.s.d.* or *£.s.d.* notation. This refers to pounds (*librae*), shillings (*solidi*) and pennies (*denarii*). There are 12 pennies in a shilling and 20 shillings in a pound. Particular details regarding the notation of income are in Lindley (1957).

Within the Valor, there is a fixed order in which ecclesiastical units appear (taken directly from Hunter, 1834): per diocese we have

1. The See of the bishop or archbishop.
2. The endowments on the various offices in the cathedral church.
3. Archdeaconries/Deaneries with their claims, and per entry the following:
 - (a) Monasteries and colleges.
 - (b) Parsonage, vicarages, chantries and free chapels.

If a deanery is home to a monastery, this monastery is listed before the other benefices in the deanery and has a specific ordering, namely:

1. Income of the precincts (i.e. any land immediately surrounding the monastery).
2. Income from lands in the county in which the house stood.

⁴¹Synodals and procurations are ecclesiastical fees.

3. Income from lands in other counties.
4. Income from impropriate rectories (rectories for which the proceeds went to a layman).

An example: the manor of Helton, Lolbroke and Bell

The manor of Helton, Lolbroke and Bell was a possession of Abbotsbury abbey and was located in Bridport deanery (in the Valor it is called *Byrport*) in Dorset. Figure A-1 is a photograph of the entry as it appears in the Record Commission edition of the Valor. Note that we omitted any deductions from this picture, it just lists temporal and spiritual income.⁴²

The first entry is an assize rent (*reddit assis'*, a fixed rent) in Helton, which gives an annual income of £: xl s: xvii d: vii. The next entry is a part of the demesne (*tr'daicaliu*) that is not farmed by the rector (*firma dimiss'*) for which he receives a rent. The next entry is another assize rent in Lolbroke & Bell. Then we have an entry that records proceeds from the manor court (*pficuis cur'*) and several other incomes (*al' pquisit'*) taken for an average year (*coibs annis*).

The next two entries are two rents (*reddit' resolut*) that are owed to an abbot and payable to his manor (*abbtu & conventui de Miltonad maniu suu*). The second figure is payable to the vicar of archdeaconry of Dorset (*vic'Dors'*). The third entry is payable to the master of the hundred Richard de Whitway (*hundr dni R de Whitway*). The last entry is payable due to the local bailiff of the manor Gilbert Kaynell (*Gilbti Kaynell balli*).

We are interested in the income from assets, or temporal income. For this manor, these are the assize rents from lands held by the manor, or the first three entries in Figure A-1. We therefore coded three entries into our database for this manor, two in Helton and one

⁴²In order to distinguish these sources of income in the text knowledge of the scribal Latin in which the Valor is recorded is required. A valuable introduction to this as well as a glossary of terms and scribal abbreviations can be found in Martin (1949).

Figure A-1: The manor of Helton, Lolbroke and Bell in the Valor Ecclesiasticus

MAN'IU' DE HELTON LOLBROKE & BELL.				
Valz in reddit' assis' in Helton p annū	xl	xvij	vij	} £ S ^m ^a s. d. lxj v v
Reddit' tr' dnicaliū ibm ad firmā dimifs' p a ^m	ix	xiiij	vj	
Reddit' assis' in Lolbroke & Bell p a ^m	vj	xiiij	iiij	
In pficuis cur' ibm videt' in finibz hiet' & at pqui- fit' cōibz annis	iiij	—	xij	
Et in reddit' resolut' abbt'i & conventui de Milton ad mañiū suū de Milton ex- eun' de p ^e dict' mañio de Helton	—	xiiij	iiij	} £ S ^m ^a s. d. — xlviiij viij
Et in quod ^a m reddit' fo- lut' an ^{ti} ' & imp ^o pm vic' Dors' p tempe existent' p quod ^a m reddit' voc' Whithertrent	—	xx	—	
Et an ^{ti} ' solut' hundr' dni R' de Whitway p a ^m	—	ij	—	
Et in feodo Gilb'ti Kaynell bafsi & recept' reddit' mañij de Helton p ^e d' p annū	—	xiiij	iiij	

in Lolbroke and Bell. The next step is to assign Ordnance Survey grid references to each of the three places. To find these we followed the method outlined below. Going through every entry in the six volumes of the Valor this way created the database we used for the analysis in this paper.

3: Construction of our dataset

This section discusses the unit of observation in our study, a historical parish, as well as our methods for matching data from different sources to individual parishes.

Unit of observation

Our unit of observation is an area from the *GIS of the Ancient Parishes of England and Wales*, which is based on the work of Roger Kain and Richard Oliver (Southall and Burton, 2004; Kain and Oliver, 2001). The GIS consists of an ArcGIS shapefile with an underlying database.⁴³ Since areas may consist of several disjoint shapes, we collapse the shapefile to collect these into one shape.⁴⁴ The resulting database has 17,898 unique shapes. Having created our unit of observation this way, we then merge each data source to this database using either one of two methods:

1. We directly match an observation in a data source based on its name to a corresponding area in the database underlying the shapefile of the GIS of Ancient Parishes.
2. We record Ordnance Survey grid references⁴⁵ for each unit we want to match, map these units in ArcGIS and spatially join them to the shapefile in the GIS of Ancient Parishes database. Grid references are found using third sources such as Vision of Britain through time project at <http://www.visionofbritain.org.uk/>, the gazetteer of

⁴³Each area in the underlying database has a type, which corresponds to an administrative unit that was used in the nineteenth century. The most common type is the ecclesiastical parish. Other types of units are townships, hamlets, boroughs, chapelries or divisions. Around fifty percent of areas are parishes, out of a total of 22,729 areas. Townships and parishes together make up eighty percent of the areas. For sub parish units, there is a parish identifier as well.

⁴⁴For instance, a parish can consist of a main portion where the parish church is and a smaller detached portion.

⁴⁵The Ordnance Survey, a government mapping agency, has divided England, Wales and Scotland up into hundred by hundred kilometer squares (the 'grid') and assigned a two letter identifier to each grid square. A grid reference then records a place within each square by adding an even number of digits, measuring east and north distance within the grid square, measured from the bottom left corner. For instance, the Tower of London is located at TQ3350080599 which means that it is in square TQ and then 33 kilometers and 500 meters to the North and 80 kilometers and 599 meters to the East, measured from the bottom left corner of the square.

British places names maintained by the association of British Counties at <http://www.gazetteer.org.uk/map.php> and the gazetteer of British placenames maintained by the Genuki project at <http://www.genuki.org.uk/big/Gazetteer/>. We only use this method if method 1 is unavailable.

Using either method, we assign a parish to the observations in each data source. For our main variables the exact assignment method is described below. If it was impossible to assign an area number to an observations using either of the above methods, we have not used it in our analysis.

The GIS of Ancient Parishes database uses the administrative structure of England around 1850 whereas we use data that is from before 1850. This creates a problem since in 1844 Parliament passed the *Counties (Detached Parts) Act* that reassigned several detached parts of counties (exclaves) to formally be under their ‘mother’ county instead of the county they were physically in. Since we matched names within counties to minimize confusion resulting from repetition of names, this could create a problem. However, the GIS of ancient parishes database records in the commentary category whether a part was transferred. Using this information we matched within county/parish composition as it was before 1844.

We match each variable to our GIS of parishes to arrive at the dataset used in this paper.

4: Additional Results

Table A-1 provides summary statistics for all variables used in this paper.

Table A-2 studies gifts of manors to monasteries after the Norman conquest of 1066. The Domesday book, the return compiled of the income of the country in 1066 and 1086, lists who owns each manor. For about 8,200 parishes we can recover who owned the

manor before the Conquest and after. We code an indicator equal to one if a manor was not owned by a monastery before the Conquest and was gifted to a monastery after the conquest, before 1086. We argued in the background section of our paper that monastic patrons gave land from their own landholdings, but that these were scattered by William the Conqueror to prevent magnates from rising up against him. This would imply that pre-existing development differences do not meaningfully matter for which manors get gifted to a monastery. We test this idea by regressing our indicator for monastic gift on the value or income generated by the manor or the manors in the parish before the Conquest in 1066. We find that these two variables are uncorrelated, either in a bivariate regression in column (1) or when controlling for our baseline covariates in column (2). This evidence is consistent with the idea that lay landownership was scattered, and that therefore monastic landownership was scattered.

Table A-3 is the first of several robustness tables. Each robustness table studies each main outcome. In columns (1)-(2), we study the impact of the Dissolution on markets and copyhold. In columns (3)-(4) we study the intermediate social consequences of the Dissolution using the presence of Gentry and Catholics. In columns (5)-(8) we study the ‘ultimate’ impact of the Dissolution on economic outcomes, studying employment and industrialization. In columns (5) and (6) we use employment in agriculture and trade/handicraft whereas in columns (7) and (8) we use either our indicator for the presence of a textile mill or the number of textile mills as the dependent variable. Subsequent tables repeat this basic structure. We first present a number of robustness checks for our cross-sectional results. Later we present a number of robustness checks that pertain both to our cross-sectional results as well as our ‘long-diff’ results.

Table A-3 repeats our main OLS results, omitting all covariates. We find that all effects go through essentially unchanged, both in sign as well as in magnitude.

In Table A-4 we vary fixed effects. Across our five panels, we use fixed effects at the level

of the hundred, an intermediate administrative unit between counties and parishes. There are about 900 hundreds in our full sample. In the second panel, we add 10 by 10 kilometer grid cell fixed effects, and in panel three we add 5 by 5 kilometer fixed effects. For the 5 by 5 kilometer grid, we get about three parishes per fixed effect, so we make essentially next-neighbor comparisons. Throughout, we find stable treatment effects even in the most restrictive specifications, except for the effect of the presence of a market which loses precision. In the fourth and fifth panels, we add north-south and east-west fixed effects. We define the North as the following counties: Cheshire, Cumberland, Derbyshire, Durham, Lancashire, Lincolnshire, Northumberland, Nottinghamshire, Staffordshire, Westmorland, Yorkshire: East Riding, Yorkshire: North Riding, and Yorkshire: West Riding. We define the East as the following counties: Bedfordshire, Buckinghamshire, Cambridgeshire, Essex, Hertfordshire, Huntingdonshire, Leicestershire, Kent, Lincolnshire, Middlesex, Norfolk, Northamptonshire, Nottinghamshire, Rutland, Suffolk, Surrey, Sussex, Yorkshire: North Riding, and Yorkshire: West Riding. For these fixed effects, too, results are by and large stable, with the exception of the number of mills. Note that the location of the industry, measured by the mill indicator is stable.

In Table A-5 we add geographical covariates. We include several measures of the productivity of the soil. These measure capture any latent productivity differences, and allow us to ascertain that our results are not driven by geographical differences. We then add several distance measures, to capture the idea that monastic parishes may simply have been located advantageously. We include distance to the nearest river, which were important sources of inanimate power. We include distance to the nearest market town (from Adams, 1700), distance to the border and distance to London, to capture proximity to economic activity. Finally, we use distance to the nearest coal field, which Pomeranz (2000) argued was crucial for why the Industrial Revolution happened in England. We find that our estimated effect of the Dissolution is robust to inclusion of all these measures. Some estimated

effect are of independent interest. We find, for example, that parishes further away from coalfields are more agricultural and less industrialized.

In Table A-6 we use the natural log of the total income generated by monastic assets in a parish as the independent variable of interest. In the paper we focused on the extensive margin, motivated by the hypothesis that the Dissolution brought a discrete change in the commercialization of a parish. The continuous measure we use here combines both the extensive margin, we retain parishes without monastic assets, and the intensive margin. In this table, as in the following tables, we now report two panels, one for our OLS model and one for our ‘long-diff’ model. We see that all results go through, but that the long-diff results become somewhat more noisy for the employment outcomes. These result suggest that our main results are largely driven by the extensive margin of the effect of the Dissolution.

In Tables A-7 we remove from the sample parishes whose monastic assets were owned by the Cistercians. Andersen et al. (2017) hypothesize that the Cistercians were prolific teachers, transmitting skills to the population. We believe that the effects of the Cistercians are likely to be muted in our study because our variation comes by and large from manors that were owned by the monasteries and not from the location of the monasteries themselves. Nevertheless, Table A-7 reports results removing the Cistercian parishes from the sample. Cistercian parishes comprise about 9% of parishes from the sample, or about 30% of monastic parishes. We observe that treatment effects are by and large unchanged, although, due to the removal of about a third of treated parishes, some estimated effects become more noisy.

Table A-1: Summary statistics for all variables

	N	Mean	Standard Deviation	Min	Max
Monastic (yes/no)	16290	0.32	0.47	0.00	1.00
Market (yes/no) 1600	2146	0.31	0.46	0.00	1.00
Copyhold count 1842-1883	2399	7.01	16.76	0.00	228.00
Number of Gentry in 1700	16290	0.67	1.00	0.00	12.00
Share Catholic 1767	12546	0.03	0.11	0.00	0.99
Share in agriculture 1831	12859	0.62	0.25	0.00	1.00
Share in trade/handicraft 1831	12859	0.21	0.17	0.00	1.00
Mill (yes/no) 1838	16290	0.04	0.20	0.00	1.00
Nr. of Mills 1838	16290	0.16	2.28	0.00	141.00
Nr. of Agricultural Patents 1672-1850	16290	0.02	0.28	0.00	14.00
Parliamentary Enclosure 1750-1840	16290	0.37	0.48	0.00	1.00
Nr. Threshing machines 1800-1830	16290	0.03	0.19	0.00	5.00
Wheat Yield (bushels/acre) 1840	4028	21.71	4.51	4.00	48.00
Copyhold count 1520	155	0.41	0.88	0.00	8.00
Number of Gentry 1399-1477	9321	0.74	0.45	0.00	2.00
Share in agriculture 1381	1035	0.35	0.34	0.00	1.00
Share in trade/handicraft 1381	1035	0.12	0.18	0.00	1.00
Mill (yes/no) 1399-1477	9321	0.06	0.24	0.00	1.00
Nr. of Mills 1399-1477	9321	0.07	0.29	0.00	4.00
ln(Lay Subsidy income per capita)	16290	1.65	1.84	0.00	8.80
Parish area	16246	7.94	8.14	0.00	198.19
Terrain elevation	16290	88.41	75.54	-2.61	588.24
Terrain slope	16290	2.63	1.96	0.00	22.39
Wheat suitability	16274	37.68	15.45	0.00	96.01
Distance to nearest river	16290	2.47	2.12	0.00	30.62
Distance to nearest market town	16290	6.12	3.41	0.01	25.84
Distance to the border	16290	26.26	21.44	0.00	89.54
Distance to London	16290	199.18	107.16	0.60	495.03
Distance to nearest coalfield	16290	42.51	41.06	0.00	194.28
Domesday value/income per capita 1066	7533	0.32	1.83	0.00	50.67
Domesday value/income per capita 1086	7533	0.23	0.31	0.00	11.94
Lay Subsidy income per capita 1332	6808	0.15	0.08	0.00	2.25
Gift of manor to monastery (yes/no)	8252	0.02	0.13	0.00	1.00
Income 1066	8252	11.33	36.35	0.00	1210.00

Table A-2: Monastic endowment after the Conquest

<i>Dependent variable:</i>	Gift of manor to monastery	
	(1)	(2)
Income 1066	0.00 (0.000)	0.00 (0.000)
Control for parish area	N	Y
County fixed effects	N	Y
Mean dep. var.	0.016	0.017
Observations	8252	8230
Nr. fixed effects	0	42
R^2	0.00	0.02

Notes: All regressions are estimated using OLS. The unit of observation is a parish. Gift of manor to monastery is an indicator equal to one if a manor in the Domesday book was owned by a lay landlord before the Conquest, and by a monastic landlord after. Income 1066 is the total income of a parish in 1066 in pounds. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table A-3: Main results without covariates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Market 1600	Copyhold 1850	Gentry 1700	Cath. 1767	Agr. 1831	TrH. 1831	Mill 1838	Mills 1838
Monastic (yes/no)	0.08*** (0.020)	0.23 (0.735)	0.29*** (0.018)	-0.01*** (0.002)	-0.01* (0.004)	0.01*** (0.003)	0.01** (0.003)	0.05 (0.044)
Control for Lay Subsidy Revenue	N	N	N	N	N	N	N	N
Control for Parish area	N	N	N	N	N	N	N	N
County fixed effects	N	N	N	N	N	N	N	N
Mean dep. var.	0.31	7.01	0.67	0.03	0.62	0.21	0.04	0.16
Observations	2146	2399	16290	12546	12859	12859	16290	16290
R^2	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00

Notes: All regressions are estimated using OLS. The unit of observation is a parish. Market (yes/no) is an indicator if a parish had a market. Copyhold count is the number of copyhold contracts recorded in a parish. Gentry 1700 is the number of members of the Gentry that live in a parish in 1700. Cath 1767 is the number of Catholics that live in a parish normalized by population. Agr. 1831 is the share of the population (male, over 20 years old) employed in agriculture in 1831. TrH. 1831 is the share of the population (male, over 20 years old) employed in trade or handicraft in 1831. Mill (yes/no) 1838 is an indicator equal to one if a parish had a textile mill in 1838. Mills 1838 is the number of textile mills a parish had in 1838. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table A-4: Varying fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Market 1600	Copyhold 1850	Gentry 1700	Cath. 1767	Agr. 1831	TrH. 1831	Mill 1838	Mills 1838
HUNDRED FIXED EFFECTS								
Monastic (yes/no)	0.09*** (0.028)	-0.49 (0.977)	0.23*** (0.018)	-0.01*** (0.002)	-0.04*** (0.004)	0.03*** (0.003)	0.02*** (0.004)	0.15** (0.060)
Mean dep. var.	0.31	7.00	0.67	0.03	0.62	0.21	0.04	0.16
Observations	2144	2394	16243	12522	12831	12831	16243	16243
Nr. fixed effects	815	453	965	946	946	946	965	965
R ²	0.45	0.23	0.23	0.28	0.43	0.39	0.33	0.10
10 x 10 KM GRID CELL FIXED EFFECTS								
Monastic (yes/no)	0.08** (0.035)	-0.03 (0.908)	0.24*** (0.019)	-0.01*** (0.002)	-0.04*** (0.005)	0.03*** (0.003)	0.03*** (0.004)	0.16*** (0.051)
Mean dep. var.	0.31	6.99	0.67	0.03	0.62	0.21	0.04	0.16
Observations	2144	2395	16246	12523	12832	12832	16246	16246
Nr. fixed effects	1071	637	1421	1406	1408	1408	1421	1421
R ²	0.51	0.26	0.23	0.39	0.39	0.36	0.29	0.13
5 x 5 KM GRID CELL FIXED EFFECTS								
Monastic (yes/no)	0.10 (0.104)	0.44 (1.213)	0.21*** (0.023)	-0.00* (0.002)	-0.04*** (0.005)	0.03*** (0.004)	0.03*** (0.005)	0.15*** (0.057)
Mean dep. var.	0.31	6.99	0.67	0.03	0.62	0.21	0.04	0.16
Observations	2144	2395	16246	12523	12832	12832	16246	16246
Nr. fixed effects	1838	1375	5110	4849	4884	4884	5110	5110
R ²	0.86	0.59	0.45	0.61	0.63	0.59	0.55	0.36
NORTH-SOUTH FIXED EFFECTS								
Monastic (yes/no)	0.07*** (0.020)	-1.02 (0.725)	0.20*** (0.018)	-0.01*** (0.002)	-0.01*** (0.005)	0.01*** (0.003)	0.01*** (0.003)	0.06 (0.043)
Mean dep. var.	0.31	6.99	0.67	0.03	0.62	0.21	0.04	0.16
Observations	2144	2395	16246	12523	12832	12832	16246	16246
Nr. fixed effects	2	2	2	2	2	2	2	2
R ²	0.01	0.03	0.08	0.08	0.01	0.01	0.01	0.00
EAST-WEST FIXED EFFECTS								
Monastic (yes/no)	0.08*** (0.020)	-0.97 (0.725)	0.20*** (0.018)	-0.01*** (0.002)	-0.02*** (0.005)	0.01*** (0.003)	0.01*** (0.004)	0.07 (0.045)
Mean dep. var.	0.31	6.99	0.67	0.03	0.62	0.21	0.04	0.16
Observations	2144	2395	16246	12523	12832	12832	16246	16246
Nr. fixed effects	2	2	2	2	2	2	2	2
R ²	0.02	0.03	0.07	0.03	0.02	0.01	0.01	0.00
<i>Covariates for all regressions</i>								
Control for Lay Subsidy Revenue	Y	Y	Y	Y	Y	Y	Y	Y
Control for Parish area	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y

Notes: All regressions are estimated using OLS. The unit of observation is a parish. Market (yes/no) is an indicator if a parish had a market. Copyhold count is the number of copyhold contracts recorded in a parish. Gentry 1700 is the number of members of the Gentry that live in a parish in 1700. Cath 1767 is the number of Catholics that live in a parish normalized by population. Agr. 1831 is the share of the population (male, over 20 years old) employed in agriculture in 1831. TrH. 1831 is the share of the population (male, over 20 years old) employed in trade or handicraft in 1831. Mill (yes/no) 1838 is an indicator equal to one if a parish had a textile mill in 1838. Mills 1838 is the number of textile mills a parish had in 1838. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. Fixed effects as indicated in the table. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table A-5: Geographical covariates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Market 1600	Copyhold 1850	Gentry 1700	Cath. 1767	Agr. 1831	TrH. 1831	Mill 1838	Mills 1838
Monastic (yes/no)	0.057*** (0.018)	-0.270 (0.774)	0.220*** (0.018)	-0.005*** (0.002)	-0.027*** (0.004)	0.018*** (0.003)	0.017*** (0.004)	0.137*** (0.053)
Terrain elevation	-0.000 (0.000)	-0.008 (0.007)	-0.001*** (0.000)	0.000* (0.000)	0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)	0.001* (0.001)
Terrain slope	0.025** (0.010)	-0.077 (0.172)	0.004 (0.006)	-0.001 (0.001)	-0.022*** (0.002)	0.011*** (0.001)	0.009*** (0.002)	0.032** (0.016)
Pasture attainable yield	-1.420** (0.642)	25.711 (20.740)	1.628*** (0.420)	0.042 (0.049)	-0.554*** (0.158)	0.665*** (0.086)	0.014 (0.102)	4.286*** (1.223)
Wheat suitability	-0.001* (0.001)	-0.041 (0.033)	0.001* (0.001)	0.000** (0.000)	0.001*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	0.001 (0.001)
Distance to nearest river	-0.005 (0.004)	-0.071 (0.151)	-0.007* (0.004)	-0.002*** (0.000)	0.009*** (0.001)	-0.007*** (0.001)	-0.008*** (0.001)	-0.024*** (0.006)
Distance to nearest market town	-0.062*** (0.003)	-0.155 (0.146)	-0.024*** (0.003)	0.001** (0.000)	0.017*** (0.001)	-0.009*** (0.000)	-0.005*** (0.001)	-0.023*** (0.006)
Distance to the border	0.002** (0.001)	0.035 (0.037)	-0.000 (0.001)	-0.000*** (0.000)	-0.000 (0.000)	0.001*** (0.000)	0.000*** (0.000)	0.008*** (0.002)
Distance to London	0.002*** (0.000)	-0.001 (0.019)	-0.002*** (0.000)	0.000** (0.000)	0.000 (0.000)	-0.000** (0.000)	0.000* (0.000)	-0.002** (0.001)
Distance to nearest coalfield	-0.001 (0.001)	0.002 (0.020)	0.000 (0.001)	-0.000*** (0.000)	0.001*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)	-0.004*** (0.001)
Control for Lay Subsidy Revenue	Y	Y	Y	Y	Y	Y	Y	Y
Control for Parish area	Y	Y	Y	Y	Y	Y	Y	Y
County fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Soil type fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Mean dep. var.	0.31	7.00	0.67	0.03	0.62	0.21	0.04	0.16
Observations	2141	2394	16228	12510	12819	12819	16228	16228
Nr. county fixed effects	43	42	43	42	42	42	43	43
R^2	0.31	0.10	0.14	0.17	0.23	0.20	0.10	0.03

Notes: All regressions are estimated using OLS. The unit of observation is a parish. Market (yes/no) is an indicator if a parish had a market. Copyhold count is the number of copyhold contracts recorded in a parish. Gentry 1700 is the number of members of the Gentry that live in a parish in 1700. Cath 1767 is the number of Catholics that live in a parish normalized by population. Agr. 1831 is the share of the population (male, over 20 years old) employed in agriculture in 1831. TrH. 1831 is the share of the population (male, over 20 years old) employed in trade or handicraft in 1831. Mill (yes/no) 1838 is an indicator equal to one if a parish had a textile mill in 1838. Mills 1838 is the number of textile mills a parish had in 1838. Elevation is the average elevation in meters in parish. Slope is the average slope of the land in a parish, measured in degrees. Pasture attainable yield is the attainable yield of pasture in parish. Wheat Suitability is the suitability of the soil for growing wheat. Distance to nearest river is the distance to the nearest river, in meters. Distance to nearest market town is the distance between the centroid of parish and the nearest market town recorded in Adams (1700), in meters. Distance to border is the distance between the centroid of parish and the sea or Scotland, whichever is closer, in meters. Distance to London is the distance between the centroid of parish and London, in meters. Distance to nearest coalfield is the distance between the centroid of parish and the nearest coalfield, in meters. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table A-6: Use monastic income rather than an indicator

	(1) Market 1600	(2) Copyhold 1850	(3) Gentry 1700	(4) Cath. 1767	(5) Agr. 1831	(6) TrH. 1831	(7) Mill 1838	(8) Mills 1838
OLS								
ln(1 + Monastic Income)	0.03*** (0.007)	0.55 (0.392)	0.09*** (0.007)	-0.00*** (0.001)	-0.01*** (0.002)	0.01*** (0.001)	0.01*** (0.002)	0.05** (0.020)
Control for Lay Subsidy Revenue	Y	Y	Y	Y	Y	Y	Y	Y
Control for Parish area	Y	Y	Y	Y	Y	Y	Y	Y
County fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Mean dep. var.	0.31	7.00	0.67	0.03	0.62	0.21	0.04	0.16
Observations	2144	2394	16243	12522	12831	12831	16243	16243
Nr. fixed effects	43	42	43	42	42	42	43	43
R ²	0.06	0.07	0.12	0.17	0.11	0.11	0.05	0.02
LONG-DIFF								
Monastic (yes/no) * ln(1 + Monastic income)	0.03*** (0.006)	-0.42** (0.192)	0.08*** (0.010)	-0.01*** (0.001)	-0.01 (0.009)	0.01 (0.005)	0.01*** (0.002)	0.04* (0.020)
Parish fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Post-Dissolution fixed effect	Y	Y	Y	Y	Y	Y	Y	Y
Mean dep. var.	0.66	0.84	0.77	0.51	0.47	0.16	0.05	0.09
Observations	4292	310	18642	25092	1754	1754	18642	18642
Nr. fixed effects	2146	155	9321	12546	877	877	9321	9321
R ²	0.77	0.51	0.52	0.99	0.63	0.71	0.53	0.50

Notes: All regressions are estimated using OLS. The unit of observation is a parish. For our *long-diff* models, in the second panel, we observe parishes twice, before and after the Dissolution. Market (yes/no) is an indicator if a parish had a market. Copyhold count is the number of copyhold contracts recorded in a parish. Gentry 1700 is the number of members of the Gentry that live in a parish in 1700. Cath 1767 is the number of Catholics that live in a parish normalized by population. Agr. 1831 is the share of the population (male, over 20 years old) employed in agriculture in 1831. TrH. 1831 is the share of the population (male, over 20 years old) employed in trade or handicraft in 1831. Mill (yes/no) 1838 is an indicator equal to one if a parish had a textile mill in 1838. Mills 1838 is the number of textile mills a parish had in 1838. $\ln(1 + \text{Monastic income})$ is the natural log of the total income generated by monastic assets in a parish in pounds in 1535. Post-Dissolution is an indicator equal to one for observations measured after the Dissolution. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Parish fixed effects are indicators for ancient parishes. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. In the *Long-diff* panel, standard errors are clustered at the parish level. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

Table A-7: Omit parishes owned by Cistercians

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Market 1600	Copyhold 1850	Gentry 1700	Cath. 1767	Agr. 1831	TrH. 1831	Mill 1838	Mills 1838
OLS								
Monastic (yes/no)	0.08*** (0.022)	-0.20 (0.845)	0.23*** (0.020)	-0.00*** (0.002)	-0.03*** (0.005)	0.02*** (0.003)	0.01** (0.004)	0.00 (0.017)
Control for Lay Subsidy Revenue	Y	Y	Y	Y	Y	Y	Y	Y
Control for Parish area	Y	Y	Y	Y	Y	Y	Y	Y
County fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Mean dep. var.	0.30	7.07	0.66	0.03	0.62	0.21	0.04	0.13
Observations	1943	2282	15155	11609	11897	11897	15155	15155
Nr. fixed effects	43	42	43	42	42	42	43	43
R ²	0.06	0.07	0.12	0.17	0.10	0.11	0.05	0.02
LONG-DIFF								
Monastic (yes/no) * Post-Dissolution	0.07*** (0.021)	-1.64** (0.690)	0.22*** (0.027)	-0.02*** (0.002)	-0.09*** (0.028)	0.02 (0.013)	0.01 (0.007)	0.01 (0.016)
Parish fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Post-Dissolution fixed effect	Y	Y	Y	Y	Y	Y	Y	Y
Mean dep. var.	0.65	0.87	0.77	0.51	0.47	0.16	0.05	0.07
Observations	3890	296	17144	23266	1642	1642	17144	17144
Nr. fixed effects	1945	148	8572	11633	821	821	8572	8572
R ²	0.77	0.51	0.52	0.99	0.63	0.72	0.53	0.51

Notes: All regressions are estimated using OLS. The unit of observation is a parish. For our *long-diff* models, in the second panel, we observe parishes twice, before and after the Dissolution. Market (yes/no) is an indicator if a parish had a market. Copyhold count is the number of copyhold contracts recorded in a parish. Gentry 1700 is the number of members of the Gentry that live in a parish in 1700. Cath 1767 is the number of Catholics that live in a parish normalized by population. Agr. 1831 is the share of the population (male, over 20 years old) employed in agriculture in 1831. TrH. 1831 is the share of the population (male, over 20 years old) employed in trade or handicraft in 1831. Mill (yes/no) 1838 is an indicator equal to one if a parish had a textile mill in 1838. Mills 1838 is the number of textile mills a parish had in 1838. Monastic (yes/no) is an indicator equal to one if a parish contained at least one manor owned by a monastery in 1535. Post-Dissolution is an indicator equal to one for observations measured after the Dissolution. Lay Subsidy revenue is the natural log of total tax revenue divided by total population in the 1525 Lay Subsidy returns. Parish area is the geographical area of a parish. County fixed effects are indicators for ancient counties. Parish fixed effects are indicators for ancient parishes. Standard errors correcting for heteroskedasticity at the parish level are in parentheses. In the *Long-diff* panel, standard errors are clustered at the parish level. * indicates significance at the 10 percent level, ** at the 5 percent level, *** at the 1 percent level.

5: Occupation conversion table for the 1381 poll tax

List occupation	Translation	Category
Agricultor, ag', agric', agricol, agricola, agricole, agricult, au- grecol	cultivator	Agriculture
Arator, arat', ar', carucar	ploughman	Agriculture
Bercar, barker, pastor, pastelere	shepherd	Agriculture
Cornayser	grain merchant	Agriculture
Cornloder	grain seller	Agriculture
Cottar, cotag, coterel	cottage tenant	Agriculture
Cultor, cult' terre, cultor, cultores	cultivator	Agriculture
Darier, daye	dairying person	Agriculture
Falcator, messor	mower	Agriculture
Famul, famulus	farm laborer	Agriculture
Fanner, vannator	grain winnower	Agriculture
Farmer, fermar, firmar		Agriculture
Flaxman	flaxer	Agriculture
Fogheler	fowler	Agriculture
Frankleyn	freeman, landowner	Agriculture
Fruytor	fruit grower	Agriculture
Fugat	sheep or cattle drover	Agriculture
Grasier	cattleherd	Agriculture
Herdman, hirdeman	tender of livestock	Agriculture
Kembere	wool comber	Agriculture
Kerner	small farmer	Agriculture
Lib' ten	free tenant	Agriculture
Miller, meller, miln, milner, molend, molendinar, mulleward, mul- ner, grinder	grain miller	Agriculture
Nat' ten', nat' terr' tenant, natis	villein tenant	Agriculture
Tenant (ten' ad volent, ten' terr)	free tenant	Agriculture
Tenant in bondage		Agriculture
Thresher, triturator, drescher, takker	thresher of grain	Agriculture
Swon, swynerd, swinherd	swineherd	Agriculture
Vaccar	cowherd	Agriculture
Allutar, tawyer	leather handler (https)	Trade and handicraft
Apprentice		Trade and handicraft
Armerer, armourer		Trade and handicraft
Arrowsmith, arwesmyth		Trade and handicraft
Artisan, artifice, art', artif'		Trade and handicraft
Aurifaber	goldsmith	Trade and handicraft
Baker, bakst', bakest', bakster, pistat, pist'	baker	Trade and handicraft
Barber, barbitosour		Trade and handicraft
Bladsmith, bladesmith		Trade and handicraft
Bookbinder		Trade and handicraft
Bowyer	maker and seller of bows	Trade and handicraft
Braciatrrix, brewer, brewstere, bruer, pandoxatore	brewer	Trade and handicraft
Butcher, bocher, carnifex, meter		Trade and handicraft
Callemaker, callere	headdress maker	Trade and handicraft
Capmaker		Trade and handicraft
Cardmaker	maker of instruments for carding wool	Trade and handicraft
Carpenter, carpent'		Trade and handicraft

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List occupation	Translation	Category
Cartwright	maker of carts	Trade and handicraft
Chaloner	blanket maker	Trade and handicraft
Chaundeler, candel, candeler	candlemaker	Trade and handicraft
Chinchere	ivory worker	Trade and handicraft
Cirotecar, cirot, wheeler	wheeler	Trade and handicraft
Cissor, sissor, schapst, schappist, schippester, tailor, taylour	tailor	Trade and handicraft
Cobbler, cobeler	shoemaker	Trade and handicraft
Combar	combsmith	Trade and handicraft
Cooper, couper, coup	a maker or repairer of casks and barrels	Trade and handicraft
Cordewaner, corveyser, sutor, soutere, sothur, sutrix	shoemaker	Trade and handicraft
Coriour, courreour	leather processor	Trade and handicraft
Cutler, cotler, cotiller	knife seller or sharpener	Trade and handicraft
Draper, lyndrap', pannar, panermaker	maker and dealer of fabric and sewing materials	Trade and handicraft
Dubber	cloth maker	Trade and handicraft
Dyer, degher, litst, list, lest, lyster, tinctor, heust	dyer of fabric	Trade and handicraft
Faber, fabri, fabro, ferour	smith	Trade and handicraft
Fiddler	a person who used a knife to remove casting from clay	Trade and handicraft
Filat', filatrix, netrix, spinster, spynner, spynvester	spinner of thread	Trade and handicraft
Fletcher	arrowsmith	Trade and handicraft
Fuller, toucar, touker, walker	a person who fulls cloth	Trade and handicraft
Furnor	baker	Trade and handicraft
Girdler	belt-maker	Trade and handicraft
Glaserwright, glasswright	glass maker	Trade and handicraft
Glover	glove maker	Trade and handicraft
Goldsmith		Trade and handicraft
Harpmaker		Trade and handicraft
Hatter	maker and seller of hats	Trade and handicraft
Hooper, houper	hoop maker	Trade and handicraft
Hoper, hopman	maker and seller of hops	Trade and handicraft
Horner	horn maker	Trade and handicraft
Hosier	maker and seller of stockings, gloves, and nightcaps	Trade and handicraft
Lardyner	metal worker	Trade and handicraft
Limenour, luminati glasier	manuscript illuminator	Trade and handicraft
Lokyer, lokiari, lokear	locksmith	Trade and handicraft
Lorymer, spurrior, sporier	maker of spurs	Trade and handicraft
Lymbernere	lime maker	Trade and handicraft
Maker	presumably a generic artisan/manufacturere	Trade and handicraft
Maltman, maltmakestre, maltmonger	malt maker/seller	Trade and handicraft
Mason, cementar, camentar, sementar		Trade and handicraft
Mustarder	mustard maker	Trade and handicraft
Nedler, needler	maker of needles	Trade and handicraft
Netherd, nethird	netmaker	Trade and handicraft
Neyler	iron nail maker	Trade and handicraft
Oliman, olim, olyman	oil maker	Trade and handicraft
Orfreys	embroider	Trade and handicraft
Orlogemaker	clockmaker	Trade and handicraft
Parchemener	parchment maker and seller	Trade and handicraft
Pattenmaker	clog maker	Trade and handicraft
Payntour, pictat, pictor	painter	Trade and handicraft
Pellipar, pelter, pelliper, skinner	one who prepares and sells animal skins	Trade and handicraft

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List occupation	Translation	Category
Pincerna	pinner, pin manufacturer	Trade and handicraft
Potter, crokkar, figul, dauber, dober	maker or seller of pottery	Trade and handicraft
Pouchmaker		Trade and handicraft
Quyltemaker	quiltmaker	Trade and handicraft
Reveter	clothier	Trade and handicraft
Roper	rope manufacturer	Trade and handicraft
Rotar	wheelwright	Trade and handicraft
Saddler, sadler, sadeler, sadelar, sellar	maker or seller of saddles	Trade and handicraft
Salter	maker or seller of salt	Trade and handicraft
Saucemaker	maker or seller of sauce (could also be medicine)	Trade and handicraft
Sawyer, saghiar, sachour, sarriator, sarrar, sarrator	wood-cutter	Trade and handicraft
Sayumaker	maker of ?	Trade and handicraft
Scharman, scherman, schermon	shearman, shearer of cloth	Trade and handicraft
Scheder, shether, vaginator	sheath maker	Trade and handicraft
Sealer	seal presser	Trade and handicraft
Seustere, sewster	seamstress	Trade and handicraft
Shipwright	repairer and maker of ships	Trade and handicraft
Slaymaker	sleigh maker	Trade and handicraft
Sopere	maker or seller of soaps	Trade and handicraft
String', stryng'	bowstring maker	Trade and handicraft
Tanner, tannator, wodour	leather tanner	Trade and handicraft
Tapister	maker and seller of tapestries	Trade and handicraft
Tiler, cooperator, helder, helier, tegulator, teghelar, teyler, teyl-maker	maker and installer of tiles	Trade and handicraft
Tornour	woodworker	Trade and handicraft
Weaver, tector, textor, webbe, webster, webere	weaver of cloth	Trade and handicraft
Wexmaker	waxmaker	Trade and handicraft
Wright, wryth, wrythys	builder or repairer	Trade and handicraft
Wyredragher	wire maker	Trade and handicraft
Botman	boatman	Mercantile
Broker, broggour		Mercantile
Carter, carect', carior, driver, dryere, thriver	transporter of goods	Mercantile
Chapman	trader, peddler	Mercantile
Charrett	chariot	Mercantile
Corsour	horse merchant	Mercantile
Dragger, mariner, nauta	sailor	Mercantile
Ferryman		Mercantile
Fisscher, fyscher, fisher, piscat, piscator, piscenar	fisher	Mercantile
Garlekmong	garlic seller	Mercantile
Grocer	fruit and vegetable seller	Mercantile
Habirdassher	cloth seller	Mercantile
Hackneyman	renter of horses and carriages	Mercantile
Huckster, hokkestere, hockester, huxster		Mercantile
Import', impot	importer	Mercantile
Irenmong, irmongere	dealer of iron products	Mercantile
M'c'	textile merchant	Mercantile
Mancip, marchaunt, mercat, mercer	merchant	Mercantile
Mango equorum	horse merchant	Mercantile
Peddler, qwaxillarius		Mercantile
Poulterer	seller of poultry	Mercantile

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List occupation	Translation	Category
Puddingwife	sausage seller	Mercantile
Regratix	retailer	Mercantile
Scuynemong	dealer of ?	Mercantile
Sefarer	seafarer	Mercantile
Spicer	spice dealer	Mercantile
Stokfisschmong	fish seller	Mercantile
Tinker	travelling repairman and salesman	Mercantile
Travent	carrier and seller of goods	Mercantile
Upholder	furniture salesman	Mercantile
Victualler	merchant of food/drink	Mercantile
Vynter	wine merchant	Mercantile
Waterman	ferryman	Mercantile
Wolmonger	wood seller	Mercantile
Apotecar (apotec')	pharmacist	Professional
Apparitor, clerk, cleric		Professional
Architect		Professional
Magistri, magister		Professional
Docata	teacher	Professional
Homin de lege, homo legis, attorn'	lawyer	Professional
Hospit	nurse	Professional
Leche	doctor	Professional
Mayster		Professional
Medicus, medico		Professional
Midwife, obstetrix		Professional
Nottar	notary	Professional
Scriptor	historian	Professional
Scrivener	clerk/writer	Professional
Subedell in facultate	faculty	Professional
Alderman	elected member of local council	Government
Squire, armig, esquire		Government
Assess	assessor	Government
Bailiff, bailly, ballivus		Government
Bellman, bellringer		Government
Burgess	elected representative	Government
Chancellor	head of administration	Government
Chiveler, miles	knight	Government
Collectores		Government
Constabular, custos, subconstabularii	constable	Government
Domina	lady	Government
Domini	lord	Government
Flagellator		Government
Generosa	gentleman	Government
Herbeger	lodging officer	Government
Jur', jurat	juror	Government
Marshal		Government
Parmont	government minister	Government
Offic', officer		Government
Somnour	summoner	Government
Syner	seignour, ruler	Government

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List occupation	Translation	Category
Waite	guard/lookout	Government
Ashburner	dustman	Laborer
Axeburner	woodsman	Laborer
Carbonar'	charcoal burner	Laborer
Colermaker, coal maker		Laborer
Forester		Laborer
Fract' lapid, lapidist, latan, latoner, latonius	stone cutter	Laborer
Forbour	metal polisher	Laborer
Gardener		Laborer
Hayward	garden warden	Laborer
Heyrer	hedger, hedge trimmer	Laborer
Labour, laborer, labourer		Laborer
Loder, loader, onerantur		Laborer
Operatrix	workman	Laborer
Ostler, palfreyman	horse groomsmen	Laborer
Packer	packer of goods	Laborer
Parker	park caretaker	Laborer
Paver		Laborer
Plumber, plumbar		Laborer
Reeder, tachere, thacher, thakkere, thashere	thatcher	Laborer
Slater, sclattere, slater	roofer	Laborer
Wolpacker	wood handler	Laborer
Woodward	keeper of forests	Laborer
Waller	builder of walls	Laborer
Harper	musician	Services
Histri	actor	Services
Hostel, hosteler, hostile, hostilar	innkeeper	Services
Wyntavernor	wine taverner	Services
Minstral, menstrual	musician	Services
Piper	musician	Services
Tabernario, tavener	tavern keeper	Services
Tapst, tappestere	barman	Services
Ancilla	maid	Servant
Bondman		Servant
Celer	cellarman	Servant
Cook		Servant
Cunarius	nanny	Servant
Dryst	workwoman (drying)	Servant
Garcio	servant or mercenary	Servant
Lavender	washerwoman	Servant
Lotrix	launderer	Servant
Manuciple	steward	Servant
Nativus	bondman	Servant
Nutrix	wet nurse	Servant
Porter		Servant
S', servient, seriaunt, servant		Servant
Servient de rector, priorisse, vicar, abbatis, parson	servant of the church	Servant
Seriant de payes	paid servant	Servant

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List occupation	Translation	Category
Servient sui artifex	servant who served as a personal artisan	Servant
Scald'	scaldler of meat, usually in a royal household	Servant
Spenser	butler/steward	Servant
Valet		Servant
Bedellus, beadle	parish officer	Church
Canon	cleric	Church
Capell	chaplin	Church
Coadjutorii	bishop	Church
Ecclessiam		Church
Feretarius	monk	Church
Rector	clergy	Church
Pardoner, questore		Church
Parmont		Church
Parson(e)	cleric	Church
Priorisse	giver of papal pardons and indulgences	Church
Vicar	chapel head	Church
Sacristan	parish head	Church
Sextayn	church officer	Church
Verger	church attendant	Church
Begger, pauper		
Bulker	thief?	Other
Chullour	traitor	Other
Claudus	cripple	Other
Commongere, commoner		Other
Confrater	brother	Other
Dicer	gambler	Other
Dicon	impoverished person	Other
Leper		Other
Secus	otherwise	Other
Socius	kindred	Other
Soiournant	visitor	Other

6: Data sources

Variable	Source	Comment
Main Variables		
The Valor Ecclesiasticus	Caley and Hunter (1810, 1814, 1817, 1821, 1825, 1831)	For coding method, see above.
Additional information on location of monastic houses	The National Archives Education Service (2019)	
Markets	Letters et al. (2003)	
Copyhold 1520	Davenport and Leadam (1898)	
Copyhold 1842-1883	Parliament	Records of Copyhold Commission, available through Parliamentary papers online
Number of Gentry in 1399-1477	Inquisitions post Mortem	http://www.inquisitionspostmortem.ac.uk/ , accessed Nov. 2020
Number of Gentry in 1700	Adams (1700)	
Number of Catholics 1767	Worrall (1980, 1989)	
Occupations - 1381 poll tax	Fenwick (1998, 2001)	See also Gibbs (2015). Data partially made available by Samuel Gibbs
Occupations - 1831 census	Gatley (2005)	
Water mills 1399-1477	Inquisitions post Mortem	http://www.inquisitionspostmortem.ac.uk/ , accessed Nov. 2020
Textile mill variables	Parliament (1839)	
Mechanisms		
Patents	Woodcroft (1854)	The data were transcribed and made available to use by James Dowey, see Dowey (2013)
Enclosure dummy	Tate and Turner (1978)	
Agricultural yield	Kain (1986)	
Threshing machines	Caprettini and Voth (2020)	
Covariates		
The Tudor Lay Subsidies	Sheail (1968)	
Coal deposits	Strahan (1912)	Digital copy available through www.davidrumsey.com

Variable	Source	Comment
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Covariates continued

Elevation	CGIAR consortium at http://srtm.csi.cgiar.org/	
Slope	Earth Resources Observation and Science Center of the USGS at http://eros.usgs.gov	
Inland rivers and water bodies	Digital Chart of the World available through www.diva-gis.org	Distances computed in ArcGIS
Distance to London		Computed in ArcGIS
Distance to national border		Computed in ArcGIS
Distance to market town	List of Market towns from Adams (1700). Distances computed in ArcGIS	
Suitability for wheat and barley	FAO at http://webarchive.iiasa.ac.at/Research/LUC/GAEZv3.0/	We used the rain-fed, low intensity, baseline period settings
Soil type	FAO at http://webarchive.iiasa.ac.at/Research/LUC/GAEZv3.0/	

Other variables

1332 Lay Subsidy	Glasscock (1975)	Data made available by Bruce Campbell
Domesday Book	Hull (2018)	

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