Of Families and Inheritance: Law and Development in England Before the Industrial Revolution[*]

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Abstract

We examine how pre-Industrial-Revolution English caselaw development on land, inheritance, and families affected, and was affected by, economic and demographic outcomes. Our yearly measures of caselaw development are derived from existing topic-model estimates that reflect a comprehensive corpus of reports on pre-1765 court cases. We estimate a structural VAR model using these caselaw time-series in combination with measures of real per-capita income and vital rates. Pre-industrial caselaw development profoundly shaped economic development. Strikingly, the areas of caselaw that stimulated real-income growth are on families and inheritance, not land. Caselaw on families and inheritance was especially important as a driver of real income and birth rates after 1710. Caselaw developments were spurred primarily by changes in real income, not by changes in vital rates. Incorporation of endogenous caselaw development leaves intact the findings of the existing literature that examines pre-industrial economic-demographic interactions. However, our findings do imply that any Malthusian trap that was present in pre-industrial England was made less severe as a result of developments in caselaw on families and inheritance.

Keywords: pre-industrial England, caselaw, economic development, families, inheritance, Malthus

JEL Classifications: N13, N43, N33, K36, K11, P48, O17

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1. Introduction

This paper brings together three strands of the literature on pre-Industrial-Revolution England that have previously developed separately. The first is the contributions that investigate whether early modern England was Malthusian, thus examining the feedback between demographic variables and per-capita income.[1] The second is the literature that explores the direct effect of changing institutions on English economic development in the century immediately preceding the Industrial Revolution.[2] The third comprises the many studies of caselaw by legal scholars who provide copious information on how the doctrines of the English legal system developed from the sixteenth to the eighteenth centuries.[3]

We connect these three areas of study in one empirical exercise that allows us to investigate the nature and extent of the interaction between socioeconomic outcomes and caselaw development in the centuries prior to the Industrial Revolution. We thereby address two fundamental questions of longstanding interest to economic, legal, and social historians. First and foremost, did the development of law originating in the English courts actually facilitate, as opposed to hinder, economic development in the pre-industrial era? Our empirics provide strong evidence that yes, caselaw stimulated economic development. And, second, did the development of caselaw in the years before industrialization reflect socioeconomic changes?[4] Again our empirical answer is yes, caselaw development was stimulated by increases in real per-capita income. To date, no contribution has been able to address these questions explicitly in a rigorous empirical framework and to provide the types of answers that we present here.

The Malthusian literature focuses on assessing whether the critical assumptions and mechanisms of the Malthusian model are in fact borne out in the data on pre-industrial England. While informative about the interaction between demographic and income variables, this literature does not incorporate variables that explicitly capture institutional changes.

The institutional literature that has so much influenced economists in general has largely focused upon the great constitutional measures. Certainly, the seminal paper in this tradition, North and Weingast (1989), which focuses almost exclusively on the Glorious Revolution, has been very important in changing the way economists think about development processes, including in a modern setting. But this facet of the institutional literature almost completely ignores the

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[1] See, for example, Clark (2007), Wrigley and Schofield (1981), Nicolini (2007), Lee and Anderson (2002), Crafts and Mills (2009, 2020), Møller and Sharp (2014), Kelly and Ó Gráda (2012, 2013).

[2] Certainly, this direct link has been implicit on the works of economic historians for centuries. We are referring in this paper to a recent literature in economics as a whole that has spurred increasing interest in this question outside the community of economic historians. The seminal works in this strand of the general economics literature are North and Weingast (1989) and Acemoglu and Robinson (2005).

[3] Even confining oneself to the hugely significant studies would entail a list that is far too long to include here. Baker (2019) provides a recent compelling synthesis. In Section 2, we cite further specific examples of relevant works.

[4] See Cornish et al. (2019: 6-10) and Harris (2004) for an overview of the literature debating the importance of law (or lack thereof) for early industrial development. The influence of society on legal development is implicit in many works by legal historians. However, the effect of socioeconomic developments on caselaw development in the pre-industrial era has not been subjected to systematic quantitative scrutiny.

development of caselaw, the central element of the English legal system. Moreover, the empirical work in this tradition has, on balance, not been supportive of the notion that those great constitutional measures did have a decisive effect on economic growth and change.[5]

The legal literature has amassed a huge amount of information on micro-institutional developments embodied in caselaw. But, until recently, this information has not been available in quantitative form, which has precluded empirical work on the interaction between caselaw development and economic and demographic measures. The contribution of Grajzl and Murrell (2021a), who estimate a structural topic model using the authoritative corpus of reports on pre-1765 English court cases, now provides the data that makes such work possible.

We draw on the data generated by Grajzl and Murrell (2021a) to construct measures of the yearly intensity of development of English caselaw on land, inheritance, and families between 1552 and 1764. We focus on these three legal domains because these are the areas of caselaw that are most directly pertinent to those demographic and economic variables emphasized in the Malthusian literature. We then estimate a structural vector autoregression (VAR) model. We use the three time series reflecting the development of caselaw on land, inheritance, and families, plus three Malthusian measures: real per-capita income, death rates, and birth rates.

We first examine the impact of caselaw on economic and demographic outcomes. Our results provide the first quantitative evidence that pre-industrial caselaw development profoundly shaped economic development. Strikingly, the key areas of caselaw that positively impacted economic development are those on families and inheritance, not land. There is a strong effect of attention to both family and inheritance caselaw on per-capita income. At the sectoral level, developments in family and inheritance caselaw especially stimulate industrial (as opposed to agricultural or service) per-capita output. Notably there is also influence in the reverse direction: we find that real-income shocks lead to elevated attention to caselaw on both families and inheritance. Thus there are positive feedback loops between these two areas of law and economic development.

In a counterfactual exercise, we explore how per-capita income and the birth rate would have evolved in the absence of the unusually large developments in family and inheritance caselaw that were attendant on the Restoration of 1660, a time period when England experienced a marked break in its trend growth rate (Crafts and Mills 2017). The counterfactual effects are economically significant. In the absence of the unusually large changes in the caselaw on inheritance that occurred in the early 1660s, the next one-hundred or so years would have seen a cumulative loss of more than a typical year's worth of real per-capita income and the implied annual growth rate of real per-capita income up to 1688 would have been 0.06 percentage points lower than it in fact was. Similarly, in the absence of the unusually large developments in family law, there would have been a cumulative loss of half a year's worth of per-capita income and the implied yearly growth

rate of real per-capita income until 1688 would have been 0.029 percentage points lower than it actually was.

We then investigate during which time periods developments in caselaw on families and inheritance were especially important as drivers of living standards and fertility. This occurred after 1710, a period that some social historians view as marking a cultural shift toward more affective families. In the 1720s, innovations in caselaw on families counteracted a series of negative shocks to real income that were probably attributable to the financial ramifications of the bursting of the South-Sea Bubble. After 1750, when the caselaw on families was already more settled, inheritance becomes the main source of the legal innovation that raised real income.

Finally, we revisit the evidence on the interaction between demographic and economic factors in pre-industrial England. Integrating endogenous caselaw development into the analysis does not notably affect the estimates of economic-demographic interactions typically found in the existing Malthusian literature. Nevertheless, our results indicate that, because development of caselaw on families and inheritance raised per-capita income, any Malthusian trap that may have existed was less severe than would have been the case in the absence of pertinent legal developments.

The paper proceeds as follows. Section 2 provides an overview of the key features of early English law that are relevant to our empirical arguments. In Section 3 we theorize about the ways in which caselaw could affect demographic and economic outcomes, and vice versa. In Section 4 we introduce and explain our data, stressing their validity as measures of caselaw development from a legal-history standpoint. In Section 5 we lay out our empirical approach. Sections 6-8 present and discuss the empirical results outlined in the paragraphs above. Section 9 summarizes the results of a placebo exercise that provides additional evidence in support of the validity of our measures of legal development. Section 10 offers concluding reflections.

2. The Early-Modern English Legal System and Its Caselaw

We provide a brief overview of the most relevant aspects of early English law, without the nuance warranted by the complexity of legal history. Our aim is merely to provide those core facts that are the basis of our empirical arguments for those readers unfamiliar with the pertinent legal-historical details.[6]

By the beginning of the time period covered here, the court system had solidified into the form it would maintain until the 19th century. At the center were two separate, complementary systems of law: common law and equity. The place of the former within the judicial system remained remarkably stable from the 14th century to the 19th century. Its system of education and debating fora, located in London's Inns of Court, provided human capital for the top stratum of legal practitioners. Its process of case reporting and reliance on precedent became the model for the

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[6] For this reason, we do not provide detailed references of sources. Sections 2 and 3 are based on our synthesis of the information contained in many papers and books. Most important among these are Abramowicz (1999), Baker (2019) Barclay (2017), Bonfield (1983a, 1983b, 1986), Cust and Lake (2020), English and Saville (1983), Erickson (1990, 2002, 2005), Feldman (2003), Forster (1983), Healey (2019), McDonagh (2017), Roebuck (1978), Seymour (1994), Solar (1995), Spring (1984), and Tait (2014).

legal systems of many countries. The central common-law courts were the King's (or Queen's) Bench, the Court of the Common Pleas, and the Court of the Exchequer. Enforcement was provided by the Crown's institutions. To facilitate access to royal justice outside London, the judges travelled around the country holding assize sessions. Assize cases that presented particularly difficult legal issues were routinely reserved for later hearing in the central courts in London.

From the earliest times, common law was regarded as rather rigid, sometimes meting out rulings that were legally rigorous but transparently unjust. A softening of its decisions could occur within equity, administered in Chancery and presided over by the Lord Chancellor, the highest-ranking legal official in the country and an at-will appointee of the Crown. Arising from the role of the monarch as the supreme authority responsible for true justice, Chancery sometimes heard cases for which prior judgment had already been given at common law, finding ways to ameliorate the worst injustices. Chancery procedure allowed adjudication at equity to be more flexible in inquisitorial techniques, invoke a wider set of remedies, and act proactively.

Most importantly for our purposes, Chancery exercised jurisdiction over matters that the common law found difficult to reach within its rather rigid sets of rules, areas that became vital in the development of land, inheritance, and family law. Two separate, but complementary, sets of rules could apply to the same entity: a parcel of land often had a formal ownership at law adjudicated in the common-law courts and an equitable ownership of the benefits of the land (the 'use') with adjudication in Chancery. This division became the basis for trusts: the owners at law, the trustees, administered that ownership on behalf of the equitable owners, the beneficiaries. Chancery's role included ensuring that trustee decisions were truly in the interests of the beneficiaries. During the time period covered in this paper, a very large proportion of English productive property was administered under this set of arrangements, and swathes of areas of law were developed, including mortgages, the property rights of children, widows, spouses, and minors, and elements of the process of inheritance.

2.1. Land

Early common law was to a great extent the law of real-property, which primarily comprised land and its improvements. The monarch was at the apex of the structure of obligations and rights that were grounded in a feudal understanding of land tenure. The formal feudal elements of the law lasted until 1660, but before that a centuries-long process led to the feudal tenant becoming the de facto legal owner. Our measure of the development of land caselaw (see Section 4) reflects the last part of this process. Thus, much of the development of land caselaw captured by our measure occurred early in the period we cover: before 1630. That development was largely a product of the common-law courts.

Many elements of caselaw developments that we capture in our measure of land caselaw therefore have a medieval tinge: disputes about lands held in common, wrangling over which type of feudal property rights obtained on any piece of land, deciding whether blackthorn is timber or

not, etc. There were also developments in the transfer of land, often made more complicated by the arcane features of feudal tenancy/ownership and attempts to bypass its stringency.

Judges often endorsed innovative but convoluted arrangements to contract around the feudal constraints. Legal practitioners became adept at using law to circumvent such inconveniences. However, there was one result of these arrangements where the stakes were so high that the monarch was forced to act. Under the feudal system, the duties due at the transfer of land between generations had provided large revenues for the crown. These revenues were eroded by techniques designed to transfer beneficial ownership, a use, between generations without transferring legal ownership. Henry VIII put a stop to these techniques in the Statute of Uses of 1536. While this addressed the revenue problem, it created a whole new set of practical legal problems for landowners, particularly in matters of inheritance (see below).

Developments in land caselaw during the century and a quarter after this Statute reflected the process of development, dispute, and decision as lawyers and their clients found new methods of transferring the property rights on land between generations. For example, common-law judges were avowedly resistant to restraints on alienation, particularly those that involved landowners attempting to control the ownership of land into the indefinite future (perpetuities). A landmark decision in 1613/1614 ruled against perpetuities in general, but a century passed before a definitive rule was broadly agreed upon. The century after the Statute of Uses was a period of much uncertainty in the land law in general, with new caselaw reflecting attempts to create a new set of workable arrangements.

2.2. Inheritance

Primogeniture was the law in England in two limited ways. First, hereditary titles usually went through the male line. Second, if a person died intestate then all the estate went to the heir determined by the line of hereditary, most commonly the oldest son. However, the Statute of Wills of 1540 confirmed what had long been practice: landowners could designate their beneficiaries in wills. Given this flexibility, the existence of a dominant primogenital culture was crucial. This cultural primogeniture was strongest among the nobility, a way of maintaining the alignment of economic, geographic, and noble status.

Primogeniture, even as a choice embodied in a will, would have left daughters, younger sons, and perhaps even widows at the mercy of the oldest sibling. This seemed unacceptable to most families. Wills increasingly aimed at making each member of the nuclear family a beneficiary, in arrangements that we discuss fully in the ensuing subsection. This presented numerous technical legal problems that had to be solved, especially in an age where early and unexpected death was very common. A significant part of our measure of the development of inheritance caselaw reflects the courts wrestling with these issues: what was acceptable in the drafting of wills, the meaning of contingencies in wills, and the resolution of disputes when wills were absent, ambiguous, internally inconsistent, or illegal. The issues surfacing in our inheritance measure are often quite mundane, but nevertheless absolutely vital in a society where land was the basis of much economic activity.

The making of wills embodied one significant preference other than taking care of the immediate family. This was a desire to preserve the family estate in the family line over successive generations. Attempts to do so involved a very old device, entail, which specified the beneficiary on death as a named male and his genetic heirs. Practically, this was accomplished by giving the named beneficiary a life estate (a use), with the condition that the beneficiary adopt the same specification of his beneficiaries: a continuing line of identical terms of inheritance. Thus, another significant part of our measure of inheritance caselaw reflects the courts making decisions on the testamentary disposition of life estates and entails.

The common-law courts were only willing to go so far in endorsing the use of entails, and equity had no jurisdiction over this aspect of law. Rules on perpetuities reduced the scope of entails; sons found ways to defeat their fathers' intentions once in possession of their life estates. The common-law courts refused to bar such actions. Even dutiful sons might be forced by circumstance to break entails, perhaps selling some land to avoid bankruptcy or to provide for siblings. This presented practical problems that were addressed with a set of legal measures that we have included under family law.

2.3. Families

We have separated family law from inheritance law even though a large part of the former concerned the latter. The reason is that how parents took care of their children, how husbands treated their wives, and how women controlled property involved a wider set of issues than just inheritance. For example, marriage changed who owned specific items of property, families bestowed property to secure better marriages for their daughters, and land inherited by minors was under de facto control of their guardians. These issues, all reflected in our data, were distinct from inheritance per se.

As with so much of property law, our story begins with the rigidities of the common law. Under coverture, a married woman no longer owned property: she and her husband were a single property owner with the husband in control. Under dower, on widowhood the wife was given a life estate in one third of the couple's property, with that one-third reverting back to the husband's heir on the death of the widow. These, just like primogeniture, were default rules, tailored for a feudal system and the preferences of the very highest strata of society. They did not match the needs of a broader class of landowners and of families who cared for more than their family line and their oldest sons. One other aspect of the common law, however, mitigated these strictures: the general freedom of contract.

The marriage settlement was a contract between bride and groom and their families that placed constraints on how the marital property was used and what happened to the property on the death of one of the betrothed. Jointures replaced the one-thirds common-law rule of dower, specifying the amount of property a widow would control in her life estate. Portions were parts of the family estate reserved for younger sons and daughters. Making sure that portions were fully paid was a responsibility of a father, and then on his death, of whoever inherited the family estate.

Developments of the marriage settlement were stimulated by the Statutes of Uses and of Wills. Conveyancers provided templates in manuals, reflecting what had been decided in caselaw. Marriage settlements were an abiding feature of the management of family property, for all classes of property owners, even those yeoman farmers with small farms. Parents could ensure a better marriage for daughters using portions; parents could protect daughters against useless and abusive husbands; widows could maintain greater control over family property on second marriage. Nevertheless, one goal that traditional marriage settlements could not accomplish was the desire to ensure that the family estate passed intact through the male line.

The device by which this became possible is the strict settlement, which does not refer to a particular legal instrument but rather to a set of practices in marriage settlements, wills, and property conveyancing. Made possible by the peculiar modulation of legal and equitable property rights, strict settlement combined three elements: the entail, dating from a statute of 1285; the life estate, endorsed by the Statute of Uses; and the placing of legal ownership in trustees, a device that had been long employed but whose features and pertinent legal rules were developed and honed in the 17th century. The duty of the trustees was to make sure the owner of the life estate (the current head of the family) could not defeat the entail and alienate his patrimony, which was easily done under common-law rules. The trustees were the formal legal owner and their prime responsibility was to ensure that the equitable owner both received the fruits of the life estate and disposed of it in accordance with the agreed-upon stipulations of the marriage settlement. Disputes about the actions of trustees were under the purview of the Chancery, with procedures and remedies that could be much more flexible and proactive than under the common law.

The strict settlement was far from perfect in preserving the line of succession: in a legal system that abhorred constraints on alienation it could not be. However, it did allow fathers some control over sons, and sometimes even grandfathers over grandsons. Via a long process of experimentation by lawyers and their clients, tested and shaped by decisions within the courts, by the end of the 17th century English families had found the basic techniques for inheritance that they would employ for two centuries. These court decisions are reflected in our data on family law. And, notably, the shadow of this law fell on more than the wealthiest families: this was a society where knowledge of the law was widespread and most property-owners, however modest, would have been aware of its rules.

An additional aspect of arrangements surrounding marriage allowed married women to contract around the constraints of coverture. By setting up a separate estate before marriage, a married woman could be an independent owner of property. This arrangement by-passed coverture because the wife was not the legal owner of the estate, trustees were. Such 'sole and separate estates' were used by landowning families from the richest to the yeomanry, becoming important in the 16th century and lasting until the 19th.

Our data on families also reflects the development of pertinent caselaw that regulated the supervision by guardians of minors who inherited an estate. Until the mid-17th century, there were two types of feudal tenures (that is, effectively ownership). Under socage, an inheriting minor was

placed under the wardship of that nearest kin who could not inherit the minor's estate. Under military tenure, the lord who was one step up the chain of feudal hierarchy held the minor's property rights until the minor came of age. Military wardships were bought and sold, as were marriages of wards. Moral hazard was intrinsic in these guardianships. Under the Tenures Abolition Act of 1660, military tenures were ended and virtually all land was converted to socage tenure. The Act confirmed an ordinance passed under Parliamentary rule. All such ordinances had become void on the restoration of the King in 1660. Given the uncertain legal status of all measures not assented to by the King, we take 1660 as the date when the legal uncertainty was resolved: as the Act itself states, "…diverse Questions might possibly arise unlesse some seasonable remedy be taken to prevent the same…". At that point, fathers could designate who would be guardians of their children until the age of 21, with guardianship a position that effectively became a trusteeship under the supervision of Chancery.

A final aspect of the law on families was relevant to the poor in need of public support. A very comprehensive Poor Law of 1601 formalized old practices in a national system. Everybody was to have a parish of settlement and could receive poor law support only from that parish. Given that parishes were small and geographic variations in wealth were substantial, subsistence migration was a constant fear and parishes often shirked their rightful burdens by expelling the poor. The poor and other parishes could appeal the decisions of a parish in local courts. Cases filtered up to judges on their assize circuits. Where difficult questions of law were at stake, cases could be reserved for discussion in London's central courts, and therefore find their way into our data on caselaw relevant to families.

3. Theorizing on the Feedback between Legal and Economic Development

In this subsection, we suggest ways in which caselaw could affect demographic and economic variables, and vice versa. For caselaw, we focus on inheritance and the family since arguments about the importance of property law, captured in our land variable, are legion in the literature. In discussing the effect of legal developments, we focus on real incomes, since the connection between family law and family demographics is quite immediate.

3.1. From Legal Developments to Economic Development

Legal developments facilitated the entry of more participants into the marketplace. 'Surplus children' inherited resources that provided security and gave scope for new economic ventures. The separate estates of wives afforded them protections when they became creditors of their husbands, buyers and sellers of property, and investors in their own projects. The greater security for wives, widows, younger sons, and daughters might itself have encouraged greater risk-taking in market activities. There were more economic agents in the possession of capital that were available to take advantage of the increasing liberalism emphasized by McCloskey (2016).

A broader effect is that the accumulation of human capital needed for wealth creation in modern-market capitalism was stimulated by the combination of the rigid rules of the common law and a legal system that was very supportive of contracting around these rules. People became

more familiar with legal processes and instruments. Contracting-around coverture and dower and the production of detailed marriage settlements led to the creation of complex written instruments, which instructed many on property and contract law. The scope for women to act on such knowledge was enhanced by their status as beneficiaries of trusts, with the possibility of being litigants at Chancery.

Implementing complex marriage settlements and wills often required employing more modern financial instruments, stimulating the development of these instruments and financial markets in general. Bonds, annuities, and securities all became ways in which guarantees in wills and settlements could be made more reliable. Because portions were the responsibility of the male heir and had to be paid before he could enjoy the fruits of his estate, he might be forced to mortgage or sell alienable parts of his estate. Debt, land, and financial markets were spurred.

Improvements in inheritance and family caselaw could have reduced transaction costs within the family and facilitated productive matching in the marriage market. The separate estate increased the bargaining power of wives, for whom a separate life now became viable when trying to escape philandering or abusive spouses. Families could protect daughters entering a risky marriage, and ensure any widowhood would not be a time of privation. Widows could protect property accrued during a first marriage from second husbands. Portions made it easier for fathers to arrange suitable marriages for their daughters. Disagreements between siblings were lessened by predictable portions that made younger sons and daughters less dependent on the whim of shiftless oldest sons. Stretching the argument further, perhaps these changes in caselaw even improved the quality of family life: "The strict settlement provided a contract that allowed fathers…to manifest the natural affection that was necessary for the operation of non-tyrannical patriarchy. In doing so, it removed the pernicious effects of greed on family life…" (Barclay 2017).

And some have even suggested that inheritance arrangements enhanced political competition. Landowners could take sides in political conflicts without fearing a confiscation of property that would threaten the family line. A family could only lose the father's life estate; the legal owners, the trustees, could preserve the benefits of ownership for the next generation (English and Saville 1983: 47).

The caselaw that surrounded the change in wardships in 1660 would likely have had important effects. Guardians with no interest in the long-term fortunes of the ward or his estate were replaced with trustee-guardians, with a fiduciary duty supervised by Chancery. The productive change in incentives is transparent. Some authors have even gone as far as arguing that periods of minority became times of higher investment and the rescue of failing estates: there was an increased availability of funds due to the absence of expenditures by an adult owner and the trustees had a duty to spend those funds for the benefit of their ward.

At the other end of the social spectrum, the Poor Law was, for its time, an effective scheme of social insurance that played an important role in England's economic development (Solar 1995). Its effectiveness depended both on local tax-payers being prevented from shifting the burden of their poor onto other communities and the confidence of potential recipients in obtaining support

in times of need. Both of these required clear rules on geographic settlement, which are reflected in our measure of family caselaw. If these conditions pertained, the incentives of the local communities to put the poor in employment and create apprenticeships were more powerful. Certainty of support during privation would have also encouraged those poor relying on unproductive parcels of land to risk the wage labor market where their productivity would be higher, stimulating both labor markets and the consolidation of smallholdings.

This discussion of the effects of family and inheritance law must close on note of caution. Nothing above should be interpreted as suggesting that woman lived in a society that accepted them as equals or that the Poor Law was an enlightened social welfare policy. Woman still lived in a male-dominated patriarchal society, with no political power. The poor were subject to a regime that often involved brutal incentives on matters of work and reproduction. Chancery was hardly a model of efficient legal processes that served all the population equally. Our only claim is that developments in English caselaw refashioned institutional structures in a manner that plausibly led to greater productivity and growth via a variety of routes

3.2. From Demographic and Economic Developments to Legal Development

We now reverse the causation perspective and turn to the effects of increases in income on developments in family and inheritance law. The broad outlines of this argument are clear. When incomes rise, economic agents seek a wider variety of ways in which to use those incomes. Some new avenues will be implementable only with new legal instruments, as we have seen above. Lawyers and conveyancers test the limits of the law when creating those new instruments, cases go to court, and new caselaw is produced.

There are also effects that arise purely from increases in population size. When birth rates rise, the sizes of families increase, which in turn leads to more variation in family circumstances that have to be taken into account. Simple combinatorics suggest that combinations of contingencies will rise exponentially with family size. Similarly, as population increases with birth rates, the number of families will also rise leading to a larger number of distinct individual family circumstances that might lead to attempts to challenge the limits of the law.

These effects apply to both inheritance and family law. As income rises, contingencies in wills become more complex and incentives to challenge interpretations of wills strengthen. Marriage settlements were stimulated by the increasing ability of fathers to provide portions for their younger sons and daughters: if income rises, the family estate can be kept intact with a smaller proportion of family capital going to the oldest son. Indeed, Blackstone viewed this goal as one of the prime reasons for the development of strict settlement. Similarly, rises in birth rates would, ceteris paribus, lead to more surviving family members, with the same result.

An important goal of marriage settlements was to maintain the wife's control over her property. Thus, the increasing use of the married woman's separate estate has been attributed to rising levels of personal property (e.g. jewels, furniture, artworks, etc.). The latter would naturally occur in

periods of higher prosperity.[7] Thus, increases in living standards would have stimulated developments in caselaw on marriage.

4. Data

4.1. Measuring Attention to Land, Inheritance, and Family in Pre-Industrial English Caselaw

Our measures of attention to specific aspects of pre-industrial caselaw are derived from the topic model estimates of Grajzl and Murrell (2021a, 2021b). Drawing on the English Reports (Renton 1900-1932) (ER, in short), Grajzl and Murrell assemble a corpus of 52,949 reports on court cases heard before 1765. The cases covered by the ER are neither the universe nor a random sample of English court cases. Instead, they constitute a selection of cases heard in the English superior courts. Grajzl and Murrell (2021a: Appendix A) discuss the history of the ER and the mechanisms for selecting the reports on cases that would eventually be included in the final edition. Reporters especially strove to record case deliberations that illuminated contentious or new aspects of law. Consequently, the content of the ER should not be interpreted as reflecting English legal development in its widest sense. Nevertheless, the ER provide the paramount and authoritative record of pre-industrial court cases that came to be used by lawyers as the basis for both legal precedent and legal education. No comprehensive exploration of English legal history could be pursued without resorting to the ER. No alternative corpus of comparable breadth and depth is available, especially in a structured form that would facilitate an exercise like the one pursued here. And no other corpus exists that could readily supplement the ER.

Grajzl and Murrell estimate a 100-topic structural topic model (STM; Roberts et al. 2014, 2016). Topic models stem from a class of generative probability models that require a researcher to posit a model of the data-generating process and then use the data to determine the values for the model's parameters. Texts are conceptualized as 'bags of words' and an unsupervised machine learning algorithm leverages the co-occurrence of words across documents to identify topics (Blei 2012). Importantly, topic modeling does not simply depend on word frequencies: topic estimation is driven by correlations of word use across documents. Thus, in spite of the loss of syntax that results from viewing texts as a bag of words, semantics is still reflected, at least partially, in the resultant estimates (Reich et al. 2015).

When applied to legal texts such as the ER, topic model estimates can therefore be viewed as providing a machine-learning legal digest, with each chapter of the digest capturing one aspect of the information contained in the corpus. Notably, the topics are not the result of an attempt to fit case reports into preexisting categories: the topics are exclusively the product of estimation. Topic modeling thus offers a path to a data-driven macroscopic quantitative representation of a corpus, rather than reflecting a preexisting interpretation of the underlying texts. Accordingly, topic modeling has been increasingly used in analyses of legal corpora (Frankenreiter and Livermore 2020).

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[7] Under coverture, a bride surrendered her personal property to the groom unless that property was isolated in a separate estate.

The naming of each chapter of the digest, and thus the interpretation of the substance of each estimated topic, is left to the researcher. This process requires the investigation of the words that are most highly used by each topic and the documents (case reports) that feature each topic prominently.[8] For example, one of the Grajzl and Murrell topics is characterized by the keywords (or rather their stems) 'marriag', 'settlement', 'land', 'articl', 'coven', 'jointur', 'estat', 'remaind', 'wife', 'jointress', 'truste', 'portion', 'life', 'heir'. The case reports emphasizing this topic highlight issues that arose in the design and interpretation of property arrangements determined immediately prior to a marriage, an occasion during which the impacted families aimed to settle future rights over an estate and to provide financial protection for the wife in the event of the husband's death or abandonment. One report notes: "A. on his Marriage agrees to settle Lands for the Benefit of his Wife, and their Issue, and afterwards aliens Part of those Lands; and Lord Nottingham decreed, that the Jointress should have the Deficiency of her Jointure made good out of the Inheritance of the Lands remaining unsold: But that Decree was reversed by Jefferies, L. C. who held, that where the Jointress and Issue claim by the same Settlement, they shall contribute proportionably in the Discharge of any prior Incumbrance on the Estate." Grajzl and Murrell name this topic Marriage Settlement.

The STM estimates pin down the proportion of each of the 100 topics within each of the 52,949 case reports. In this paper, we focus on three areas of law highly relevant to families. The reason for this is that family matters are the issues that are most directly relevant to the combination of demographic and economic variables that have been used in the literature testing Malthusian ideas. We thus concentrate on those 28 topics that, in our judgment and study of legal history, clearly reflect caselaw and legal ideas on land (14 topics), inheritance (9 topics), and families (5 topics).[9,10] At this time, the English families for whom the law was most relevant were focused on matters relating to landed property, the critical production input in the pre-industrial era; inheritance, which determined how property could be passed between generations; and family law, relevant to how the law treated the property of women and children. Table 1 lists the corresponding topics with sample keywords.[11]

We focus on relative as opposed to total attention (as measured, for example, with total word count) of the ER to landed property, inheritance, and families. The reason is that during the period under consideration the number of reports included in the ER varies considerably (see Figure 1 in Grajzl and Murrell 2021a). Moreover, case reporting at that time was highly unsystematic and not commissioned by the courts. In comparison with a measure of total attention, a measure of relative

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[8] In topic modeling, topics are distributions over vocabulary. Documents are distributions over topics.

[9] The land theme corresponds to the theme that Grajzl and Murrell name real property. We assigned this particular theme a different name because the themes of families and inheritance are both relevant to real-property.

[10] See Gennaro and Ash (2022) for an analogous methodological approach that relies on researchers' judgment and knowledge of institutional context to construct broader themes on the basis of estimated topics.

[11] The complete list of keywords and detailed justification of each topic, with extracts from reports featuring a given topic prominently, are provided in appendices D and E in Grajzl and Murrell (2021a).

attention is less sensitive to variability in the raw count of available reports and therefore better suited for capturing fundamental changes in emphases on specific sets of legal ideas.

To calculate the time series of (relative) attention to our three themes, land, inheritance, and family, we use the year of each report and the report's word length. The STM estimates θ_{irt}, the proportion of topic i in report r on cases heard in year t. We know the word-length of report r on cases heard in year t, w_{rt}. We thus calculate the attention to theme $m \in \{\text{land, inheritance, families}\}$ in year t as:

$$\Theta_{mt} = \frac{\sum_{r \in R_t} w_{rt} \sum_{i \in M} \theta_{irt}}{\sum_{r \in R_t} w_{rt}}, \tag{1}$$

where R_t is the set of report on cases heard in year t and M is the set of topics that comprise the theme m. That is, for each case report, we first sum the prevalences of the constituent topics for the given theme to obtain report-level theme prevalences. Then, for each year, we calculate a weighted average of the theme prevalences in reports on cases heard in that year, using as weights the number of words in a report. We repeat this process for each of the three themes. This yields the three time series that capture the temporal evolution of the yearly attention of the English reports to land, inheritance, and families between 1552 and 1764.

Importantly, our construction of the time series of attention to each of the three legal themes under consideration therefore does not involve classifying specific case reports under just a single theme. In the STM, every case report is conceptualized as a mixture of all topics. Thus, although different reports will typically emphasize different themes to a different extent, any specific case report contributes to the measured attention of all three legal themes.

Figure 1 provides timelines of the three caselaw time series. Table 2 contains descriptive statistics. Figures A1, A2, and A3 in Appendix A present timelines of each of the 28 constituent topics.

4.2. Interpreting Attention as Legal Development

By definition, the series portrayed in Figure 1 show the relative attention of the courts to the three areas of law in each year between 1552 and 1764. However, the resulting series may also be interpreted as measures of legal development. To justify this interpretation, Grajzl and Murrell (2021a) develop a stylized model of the diffusion of legal ideas. Using the model and examples from legal history, they demonstrate that the attention paid to any topic or theme in any given year reflects the amount of change in adherence to the corresponding legal ideas in that year. The value of the time series in a given year thus captures the intensity of development of the pertinent area of law in that year.[12] In the remainder of the paper, we therefore use the term 'development of' an area of law in a given era as a synonym for 'attention to' that area of law in the noted era.

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[12] In contrast, the cumulative sum of the time series up to a certain year (i.e., cumulative attention) reflects the overall development by that year of the applicable area of law.

However, it is critically important to stress that our measure of the development of a particular area of caselaw only refers to refinements in that law from the standpoint of legal professionals (judges, lawyers, and reporters). Given inherent uncertainties in the process of legal evolution and the rent-seeking motives of the legal profession, clearly not all those changes considered refinements by lawyers necessarily stimulate economic development. Legal history provides examples illustrative of this point. For instance, the evolution of caselaw on land saw a time when the courts actively endorsed restrictions on alienation of landed property (see Section 2.1). The corresponding legal development benefited wealthy landowners and their lawyers, but hindered the development of a market for land (Haskins 1977, Habakkuk 1981: 200).

The series in Figure 1 are thus informative of macro-temporal developments in the three areas of law under consideration. Periods when a series exhibits an increasing trend are times when the legal system enters a period of intense legal development, manifested in increasingly vigorous debates about the pertinent area of law. For example, the early 18th century featured many developments in, and thus rising attention to, caselaw on families (Figure 1(c)). These were to a large extent triggered by late 17th-century court decisions that enabled the widespread use of the legal device of strict settlement (see Section 2.3), which in turn facilitated the "rise of great estates" (Bonfield 1983a). In contrast, episodes when a series trends downward are times when the applicable law is becoming relatively established and thus discussed in the courts less intensely.[13] For instance, with the waning of feudalism many pressing issues concerning land tenures and ownership had been addressed already by the 17th century (Baker 2019, Grajzl and Murrell 2021b). From that point onwards, with the exception of specific subareas of land law such as that pertaining to trusts (Figure A1), the overall intensity of legal development in, and hence attention to, caselaw on land generally decreases (Figure 1(a)).

In sum, while our yearly caselaw series in Figure 1 by construction do not trace the micro nuances of legal change that could only be gleaned from a mapping of individual court case decisions, they do reflect the temporal patterns in the intensity of legal development in the pertinent areas of law that have been stressed by legal historians. Whether and how the legal developments captured by our data impacted demographic and economic outcomes is then an empirical question that we tackle in our ensuing analysis.

4.3. Demographic and Economic Measures

To characterize the economic and demographic developments in pre-industrial England we use standard measures employed in the empirical literature. Our measures of the annual birth rate and death rate are Wrigley and Schofield's (1981) estimates of the number of births and deaths per one thousand people. While the methodology underlying the construction of Wrigley and Schofield's

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[13] Thus, relative lack of attention to a specific area of law in a given time period does not necessarily imply that the relevant law was not a fixture of the legal system in that era. Given the nature of the English Reports, a set of legal ideas that are thoroughly accepted will not garner as much attention as one that is undergoing lively development.

estimates has been debated, these demographic data are the only measures available of their kind. As such, they have been widely used in empirical analyses of pre-industrial England.[14]

To measure real per-capita income, we use the series constructed by Humphries and Weisdorf (2019). Whereas other commonly used measures of pre-industrial real incomes reflect daily wages (Allen 2001, Clark 2010), the Humphries-Weisdorf measure is based on estimates of real annual earnings. Its units are the number of Allen's (2009) respectability consumption baskets that could be purchased with annual income of an unskilled male worker. Because the number of days worked per year varied over time, that measure provides a more realistic picture of the temporal evolution of pre-industrial living standards than prior estimates based on daily earnings. We emphasize, however, that none of our conclusions are dependent on the use of the Humphries and Weisdorf (2019) real per-capita income series. Our central findings do not change if we instead measure living standards with the estimates of real wages by Allen (2001) or Clark (2010), or the estimates of real GDP per capita by Broadberry et al. (2015).[15] Figure 1 plots the timelines of birth and death rates, and real per-capita income. Table 2 provides descriptive statistics.

5. Empirical Approach

To examine the relationship between legal, demographic, and economic developments, we use vector autoregression (VAR). Variants of VAR have been widely used to investigate historical demographic and economic phenomena. Our interest lies in investigating the interaction over time of our legal, demographic and economic variables, as opposed to examining their long-run or short-run equilibrium relationships. We thus use a standard VAR with all variables in levels, an approach that is fully appropriate even if some variables are non-stationary (Kilian and Lütkepohl 2017).

The foundation of our empirical setting is the benchmark model of a pre-industrial society featuring the interaction of the vital rates (birth and death rates) and the living standard (see, e.g., Clark 2007). We augment the resulting core set of variables, which constitute the focus of prior related VAR-based studies (e.g., Nicolini 2007, Crafts and Mills 2009, Fernihough 2013), by adding our measures of development in caselaw on land, inheritance, and families. Given the central importance of the nuclear family, land, and land-related property in pre-industrial England, these are the areas of law that most likely influenced, and at the same time were influenced by, the demographic and economic developments. We therefore study the behavior of the vector

$$\mathbf{y}_t \equiv (land_t, inheritance_t, families_t, birth_t, death_t, income_t)', \qquad (2)$$

where the elements of the vector are the eponymously named time series. Note that $income_t$ refers to the logarithm of real per-capita income in year t.

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[14] See, e.g., Bailey and Chambers (1998), Lee and Anderson (2002), Nicolini (2007), Crafts and Mills (2009), Møller and Sharp (2014), Rathke and Sarferaz (2014), and Crafts and Mills (2020). These contributions utilize Wrigley and Schofield's (1981) data in diverse ways and employ different empirical approaches, including standard VAR analysis, cointegrated VAR, and non-VAR based structural modeling.

[15] Full results on this point are available on request.

We posit the following structural VAR model:

$$\mathbf{A}\boldsymbol{y}_t = \boldsymbol{\Gamma}_0 + \sum_{i=1}^{4} \boldsymbol{\Gamma}_i \boldsymbol{y}_{t-i} + \boldsymbol{u}_t, \tag{3}$$

where $\boldsymbol{y}_t$ is the 6×1 column vector defined in (1). $\boldsymbol{\Gamma}_0$ is a 6×1 column vector of constants. $\mathbf{A}$ is a 6×6 nonsingular matrix of coefficients. $\boldsymbol{\Gamma}_i, i \in \{1,2,3,4\}$, are 6×6 matrices of coefficients. The model with four lags was chosen on the basis of standard lag length criteria and tests (see, e.g., Kilian and Lütkepohl 2017).[16] The choice of four lags is also readily justifiable on institutional grounds. A steady flow of information to localities and individuals from different social classes was an important feature of English governance and law. The central courts were located in Westminster. However, each locality was visited by central-court judges or serjeants multiple times a year to conduct hearings in the most important cases in the assize courts (Baker 2019: 25).[17] Assize judges gave news on legal developments and advice to the justices of the peace, who heard lesser cases in the quarter sessions, performed a multiplicity of administrative tasks, and interacted frequently with the local population (Cust and Lake 2020). The justices of the peace were typically local dignitaries, many of whom had been educated at the Inns of Court (Levy 1982, Goldie 2001). News on legal developments could thus spread quickly. Facilitated by a well-organized legal profession eager to engage in client representation and increasing availability of law books and reports (Levy 1982), those who owned property were especially well aware of legal developments. But legal news also reached lesser local officials, who were drawn from a broad range of social strata (Goldie 2001), and the poor, who were subject to the poor laws administered by the localities. For all these reasons, the societal response to a caselaw shock would have taken place relatively swiftly.

$\boldsymbol{u}_t$ is a 6×1 column vector of orthonormal structural shocks such that $\mathrm{E}(\boldsymbol{u}_t \boldsymbol{u}_t') = \boldsymbol{I}_6$. Examples of sources of structural shocks include weather and epidemics, important political events, enactments of significant legislation, and individual judges and legal practitioners of genius moving beyond normal legal processes.

To identify the parameters of (3), we rely on short-run restrictions, the workhorse approach in empirical macroeconomics (see, e.g., Christiano et al. 1999, Ramey 2016, Kilian 2009). We thereby make assumptions about the off-diagonal elements of $\mathbf{A}$, imposing restrictions on which shocks may not contemporaneously affect which variables. We base our argument on widely accepted characterizations of the pre-industrial English legal system and society.

Procedure was the cornerstone of early English law (Baker 2019: 60). Accordingly, the courts were meticulous in adhering to rigorous procedural steps and emphasized due process. Thus, any response of the legal system to demographic and economic shocks would have necessarily taken place with a lag.

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[16] The sequential modified LR statistic, final prediction error, and Akaike information criterion all suggest the use of four lags. The Schwartz and Hannan-Quinn information criteria suggest an even smaller number of lags.
[17] The serjeants were the very small pool of elite lawyers from whom future judges would be appointed.

Land-law related issues arising in the context of inheritance and families inherently presuppose the existence of some form of transferrable landed property. Indeed, land matters were at the core of attention of early English law (Baker 2019: 241). Therefore, new developments in law on inheritance and families would have given rise to the reconfiguration of rules on landed property only with a lag, after individuals and their lawyers have had the time to reconceptualize landed property on the basis of such innovations. Similarly, innovations in the caselaw on families would have resulted in the reconfiguration of rules on inheritance only once individuals and their lawyers have had the time to understand how those innovations changed the processes of inheritance.

Finally, in imposing the restrictions involving socioeconomic variables, we exactly follow the VAR-based literature examining the interaction of vital rates and income in pre-industrial England (Nicolini 2007, Fernihough 2013, Rathke and Sarferaz 2014). Given the yearly frequency of our data, the biologically-conditioned lag between conception and birth implies that the birth rate would have responded to income and death shocks only with a delay. Moreover, shocks to income would have affected the death rate only in subsequent years, via shaping the disease environment and the accumulated resources of the impacted individuals.

Based on the above set of arguments, the matrix $\mathbf{A}$ in (3) is lower-triangular, implying an ordering of variables from most to least 'sticky' as in (2).[18] Then, the errors from the reduced-form VAR can be expressed as $\boldsymbol{e}_t = \mathbf{A}^{-1}\boldsymbol{u}_t$, where

$$\boldsymbol{e}_t \equiv \begin{bmatrix} e_t^{land} \\ e_t^{inheritance} \\ e_t^{families} \\ e_t^{birth} \\ e_t^{death} \\ e_t^{income} \end{bmatrix} = \begin{bmatrix} \tilde{a}_{11} & 0 & 0 & 0 & 0 & 0 \\ \tilde{a}_{21} & \tilde{a}_{22} & 0 & 0 & 0 & 0 \\ \tilde{a}_{31} & \tilde{a}_{32} & \tilde{a}_{33} & 0 & 0 & 0 \\ \tilde{a}_{41} & \tilde{a}_{42} & \tilde{a}_{43} & \tilde{a}_{44} & 0 & 0 \\ \tilde{a}_{51} & \tilde{a}_{52} & \tilde{a}_{53} & \tilde{a}_{54} & \tilde{a}_{55} & 0 \\ \tilde{a}_{61} & \tilde{a}_{62} & \tilde{a}_{63} & \tilde{a}_{64} & \tilde{a}_{65} & \tilde{a}_{66} \end{bmatrix} \begin{bmatrix} u_t^{land} \\ u_t^{inheritance} \\ u_t^{families} \\ u_t^{birth} \\ u_t^{death} \\ u_t^{income} \end{bmatrix}. \tag{4}$$

The reduced-form VAR is therefore:

$$\boldsymbol{y}_t = \mathbf{A}^{-1}\boldsymbol{\Gamma}_0 + \mathbf{A}^{-1}\sum_{i=1}^{4}\boldsymbol{\Gamma}_i\boldsymbol{y}_{t-i} + \boldsymbol{e}_t. \tag{5}$$

This model is consistently estimated using ordinary-least-squares, applied equation by equation. The reduced-form VAR estimates in combination with (4) provide an estimate of the structural VAR representation of the model. Importantly, the structural shocks ($\boldsymbol{u}_t$) can be estimated, providing evidence on when events occurring outside the system had a profound effect on development.

Given our primary interest in investigating the interrelated character of legal, demographic, and economic development in pre-industrial England, we focus on two sets of results: those that illuminate the role of legal development for demographic and economic development (Section 6),

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[18] We have explored the consequences of an alternative ordering assumption, whereby unanticipated developments in law affect demographic and economic variables with a lag, but shocks to demographic and economic variables exert a contemporaneous effect on attention to law. None of our key findings change as a result.

and those that highlight the impact of demographic and economic developments on legal development (Section 7). We use impulse-response analysis, historical decompositions, and counterfactual simulations. In Section 8, we comment on our results for those demographic and economic interactions studied in the related VAR-based literature.

For the interested reader, we discuss the response of law variables to law shocks in Appendix D. We show, for example, that shocks to family law spur increased attention to inheritance law, and that shocks to land law reduce attention to caselaw on families. These findings are indicative of the coevolutionary nature of caselaw development.

Appendix E provides plots of averages over five-year intervals of the estimated structural shocks to the three focal areas of law, vital rates, and real per-capita income. These are the data underlying several of our remarks in the analysis below, when we comment on the size and sign of shocks.

6. Evidence on Legal Development as a Driver of Demographic and Economic Outcomes

6.1. Impulse-Responses

How do the birth rate, the death rate, and real per-capita income respond to innovations in the three areas of law? We model innovations as one-standard-deviation structural shocks that result in a one-time increase in attention to the pertinent legal domain, a manifestation of an exogenously-spurred change in caselaw development. We estimate impulse-response functions (IRFs) over a 30-year period, reporting 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.[19]

Figure 2 summarizes the results in the form of non-accumulated responses. (We display the corresponding accumulated responses in Figure B1 in Appendix B.) The responses of the vital rates and real income to innovation in attention to a given area of law are arranged in columns. The responses of a given demographic or economic variable to different legal shocks are shown in rows. For legibility, each part of Figure 2 displays the response magnitude using a customized scale. In surveying the results, we highlight those effects that are statistically significant.

Figure 2 displays results that are entirely new to the literature. These results convey a story about English development that supports what many historians have proposed in the past, but have not been able to document empirically in as precise fashion as we have: caselaw development had a significant effect on demographic and economic development. Institutions really do matter, but institutions that have not been emphasized to a great extent in the economics literature: the minutiae of caselaw and, within caselaw, areas that have received little direct attention—families and inheritance.

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[19] If instead we use 95-percent confidence intervals, the innovations in law on families still exert a statistically significant positive effect on the birth rate and real per-capita income. The positive effect of innovations in inheritance law on real per-capita income and the negative effect of innovations in land law on real per-capita income become marginally statistically insignificant.

Within the three areas of caselaw, innovations in law on families exert the most powerful effects, on the birth rate (Figure 2(c)) and, very importantly, real income (Figure 2(i)). Following an exogenous increase in attention to law on families, both the birth rate and real income exhibit significant increases after about five years, consistent with the perspective that much of the impact of new caselaw developments on demographic and economic outcomes is not immediate. The positive effect on the birth rate persists beyond three decades and that on real income into the end of the second decade after the occurrence of the shock. By the end of the third decade after a typical shock in attention to law on families, the cumulative increase in real per-capita income amounts to 33 percent of the value of real per-capita income at the time of the shock (Figure B1(i)).

We also see evidence of an effect on real income of unforeseen developments in inheritance law, albeit transitory and marginally statistically significant (Figure 2(h)). The magnitudes of the corresponding effects are somewhat smaller than in the case of shocks to law on families. By the end of the third decade from the time of the typical shock in attention to law on inheritance, the cumulative increase in real per-capita income amounts to 24 percent of the value of real per-capita income at the time of the shock (Figure B1(h)). Exogenous shocks in attention to inheritance law, however, do not exert a readily discernible effect on birth and death rates (Figures 2(b) and 2(e)).

Interestingly, unexpected increases in attention to caselaw on land lead to a statistically significant reduction in real per-capita income (Figure 2(g) and Figure B1(g)), although the effect on total income is less since birth rates rise and death rates fall. Evidently not all kinds of legal development stimulated economic development in the pre-industrial times.[20] In our data, one especially likely reason for the documented negative effect of land law on real per-capita income is that most of the developments in land law occurred in the Elizabethan era when the legal profession focused on shoring up the rickety feudal-based system, even within the context of a modernizing common-law. As we noted in Section 2, these changes led to great uncertainty in the caselaw relevant to land, as exemplified by the attempts to settle on an acceptable rule on perpetuities. Indeed, in the 16th and 17th centuries, various legal restrictions on free alienability of land were introduced and persisted because they were endorsed by the wealthy elite. Many pre-industrial developments in land law thereby prohibited the development of a vibrant land market, which in turn stymied economic development (Hodgson 2022). Finally, it is possible that in some areas of law legal developments only lead to economic development over a longer time frame than our VAR estimates could possibly hope to capture.[21]

The above analysis provides insight into the role of caselaw development in economic development as measured by effects on real per-capita income. But were all segments of England's pre-industrial economy equally affected by innovations in the three legal domains? Or did caselaw developments perhaps impact some sectors more than others? We provide insight into these

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[20] See Hodgson (2022: Ch 3) who provides an overview of the pertinent work by social and legal historians on this point.

[21] Interestingly, by combining our estimates of the effect of innovations in land law on all three demographic and economic variables, we can obtain an estimate of changes in real income. This begins to grow only 30 years after the shock.

additional questions in Appendix C. We draw on Broadberry et al.'s (2015) data on real output in agriculture, industry, and service sectors, as well as on England's population. We then estimate an expanded version of the VAR laid out in Section 5 by replacing logged real per-capita income with a three-variable vector of logged measures of real per-capita sectoral output in agriculture, industry, and services. We retain all other assumptions of the model.

The analysis of impulse-responses (Figure C1) shows that innovations in caselaw on families and inheritance primarily increase per-capita output of the industrial sector, that is, the segment of the economy that would become the driver of England's unprecedented economic expansion during the later Industrial Revolution. We find little evidence that innovations in family and inheritance caselaw stimulate per-capita output in the agriculture and service sectors. It is beyond the scope of this paper to examine the precise reasons for why it was the industrial sector that was impacted especially prominently. However, one can conjecture, based on what is known about the development of caselaw on families and inheritance (Section 2) and the different channels through which those caselaw developments could have impacted the economy (Section 3). For example, innovations in family and inheritance law changed the legal status of women, younger sons, trustee-guardians, and even the poor, enabling more economic agents to participate in capital and labor markets, which in turn facilitated industrial growth. At the same time, innovations in caselaw on land elicit an enduring negative effect especially on per-capita output in agriculture, the sector that would have naturally been most impacted by the various land law developments, many of which would not be deemed productivity-enhancing by modern-day economists.

6.2. Counterfactual Simulations

How important quantitatively were the effects of identifiable caselaw shocks for growth in real per-capita income and changes in the birth rate? As an illustrative example, we focus on the early 1660's. During this time, our data show that there were sizeable shocks to caselaw on family and inheritance (Figure E1). In addition, in the early 1660's England experienced the onset of its first sustained economic expansion: the year 1663 saw a break point in the trend growth of England's GDP per person (Crafts and Mills 2017).[22] Our analysis in this subsection is therefore indicative of the importance of the developments in caselaw on families and inheritance as contributors to the beginnings of sustained economic growth in England.

From the perspective of legal development, the early 1660's were truly watershed years and thus the existence of caselaw shocks during this time is hardly surprising. In 1660, the Interregnum ended and the monarchy was restored in the shape of Charles II. Caselaw shocks arose from the reversal of many features of the Interregnum, including its strictures on cultural expression, its changes in church governance, and its effects on property ownership of supporters and opponents of the monarchy. Moreover, the Restoration saw the passage of significant legislation, one component of which was the Tenures Abolition Act of 1660, which Blackstone thought "a greater

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[22] Specifically, using Broadberry et al.'s (2015) data, Crafts and Mills (2017) demonstrate that the annual trend growth of English real GDP per capita was equal to 0.03 percent before 1663 and 0.84 percent between 1663 and 1707.

acquisition to the civil property of this kingdom than even Magna Carta itself".[23] As detailed in Section 2, this Act finally removed the feudal elements of guardianship under military tenures and loosened constraints on the disposition of properties in wills. Guardianships could now last until the child reached the age of 21 (up from 14) and parents could specify who would be the guardians of their children. Guardianships became a matter of family choice and they were now trusteeships, a fiduciary relationship. Inheritance caselaw developed in response to these changes, with our raw series on inheritance caselaw evidencing a notable upturn in the 1660s (Figure A2).

These changes affected law on families too, which includes caselaw on minors and guardians. But there were other reasons that there were shocks to family law in the 1660s. The Restoration did not revive the jurisdiction of the ecclesiastical courts over marital matters that had ended in the Interregnum. Chancery took over much of this activity and developed new caselaw accordingly. Finally, the Poor Relief Act 1662 specified much more closely the rules of settlement that entitled a person to relief in a specific parish. A settlement document became mandatory. Newcomers could be removed, subject to appeal. This led to a spate of litigation between neighboring parishes and between parishes and the poor, thereby leading the common-law courts to clarify settlement rules. Caselaw on geographic settlement is included in our measure of family law.

We use counterfactual simulations to characterize how real per-capita income and the birth rate would have evolved in the absence of the external shock of the Restoration. We first compute the series of structural shocks implied by our model. We then conduct two exercises. In the first, we set to zero all structural shocks to family law from 1662 to 1666.[24] In the second, we set to zero the structural shocks to the law on inheritance in 1661 and 1662.[25] For each exercise, we then simulate the counterfactual paths of real per-capita income and the birth rate implied by our structural VAR estimates. This is the path that real per-capita income and birth rates would have taken in the absence of the immediate effect of the Restoration on caselaw that had its roots outside the court system.

Figure 3 summarizes the results of these exercises, showing the temporal evolution of the counterfactual values of real per-capita income and birth rate expressed as percent of their actual values. Figures 3(a) and 3(b) show that, in the absence of the developments of the law on families, in 1671-1672 real per-capita income and the birth rate would have been about two percent and one percent lower than they actually were. The levels of actual and counterfactual income are the same only after 1721. Around the same time, the counterfactual birth rate reaches the actual birth rate. Over the time period 1662-1721, there would have been a cumulative loss of real per-capita income amounting to 43 percent of a typical year's real per-capita income.[26] Assuming a constant yearly

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[23] Expressed in Blackstone's *Commentaries on the Laws of England*.
[24] The mean of yearly structural shocks to law on families between 1662 and 1666 equals about one quarter of one standard deviation of the magnitude of yearly structural shocks between 1556 and 1764.
[25] The mean of yearly structural shocks to law on inheritance during 1661-1662 equals about 1.9 standard deviations of the magnitude of yearly structural shocks between 1556 and 1764.
[26] After 1722, counterfactual income slightly overshoots actual income and then slowly converges toward actual income.

growth rate, the annual growth rate of real per-capita income between 1662 and 1688 would have been 0.029 percentage points lower than it actually was (0.61 percent).

Figures 3(c) and 3(d) show the analogous results for the second exercise, when we simulate the counterfactual outcomes in the absence of positive shocks to law on inheritance during 1661-1662. In 1667-1668, the counterfactual real per-capita income and birth rate would have been about five percent and one percent lower than they actually were. Counterfactual income and birth rate approximate their actual realized values by 1753 and 1730, respectively. Over the time period 1661-1753, there would have been a cumulative loss of real per-capita income amounting to 118 percent of a typical year's real per-capita income. Under the assumption of a constant yearly growth rate, the annual growth rate of real per-capita income between 1661 and 1688 would have been 0.060 percentage points lower than it in fact was (1.55 percent).[27]

Of course, these results are intended to be merely illustrative of the possible importance of the effect sizes, rather than pinning them down with any exactness. Nevertheless, even if these counterfactuals exaggerate by an order of magnitude, the implied effects are still considerable. The stimulus to the caselaw on families and inheritance provided by the Restoration therefore can be seen as contributing more than 150 percent of a year's per-capita income in the eighty years after the Restoration. When one puts this into the context that families and inheritance cover less than 12 percent of the English Reports, that the Restoration is only one of many significant political developments over the time period under study, and that shocks are only one element of the dynamic processes that produce developments in caselaw, one can be sure in concluding that caselaw development in pre-industrial England exerted a profound impact on socioeconomic outcomes.

6.3. Historical Decompositions

Our data covers over two centuries. While the dynamic structure of the system, as captured in the impulse-responses, might remain constant over time, shocks in one time-span can be much more important than shocks in other eras. Historical decompositions provide a straightforward way of understanding which eras saw the greatest influence of current and past shocks on demographic and economic outcomes. We focus on the effects on real per-capita income and birth rate, which Figure 2 shows are the demographic and economic outcomes that are most responsive to law shocks.[28]

Figure 4(a) displays the historical decomposition of fluctuations in real per-capita income due to current and past shocks in real per-capita income and caselaw on families, inheritance, and land. (For clarity, we do not display the contributions of shocks to birth and death rates.) Four findings are prominent. First, with one exception, before the early 18th century, fluctuations in real income were driven primarily by its own shocks. Second, the exception is that in the last quarter of the

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[27] The difference in the estimated constant actual annual growth rate of real per-capita income between 1661 and 1688 (this paragraph) versus between 1662 and 1688 (previous paragraph) arises because of a sizeable increase in real per-capita income between the years 1661 and 1662.
[28] Historical decompositions show that changes in the death rate are driven mostly by its own shocks.

16th century innovations in law on landed property depressed real income (see Figure E1 in Appendix E). Indeed, this was the period when the legal profession was seeking creative ways of avoiding changes in legal rules on the ownership and conveyance of land that were a result of Henry VIII's legislative enactments, especially the 1535 Statute of Uses. For example, perpetuity clauses, introduced by the legal profession in this era, were initially accepted by the courts, but had the collateral effect of precluding the sale of land for repayment of debts (Baker 2019: 307), thereby suppressing economic activity.

Third, between 1710 and 1750, current and past shocks to law on families had a marked positive effect on real income. Indeed, during a subset of this period, in the 1720s, innovations in caselaw on families effectively counteracted persistent negative shocks to real income (Figures E1 and E2), perhaps caused by the ramifications of the bursting of the South-Sea Bubble. Legal developments on families were therefore a critical driver of the rising living standards recorded in the early 18th century. What can explain this series of shocks to family law? Our data, of course, cannot provide the answer to this question, but many hints are present in the historical literature. For example, Erickson (1993: 6) notes a post-1700 cultural change toward affective families, which implies increasing attention in marriage settlements for wives, younger sons, and daughters. At the same, a 1697 common-law ruling, which later observers depict as an unforeseen departure from prior doctrine, elevated the importance of trustees in implementation of land settlements and thereby spurred further developments in marriage settlements (Bonfield 1983a: Ch. 4). Finally, legislation focused attention on the settlement rules of the poor. Thus a series of statutes concerning vagrancy was passed between 1700 and 1744, while private Parliamentary acts enabled groups of parishes to combine to run workhouses, a reform that eventually resulted in a general act in 1723. All of these developments outside the regular VAR dynamics would have elevated the attention to caselaw and legal ideas on families.

Fourth, after 1750, when the law on families was starting to settle and thus attention to that legal domain gradually fell (Figure 1(c), and Figure E1), inheritance becomes the main source of legal innovations that contributed to the growth of real per-capita income. This was possibly a reflection of a shock in the form of a major piece of legislation in 1751 that changed rules on when wills were valid and on the use of witness testimony to establish validity.

Figure 4(b) shows the historical decomposition of fluctuations in the birth rate driven by present and past shocks to the three areas of law and to the birth rate itself. The main finding implied by that figure is complementary to that from Figure 4(a): between 1710 and 1750, current and past shocks to the law on families were a critical driver of the birth rate. Thus, our estimates demonstrate that new external stimuli to the development of caselaw on families could explain much of the early 18th-century rise in fertility.

7. Evidence on Demographic and Economic Drivers of Legal Development

Did demographic and economic developments exhibit an effect on legal development, and if so, which demographic and economic variables and on which legal domains? Figure 5 presents the pertinent IRFs. Impulses are now defined as one-standard-deviation structural shocks to the

three socioeconomic variables. The responses of law variables to a shock to a given socioeconomic variable are arranged in columns. The responses of a given law variable to shocks to different socioeconomic outcomes are shown in rows.

Among the three considered demographic and economic variables, real income had the largest influence on legal developments. Following a real-income shock we see a rise in attention to two areas of law: families (Figure 5(i)) and inheritance (Figure 5(f)). Income shocks continue to raise attention to caselaw on families and inheritance for three decades after the pertinent shock. The cumulative increase in attention to law on families after three decades of a typical income shock equals 0.037 or 112 percent of mean yearly attention to law on families during this era. The analogous cumulative increase in attention to law on inheritance equals 0.070, or 84 percent of mean yearly attention to law on inheritance during this era. In contrast, we do not find evidence of a detectable impact of income shocks on the development of law on landed property (Figure 5(c)). Nor do we find much of an effect from shocks to the demographic variables (Figure 5, first two columns).

When were income shocks most important as drivers of developments in law on families and inheritance? Figures 6(a) and 6(b) provide the answer, presenting historical decompositions of the attention to law on families and inheritance. (For legibility, we plot only the contributions of shocks to income, birth rate, and death rate; we suppress displaying the contribution of other types of shocks.) The results show that current and past income shocks were important as drivers of fluctuations in attention to law on families and inheritance up to the early 18th century. From that point on, developments in the two areas of law can no longer be largely explained by current and past income shocks. Rather, based on our estimates, the post-1710 fluctuations in attention to law on families and inheritance were predominantly a consequence of shocks in attention to the respective areas of law (not shown).

8. Revisiting the Evidence on Demographic and Economic Interactions

Our VAR estimates also allow us to examine the IRFs for the response of demographic and economic variables to demographic and economic shocks. This set of results is of interest because it reflects on whether explicitly accounting for endogenous evolution of law alters the estimates of the economic-demographic dynamics typically found for pre-industrial England.

The relevant IRFs are shown in Figure 7. The fundamental result that emerges from examining the components of Figure 7 is that allowing for endogenous legal development leads to a set of economic-demographic interactions that are similar to those in existing contributions on England that use VAR to examine such interactions without explicitly embodying the effects of institutions (e.g., Nicolini 2007, Crafts and Mills 2009, Møller and Sharp 2014, Rathke and Sarferaz 2014).[29] In particular, we find that an exogenous increase in real per-capita income induces an increase in the birth rate (Figure 7(c)), evidence in support of the operation of a Malthusian preventive check.

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[29] For evidence on economic-demographic interactions during the pre-industrial era outside of England, see for example Chiarini (2010), Chiarini and Marzano (2019), Jensen et al. (2022), and Pedersen et al. (2021).

Consistent with the existing literature, we do not find a statistically significant response of the death rate to an exogenous increase in real per-capita income (Figure 7(f)) and therefore do not detect a Malthusian positive check. The remaining IRF estimates in Figure 7 likewise closely match those found in prior studies. In particular, real per-capita income increases following an unanticipated surge in the death rate (Figure 7(h)) and decreases after an unforeseen increase in the birth rate, reflecting diminishing returns (Figure 7(g)).

Therefore legal evolution in pre-industrial England took place and shaped societal outcomes alongside the forces that conditioned demographic and economic interactions, rather than fundamentally altering those forces. Nevertheless, as demonstrated in Section 5, legal developments exerted a clear positive effect on real per-capita income even after taking into account the system's dynamics, which includes the endogenous responses of birth and death rates. Therefore, our analysis demonstrates that in pre-industrial England, innovations in law on families and inheritance relaxed Malthusian economic-demographic constraints, much like technological progress did so during the industrialization (see, e.g., Crafts and Mills 2020).

9. Placebo Exercises

Given the purely time-series character of our measures of caselaw development, a concern about our analysis may be that our estimates in Sections 6 and 7 might be capturing an element of the data that adventitiously results from the topic modeling, perhaps even noise, as opposed to really capturing the effects of legal development. To probe this issue, we conducted a series of placebo exercises in which we re-estimated our six-variable structural VAR three separate times, in each case replacing one of our three measures of the development of caselaw with a time series of attention to Non-Translated Latin (NTL). This was a residual topic generated within Grajzl and Murrell's (2021a) topic model.[30] Although Grajzl and Murrell were able to translate many Latin words into standard English, pre-industrial English lawyers used highly idiosyncratic Latin orthography and inflections, which could only be partially addressed by the databases at hand. Consequently, the use of idiosyncratic Latin occurs naturally as a topic in Grajzl and Murrell's estimates. As DiMaggio et al. (2013: 582) make clear, topic models "often shunt noisy data into uninterpretable topics in ways that strengthen the coherence of topics that remain."

From the one hundred topics produced by Grajzl and Murrell, the NTL topic is thus least reflective of substantive legal content while at the same time certainly non-random. As such, the time series of attention to NTL is especially well-suited for purposes of a placebo exercise. Figures F2 and F3 in Appendix F respectively show the full set of non-accumulated and accumulated IRF estimates based on a VAR in which we replaced the series of the development of caselaw on families—the legal domain for which we uncover the most striking effects—with the NTL series while maintaining all other assumptions of our main VAR specification. The analogous

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[30] To construct the time series of attention to NTL we followed exactly the same procedure as described in Section 4.2. The resultant time series is displayed in Figure F1 in Appendix F.

exercises—replacing each of caselaw on land and inheritance with the NTL series—yielded identical conclusions and are thus omitted.[31]

The key finding that is readily apparent from Figures F2 and F3 is that NTL does not exhibit a discernible effect on vital rates and income and shocks to vital rates and income do not induce changes in attention to NTL. At the same time, replacing the series on caselaw on families with the NTL series preserves the effect of innovations in inheritance caselaw on income, emphasized in Section 6, as well as the patterns of demographic-economic interactions, discussed in Section 8. In sum, the placebo exercises provide evidence in favor of the argument that our caselaw series capture salient aspects of actual legal development in the pertinent areas of law.

10. Concluding Reflections

In the lessons that economists have absorbed on the law-related institutional determinants of England's rise, there has been a tendency to emphasize two specific aspects of the legal system— threats by the state to the security of property rights and how the security of property rights might have changed due to legislation, particularly that enacted during the great constitutional moments.[32] This focus means that many economists follow North and Weingast (1989) in emphasizing legislation, and ignoring caselaw, when summarizing the institutional changes that "…permitted the drive toward British hegemony and dominance of the world". A similar focus on legislation has been present in the more general historical literature, where caselaw has been most usually treated as subordinate to statutory law and therefore generally not deemed to be an independent force producing development.[33]

In this paper, we have sought the institutional drivers of England's pre-industrial economic development in caselaw. While it is relatively easy to identify statutes that prohibit some existing practice perceived as a threat to private property (e.g., the dispensing power or appointment of judges at the King's pleasure), there are few seismic events in caselaw. Even when a specific case makes a decisive break, it takes years to be incorporated into the regular practices of the law (as our estimates indicate), and is usually seen as a landmark only in the rear-view mirror. Any perceived threats by the state against the security of property rights appear in the caselaw record among thousands of other cases where defendants, private or state, want to benefit from some item of property in ways different than plaintiffs, private or state, want to benefit from the same item.

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[31] The complete set of results is available upon request.

[32] See McCloskey (2010: 310-345) for a summary of the relevant literature, which exemplifies the focus on the security of property. The statement in the text is a generalization, of course, and two important exceptions should be emphasized. First, the tenor in the legal history literature referenced in Sections 2 and 3 is very different from that in the economic history literature, and indeed in the history literature in general. Second, Bogart and Richardson (2011) have emphasized the facilitative role of 18th-century legislation that changed specific property rights. However, this legislation did not create new general legal rules but rather used the existing legal framework to facilitate economic projects.

[33] "…numerous modern historians, and in particular intellectual historians, have followed Mill in approaching the common law as a subordinate discipline. Principally, Restoration common law has been treated as an instrument of the king's or Parliament's will…This tendency to assume that the common lawyers carried out the will of their superiors is even more acute among historians of early modern sovereignty" Kearns (2019).

A sole focus on threats by the state to property rights will therefore lead one to overlook the contribution of the broader facilitative role of caselaw. In the crudest terms, caselaw will define which of the countless ways of using property would be available to its putative owner without worrying about costly contestation. Caselaw therefore contributes to economic productivity by constructing a grand edifice of thousands of rules, many of which are enabling rather than protective. Only by using a dataset of the kind generated by Grajzl and Murrell (2021a) is one able to incorporate such caselaw development into a quantitative analysis.

Importantly, the process of caselaw construction is primarily backward looking. When judges in the 17th and 18th centuries ruled on new methods of conducting family affairs, for example, they were aware that they could not move far from past decisions, given that system-wide ramifications were very hard to predict (Grajzl and Murrell 2016). New methods could quickly diffuse when endorsed by the courts, but initially only into the new marriage settlements and new wills of those who kept their human capital current. There was always a stock of old marriage settlements and wills that might last for decades, and always people for whom human capital was slow to change. Additionally, new marriage settlements and wills often needed clauses that meshed with stipulations made in older documents using the old practices. Additional approaches complementary to the new legal practices took time and experience to be generated and then more time to be adjudicated to make their legal status predictable.

In many respects, therefore, caselaw embodies the characteristics of a networked technology and exhibits the kinds of diffusion processes typical of such technologies. In caselaw, just like the dynamo (David 1990), a shock might take many years to reverberate across the economy, as indeed our VAR estimates show. From that perspective, it is not at all surprising that English men and women could in 1760 access a system of property rights that was much more economically productive than that available a century ago, while at the same time not being able to identify any single source for this change.[34] Long before the Industrial Revolution, caselaw development was not concerned with quashing threats to the security of property by the state because property rights were already quite secure (Clark 2007, McCloskey 2010, Ogilvie and Carus 2014, Hodgson 2017). Rather the new caselaw facilitated novel ways of bequeathing and distributing family property, thereby spurring new commercial activities. This process of caselaw development was cautious and incremental, as it had to be given common-law culture and implementation within a conservative society. Nevertheless, as our empirical findings reveal, caselaw development was responsive to changes in living standards. And most importantly, it constituted a critical driver of England's economic development.

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[34] McCloskey (2010), for example, states: "As many economic historians before and after me have noted, the institutions relevant to the *economy* [emphasis in the original] of Britain in fact did not change much in the very late seventeenth century, or even over the long eighteenth century 1688-1815."

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Table 1: The three legal themes and their constituent topics, estimated using the English Reports

Themes and constituent topics	Top words (stems)
Land	
Common-Land Disputes	common, cattl, replevin, avowri, prescript, distrain, pastur, distress, soil, land, forest, enclose, couchant, levant
Competing Land Claims	land, writ, tenant, dower, vouche, formedon, assiz, warranti, land, seiz, will, demand, abat, default, give, reason
Conveyancing by Fine	fine, levi, conuse, proclam, conuse, nonclaim, discontinu, land, entri, formedon, conusan, right, acknowledg, pass
Elizabethan Land Cases	elizabeth, case, land, hold, opinion, justic, queen, common, bench, move, plead, matter, justic, matter, adjudg
Equitable Waste	wast, tempt, impeach, ridgeway, timber, injunct, restrain, cut, newland, dig, collieri, commit, tenant, coal, order
Implementing Trusts	truste, trust, estat, chariti, profit, decre, convey, charit, beneficiari, purchas, heir, use, sale, sell, surplus, inherit
Manorial Tenures	manor, custom, copyhold, surrend, lord, tenant, land, hold, estat, admit, parcel, freehold, grant, admitt, copi, servic
Possession & Title	possess, titl, seiz, right, eject, enter, claim, entri, tenant, profit, actual, freehold, enjoy, ouster, premis, land, wrong
Self-Help in Real-Property Disputes	appurten, tenement, acr, juror, manor, pastur, day, messag, seiz, trespass, premis, justice, demesn, counti, court
Shared & Divided Property Rights	one, two, sever, part, three, joint, moieti, jointten, partit, whole, four, entir, divid, join, common, residu, undivid
Timing of Property Rights	remaind, tenant, life, recoveri, estat, tail, entail, fee, remainderman, revers, issu, male, convey, discontinu, limit
Transfer of Ownership Rights	feoff, grant, make, revers, condit, lesse, grante, liveri, tenant, deed, acr, grantor, estat, seiz, land, life, fee, disseize
Tree Law	tree, wood, except, land, cut, wood, outlaw, timber, wast, oak, lop, grow, underwood, estov, coppice, growth
Uses	use, feoff, heir, seiz, warranti, estat, convey, land, fee, bargain, tail, descend, beneficiari, indentur, limit, releas
Inheritance	
Contingency in Wills	conting, remaind, devis, son, limit, survivor, death, vest, executori, issu, die, twentyon, life, child, testat, void
Disentangling Heirs	son, father, daughter, heir, mother, male, young, grandfath, die, brother, issu, sister, death, descend, grandson
Estate Tail	male, heir, estatetail, estat, remaind, testat, bodi, tail, son, issu, limit, beget, life, construct, devis, intent, deceas
Excluding Beneficiaries of Wills	papist, alien, blood, descent, heir, attaind, inherit, disabl, escheat, attaint, ancestor, treason, protest, incapac, idiot
Execution & Administration of Estates	executor, administr, testat, asset, intest, debt, executrix, administratrix, probat, administ, die, testament, manag
Implementing Ambiguous Wills	legaci, testat, will, legate, codicil, devis, executor, residuari, bequest, surplus, estat, word, intend, fund, gift
Intestacy	intest, child, share, sister, distribut, estat, moieti, grandchild, kin, daughter, mother, equal, divid, brother, surviv
Specifying Inherited Property Rights	devis, land, devise, heir, devisor, testat, estat, fee, descend, feesimpl, will, tenement, pass, seiz, purchas, heredita
Validity of Wills	depon, will, deceas, codicil, prerog, propound, inventori, respond, probat, believ, write, declar, paper, die, prove
Families	
Daughters' Legacies	daughter, marriag, portion, marri, rais, pay, mother, condit, age, mainten, consent, father, truste, legaci, child
Geographic Settlement of the Poor	parish, settlement, child, inhabit, pauper, hire, bastard, quash, remov, father, certif, order, mother, chargeabl
Marriage Settlement	marriag, settlement, land, articl, coven, decre, jointur, estat, remaind, wife, jointress, truste, portion, life, heir
Minors & Guardians	infant, age, guardian, minor, guardianship, infanc, prochein, wardship, chivalri, soccag, attain, heir, custodi, right
Rights of Married Women	wife, husband, dower, marriage, right, covertur, surviv, die, death, separ, divorc, intermarriag, life, feme, sole,

Notes: The table lists the themes and constituent topics based on Grajzl and Murrell's (2021a) STM estimates utilizing the corpus of pre-1765 cases in the English Reports. The lists of top words (in stemmed form) include a selection of Highest Probability and Score words. See Appendices D and E in Grajzl and Murrell (2021a) for complete lists of top words and a detailed justification of each topic name, with extracts from reports featuring a given topic prominently.

Table 2: Descriptive statistics for the time-series variables

Variable	Obs.	Mean	S.D.	Min.	Max.
Legal					
Land Law	213	0.173	0.118	0.053	0.515
Inheritance Law	213	0.083	0.045	0.013	0.309
Family Law	213	0.033	0.022	0.005	0.113
Demographic and economic					
Birth Rate	213	32.2	2.7	22.9	39.1
Death Rate	213	27.5	4.9	19.2	53.9
Real Income (non-logged)	213	1.86	0.35	1.02	2.80

Notes: The table presents the descriptive statistics for the yearly time series on relative attention to law and the demographic and economic variables. Birth Rate and Death Rate, respectively, are the Wrigley and Schofield (1989) crude birth rate and death rate, defined as the number of births and deaths per one thousand people. Real Income is the (non-logged) Humphries and Weisdorf (2019) measure of annual real per-capita income, expressed as the number of Allen's (2009) respectability baskets that could be purchased with the annual income of an unskilled male worker. The sample period is 1552-1764.
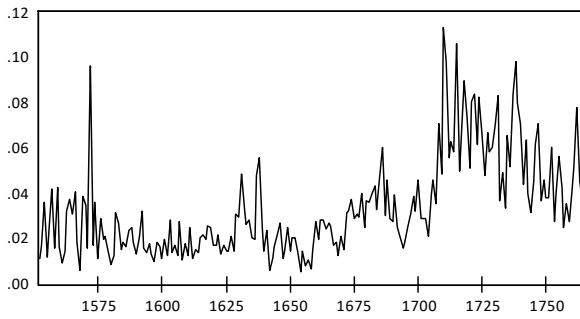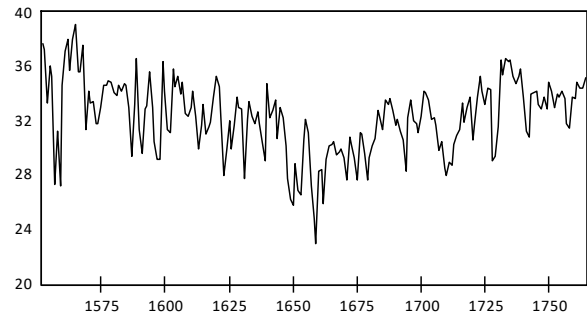
Figure 1: The time-series
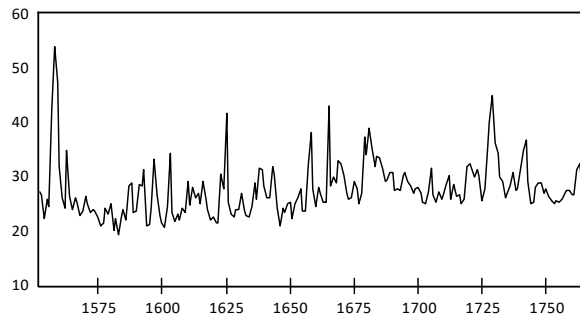

(a) Land Law
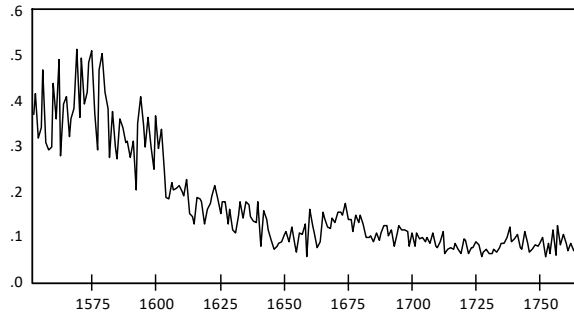
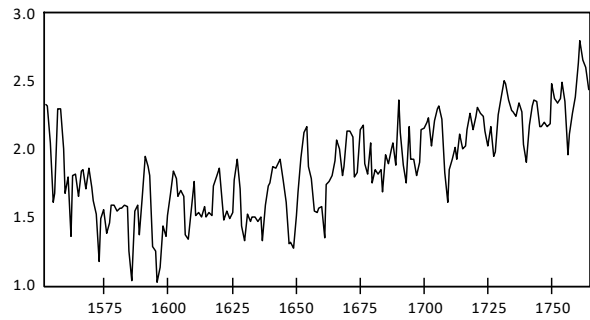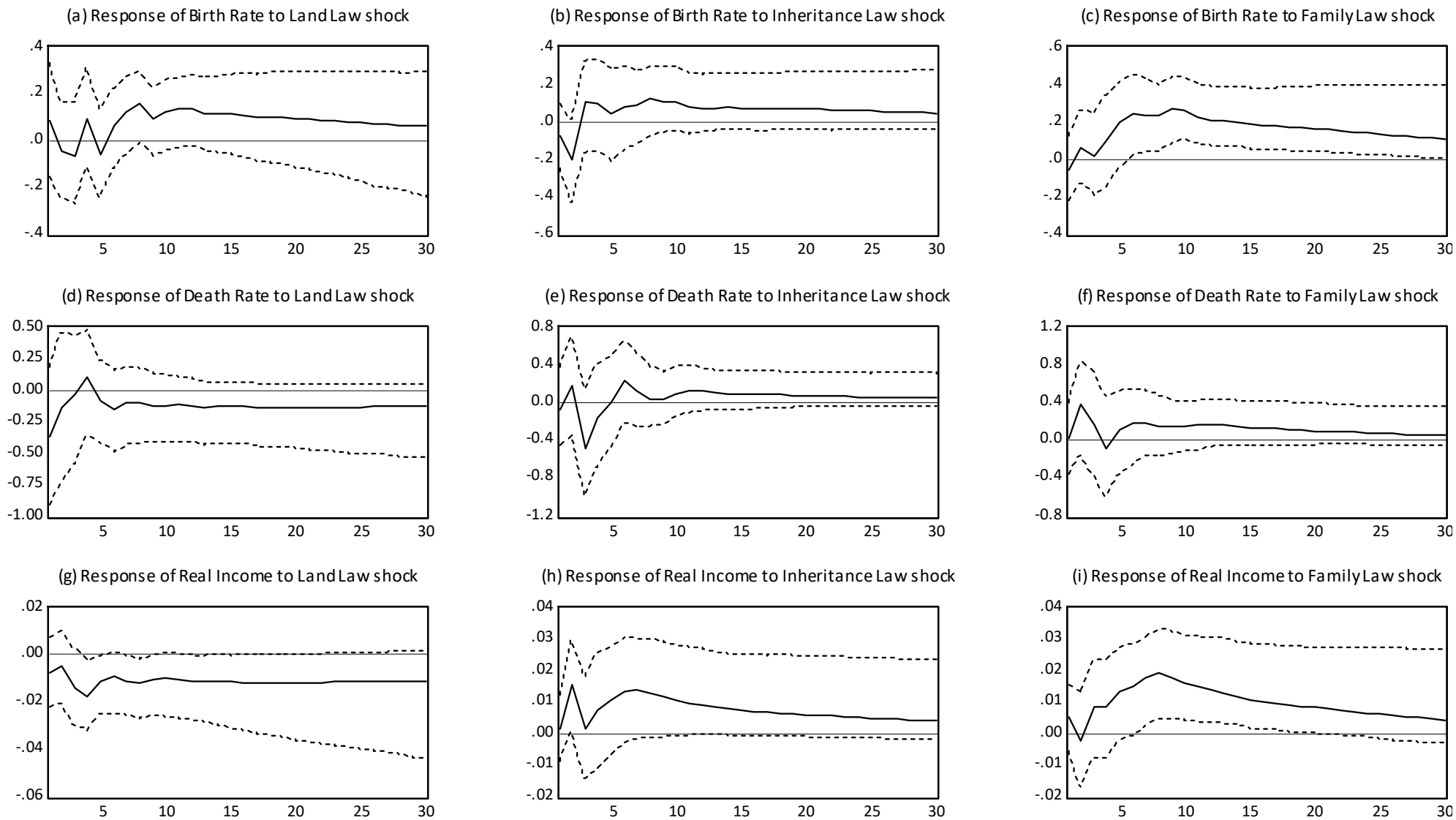(b) Inheritance Law
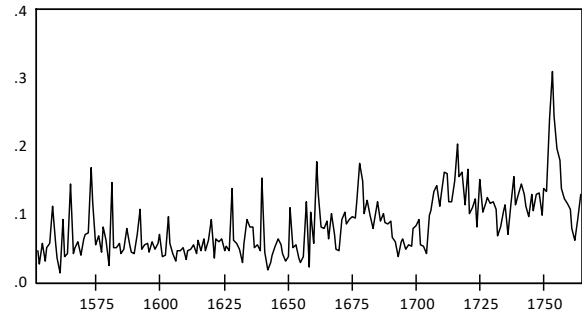
(c) Family Law
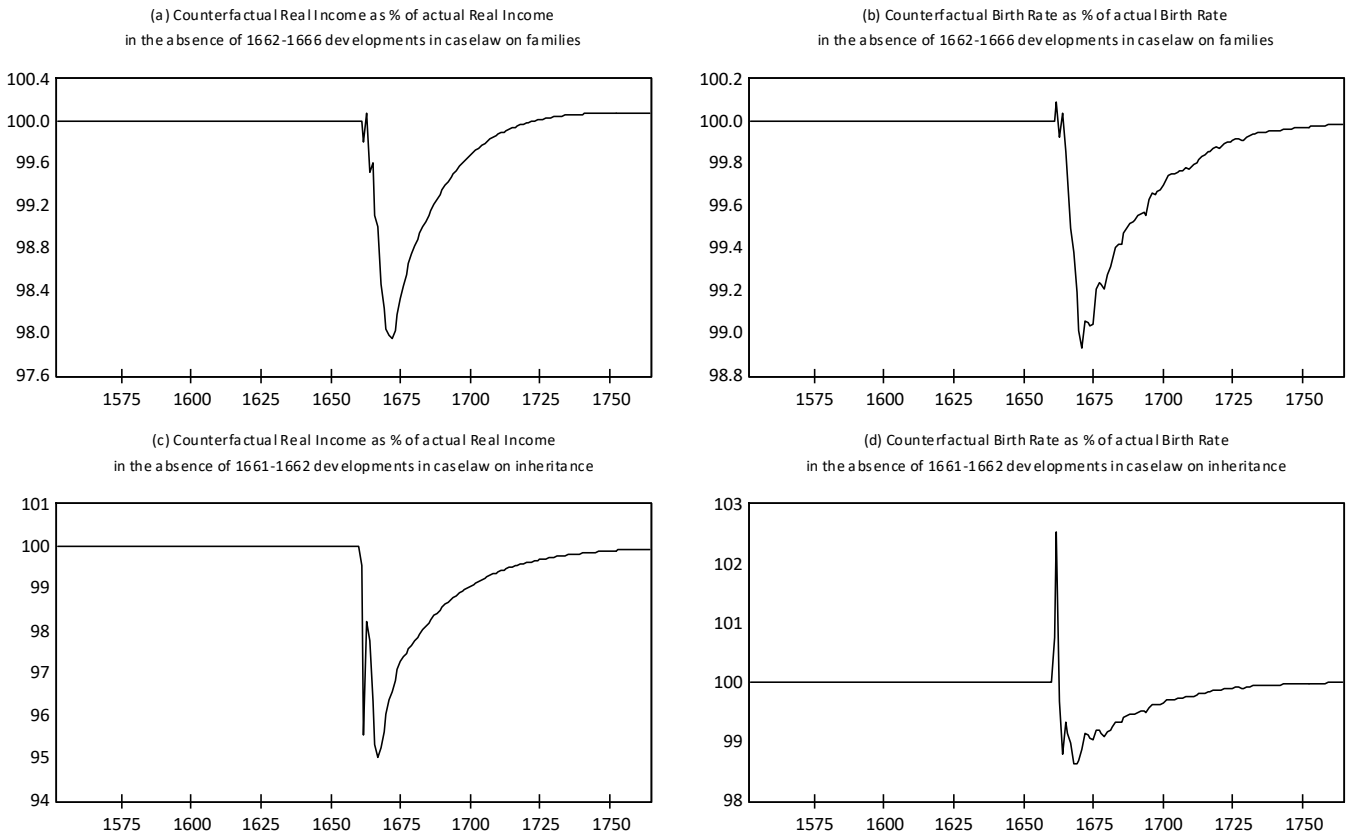
(d) Birth Rate

(e) Death Rate

(f) Real Income (non-logged)

Figure 2: Responses (non-accumulated) of demographic and economic variables to law shocks

(a) Response of Birth Rate to Land Law shock

(b) Response of Birth Rate to Inheritance Law shock

(c) Response of Birth Rate to Family Law shock

(d) Response of Death Rate to Land Law shock

(e) Response of Death Rate to Inheritance Law shock

(f) Response of Death Rate to Family Law shock

(g) Response of Real Income to Land Law shock

(h) Response of Real Income to Inheritance Law shock

(i) Response of Real Income to Family Law shock

Notes: 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.

Figure 3: Counterfactual simulations

(a) Counterfactual Real Income as % of actual Real Income
in the absence of 1662-1666 developments in caselaw on families

(b) Counterfactual Birth Rate as % of actual Birth Rate
in the absence of 1662-1666 developments in caselaw on families

(c) Counterfactual Real Income as % of actual Real Income
in the absence of 1661-1662 developments in caselaw on inheritance

(d) Counterfactual Birth Rate as % of actual Birth Rate
in the absence of 1661-1662 developments in caselaw on inheritance

Notes: Parts (a) and (b) show counterfactual real per capita income and birth rate as percent of actual real per capita income and birth rate in the absence of the developments in caselaw on families that took place from 1662 to 1666. Parts (c) and (d) show counterfactual real per capita income and birth rate as percent of actual real per capita income and birth rate in the absence of the developments in caselaw on inheritance that took place in 1661 and 1662.

Figure 4: Effects of cumulative shocks to law on the fluctuations of (logged) real per-capita income and birth rate
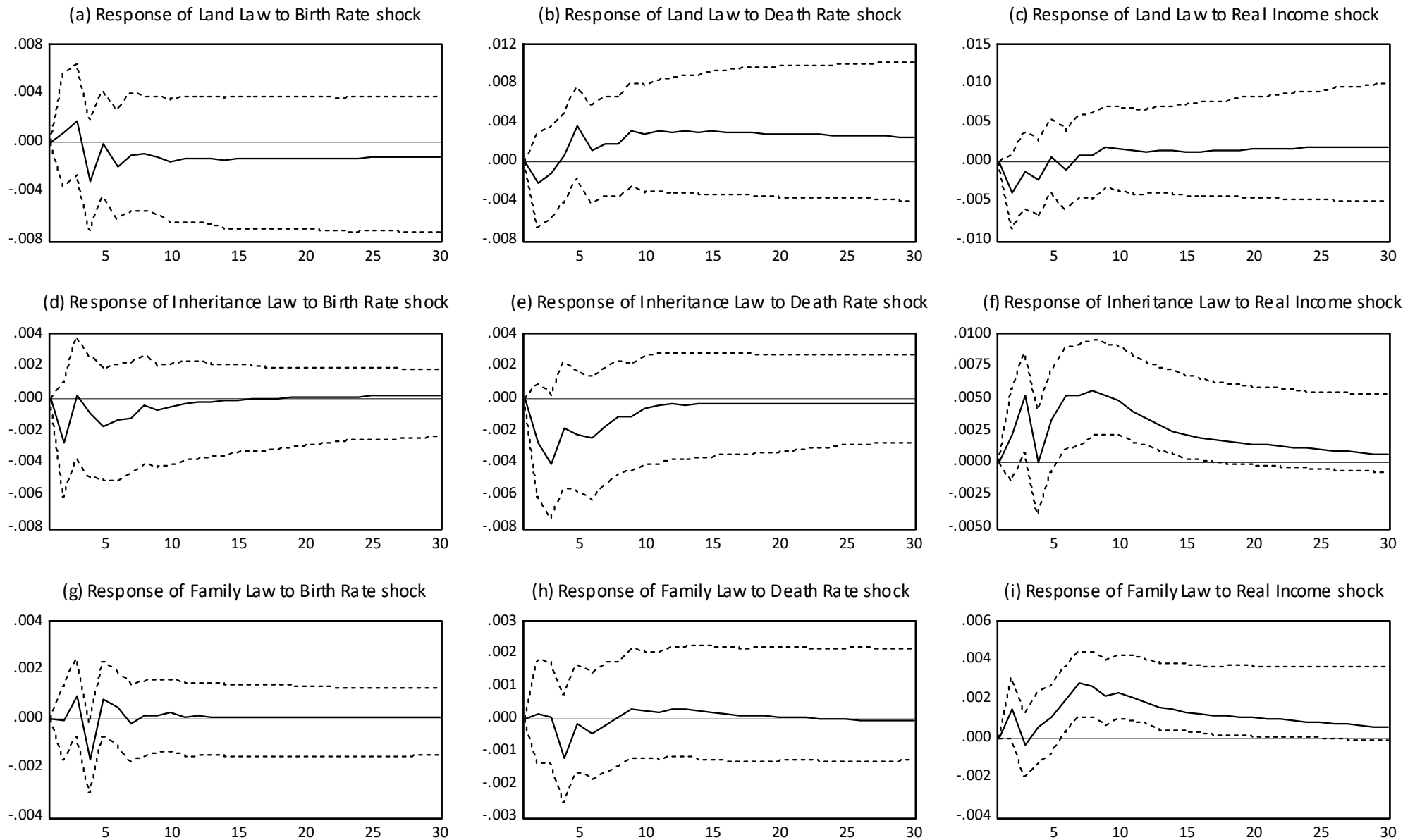
(a) Historical decomposition of (logged) Real Income
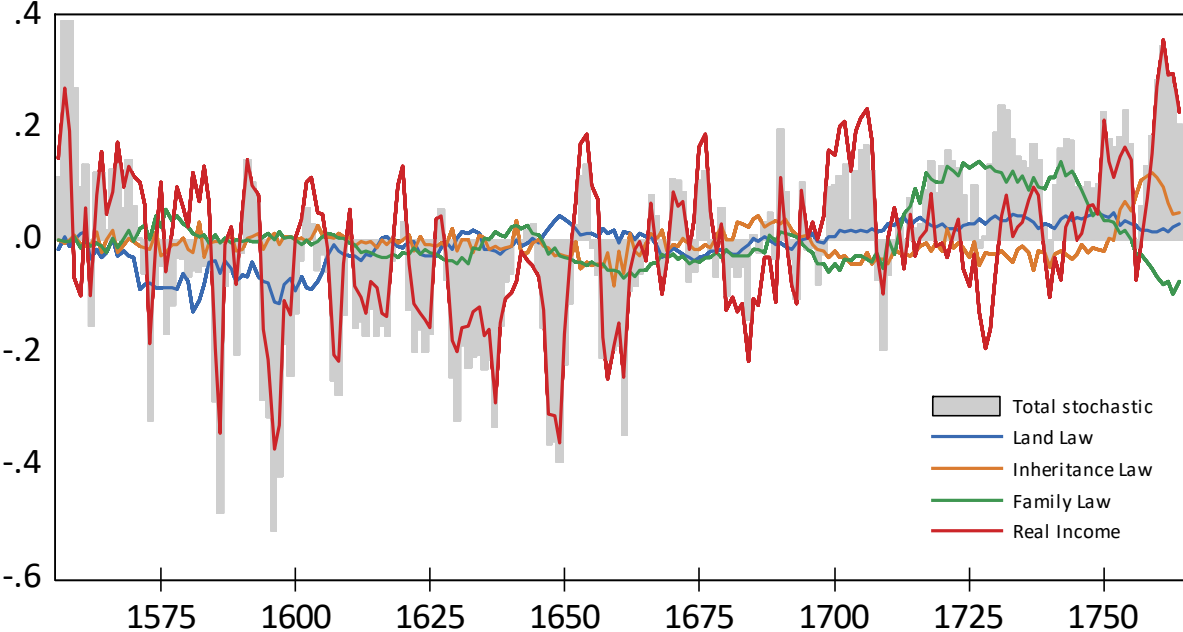
(b) Historical decomposition of Birth Rate
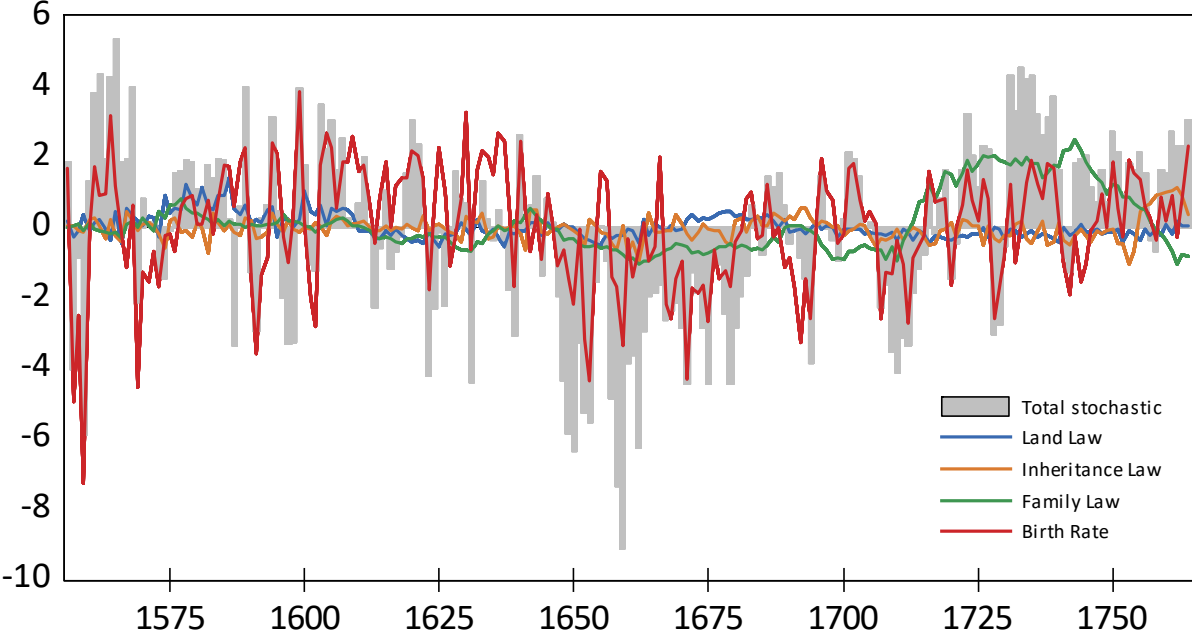
Figure 5: Responses (non-accumulated) of legal variables to demographic and economic shocks


(a) Response of Land Law to Birth Rate shock

(b) Response of Land Law to Death Rate shock

(c) Response of Land Law to Real Income shock

(d) Response of Inheritance Law to Birth Rate shock

(e) Response of Inheritance Law to Death Rate shock

(f) Response of Inheritance Law to Real Income shock

(g) Response of Family Law to Birth Rate shock

(h) Response of Family Law to Death Rate shock

(i) Response of Family Law to Real Income shock

Notes: 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.
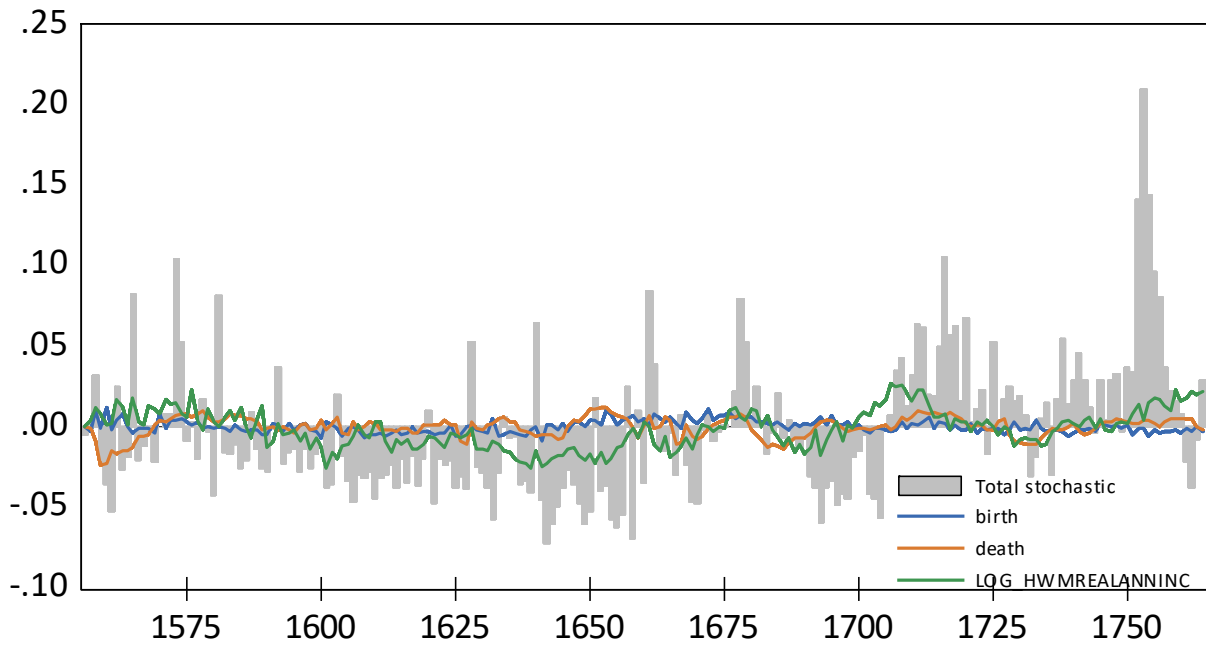
Figure 6: Cumulative demographic and economic shocks and development of law on families and inheritance
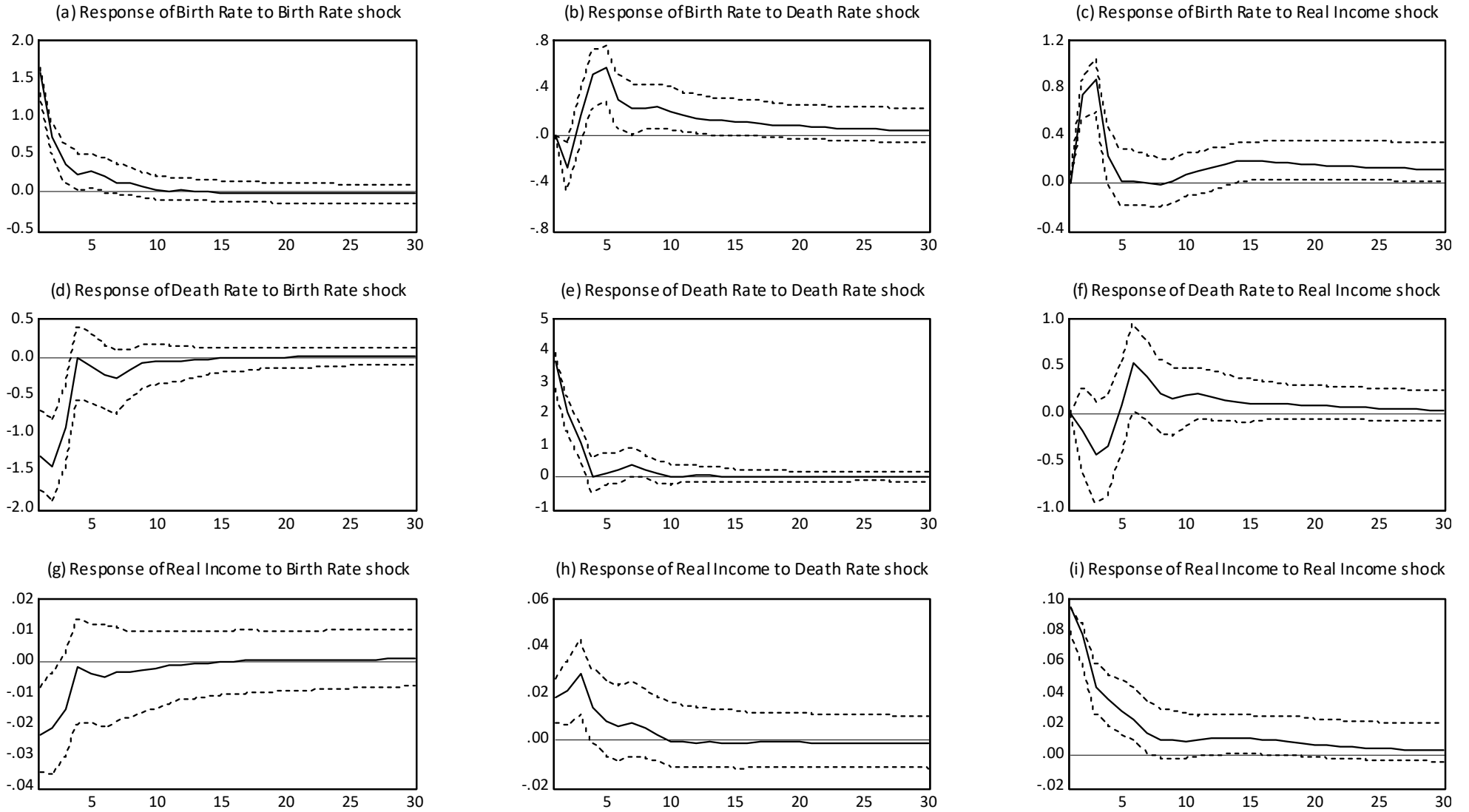
(a) Historical decomposition of Family Law
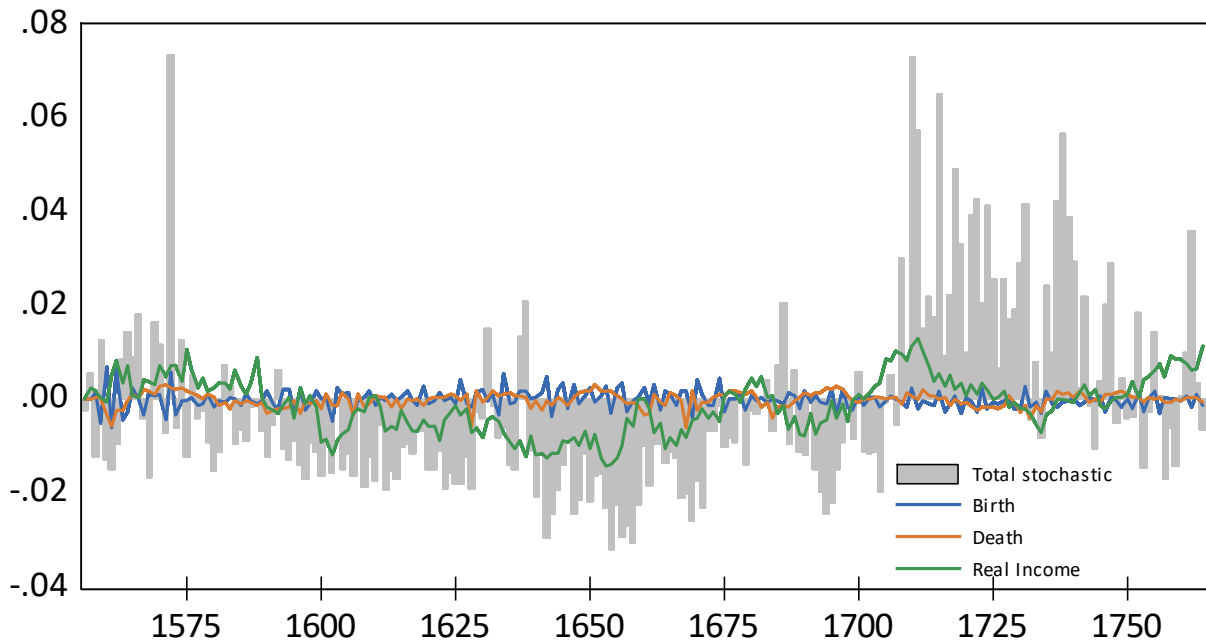
(b) Historical decomposition of Inheritance Law

Figure 7: Impulse-responses (non-accumulated), demographic-economic interactions


(a) Response of Birth Rate to Birth Rate shock

(b) Response of Birth Rate to Death Rate shock

(c) Response of Birth Rate to Real Income shock

(d) Response of Death Rate to Birth Rate shock

(e) Response of Death Rate to Death Rate shock

(f) Response of Death Rate to Real Income shock

(g) Response of Real Income to Birth Rate shock

(h) Response of Real Income to Death Rate shock

(i) Response of Real Income to Real Income shock

Notes: 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.
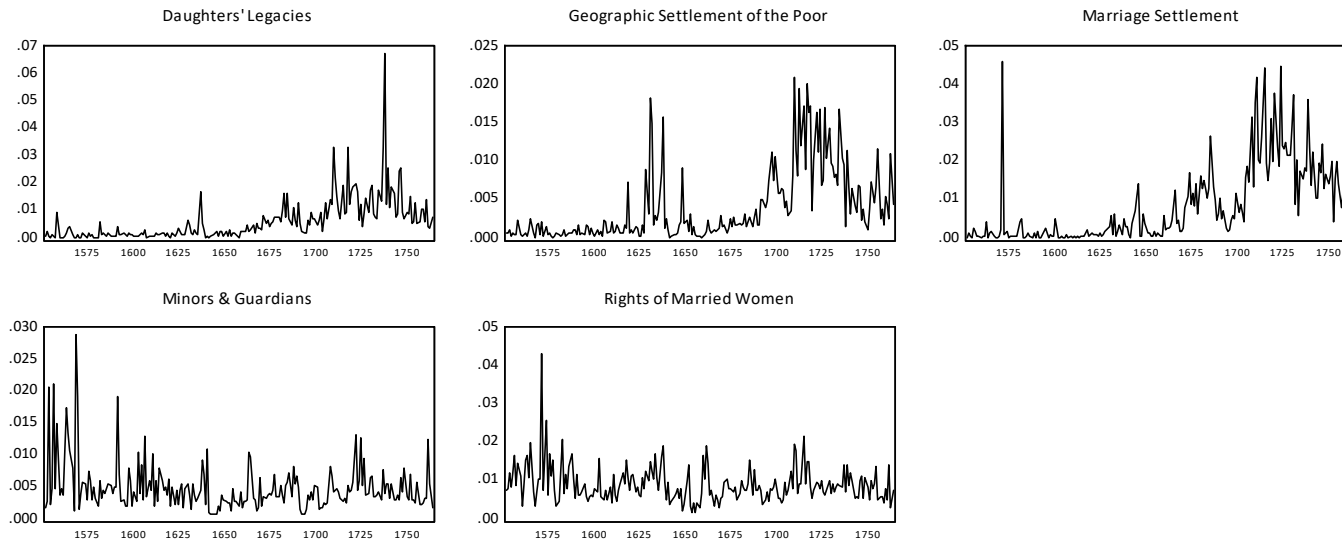
Appendix A

Figure A1: The time series of the attention to topics comprising the Land theme
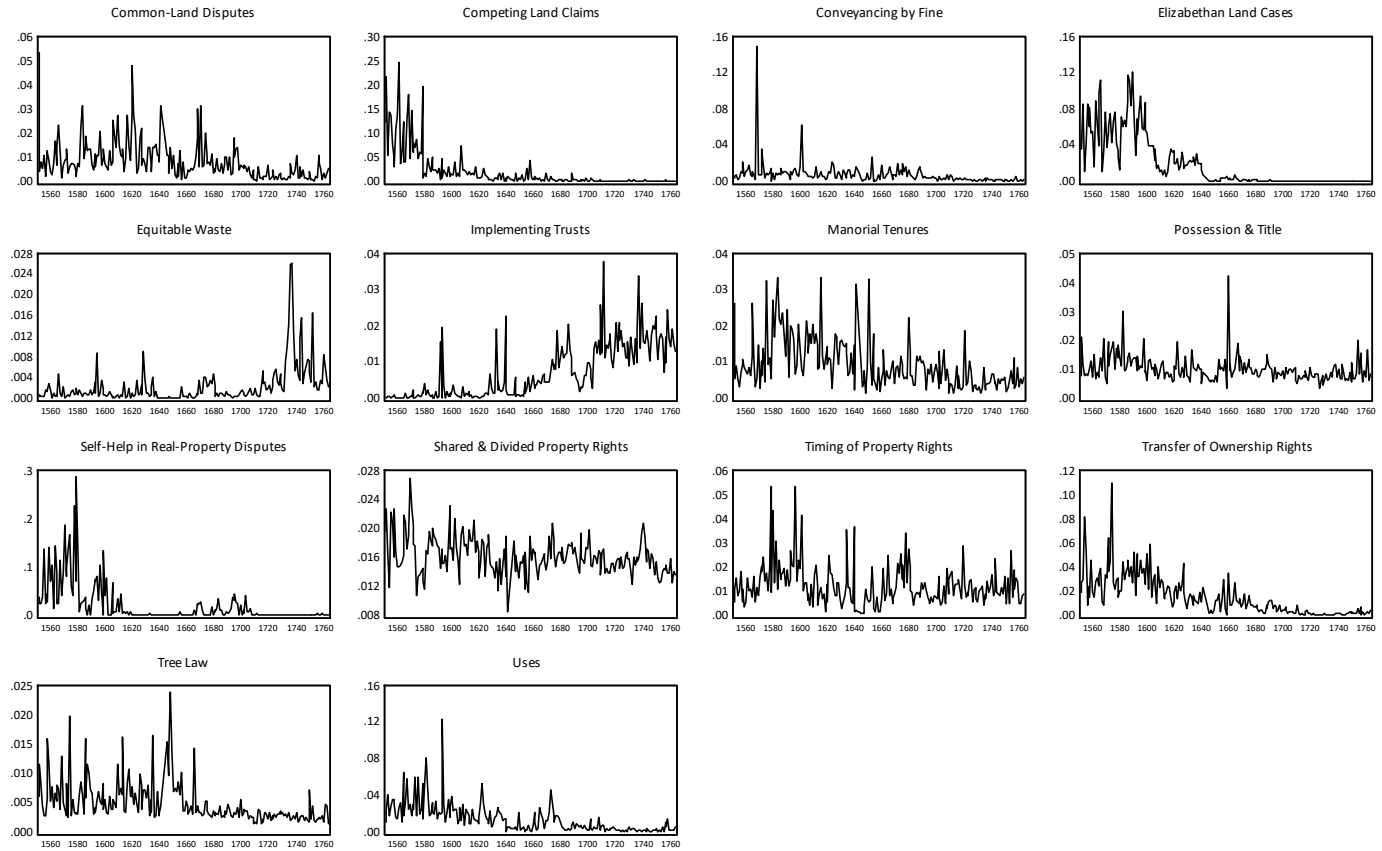
Figure A2: The time series of the attention to topics comprising the Inheritance theme
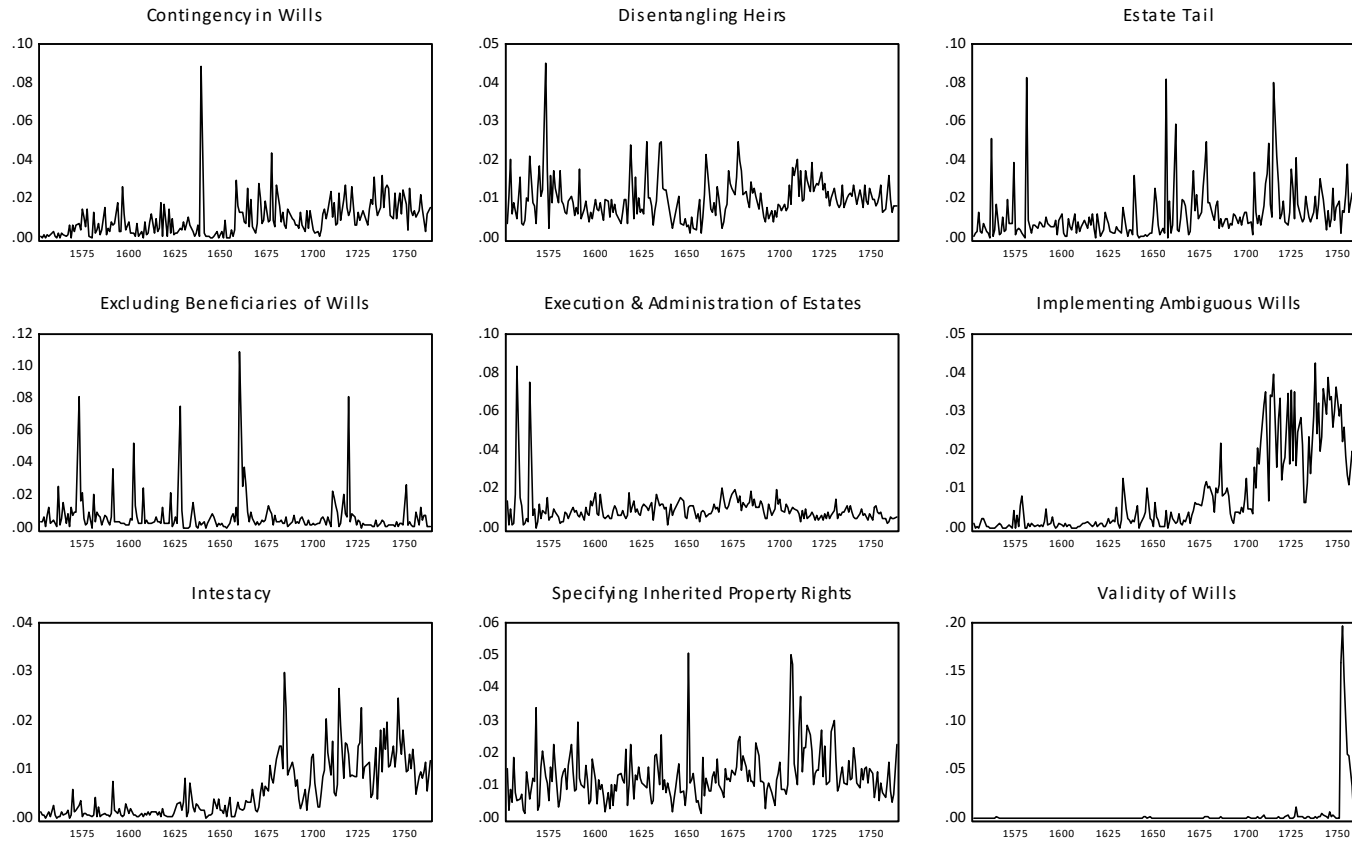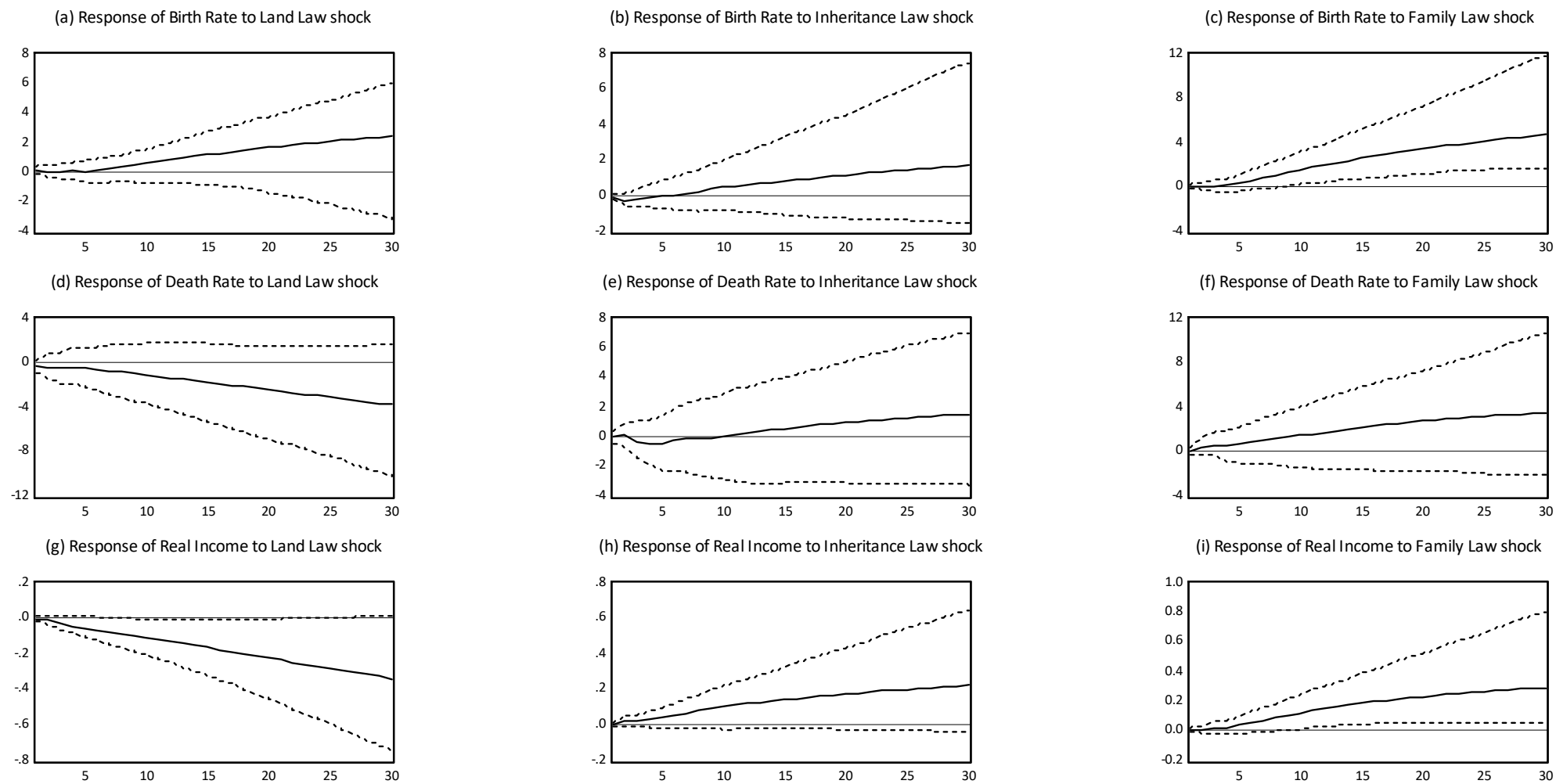
Figure A3: The time series of the attention to topics comprising the Families theme

Appendix B

Figure B1: Accumulated responses of demographic and economic variables to law shocks

(a) Response of Birth Rate to Land Law shock

(b) Response of Birth Rate to Inheritance Law shock

(c) Response of Birth Rate to Family Law shock

(d) Response of Death Rate to Land Law shock

(e) Response of Death Rate to Inheritance Law shock

(f) Response of Death Rate to Family Law shock

(g) Response of Real Income to Land Law shock

(h) Response of Real Income to Inheritance Law shock

(i) Response of Real Income to Family Law shock

Notes: 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.

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Appendix C

This appendix presents the results concerning the effect on economic development at the sectoral level of legal developments in the three areas of caselaw under consideration (land, inheritance, and families). To this end, we use Broadberry et al.'s (2015) data on real output in the agriculture, industry, and service sectors, expressed in the form of index numbers (the base year is 1700), and on England's population, expressed in millions. (The data in electronic format are available on the Bank of England's website under the heading A Millennium of Macroeconomic Data.)

For each of the three sectors (agriculture, industry, and service) we compute the real output index per one million people. Specifically, let q_t denote the (unobserved) real output of a particular sector in year t. Then, the (observed) index of real output in year t equals $(q_t/q_{1700}) \times 100$, and the index of real output per one million people in the same year is

$$\frac{\frac{q_t}{q_{1700}} \times 100}{pop_t} \equiv \left(\frac{q_t}{pop_t}\right) \times \left(\frac{100}{q_{1700}}\right), \tag{C1}$$

where pop_t is year t population measured in millions. The first term on the right-hand side of (C1) is the (unobserved) real sectoral output per one million people. The second term on the right-hand side of (C1) is time-invariant. Applying natural logarithms to (C1) and first-differencing the resulting expression with respect to time, t, then shows that relative changes over time in (C1) perfectly reflect the relative changes over time in the (unobserved) real sectoral output per capita.

We estimate an expanded version of the VAR developed in Section 5. Specifically, we replace logged real per-capita income in vector y_t, defined by expression (2), with our logged measures of real per-capita sectoral output, $agric_t$, ind_t, and $serv_t$, as defined in (C1). We add all three variables to the model at once. Our new vector y_t therefore contains eight variables. We retain all other assumptions of the model as developed in Section 5.
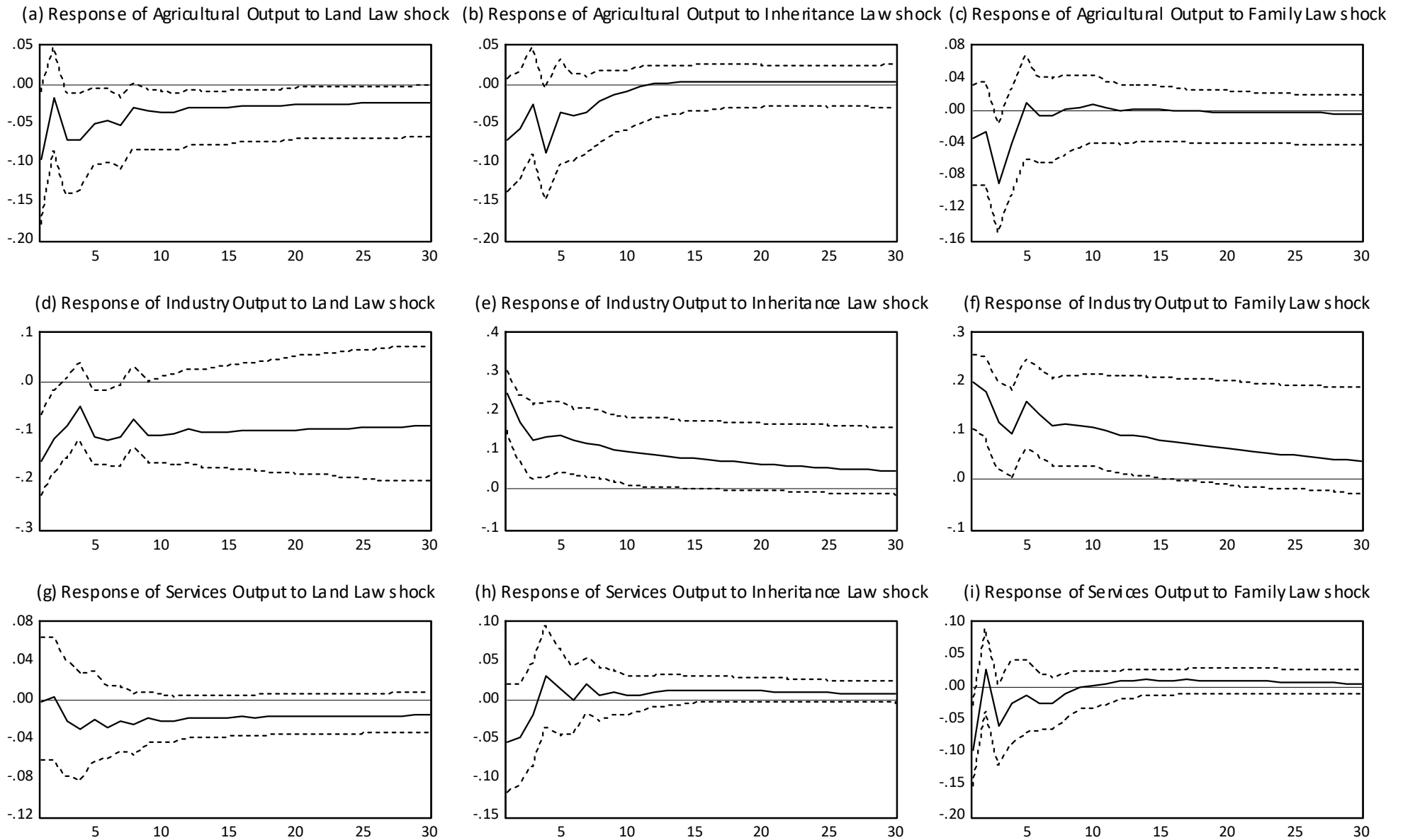
In the resultant expanded VAR we approach identification as follows. Intuitively, agricultural output, both arable and pastoral, reflects activity (planting, acquisition of cattle etc.) from many months ago. Shocks to the industrial and service sectors will thus normally not affect agricultural output in the same year. Similarly, industrial production relies heavily on the use of physical capital (machinery and equipment), the stock of which increases only with investment. Shocks to the service sector will therefore plausibly not affect industrial output in the same year. Accordingly, for identification, we place the new variables at the very end of the vector y_t (the position occupied by $income_t$ in the main model) and order them as $agric_t$, ind_t, $serv_t$. We have verified, however, that our findings are fully robust to alternative orderings within the sub-vector of the three newly-included variables.

The relevant subset of the estimated (non-accumulated) impulse-responses is shown in Figure C1. As emphasized in Section 6.1, innovations in caselaw on families and inheritance increase per-capita output of the industrial sector (Figures C1(e)(f)), but do not exert a discernible

effect on per-capita output in agriculture and services sectors (Figures C1(b)(c)(h)(i)). Innovations in caselaw on land have a discernible negative effect on per-capita output of the agricultural and industrial sectors (Figure C1(a)(b)). However, only the negative effect on the agricultural sector is statistically significant at extended horizons.

Figure C1: Responses (non-accumulated) of sectoral real per-capita output variables to law shocks

(a) Response of Agricultural Output to Land Law shock | (b) Response of Agricultural Output to Inheritance Law shock | (c) Response of Agricultural Output to Family Law shock

(d) Response of Industry Output to Land Law shock | (e) Response of Industry Output to Inheritance Law shock | (f) Response of Industry Output to Family Law shock

(g) Response of Services Output to Land Law shock | (h) Response of Services Output to Inheritance Law shock | (i) Response of Services Output to Family Law shock

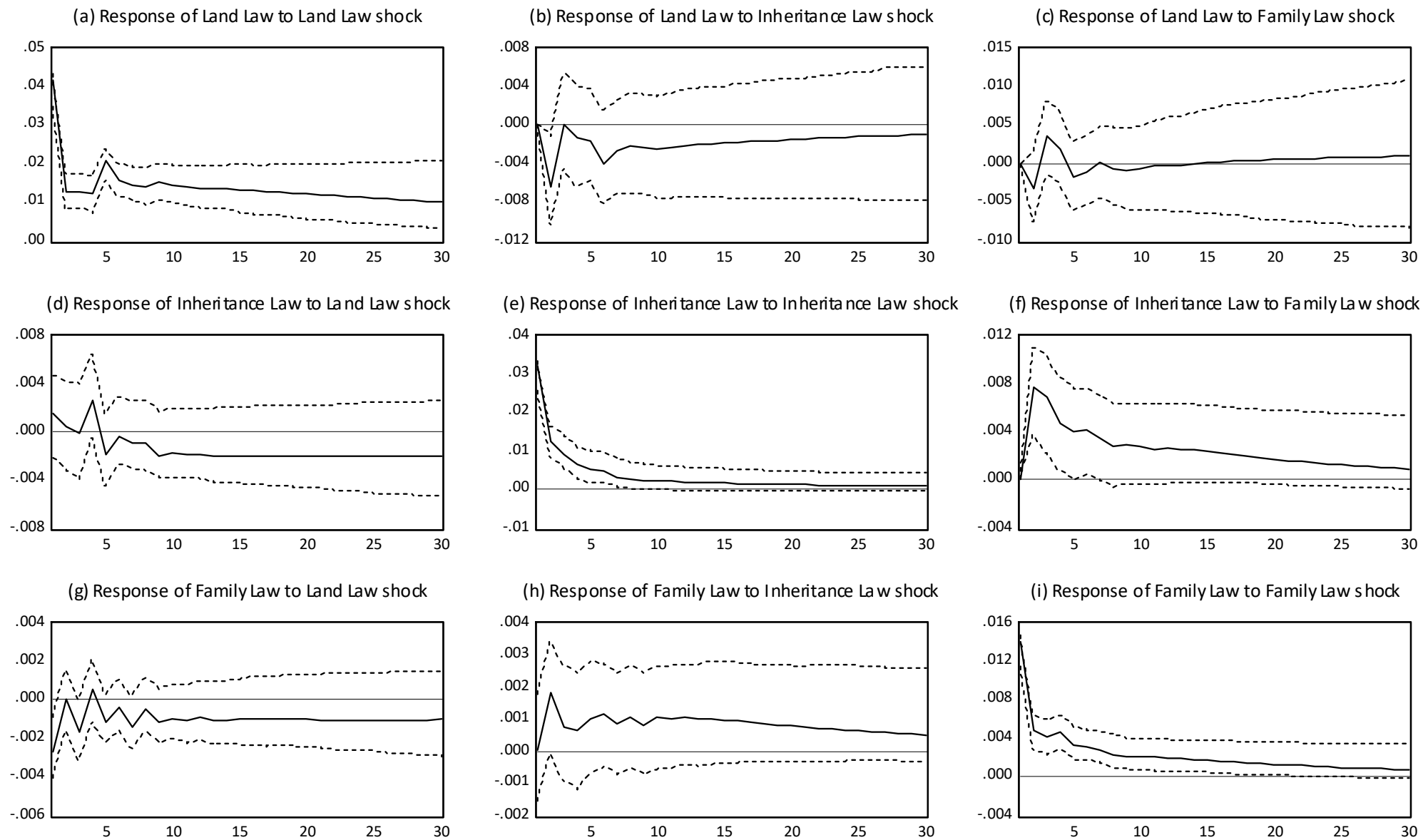*Notes*: 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.

Appendix D

This appendix presents and discusses the (non-accumulated) impulse-responses of attention to different areas of caselaw to law shocks. The results are summarized in Figure D1.

The response in attention to law in one domain as a consequence of a shock in attention to law in another domain shows the coevolutionary character of caselaw. For example, when innovations in one area of law require complementary adjustments in another area of law, then shocks to the first area of law will lead to heightened attention in the second area of law. Law on inheritance and law on families evidence such coevolution (Figures D1(f)(g)). Innovations in one area of law can resolve issues in another area of law, implying that shocks to the first area of law will lead to reduced attention to the second area of law. In addition, reductions in attention in a given area of law following a shock in another area of law could be a consequence of substitution effects arising from constraints on the time and resources of the courts. While only a subset of the corresponding impulse-responses is statistically significant, this is the nature of the relationship between either law on families or law on inheritance on the one side and law on land on the other side (Figures D1(b)(d)(g)(c)).

Finally, following a shock to any single legal domain, later attention to that legal domain initially rises and then gradually declines (Figures D1(a)(e)(i)). External shocks, such as legislation, thus do not immediately result in the resolution of all problems, but rather cause heightened attention to the relevant area of law for an extended time. This is especially true for law on land.

Figure D1: The non-accumulated responses of law variables to law shocks


(a) Response of Land Law to Land Law shock

(b) Response of Land Law to Inheritance Law shock

(c) Response of Land Law to Family Law shock

(d) Response of Inheritance Law to Land Law shock

(e) Response of Inheritance Law to Inheritance Law shock

(f) Response of Inheritance Law to Family Law shock

(g) Response of Family Law to Land Law shock

(h) Response of Family Law to Inheritance Law shock

(i) Response of Family Law to Family Law shock

Notes: 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.

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Figure E1: Structural shocks (averages for five-year bins) to the three areas of law
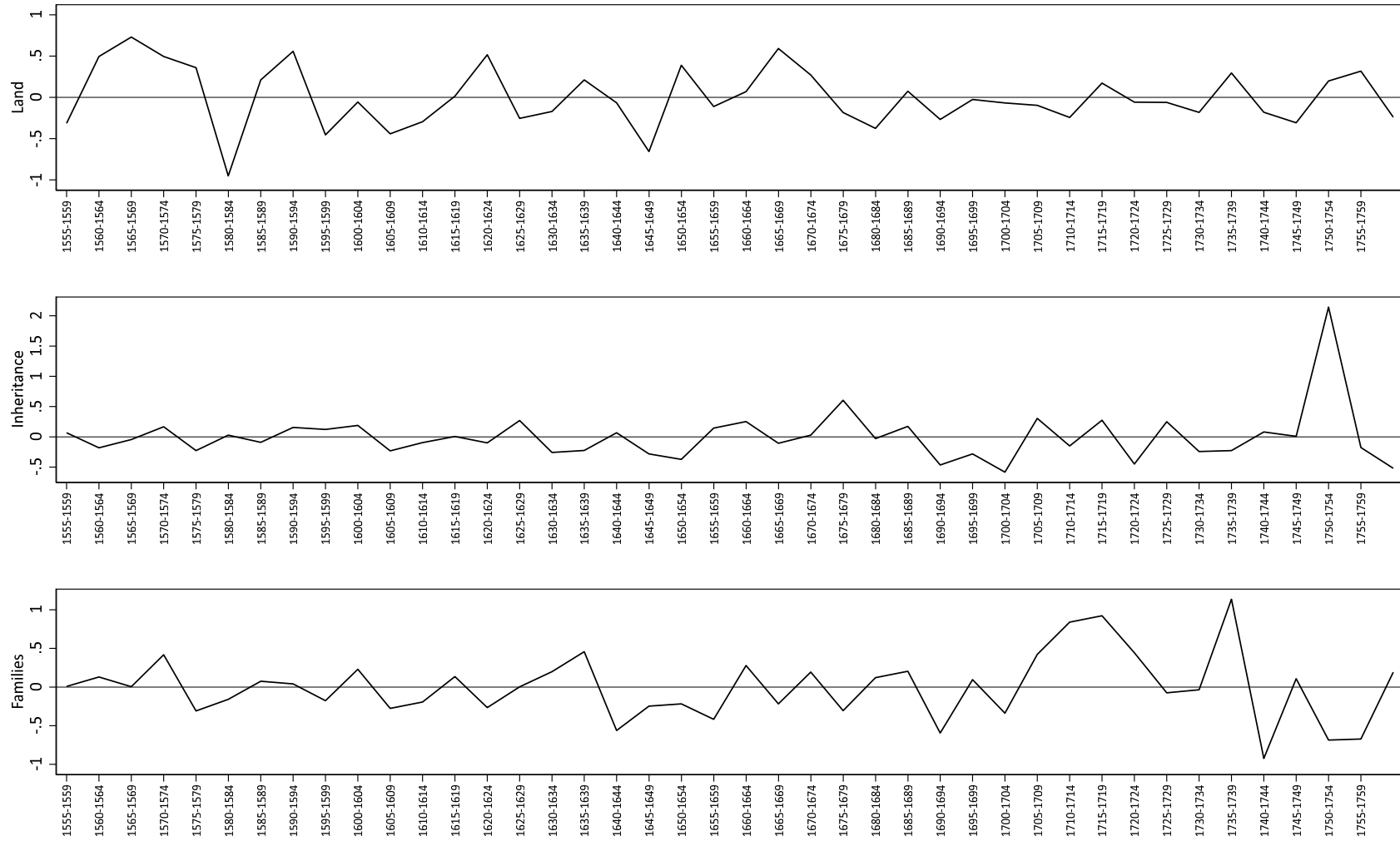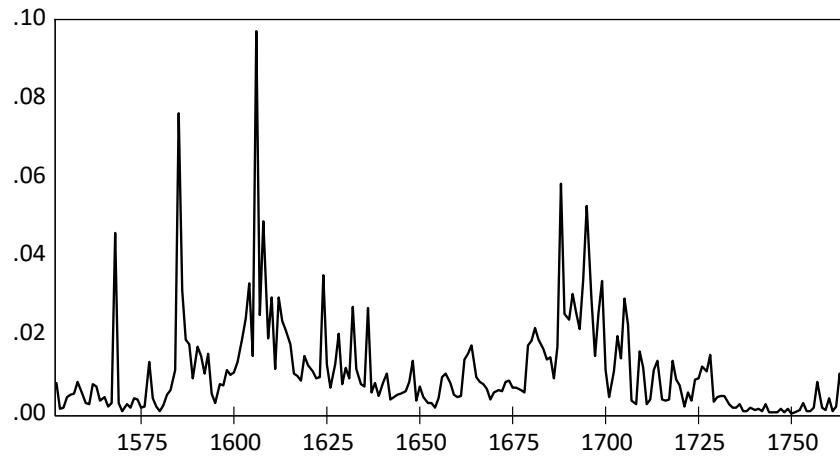
Figure E2: Structural shocks (averages for five-year bins) to demographic and economic variables
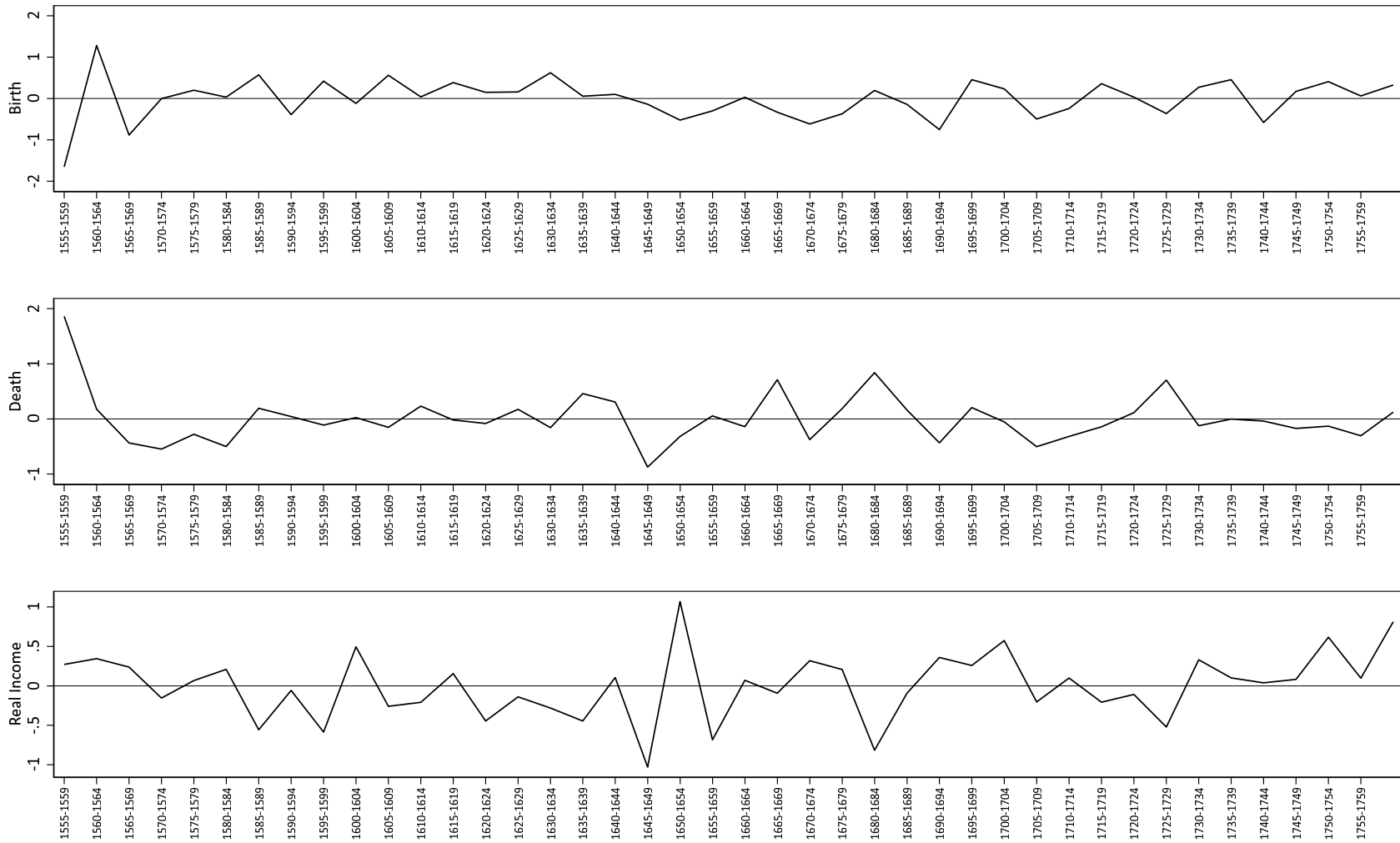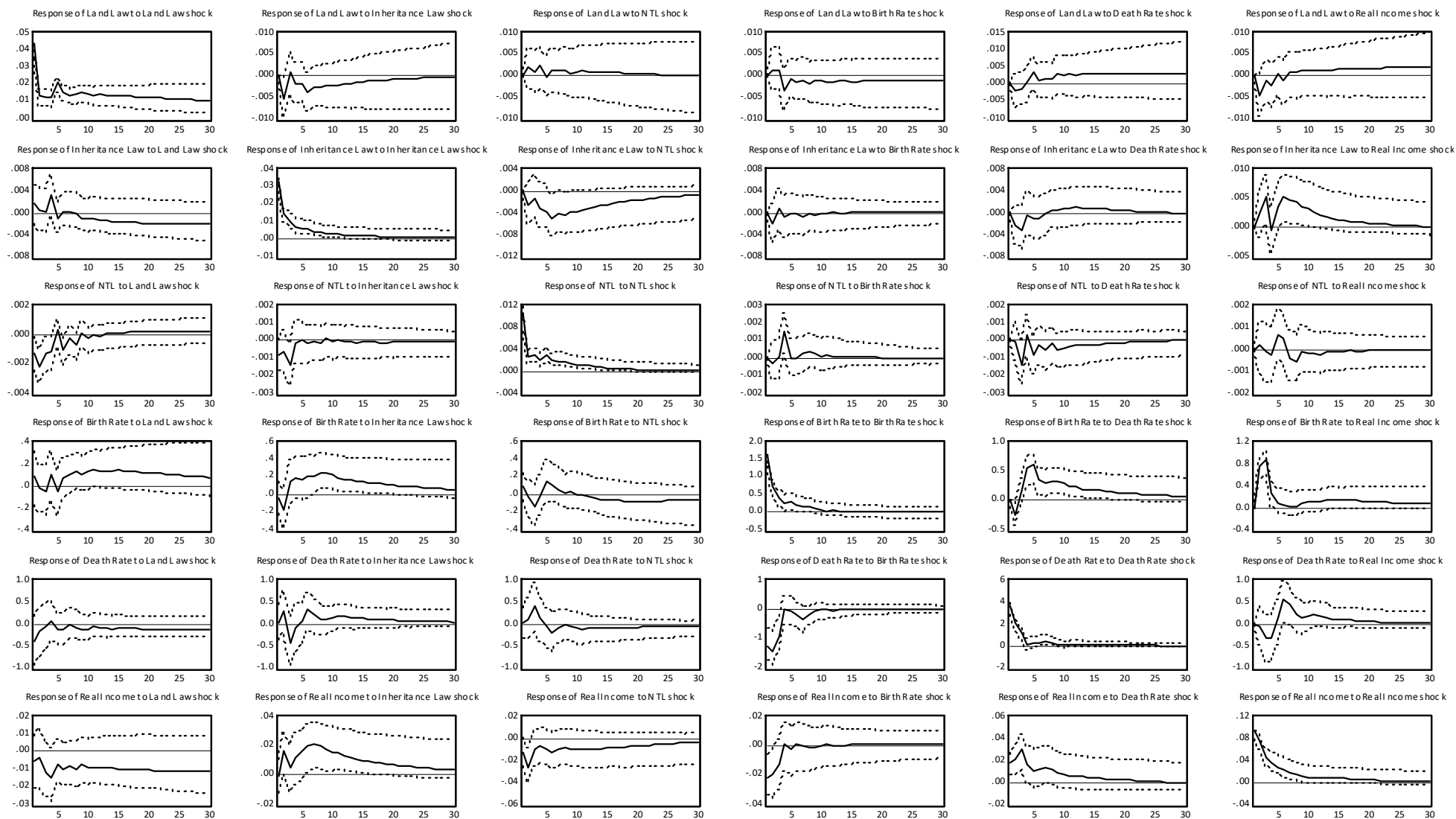
Appendix F

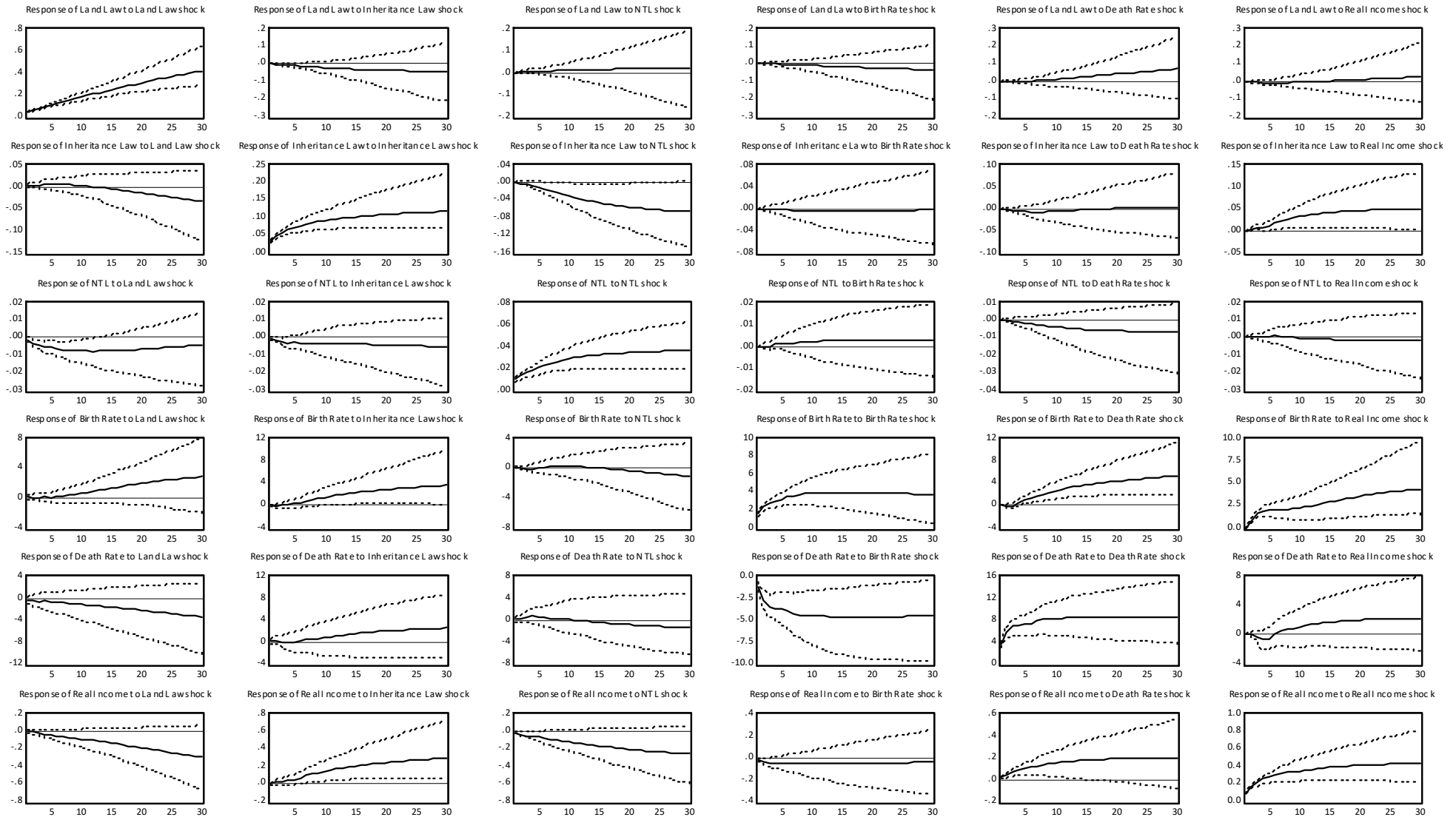**Figure F1: The time series of the attention to the topic Non-Translated Latin**

Figure F2: Impulse-responses (non-accumulated) when replacing the Family Law series with the Non-Translated Latin (NTL) series

Notes: 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.

Figure F3: Impulse-responses (accumulated) when replacing the Family Law series with the Non-Translated Latin (NTL) series

Notes: 90-percent confidence intervals computed using Kilian's (1998) bootstrap method.