Coffeehouses and the Rise of Science*

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Abstract

Coffeehouses emerged as a key social institution in early modern England. In 1962, Jürgen Habermas famously argued that they transformed the public sphere by fostering rational debate, enabling Enlightenment ideas to flourish. This paper tests that claim in the context of Enlightenment science in seventeenth-century London. Exploiting the staggered spread of coffeehouses, we find a substantial increase in the number of applied scientists and scientific instrument shops coinciding with the establishment of the first coffeehouse in a jurisdiction. We argue that coffeehouses fostered this growth by lowering the cost of accessing scientific knowledge and making experimental science more interactive and public. Consistent with this mechanism, coffeehouses especially benefited individuals with weaker ties to elite intellectual circles, strengthened links between theory-oriented scientists and practical instrument makers, and increased the number of experimental instrument shops.

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1. INTRODUCTION

Technological progress is a key driver of sustained economic growth. In pre-modern Europe, advances arose mainly through trial and error rather than through systematic study. By the Industrial Revolution, however, innovation increasingly relied on structured knowledge and empirical methods developed during the Scientific Revolution and the Enlightenment. How did this shift come about?

In this paper, we examine whether a prominent hypothesis proposed by philosopher and social theorist Jürgen Habermas (1991 [1962]) can help explain the rise of modern science in early modern Europe. In his analysis of the Enlightenment, Habermas argued that the new social institutions of seventeenth- and eighteenth-century Europe, such as English coffeehouses, French salons, and German table societies, reflected the emergence of a bourgeois public sphere that encouraged rational-critical debate. In these spaces, individuals could, for the first time, step outside established hierarchies and engage freely in the exchange of ideas. Reason, rather than religion, social rank, or inherited authority, shaped the debate.

Building on this perspective, historians have emphasized the role of social institutions in promoting the exchange of useful knowledge and supporting Europe's transition to modern economic growth (Stewart, 1992; Jacob, 1997; Mokyr, 2002, 2005, 2016). These institutions, including coffeehouses, helped connect natural philosophers, artisans, and merchants, bridging the gap between theory and practice. They encouraged discussion, experimentation, and collaboration across social boundaries, lowering the cost of sharing and verifying knowledge. In early modern London, Stewart (1999) shows that coffeehouses served as key sites of intellectual exchange and as early incubators of what Mokyr (2016) describes as the "Industrial Enlightenment," when the ideals of reason and experimentation merged with practical invention. Yet, despite their prominence in historical accounts, there is no quantitative empirical evidence on whether and how such institutions contributed to the rise of modern science.

In this paper, we examine the role of coffeehouses in explaining the rise of modern science in seventeenth-century London, the main center of the Scientific Revolution in the British Isles. Using newly assembled location information on the universe of known coffeehouses, comprehensive records on applied scientists, their social networks, and scientific instrument shops active in the period, we document two facts. First, as shown in Figure 1, scientific activity increased sharply and persistently after the first coffeehouse opened in an area. Second, this pattern cannot be explained by preexisting trends, local shocks, or changes in general economic activity.

[Figure 1 about here.]

We then ask what explains this relationship. Our evidence points to a simple mechanism. Coffeehouses lowered the cost of accessing and exchanging useful knowledge related to applied science. They created open, commercially operated venues where natural philosophers, instrument makers, artisans, merchants, and the middling sort interacted on relatively equal footing. Universities, the Royal Society, and private workshops did not offer this type of low-barrier setting. By widening participation in London's emerging culture of experimental inquiry, coffeehouses strengthened links between holders of theoretical knowledge (e.g., natural philosophers) and practical knowledge (e.g., scientific instrument makers), and in turn increased demand for new scientific instruments. Consistent with this mechanism, coffeehouses especially benefited individuals with weaker elite connections, increased cross-network links between practitioners and instrument makers, and encouraged the entry of shops producing experimental tools such as microscopes and air pumps.

Our analysis provides quantitative evidence for a long-standing idea in the history of knowledge: informal, public institutions that reduce communication frictions can help shift practice from craft-based trial and error to systematic scientific inquiry. More broadly, our results show that modest changes in how information circulates can reshape collaboration and accelerate knowledge production.

Related Literature. This paper deepens our understanding of how seventeenth-century England became a center of the new experimental science of the Scientific Revolution in Europe. It traces the rise of applied mathematicians and scientific instrument makers in London, the center of English modern science, and identifies a key driver: the spread of coffeehouses.

Previous studies have documented the growth and geographical spread of these early modern practitioners and their greater success in England than in France (e.g., Zilsel, 1942; Taylor, 1954; Kelly and Gráda, 2022), but have not quantitatively identified the key drivers of these patterns. Zilsel (1942) argues that the rise of early capitalism eroded the rigid separation between university scholars and artisans, which helped foster collaboration and the exchange of theoretical and practical knowledge. Taylor (1954) instead stresses that new technological demands in navigation, warfare, and surveying stimulated the development of applied scientific knowledge. This paper identifies and empirically supports the interaction of these forces. The seventeenth-century economic shift created new wage earners who eagerly consumed broadsides, pamphlets, news sheets, and public entertainments (Lake and Pincus, 2006). These forms of popular culture converged in the coffeehouse, where artisans and intellectuals met beyond the older, more private sphere of instrument shops (Cormack et al., 2017). As Stewart (1992) shows, the coffeehouse became an arena for public science, fostering demand for practical and experimental instruments that engaged natural philosophers. We demonstrate this process by showing that coffeehouses strengthened connections between practical knowers (instrument makers) and theoretical knowers (natural philosophers) and that this shift coincided with a marked rise in shops producing the experimental instruments that natural philosophers required, such as microscopes and air pumps.

The idea that London coffeehouses played a central role in the diffusion of knowledge can be traced to John Houghton (1645–1705), an English apothecary, writer on agriculture and trade, and Fellow of the Royal Society (Houghton, 1699, 1727). In 1701, Houghton (1727, p. 132) observed:

> Coffee-houses make all sorts of people sociable, the rich and the poor meet together, as also do the learned and unlearned: It improves arts, merchandize, and all other knowledge; for here an inquisitive man, that aims at good learning, may get more in an evening than he shall by Books in a month [. . .]. I have heard a worthy friend of mine [. . .] who was of good learning [. . .] say, that he did think, that coffeehouses had improved useful knowledge, as much as [the universities] have, and spake in no way of slight to them neither.

Since then, the role of coffeehouses in the Enlightenment has been extensively studied (e.g., Habermas, 1991; Cowan, 2005; Ellis, 2004), as has the influence of such social institutions on the spread of scientific ideas and the accessibility of applied scientific knowledge (e.g., Mokyr, 2016; Iliffe, 1995; Stewart, 1999; Jacob, 1997; Ellis, 1956). Our contribution is to provide the first quantitative estimates of the effect of coffeehouses on the growth of applied science. In doing so, we also connect to the broader literature on social networks in innovation and technological diffusion (e.g., Andrews, 2023; Andrews and Lensing, 2024; Cinnirella et al., 2025; Galofré-Vilà, 2023; Dowey, 2017). Closest to our work in this strand of the literature is Andrews (2023). We differ in several respects. First, whereas Andrews studies a negative shock to informal social interaction, we examine the expansion of a social institution and its positive effects on applied science. Second, we directly measure the number and location of coffeehouses, whereas Andrews does not observe the number of pubs. Finally, our early modern setting highlights how informal networks lowered entry costs to scientific knowledge when formal scientific institutions were still limited, emphasizing not only sociability in public houses but also a social mobility channel into applied science.

The growing focus on social capital in explaining the spread of early modern science is a recent trend in quantitative research, as earlier studies emphasized other forms of capital. For example, Dittmar (2019) argues that Gutenberg's printing press increased the value and availability of scientific knowledge, raising professors' pay, expanding science education, and promoting innovation in universities and competitive cities. In contrast, de la Croix et al. (2025) highlight Europe's universities and academies, arguing that these institutions built strong intellectual networks that spread ideas and innovation more effectively than books or geography. In related work, Koschnick (2025) shows that teachers shaped students' research paths and fostered the intellectual climate that supported England's Scientific Revolution. However, these studies overlook artisans, whose practical and experimental methods lay outside university circles. Cinnirella et al. (2025) addresses this gap by showing that eighteenth-century Germany's economic societies, which connected artisans, engineers, and officials, reduced the cost of accessing knowledge and encouraged lasting regional innovation. Building on this work, this paper identifies the coffeehouse, distinct from universities and academies, as another key driver of early modern science and innovation.

Finally, we contribute to the broader literature on how the Enlightenment lowered the costs of accessing useful knowledge (e.g., Squicciarini and Voigtländer, 2015; Cinnirella et al., 2025). In contrast to their focus on elites and learned societies, we show that informal public, commercial venues, such as London's coffeehouses, connected artisans and natural philosophers and facilitated the spread of useful knowledge beyond elite circles.

Outline. The remainder of this paper is organized as follows. Section 2 provides historical background, focusing on coffeehouses and science in seventeenth-century London. Section 3 describes the datasets and sources. Section 4 details the empirical strategy and presents the main results on the impact of coffeehouses on scientific activity. Section 5 examines potential channels through which coffeehouses influenced science. Section 6 concludes.

2. BACKGROUND

London in the early seventeenth century was a rapidly growing commercial metropolis with dense trade networks and a thriving manufacturing sector of blacksmiths, clockmakers, and other skilled artisans (Shaw-Taylor et al., 2024). Rapid urbanization and the rise of wage labor expanded consumerism and increased disposable income, which strengthened the demand for printed material and for exotic imports such as coffee (Lake and Pincus, 2006). Coffee reached London through contact with the Ottoman Empire, where a distinct coffee culture had flourished since the 1500s (Hattox, 2014). In this environment, merchants who had encountered coffee abroad and natural philosophers seeking new forms of knowledge became early adopters (Cowan, 2005), helping to integrate coffeehouses into the commercial life of London.

The interest of natural philosophers reflected the broader intellectual climate shaped by Francis Bacon (1561–1626), a central figure of the British Enlightenment, who encouraged systematic curiosity about the natural world (Cowan, 2005). Coffee became one such curiosity. Bacon noted Turkish claims that it sharpened courage and wit, and writers in the coffeehouse milieu, including some natural philosophers, described it as "wine of Islam", helping present coffee as suited to an English palate long accustomed to wine and other alcoholic drinks. As coffeehouses spread, they attracted a broader clientele. London had dense informal communication networks but few formal venues for open debate. Long-standing traditions of sociability in, e.g., taverns, bookshops, artisanal workshops, and literary circles provided a familiar framework that allowed coffeehouses to become central hubs for news, conversation, and exchange in the social and intellectual life of late seventeenth-century London.

2.1 Coffeehouses

[Figure 2 about here.]

In early 1650s England, coffeehouses emerged as a new public house, akin to the tavern, inn, or alehouse, where people could converse, exchange ideas, and build trust. What set them apart at first was simply the drink they offered: coffee. Like beer, wine, and ale, coffee encouraged conviviality, yet spared patrons the fog of intoxication. Physicians, writers, and politicians soon praised it as a sober stimulant that sharpened the mind and increased productivity, while alcohol was increasingly condemned as a threat to social order. Although the medical benefits of coffee remained uncertain, promotional tracts had promised mental clarity and self-control since well before the 1650s, and coffeehouses prospered on that promise.[1]

That appeal first took physical shape in 1652, when Pasqua Rosée, a Greek servant of the Levant Company, opened the first coffeehouse in London.[2] To attract customers, he circulated a handbill advertising the virtues of coffee, claiming the beverage "quickens the Spirits, and makes the Heart lightsome" and "is excellent to prevent and cure the Dropsy, Gout, and Scurvy." The idea spread quickly. By 1663, London already counted 82 coffeehouses. Admission cost a penny (about 0.3 USD in 2020) and a cup of coffee two pence, fees low enough to turn these rooms into democratic arenas for sober debate. Throughout the 1660s, coffeehouses became fixtures of urban life: Fellows of the Royal Society gathered at Garraway's, merchants met near the Royal Exchange, and their growing influence so alarmed Charles II that in 1666 he even considered banning them. Their blend of low cost and lively discussion earned them the contemporary nickname "penny universities," a phrase that underscored their reputation as informal centers of learning. In a 1675 London broadside, *The Triumphs of London*, poet Thomas Jordan vividly echoes this sentiment:

> So great an university,
>   I think there ne'er was any;
> In which you may a scholar be,
>   For spending of a penny.

Habermas (1991 [1962]) expands on this view by presenting English coffeehouses as the embodiment of the emerging "public sphere" in early modern Europe: bourgeois, urban spaces open to all, where rational, egalitarian debates on topics from literature to politics flourished, reason rather than social rank or political power settled matters,

[1] In *Theatrum Botanicum* (1640), the herbalist John Parkinson offered the first full English description of coffee, praising it for "strengthening a weake stomacke, helping digestion, and the tumours and obstructions of the liver and spleene, being drunke fasting for some time together."

[2] Pasqua Rosée's Coffee House is generally regarded as the first coffeehouse in Christian Europe (Ellis, 2004). Although some sources credit an Oxford establishment with this distinction, Ellis (2004) disputes the claim, contending that Rosée's London coffeehouse had no predecessor. The Oxford attribution rests on Anthony Wood's diary entries, written between 1654 and 1655, which report that a Jew named Jacob sold coffee near the Angel in 1650. Ellis (2004) reject this claim, maintaining that Rosée's establishment was the first true coffeehouse in Christendom.

and philosophical discourse escaped rigid hierarchies. The coffeehouse, in this account, became a seedbed of Enlightenment ideals. Mokyr (2005) strikes a similar note, portraying the coffeehouse as a natural gathering point for polymaths and practical men alike, a locus where disciplines intertwined and a culture of improvement and empiricism took hold. "Much of the improved access to useful knowledge," he writes, "took place through informal meetings, in coffeehouses and pubs, improvised lectures, and private salons."

Understanding the social impact of coffeehouse culture requires comparison with earlier norms. As Cowan (2005) explains, coffeehouses replaced alcohol-centered public houses as key venues for elite exchange. In early seventeenth-century England, the virtuosi had gathered in aristocratic great houses, where interactions were formal and exclusive. Coffeehouses, by contrast, encouraged informal, cross-class dialogue. While they did not replace great houses as centers of virtuosi activity, they challenged traditional pathways to intellectual recognition. For less wealthy aspiring virtuosi, coffeehouses provided unprecedented access to information and social networks.

2.2 Diffusion, Reception, and Clientele

The spatial diffusion of coffeehouses within London followed the city's commercial and institutional geography (Cowan, 2005, pp. 152–192). Early establishments clustered near the Royal Exchange, Fleet Street, and the Inns of Court, just beyond the western wall of the City, where merchants, lawyers, and printers intersected. From these nodes, coffeehouses expanded into nearby neighborhoods as proprietors captured foot traffic and repeat customers. By the early 1660s, coffeehouses were a stable feature of the metropolitan landscape, often differentiated by clientele, profession, or politics. Diffusion reflected integration into existing circuits of movement, credit, and information.

Public reception reflected both the coffeehouse's role as a site of collective discussion and its positioning as a sober alternative to traditional public houses (Cowan, 2005, pp. 45–46). Whether coffeehouses were uniformly sober in practice is secondary. What mattered was that they were marketed and widely understood as spaces of sobriety, in contrast to taverns, inns, and alehouses. This framing shaped patron expectations and official scrutiny. The concentration of news, opinion, and rumor drew attention from authorities during periods of political instability in the late seventeenth century. Regulatory efforts focused on publicity rather than consumption (Cowan, 2005, pp. 193–224). Satire and polemic framed coffeehouses as idle or pretentious, but such criticism did not slow their expansion.

Coffeehouse clientele was broad but bounded (Cowan, 2005, pp. 1–15). Early patrons included natural philosophers and merchants familiar with coffee through contact with the Ottoman Empire, but coffeehouses quickly expanded to serve a wider urban audience. Participation required modest means, literacy, and conversational competence, excluding much of the urban poor. Women were largely absent as regular patrons, though present as proprietors or workers. Before the 1650s, early modern scientists had limited ties to merchants, and historical evidence suggests that the emergence of coffeehouses was not driven by changes in scientific or intellectual life.[3] Coffeehouses thus connected commercial, intellectual, and technical communities, explaining why merchant-run venues became spaces where scientific problems, methods, and reputations could circulate beyond formal institutions.

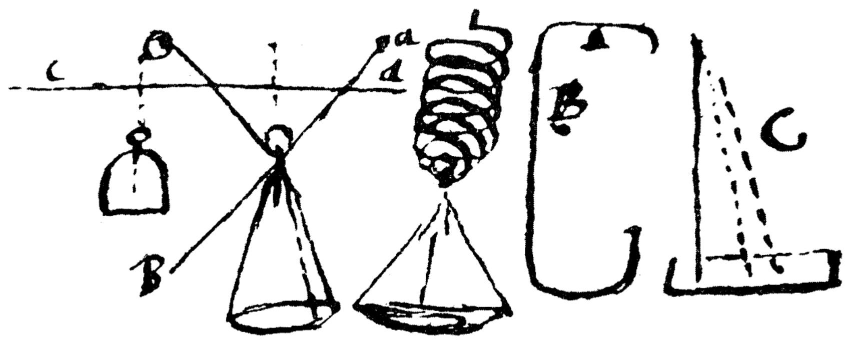
2.3 Relation to Science

In January 1684, at Garraway's Coffee House in London, Robert Hooke, Christopher Wren, and Edmund Halley met to discuss the problem of planetary motion, specifically the nature of the force that keeps planets in orbit (Mount, 2021, pp. 145–146). Hooke claimed to have discovered the inverse-square law but did not provide a demonstration. Wren offered a prize for a proof, which Hooke failed to deliver. Halley, seeking a resolution, visited Isaac Newton in Cambridge later that year. Newton replied he had already solved the problem and subsequently sent Halley a manuscript, *De motu corporum in gyrum*. This work became the foundation for his *Philosophiæ Naturalis Principia Mathematica*, one of the most influential books in the history of science.

The episode illustrates how coffeehouses facilitated critical scientific dialogue and major advancements. From their early beginning, coffeehouses served as public spaces of exchange, unlike the exclusive Royal Society. Hooke's diary is filled with references to various London coffeehouses, which he frequented almost daily. As Iliffe (1995) demonstrates, beginning in the early 1660s, Hooke used these spaces to build networks, disseminate knowledge, and conduct business. His diary reveals that coffeehouses

[3] Among 30 so called mathematical practitioners described in Section 3 for whom detailed network data are available in the Oxford Dictionary of National Biography, only 9 of 348 recorded connections are to merchants, and only 6 practitioners had any such connection. By contrast, early coffeehouse proprietors were embedded in mercantile networks from the outset. Thomas Garraway and Edward Lloyd established coffeehouses near the Royal Exchange and transformed them into centers for auctions, shipping intelligence, and financial exchange, while Pasqua Rosée's first coffeehouse emerged directly from Levant Company connections. This contrast suggests that commercial and technical communities initially belonged to distinct social cultures, and that coffeehouses helped bridge, rather than reflect, an existing integration between them.

often served as informal precursors to university seminars, providing scientists with opportunities to present their ideas, engage in debate, and receive feedback. One such instance occurred on August 21, 1678, after a meeting with Christopher Wren at Man's Coffee House, when Hooke recorded the following drawing and notes:



> "Discoursd much about Demonstration of spring motion. He told a pretty thought of his about a poysd weather glasse as, at B. I told him an other as C. I told him my philosophicall spring scales as D. He told me his mechanick rope scale as G, wherein the weights of the scale are found by the intersection of Cd by ab."

Stewart (1999) more broadly documents that coffeehouses set aside rooms for meetings, lectures, and discussions, serving as important sites for exchanging knowledge and print materials. They hosted lectures and demonstrations in natural philosophy, sometimes with a formality comparable to that of formal schools, the Royal Society or Gresham College. Stewart (1999) characterizes coffeehouses as "other centres of calculation," frequently attended by key figures of the Royal Society, underscoring their role in knowledge production and circulation.

3. DATA

We assemble a unique panel dataset of 162 London jurisdictions by year over the 17th century, combining the geographic distribution of coffeehouses with data on scientific activity. Below, we describe the data sources and our dataset.

Coffeehouses. Our coffeehouse data is sourced from *London Signs: A Reference Book of London Signs From Earliest Times to About the Mid-Nineteenth Century* by Lillywhite (1972), a comprehensive compilation of primary and secondary sources from the Guildhall Library.[4] This volume incorporates and expands upon the author's earlier work *London Coffee Houses: A Reference Book of Coffee Houses of the Seventeenth, Eighteenth and Nineteenth Centuries* (Lillywhite, 1963), which accounts for approximately 90.2% of the coffeehouses in our dataset. Together, these works painstakingly document all known London coffeehouses from the seventeenth to nineteenth centuries, drawing on materials such as tokens, signboards and the historical records documenting them,[5] lost and reward notices, business directories, newspapers, advertisements, letters, reference works, and diaries. Lillywhite (1963) lists 2,034 entries, with 1,925 including addresses, and provides names, years of mention, and historical details.[6] Lillywhite (1972) adds 220 more coffeehouses to the dataset, including addresses for 199 of them, and provides information on the same variables as in his earlier work, excluding historical details.[7] Together, these two works form the foundation of our coffeehouse dataset.

To our knowledge, Lillywhite (1963, 1972) remains the most comprehensive source on early modern London coffeehouses, documenting far more than just the notable ones. The significance of Lillywhite (1963) is particularly recognized by leading English coffeehouse historians: Ellis (2006) treats it as *the* major reference work; Pincus (1995) calls it an "encyclopedic list of coffeehouses"; and Cowan (2007) describes it as an "enormously valuable catalogue of references to London coffeehouses."

However, the completeness and accuracy of our source are not guaranteed. First, we merge duplicate entries: if the same coffeehouse appears under different names, Lillywhite (1963, 1972) lists each separately with its own history and notes any overlaps, which we use to consolidate them.[8] Second, we identify and remove a few non-coffeehouse public houses, mainly old taverns and inns, included by Lillywhite (1963, 1972) for contextual

[4]The Guildhall Library, or the Library of London History, is a public reference library in London specializing in the history of London.

[5]Before the London Streets Act of 1762, buildings in London were identified by house signs rather than building numbers. These signs often indicated the type of social institution on the premises. Historical records of these signs form the basis of Lillywhite (1972).

[6]Figure D.1 shows an excerpt from Lillywhite (1963). Entry 656 details "Jonathan's Coffee House," located at "Exchange Alley, Cornhill, No. 20," first mentioned in "1680–1684," along with its background.

[7]Figure D.2 shows an excerpt from Lillywhite (1972). Entry 13056 refers to the "Sandford Coffee House" on Lawrence Lane in Cheapside ward, a 1600s coffeehouse not listed in Lillywhite (1963), whose coffeehouses are covered under entries 1 to 2034. Entry 1163, then, corresponds to a coffeehouse already documented in Lillywhite (1963).

[8]For example, "The New Bagnio" (entry 1845) also appears as "Turk's Head Bagnio" (entry 1957). In general, coffeehouses were known by various names based on location (e.g., "St. Dunstan"), sign (e.g., "Turk's Head"), or proprietor (e.g., "Bowman"), and Lillywhite (1963) consolidates these by cross-referencing them.

completeness.[9]

Third, we here assess the completeness of the resulting dataset by comparing the number of recorded coffeehouses with figures from the 1663 magistrate survey and the 1692–1698 poll tax returns cited by Cowan (2005). The 1663 survey lists 82 coffeehouses in the City of London, while Lillywhite (1963, 1972) notes 31.[10] The 1692–1698 poll tax lists 90 coffeehouses in 13 of 26 wards for which there is data, while 1701 administrative records note 34 more in 7 of the 13 previously missing wards, giving a total of about 124 coffeehouses in the late 17th century, slightly above our estimate of 113 for 1692–1698 based on Lillywhite (1963, 1972). This indicates Lillywhite (1963, 1972) covers late 17th-century coffeehouses more comprehensively than mid-century ones, likely due to record losses from the 1666 Great Fire. Observation delays contribute too; "Henry Willington" in "Dowgate" is listed in the 1663 survey, with "H. Wellington" in "Dowgate" first noted in a 1665 token by Lillywhite (1963, 1972). Likewise, Lillywhite (1963, 1972) may have stopped observing a coffeehouse before 1663. To facilitate a broader 1663 comparison, we can allow for a margin of error: allowing a margin of ±1 year around 1663 results in 37 coffeehouses recorded by Lillywhite (1963, 1972), ±2 years in 42, and ±3 years in 71.[11]

Fourth and finally, Mackie (2013) attempts to fill the gaps in Lillywhite (1963) by using modern searchable databases such as Electronic Enlightenment, Old Bailey Online, and British Periodicals. However, he uncovers only a few additional coffeehouses, most of which are more dubious and proletarian.[12]

[9] For example, "Pope's Head Tavern" (entry 1870) is "included by reason of its site and close connexion with coffee-houses" (Lillywhite, 1963, p. 724).

[10] Notably, Lillywhite (1963, 1972) does not mention this source, likely because the survey lists coffeehouses only by owner and ward, without names or specific addresses.

[11] The sharp increase under the ±3 margin is due to a 1666 spike (cf. Figure E.6), likely reflecting the extensive documentation of properties affected by the Great Fire of 1666, which destroyed nearly all of London within the city walls.

[12] We conducted a similar search using *Seventeenth and Eighteenth Century Nichols Newspapers Collection* and *Seventeenth and Eighteenth Century Burney Newspapers Collection*, focusing on mentions of "coffee" and its variants. The results indicate that coffeehouses are mentioned less frequently than expected based on Lillywhite (1963, 1972). When "coffee" is associated with a location not listed in Lillywhite (1963, 1972), it is often unclear whether the venue was a coffeehouse or merely an inn or tavern. This underscores the need for caution in identifying historical coffeehouses from such sources and reinforces the conclusion that it is difficult to improve upon Lillywhite (1963, 1972).

Although it is often claimed that thousands of coffeehouses existed in London by the early 18th century, or even by the late 1670s (Iliffe, 1995), we could not identify more than a an additional handful from the 17th century. Reports of 2,000–3,000 coffeehouses in that period rely only on secondary sources, lack primary evidence, and are surely exaggerated. The first reliable figure comes from 1739, when topographer and

Figure E.6 shows the number of coffeehouses in 17th-century London in our dataset. The variation over time appears to align consistently with historical events. The first two coffeehouses opened in 1652. The number rose sharply from 14 to 26 in 1660, following Charles II's return and the subsequent increase in resettlements. The Great Fire of 1666 destroyed many coffeehouses and their records; however, growth resumed after the Rebuilding of London Acts of 1666 and 1670. The upward trend continued throughout the century.

To understand where these openings occurred, Figure 3 shows the decade in which the first coffeehouse opened in each London jurisdiction by 1660, tracing their spread throughout the 17th century. The earliest coffeehouses of the 1650s appeared near centers of intellectual and commercial exchange, such as Gresham College and the Royal Exchange. One to two decades later, new openings clustered around Paternoster Row, a center of knowledge production with a high concentration of printers, publishers, and booksellers. Some areas outside the city walls also saw early openings in the first two decades. In the decades that followed, the spread of coffeehouses does not appear to cluster around any of the three key locations marked on the map.

[Figure 3 about here.]

Mathematical Practitioners. Our data on mathematical practitioners (men who applied mathematics in teaching, writing, instrument making, and other technical occupations) are based on the seminal work of Taylor (1954), who pioneered the study of early English applied mathematicians and instrument makers.[13] Based on a variety of sources (contemporary works and diaries, bibliographical works, museum catalogs, archival manuscripts, etc.), she compiled a collective biography of 584 mathematical practitioners active in England from 1507 to 1714. Since its publication, "[f]ew new [mathematical] practitioners have been added, and rarely has the category itself been seriously challenged" (Cormack et al., 2017). As this paper focuses on seventeenth-century London, we restrict the data to the 261 mathematical practitioners precisely located in London whose flourishing began before 1700.[14] Appendix Figure A.1 shows that roughly 60 percent of mathematical practitioners were active in London during the seventeenth century.

historian William Maitland counted 551 coffeehouses in his History of London, compiled over 11 months. For further discussion, see Ellis (2006, pp. xxix–xxx).

[13]Figure D.3 presents an excerpt from Taylor (1954).

[14]Of the 312 Londoners, 1 is dated simply to the "seventeenth century," 31 have flourishing start dates after the 1600s, and 19 can only be identified as from "London."

Each biography gives us the practitioner's first and last names, dates of flourishing, locations of activity (i.e., workplaces), types of activity (e.g., instrument making, teaching, researchh), and connections to other practitioners, as recorded by Taylor (1954).[15] In our sample of 261 Londoner practitioners, 139 are scientific instrument makers, 56 are mathematical teachers, and 68 are active in other mathematical capacities (e.g., mathematicians).

Mathematical Practitioner Network. Our primary data on connections among mathematical practitioners comes from Taylor (1954), who documents relationships noted in individual biographies. These connections span a variety of forms, including "friends," "master," "received advice from," "associated with," "visited," "employed or consulted," "corresponded with," and "mentioned by." Accordingly, we consider practitioners connected whenever there is historical evidence of social or intellectual association. In other words, these connections indicate a general likelihood of influence or interaction.

We expand the network using the *Oxford Dictionary of National Biography* (ODNB), identifying entries for 107 of the 290 practitioners in our dataset. These entries are manually linked to the *Six Degrees of Francis Bacon* (SDFB) database, which uses machine learning to infer influence or interaction among early modern individuals based on mentions in ODNB biographies (Warren et al., 2016).[16] This approach uncovers additional connections of the same type not present in Taylor (1954), bringing the total to 1,192 links, of which 372 occur only in the SDFB and 296 only in Taylor (1954).

The available sources do not provide precise timing for when individuals became connected, so we cannot determine when any specific relationship began. The direction of influence is also uncertain. We therefore treat all links as undirected, interpreting them as evidence that two individuals were socially or intellectually associated at some point. Formally, we set $g_{ij} = 1$ if practitioners i and j are ever connected in this sense, and 0 otherwise. To capture variation over time, we define $g_{ijt} = 1$ if $g_{ij} = 1$ and both i and j are active in period t, and 0 otherwise. This measure represents the maximum possible connectivity under the assumption that links require both individuals to be active.[17]

[15] Dates of flourishing generally indicate the period during which a mathematical practitioner was active. However, for the 65 practitioners for whom Taylor (1954) provides birth dates instead of dates of flourishing, we define flourishing as spanning from the year the individual turned 21 to the year of death or the last year of flourishing, following the implicit chronological order of biographies in Taylor (1954).

[16] The SDFB database is available at http://www.sixdegreesoffrancisbacon.com/.

[17] The set of practitioner dyads (i, j) for which $g_{ij} = 1$ includes biological ties such as "father" and "son" recorded by Taylor (1954). Restricting the analysis to within-time connectivity, as defined by g_{ijt}, implicitly excludes such ties, since $g_{ij} = 1$ does not necessarily imply $g_{ijt} = 1$ for some t, and the fathers and sons in our

Scientific Instrument Shops. Our data on scientific instrument shops are based on an extract from an updated and restructured version of a database originally developed by Gloria Clifton and colleagues at the National Maritime Museum and Royal Observatory, Greenwich in the 1980s and 1990s.[18] This version was produced through the project *Tools of Knowledge: Modelling the Creative Communities of the Scientific Instrument Trade, 1500–1914*, which brings together curators, historians, and digital humanities experts from five institutions.[19] Our dataset covers every known scientific instrument shop in London through the 1690s, listing each maker's name, shop address, and active dates. In the seventeenth century, we identify 233 makers operating 371 shops in total.[20]

Appendix Figure A.1 shows that roughly 90 percent of seventeenth-century scientific instrument makers were active in London. Appendix Figure A.2 shows that production was dominated by practical instruments, such as dividers, sectors, and compasses, until the 1660s, when experimental instruments, including microscopes and air pumps, began to expand rapidly.

Other. We also gather data on additional variables to compare groups, test the robustness of our results, and explore potential mechanisms. See Table D.1 for these variables and their data sources.

Geocoding. Our data include historical addresses that require geolocation for empirical analysis. To determine their coordinates, we manually map each address onto a contemporary Google Map of Greater London using digital historical maps and gazetteers.[21] These coordinates are then spatially joined with a shapefile from Cummins et al. (2016), which

dataset are not active in the same period. Hence, we restrict attention to non-familial connections.

[18]The only part of the original database that is publicly available appears in Clifton (1995). An excerpt is shown in Figure D.5, which includes, for example, a record of "ALLEN Elias" opening a shop in 1606 in "Blacke Horse-ally, neere Fleetbridge, London."

[19]The extract was generously provided by Rebekah Higgitt of the National Museums of Scotland.

[20]Note that our sample of mathematical practitioners from Taylor (1954) includes only 139 scientific instrument makers. This stems from Taylor (1954), an earlier work that served as a source for Clifton (1995), which can be regarded as a partial follow-up. Not all instrument makers in Taylor (1954) appear in Clifton (1995), likely due to minor differences in classification. For instance, Christopher Wren (1632–1723) is listed as an instrument maker in Taylor (1954) but not in Clifton (1995). We do not merge the two datasets, as they are conceptually distinct: Taylor (1954) records dates of flourishing, whereas Clifton (1995) emphasizes dates of activity and shop operations. Accordingly, our analysis of scientific instrument shops relies exclusively on Clifton (1995). Nevertheless, upon matching the two, we find that 100 instrument makers active before 1700 appear in both Taylor (1954) and Clifton (1995).

[21]Appendix F details the geocoding procedure and provides examples.

represents the jurisdictions of London in 1660. The shapefile delineates 162 jurisdictions: 113 parishes within the City of London (including 97 inside the city walls), 20 adjacent liberties or extra-parochial areas, 20 parishes in Middlesex and Surrey, and 9 parishes in Westminster. This procedure enables us to assign each address both geographic coordinates and its corresponding jurisdiction.

4. EMPIRICAL ANALYSIS

4.1 Empirical Strategy

To estimate effects on scientific activity, we exploit the staggered introduction of coffeehouses in seventeenth-century London starting in 1652. Specifically, we use an event study model to examine scientific activity before and after the first coffeehouse opens in a jurisdiction. We focus on first openings because later openings are unlikely to be exogenous.

The timing of first coffeehouse entry was driven by supply and demand forces unrelated to scientific activity. Coffeehouses were founded by middling merchants and traders motivated by curiosity or commerce rather than science, and scientists and merchants largely occupied separate social and intellectual spheres prior to 1652.[22] In addition, the rapid expansion of coffee supply beginning in 1660 generated widespread coffeehouse growth across London unrelated to increased demand for science.[23] At the same time, widespread demand from merchants, aristocrats, politicians, virtuosi, and other non-scientists suggests that initial locations reflected geography and commercial activity rather than pre-existing scientific communities.

As descriptive evidence, Figure A.7 presents normalized differences between jurisdictions that did and did not receive a coffeehouse. Treatment jurisdictions were poorer in 1582 but had similar wealth to controls by the 1640s and were comparable in population density and early indicators of financial capital, such as pre-1650 letter densities of scientists and goldsmiths. The largest differences appear in broader social and economic activity. Treated jurisdictions had higher densities of tradesmen's tokens, signs, taverns and inns, and booksellers, and were located closer to major London centers such as the Royal Exchange,

[22]On the economic status of coffeehouse keepers, see Appendix Table B.1. Before 1650, only 6 of 30 mathematical practitioners in the ODNB with measurable social ties had any connection to a merchant, accounting for just 9 of their 348 recorded links.

[23]Coffee supply grew rapidly after the first official East India Company coffee sale in 1660. See Appendix Table B.2.

Gresham College, Paternoster Row, and Cheapside.

Nonetheless, the event study model used to estimate effects does not require that unobserved factors correlated with scientific activity be uncorrelated with treatment. Identification instead relies on a parallel trends assumption and accounts for baseline differences between treated and control areas by comparing changes in scientific activity before and after the opening of the first coffeehouse. Concretely, we estimate the following unconditional difference-in-differences model with multiple time periods:

$$y_{it} = \alpha + \sum_{g=1650}^{1690} \sum_{s=1600}^{1690} \beta_{gs} \, \mathbb{1}[s = t] \, \mathbb{1}[g = E_i] + \gamma_i + \delta_t + \epsilon_{it}. \tag{1}$$

Here, y_{it} denotes the number of mathematical practitioners, or scientific instrument shops, in jurisdiction i at decade t. γ_i and δ_t denote jurisdiction and decade fixed effects that control for local time-invariant differences and London-wide shocks and trends. E_i denotes the decade in which the first coffeehouse opened in jurisdiction i.[24] The coefficient β_{gs} captures the average treatment effect of coffeehouse entry relative to the never-treated counterfactual, $E_i = \infty$. ϵ_{it} is an error term with a constant mean conditional on observables. Standard errors are clustered by jurisdiction.

Dynamic treatment effects are the estimands of interest. We estimate these effects following Wooldridge (2023) after estimating equation (1) by OLS. We first predict outcomes using the estimated coefficients and fixed effects, yielding $\widehat{y}_{it}$. We then impute the untreated potential outcome $y_{it}(\infty)$ as $\widehat{y}_{it}(\infty)$ by predicting from equation (1) with all coefficients except the intercept and fixed effects set to zero. The implied observation-specific treatment effect is $\widehat{\tau}_{it} \equiv \widehat{y}_{it} - \widehat{y}_{it}(\infty)$. Estimates of the dynamic treatment effects are then obtained by averaging $\widehat{\tau}_{it}$ across jurisdictions observed h years after the first coffeehouse opens,

$$\widehat{\tau}_h \equiv \frac{1}{|I_h|} \sum_{i \in I_h} \widehat{\tau}_{i,E_i+h}, \tag{2}$$

where I_h denotes the set of jurisdictions observed in period $E_i + h$. We plot dynamic treatment effects relative to the decade immediately preceding treatment, $\widehat{\tau}_h - \widehat{\tau}_{-10}$.

The dynamic treatment effect estimates and standard errors are numerically equivalent to those from the long-difference estimators of Callaway and Sant'Anna (2021). We nonetheless adopt the approach of Wooldridge (2023) because it is more flexible and

[24] Appendix Figure A.3 shows the rollout of treatment across jurisdictions. Appendix Figure A.5 shows coffeehouse counts by event time relative to the first coffeehouse entry.

accommodates count outcomes with many zeros through a Poisson specification with an exponential conditional mean:[25]

$$y_{it} = \exp\left(\alpha + \sum_{g=1650}^{1690} \sum_{s=1600}^{1690} \beta_{gs}\, \mathbb{1}[s=t]\, \mathbb{1}[g=E_i] + \gamma_i + \delta_t + \epsilon_{it}\right). \tag{3}$$

Under this specification, the parallel trends assumption requires treated and control groups to experience the same percentage changes rather than level changes in outcomes.

4.2 Mathematical Practitioners and Scientific Instrument Shops

Results from estimating equation (1) for mathematical practitioners and scientific instrument shops are presented in Figure 4. The validity of these results is supported by flat pre-trends.[26] Panel A shows a persistent increase in the number of mathematical practitioners following the opening of the first coffeehouse. In the decade prior to entry, the 61 treated jurisdictions averaged 0.62 mathematical practitioners. In the decades after entry, this number increased by an average of 0.68, roughly doubling relative to that baseline. Panel B examines the effect on scientific instrument shops and again shows a persistent increase. These estimates correspond to a nearly fivefold increase, from a baseline of 0.33 in the decade before treatment to a post-treatment level of 1.57.

[Figure 4 about here.]

Despite data scarcity, these effects are precise and statistically significant at conventional levels, with the exception of the first decade after entry for scientific instrument shops. The magnitudes are substantial. In aggregate terms, the estimates imply that first coffeehouses account for 42 additional mathematical practitioners and 76 additional scientific instrument shops in London.[27] These increases account for 61 percent of the rise in mathematical practitioners between the 1640s and the 1690s and 55 percent of the corresponding increase in scientific instrument shops. As shown in subsequent subsections, these findings are preserved across a host of robustness checks.

[25]This avoids common problems of linear models, including negative predictions, reliance on a linear parallel trends assumption, and the need for arbitrary transformations such as the inverse hyperbolic sine (Roth and Sant'Anna, 2023; Wooldridge, 2023; Chen and Roth, 2024).

[26]We fail to reject the null that all pre-treatment effects are jointly zero ($p = 0.31$ for mathematical practitioners and $p = 0.29$ for scientific instrument shops).

[27]The standard errors of these estimates are 13 and 18, respectively.

It is important to note that the treatment and the two outcome measures are drawn from three largely independent sources. The consistent positive effects across outcomes thus provide independent corroboration that coffeehouses spurred scientific activity, rather than reflecting an artifact of a single source. Moreover, the results are unlikely to be driven by observability bias. One concern is that applied scientists who spent more time in coffeehouses may have been more likely to appear in the historical record. While this concern may apply to the outcome measuring the number of mathematical practitioners, which is largely based on historically notable individuals, it does not apply to scientific instrument shops. That outcome is constructed from an exhaustive collective biography of otherwise unnotable makers identified through signatures on extant instruments in museum collections, supplemented by guild records, trade cards, and other archival sources. It is implausible that coffeehouse presence affected the survival of such sources into the present.

4.3 Coffeehouse Locations

A potential concern is that the timing of first coffeehouse entry may not be exogenous to local conditions relevant for scientific activity and may therefore have coincided with unobserved shocks. While the historical context suggests that entry was driven largely by non-scientific supply and demand forces, this concern nonetheless warrants empirical scrutiny. Below, we examine the determinants of coffeehouse locations, test whether placebo locations yield similar reduced-form effects, and assess whether openings coincided with outcomes unlikely to be affected by them or that might independently influence local scientific activity.

Covariate Adjustment. Our results rely on the parallel trends assumption, which cannot be directly tested. If observable factors related to scientific activity differ systematically across groups, this assumption may not hold after treatment. To assess this concern, we compare baseline characteristics across jurisdictions. Appendix Figure A.7 reports normalized mean differences between ever-treated and never-treated groups. Following Imbens and Rubin (2015, p. 277), absolute differences greater than 0.25 indicate meaningful covariate imbalances. Several pre-treatment measures show imbalances: the median tax paid in 1582 and the densities of tradesmen's tokens issued between 1648 and 1651, taverns and inns, signs, and booksellers in the 1640s. The 1582 tax difference is likely minor, since a temporally closer indicator of wealth, the share of substantial households in 1638, is balanced.

To correct the remaining imbalances, we estimate the propensity score of ever being treated using 1640s measures of tokens, signs, and booksellers. After applying inverse probability weights, all covariate differences fall below 0.25 except for the 1582 median tax, as shown in Appendix Figure A.7. The weighted estimates in Appendix Figure A.8 closely align with our baseline results. In Appendix Figure A.9 and A.10, we also perform a conventional regression adjustment and, following Baker et al. (2025), a doubly robust adjustment using the same covariates. Both yield consistent results. Overall, our findings are robust to alternative adjustment methods.

Placebo Coffeehouses. We next assess whether the main findings could arise by chance. We conduct a randomization inference exercise by constructing 1,000 placebo samples. In each draw, we randomly assign treatment to 61 of the 162 jurisdictions, matching the size of the treated group, and randomly assign each treated jurisdiction a decade of first coffeehouse entry drawn uniformly from the 1650s to the 1690s. The remaining jurisdictions are coded as never treated. We then re-estimate the event study for each placebo sample.

Appendix Figure A.11 reports the results. For both outcomes, the post-treatment effects based on the historical timing of first coffeehouses lie in the extreme upper tail of the placebo distributions, while the pre-treatment effects are centered near the medians. These patterns indicate that the observed effects are highly significant and unlikely to arise from random treatment timing or spurious entry patterns.

Placebo Outcomes. Because coffeehouses made up only a small share of all establishments, we do not expect them to directly affect the number of taverns, inns, or other types of signs. Nor do we anticipate any direct influence on general non-scientific correspondence within the so-called Republic of Letters or on population density. Thus, any correlation between coffeehouse openings and these variables would likely reflect unobserved differences between jurisdictions with and without coffeehouses. Appendix Figures A.12, A.13, A.14, and A.15 show that the estimated effects on these placebo outcomes are statistically insignificant and economically small.

4.4 Robustness

We conduct several robustness checks, all of which yield results consistent with the main findings. Taken together, the evidence points to a robust positive effect of coffeehouses on scientific activity in seventeenth-century London and supports the validity of the event study design.

Great Fire of London. The Great Fire of London in 1666 was a major exogenous shock that reshaped the economic geography of London by displacing poorer residents, concentrating wealth in rebuilt areas, and shifting commerce toward wealthier districts (Ager et al., 2025). Because these changes likely affected both the timing and location of coffeehouse entry and the demand for mathematical practitioners, controlling for the fire is essential to avoid confounding. The fire may also have introduced non-classical measurement error by biasing the measurement of treatment adoption through the loss of historical records. Accordingly, we re-estimate equation (1) using a nonparametric function of time interacted with an indicator for exposure to the Great Fire. Specifically, we add a fixed effect $\zeta_{tG(i)}$ to the exponential function in equation (1), where $G(i)$ denotes whether jurisdiction i was exposed to the Great Fire.[28] Appendix Figure A.16 shows that the main results remain robust when this control is included.

London Wall. The London guilds controlled nearly all trade within the city walls, making guild membership essential for legitimate commerce. Because no guild existed for the emerging craft of scientific instrument-making, artisans either worked outside the walls or joined existing guilds. Most chose the latter (Cormack et al., 2017, p. 79). Consequently, unobserved differences between areas inside and outside the walls may influence where scientific instrument shops and coffeehouses, given higher residential rents within the walls (Baer, 2010), were established. To address this, we control for non-parametric time trends separately for locations inside and outside the London Walls. Appendix Figure A.17 shows that the main results remain robust when this control is included.

Spatial Spillovers. The opening of a coffeehouse may create spatial spillover effects on nearby control units. If the average spillover effect on these controls is negative, the total average treatment effect will be overestimated; if positive, it will be underestimated (Butts, 2023).

To assess the magnitude of these spillovers, we estimate a multi-period difference-in-differences model that accounts for spillovers by redefining event timing accordingly. Formally, we assess sensitivity to the treatment radius r by defining jurisdiction i as first

[28]This specification nests the case with different linear pre- and post-treatment time trends interacted with the exposure indicator.

treated in period t if and only if (i) the first coffeehouse within i was established in t, and (ii) no coffeehouse was established before t within an r-kilometer radius of the centroid of i. This approach compares points just near the treatment to those far enough away.

The results of this exercise are presented in Appendix Figure A.18. We find positive spatial spillovers for mathematical practitioners extending up to 700 metres, implying that our main estimate may understate the true effect by roughly half, though the precise magnitude is uncertain. In contrast, we detect no spatial spillovers for scientific instrument shops.

Temporal Granularity. The main specification is at the decade level, chosen to minimize measurement error in event timing. Event timing is based on the first recorded mention of a coffeehouse, which may differ from its actual opening year. Using a longer time frame reduces measurement error but introduces coarser temporal aggregation, potentially masking small yet meaningful deviations that indicate non-parallel trends or anticipatory effects. In other words, longer intervals may increase the likelihood of unobserved drivers of scientific activity coinciding with coffeehouse openings. To assess sensitivity to time-frame length, we re-estimate equation (1) using two-, three-, and five-year intervals instead of decades.[29] This tests whether results depend on the chosen temporal aggregation and helps identify non-parallel trends or anticipatory effects that may be obscured in decade-long windows.

In Appendix Figure A.20, we re-estimate the main specification using different time spans.[30] The pre-treatment parallel trends assumption holds across all spans, with no evidence of anticipatory effects, and the qualitative and quantitative results remain unchanged.

Spatial Granularity. The main specification operates at the jurisdiction level, a natural geographic unit because many historical addresses reference the nearest church parish, but some records provide more precise locations such as streets, alleys, or signboards, allowing analysis at finer spatial resolutions and the construction of alternative fixed-effect sets to better control for unobserved factors.

To this end, we re-estimate equation (1) using a hexagonal partition of London, shown in

[29] An annual specification is infeasible due to limited variation in outcomes after controlling for jurisdiction and year fixed effects.

[30] Outcome variation is insufficient to estimate the specification annually, and for scientific instrument shops, even biannually.

Appendix Figure A.21, which divides the city into 15,351 hexagons of 5,000 m2 each, with results reported in Appendix Figure A.22. The baseline findings hold and are qualitatively unchanged.

Adding jurisdiction-by-decade fixed effects, which exploit only within-jurisdiction variation over time, preserves the qualitative patterns but reduces the magnitude and significance of the effect of coffeehouses on the number of mathematical practitioners, while the results for scientific instrument shops are largely unchanged. However, although we have precise geographic coordinates for each historical address, some addresses correspond only to church locations, so jurisdiction-by-decade fixed effects may absorb much of the relevant spatial variation across church jurisdictions.

Selective Migration. A possible concern is that our main result reflects the movement of existing mathematical practitioners rather than the emergence of new ones. To test this, we focus on first-generation scientific instrument shops only, excluding subsequent openings by the same maker. The results, shown in Appendix Figures A.23 and A.24, remain qualitatively and quantitatively consistent with our main findings.

Selection into the Historical Records. Our outcome measures face two potential sources of error. First, the exact date or location of a mathematical practitioner or shop's establishment or period of activity may be uncertain. Second, there may be a mechanical link between coffeehouse activity and the likelihood of being recorded in historical sources such as the diaries of Samuel Pepys or Robert Hooke, both cited by Taylor (1954).

The first issue cannot be fully resolved within our data, as no better records of mathematical practitioners' dates or locations exist. However, our data on scientific instrument shops largely derive from museum catalogues of signed instruments, which are unlikely to be biased by coffeehouse attendance. To address the second concern, we restrict the analysis to the 180 of 266 instrument makers who can be linked to London guilds with well-preserved records. Limiting the sample to these makers, while excluding those outside the guild system, does not alter the qualitative results, as seen in Appendix Figure A.25. Since many guild records were destroyed in the Great Fire of 1666, we also control for this loss as an additional robustness check in Appendix Figure A.26; the results are barely affected.

In sum, the observed relationship between coffeehouses and applied scientific activity does not appear to result from selective visibility in historical records.

Never- and Not-Yet-Treated as Control. In Appendix Figure A.27, we employ the conventional event study design from Callaway and Sant'Anna (2021), using the never-treated group as the control group and examining long differences relative to the time period immediately preceding the intervention. The results remain qualitatively unchanged.

Definition of Treatment as Non-Absorbing. Our main specification defines treatment as the first decade in which a coffeehouse opens. We do not, however, claim that effects differ under a non-absorbing, decade-by-decade measure of coffeehouse presence. Accordingly, Appendix Figure A.28 applies the method of de Chaisemartin and d'Haultfoeuille (2024) to estimate the effect of exposure to the presence versus absence of coffeehouses over multiple periods, using the treatment variation visualized in Appendix Figure A.4. The results closely match those based on the first-coffeehouse treatment.

Closing Coffeehouses. The method of de Chaisemartin and d'Haultfoeuille (2024) also enables trend analysis in scientific activity after closing all coffeehouses in areas that previously had at least one. As shown in Appendix Figure A.29, coffeehouse closures have a small but measurable negative effect on scientific activity.

Group-Specific Trends. Following Goodman-Bacon (2021), we test robustness to adjusting for group-specific linear trends in outcomes. Appendix Figure A.30 shows event study estimates after detrending outcomes within treatment cohorts using only observations before treatment. This adjustment removes differential pre-trends across jurisdictions, yielding estimates that better capture changes associated with coffeehouse entry rather than broader secular movements. The results remain qualitatively similar to the main estimates in magnitude and significance, although confidence intervals are wider.

Leave-One-Out Sensitivity Check. Appendix Figure A.31 shows a leave-one-out sensitivity check, where we re-estimate the results after removing each jurisdiction in turn. The findings remain consistent, indicating that no single jurisdiction drives the main results.

Specification Checks. Appendix Figures A.32 and A.33 show that the results are robust to alternative functional forms, including a Poisson specification as in equation (3) and the inverse hyperbolic sine transformation.[31]

[31] The inverse hyperbolic sine transformation accommodates right-skewed count outcomes and zero values without ad hoc adjustments.

Spatial Correlation. To account for arbitrary spatial and temporal correlation in the error terms, we compute Conley standard errors (Conley, 1999), which correct for heteroskedasticity, autocorrelation, and spatial dependence using a linear distance-decay function with a specified cutoff. Appendix Figure A.34 shows that the results are robust to distance cutoffs of 0.25, 0.5, 1, and 2 kilometers.

5. MECHANISMS

How can we explain the link between coffeehouses and scientific activity in seventeenth-century London?

5.1 Penny Universities

One potential mechanism through which coffeehouses increased scientific activity is by lowering barriers to access existing knowledge. Contemporary observers characterized seventeenth-century English coffeehouses as "penny universities" that widened participation in learned exchange beyond the intellectual elite (Ellis, 1956). Before their emergence, scientific interaction was largely confined to aristocratic households and college chambers, restricting access by social background (Cowan, 2005, pp. 102ff.). By making information more public, cheaper, and easier to acquire, coffeehouses lowered the cost of accessing existing knowledge, consistent with the role emphasized by Mokyr (2005, p. 312).

If coffeehouses relaxed elite access constraints by making scientific exchange more public, effects should be strongest among practitioners with weaker inherited ties to established intellectual networks. To test this prediction, we follow Clark and Cummins (2014) and proxy this dimension of social status using relative representation of surnames among Oxford and Cambridge (Oxbridge) alumni prior to 1650. For each surname s, we compute its relative representation among Oxbridge alumni before 1650:

$$z(s) \equiv \frac{\text{share of } s \text{ among pre-1650 Oxbridge alumni}}{\text{share of } s \text{ among English couples married 1538–1649}}. \tag{4}$$

The denominator proxies the share of s in the adult English population before 1650. Higher values of $z(s)$ indicate stronger ties to the elite, while lower values indicate weaker or absent ties.[32]

[32] Appendix Figure A.6 validates this proxy by showing that higher values of $z(s)$ are associated with higher status paternal occupations, while lower values correspond to lower status occupations.

Figure 5 presents results consistent with this mechanism. Average post-treatment effects, measured relative to the mean in the decade immediately preceding the first coffeehouse opening, are substantially larger for practitioners with weaker elite connections. Panel A shows that effects are concentrated among practitioners below the median of $z(s)$, while estimates for those with above median values of $z(s)$ are markedly smaller. Panel B extends this analysis across the full distribution of $z(s)$ by estimating treatment effects among the bottom x% of practitioners ranked by Oxbridge representation. The lowest group, comprising 18 percent of practitioners, consists of surnames with $z(s) = 0$, meaning they never appear in the matriculation registers of either Oxford or Cambridge. The estimated effect declines monotonically across the distribution, falling from approximately 6 for the least represented surnames to about 0.7 for the most represented. These patterns suggest that the positive effects of coffeehouses on scientific activity reflect differences in elite access rather than solely a uniform increase in knowledge production.

[Figure 5 about here.]

5.2 Knowledge Exchange

Mokyr (2005, 2016) argue that coffeehouses served as institutional mechanisms that lowered the cost of acquiring knowledge held by others in society, reflecting their role as "penny universities." They also increased the likelihood of connecting individuals with prescriptive knowledge (knowing by thinking) and those with propositional knowledge (knowing by doing). This view is supported by Ellis (2006), who describes coffeehouses as spaces where scientific virtuosi conducted business with instrument makers and where the experimental method was debated by the wider public. Publicly performed experiments further stimulated interest in testing and demonstrating new scientific theories using the experimental tools of the emerging sciences.

These ideas lead to two testable predictions. First, as coffeehouses emerged, theoretically inclined mathematical practitioners, such as natural philosophers, were more likely to meet practically oriented practitioners, including scientific instrument makers who knew by making and crafting. Second, as the intensity of their contact increased, instrument makers would have stronger incentives to produce experimental instruments that allowed theorists to refine or test empirical theories. Figure 6 and 7 test these predictions.

Figure 6 shows that coffeehouses did not significantly increase overall contact or contact among theorists. They did, however, significantly increase contact between theorists and makers, and among makers themselves, by roughly twice the reference mean. This likely reflects the fact that theorists already had institutional places to meet, such as universities and learned societies.

If theorists and makers begin interacting more often, we should expect makers to learn about theorists' needs for experimental instruments and to start producing more of them, since theorists are their natural clients. Figure 7 confirms this prediction: the number of shops producing experimental instruments rises, alongside those making mathematical instruments. The increase is larger for experimental instruments, although the difference is not statistically significant. The increase in the number of experimental instrument shops in coffeehouse areas is striking, reaching about four times the reference mean only two decades after the treatment.

[Figure 6 about here.]

[Figure 7 about here.]

5.3 Taverns and Inns as a Comparative Placebo

Pubs, understood here as taverns and inns, supported social interaction since the Middle Ages, but their primary functions were food, drink, lodging, and sociability (Clark, 1983). Coffeehouses, by contrast, were a novel institution. They were similarly low cost and sociable public venues, but centered on news, debate, and business, attracting civil, curious, and cosmopolitan patrons, including virtuosi engaged in learned discourse (Cowan, 2005, p. 89). Scientific activity could and did occur in pubs (Stewart, 1992, p. 142), but historians link coffeehouses more closely to the virtuosi and the culture of experimental inquiry (Cowan, 2005; Ellis, 2004). As Cowan (2005, p. 260) argues, the coffeehouse was "not simply one among many backdrops" but "the product of the cultural world forged by the virtuosi in Britain's age of scientific revolution." In this sense, coffeehouses complemented rather than replaced pubs.

This distinction motivates a placebo test using pubs as an alternative class of meeting spaces. If the estimated effects of coffeehouses reflected a general expansion of venues for sociability, similar effects would follow the opening of pubs. Appendix Figure A.12 shows that coffeehouse openings do not predict differential increases in pubs across jurisdictions. However, pub and coffeehouse openings are correlated, as shown in Appendix Table B.3, potentially reflecting a common underlying factor such as commercial rental costs that influenced both types of establishments. To address this concern, we also restrict the placebo analysis to periods before the emergence of coffeehouses in the 1650s.

Figure 8 reports the estimated effects of the first seventeenth-century pub opening for the sample spanning the 1550s–1690s and, separately, the 1550s–1640s. In the full sample, strong pretrends in the number of mathematical practitioners indicate that the baseline design is invalid, and there is no evidence of an increase in scientific activity following the first pub opening. Controlling for group-specific linear trends removes these pretrends and yields negative effects on mathematical practitioners, as shown in Appendix Figure A.35. Estimated effects on scientific instrument shops are positive in the full sample but become small and often indistinguishable from zero when restricting the analysis to the 1550s–1640s. Taken together, these results indicate that pub openings did not meaningfully increase scientific activity, or did so to a much smaller extent than coffeehouses, supporting the interpretation that coffeehouses offered more than general gathering spaces.

[Figure 8 about here.]

5.4 Additional Evidence on Mechanisms

Figure 9 reports additional outcomes that speak to the institutional and intergenerational implications of the mechanisms discussed above. Jurisdictions with coffeehouses experience a substantially larger increase in fellows elected to the Royal Society, consistent with greater participation in elite scientific institutions. Coffeehouses are also associated with increases not only in the number of scientific instrument shops but also in the number of apprentices they employ, suggesting that the access and knowledge exchange mechanisms documented above extended to training and entry into scientific trades. Exposure to public experimental science in coffeehouses may have redirected young entrants, typically around age fourteen (Wallis, 2025), into instrument making apprenticeships. The subsequent expansion of booksellers, a key institution for knowledge access, is likewise consistent with coffeehouse locations functioning as sites of knowledge agglomeration. Finally, increases in links between older and younger mathematical practitioners suggest that the access and knowledge exchange mechanisms documented above also operated through social transmission, with senior practitioners informally integrating younger cohorts into scientific communities through repeated interaction.

[Figure 9 about here.]

5.5 Coffee Consumption or Coffeehouse Culture?

In seventeenth-century England, coffee was likely consumed primarily in coffeehouses, though overall consumption remained modest. Before 1700, London household inventories rarely listed utensils for hot drinks, indicating that coffee was rarely prepared at home (Withington, 2020, p. 59). Robert Hooke, a frequent patron, seldom mentioned drinking coffee in the establishments he visited (Withington, 2020, p. 54), possibly because it was too routine to note. Even so, between the 1660s and 1690s, England imported at most 6,600 liters of coffee per day, enough for roughly a dozen servings for about 1.5 percent of adults (Smith, 2001). Coffee consumption itself was therefore too limited to account for any substantial productivity effect, and there is little reason to attribute our findings to the physiological effects of caffeine.

The influence of coffeehouses lay instead in their institutional form. Coffeehouses defined themselves against taverns, promoting sobriety, order, and rational exchange (Cowan, 2005). As Cowan emphasizes, coffee did not make London sober. This was a rhetorical ideal rather than a behavioral fact. Coffeehouses mattered because they embodied and diffused new norms of civility and intellectual openness. By providing accessible, stable, and predictable venues for discussion among individuals from different social backgrounds, they reduced the cost of communication and facilitated interaction between theorists, craftsmen, and entrepreneurs. Their contribution was institutional and cultural, not physiological.

6. CONCLUSION

This paper documents the rise of scientific activity in seventeenth-century London and highlights the central role of coffeehouses in this process. Using novel location data on the full universe of known coffeehouses, together with newly assembled comprehensive records on applied scientists, their social and intellectual networks, and detailed information on scientific-instrument makers and their shops, we show that scientific activity increased sharply during this period, particularly after the rapid expansion of coffeehouses across the city. Our findings indicate that this pattern is not coincidental and that coffeehouses played a pivotal role in fostering the rise of modern science in seventeenth-century London, the principal hub of the Scientific Revolution in Britain.

Quantitatively, coffeehouse openings account for roughly 61 percent of the rise in mathematical practitioners and 55 percent of the growth in scientific-instrument shops between the 1650s and 1690s. To ensure that locations were not simply following pre-existing trends or unobserved factors related to scientific activity, we implement a difference-in-differences design that exploits variation in the timing of first coffeehouse openings that, from the perspective of the community of applied scientists and scientific instrument makers, is exogenous. We provide extensive evidence of no differential pre-trends and no correlation with other local changes coinciding with the first openings.

We argue that coffeehouses lowered the cost of accessing and exchanging scientific knowledge, fostered interactions between scientists and skilled artisans, and made experimental science more public, giving intellectuals of modest means a space for their ideas to be debated and craftsmen in the booming manufacturing sector the opportunity to transition into scientific instrument makers. As we show, coffeehouses especially benefited those with weaker ties to elite intellectual circles, strengthened links between theory-oriented scientists and practical instrument makers, and increased the number of experimental instrument shops. By enabling wider participation in emerging experimental science and providing public venues where experiments could be demonstrated, discussed, and refined, coffeehouses showcased the power of empirical testing, stimulated demand for new scientific instruments, and ultimately promoted the production of scientific tools and the advancement of theoretical knowledge.

More generally, our findings show that simple institutions reducing communication frictions spur collaboration, innovation, and scientific progress. Coffeehouses helped transform seventeenth-century London into a center of experimental science, showing how changes in information exchange shape technological and intellectual development.

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FIGURES

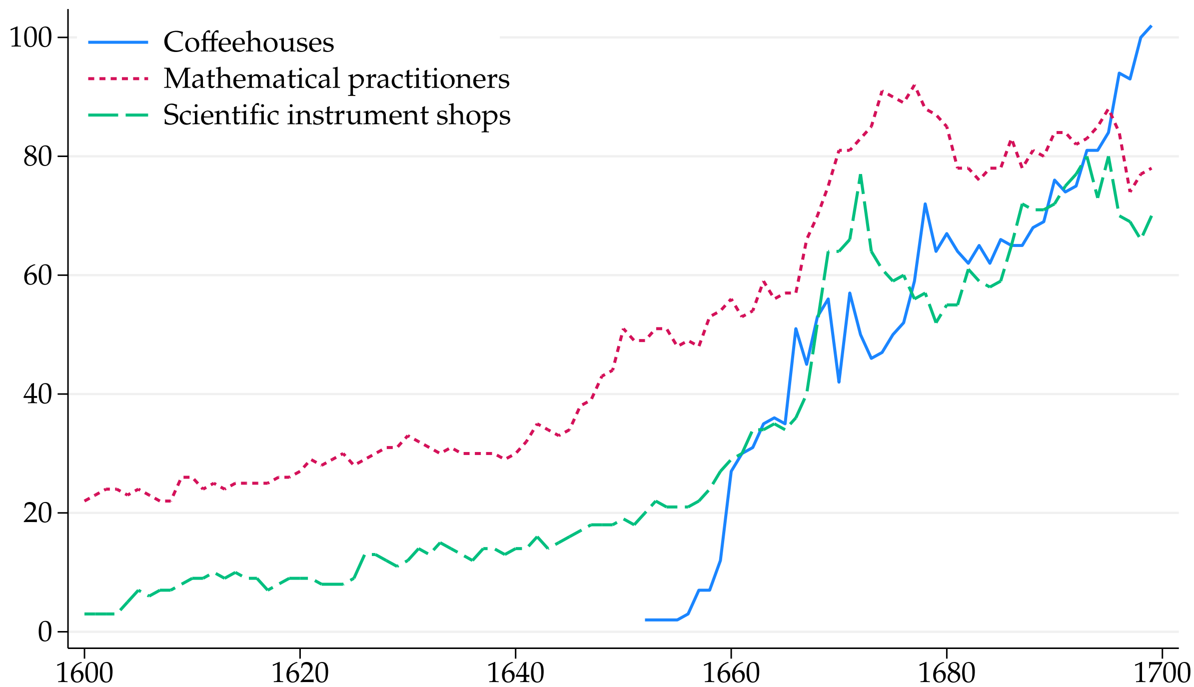


Figure 1: Coffeehouses and Science in London over time

Notes: Figure plots the annual number of coffeehouses, mathematical practitioners, and scientific instrument shops in seventeenth-century London. Data from Taylor (1954); Lillywhite (1963, 1972); Clifton (1995).

FIGURE 2: A SEVENTEENTH-CENTURY LONDON COFFEEHOUSE

Notes: Drawing by an unknown artist, circa 1690–1700, showing the interior of a London coffeehouse. Among the earliest visual records of a coffeehouse, it depicts a maid behind a canopied bar, servants preparing coffee and taking clay pipes from a chest, and patrons reading newspapers and drinking by the fire. British Museum, London, museum no. 1931,0613.2.

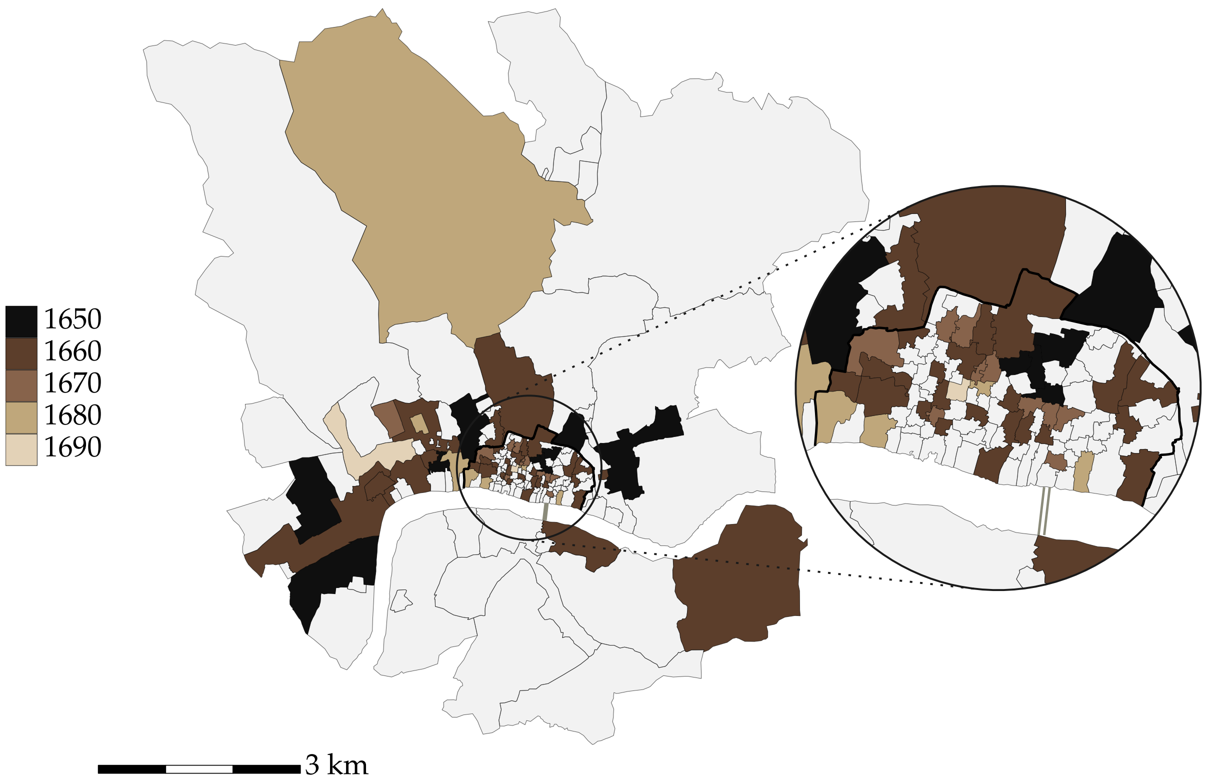
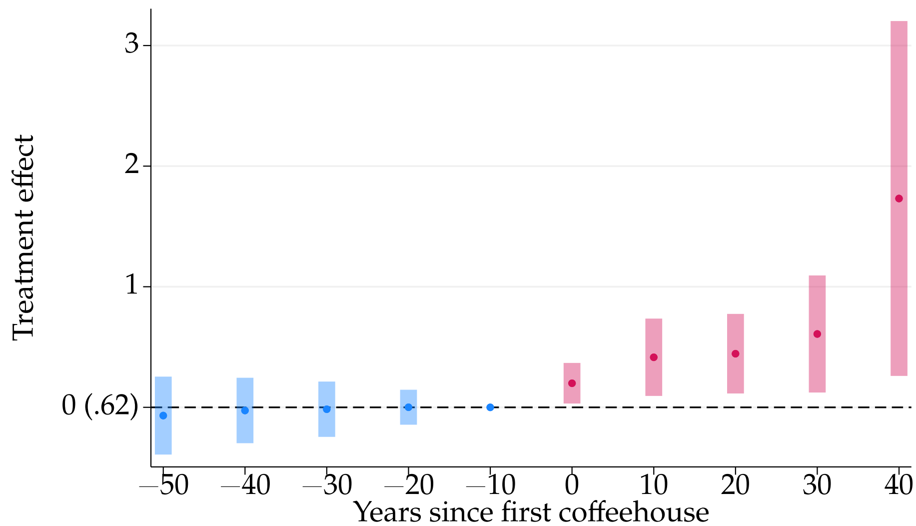


FIGURE 3: MAPPING THE FIRST COFFEEHOUSES IN LONDON

Notes: Map showing the decade in which each London jurisdiction saw its first coffeehouse established, with an inset of the City of London. Gray areas mark jurisdictions with no coffeehouses during the 1600s.

(a) Mathematical practitioners



(b) Scientific instrument shops

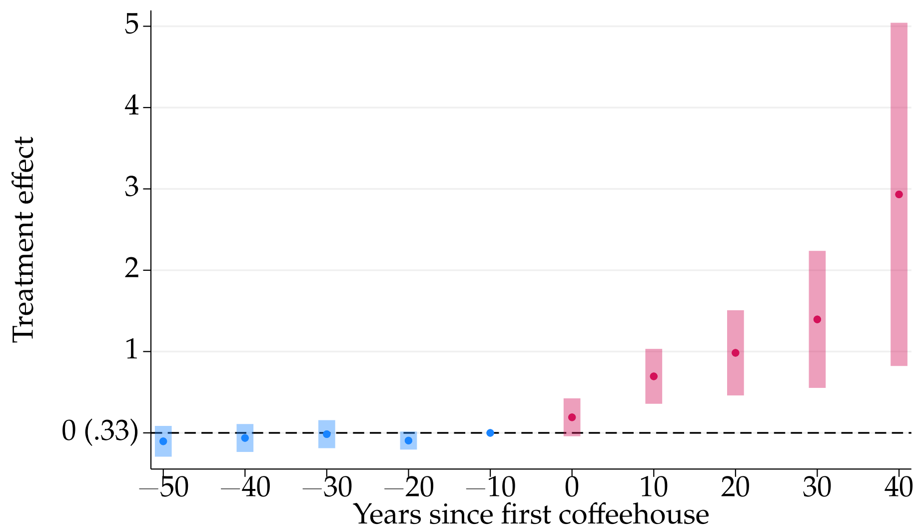
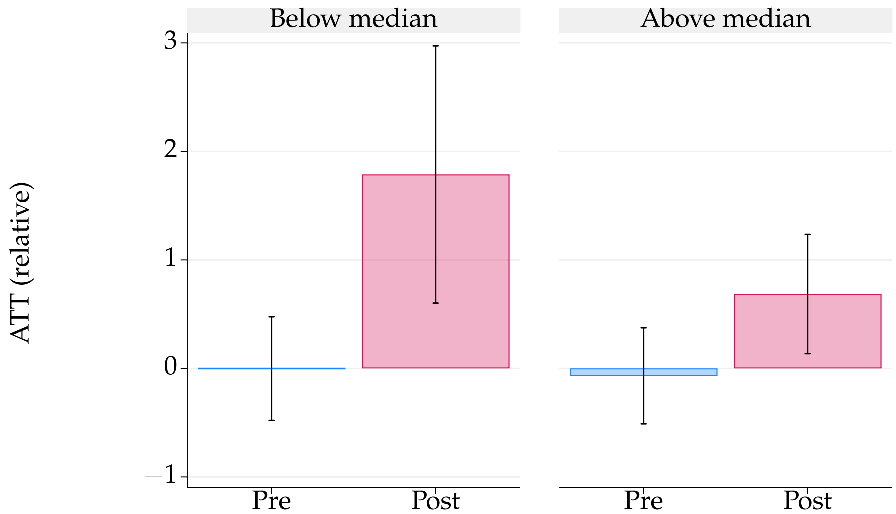


Figure 4: Effects on scientific activity

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

(A) Below and above median split



(B) Along the Lorenz curve

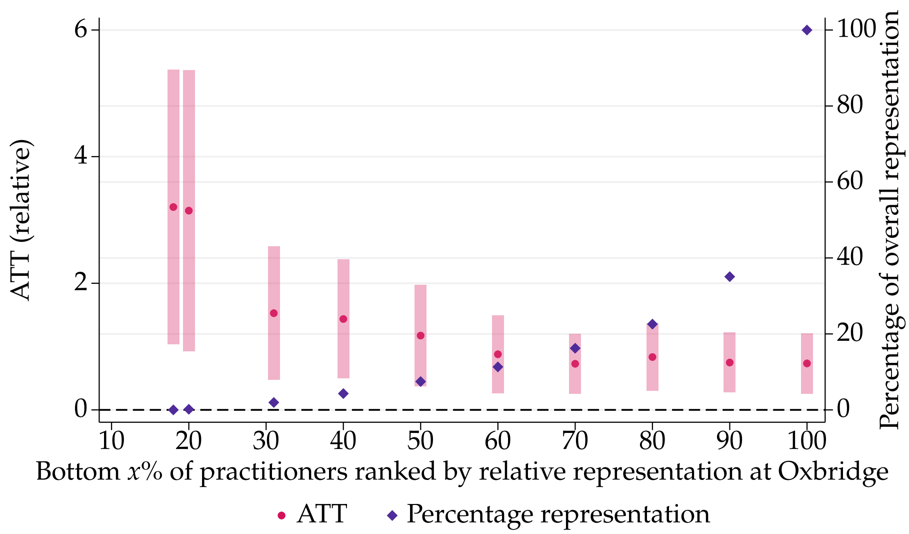


Figure 5: Effects on Mathematical Practitioners by relative representation at Oxbridge

Notes: Figure shows ATTs and 95 percent confidence intervals based on event study estimates from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of mathematical practitioners for given values of the relative representation $z(s)$ of a practitioner's surname s at Oxbridge before 1650. Panel A splits by values of $z(s)$ above or below the median of its empirical distribution. Panel B splits by values of $z(s)$ within the bottom x percent of its empirical distribution. Each outcome is divided by its reference mean, i.e., the sample mean of the outcome one decade before the first coffeehouse opened. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Standard errors clustered by jurisdiction.

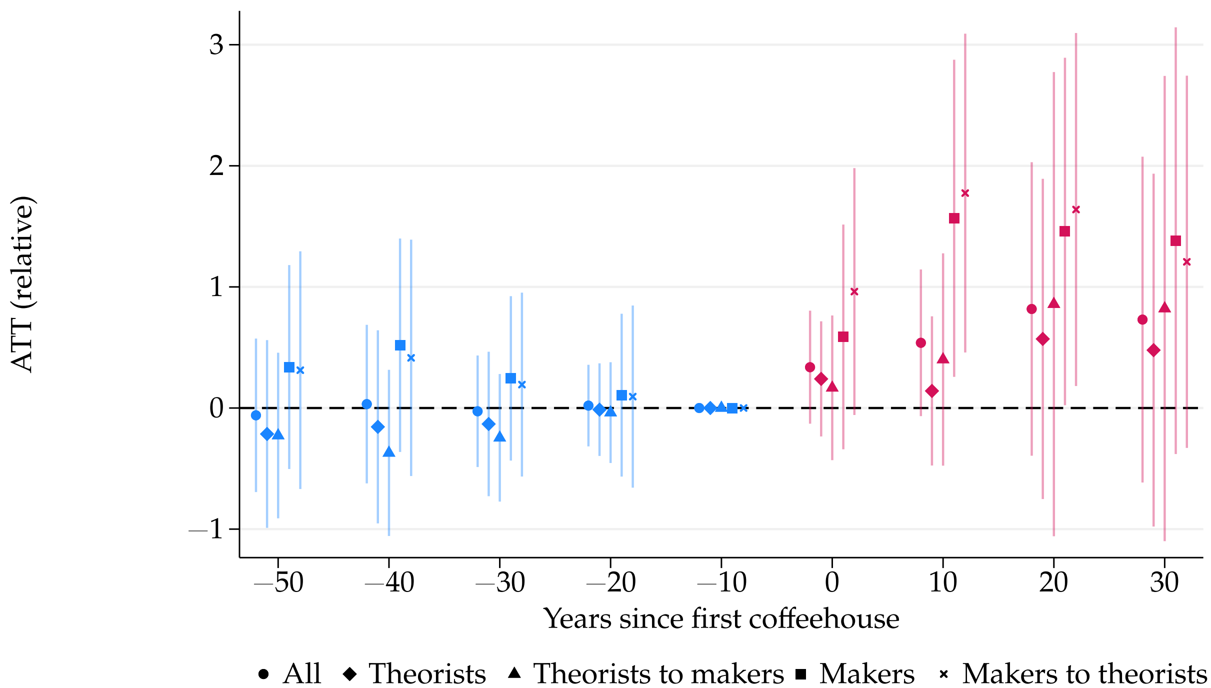


Figure 6: Effects on mathematical practitioner connections

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on connetions between scientists. Outcomes of interest include the decadal number of connections; connections among theorists only, defined as mathematical practitioners excluding makers of scientific instruments, globes, and similar objects; connections from theorists to makers, where each connection represents a theorist in the jurisdiction of interest linking to a maker within the same jurisdiction or elsewhere; connections among makers only; and connections from makers to theorists, where each connection represents a maker in the jurisdiction of interest linking to a theorist within the same jurisdiction or elsewhere. Each outcome is divided by its reference mean, i.e., the sample mean of the outcome one decade before the first coffeehouse opened. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Standard errors clustered by jurisdiction.

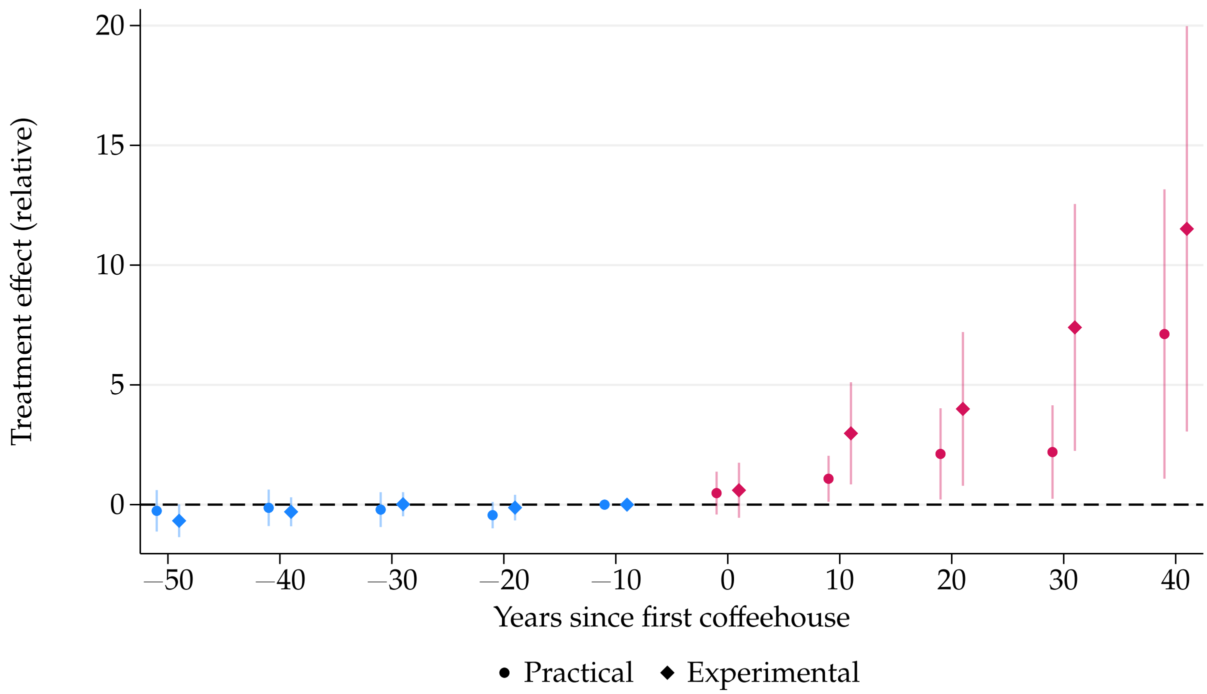
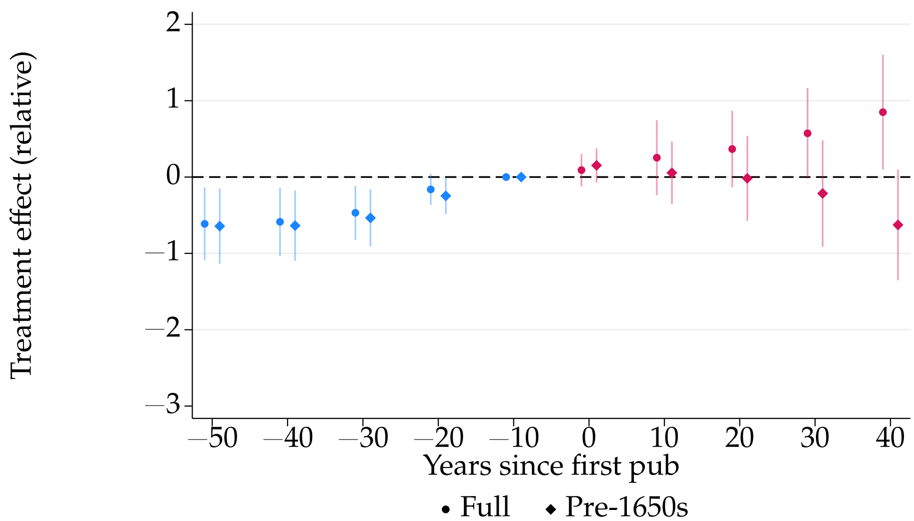


Figure 7: Effects on Scientific Instrument Shops by Type

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of practical (mathematical, navigational, and surveying) and experimental (optical and philosophical) instrument shops in a jurisdiction. Each outcome is divided by its reference mean, i.e., the sample mean of the outcome one decade before the first coffeehouse opened. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Standard errors clustered by jurisdiction.

(a) Mathematical practitioners



(b) Scientific instrument shops

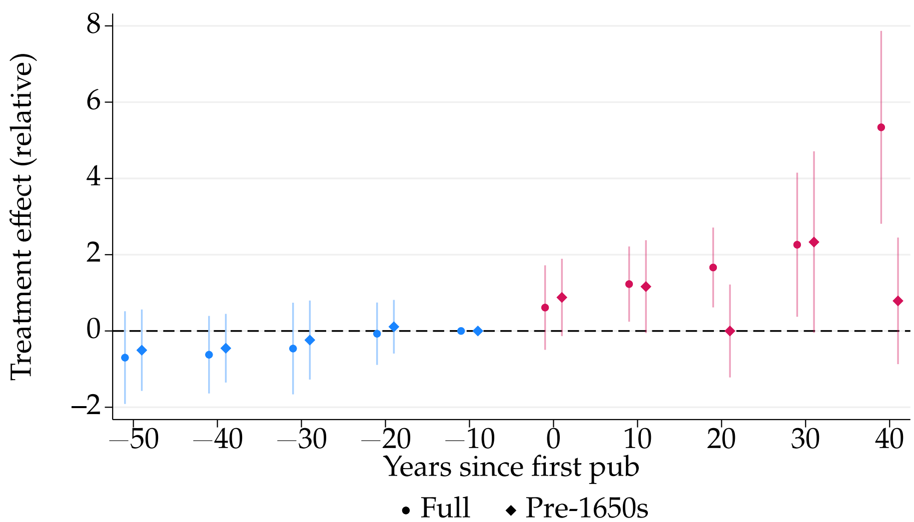


Figure 8: Pub effects on scientific activity

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first pub opening in the 1600s on scientific activity. Pubs are defined as taverns and inns. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Each outcome is divided by its reference mean, i.e., the sample mean of the outcome one decade before the first coffeehouse opened. Sample includes all 162 jurisdictions from the 1550s to the 1690s (full) or the 1550s to the 1690s (before 1650s). Unit of observation is jurisdiction-decade. Standard errors clustered by jurisdiction.

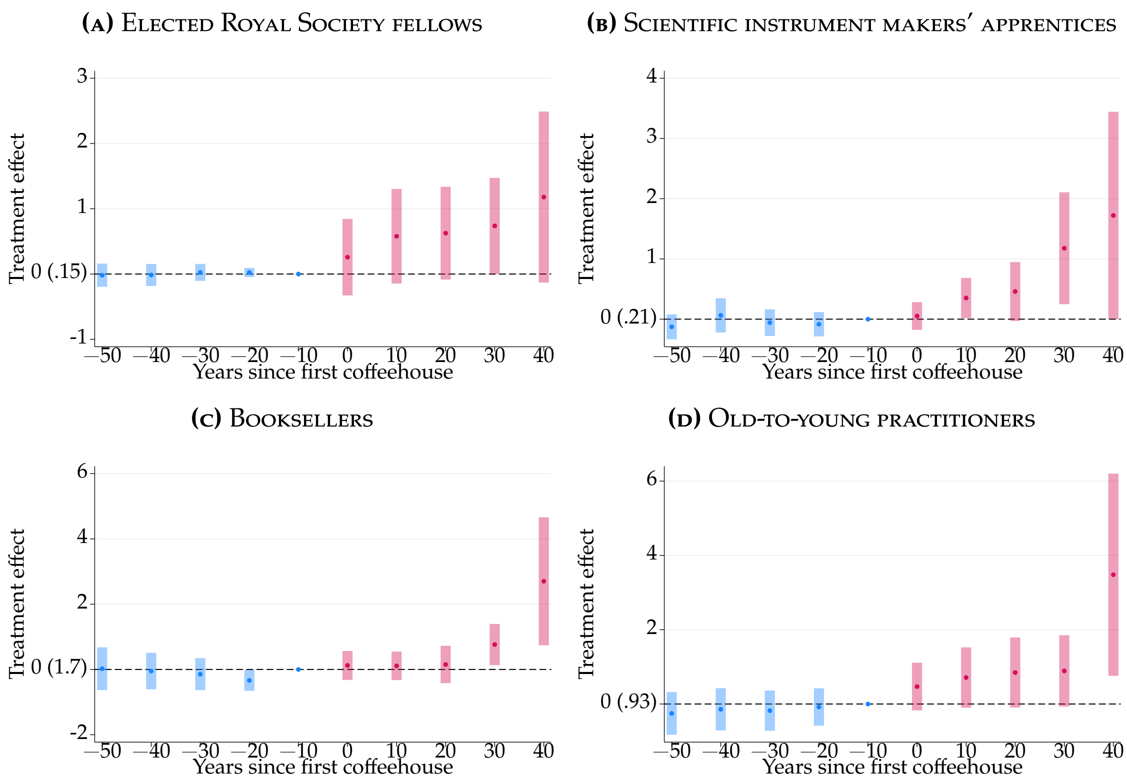


Figure 9: Effects on additional scientific outcomes

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of elected Royal Society fellows (Panel A), scientific instrument makers' apprentices (Panel B), booksellers (Panel C), and links between mathematical practitioners active a decade apart, running from the older practitioner in the jurisdiction of interest to a younger practitioner in the same or another jurisdiction (Panel D). Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

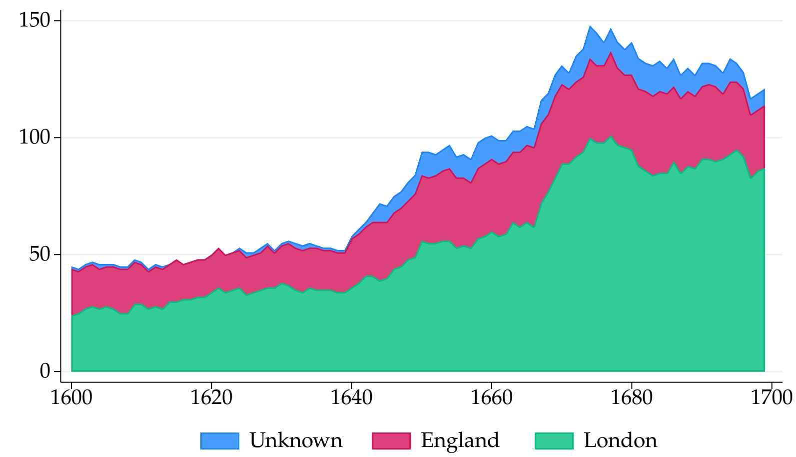
APPENDIX

APPENDIX TABLE OF CONTENTS

A. APPENDIX FIGURES

A.1 The Relative Size of Science in London

(a) Mathematical practitioners



(b) Scientific instrument makers

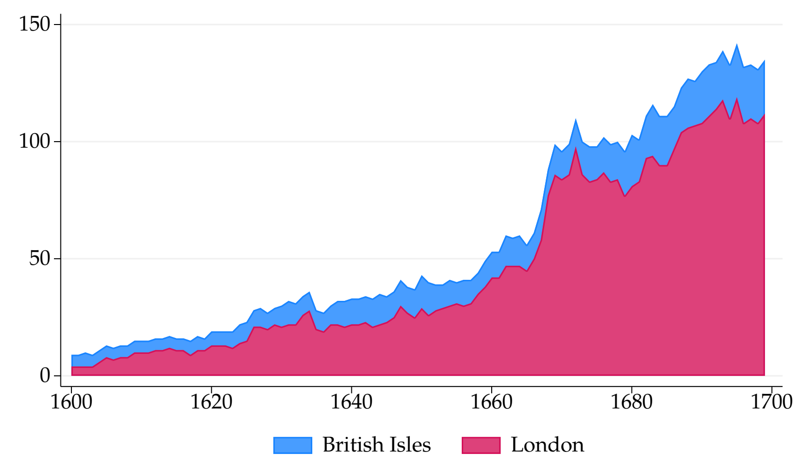


Figure A.1: Science in London relative to England and the British Isles over time

Notes: Panel A plots the annual number of mathematical practitioners in seventeenth-century England, separated by whether they were ever active in London or only outside it but still within England. Unknowns were active in England, but whether they were active in London is unknown. Panel B plots the annual number of scientific instrument makers in seventeenth-century British Isles and London. Data from Taylor (1954); Clifton (1995).

A.2 Composition of Scientific Instrument Makers in London

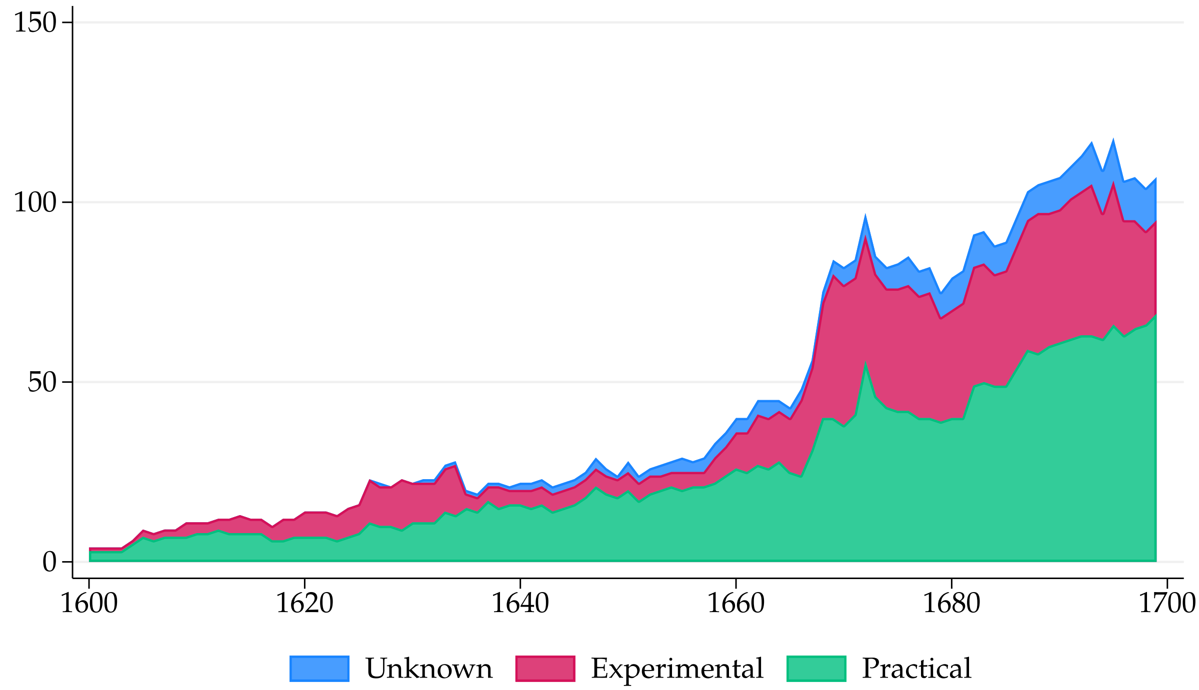


FIGURE A.2: SCIENTIFIC INSTRUMENT MAKERS IN LONDON OVER TIME BY TYPE

Notes: Figure plots the annual number of scientific instrument makers in seventeenth-century London by type. Experimental makers produced optical (e.g., telescopes, microscopes) and philosophical (e.g., air pumps, barometers, electric machines) instruments. Practical makers produced mathematical (e.g., dividers, sectors, scales), navigational (e.g., compasses, astrolabes), and surveying (e.g., theodolites, circumferentors) instruments. Data from Clifton (1995).

A.3 Treatment Rollout

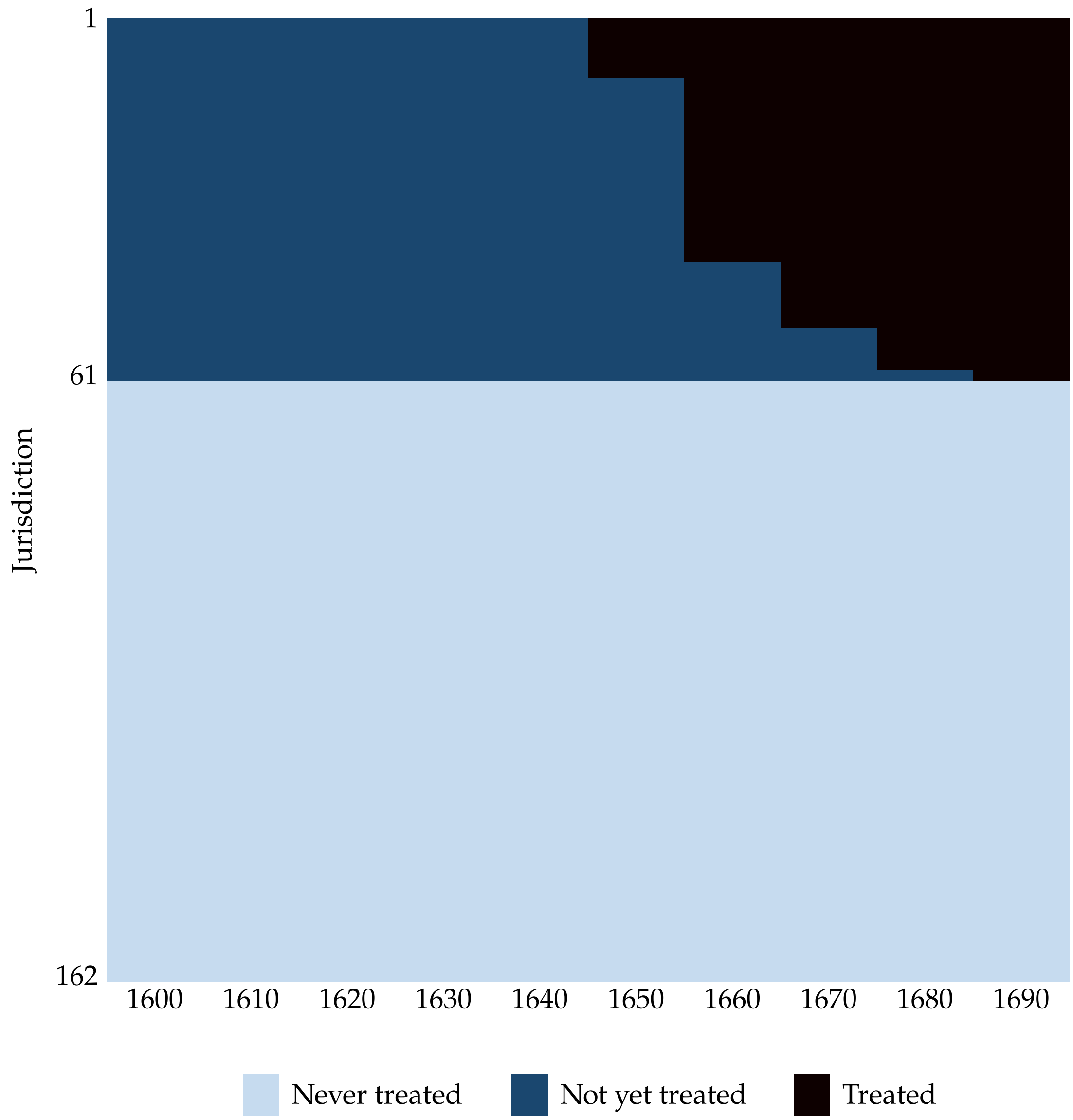


Figure A.3: Treatment rollout: First coffeehouses

Notes: Figure shows the decades in which the first coffeehouse opened across all 162 jurisdictions, grouped by decade of first opening. Jurisdictions are ordered from earliest to latest opening decade, followed by those with no coffeehouse openings.

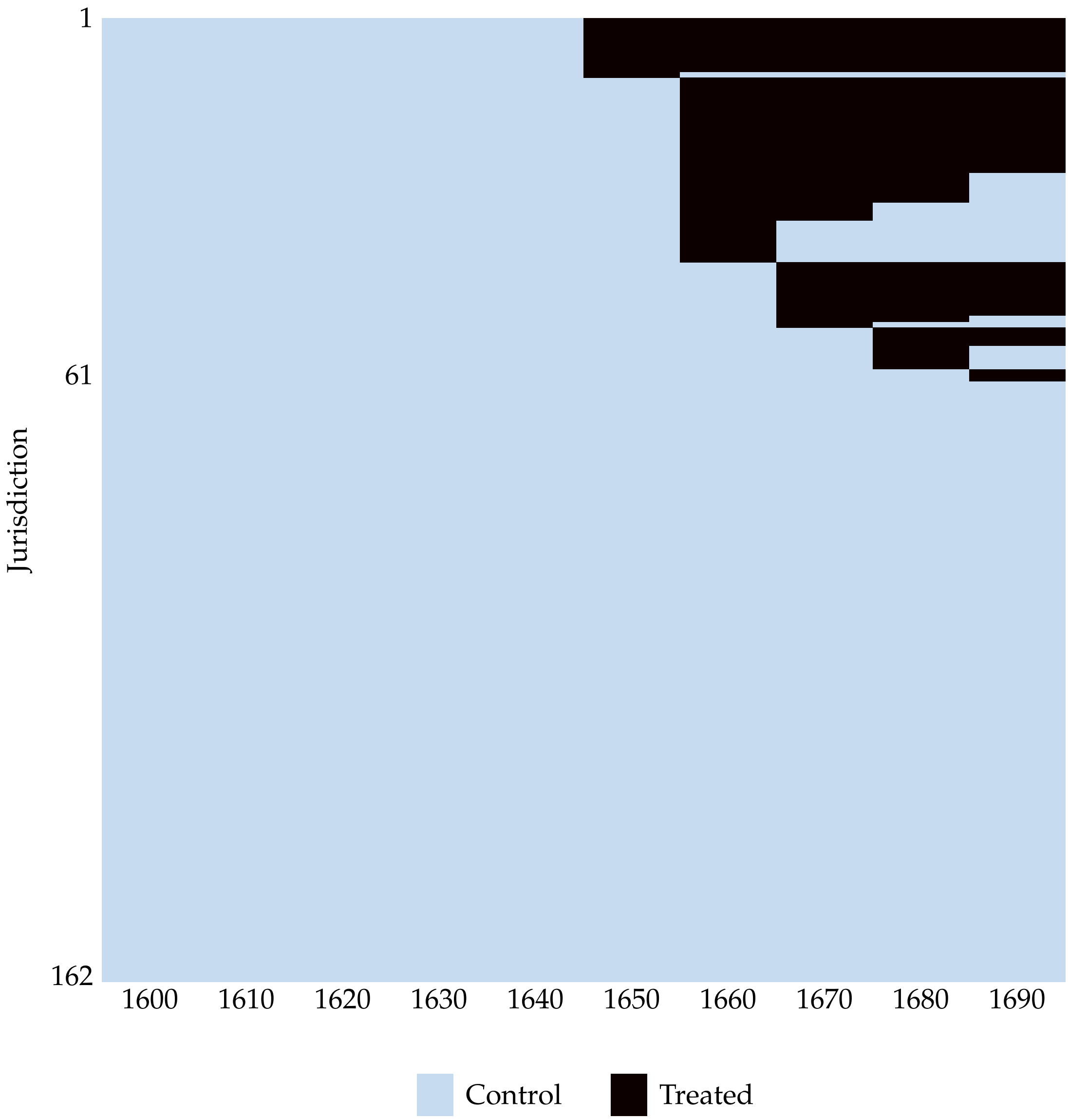


Figure A.4: Treatment rollout: Coffeehouse presence

Notes: Figure shows the decades in which the a coffeehouse is open across all 162 jurisdictions, grouped by decade of first opening. Jurisdictions are ordered from earliest to latest opening decade, followed by those with no coffeehouse openings.

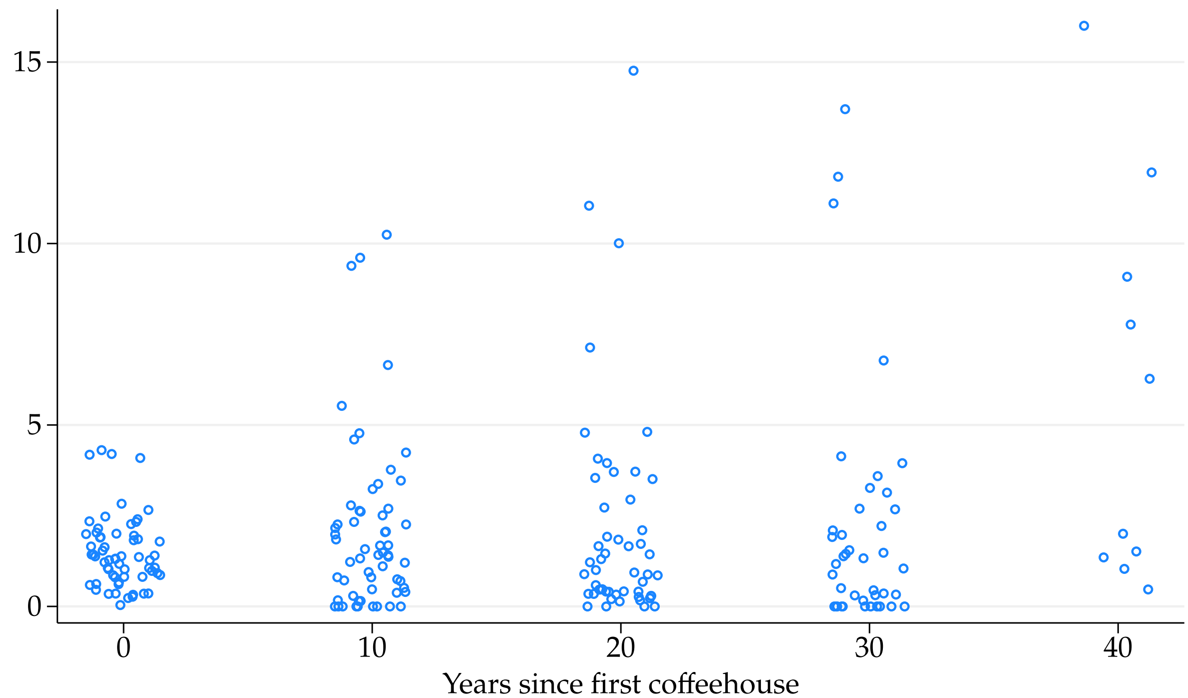


Figure A.5: Coffeehouses over years since first coffeehouse

Notes: Figure shows a jittered strip plot of the number of coffeehouses by years since the first coffeehouse opened. Sample includes the 61 jurisdictions that ever have a coffeehouse from the 1600s to the 1690s.

A.4 Relative Representation at Oxbridge and Parental Occupation

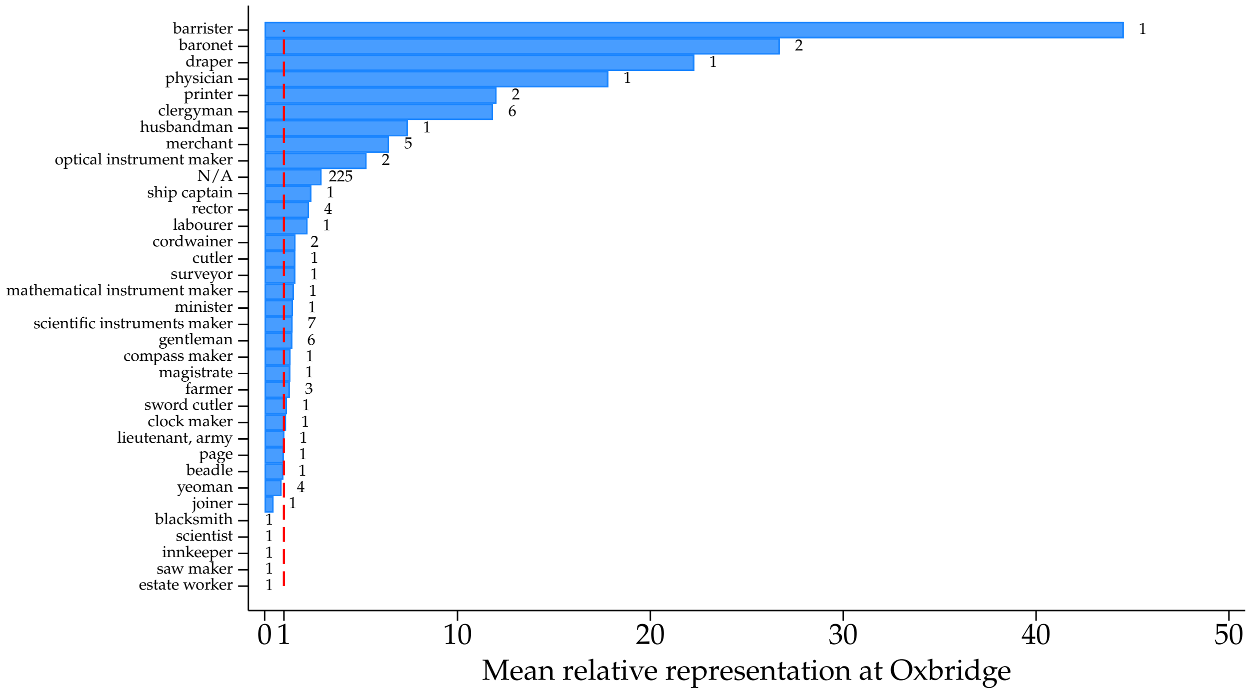


Figure A.6: Father's Occupation of Mathematical Practitioners by Oxbridge Representation

Notes: Figure shows the mean relative representation of mathematical practitioners' surnames by their fathers' occupations. "N/A" indicates unknown paternal occupation. Numbers to the right of each bar denote the number of observations for that occupation. Authors' dataset based on Taylor (1954), Wikipedia, and the Oxford Dictionary of National Biography.

A.5 Adjusting for Covariate Imbalances

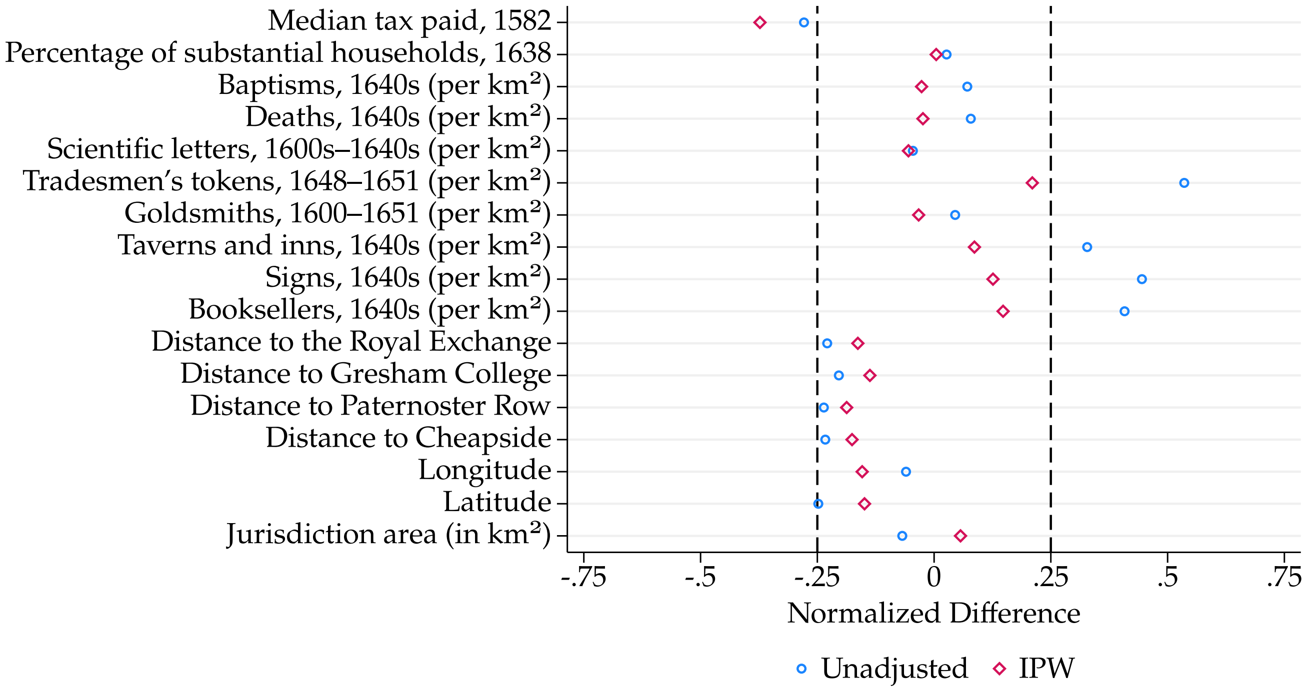
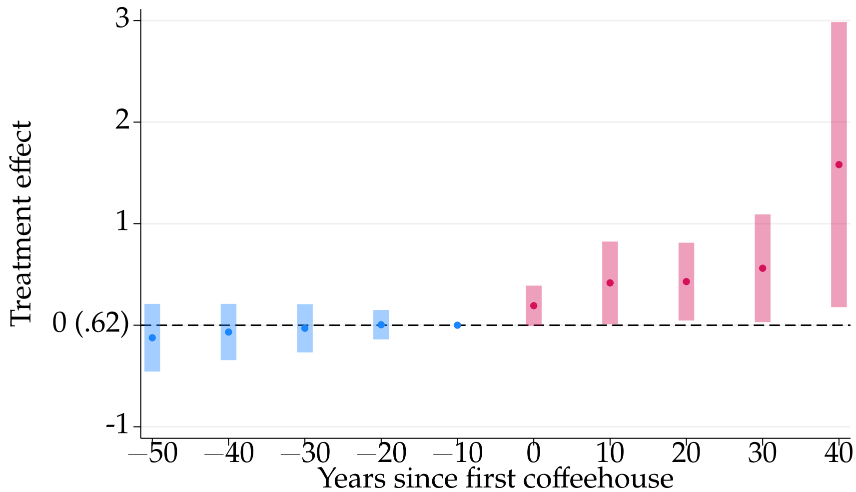


Figure A.7: Covariate Balance Graph

Notes: Figure plots the normalized differences in a set of pre-treatment characteristics between ever-treated and never-treated jurisdictions, where treatment is defined as the decade of first coffeehouse opening in seventeenth-century London. The unadjest normalized difference for a covariate x is $\frac{\overline{x}_t - \overline{x}_c}{\sqrt{(s_t^2 + s_c^2)/2}}$, where $\overline{x}_t$ and s_t^2 denote the sample mean and variance of x in the ever-treated group, and $\overline{x}_c$ and s_c^2 the corresponding quantities in the never-treated group. IPW normalized differences use inverse-probability weights derived from a propensity score for ever being treated. The propensity score is estimated with a probit model including tradesmen's tokens (1648–1651), booksellers per km2 in the 1640s, and signs per km2 in the 1640s.

(A) Mathematical practitioners



(B) Scientific instrument shops

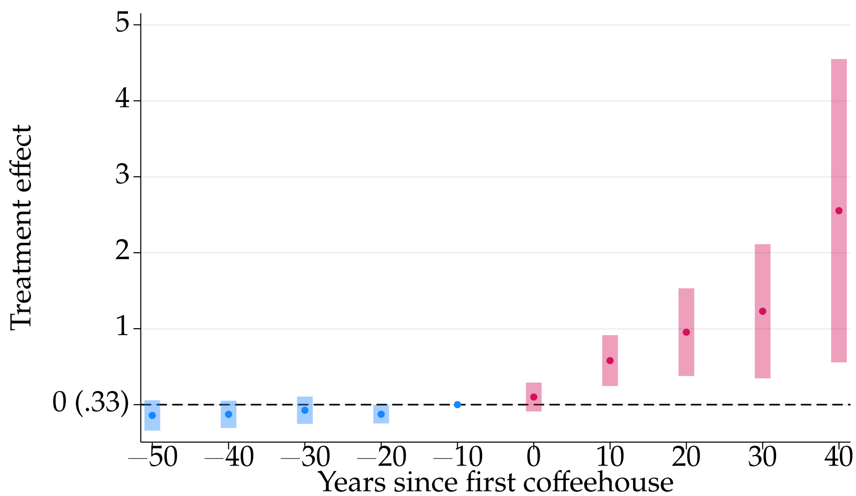
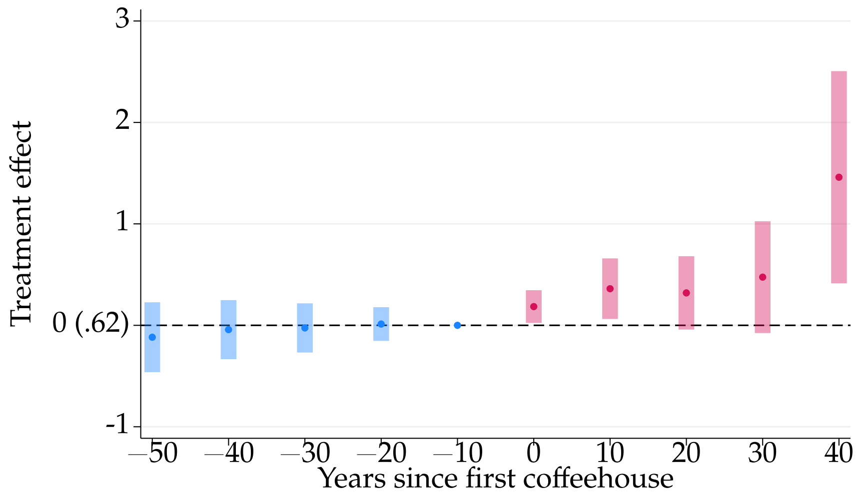


Figure A.8: Effects on scientific activity: IPW adjustment

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1), weighted with inverse-probability weights (IPWs), of the effect of first coffeehouse opening on scientific activity. The IPWs are based on a probit-estimated propensity score for ever being treated, using tradesmen's tokens (1648–1651), booksellers per km2 in the 1640s, and signs per km2 in the 1640s. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

(A) Mathematical practitioners



(B) Scientific instrument shops

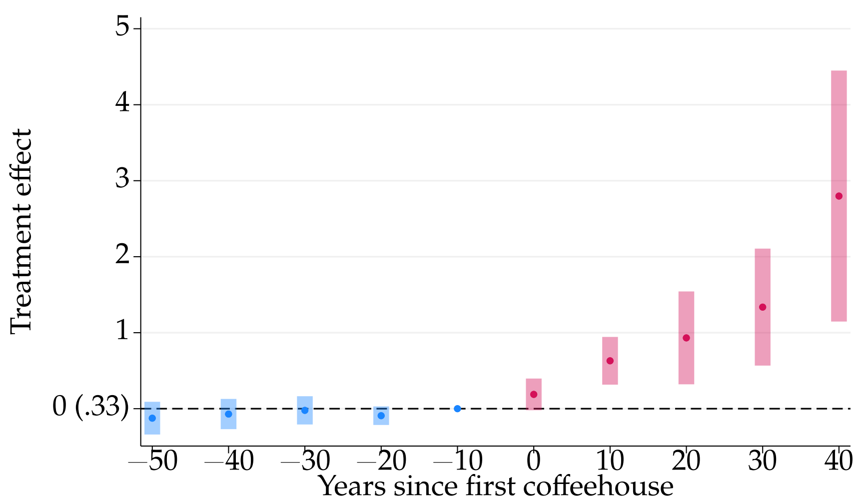
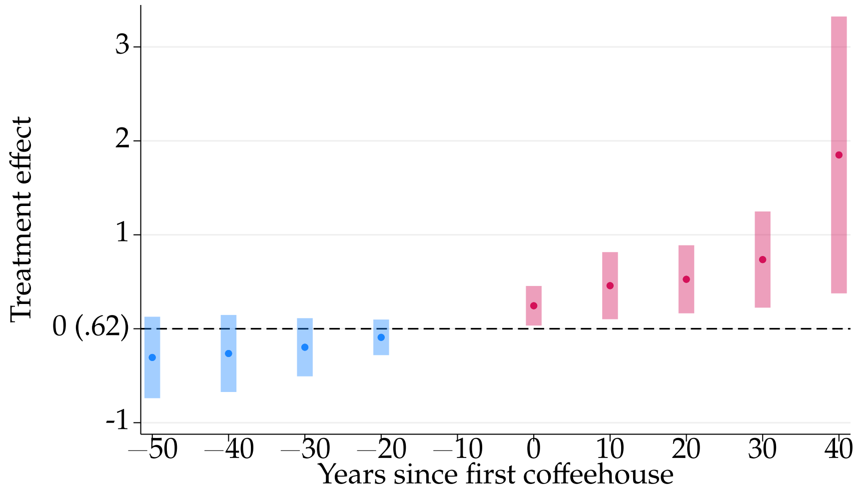


Figure A.9: Effects on scientific activity: regression adjustment

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1), with covariates, of the effect of first coffeehouse opening on scientific activity. Covariates are added fixed effects using tradesmen's tokens (1648–1651), booksellers per km2 in the 1640s, and signs per km2 in the 1640s, interacted with each decade. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

(A) Mathematical practitioners



(B) Scientific instrument shops

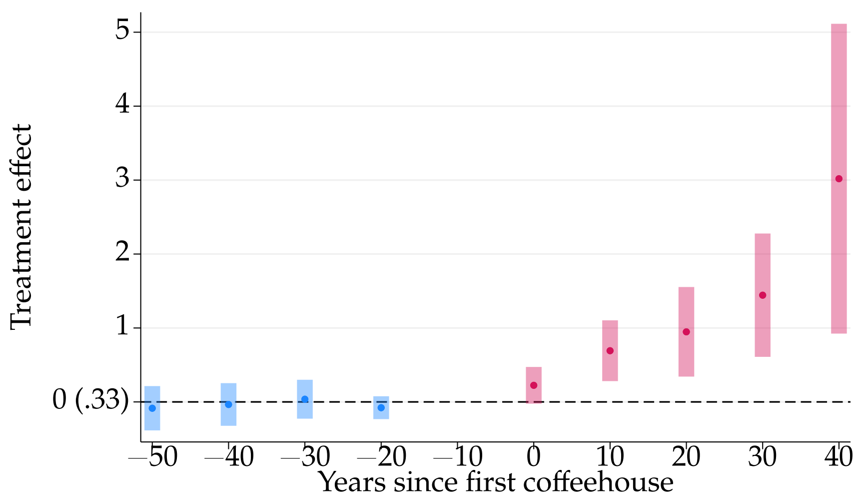
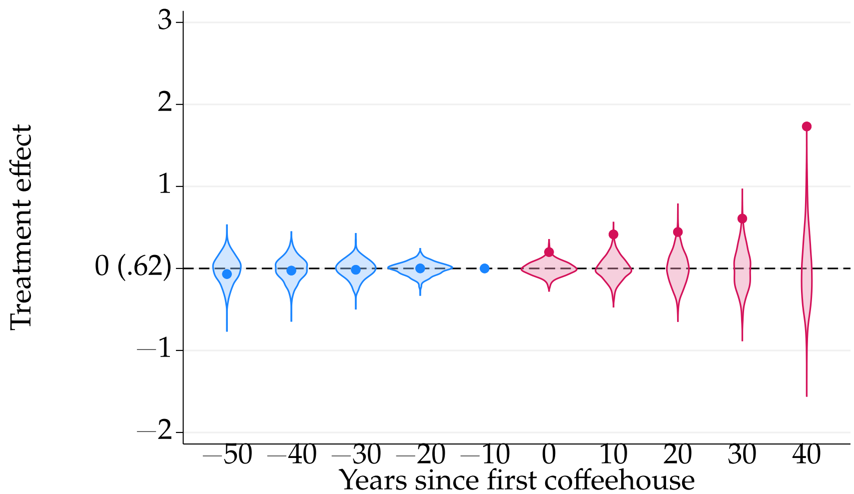


Figure A.10: Effects on scientific activity: doubly robust adjustment

Notes: Figure shows event study estimates and 95 percent confidence intervals based on Callaway and Sant'Anna (2021) doubly robust estimator with controls. The set of controls include tradesmen's tokens (1648–1651), booksellers per km2 in the 1640s, and signs per km2 in the 1640s. Outcome of interest is the decadal number of scientific instrument shops operated by instrument makers who are members of a guild. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.6 Placebo Coffeehouses

(A) Mathematical practitioners



(B) Scientific instrument shops

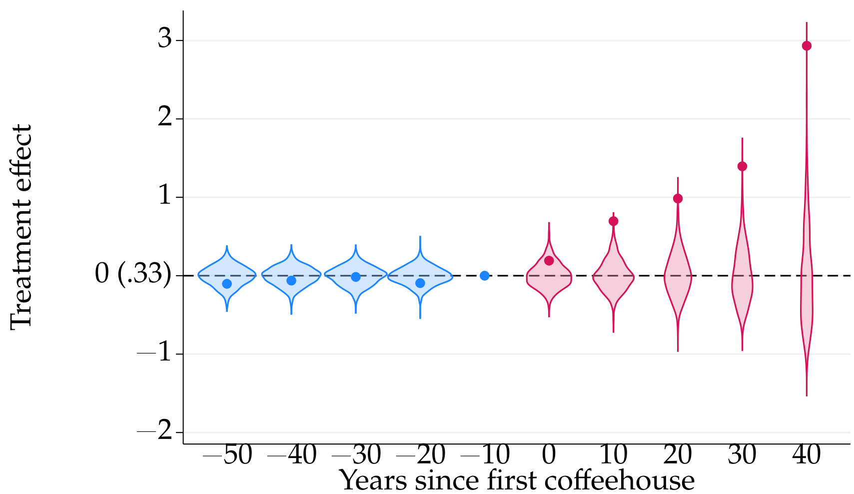


Figure A.11: Effects on scientific activity: Randomization inference

Notes: Figure shows violin plots of event study estimates from a series of 1,000 placebo estimates of equation (1) of the effect of the first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. In each placebo dataset, we randomly assign the timing of the first coffeehouse opening to one of the decades from the 1650s to 1690s for 61 of the 162 jurisdictions, preserving the size of the treated group in the main sample. Violin plots show the distribution of placebo treatment effects by event time, with dots indicating the actual event study estimates from the true dataset. Samples includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment.

A.7 Placebo Outcomes

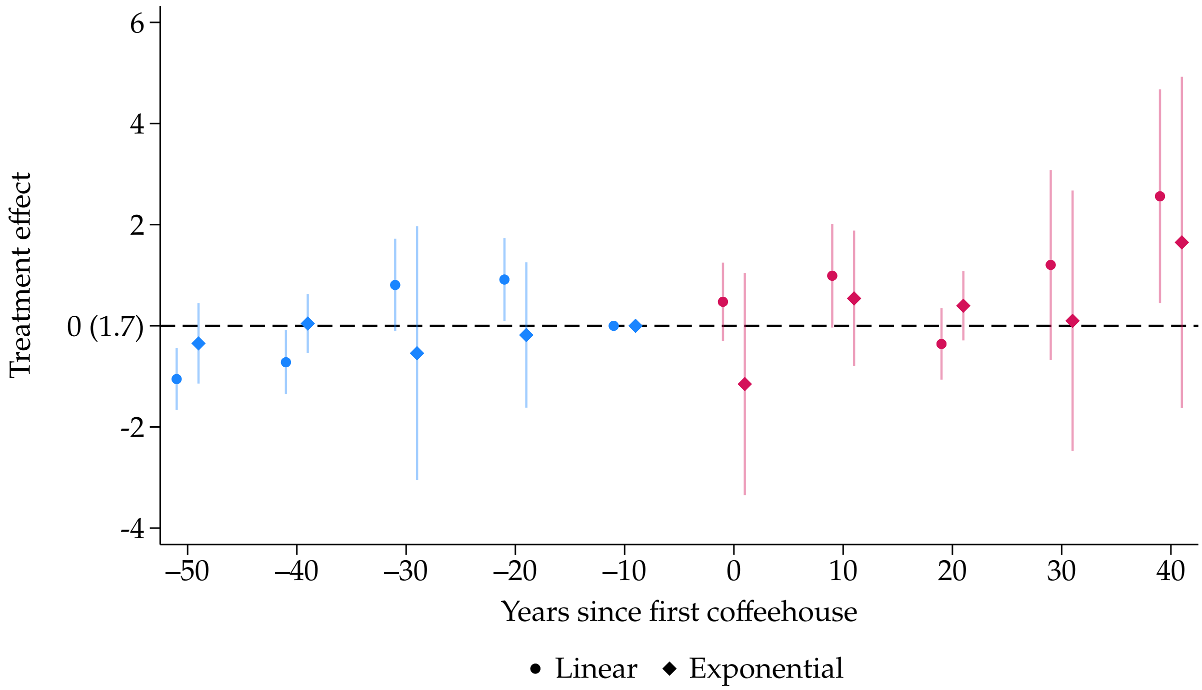


Figure A.12: Effects on Taverns and Inns

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (3) of the effect of first coffeehouse opening. Outcome of interest is the decadal number of tavarns and inns in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

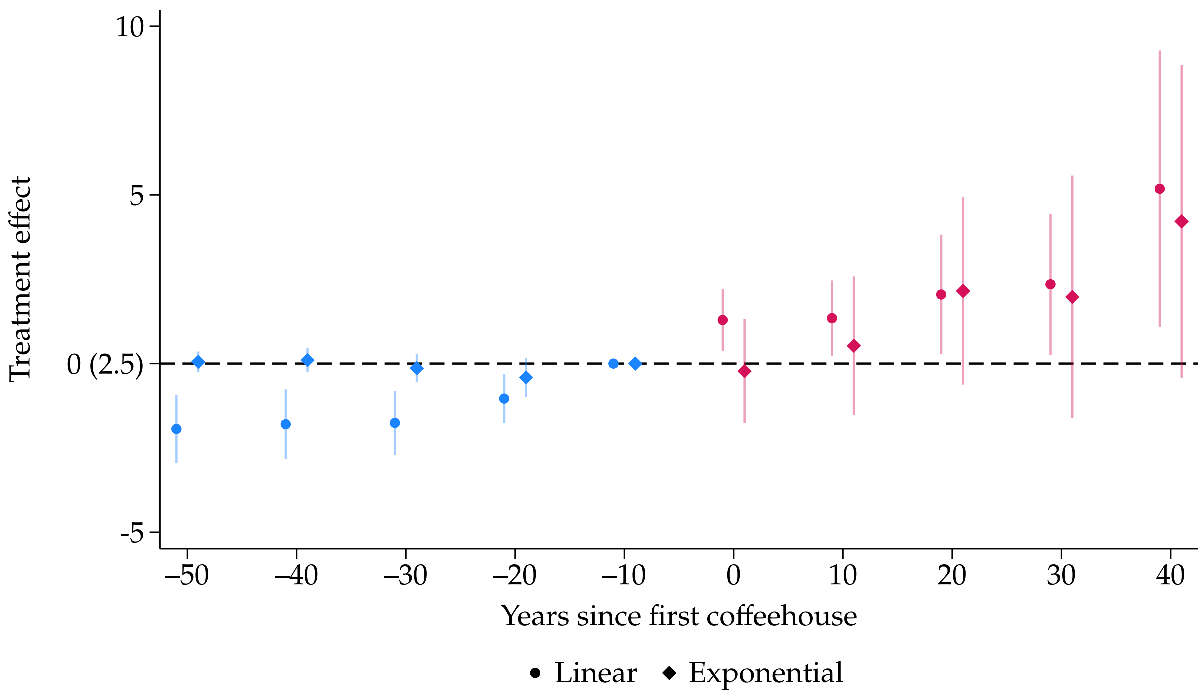


Figure A.13: Effects on Signs

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (3) of the effect of first coffeehouse opening. Outcome of interest is the decadal number of signs in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

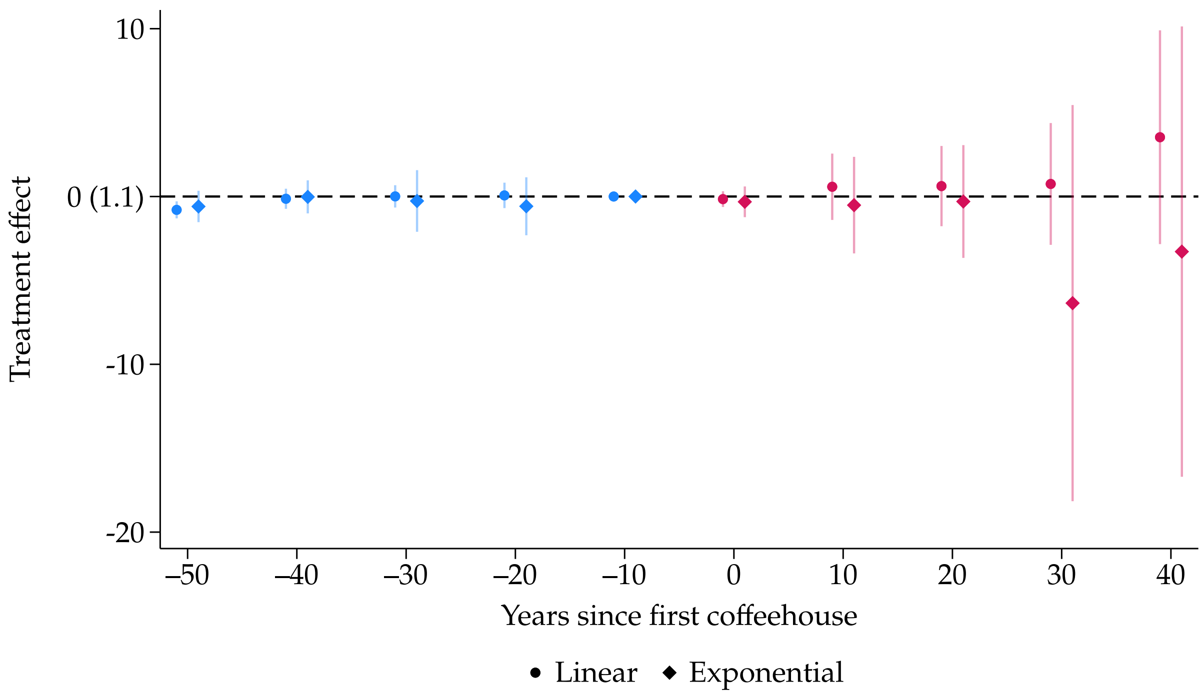
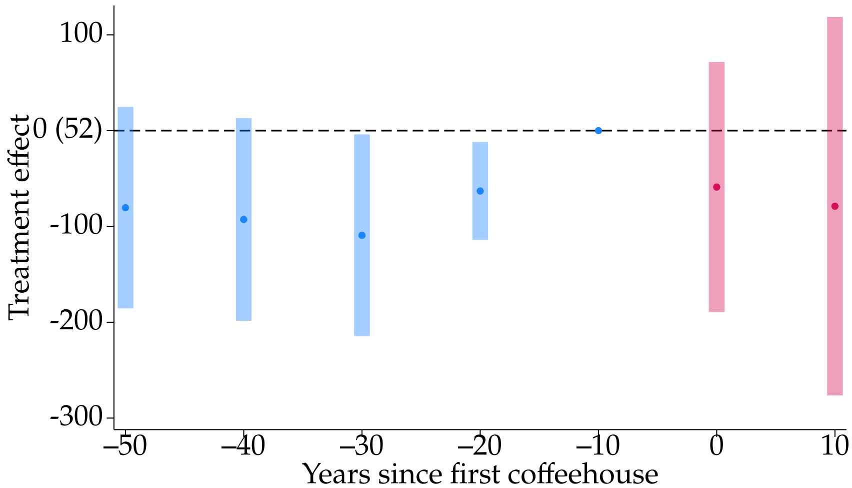


Figure A.14: Effects on Non-Scientific Letters

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (3) of the effect of first coffeehouse opening. Outcome of interest is the decadal number of non-scientific letters in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

(A) Baptisms density



(B) Deaths density

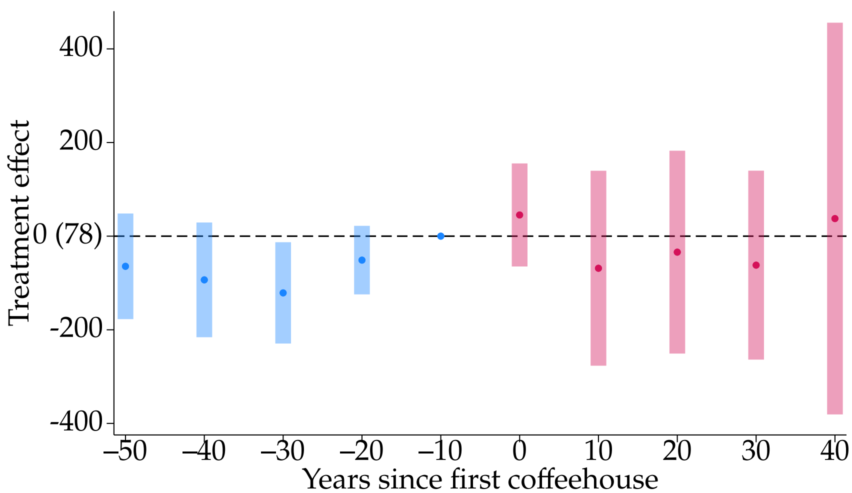
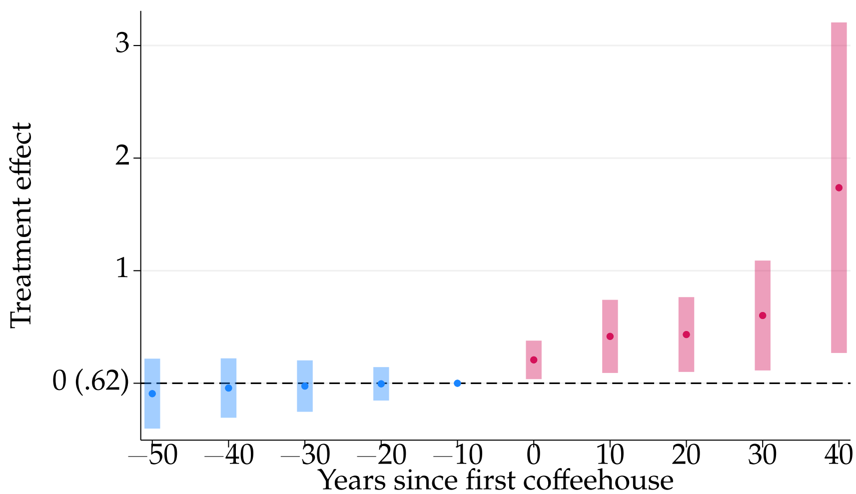


Figure A.15: Effects on population density

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on placebo outcomes. Outcomes of interest are the decadal number of baptisms and deaths per square kilometre in a jurisdiction. Sample includes 130 of 162 jurisdictions for baptisms from the 1600s to the 1660s and 119 of 162 jurisdictions for deaths from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.8 Great Fire of London

(A) Mathematical practitioners



(B) Scientific instrument shops

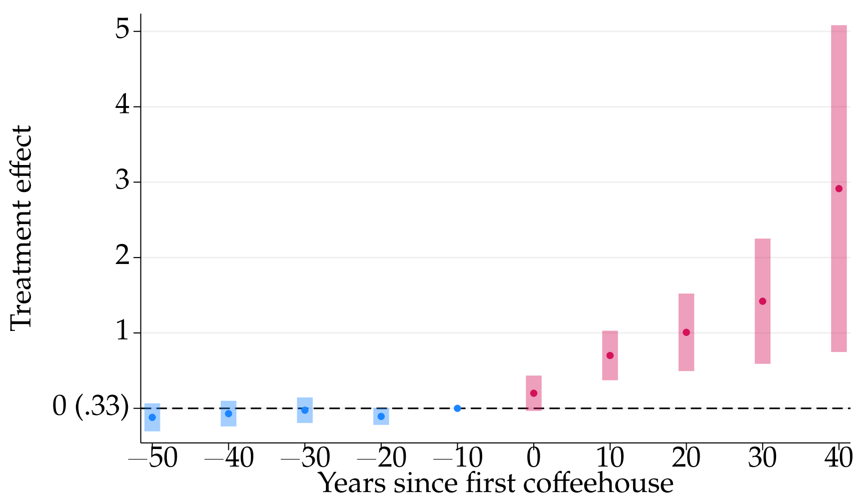
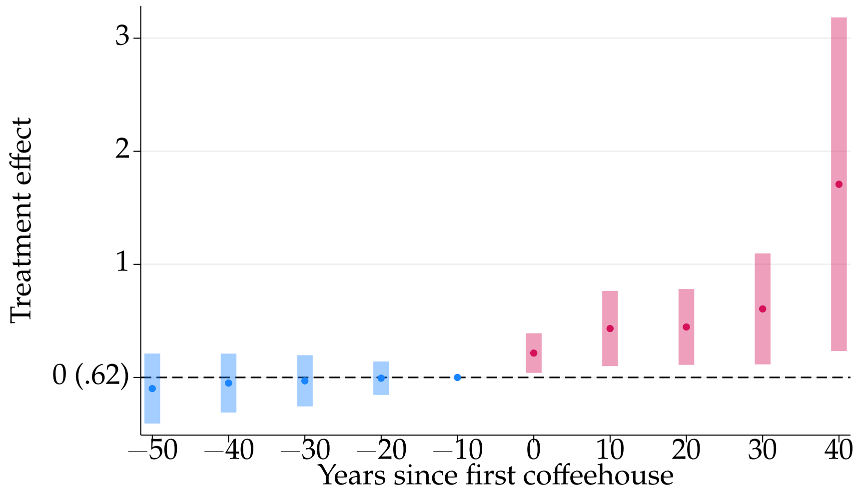


Figure A.16: Effects on scientific activity: control for exposure to the Great Fire

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1), including fixed effects for the interaction between the Great Fire exposure 0-1 indicator and each decade, of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.9 London Wall

(a) Mathematical practitioners



(b) Scientific instrument shops

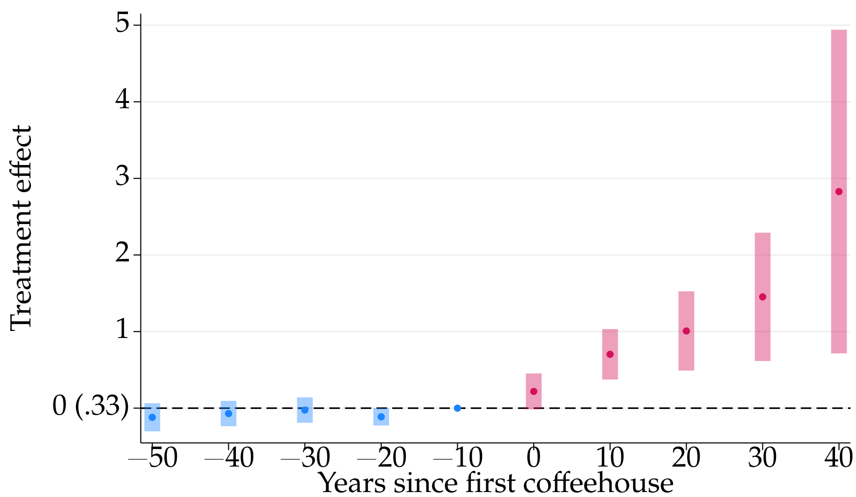
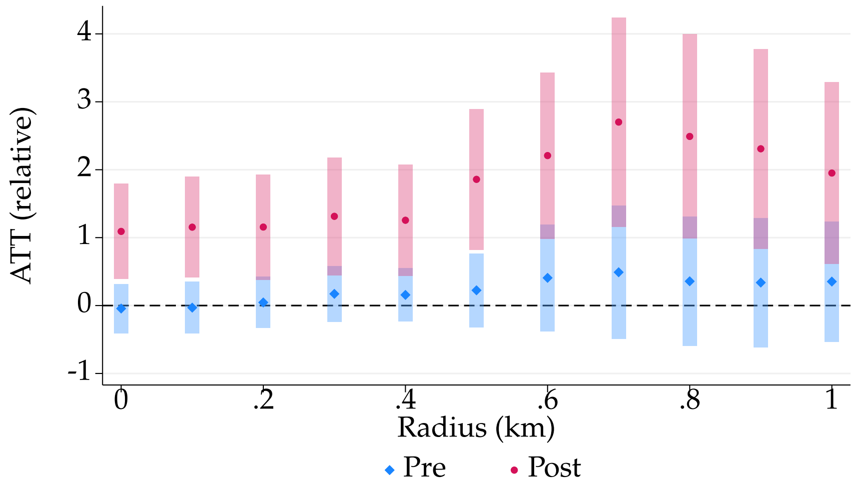


Figure A.17: Effects on scientific activity: control for within London Wall

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1), including fixed effects for the interaction between an if within the London Wall 0-1 indicator and each decade, of the effect of first coffeehouse opening on scientific activity. Outcome of interest is the decadal number of scientific instrument shops operated by instrument makers who are members of a guild. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.10 Spatial Spillovers

(A) Mathematical practitioners



(B) Scientific instrument shops

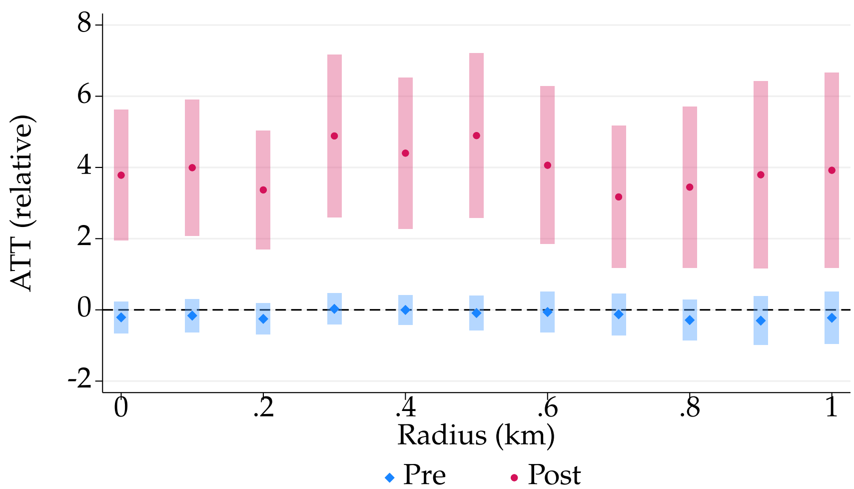


Figure A.18: Effects on Scientific Activity by Spillover Radius

Notes: Figure shows pre- and post-averages of event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity, but where first coffeehouse opening in jurisdiction i in decade t is defined by a set spillover radius r: (i) the first coffeehouse within i was established in t, and (ii) no coffeehouse was established before t within an r-kilometer radius of the centroid of i. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Each outcome is divided by its reference mean, i.e., the sample mean of the outcome one decade before the first coffeehouse opened. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Standard errors clustered by jurisdiction.

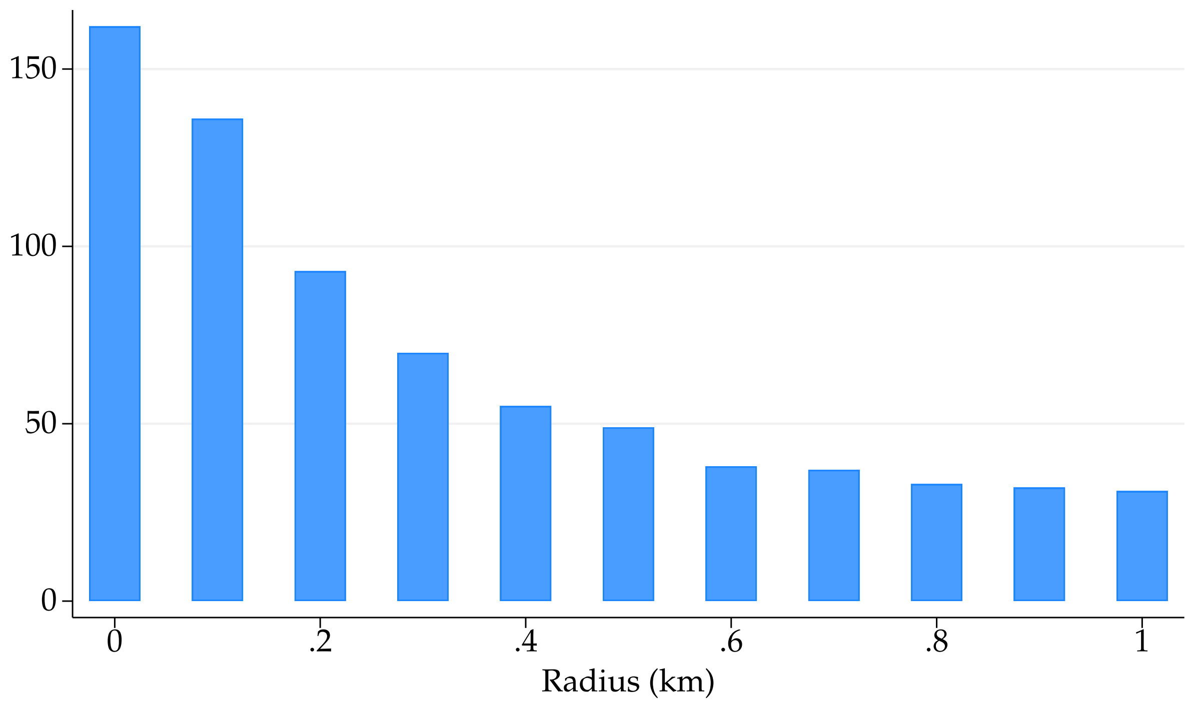
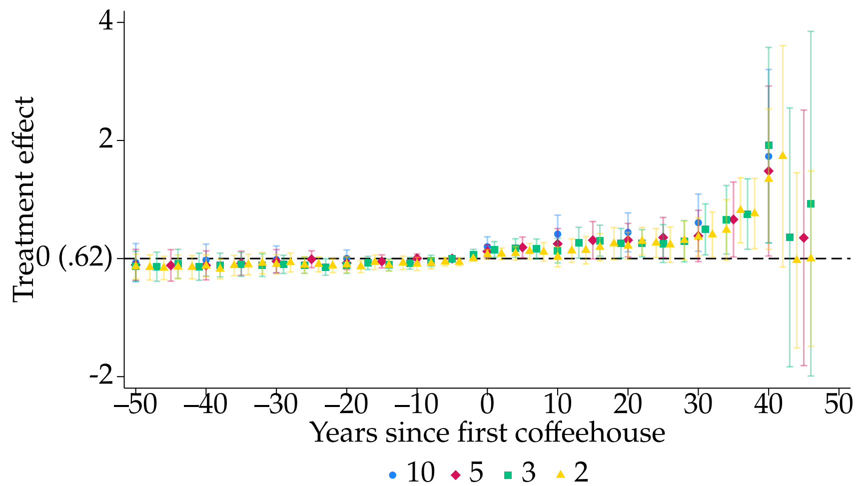


Figure A.19: Number of jurisdictions after removing treated neighbors by spillover radius

Notes: Figure plots the number of jurisdictions in the sample by spillover radius r when first coffeehosue opening in jurisdiction i in decade t is defined by a fixed spillover radius r: (i) the first coffeehouse within i was established in t, and (ii) no coffeehouse was established before t within an r-kilometer radius of the centroid of i. This implicitly drops jurisdictions that had a coffeehouse established prior to decade t within the specified radius r of their centroid, so the number of jurisdictions declines as r increases.

A.11 Temporal Granularity

(A) Mathematical practitioners



(B) Scientific instrument shops

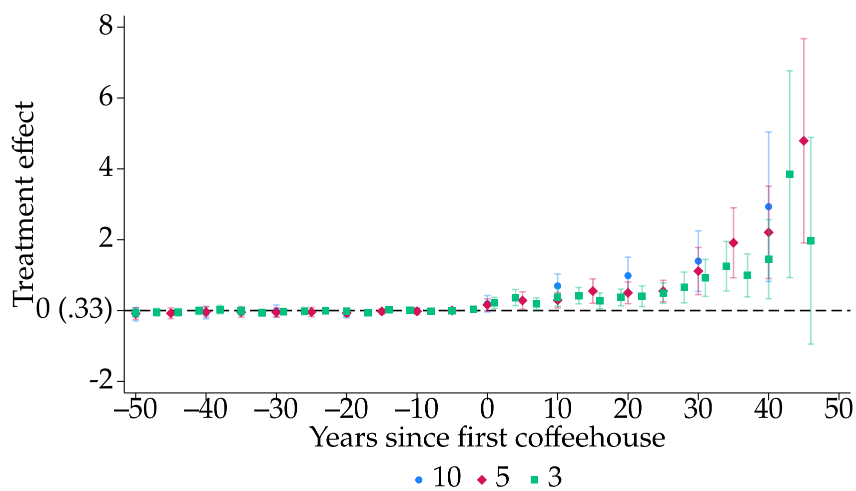


Figure A.20: Effects on scientific activity by time-frame length

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the number of mathematical practitioners and scientific instrument shops in a jurisdiction, estimated across varying time-frame lengths. Unit of observation is jurisdiction by time-frame length (decadal, quinquennial, triennial, and biannual). Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.12 Spatial Granularity

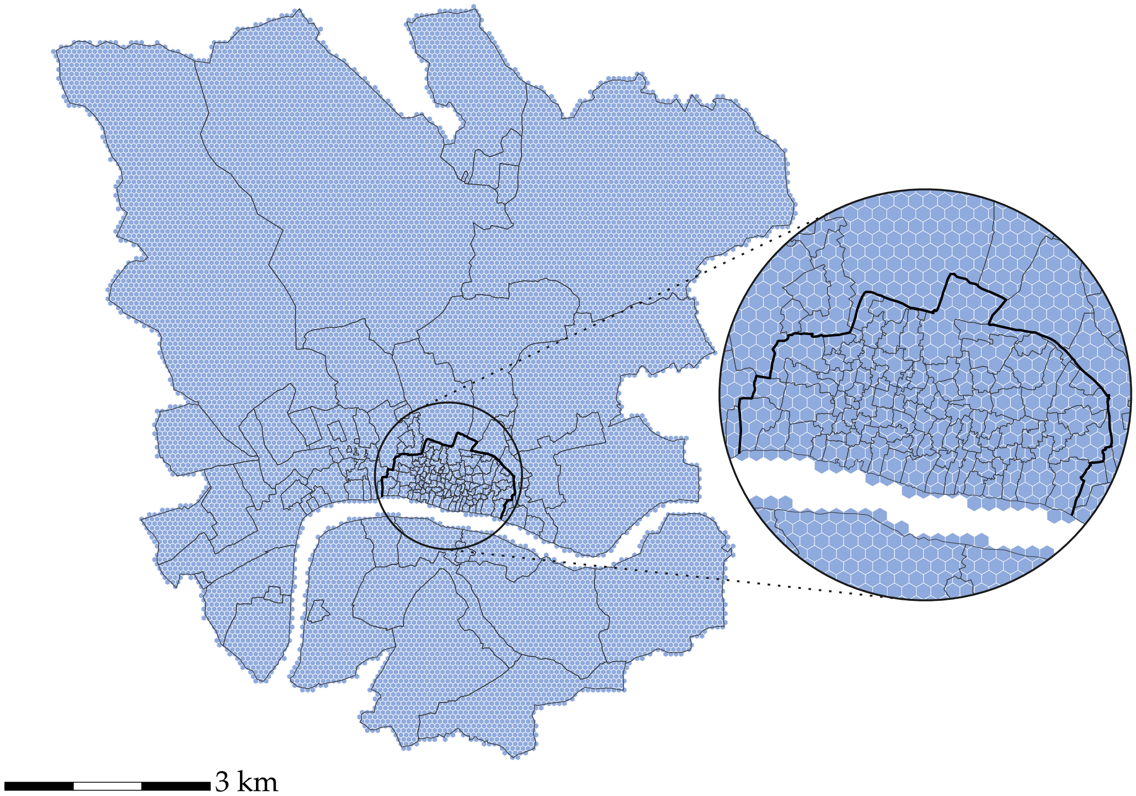
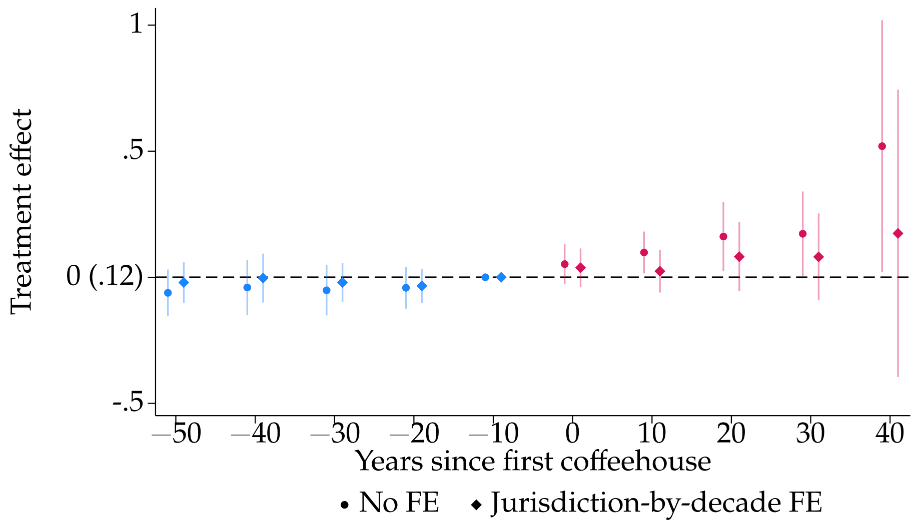


Figure A.21: Hexagonal partition of London

Notes: Map of London divided into 15,351 hexagons of 5,000 m2 each, with white lines for hexagon boundaries and black lines for the 162 jurisdiction boundaries.

(A) Mathematical practitioners



(B) Scientific instrument shops

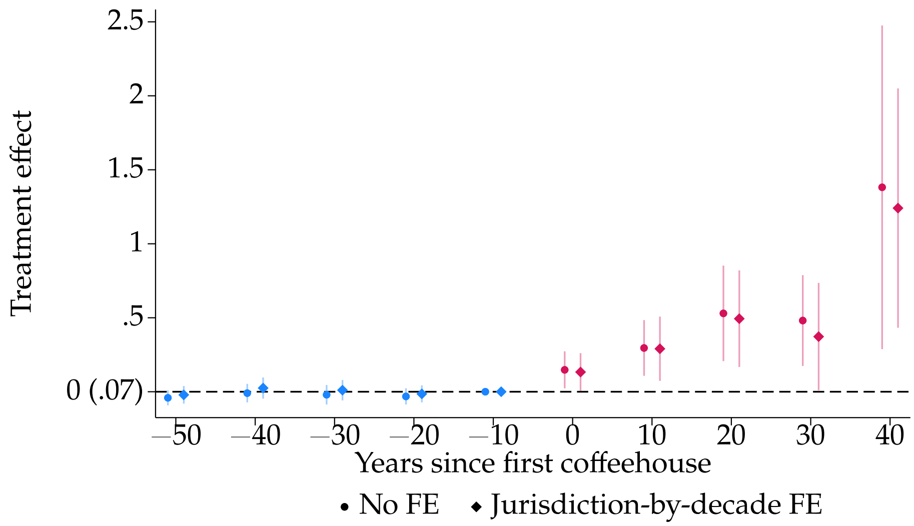


Figure A.22: Effects on scientific activity

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity, without and with jurisdiction-by-decade fixed effects. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a 5000 m2 hexagon. Sample includes all 15,351 hexagons of size 5,000 m2 (see Appendix Figure A.21) and all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is hexagon-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.13 Selective Migration

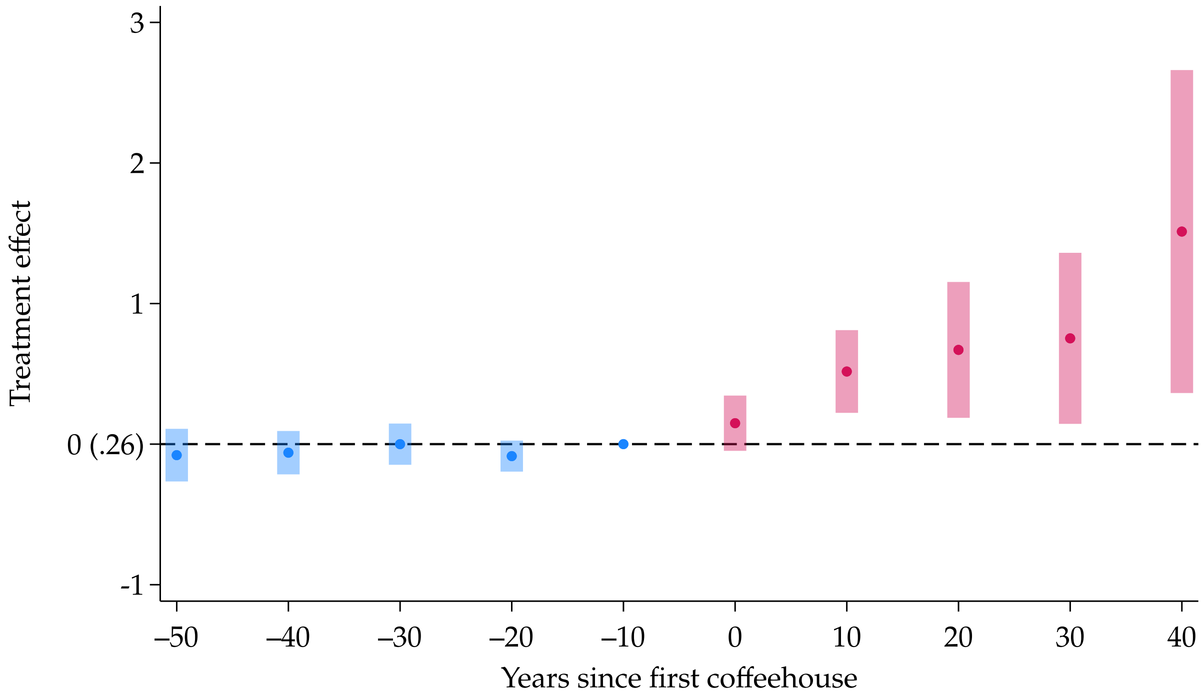


Figure A.23: Effects on first-generation scientific instrument shops

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcome of interest is the decadal number of original established scientific instrument shops in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

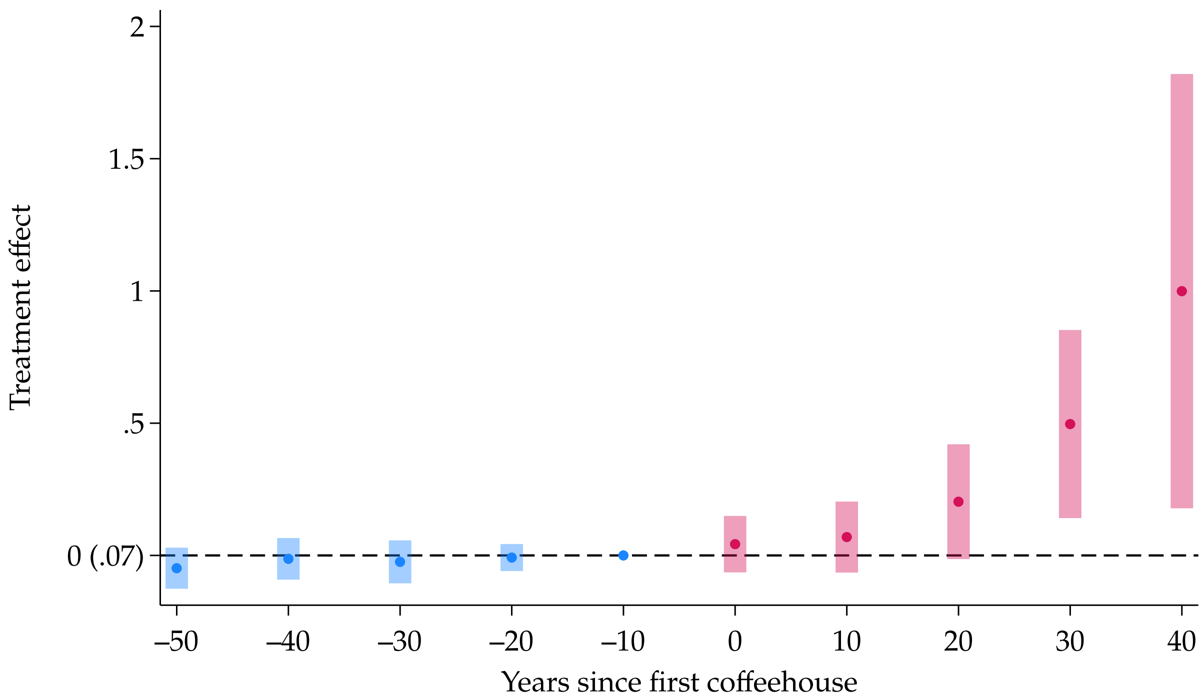


Figure A.24: Effects on incoming later-generation scientific instrument shops

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcome of interest is the decadal number of scientific instrument shops in a given jurisdiction that were originally established elsewhere. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.14 Selection into the Historical Records

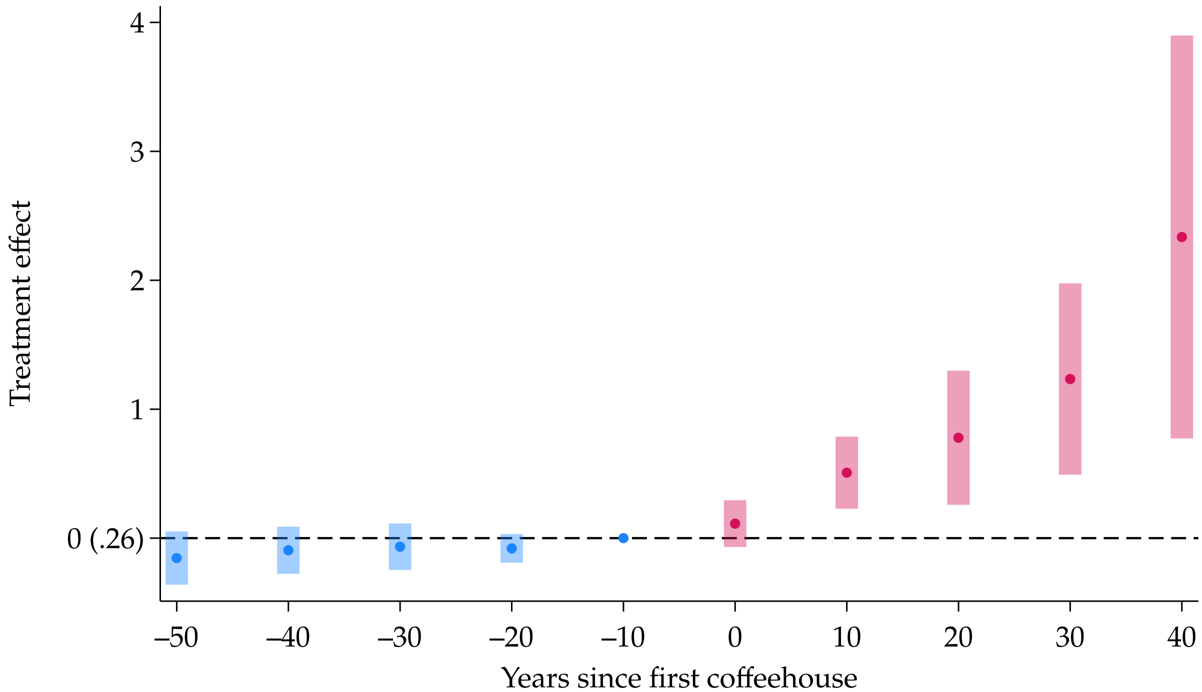


Figure A.25: Effects on scientific instrument shops in guild

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcome of interest is the decadal number of scientific instrument shops operated by instrument makers who are members of a guild. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

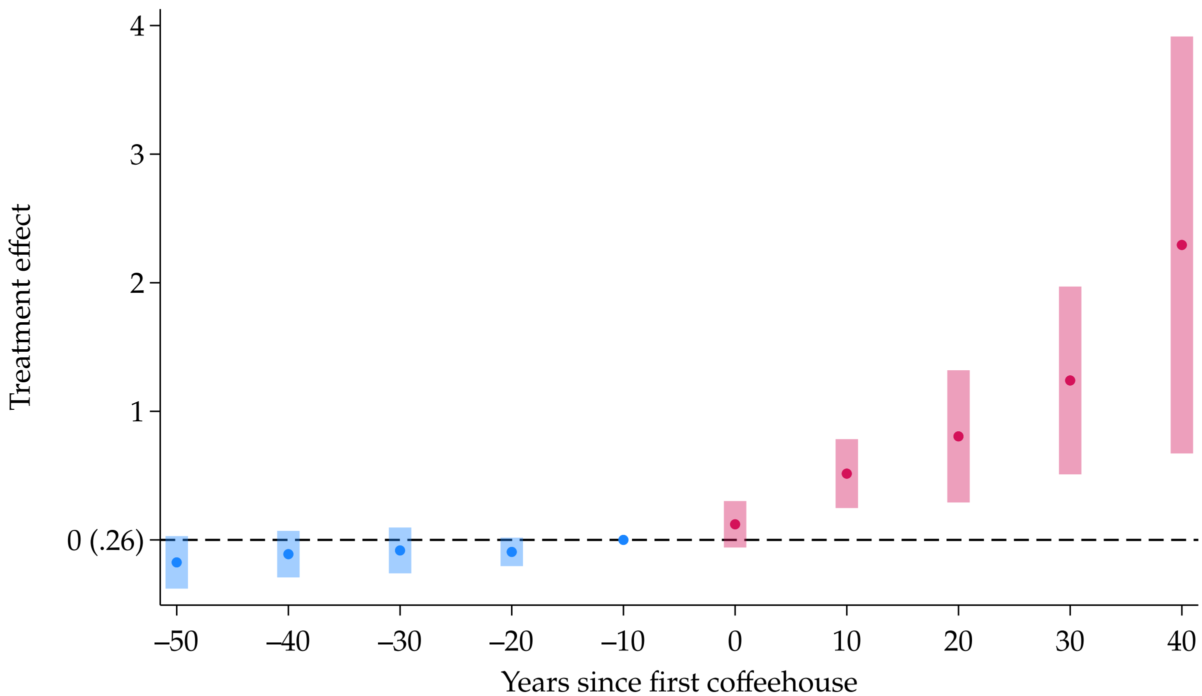
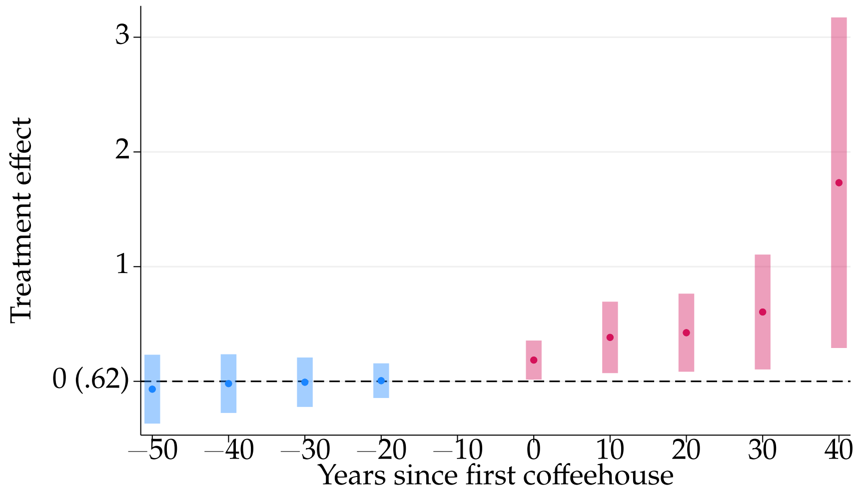


Figure A.26: Effects on scientific instrument shops in guild: Control for Great Fire

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1), including fixed effects for the interaction between the Great Fire exposure 0-1 indicator and each decade, of the effect of first coffeehouse opening on scientific activity. Outcome of interest is the decadal number of scientific instrument shops operated by instrument makers who are members of a guild. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.15 Never- and Not-Yet-Treated as Control

(a) Mathematical practitioners



(b) Scientific instrument shops

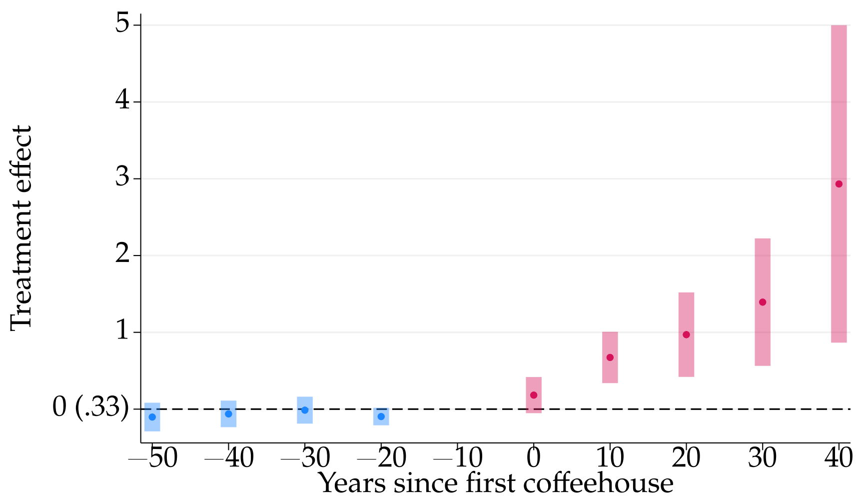
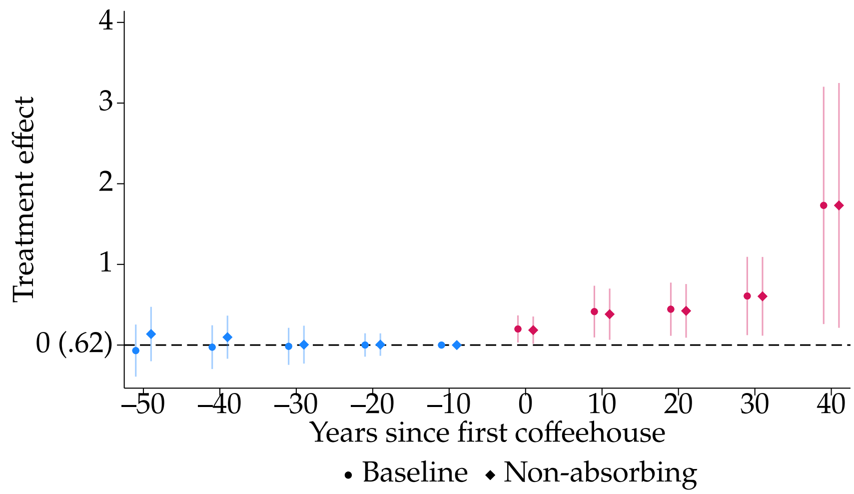


Figure A.27: Effects on scientific activity: Never- and not-yet-treated

Notes: Figure shows event study estimates and 95 percent confidence intervals from our baseline specication and based on Callaway and Sant'Anna (2021) of the effect of first coffeehouse opening on scientific activity, where the control group consists of both never- and not-yet-treated jurisdictions. Outcome of interest is the decadal number of mathematical practitioners and scientific instrument shops. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.16 Definition of Treatment as Non-Absorbing

(a) Mathematical practitioners



(b) Scientific instrument shops

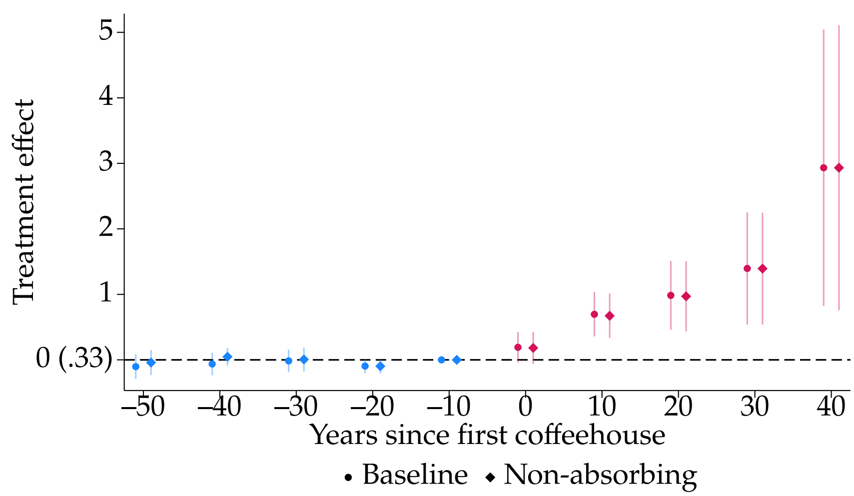
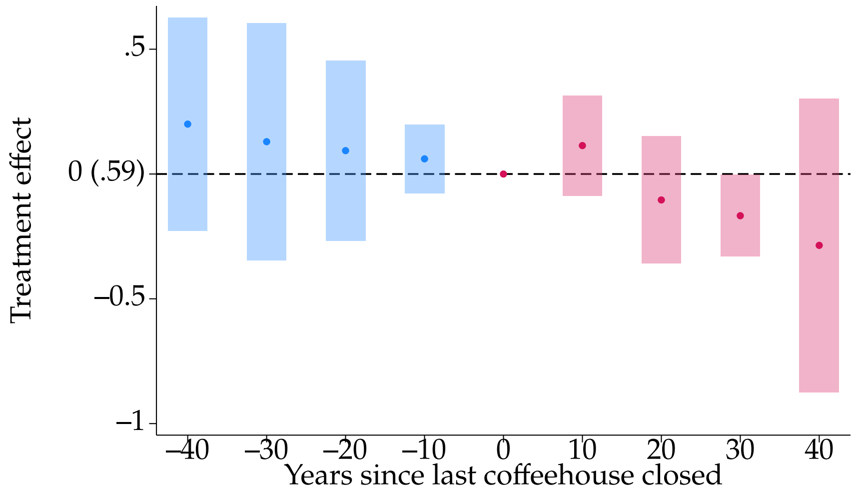


Figure A.28: Effects on scientific activity: non-absorbing treatment

Notes: Figure shows event study estimates and 95 percent confidence intervals from our baseline specication and based on de Chaisemartin and d'Haultfoeuille (2024) of the effect of the presence versus absence of coffeehouses on scientific activity. Outcome of interest is the decadal number of mathematical practitioners and scientific instrument shops. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.17 Closing Coffeehouses

(a) Mathematical practitioners



(b) Scientific instrument shops

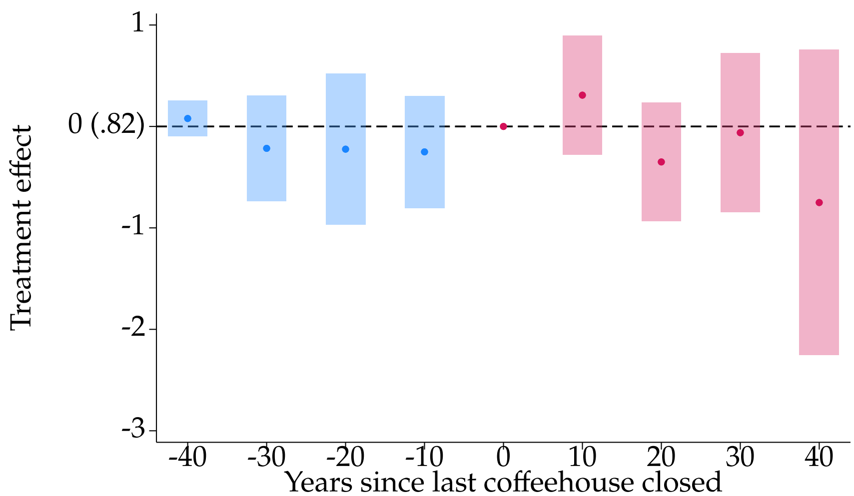
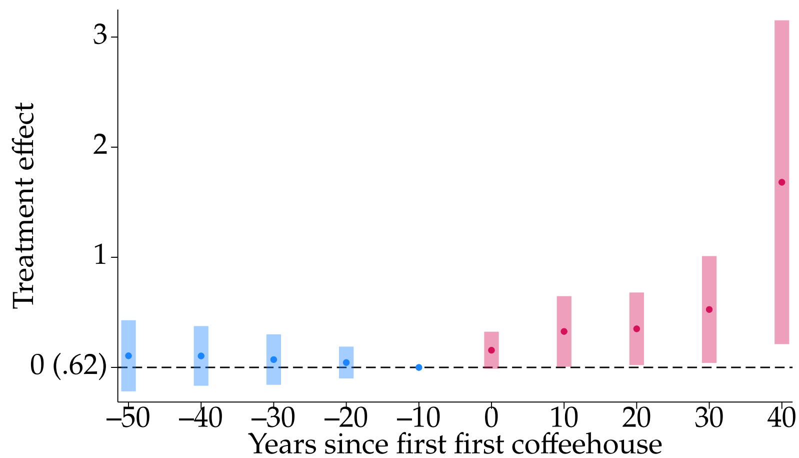


Figure A.29: Effects on scientific activity: closing down the last coffeehouse

Notes: Figure shows event study estimates and 95 percent confidence intervals based on de Chaisemartin and d'Haultfoeuille (2024) of the effect of closing down coffeehouses on scientific activity. Outcome of interest is the decadal number of mathematical practitioners and scientific instrument shops. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.18 Group-Specific Trends

(a) Mathematical practitioners



(b) Scientific instrument shops

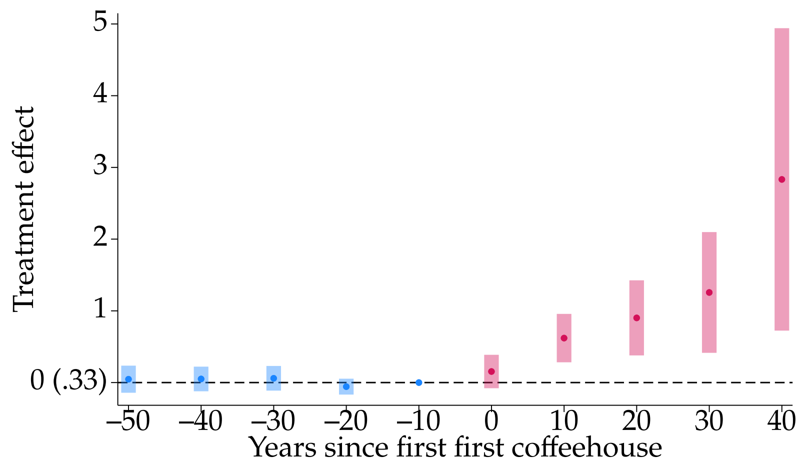
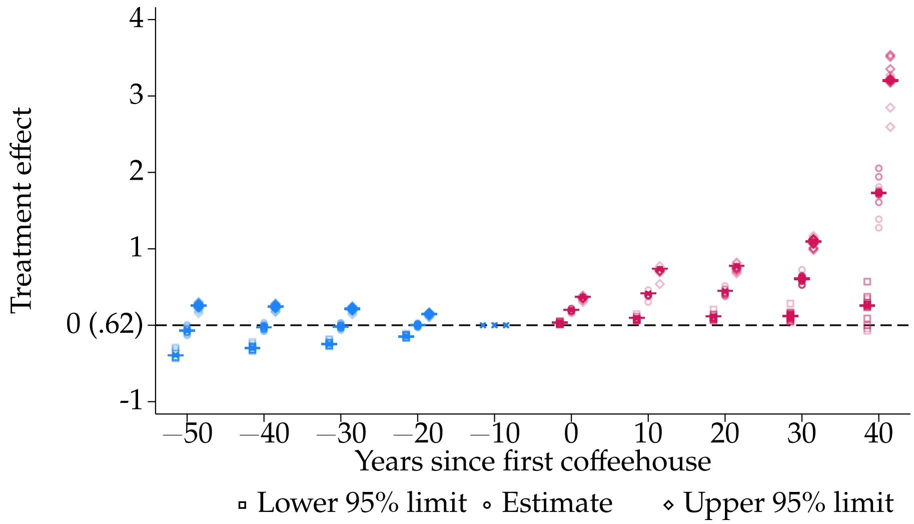


Figure A.30: Effects on scientific activity: Group-specific trends

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity after adjusting for group-specific trends. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. We detrend by following a suggestion in Goodman-Bacon (2021) by first estimating a linear trend in the outcome by cohort of treatment using only observations before treatment and then subtracting the estimated linear trend from the outcome. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.19 Leave-One-Out Sensitivity Check

(a) Mathematical practitioners



(b) Scientific instrument shops

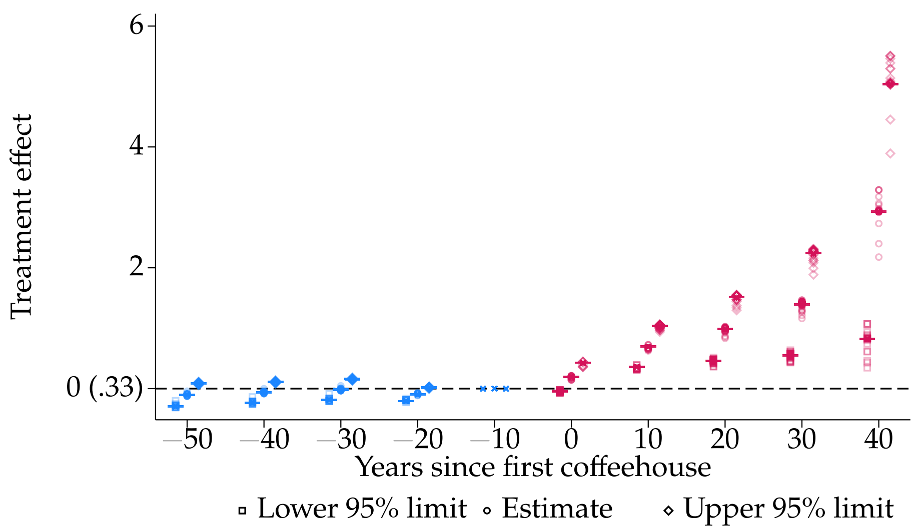
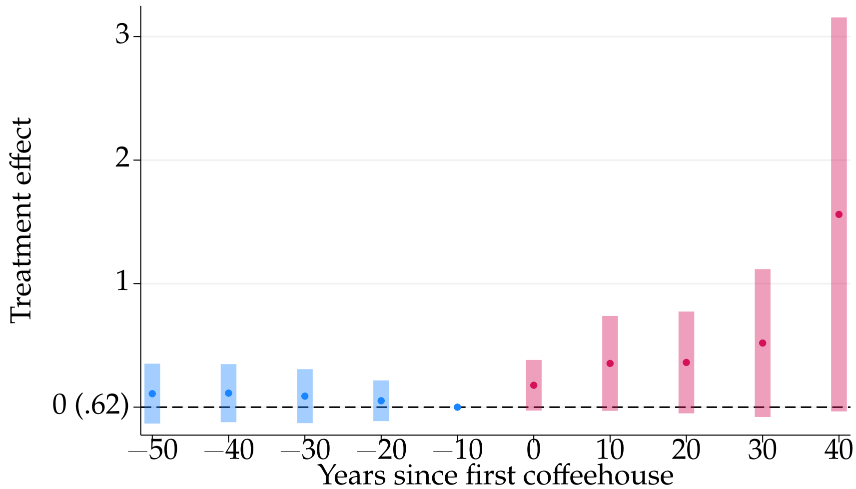


Figure A.31: Effects on scientific activity: Leave-One-Out Sensitivity Check

Notes: Figure shows boxplots with outliers of event study estimates and their 95 percent confidence limits from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. The boxplots use 162 leave one out samples from the 1600s to the 1690s, with each jurisdiction omitted once. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.20 Specification Checks

(A) Mathematical practitioners



(B) Scientific instrument shops

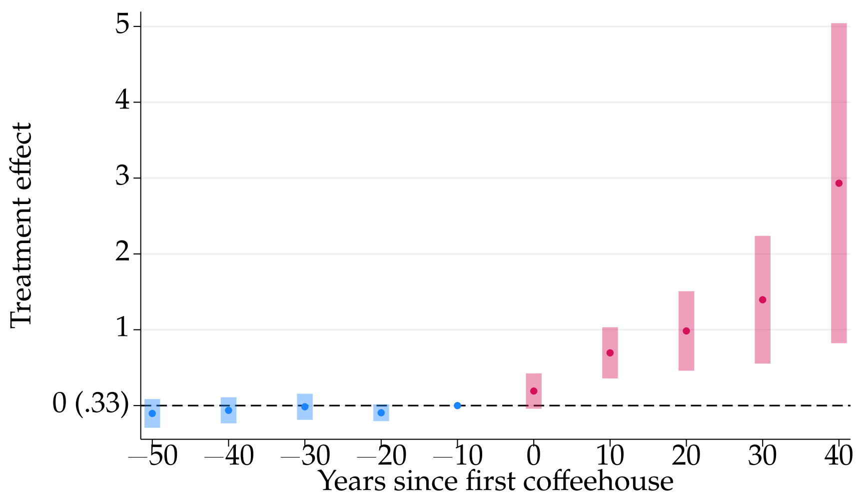
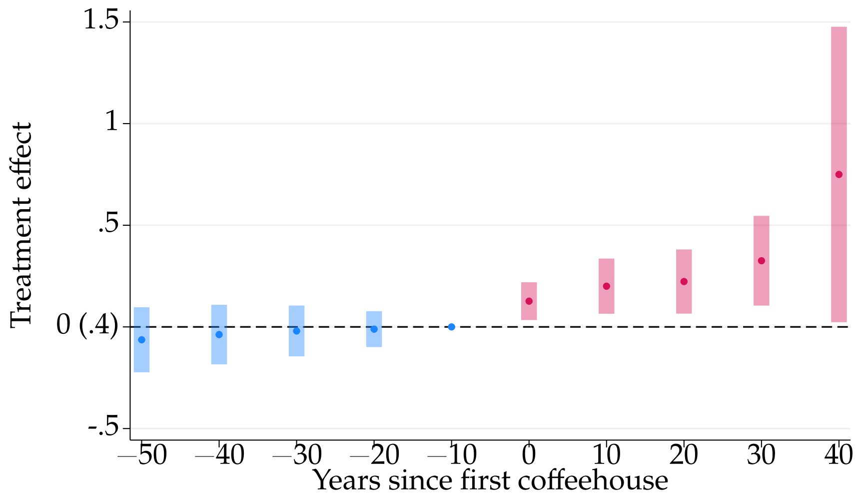


Figure A.32: Effects on scientific activity: Poisson

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (3) of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

(a) Mathematical practitioners



(b) Scientific instrument shops

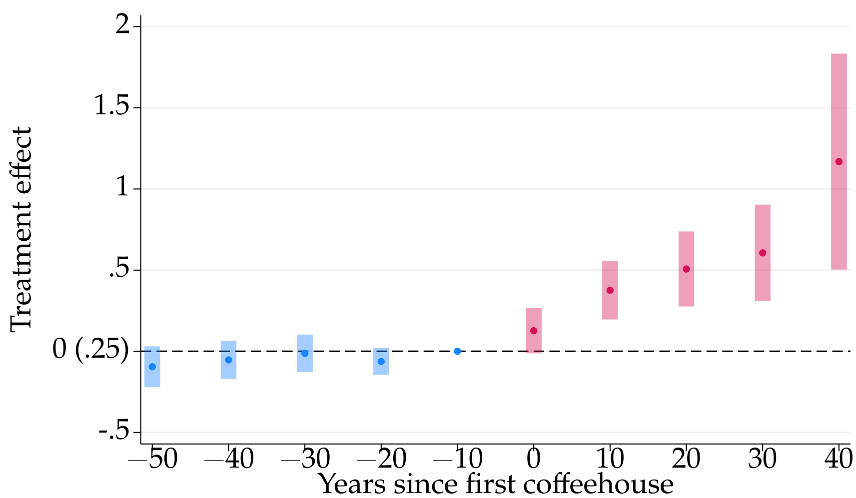
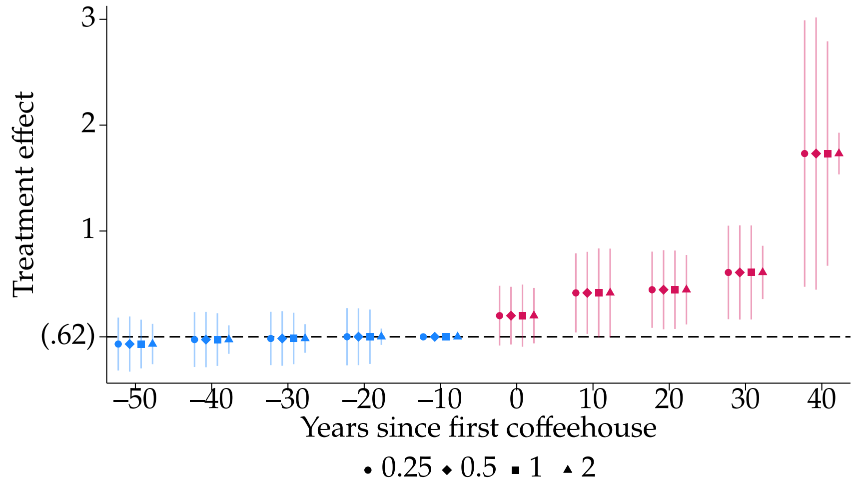


Figure A.33: Effects on scientific activity: Inverse hyperbolic sine

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) using the inverse hyperbolic sine of the outcome, i.e., $\text{IHS}(y_{it}) = \alpha + \sum_{g \in \mathcal{G}} \sum_{s=1600}^{1690} \beta_{gs} \mathbb{1}[s = t] \mathbb{1}[g = E_i] + \gamma_i + \delta_t + \epsilon_{it}$, of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors clustered by jurisdiction.

A.21 Spatial Correlation

(A) Mathematical practitioners



(B) Scientific instrument shops

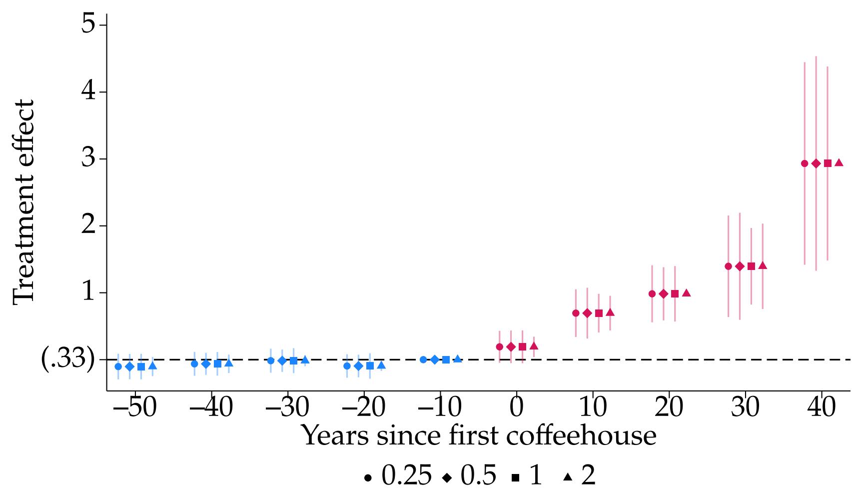
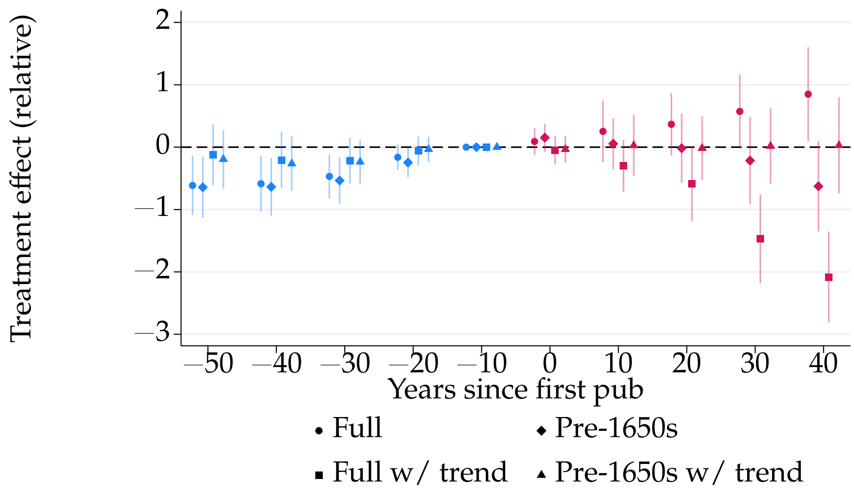


Figure A.34: Effects on scientific activity: Conley SEs

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first coffeehouse opening on scientific activity. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Parenthetical next to 0 gives the sample outcome mean one decade before treatment. Standard errors are calculated following Conley (1999), corrected for heteroskedasticity, autocorrelation, and spatial correlation using a linear distance decay function with cutoffs of 0.25, 0.5, 1, and 2 kilometers.

A.22 Taverns and Inns as a Comparative Placebo: Robustness

(A) Mathematical practitioners



(B) Scientific instrument shops

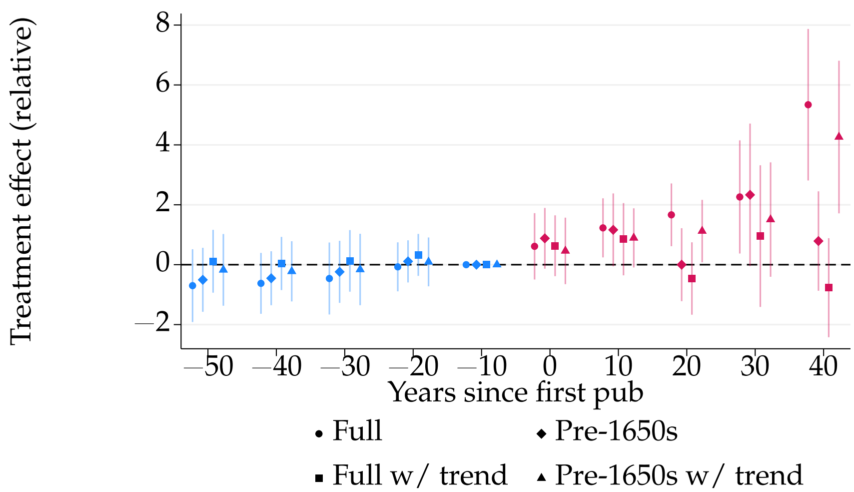


Figure A.35: Pub effects on scientific activity: Group-specific trends

Notes: Figure shows event study estimates and 95 percent confidence intervals from equation (1) of the effect of first pub opening in the 1600s on scientific activity. Pubs are defined as taverns and inns. Outcomes of interest are the decadal number of mathematical practitioners and scientific instrument shops in a jurisdiction. Each outcome is divided by its reference mean, i.e., the sample mean of the outcome one decade before the first coffeehouse opened. Sample includes all 162 jurisdictions from the 1550s to the 1690s (full) or the 1550s to the 1690s (before 1650s). Results "w/ trend" first adjust for group-specific linear trends, where we detrend by following a suggestion in Goodman-Bacon (2021) by first estimating a linear trend in the outcome by cohort of treatment using only observations before treatment and then subtracting the estimated linear trend from the outcome. Unit of observation is jurisdiction-decade. Standard errors clustered by jurisdiction.

B. APPENDIX TABLES

Table B.1—Relative Wealth in the London Victualling Trades, 1692–93

Trade	Individuals	Householders	Mean Rent, £	Mean Stock, £
Victuallers	773	768	21	26
Coffeemen and Women	137	135	30	20
Vintners	131	123	80	149
Innholders or Keepers	91	91	80	74
Tapsters	23	3	—	—
Alehouse-keepers	10	10	21	25
Strongwater-men	10	10	16	42
Total	1,175	1,140		

Notes: Data from Cowan (2005, table 7).

Table B.2—Coffee trade of the East India Company, 1650s–80s

Period	Activity	Pounds
1657	1st coffee order	22,400
1659	2nd coffee order	44,800
1660	1st official coffee sale	—
1660s	Coffee imports	45,000–56,000 per year
1680s	Coffee imports	280,000 per year

Notes: Avoirdupois pounds. Data from Smith (2001, pp. 264–5).

Table B.3—Correlation between coffeehouses and pubs

	Coffeehouses (standardized)				Coffeehouses > 0			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pubs (standardized)	0.410	0.267	0.419	0.259				
	(0.086)	(0.084)	(0.088)	(0.089)				
Pubs > 0					0.194	0.083	0.182	0.033
					(0.026)	(0.024)	(0.027)	(0.022)
Mean dep. var.	0	0	0	0	0.107	0.107	0.107	0.107
Observations	1620	1620	1620	1620	1620	1620	1620	1620
Jurisdiction FE		✓		✓		✓		✓
Decade FE			✓	✓			✓	✓

Notes: Table shows the relationship between coffeehouses and pubs. Columns 1–4 show effect sizes from regressions of the number of coffeehouses on the number of pubs, after standardizing to mean 0 and standard deviation 1, beginning with the raw correlation in Column 1, then add jurisdiction fixed effects, decade fixed effects, and finally both jurisdiction and decade fixed effects. Columns 5–8 show the corresponding extensive-margin regressions of indicators of coffeehouses and pubs with the same sequence of fixed effects. Sample includes all 162 jurisdictions from the 1600s to the 1690s. Unit of observation is jurisdiction-decade. Standard errors clustered by jurisdiction.

C. HISTORICAL BACKGROUND

C.1 Coffeehouse Founders and the Choice of Coffeehouse Locations

This appendix provides anecdotal evidence that coffeehouse founders came from a different cultural background than mathematical practitioners and chose their locations for reasons unrelated to science.

C.2 Examples of Science in Coffeehouses

D. DATA APPENDIX

D.1 Variable Definitions

Coffeehouses. The number of coffeehouses established between 1652 and 1699 in a given jurisdiction is based on public houses identified as coffeehouses by Lillywhite (1963, 1972), excluding entries explicitly marked as duplicates. When Lillywhite (1963, 1972) is uncertain whether two mentions refer to the same establishment, both are retained as separate entries. For any year t, the count includes all coffeehouses whose recorded years of activity encompass t, as determined by their earliest and latest mentions. In cases where only a decade is known (about 4 percent of records), activity years are set to the full decade range (e.g., 1660s as 1660–1669).

Mathematical Practitioners. TBA.

Scientific Instrument Shops. TBA.

D.2 Data Sources

Table D.1—Data Sources

Data Source	Publication Year(s)	Online Description	Variables
Burn (1855)	1855	Internet Archive	Tradesmen's Tokens 1648–1672
Taylor (1954)	1954	Internet Archive	Mathematical Practitioners, Connections Between Mathematical Practitioners
Lillywhite (1963)	1963	Internet Archive	Coffeehouses
Lillywhite (1972)	1972	Internet Archive	Coffeehouses, Signs, Taverns, Inns, Goldsmiths
Clifton (1995)	1995	Internet Archive	Scientific Instrument Shops
Clark and Cummins (2014)	2014	Human Nature	Surname Counts Among Alumni at the University of Cambridge and Oxford
Cummins et al. (2016)	2016	Economic History Review	Median Tax Paid 1582, Percentage of Substantial Households 1638, Baptisms, Deaths
Warren et al. (2016)	2016	Six Degrees of Francis Bacon	Connections Between Figures in the Oxford Dictionary of National Biography (ODNB)
FamilySearch (2025)	2024	FamilySearch	Surname Counts Among English Couples Married 1538–1649
Hotson and Lewis (2024)	2024	Early Modern Letters Online	Letters Sent and Received
Isaac et al. (2024)	2024	University of Oxford	Booksellers
The Royal Society (2024)	2024	The Royal Society	Fellows of the Royal Society

D.3 Sample Pages of Original Historical Data

London Coffee Houses

649. John Shipton's Coffee House, *in Exchange Alley. Afterwards in Swithen's Alley by the Royal Exchange. Also mentioned as Shipston's.*

1705–11 John Shipton is first noted at John's Coffee House in Exchange Alley, and appears to have removed himself between 1705 and 1711 to John's Coffee House in Sweeting's Alley on the corner of Cornhill, later known as No. 87 Cornhill. These dates are subject to correction, as Ashton's list of coffee houses compiled in 1897, names 'Shipton's Coffee House Swithin's Alley' in 1702–14, when contemporary accounts place him in Exchange Alley.

See John's Coffee House. No. 636.
John's Coffee House. No. 635.
Shipton's Coffee House. No. 1202.

650. John's and Turkey Coffee House, 87, *Cornhill.*

1796–1822 Title adopted by John's Coffee House, 87 Cornhill from about 1796 to 1822.

See John's Coffee House. No. 635.

651. John's Turkey and Mediterranean Coffee House, 87 *Cornhill. At times mentioned as John's and Mediterranean Coffee House.*

1822–40 Further change of title adopted by preceding house about 1822, under the Proprietorship of T. L. Terry.

See John's Coffee House. No. 635.
John's and Turkey Coffee House. No. 650.

652. Johnson's Coffee House, '*near St. James's Church, Piccadilly*'.

1702–14 In Ashton's list.

653. Johnson's Coffee House, 1 *&* 2, *Bolt Court, Fleet Street.*

1833–34 Listed in Pigot's directory. Proprietor—Anthony Beck.

654. Johnson's Coffee House, *adjoining the Surrey Theatre, Blackfriars Road. The Royal Circus for equestrian performances opened* 4*th November,* 1782 *and was burnt down on* 12*th August,* 1805. *Rebuilt* 1806 *and named the Surrey Theatre. Johnson's Coffee-house adjoined on the left-hand side when facing the building.*

1809–11 Listed in Holden's directory as the address of Hoffman & Co. Merchants; it is possible Hoffman was the proprietor of Johnson's.

1813 J. Dempster is given in the Post Office directory, 1813—Academical & Commercial Agent, Southwark, or at Johnson's Coffee-house.

1814 A Print published by Robert Wilkinson, 1814, shows both the Surrey Theatre and Johnson's Coffee-house adjoining. In 1819, the Surrey Theatre is described as 'Lately called the Royal Circus, is fitted up with a considerable degree of elegance, and is a very convenient theatre. Here under an annual licence from the Magistrates of the county, burlettas, melodramas, dances and pantomimes are got up and performed in good style. It is at present under the management of Mr. Dibdin.'

1826–27 Johnson's Coffee House is listed in 1826–27 directories as 1 Watton place, Blackfriars Road. Proprietor—Mary Johnson.

1828 Johnson's Coffee House is shown in a drawing by T. H. Shepherd of the 'Surry Theatre, Blackfriars Road,' published Feb. 1828 by Jones; but I find no later reference to Johnson's.

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London Coffee Houses

1838 The directories for 1838, under Blackfriars Road, west side, list No. 123, Surrey Coffee House, R. C. Rhodes 'next door to the Surrey Theatre'.

See Surrey Coffee House. No. 1298.

655. Jonah's Coffee House.

Malcolm's 'Manners & Customs' mentions this coffee-house, but with no location, when 'Nicholas No-shoes' under date September,
1736 18, 1736 addressed to a Society at 'Jonah's coffee-house' a satirical attack upon the pernicious effect of Gin. Malcolm's account of the times, is worth quoting: 'The next disturbance of the public pease proceeded from the dregs of the people, who were exasperated beyond measure at the laudable attempts of their superiors to suppress the excessive use of Gin; and their resentment became so very turbulent in September 1736, that they even presumed to exclaim in the streets 'No Gin, no King' in consequence, double guards were posted at Kensington, St. James's, Somerset-house, and the Rolls. Besides these precautions, 500 of the Grenadier guards, and the Westminster troop of Horse-militia, were distributed as patroles, and in Hyde and St. James's Parks, Covent Garden &c. . . .'

656. Jonathan's Coffee House, *Exchange Alley, Cornhill, No.* 20, *in* 1767.

Notwithstanding the exaggerated accounts given by various writers
1680–84 describing Jonathan's as 'a great coffee-house in 1663', the late Dr. Kenneth Rogers claimed the discovery that Jonathan's was established and named by its proprietor, Jonathan Miles, about 1680. This was first brought to light by Rogers and published in The Banker, Vol. VIII, No. 33, October 1928. In support, are quoted entries in the registers of St. Mary Woolnoth, and the MS lists of the Langbourne Ward housed in Guildhall Library. In 1680, is recorded the baptism of Jonathan, son of Jonathan and Dorothie Miles; 1684, a maid-servant to Jonathan Miles, Coffeeman, buried. In the MS Watch Book list Langbourne Ward 1682, Jonathan Miles is assessed at 4s. in the same part of the list as Thomas Garraway, and in the Poll Tax list 1692, appears the assessment—Jonathan Miles, Coffee-house, 11s.—wife, 3 men and 2 mayds 6s.—17s.

1680 According to Robinson's History of Early Coffee Houses, Jonathan's Coffee-house is included in Dangerfield's list of suspect houses at the time of the Popish scare.

1681 John Aubrey does not mention Jonathan's in his 'Brief Lives' written about 1681; but writing on Sir Henry Blount's support of the coffee-houses, he records that 'Jonathan Paynter, opposite to St. Michael's Church, was the first apprentice to the Trade, viz.: to Bowman . . .' This remark may have led later writers to suppose that Jonathan Paynter established Jonathan's Coffee House Exchange-alley as early as 1663. It is known that Bowman's house was established in 1652 and that Jonathan Paynter his first apprentice; that Bowman died in 1662 and the coffee-house taken on by others, and perished in the Fire in 1666. Nearby, was John Painter, Cornhill, in Muddiman's list 1661[?] and in 1677 described as 'Mr. John Painter, at his house called John's Coffee-house, above the Royal Exchange in

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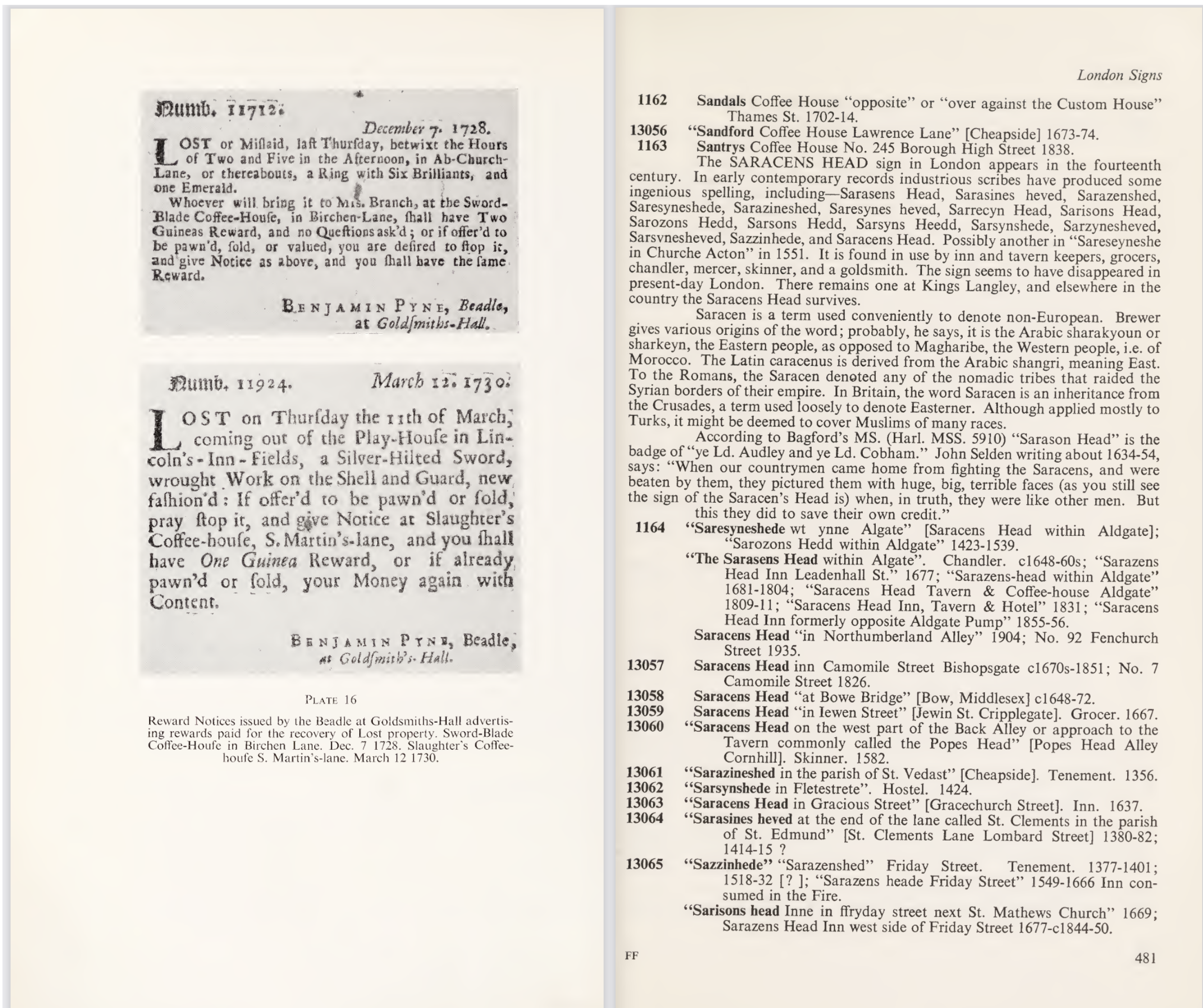
FIGURE D.1: COFFEEHOUSES IN LONDON (LILLYWHITE, 1972, PP. 304–5)



Numb. 11712.

December 7. 1728.

LOST or Miſlaid, laſt Thurſday, betwixt the Hours of Two and Five in the Afternoon, in Ab-Church-Lane, or thereabouts, a Ring with Six Brilliants, and one Emerald.

Whoever will bring it to Mrs. Branch, at the Sword-Blade Coffee-Houſe, in Birchen-Lane, ſhall have Two Guineas Reward, and no Queſtions ask'd; or if offer'd to be pawn'd, ſold, or valued, you are deſired to ſtop it, and give Notice as above, and you ſhall have the ſame Reward.

BENJAMIN PYNE, *Beadle*,
at *Goldſmiths-Hall*.

Numb. 11924. *March* 12. 1730.

LOST on Thurſday the 11th of March, coming out of the Play-Houſe in Lincoln's-Inn-Fields, a Silver-Hilted Sword, wrought Work on the Shell and Guard, new faſhion'd: If offer'd to be pawn'd or ſold, pray ſtop it, and give Notice at Slaughter's Coffee-houſe, S. Martin's-lane, and you ſhall have *One Guinea* Reward, or if already pawn'd or ſold, your Money again with Content.

BENJAMIN PYNE, Beadle,
at Goldſmith's-Hall.

PLATE 16

Reward Notices issued by the Beadle at Goldsmiths-Hall advertising rewards paid for the recovery of Lost property. Sword-Blade Coffee-Houfe in Birchen Lane. Dec. 7 1728. Slaughter's Coffee-houfe S. Martin's-lane. March 12 1730.

London Signs

1162 **Sandals** Coffee House "opposite" or "over against the Custom House" Thames St. 1702-14.

13056 "**Sandford** Coffee House Lawrence Lane" [Cheapside] 1673-74.

1163 **Santrys** Coffee House No. 245 Borough High Street 1838.

The SARACENS HEAD sign in London appears in the fourteenth century. In early contemporary records industrious scribes have produced some ingenious spelling, including—Sarasens Head, Sarasines heved, Sarazenshed, Saresyneshede, Sarazineshed, Saresynes heved, Sarrecyn Head, Sarisons Head, Sarozons Hedd, Sarsons Hedd, Sarsyns Heedd, Sarsynshede, Sarzynesheved, Sarsvnesheved, Sazzinhede, and Saracens Head. Possibly another in "Sareseyneshe in Churche Acton" in 1551. It is found in use by inn and tavern keepers, grocers, chandler, mercer, skinner, and a goldsmith. The sign seems to have disappeared in present-day London. There remains one at Kings Langley, and elsewhere in the country the Saracens Head survives.

Saracen is a term used conveniently to denote non-European. Brewer gives various origins of the word; probably, he says, it is the Arabic sharakyoun or sharkeyn, the Eastern people, as opposed to Magharibe, the Western people, i.e. of Morocco. The Latin caracenus is derived from the Arabic shangri, meaning East. To the Romans, the Saracen denoted any of the nomadic tribes that raided the Syrian borders of their empire. In Britain, the word Saracen is an inheritance from the Crusades, a term used loosely to denote Easterner. Although applied mostly to Turks, it might be deemed to cover Muslims of many races.

According to Bagford's MS. (Harl. MSS. 5910) "Sarason Head" is the badge of "ye Ld. Audley and ye Ld. Cobham." John Selden writing about 1634-54, says: "When our countrymen came home from fighting the Saracens, and were beaten by them, they pictured them with huge, big, terrible faces (as you still see the sign of the Saracen's Head is) when, in truth, they were like other men. But this they did to save their own credit."

1164 "**Saresyneshede** wt ynne Algate" [Saracens Head within Aldgate]; "Sarozons Hedd within Aldgate" 1423-1539.

"**The Sarasens Head** within Algate". Chandler. c1648-60s; "Sarazens Head Inn Leadenhall St." 1677; "Sarazens-head within Aldgate" 1681-1804; "Saracens Head Tavern & Coffee-house Aldgate" 1809-11; "Saracens Head Inn, Tavern & Hotel" 1831; "Saracens Head Inn formerly opposite Aldgate Pump" 1855-56.

Saracens Head "in Northumberland Alley" 1904; No. 92 Fenchurch Street 1935.

13057 **Saracens Head** inn Camomile Street Bishopsgate c1670s-1851; No. 7 Camomile Street 1826.

13058 **Saracens Head** "at Bowe Bridge" [Bow, Middlesex] c1648-72.

13059 **Saracens Head** "in Iewen Street" [Jewin St. Cripplegate]. Grocer. 1667.

13060 "**Saracens Head** on the west part of the Back Alley or approach to the Tavern commonly called the Popes Head" [Popes Head Alley Cornhill]. Skinner. 1582.

13061 "**Sarazineshed** in the parish of St. Vedast" [Cheapside]. Tenement. 1356.

13062 "**Sarsynshede** in Fletestrete". Hostel. 1424.

13063 "**Saracens Head** in Gracious Street" [Gracechurch Street]. Inn. 1637.

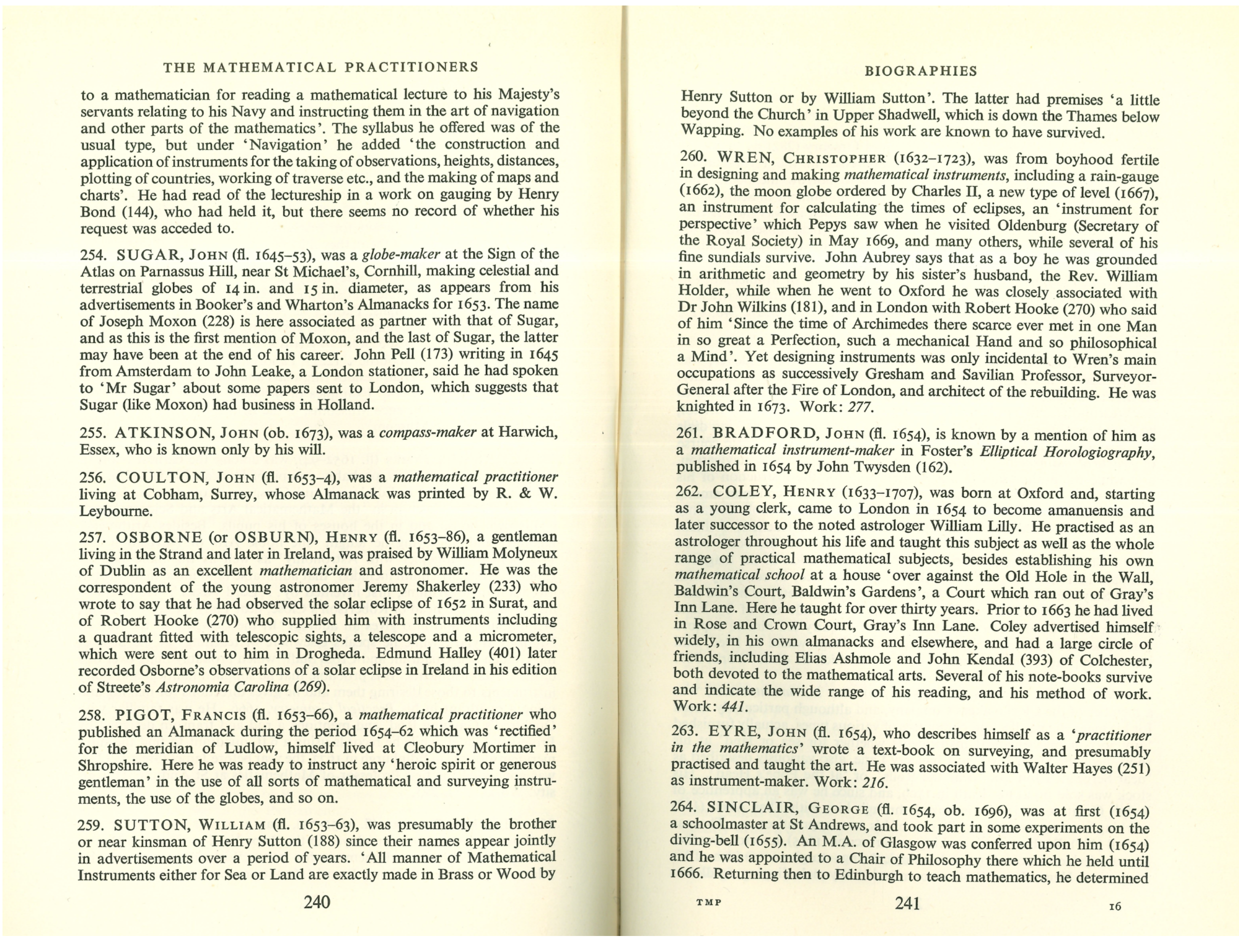
13064 "**Sarasines heved** at the end of the lane called St. Clements in the parish of St. Edmund" [St. Clements Lane Lombard Street] 1380-82; 1414-15 ?

13065 "**Sazzinhede**" "Sarazenshed" Friday Street. Tenement. 1377-1401; 1518-32 [?]; "Sarazens heade Friday Street" 1549-1666 Inn consumed in the Fire.

"**Sarisons head** Inne in ffryday street next St. Mathews Church" 1669; Sarazens Head Inn west side of Friday Street 1677-c1844-50.

FF 481

Figure D.2: Signs in London (Lillywhite, 1972, pp. 480–1)



to a mathematician for reading a mathematical lecture to his Majesty's servants relating to his Navy and instructing them in the art of navigation and other parts of the mathematics'. The syllabus he offered was of the usual type, but under 'Navigation' he added 'the construction and application of instruments for the taking of observations, heights, distances, plotting of countries, working of traverse etc., and the making of maps and charts'. He had read of the lectureship in a work on gauging by Henry Bond (144), who had held it, but there seems no record of whether his request was acceded to.

254. SUGAR, JOHN (fl. 1645–53), was a *globe-maker* at the Sign of the Atlas on Parnassus Hill, near St Michael's, Cornhill, making celestial and terrestrial globes of 14 in. and 15 in. diameter, as appears from his advertisements in Booker's and Wharton's Almanacks for 1653. The name of Joseph Moxon (228) is here associated as partner with that of Sugar, and as this is the first mention of Moxon, and the last of Sugar, the latter may have been at the end of his career. John Pell (173) writing in 1645 from Amsterdam to John Leake, a London stationer, said he had spoken to 'Mr Sugar' about some papers sent to London, which suggests that Sugar (like Moxon) had business in Holland.

255. ATKINSON, JOHN (ob. 1673), was a *compass-maker* at Harwich, Essex, who is known only by his will.

256. COULTON, JOHN (fl. 1653–4), was a *mathematical practitioner* living at Cobham, Surrey, whose Almanack was printed by R. & W. Leybourne.

257. OSBORNE (or OSBURN), HENRY (fl. 1653–86), a gentleman living in the Strand and later in Ireland, was praised by William Molyneux of Dublin as an excellent *mathematician* and astronomer. He was the correspondent of the young astronomer Jeremy Shakerley (233) who wrote to say that he had observed the solar eclipse of 1652 in Surat, and of Robert Hooke (270) who supplied him with instruments including a quadrant fitted with telescopic sights, a telescope and a micrometer, which were sent out to him in Drogheda. Edmund Halley (401) later recorded Osborne's observations of a solar eclipse in Ireland in his edition of Streete's *Astronomia Carolina* (*269*).

258. PIGOT, FRANCIS (fl. 1653–66), a *mathematical practitioner* who published an Almanack during the period 1654–62 which was 'rectified' for the meridian of Ludlow, himself lived at Cleobury Mortimer in Shropshire. Here he was ready to instruct any 'heroic spirit or generous gentleman' in the use of all sorts of mathematical and surveying instruments, the use of the globes, and so on.

259. SUTTON, WILLIAM (fl. 1653–63), was presumably the brother or near kinsman of Henry Sutton (188) since their names appear jointly in advertisements over a period of years. 'All manner of Mathematical Instruments either for Sea or Land are exactly made in Brass or Wood by

Henry Sutton or by William Sutton'. The latter had premises 'a little beyond the Church' in Upper Shadwell, which is down the Thames below Wapping. No examples of his work are known to have survived.

260. WREN, CHRISTOPHER (1632–1723), was from boyhood fertile in designing and making *mathematical instruments*, including a rain-gauge (1662), the moon globe ordered by Charles II, a new type of level (1667), an instrument for calculating the times of eclipses, an 'instrument for perspective' which Pepys saw when he visited Oldenburg (Secretary of the Royal Society) in May 1669, and many others, while several of his fine sundials survive. John Aubrey says that as a boy he was grounded in arithmetic and geometry by his sister's husband, the Rev. William Holder, while when he went to Oxford he was closely associated with Dr John Wilkins (181), and in London with Robert Hooke (270) who said of him 'Since the time of Archimedes there scarce ever met in one Man in so great a Perfection, such a mechanical Hand and so philosophical a Mind'. Yet designing instruments was only incidental to Wren's main occupations as successively Gresham and Savilian Professor, Surveyor-General after the Fire of London, and architect of the rebuilding. He was knighted in 1673. Work: *277.*

261. BRADFORD, JOHN (fl. 1654), is known by a mention of him as a *mathematical instrument-maker* in Foster's *Elliptical Horologiography*, published in 1654 by John Twysden (162).

262. COLEY, HENRY (1633–1707), was born at Oxford and, starting as a young clerk, came to London in 1654 to become amanuensis and later successor to the noted astrologer William Lilly. He practised as an astrologer throughout his life and taught this subject as well as the whole range of practical mathematical subjects, besides establishing his own *mathematical school* at a house 'over against the Old Hole in the Wall, Baldwin's Court, Baldwin's Gardens', a Court which ran out of Gray's Inn Lane. Here he taught for over thirty years. Prior to 1663 he had lived in Rose and Crown Court, Gray's Inn Lane. Coley advertised himself widely, in his own almanacks and elsewhere, and had a large circle of friends, including Elias Ashmole and John Kendal (393) of Colchester, both devoted to the mathematical arts. Several of his note-books survive and indicate the wide range of his reading, and his method of work. Work: *441.*

263. EYRE, JOHN (fl. 1654), who describes himself as a '*practitioner in the mathematics*' wrote a text-book on surveying, and presumably practised and taught the art. He was associated with Walter Hayes (251) as instrument-maker. Work: *216.*

264. SINCLAIR, GEORGE (fl. 1654, ob. 1696), was at first (1654) a schoolmaster at St Andrews, and took part in some experiments on the diving-bell (1655). An M.A. of Glasgow was conferred upon him (1654) and he was appointed to a Chair of Philosophy there which he held until 1666. Returning then to Edinburgh to teach mathematics, he determined

Figure D.3: Mathematical practitioners in England (Taylor, 1954, pp. 240–1)

ALLAN John

ALLEN James*
Known to have sold: sextant, repeating circle
Sources: Ts39 (1992/3) item 23; Bn; H; Und; Bennett (1985) p.19,22; Stimson (1985) p.103–04,113

ALLAN John
w 1790–1794
Sextant M, Quadrant M
London
1790–1794 12 Blewitt's Buildings, Fetter Lane, London
Father of ALLAN James*
Succeeded by ALLAN James*
Known to have sold: sextant
Sources: Ts39 (1992/3) item 23; W; JAC

ALLBUT Isaac
w 1811–1845
Rule M
Alternative name: ALLBUTT
1811–1845 Salop St, Wolverhampton
1818 105 Salop St, Wolverhampton
See also ALLBUTT I.*
Sources: PB; Pg; Wh

ALLBUTT I.
w 1845
Rule M
1845 Birmingham
See also ALLBUT Isaac*
Sources: Roberts (1982)

ALLCOCK Thomas
w 1851
Chrono M, Watch M
1851 14 South Island Place, Clapham Rd, London
Sources: PO

ALLEN -
w 1820
Alternative name: Possibly Alexander ALLAN
1820 Near the College, Edinburgh
Instrument advertised: geometric solids
Sources: Larkin (1820) (DJB)

ALLEN B.
w 1851
Optician
1851 2 Lower Copenhagen St, Islington, London
Sources: Wk

ALLEN Elias
w 1607 d 1653
Math IM (in brass), Book plate engraver
Alternative name: ALLIN
Blackhorse Alley, Fleet St, London
Horseshoe over against St. Clement's Church, Strand, London
1606–1611 Blacke Horse-ally, neere Fleetbridge, London
1623–1639 Without Temple Bar, over against St.Clement's Church, London
1618 At the Bull's head over against St Clement's Church, Strand, London
1653 Horseshoe without Temple Bar near St Clement's Church, London
1645 The Blackmoor without Temple Bar, London
Guild: Grocers, Clockmakers
Apprenticed to WHITWELL Charles c.1602 GC
Had apprentice:
BLAYTON (BLIGHTON) Edward 1612 GC
BLIGHTON John*nd fr 1620 GC
SHEWSWELL Thomas fr 1623 [possibly SHASWELL *] GC
ALLEN John (I)* 1617 GC
SEFTON Henry 1620 GC
DAVENPORT Robert*1623 GC
BROOKES Christopher* 1629 GC
WINCKFIELD Edward 1629 GC
COOKE George 1635 GC
JORDAN William 1649/50 GC
GREATOREX Ralph* 1639 by t/o CKC
CHENEY Withers* 1646 by t/o CKC
GRIMES Edward 1640/41 by t/o CKC
PRUJEAN (PRIGEON) John* CKC
Took over from WHITWELL Charles*
Succeeded by GREATOREX Ralph*
Associated with
THOMPSON John (I)*
HAYES Walter*
THOMPSON Anthony*
fr GC 1612, fr CKC 1633; d 1653; another Elias Allen, who carried out surveys for Charles I was d by 1637
Known to have sold: armillary sphere, compass (magnetic), ellipsograph, marine astrolabe, mural quadrant, rule, sector, sundial
Instruments advertised: mathematical instruments
Sources: Brown J (1979a) p.24–25; Brown J (1979b) p.11–14,27; Bryden (1992) p.306n,308,318; DG

ALLEN James
w 1825–1826
Math IM
Alternative name: ALLAN?
1825–1826 196 Piccadilly London
See also ALLAN James *
Same premises as WORTHINGTON & ALLEN*
Attended London Mechanics Institute 1825–1826, not known as a master on his own
Sources: LMIR (AM)

ALLEN James Patishall
w 1850–1852
Math IM
1850–1852 20 King St, Stepney, London
Guild: Merchant Taylors, fr 1861
Son of ALLEN James [no trade given]
Apprenticed to LILLEY John (I)*or (II)* 1841
Sources: PO; Wk; GL: MTC MF 320, 324 (MAC)

ALLEN John (I)
w 1630–1642
Math IM (in brass)
1630–1631 Near the Savoy, Strand, London
Guild: Grocers fr 1631/2, ?Clockmakers 1653
Apprenticed to ALLEN Elias*
Had apprentice HAYES Walter* 1631/2 GC
Working in own name before free in 1631/2; a John Allen admitted to Clockmakers 1653
Known to have sold: astrolabe, sector
Sources: Brown J (1979a) p.26; Brown J (1979b) p.14,27; Bryden (1992) p.309

ALLEN John (II)
w 1842–1855
Phil IM, Drawing IM
1842–1845 35 St.Swithin's Lane, London
1847–1855 5 Three King Court, Lombard St, London
Succeeded by ALLEN Mrs.A.
Sources PO

ALLEN M.H. & J.W.
c 1838–1840
[Drawing IS]
Dame St, Dublin
Known to have sold: beam compass invented and made by SMITH W. & A.*
Sources: inst MHS; Pg

ALLEN Nathaniel
w 1790 w 1793
Ship chandler
1793 Wapping New Stairs, London
Guild: Merchant Taylors, fr 1766
Apprenticed to EADE Jonathan (I)* 1754
Son of ALLEN James, Gent , d, of Dulwich, Kent
Had apprentice ALLEN Thomas James, his son, 1781
Master MTC 1790
Sources: Wil; GL: MTC MF 319,320,324 (MAC)

ALLEN Thomas (I)
d 1767
Math IM
1767 Dublin
Sources: Burnett & Morrison-Low (1989) p.120

ALLEN Thomas (II)
w 1850–1856
Rule M
1850 12 St. Mary's Row, Birmingham
1850 (Residence) Aston Road, Birmingham
Took over from ALLEN & ROWE *
Associated with
ROWE James
ROWE Thomas
Sources: Roberts (1982); Sl

ALLEN William (I)
w 1788–1791
Phil IM, Math IM
1787 37 High St, Birmingham
1791 Bull Ring, Birmingham
Sources: Pye

ALLEN William (II)
fl 1838
Math IM, Phil IM
29 Seward St, Goswell St. London
Said by Taylor (1966) p.466 to be listed in directories, but not verified; possibly AILES William*

ALLEN & ROWE
w 1849–1850
Rule M

6

Figure D.4: Scientific instrument makers in the British Isles (Clifton, 1995, p. 6)

D.4 Examples of Primary and Secondary Sources

This section presents examples of primary and secondary sources on which our main data sources are based (Lillywhite, 1963, 1972; Taylor, 1954; Clifton, 1995).

BIBLIOGRAPHY OF SECONDARY WORKS

The Works listed in Part III provide the main source material for the book, and in addition a large number of contemporary works (including annual almanacks) compiled by or referred to by the Mathematical Practitioners have been examined for biographical details. The manuscript material used is mainly that in the British Museum, supplemented by the Ashmolean MSS. in the Bodleian Library, and the Minutes and Letter Books (with a few miscellaneous original Papers) of the Royal Society.

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Figure D.5: Primary and secondary sources used by Taylor (1954)

E. DATA VALIDATION

E.1 Coffeehouses

Figure E.6 shows the number of coffeehouses in London over time, and Figure E.7 shows the frequency of coffeehouse terms in the British English corpus over time. Because most coffeehouses in the British Isles were located in London Cowan (2005), the corpus trends likely reflect developments in London. The close alignment between the two series suggests that Lillywhite (1963, 1972) accurately capture the historically known universe of coffeehouses. Early mentions in the early 1600s likely reflect the emergence of discourse about coffee during this period (Smith, 2001).

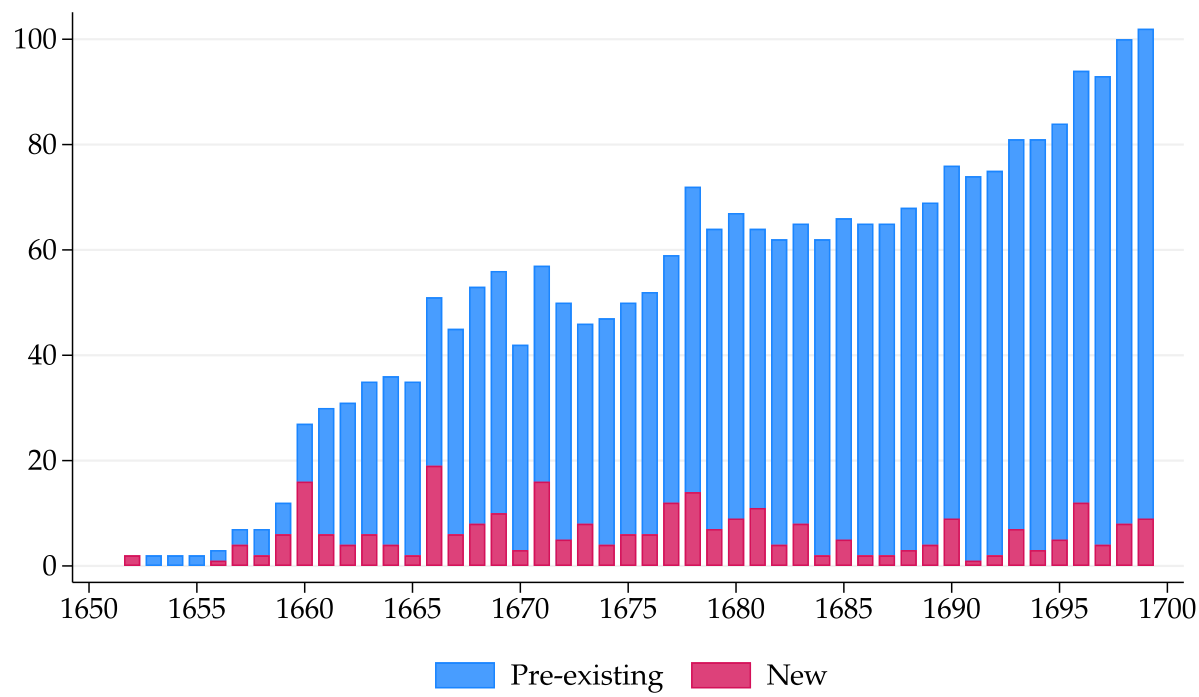

FIGURE E.6: COFFEEHOUSES IN LONDON OVER TIME

Notes: Figure plots the annual number of coffeehouses in London from 1652, when the first opened, to 1699, distinguishing between those already established and those newly opened. Data from Lillywhite (1963, 1972).

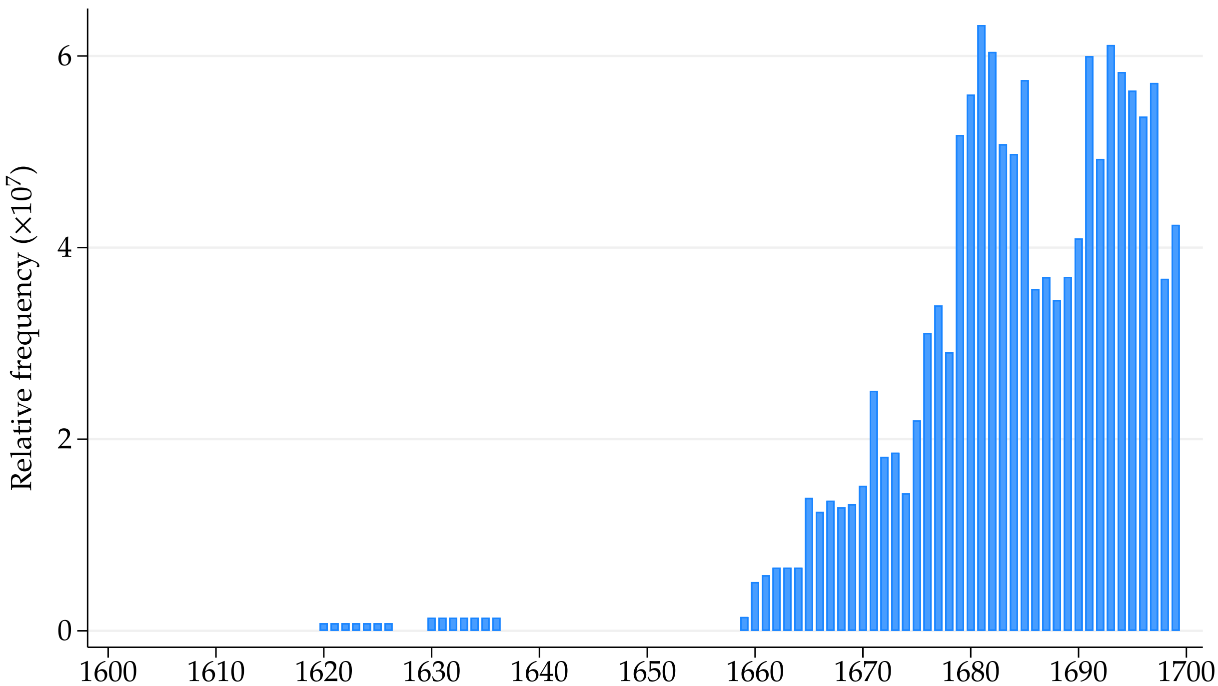

FIGURE E.7: RELATIVE FREQUENCY OF N-GRAMS CONTAINING COFFEEHOUSE TERMS OVER TIME

Notes: Figure plots the annual relative case-insensitive frequency of n-grams containing the terms "coffee house" and "coffeehouse" from 1600 to 1699. Data from Google Books Ngram Viewer, British English corpus, accessed November 5, 2025.

F. GEOCODING

F.1 Procedure

Each historical address is assigned a geographic coordinate through a two-step, manually performed process aided by digital tools:

1. The address is located on a historical map of London.
    - Digitized historical maps of London are available on the Grub Street Project website (https://www.grubstreetproject.net/). Several of these maps support searchable places. See Figure F.1.[33]
    - If the address cannot be found on a historical map of London, we use contextual information from the source or additional resources (e.g., Wikipedia, historical gazetteers, historical works on London) to identify a nearby address that can be located on a historical map of London.
2. The geographic coordinate of the location identified in Step 1 is estimated by visually overlaying the historical map onto a contemporary Google map of London.
    - In this step, key geographic features (e.g., rivers, streets, and churches) are often aligned.
    - It should be noted that this comparison is inherently imperfect, owing to the limited accuracy of seventeenth-century maps of London.[34]

Additionally, though infrequently, we may deviate from this process and rely on other credible sources that provide coordinates directly. For example, we use a map of about 100 London workplaces from Taylor (1954) and coordinates for roughly 600 addresses geolocated in the Early Modern Letters Online project (Hotson and Lewis, 2024). In some instances, we also draw on ChatGPT to support this manual process. All coordinates are manually verified.

[33] A digital gazetteer of locations from the Woodcut Map of London (early 1560s) has been created on the Map of Early Modern London website (https://mapoflondon.uvic.ca/index.htm), which was occasionally used for very hard-to-geolocate addresses.

[34] French-born British surveyor and cartographer John Rocque's 1746 map of London constitutes the earliest topographic survey of the city with sufficient precision to allow for comprehensive georeferencing against modern maps. Cf. *Locating London's Past :: Recreating Rocque — London 1746*, available at https://locatinglondonspast.wordpress.com/2011/06/22/recreating-rocque-london-1746, accessed September 5, 2025.

F.2 Application

Below we geocode three historical addresses to demonstrate the geocoding procedure.

- Geolocate “St Katharine’s Stairs”.
  1. The Grub Street Project provides points on digitized maps of London from 1553 to 1736 indicating the location of “St. Katherine’s Stairs.”[35]
  2. The 1736 map clearly shows that the location lies just southeast of the Tower of London, next to the Thames. The corresponding modern location is easily identified on Google Maps as “St. Katharine Docks.” This yields the following coordinate:
$$(51.506398094563295, -0.07187462117211817).$$
- Geolocate “Pasqua Rosée’s Coffee House” in “St. Michael’s Alley, Cornhill”.
  1. The location refers to a medieval alley next to St. Michael’s Church in Cornhill.[36] The original church, destroyed in the Great Fire of London (1666), was replaced in 1670 by the present church.[37]
  2. Google Maps assigns the following coordinate to the current St. Michael’s Church, which we use for “St. Michael’s Alley, Cornhill”:[38]
$$(51.51324613158396, -0.08555984818390787).$$
- Geolocate “Pilkington Court”.
  1. The location refers to a court in Little Britain, according to a contemporary obituary.[39]

[35] *The Grub Street Project :: Places :: St. Katherine’s Stairs*, available at https://www.grubstreetproject.net/places/4318/, accessed September 4, 2025.

[36] *The Grub Street Project :: Places :: St. Michael’s Alley*, available at https://www.grubstreetproject.net/places/4421/, accessed August 5, 2025.

[37] *St Michael, Cornhill*, Wikipedia, available at https://en.wikipedia.org/wiki/St_Michael,_Cornhill, accessed August 5, 2025.

[38] *St Michael Cornhill Saint Michael’s Alley, London* on Google Maps, available at https://maps.app.goo.gl/9DJKJm9cwTVkz1fN7, accessed August 5, 2025.

[39] “Mr. Franck, a juryman at Pilkington Court in Little Britain,” is mentioned in a contemporary 1661 entry in an obituary by a London man, discovered through a Google search for `“Pilkington Court” + “London” filetype:pdf` (Smyth, 1849, p. 53).

2. We are unable to identify the exact location of Pilkington Court within Little Britain. However, Little Britain itself is a sufficiently precise reference and was a well-known street in seventeenth-century London. Its Wikipedia entry directly provides Google Maps coordinates for the street:[40]

$$(51.51699499272915, -0.09780000001763406).$$

Accordingly, these coordinates are assigned to "Pilkington Court."

Figure F.1: 1720 London (Strype): Excerpt from the Grub Street Project website

[40] *Little Britain, London*, Wikipedia, available at https://en.wikipedia.org/wiki/Little_Britain,_London, accessed September 5, 2025.

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