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Freedom of the Press?
Catholic Censorship during the Counter-Reformation*

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Abstract

The Protestant Reformation in the early 16th century challenged the monopoly of the Catholic Church. The printing press helped the new movement spread its ideas well beyond the cradle of the Reformation in Luther's city of Wittenberg. The Catholic Church reacted by issuing indexes of forbidden books which blacklisted not only Protestant authors but all authors whose ideas were considered to be in conflict with Catholic doctrine. We use newly digitized data on the *universe* of books censored by the Catholic Church during the Counter-Reformation, containing information on titles, authors, printers and printing locations. We classify censored books by topic (religion, sciences, social sciences and arts) and language and record when and where books were indexed. Our results show that Catholic censorship did reduce printing of forbidden authors, as intended, but also negatively impacted on the diffusion of knowledge, and city growth.

JEL codes: D7; N93; J24
Keywords: Censorship; Counter-Reformation; Political Economy; Elite Human Capital.

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1 Introduction

The movable type printing press is regarded as one of the greatest innovations in history. Dittmar (2011) shows that European cities where printing presses were established in the 1400s grew 60% faster than otherwise similar cities. It also played a relevant role in the diffusion of Protestantism in Europe. Holborn (1942) argues that, in contrast to the success of the Protestant reform, the failure of the Hussite reform was due in part to the lack of means for spreading the ideas of Hus. Ekelund, Hébert, and Tollison (2006) contend that the invention of the movable type printing press created a new threat to the monopoly of the Catholic Church on matters of faith and morals. Rubin (2014) finds that cities with a press by 1500 were significantly more likely to accept the Reformation. In response to the challenge posed by Protestantism, the Catholic Church censored the printing and diffusion of writings professing the new doctrine but also other texts perceived to be in opposition to Catholic doctrine. It is in this context that the Congregation of the Index and the Index of Forbidden Books (*Index Librorum Prohibitorum*, ILP) were created.[1]

In this paper, we analyze whether censorship during the Counter-Reformation period was effective in reducing the printing of forbidden works, and how this affected the attractiveness of cities to 'famous people'.[2] Using the Index Librorum Prohibitorum (ILP),[3] we create a dataset of publishers, authors and works censored by the Catholic Church. Our primary source is the work of J. M. De Bujanda (De Bujanda, 1996), who compiled a comprehensive collection of all Catholic indexes issued in the sixteenth century. We combine these data with the Universal Short Title Catalogue (USTC), a catalogue of all known books printed in Europe between the

[1]The Catholic Church did not only target the writings of Protestant Reformers, though, but also other authors they considered as challenging Catholic doctrine and world views. For instance, Galileo Galilei (1564-1642) became famous for the phrase 'eppur si muove' ('and yet it moves'), expressed in 1633 after he was forced to recant his claims that the Earth moves around the Sun, rather than the converse.

[2]A recent literature in economic history recognizes the importance of 'upper-tail human capital' for development, see e.g. Squicciarini and Voigtlander (2015), Xue (2021) and Dittmar and Meisenzahl (2020).

[3]We use the term ILP to collectively refer to all indexes issued by Catholic authorities, both the 'main' ILP issued by Vatican as well as country-specific indexes, as discussed further below.

invention of printing (c. 1450) and 1650. This allows us to construct various measures of censorship, such as the share of censored authors in a given city, and the proportion of forbidden books.

Our analysis proceeds in three steps. First, we analyze whether the ILP was effective in containing the spread of Protestant and other forbidden authors across Europe. Ekelund, Hébert, and Tollison (2006) argue that the ILP was one of the tools used by the Catholic Church to protect its "market power" in the religious market. Despite the failure to suppress Protestantism completely, the ILP might have contributed to the slowdown of its expansion. Our results show that censorship was effective in reducing printing of forbidden authors.[4]

Second, we analyze the impact of the ILP on the diffusion of knowledge. Book censorship comprised not only religious books, but also literature, science, and art. We investigate whether being included in the ILP had an effect on publishers' business, as well as on literary and scientific creation ('thinkers'). We show that cities printing forbidden authors were more likely to attract famous people than cities who did not print these authors. We also pay attention to vernacularization, as recent work by Binzel, Link, and Ramachandran (2020) shows that in the wake of the Protestant Reformation, vernacular works gained prominence and are associated with the attractiveness of cities to famous people, and city growth.

Finally, we analyze whether the ILP had an effect on economic development. To the extent that censorship might have made printing less profitable in Catholic areas, Dittmar (2011)'s finding of a positive effect of the printing press on city growth would imply that where the 'freedom of the press' was constrained, cities grew more slowly. Reduced competition (see Dittmar and Seabold (2019) as a result of restrictions on what can be printed is another likely channel slowing down growth.[5] We find that, indeed, cities that print more forbidden material

[4]For instance, looking at the effectiveness of the index of Paris 1544 which targeted the French market, we show that after the index was issued, the number of printed books by forbidden authors declined by more than two-thirds, relative to the number of books by non-forbidden authors.

[5]There are further channels through which the Index could have hindered development. One of them is technology diffusion. Mills (1994) argues that the printing press helped the spread of double-entry accounting through the issuing of arithmetic and printing manuals. Therefore, if the Index obstructed the development of the printing

relative to their overall printing volume, grew faster.

Despite anecdotal evidence, there is, to the best of our knowledge, no work that systematically analyzes the effect of censorship by the Catholic Church on socioeconomic outcomes.[6]

Our paper contributes to various strands of the literature. First, on the economic history side, while the Reformation has received a lot of renewed attention over the last decade (see Becker and Woessmann (2009), Cantoni (2012), Cantoni, Dittmar, and Yuchtman (2018), Dittmar and Meisenzahl (2020)), its twin sister, the Counter-Reformation, has been under-researched (see Becker, Pfaff, and Rubin (2016)). This is surprising given the centrality of the 16th century in Europe's history. Our paper takes a closer look at the response of the Catholic Church to the Protestant threat.

Second, the role of religion in economic development has fascinated social scientists at least since Max Weber wrote his 'Protestant Ethic' (see Weber ([1930] 2001)).[7] Some religions with their emphasis on reading have had positive effects on human capital acquisition.[8] The mirror image is that other religious denominations without such emphasis on education could be seen as holding back development (see e.g. Squicciarini (2020) showing that Catholic schooling in 19th century France was associated with delayed industrialization). In many cases, also political economy aspects come into play. Benabou, Ticchi, and Vindigni (forthcoming) describe the interaction between scientific knowledge, types of government and religion. They show how theocratic regimes may cause a stagnation of the evolution of knowledge, but they also show how a democratic country can erode discoveries and ideas as a consequence of high inequality levels and the prominent role of religion. These situations do not need to be static. A society can

industry, it might have as well inhibited economic development.

[6]The closest attempt is Anderson (2015), who shows that *countries* in which the inquisition operated had significantly fewer scientific scholars. However, these countries might differ in various characteristics other than the establishment of the inquisition, and not all of these factors can be easily controlled for, which makes it difficult to infer a causal effect of censorship on diffusion of knowledge.

[7]See Iannaccone (1998) and Iyer (2016) for two excellent surveys.

[8]Botticini and Eckstein (2012) describe that Jews had a higher degree of human capital because Judaism had an old norm centered on reading and studying the Torah, and requiring the fathers to send their sons to schools. Becker and Woessmann (2010) show that Protestant regions in Prussia had higher school enrolment rates already before the industrial revolution.

evolve from being tolerant towards scientific knowledge to being intolerant towards it. Chaney (2016) shows how the Muslim state evolved from being tolerant and experiencing intellectual achievements to condemning dissenting views. Our research is linked to this literature, as we analyze whether the Catholic censorship that took place in the sixteenth century had an impact on the spread of ideas and on economic development.

Third, our work relates to the literature on the effectiveness and consequences of censorship. Censorship is common in autocratic regimes and has long been seen as key to their popular support and stability (Ford (1935)). In a similar way, the Catholic Church tried to defend its monopoly in the Western Christian world. Despite the widespread use of censorship in autocratic regimes, direct evidence on its effectiveness is scarce, as pointed out by Chen and Yang (2019), not only in historic context. If anything, studies on censorship in modern times study the 'direct' effects of government interventions on beliefs and economic and political outcomes. The existing literature generally does not study the effectiveness of censorship *per se*, namely whether the censor manages to suppress the production of media (e.g. books) considered dangerous. [9] There are two reasons: one is that the empirical design may randomize censorship. In their recent paper, Chen and Yang (2019) study the impact of Chinese censorship on economic beliefs and political attitudes. In a field experiment, treated Beijing students are given uncensored internet access and are compared to students subject to standard Chinese censoring. Another reason that the effectiveness of censorship *per se* is little studied is that internet shutdowns and blocking of certain websites can be implemented very effectively when autocratic regimes directly control internet infrastructure.

Our context is fascinating because the Catholic Church only had limited control over authors, printers and readers, allowing us to study the effectiveness of censorship *per se* in this crucial period of European history. At the same time, censorship of the Catholic Church is

[9] A rare exception is Abramitzky and Sin (2014), who document an increase in the number of translations after the collapse of Communism in Eastern Europe, suggesting that under Communism the production of translated books was suppressed, thereby also hampering the flow of ideas.

author-specific, allowing us to employ a difference-in-differences design with author fixed effects and city fixed effects to identify the effectiveness of censorship.[10]

The rest of the paper is organized as follows. Section 2 presents a detailed historical background, focusing on censorship during the Counter-Reformation. Section 3 explains the data construction. Section 4 analyzes whether censorship was effective in reducing the printing of forbidden authors. Section 5 shows the effect of censorship on the movement and location of thinkers, while section 6 does the same with city growth. Finally, section 7 states the conclusion.

2 Historical Background

2.1 Censorship before the Counter-Reformation

The introduction and spread of the printing press across Europe from 1450 opened new ways of diffusion for ideas. Baten and Van Zanden (2008) argue that the increased production of knowledge resulting from the introduction of the press led to an "Industrial Enlightenment", which later, according to Mokyr (2002, 2016), was one of the causes of the Industrial Revolution in the eighteenth century.

The challenge posed by dissenting views generated the need to regulate printing activity from the perspective of the Catholic Church (De Bujanda, 1985). Although censorship was mostly decentralized and not very organised during the second half of the 15th century and beginning of the 16th century (Soen, François, and Vanysacker, 2017), its objective was wider than just to eradicate dissent. Book censorship was a mechanism to shape and control the ideas to which citizens had access (Vega and Esteve, 2010).

European States, the Church, universities, papal nuncios, even local guilds, all participated in it and tried to organise some level of censorship or control over printing between the end of the 15th century and beginning of the 16th century. This fragmented institutionalization of

[10]Going beyond the context of censorship of books or media, Waldinger (2010) provides evidence of the negative effects of the expulsion of Jewish scientists in Germany for PhD student outcomes. Similarly, Xue (2021) show that the persecution of intellectuals in eighteenth-century China had long-lasting effects on literacy.

censorship, thanks to an inefficient and unclear legislation over the matter, resulted in uncertain results (Soen, François, and Vanysacker, 2017).

However, there was heterogeneity regarding the level of fragmentation of institutionalised censorship across different States in Europe. While the Habsburg Netherlands exemplifies a decentralised and fragmented control over book production (Soen, François, and Vanysacker, 2017), Spain would exemplify a more centralised structure. For instance, the Catholic Monarchs (Ferdinand and Isabella) issued a law in 1502 regulating the acquisition of a permit to import and print books. Bishops and archbishops were in charge of issuing such permits (De Bujanda, 2014). Later on, the Spanish Inquisition secured the regulation of censorship by issuing the indexes of forbidden books in Spain.

The beginning of Catholic censorship of printed material can be traced back to the first decades after the introduction of the printing press in Europe. In particular, popes Sixtus IV (1471-1484), Innocent VIII (1484-1492) and Alexander VI (1492-1503) issued some of the first edicts and bulls to control the printing and distribution of books following demand from German bishops (De Bujanda, 1985). For instance, Sixtus IV authorised the rector of the University of Cologne to impose penalties upon those printing and selling heretical books in 1479 (Putnam, 1906; Green and Karolides, 2005); Innocent VIII issued the first general regulation of papal censorship with a bull regulating printing directed to the University of Cologne in 1487 (Putnam, 1906). In 1501, Alexander VI issued the bull *Inter Multiplices* directed to the archbishop of Magdeburg to control printer activity in Cologne, Mainz, Treves/Trier and Magdeburg. He instructed that bishops and inquisitors should be in charge of stopping the printing of forbidden books (Putnam, 1906; Green and Karolides, 2005).

In general, though, censorship in the second half of the 15th century attempted to condemn or forbid individual works or authors, but there was no real attempt to create a set of rules to control printing or create a complete index of forbidden books (Lenard, 2006).

Leo X (1513-1521) continued the work of his predecessors and issued the bull *Exsurge*

Domine in 1520 identifying errors in Luther's works, including the Ninety-five Theses. A year later, Charles V issued the *Edict of Worms* that banned the reading or possession of Luther's works. The decree was also relevant as it emphasised the joint work between the State and the Church regarding Imperial censorship regulations. They worked together against heretics and treason against the State. The Church also secured that control of printing would be under ecclesiastical censors (Putnam, 1906). In 1524, Pope Adrian VI., in the annual bull on Maundy Thursday (Bulla Coenae Domini) issues a wholesale condemnation of Martin Luther 'and his sect' (Reusch, 1883). It would still take more than 40 years though to have the first Index of Forbidden Books (ILP) from a Pope.

2.2 Local Indexes before (and after) the Tridentine Index of 1564

Even though the first ILP appeared in 1564, there were earlier (and later) indexes of prohibited books issued by secular rulers, universities and cities: the posters ('Placards') of Charles V. in the Low Countries (1521-1550) are considered the first attempt to provide a list of forbidden works and make them publicly known via public announcements; those were followed by the indexes from The University of Paris (1544, 1545, 1547, 1548, 1551, 1556), the University of Louvain (1546, 1550, 1558), the cities of Venice (1549, 1554) and Milan (1554), the Portuguese Inquisition (1547, 1551, 1559, 1561, 1564, 1581, 1597), the Spanish Inquisition (1551, 1554, 1559, 1583, 1584), the city of Liege (1568, 1569), Antwerp (1569, 1570, 1571), the Indexes of Rome (1559, 1564, 1590, 1593, 1596), the index of Parma in 1580 and the Munich index in 1582 (Putnam, 1906; De Bujanda, 1985; Lenard, 2006; Soen, François, and Vanysacker, 2017).

What distinguishes these indexes from earlier attempts at censorship is that they provide for systematic listings of forbidden works, authors and printers. They were thus not ad hoc reactions to specific threats but aimed at some degree of comprehensiveness, in a country-specific context.

The University of Paris issued the first 'formal' Index in 1544, followed by the University of Louvain in 1546. Their power emanated from royal or imperial authority. The Index of

Paris was updated in subsequent years and in the version of 1556 it contained more than 500 condemnations.

The Index of Louvain, created under instructions of Charles V, and providing a more structured approached to his ad hoc 'placards', covered books in three languages: in Latin, Flemish and French. The University of Louvain was in charge of the censorship and its enforcement. The Inquisition, under Spanish control, influenced the 1550 Louvain index and the 1558 edition expanded the previous version by more than 100 titles.

Other cases, such as the indexes of Spain and Portugal, were prepared and published by the local Inquisition. Even after the publication of the 1564 Roman Index, there were other indexes, such as the Index of Munich in 1582, which reproduced the Roman Index and enlarged it with additional condemned authors (De Bujanda, 1996).

2.3 The Roman Indexes

The first Roman Index published in 1559 by Paul IV caused a strong opposition from printers and booksellers and a lack of consensus among intellectuals. They considered the Index to be too restrictive. It condemned approximately 1,000 writings and more than half of them were writings that did not contain any passage against religion; they were just written by authors who departed from the Catholic faith (De Bujanda, 1985).

The Council of Trent revised the list published in 1559, but it was not possible to reach an agreement before 1564, when a Papal Commission took over the responsibility to write a new index. The commission was aware that the purpose of the Index was not just to prevent heretical books from corrupting faith and the moral of Catholics. The Catholic Church considered that the social order of Christendom, as well as the role of the Church as spiritual, intellectual and political authority was at stake.

Finally, the commission published the Tridentline Index in 1564. In the Italian peninsula, it secured a wider distribution and more general acceptance than the 1559 index, and local indexes

(Putnam, 1906). It was the first index to publish a set of rules that provided guidelines on the control of printing and what ideas should be banned. The position of the Roman curia was that the index was universal and that no formal acceptance or confirmation was required to make the index binding. But this was not the general view. As a consequence there was heterogeneity in the degree of acceptance of the Index across Europe. Belgium, Bavaria and Portugal adopted the regulations of the Tridentine Index under royal edicts, and adopted and extended the Tridentine Index by virtue of new editions of 'local' indexes (Reusch, 1883). France and Germany (outside of Bavaria) did not accept it, with some exceptions. In Spain, in the hands of the Inquisition, none of the Roman Indexes was ever binding, but Spain adopted the Ten Tridentine rules.

2.4 Received Wisdom on the Effectiveness of 16th Century Censorship

What were the consequences of all those Indexes on printing and the distribution of books across Europe, according to received wisdom? There is no Europe-wide empirical study of the effectiveness of censorship. Existing evidence is largely anecdotal. We limit ourselves to highlighting some themes emanating from the literature.

One theme is that the reach of country-specific indexes (e.g. Paris for France) was largely limited to the country in which they were issued. Even the Roman index as such, despite the pretention to apply to the world-wide church, was limited to the Italian peninsula. If anything, it applied in other countries only if and when its content was adopted in a new edition of a local index. We will test this insight by looking at the effectiveness of local indexes in their jurisdiction of origin, compared to neighboring jurisdictions.

A second theme is that the index was likely more effective, by means of enforcement, near the 'index city'. In France, Paris and Lyon were the two main centres of printing. The Indexes of Paris, promoted by the University of Sorbonne, decreased the book-trade of Paris in favour of the printers located in Lyon, Montpellier and other provincial centers, where it was impracticable to enforce the regulations of Paris theologians (Putnam, 1906).[11]

[11]There is also a claim about deviance as result of increased printing in neighboring jurisdiction after certain

A third theme concerns the reach of the Catholic Church in Protestant areas. For instance, in the German lands (or more precisely the Holy Roman Empire), printing presses were distributed across a large number of towns. Given how fragmented the Holy Roman Empire was, with its myriads of jurisdictions, it was difficult for the Catholic Church to keep control of, or supervision over, the production of rapidly increasing printing presses. This was despite the repeated efforts by successive popes, Pius V (1566-1572), Gregory XIII (1572-1585) among others and edicts from Maximillian II and Rudolf II (Putnam, 1906). Ultimately, the Catholic Church had to admit that its reach in Protestant areas was fading, and it tried to support printers in Catholic towns.[12]

Yet, there is evidence of increased difficulties that bookmen (i.e. publishers, printers and booksellers) faced to publish books deemed "heretical" in the *Index Librorum Prohibitorum*. Grendler (1975) describes that, in Venice, the government inspected books at the customs house, shops and storehouses. Bookmen in possession of prohibited volumes were fined and the books burned.

In terms of topics, religious books were the main target of censors (also because they comprised a large share of titles published). But the index also targeted scientific and literaturary works. We can measure in how far compliance with censorship varied by subject.

Finally, the role of enforcement and punishment is only documented in a sketchy fashion. Punishment for heretic authors varied significantly, including the recantation of their work, imprisonment and even death.[13] But in many cases, authors (and printers) did not incur any punishment.

works were forbidden. As a result of censorship in Paris there was increased printing in Holland, i.e. the Northern part of the neighboring Low Countries (Putnam, 1906), where Protestantism had made an inroad

[12]The bishop of Vienna wrote in 1582 "You can permit the books printed in Munich, Ingolstadt, Cologne and other towns under ecclesiastical influence, but those from Wittenberg, Tubingen ... must be forbidden."

[13]One example is Giordano Bruno, a Dominican friar who supported the ideas of a heliocentric universe and wrote a series of books that captured the attention of the Inquisition. After a period of hiding, he was arrested in Venice and placed on trial, where he recanted his writings. However, he was sent to Rome where he spent eight years imprisoned, faced another trial where he was sentenced to death. In 1600 he was burned at the stake (Thomsett, 2010). His works were later included in the ILP.

It is safe to say that the existing literature has not studied 16th century censorship using large-scale data. The existing evidence is largely anecdotal and of limited regional scope. Our study will attempt to go beyond the anecdotal and provide Europe-wide evidence on the effectiveness of Catholic censorship, and the resulting economic consequences.

3 Data

The data for this paper come from various sources. The dataset of forbidden books during the Counter-Reformation comes from De Bujanda's monumental work "Index des Livres Interdits". In particular, volume X of the collection (De Bujanda, 1996) lists all books included in the indexes prior to year 1600, while volume XI lists books indexed from 1600 onwards. Data of published books for the period of 1450-1600 comes from the Universal Short Title Catalogue (USTC, 2015) which is publicly available at http://www.ustc.ac.uk and has already been used in the literature (Dittmar and Seabold, 2019; Becker and Pascali, 2019). The USTC dataset includes information about the author, the publisher, place and year of publication. This dataset, together with the data on forbidden books, allows us to construct measures of censorship at the city level: the share of authors with at least one publication censored, or the proportion of works censored.

To analyze the diffusion of knowledge we will use two approaches. First, as measures of the diffusion of printing technology we use as dependent variables the existence of a printing press and the number of books published in each city. Second, to measure the effect on the location of thinkers, we collect biographies of famous people.

Data on city-level population are obtained from Bairoch, Batou, and Chèvre (1988). Population is regarded in the literature as a good measure of economic development for pre-modern Europe (De Long and Shleifer, 1993; Acemoglu, Johnson, and Robinson, 2005).

Since a focus of our work is to look at Protestant vs Catholic areas, we draw on city-level on Protestantism from Cantoni (2012) and Rubin (2014). Rubin (2014) includes all European

cities in Bairoch, Batou, and Chèvre (1988) (that is, cities that reached 5,000 inhabitants at some point between 1000 and 1800), while Cantoni (2012) focuses on German cities.

We also include a series of control variables that could be correlated with our outcomes of interest. We include a dummy variable for whether the city hosted a medieval university. Universities are relevant since they increased the demand for knowledge and had an effect on economic growth (see Cantoni and Yuchtman, 2014). We also control for whether the city had a bishop or archbishop by 1517 (the year Martin Luther posted his ninety-five theses in Wittenberg, usually considered as the starting date of Protestantism), and whether the city was an independent Free Imperial City in 1517. Finally, we use variables indicating the geographical advantage of some cities, such as dummy variables for whether the city is a sea or river port. These data come from Rubin (2014).

3.1 Index Librorum Prohibitorum

The original indexes were written in Latin (although there are some versions in French or Flemish), and contained little detail of the author or work condemned. To exemplify how forbidden works and authors were listed, Figure 1a shows a page of the original Spanish index of 1551 (reproduced by De Bujanda), with Martin Luther's condemnation in the first row. Each volume of De Bujanda's collection is devoted to a set of indexes, providing detailed information for each condemnation. Figure 1b shows the analysis of Luther's condemnation in the Spanish 1551's index. We digitized Volume X of De Bujanda's collection, which includes all forbidden authors until year 1600. It contains the author's last name and first name, alternative names, dates of birth and death (approximate, if unknown), and the list of all works condemned, together with a reference to the indexes where they are listed. If all works of an author are condemned, there is an entry called "opera omnia". There is also indication of whether the author's name is a pseudonym, and whether the author is listed because his work is included in a book 'co-authored' by a condemned author. This is typically the case of some classical authors such as

Aristotle or Cicero, whose work had a preface written by a Protestant reformer.

De Bujanda's collection of indexes lists 2,953 authors. We identify 835 entries as pseudonyms or alternative spellings of authors, reducing the number to 2,118 unique authors.

We aggregate information of condemnation of individual works to the author level to construct the dummy variable *index*, which takes the value of 1 if an author is mentioned in at least one of the indexes of forbidden books. Even though in theory it would be possible to define this variable at the book level, matching this information to the USTC database is impractical.[14] Therefore, in practice we treat all indexed authors as "opera omnia".[15] We also construct dummy variables for whether an author is mentioned in a specific index.

3.2 Indexed authors in USTC

We identify indexed authors in USTC by linking De Bujanda's list of indexed authors to the USTC database. This exercise is not easy given the authors' alternative spellings of names, pseudonyms, and typos. In turn, USTC can list authors in various categories: primary, secondary, editor and translator. We look for matches in all four categories. We start by looking at exact matches, and then use the Stata command `reclink2` (Wasi and Flaaen, 2015). We manually verify each fuzzy match, checking for alternative spellings with the Consortium of European Research Libraries (CERL) Thesaurus,[16] the Library of Congress Name Authority File,[17] and the Virtual International Authority File (VIAF).[18]

Because of multiple authors, works can have more than 1 author indexed. One example is

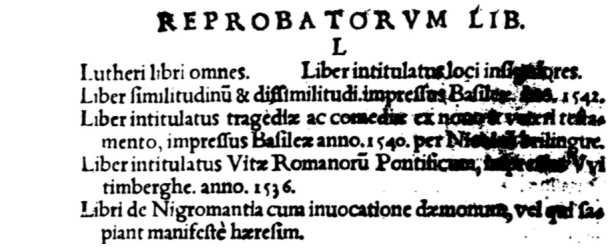
[14]Matching author names is already challenging because of typos and variant names. But we successfully deal with this as explained below. When it comes to book titles, though, editions in different cities can vary in length as catalogued in the USTC, making matching across nearly 100,000 editions close to impossible without risking false and missed matches. Furthremore, editions of the same book in different translations posesan additional challenge. Finally, we need to deal with compilations and books that bundle various titles. By focusing on authors we don't deal with these issues. Also, almost 2/3 of authors are opera omnia. I guess we might want to include some of this in the explanation for why using authors and not titles.

[15]65% of authors are "opera omnia" anyways. An alternative interpretation is that once an author is indexed, all his works are tainted by censorship.

[16]https://thesaurus.cerl.org/cgi-bin/search.pl

[17]http://id.loc.gov/authorities/names.html

[18]https://viaf.org/. We thank Eric Chaney for his invaluable support with the VIAF.



REPROBATORVM LIB.

L

Lutheri libri omnes. Liber intitulatus loci inſignes libres.
Liber ſimilitudinū & diſſimilitudi. impreſſus Baſileæ. anno. 1542.
Liber intitulatus tragediæ ac comediæ ex nouo & veteri testamento, impreſſus Baſileæ anno. 1540. per Nicolaū Gerbelium bilingue.
Liber intitulatus Vitæ Romanorū Pontificum, impreſſus Vvitimberghe. anno. 1536.
Libri de Nigromantia cum inuocatione dæmonum, vel qui faciant manifeſtè hæreſim.

(a)

LUNA, Pedro de (Benedictus XIII, antipape) (c.1324-1423)
- *Opera omnia*: Venise, 1554, 475 (III, 339). Rome, 1559, 082 (VIII, 299).

LUPÁČ, Prokop (LUPACIUS, Procopius) (c.1530-1587)
- *Opera omnia*: Munich, 1582, 292 (IX, 258). Rome, 1596, 947 (IX, 688).

LUPANO, Ottone (XVI^e s.)
- *Torricella*: Rome, 1559 et 1564, 962 (**VIII, 693-694**); 1590 et 1593, 0442 (IX, 445-446). Espagne, 1583, 1630, 1993 (VI, 551, 665).

LUPULUS, Heinrich (-1534)
- *Opera omnia*: Venise, 1554, 238 (III, 284). Rome, 1559 et 1564, 377 (VIII, 491). Espagne, 1583, 731 (VI, 347).

LUPULUS, Sebastian, voir LEPUSCULUS.
LUSCINIUS, voir NACHTGALL.

LUSCUS, Hermannus
- *Opera omnia*: Rome, 1559 et 1564, 390 (VIII, 494). Espagne, 1583, 754 (VI, 352).

LUTHER, Martin (1483-1546)
- *Opera omnia*: Placard de Charles Quint, 1; Louvain, 1550, 155; 1558, 154 (II, 89). Portugal, 1547, 51; 1551, 317 (IV, 134, 282). Venise, 1549, 1; 1554, 400 (III, 149, 321). Espagne, 1551, 92; 1559, 308 (V, 263, 407); 1583, 1219, 1242 (VI, 455, 460). Rome, 1559 et 1564, 642, 711 (VIII, 573, 605).

(b)

Figure 1: (a) Original condemnation in the Spanish index of 1551. All Luther's books are condemned in row 1. (b) De Bujanda's (1996) listing of condemned authors and works.

Urbanus Rhegius' book *De fide et resurrectione*. Rhegius is listed as primary author, Helius Eobanus Hessus as secondary author, and Johannes Freder as the translator. All three authors appear in the index.

Our vintage of the USTC dataset has 709,986 editions, with publication dates spanning from 1452 to 1650. We were able to identify 95,939 works (13.5%) as written by authors indexed by the Catholic Church.

3.3 Deutsche Biographie

To understand whether censorship affects the location of thinkers, we use the *Deutsche Biographie* (German Biography), a bibliographical reference work of famous people in the German-speaking countries.[19] In our historical setting, the area covered by the *Deutsche Biographie* roughly corresponds to the Holy Roman Empire, i.e. we restrict our analysis in the part on thinkers to this area. The Deutsche Biographie was produced by the Historical Commission at the Bavarian Academy of Sciences and Humanities and is meant to inform 'in brief, scholarly well-founded articles about deceased persons whose actions and work have had a substantial influence on political, economic, social, scholarly/scientific, technical or artistic developments.' For short, we call these 'thinkers' or 'famous people'. Importantly for our work, it reveals the place of birth and place of death of famous people, whenever known. Following the practice in the literature (e.g. Dittmar and Meisenzahl (2020)) we take the place of death to capture the last place of work.[20]

3.4 A first look at the data

3.4.1 The geography of printing across Europe

The existing literature does not employ comprehensive measures of book production across Europe and instead largely relies on anecdotal evidence about the effectiveness of censorship.

Here, we give a first overview of the geography printing across Europe, and where works written by forbidden authors were printed.

Figures 2 and 3 illustrate the geography of printing in Europe in the 16th century. It shows the total number of printing presses and printed editions at the city level in the period 1450-1600. Figure 4 shows the total number of editions written by forbidden authors printed in during the period 1450-1600. We observe that a disproportional number of prohibited books were printed

[19] We are planning to extend this analysis to our Europe-wide data set.

[20] We check, in a subsample of famous people where also places of work are known, that place of work and place of death indeed coincide in the vast majority of cases.

in the Protestant areas of Northern Europe.

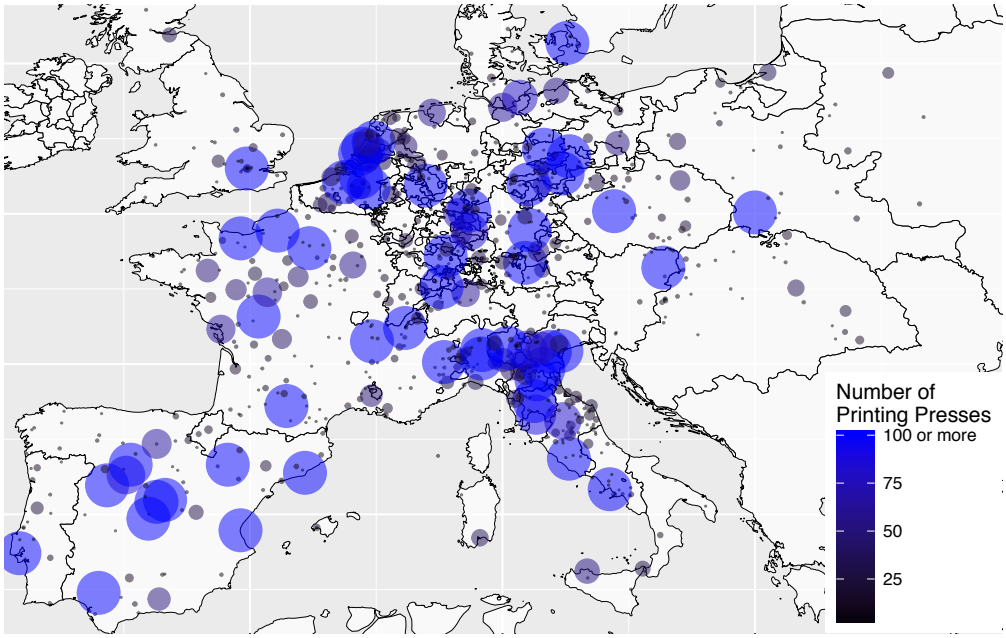


Figure 2: The geography of printing: Number of printing presses

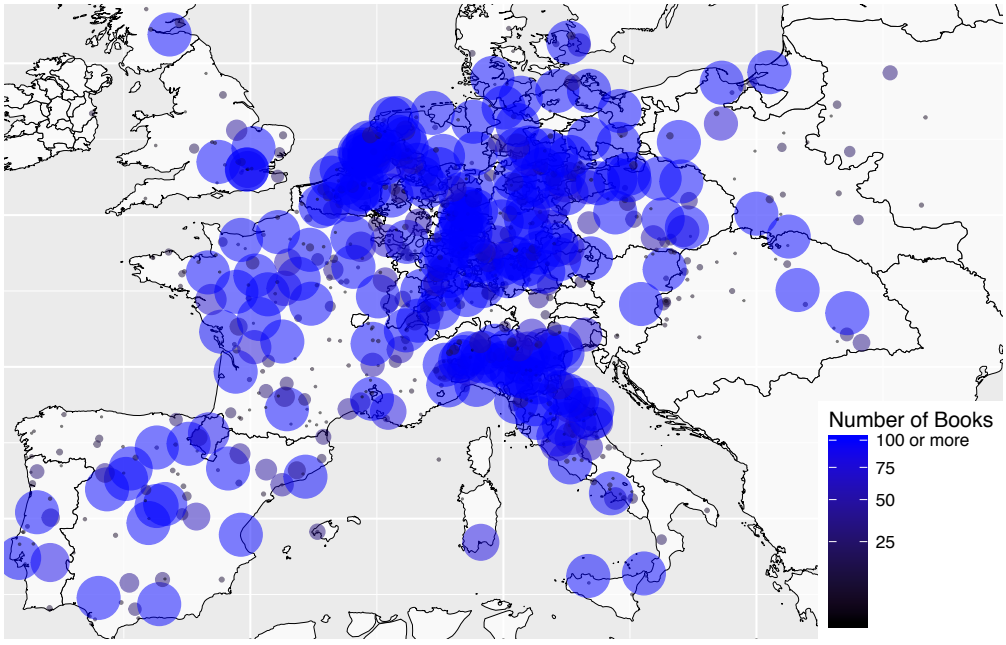


Figure 3: The geography of printing: Number of books

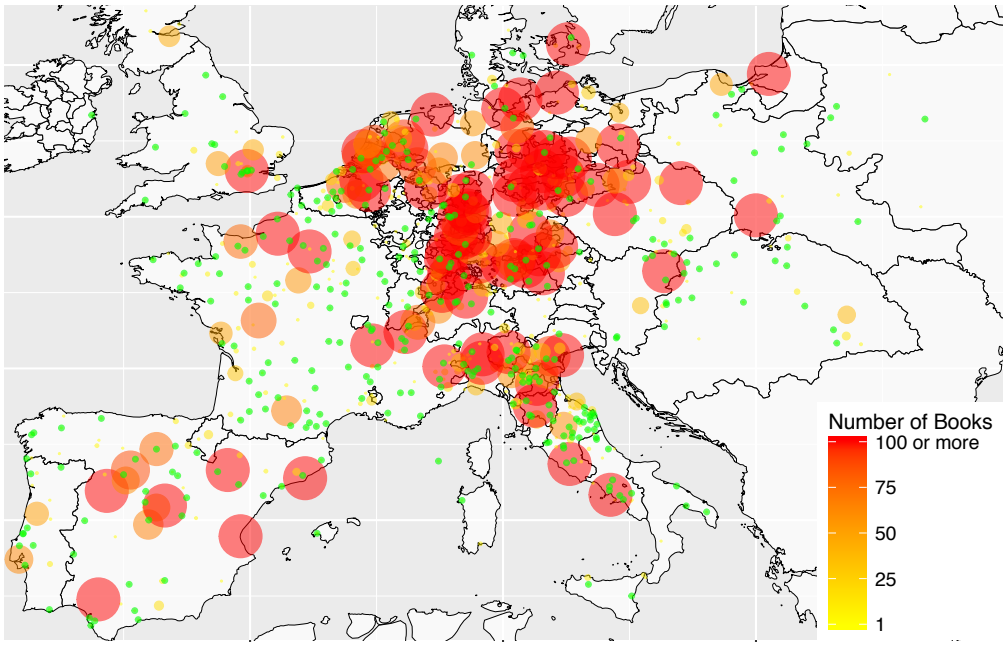


Figure 4: Number of indexed books printed

3.4.2 Protestant vs Catholic areas

What were the consequences of censorship? Did Protestant areas oblige with censorship?

Figure 5 shows the evolution of prohibited and printed books in Catholic and Protestant areas within the Holy Roman Empire, based on Becker and Pascali (2019) classification of cities for 1546. In Protestant cities we observe a peak in the printing of (to be) prohibited books around 1517, with around 60% of all books printed. This remained fairly stable until 1550, where it starts declining towards the end of the century. On the other hand, in Catholic cities we observe a peak in indexed books around 1550, with a sharp decline thereafter. The figure suggests that censorship in Catholic areas had a greater impact than in Protestant areas.[21]

This evidence suggests that, in fact, Catholic censorship had an influence on the geography of printing of books. AppendixA gives further evidence on the same issue. It shows that, as a result of Catholic censorship, the printing of Martin Luther's works, which originally were also

[21] In Figure C.1 in the Appendix we show the pattern for indexed religious books, both in Catholic and Protestant areas. The pattern of printing is similar but more pronounced, with indexed books in Protestant areas reaching almost 80% of all books on religion printed.

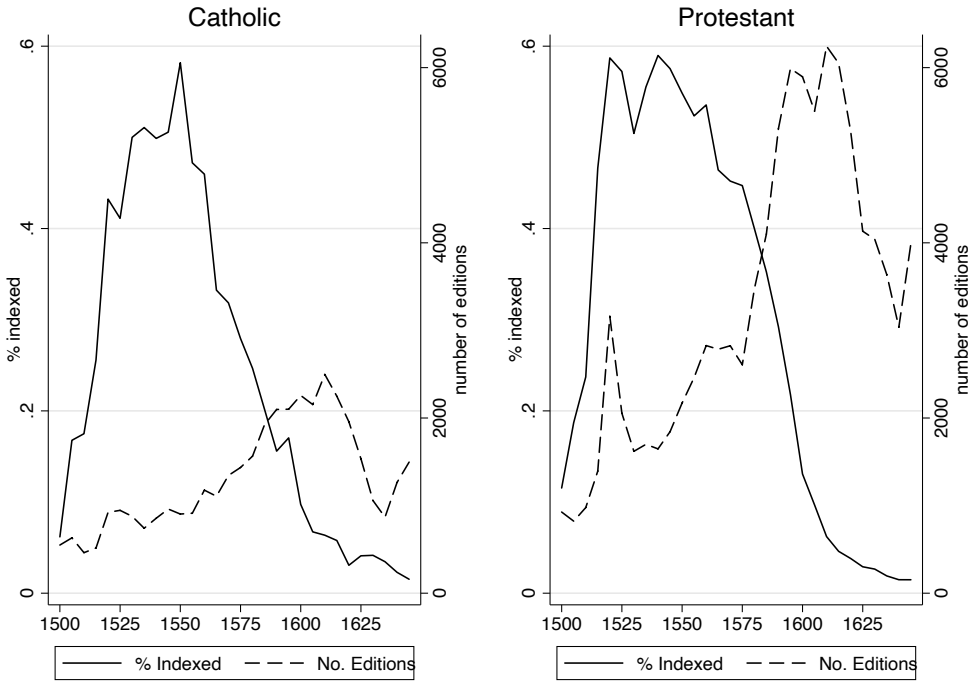


Figure 5: Censorship by religious denomination in the HRE. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Religious denomination from Becker and Pascali (2019).

printed in some cities even in Northern Italy, were increasingly printed in more North-Eastern locations of Europe, so in territories that established themselves as Protestant.

Now, we turn to regression evidence to study the effectiveness of censorship in more depth.

4 Was Censorship Effective?

4.1 Empirical Strategy

We are interested in understanding whether censoring is effective in the sense that, after being indexed, forbidden authors (or author teams) get printed less. The most common form of authorship is single authorship. However, some works are genuinely co-authored, or a work by author A gets translated by translator B, making for a team AB. As a result, from an econometric point of view, the most natural way to accomodate single and multiple authorships is to

define *author team* identifiers. In other words, author A and and author team AB define two different authorship IDs. For simplicity we will use the term author ID, but repeat that it is a short form for *author team* ID.

Our unit of analysis is an author ID by city by decade. We restrict the sample to authors who have published at least 25 editions, and to cities with at least 20 editions published. We run difference-in-difference regressions that control for author fixed effects and city fixed effects:

$$y_{ait} = \beta \text{ index}_a \times \text{post}_t + X_{it}\gamma + \nu_i + \mu_a + \eta_t + \varepsilon_{ait} \tag{1}$$

where y_{ait} measures printing (number of editions printed, or an indicator variable for *any* printing) of author (team) a in city i at time t. The variable index_a denotes whether author a is indexed on a specific index, and post_t is equal to one for all decades following the publication of a specific index. In our benchmark model, we only consider authors indexed in the first issue of an index (e.g. 1544 for Paris).[22] Note that we align decades to the index of interest, e.g. if the index year is 1546, decades are 1546-1555, 1556-1565, etc.[23] As a result, for the Louvain index of 1546, the variable post_t will be equal to one for all decades from 1546 onwards. X_{it} denotes city-by-decade level controls, e.g. the total volume of printing in city i in decade t, or the first year in which an author was printed anywhere (a variable that is not time-varying), interacted with post_t (as the main effect is washed out by the author fixed effect). Importantly, in all regressions, we include author fixed effects μ_a, city fixed effects ν_i, and decade fixed effects η_t. As a result of author fixed effects, μ_a, the main effect of being indexed is not identified, but of course our difference-in-differences coefficient of interest, β, is.[24]

Our panel is unbalanced because the first and last decade of printing varies by city. Naturally,

[22] In alternative specifications, we consider authors indexed in any of the issues of the index. These results, shown in Table B.2 in the Appendix, yield similar estimates.

[23] Results are similar if we use standard decades 1550-1559, 1560-1569, etc.

[24] In the Appendix, as a complementary specification, we implement an instrumental variable strategy (within the difference-in-differences setting) where we use as instrument for index_a, whether an author was already indexed in the previous index. We discuss the rationale of this instrument in detail in the Appendix and present the corresponding results in Table B.3.

whenever an author is not printed in a city i at time t, $y_{ait} = 0$. Furthermore, we restrict the sample to plus/minus three decades around the relevant index year. (We probe robustness to different time windows below.)

We start by looking at the impact of each index, one by one. For each index, we define sample cities as cities within 500km of the index city.[25] For instance, when considering the Paris index of 1544, we restrict the sample to cities within 500km from Paris, to test whether the Paris index was effective in reducing printing of forbidden material in proximity to Paris. Similarly, we ask whether the Venice index of 1549 was successful within a certain radius around Venice and so forth. Our focus on every single index, one by one, is motivated by the existing (anecdotal) literature covered above, which argues that indexes were de facto 'country-specific' in scope, including the Roman (Tridentine) Index.

In extensions of the basic differences-in-differences estimation, we split the main difference-in-differences term $\text{index}_a \times \text{post}_t$ into two parts:
$\text{index}_a \times \text{post}_t \times \text{near}_i$ and $\text{index}_a \times \text{post}_t \times \text{far}_i$, where near_i takes the value of 1 if city i lies within 250km of an index city and far_i those above 250km in distance.

In the same spirit, we also look at other interaction terms. For instance, our estimates will show that the effectiveness of any index is substantially lower outside the country/jurisdiction in which it was issued, independent of geographic distance to the town in which it was issued ('index city').

4.2 Results

Table 1 shows our main regression results that inform as about the effectiveness of indexation to reduce printing of (forbidden) authors. We control for city and author fixed effects, as well as for decade fixed effects, and for the total number of works printed in a city in a given decade.

Table 1 has multiple panels, one for each index we consider. In the first panel, the focus is

[25] For the Spanish index, we use the shortest distance between any city and Valencia, Valladolid, Sevilla, Toledo and Granada.

on the Paris indexes, the first of which was issued in 1544 and thus is our year of reference for this particular index. The second index under consideration is the Index of Louvain, which first came out in 1546, and so forth. In all cases the sample cities are those cities within 500km from the index city, as described in section 4.1.

In columns 1–3 we use a binary outcome variable, namely whether a given author is printed in a city-decade *at all*. Alternatively, in columns 4–6 we employ the number of works of an author printed in a city-decade. Alternatively, we employ a binary outcome variable, namely whether an author gets printed in a city-decade *at all* (columns 4–6). On average, an author pair gets printed less than once in any city-decade across all samples.[26] In columns 1 and 4, we use a window of $+/-$ three decades around the index year. In columns 2 and 5, we take a more restrictive window of $+/-$ two decades around the index year, and in columns 3 and 6, we use only one decade before and after the decade of a given index.

Overall, the results in Table 1 suggest that indexation is effective, i.e. that being indexed reduces the likelihood of being printed, and that the number of editions printed is reduced after the index is issued. This is the case for all indexes except for Portugal and Spain. For the Roman index, results are somewhat mixed: we do find a significant effect on the extensive margin, but not on the number of forbidden works printed,[27]

Throughout, it is important to note that the 500km circle, which we use for uniformity across samples (panels), may be less adequate in some cases. For instance, the 500km circle around Paris covers parts of England and the Low Countries, and hence areas outside the French jurisdiction. Similarly, for the Portuguese and the Munich index, the 500km circle encompasses a substantial number of cities outside Portugal and Bavaria, respectively. We will look at the role of jurisdiction and proximity in the next table.

[26]Recall that we restrict the sample to authors who issue at least 25 editions (regardless of when and where) in the years 1450-1650, and that we only include cities with at least 20 printed editions overall throughout the years 1450-1650. Our results are robust to including authors who issue at least 10 editions.

[27]As discussed, we use the 1559 Roman index. Our results are similar if we instead consider the Tridentine Index of 1564.

Table 1: The effect of being indexed on getting printed: number of printed works or being printed at all

Outcome:	Being printed at all			Number of printed works		
Distance to index city:	500km	500km	500km	500km	500km	500km
Time window around index:	± 30	± 20	± 10	± 30	± 20	± 10
	(1)	(2)	(3)	(4)		
Paris X Post 1544	-0.015***	-0.014**	-0.012**	-0.138*	-0.122	-0.081
	(0.006)	(0.006)	(0.005)	(0.083)	(0.076)	(0.064)
Mean Dep. Var. (indexed, pre)	0.023	0.026	0.028	0.147	0.149	0.141
Observations	1,510,705	1,079,075	644,906	1,510,705	1,079,075	644,906
Louvain X Post 1546	-0.013**	-0.012**	-0.012**	-0.120	-0.084*	-0.049*
	(0.005)	(0.005)	(0.005)	(0.088)	(0.050)	(0.027)
Mean Dep. Var. (indexed, pre)	0.026	0.026	0.028	0.152	0.129	0.118
Observations	1,741,754	1,246,649	738,849	1,741,754	1,246,649	738,849
Portugal X Post 1547	-0.003	-0.003	-0.002	-0.010	-0.007	-0.003
	(0.002)	(0.002)	(0.002)	(0.007)	(0.005)	(0.003)
Mean Dep. Var. (indexed, pre)	0.006	0.008	0.009	0.011	0.013	0.015
Observations	246,283	180,269	111,716	246,283	180,269	111,716
Venise X Post 1549	-0.014***	-0.012**	-0.012**	-0.137*	-0.063*	-0.061**
	(0.005)	(0.005)	(0.005)	(0.081)	(0.034)	(0.030)
Mean Dep. Var. (indexed, pre)	0.019	0.018	0.021	0.119	0.080	0.092
Observations	1,404,067	1,002,905	601,743	1,404,067	1,002,905	601,743
Espagne X Post 1551	-0.002**	-0.001*	-0.000	-0.005*	-0.003*	-0.002
	(0.001)	(0.001)	(0.000)	(0.003)	(0.001)	(0.001)
Mean Dep. Var. (indexed, pre)	0.002	0.002	0.002	0.003	0.003	0.003
Observations	558,580	403,701	248,822	558,580	403,701	248,822
Rome X Post 1559	-0.005*	-0.005*	-0.003	-0.026	-0.024	-0.018
	(0.003)	(0.003)	(0.002)	(0.018)	(0.018)	(0.014)
Mean Dep. Var. (indexed, pre)	0.005	0.006	0.005	0.023	0.027	0.029
Observations	908,962	647,445	388,467	908,962	647,445	388,467
Anvers X Post 1569	-0.004	-0.004	-0.007**	-0.008	-0.004	-0.024*
	(0.003)	(0.003)	(0.004)	(0.013)	(0.010)	(0.014)
Mean Dep. Var. (indexed, pre)	0.017	0.016	0.018	0.055	0.050	0.053
Observations	1,843,314	1,325,358	804,863	1,843,314	1,325,358	804,863
Parme X Post 1580	-0.006***	-0.004***	-0.002**	-0.030**	-0.020*	-0.009**
	(0.002)	(0.001)	(0.001)	(0.015)	(0.010)	(0.004)
Mean Dep. Var. (indexed, pre)	0.011	0.010	0.008	0.046	0.039	0.031
Observations	1,756,988	1,272,039	776,934	1,756,988	1,272,039	776,934
Munich X Post 1582	-0.003	-0.003*	-0.004**	-0.016*	-0.021**	-0.023***
	(0.002)	(0.002)	(0.002)	(0.009)	(0.010)	(0.008)
Mean Dep. Var. (indexed, pre)	0.013	0.014	0.016	0.054	0.065	0.074
Observations	2,518,688	1,835,697	1,127,316	2,518,688	1,835,697	1,127,316
Author FE	✓	✓	✓	✓	✓	✓
City FE	✓	✓	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓	✓	✓
Controls‡	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation 1. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

‡ Controls include the total number of works printed in the city in the given decade.

For the Spanish index, all coefficient estimates are small and statistically insignificant. We believe that this is the result of the effectiveness of the Spanish Inquisition well before the Spanish index came into existence. In fact, the Spanish Inquisition was instituted in 1478, on demand of the Spanish King, to protect the Catholic faith against heretics. To the extent that the Spanish Inquisition already prosecuted authors and printers of forbidden material before the Spanish Index came into being, it is no surprise that we do not find a difference-in-difference effect for Spain.[28] Results for the Portuguese index look similar but may be affected by the fact that large parts of Spain are within the 500km circle around Lisbon, and we just saw the high degree of compliance, both pre and post index, in the Spanish case. Note that this observation of Spain being a special case is also underlined by the fact that the top 10 Protestant authors were barely ever printed in Spain. The maximum number of top 10 Protestant authors getting printed in any 5-year interval is equal to one.[29]

The estimated diff-in-diff coefficients are sizable and at first sight even seem too big against the average number of editions across all authors printed per city-decade. However, the relevant reference point is the pre-index number of editions of forbidden authors (per city-decade), which is .023 for the case of Paris (column 1). So, indexation brings down the number of editions of forbidden authors by about two thirds (.015).

It is important to note that, in principle, authors may get printed less over time because their work ages and reader interest decreases over time. However, such vintage effects should apply to indexed and non-indexed authors alike and be taken care of by our difference-in-difference setting. Yet, we probe the important issue of vintage effects even further, in Table B.1 in the Appendix. We replicate Table 1, adding the year in which an author was first printed anywhere, interacted with the Post dummy, as an additional control. The main effect of 'year first printed' is constant within author and hence absorbed by the author fixed effect. But the interaction with

[28] See e.g. the Inquisitorial persecution of Erasmus' works in 1520s and 1530s, Griffin (2005, pp. 2-3)

[29] There were also economic incentives not to print certain books in Spain before 1550. The cost of paper and an incipient industry did not attract buyers (Griffin, 2005).

the Post dummy is identified. In case there were important differences in vintage effects for indexed and non-indexed authors following indexation, we would expect the main DD coefficient to be affected. However, coefficient estimates are very close to those in Table 1.

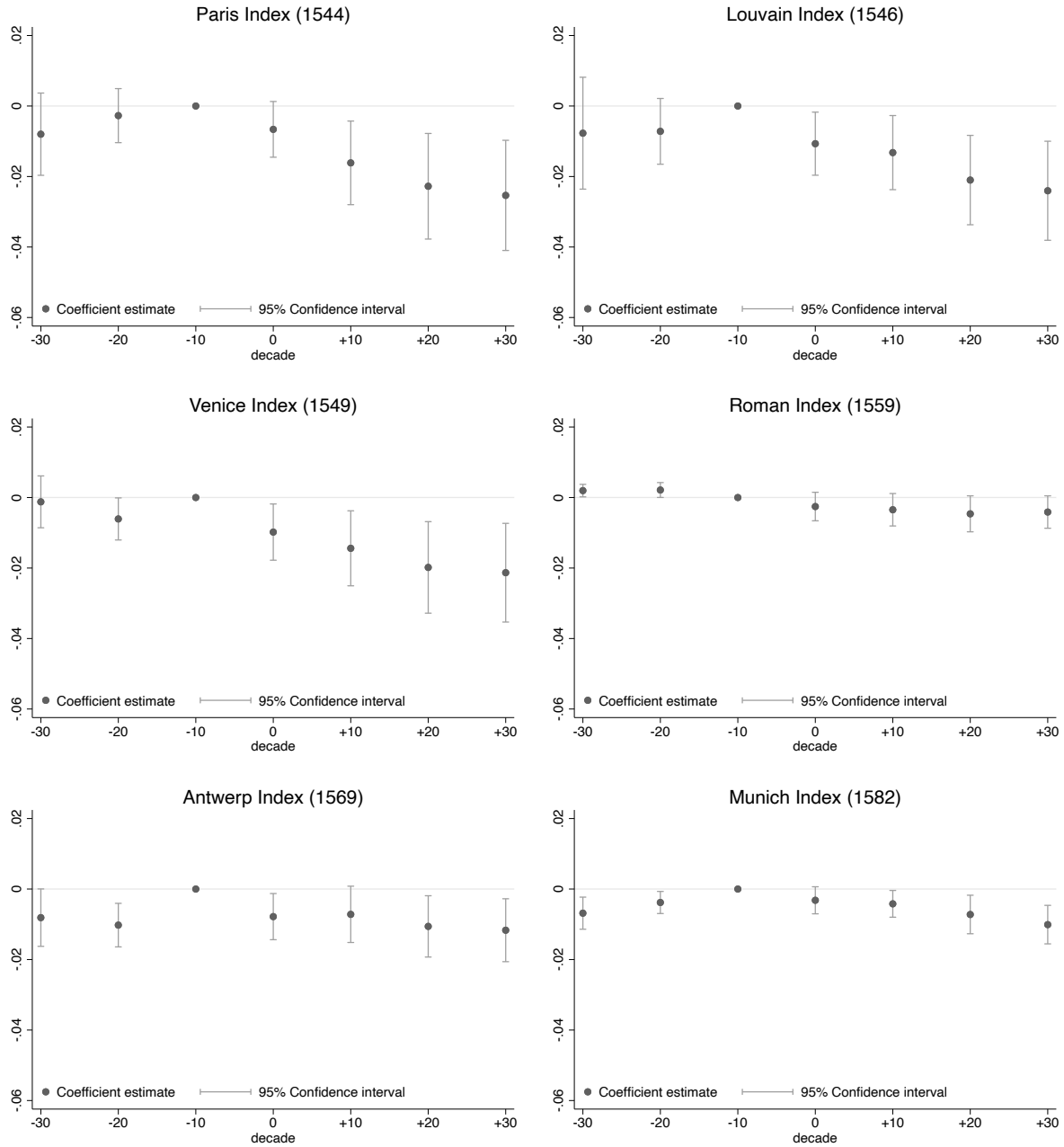
Pre-trends and event study The validity of our DD estimates hinges on the assumption of parallel trends, i.e. that indexed and non-indexed authors are equally likely to get printed before the introduction of the index. To assess this, and also to check whether the index had an immediate or a gradual effect on the printing of forbidden authors, we implement an event-study type model, where we re-estimate equation 1, but replacing the DD term with an interaction of index_a and a full set of decade dummies. The results are shown in Figure 6, where we plot the coefficients on the interaction terms, taking the decade before the introduction of the index as the reference point.

The figures show that in the decades prior to the publication of the index, forbidden authors are as likely to get printed as non-forbidden ones. The only exception is the Roman index, which shows that indexed authors have a slightly higher probability of being published before the Roman index was issued. However, after its publication, indexed authors are increasingly less likely to get printed.

In which cities is the index more effective? Tables 2 and 3 look at different dimensions of heterogeneity in the effectiveness of the index. First, to the extent that the index city is the seat not only of the authorities issuing a given index, but also more likely to hold more powers of enforcement than a city far away, we would expect an index to be more effective in closer geographic proximity to the index city.

While column 1 reproduces column 1 from Table 1 for ease of comparison, column 2 asks whether cities closer to a specific index are more likely to be compliant. To check this, we split the DD coefficient into 'DD near' and 'DD far' where 'near' is defined as being within 250km of an index city, and 'far' captures cities further away than 250km. The point estimates for

Figure 6: The effect of being indexed on getting printed: Event Study



Notes: Each figure shows coefficients from regressions based on equation 1. The reference point is the decade prior to the publication of the index. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP).

the 'DD near' coefficients are generally larger than those for 'DD far'. While the difference between them is generally not statistically significant, the size pattern is consistent with the

idea that proximity to index cities matters. This could be for several reasons that our data do not allow us to formally test, but that we try to speak to below: first, printers nearby an index city may be better informed about indexation; second, conditional on printers being up-to-date about indexed works, they may be more compliant nearby index cities, as authorities are more likely to enforce indexation.

One might also argue that religiosity is an important factor for compliance of Christian printers and readers when being told that certain works should no longer be printed and read. Obviously, there are no survey data from the 16th century telling us about beliefs of individuals. But we can proxy the degree of religiosity of a location by looking at which municipality names honor a Christian saint, such as St. Etienne in France, or St. Peter(-Ording) in North Germany. We compute the number of municipalities with names honoring a saint as the share of all municipalities within a 20 km radius around each printing city, and split the set of printing cities in those above and below the median in terms of saint share. Notice that this measure does not use proximity or jurisdiction in any way. Column 3 shows that compliance is generally stronger in printing cities surrounded by more municipalities with names honoring saints. This suggests that the intrinsic motivation of printers in more religious places to 'do the right thing' might be an important factor.

Finally, the historical narrative we reported earlier about the 'local' reach of indexes is primarily concerned with political jurisdictions. We stressed that, for instance, both the Spanish King and the Spanish Inquisition insisted on their independence from Roman interference, and would only recognize works indexed on the Roman index to the extent that they themselves scrutinized these works and added them to the Spanish edition of the index. We reported similar anecdotal evidence for other jurisdictions which issued their own 'local' indexes to give legal power to what was and was not considered heretic.

If that is indeed the case, we would expect stronger compliance with a local index in its own jurisdiction, and less so in neighboring jurisdictions. In Column 4 we test for this by including

Table 2: The effect of being indexed on getting printed:number of printed works

Outcome: Being printed at all				
	(1)	(2)	(3)	(4)
Interaction:	-	± 250km	± cities with saint names	inside/outside of state
Paris X Post 1544	-0.015***			
	(0.006)			
Paris X Post 1544 X Below		-0.023***	-0.009	-0.021***
		(0.007)	(0.006)	(0.007)
Paris X Post 1544 X Above		-0.013**	-0.020***	-0.013**
		(0.005)	(0.007)	(0.006)
Mean Dep. Var. (indexed, pre)	0.023	0.023	0.023	0.023
Observations	1,510,705	1,510,705	1,510,705	1,510,705
Louvain X Post 1546	-0.013**			
	(0.005)			
Louvain X Post 1546 X Below		-0.023***	-0.002	-0.025***
		(0.007)	(0.007)	(0.007)
Louvain X Post 1546 X Above		-0.007	-0.018***	-0.010*
		(0.005)	(0.006)	(0.005)
Mean Dep. Var. (indexed, pre)	0.026	0.026	0.026	0.026
Observations	1,741,754	1,741,754	1,741,754	1,741,754
Venise X Post 1549	-0.014***			
	(0.005)			
Venise X Post 1549 X Below		-0.023***	-0.007	-0.030**
		(0.008)	(0.004)	(0.012)
Venise X Post 1549 X Above		-0.009*	-0.020***	-0.012**
		(0.004)	(0.007)	(0.005)
Mean Dep. Var. (indexed, pre)	0.019	0.019	0.019	0.019
Observations	1,404,067	1,404,067	1,404,067	1,404,067
Rome X Post 1559	-0.005*			
	(0.003)			
Rome X Post 1559 X Below		-0.004**	-0.004**	-0.004**
		(0.002)	(0.002)	(0.002)
Rome X Post 1559 X Above		-0.006	-0.006	-0.005
		(0.003)	(0.004)	(0.003)
Mean Dep. Var. (indexed, pre)	0.005	0.005	0.005	0.005
Observations	908,962	908,962	908,962	908,962
Author FE	✓	✓	✓	✓
City FE	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓
Controls‡	✓	✓	✓	✓

Notes: The table shows regressions based on equation 1. Column 2 includes interactions of Index X Post with a dummy for being in a city within/outside a 250 km radius of the index city. Column 3 includes interactions of Index X Post with a dummy for being in a city above/below the median number of cities with saint names in a 20 km radius. Column 4 includes interactions of Index X Post with a dummy for being in a city within/outside the index's political jurisdiction. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

‡ Controls include the total number of works printed in the city in the given decade.

Table 3: The effect of being indexed on getting printed:number of printed works

Outcome: Being printed at all				
	(1)	(2)	(3)	(4)
Above/below:	-	± 250km	± cities with saint names	inside/outside of state
Anvers X Post 1569	-0.004			
	(0.003)			
Anvers X Post 1569 X Below		-0.007	0.000	-0.005
		(0.004)	(0.003)	(0.005)
Anvers X Post 1569 X Above		-0.001	-0.008**	-0.003
		(0.003)	(0.004)	(0.002)
Mean Dep. Var. (indexed, pre)	0.017	0.017	0.017	0.017
Observations	1,843,314	1,843,314	1,843,314	1,843,314
Parme X Post 1580	-0.006***			
	(0.002)			
Parme X Post 1580 X Below		-0.006***	-0.006***	-0.007***
		(0.002)	(0.002)	(0.002)
Parme X Post 1580 X Above		-0.006***	-0.005***	-0.005***
		(0.002)	(0.002)	(0.002)
Mean Dep. Var. (indexed, pre)	0.011	0.011	0.011	0.011
Observations	1,756,988	1,756,988	1,756,988	1,756,988
Munich X Post 1582	-0.003			
	(0.002)			
Munich X Post 1582 X Below		-0.004	0.004	-0.012***
		(0.003)	(0.003)	(0.003)
Munich X Post 1582 X Above		-0.002	-0.009***	-0.002
		(0.002)	(0.002)	(0.002)
Mean Dep. Var. (indexed, pre)	0.013	0.013	0.013	0.013
Observations	2,518,688	2,518,688	2,518,688	2,518,688
Author FE	✓	✓	✓	✓
City FE	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓
Controls‡	✓	✓	✓	✓

Notes: The table shows regressions based on equation 1. Column 2 includes interactions of Index X Post with a dummy for being in a city within/outside a 250 km radius of the index city. Column 3 includes interactions of Index X Post with a dummy for being in a city above/below the median number of cities with saint names in a 20 km radius. Column 4 includes interactions of Index X Post with a dummy for being in a city within/outside the index's political jurisdiction. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.
‡ Controls include the total number of works printed in the city in the given decade.

an interaction with a dummy taking the value of 1 if the city is within the political jurisdiction of the index. Thus, for the Paris index we consider French cities as being 'inside' the political jurisdiction of the Paris index. The results show larger point estimates in cities within the same jurisdiction of the index city than outside that jurisdiction.

Indexation of Protestant authors vs non-Protestant authors To the extent that the most salient threat to the authority of the Catholic Church during the 16th century came from the Protestant movement, it is interesting to ask whether indexation was equally effective in containing printing of Protestant authors and non-Protestant authors.

Table 4 shows estimates from various regression specifications that try to address this important aspect. Column 1 reproduces, for ease of comparison, column 1 from Table 1. In column 2, we restrict the sample (treatment *and* control group) to only Protestant reformers, some of whom were explicitly indexed and some who were not.[30] In column 3, we restrict the sample (treatment and control group) to only non-Reformers, i.e. we delete Protestant reformers from treatment and control group.

The findings indicate that, for the earlier indexes (Paris, Louvain, Venice) which also happen to be physically closer to the Holy Roman Empire, i.e. the centre of the Protestant 'outbreak', the difference-in-difference coefficients in columns 2 and 3 are roughly similar, i.e. indexation was equally effective for indexed Protestant and indexed non-Protestant authors, when compared to authors of the same denomination. Later indexes were no longer effective with indexed Protestant authors relative to non-indexed Protestant authors as, all DD coefficients are close to zero.

But indexation continued to be effective with non-Protestant authors in the two 'Italian indexes' (Rome and Parma), i.e. with dissenters *within* the Catholic Church. One potential interpretation is that while the Protestant movement had gained ground early on, the Catholic Church did succeed in containing its further spread by reducing further dissent in its own ranks earlier on, instead of such dissenters turning into a new movement or joining the Protestant one.

[30]The source for this is en.wikipedia.orgwikiList_of_Protestant_Reformers.

Table 4: The effect of being indexed on getting printed: Are Protestant authors different?

Outcome:	Being printed at all		
Sample:	All authors	Protestant (T & C)	Non-Prot. (T & C)
	(1)	(2)	(3)
Paris X Post 1544	-0.015***	-0.015**	-0.024***
	(0.006)	(0.006)	(0.008)
Mean Dep. Var. (indexed, pre)	0.023	0.020	0.027
Observations	1,510,705	69,615	1,441,090
Louvain X Post 1546	-0.013**	-0.010	-0.014***
	(0.005)	(0.007)	(0.005)
Mean Dep. Var. (indexed, pre)	0.026	0.029	0.024
Observations	1,741,754	80,262	1,661,492
Venise X Post 1549	-0.014***	-0.015**	-0.012**
	(0.005)	(0.006)	(0.005)
Mean Dep. Var. (indexed, pre)	0.019	0.023	0.016
Observations	1,404,067	64,701	1,339,366
Rome X Post 1559	-0.005*	0.000	-0.006*
	(0.003)	(0.001)	(0.004)
Mean Dep. Var. (indexed, pre)	0.005	0.001	0.006
Observations	908,962	41,886	867,076
Anvers X Post 1569	-0.004	-0.001	0.005*
	(0.003)	(0.003)	(0.003)
Mean Dep. Var. (indexed, pre)	0.017	0.019	0.015
Observations	1,843,314	84,942	1,758,372
Parme X Post 1580	-0.006***	0.001	-0.006***
	(0.002)	(0.001)	(0.002)
Mean Dep. Var. (indexed, pre)	0.011	0.006	0.012
Observations	1,756,988	80,964	1,676,024
Munich X Post 1582	-0.003	-0.001	-0.002
	(0.002)	(0.007)	(0.002)
Mean Dep. Var. (indexed, pre)	0.013	0.024	0.011
Observations	2,518,688	116,064	2,402,624
Author FE	✓	✓	✓
City FE	✓	✓	✓
Decade FE	✓	✓	✓
Controls‡	✓	✓	✓

Notes: The table shows regressions based on equation 1. Column 2 includes only Protestant authors, while Column 3 includes non-Protestant authors. Column 4 restricts the treatment group to Protestant authors. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

‡ Controls include the total number of works printed in the city in the given decade.

4.3 Was Censorship Effective? Printers

Our dataset allows us to also look at the effect of censorship on the printing industry. We follow Dittmar and Seabold (2019) in identifying printing firms by also following printers' widows and heirs. To make this process tractable, as we include printers in all Europe, we restrict our sample to the most prolific printers (i.e. printers with more than 50 works recorded in USTC).

We estimate an equation similar to equation 1, but now constructing measures at the publisher level and including publisher fixed effects:

$$y_{pit} = \beta \text{ index}_p \times \text{post}_t + X_{it}\gamma + \nu_i + \mu_p + \eta_t + \varepsilon_{pit} \tag{2}$$

The variable index_p is a dummy for whether publisher p printed a (soon to be) indexed book *before* the index was issued. Given that this is analysis is a more aggregated version of the author-level regressions, we expect to find that the publication of the index led to a reduction in the number of editions printed by publishers of indexed authors, likely driven by a decrease in the number of indexed or Protestant authors. [31]This reduction might have also led to the closing of some printing houses.

The results are shown in Table 5. In Column 1, the dependent variable is a dummy for whether a publisher prints an edition in city i in decade t. In column 2 we consider the number of editions printed by a publisher, while column 3 looks at the number of indexed books printed by the publisher. Finally, column 4 considers as dependent variable the number of printed books written by Protestant authors.

Column 2 shows that for the case of Venice, Rome and Antwerp the index reduced the number of editions printed by publishers who had printed indexed authors in the pre-index period. This reduction comes mainly from indexed editions (column 3), rather than from Protestant authors (column 4). Finally, column 1 shows that with the exception of the Paris index, all indexes

[31]It is important to remember that not all Protestant authors are indexed, and that not all indexed books were written by Protestants.

reduce the likelihood of a publisher printing at all after the index was issued. This suggests that the index not only shifted printing from indexed to non-indexed authors, but also induced some printers to close their businesses altogether.

Table 5: The effect of being indexed on publishers

Outcome:	1*(print)	N editions	N indexed	N Protestant
Distance to index city:	500km	500km	500km	500km
Time window around index:	± 30	± 30	± 30	± 30
	(1)	(2)	(3)	(4)
Paris X Post 1544	-0.013	-0.632	-0.116	-0.014
	(0.009)	(0.630)	(0.216)	(0.023)
Mean Dep. Var. (indexed, pre)	1.000	42.792	12.281	0.729
Observations	8,787	8,787	8,787	8,787
Louvain X Post 1546	-0.015*	-0.592	-0.156	-0.023
	(0.007)	(0.340)	(0.093)	(0.016)
Mean Dep. Var. (indexed, pre)	1.000	39.182	10.247	0.870
Observations	9,595	9,595	9,595	9,595
Venise X Post 1549	-0.017**	-0.892*	-0.160*	-0.012
	(0.006)	(0.452)	(0.084)	(0.013)
Mean Dep. Var. (indexed, pre)	1.000	54.000	10.364	0.782
Observations	9,898	9,898	9,898	9,898
Rome X Post 1559	-0.022*	-0.514**	-0.031**	-0.004
	(0.012)	(0.186)	(0.012)	(0.004)
Mean Dep. Var. (indexed, pre)	1.000	33.274	3.452	0.107
Observations	8,787	8,787	8,787	8,787
Anvers X Post 1568	-0.028**	-1.340*	-0.564*	-0.026
	(0.011)	(0.625)	(0.262)	(0.017)
Mean Dep. Var. (indexed, pre)	1.000	37.897	12.195	0.621
Observations	7,676	7,676	7,676	7,676
Parme X Post 1580	-0.030*	-1.646	-0.265*	-0.009
	(0.017)	(1.104)	(0.134)	(0.006)
Mean Dep. Var. (indexed, pre)	1.000	44.277	7.681	0.294
Observations	10,504	10,504	10,504	10,504
Munich X Post 1582	-0.018*	-1.386	-0.254	-0.006
	(0.009)	(0.893)	(0.182)	(0.024)
Mean Dep. Var. (indexed, pre)	1.000	49.928	11.696	1.145
Observations	12,019	12,019	12,019	12,019
Publisher FE	✓	✓	✓	✓
City FE	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓
Controls‡	✓	✓	✓	✓

Notes: The table shows regressions based on equation 2. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-publisher level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

‡ Controls include the total number of works printed in the city in the given decade.

5 The Effects of Censorship: Location of Thinkers

5.1 Empirical Strategy

The previous sections have shown that Catholic censorship influenced the likelihood of censored authors being printed. We hypothesize that Catholic censorship was detrimental to freedom of thought by influencing printed works and their geographical distribution and, therefore, it could have influenced the preferences of famous people and thinkers when deciding where to settle and work. Squicciarini and Voigtlander (2015), Xue (2021), Dittmar and Meisenzahl (2020), and others have highlighted the importance of 'upper-tail' human capital for early-modern economic growth. We look at the relationship between the number of indexed books that a particular city prints, and the birth and immigration of famous people. We want to check whether the suppression of free thinking (i.e. accepting and implementing the ILP) affected attractiveness to upper-tail human capital. We use the *Deutsche Biographie* and limit our analysis to the area of the Holy Roman Empire in 1500. Later, we will extend the analysis to other parts of Europe.

Our unit of analysis is a city by decade. We estimate the following model that controls for city fixed effects:

$$y_{it} = \delta indexed_{it} + X_{it}\gamma + \nu_i + \mu_t + \varepsilon_{it} \tag{3}$$

where y_{it} measures famous people/thinkers in city i at time t. This outcome variable can be the number of famous people born, an indicator variable for at least one famous person born, the number of emigrants, the number of immigrants, and the number of famous people who died in the city. The variable $index_{it}$ denotes the number of printed works in city i in decade t that were included in an index of forbidden books. X_{it} denotes city-by-decade level controls, e.g. the total volume of printing in city i in decade t, or the number of famous people born in in city i in decade t. Importantly, in all regressions, we include both city fixed effects ν_i and decade fixed effects μ_t. In alternative specifications, instead of using city by decade observations, we look at city X (20 year), or city X (50 year) observations.

5.2 Results

The *Deutsche Biographie* contains short biographies of 127,600 'thinkers' or 'famous people' who were born or died in German speaking countries. We are interested in the subsample of thinkers that were born before 1650, or died during the same period. With these constraints, we obtain a dataset of 12,486 thinkers that were born in German speaking countries up to 1650. From those, 7,876 died before 1650. However, in our analysis we need to have information on both place of birth and death for each of them, leaving us with a final sample of 3,670 famous people. Table 6 shows the basic summary statistics. The first columns shows the information for the whole final sample of 3,670 thinkers; the second column shows the same information for those famous people who did not migrate and the third column shows the same information for those who did migrate. We define a migrant as an individual whose place of death is different from their place of birth.

Table 6 shows that most of the famous people in our database did move during their lifetime. Coordinates of birthplaces and places of death are not statistically different between thinkers who migrated and those who did not. Overall, social sciences is the group of thinkers with a larger representation in our sample. There is, however, a big difference between those thinkers who did not migrate and those who did migrate. In particular, the proportion of thinkers that belong to social sciences is 55% for those who migrated, while it only represents 38% of those thinkers who did not migrate. Similarly, 36% of those who migrated are related to a religious occupation, while only 19% for those who did not migrate.

Table 7 shows statistics of the cities where at least a thinker either was born or died. In particular, we collect information on the geographical coordinates of those towns and the statistics regarding the type of occupations of thinkers who either were born or died there. Our sample consists of 1,304 towns, built upon the dataset of famous people obtained from the DB mentioned above. Of those 1,304 towns, 304 did not see the birth of any thinker before 1650; no thinker died in 678 of them. We show geographical coordinates and the average of the total

Table 6: Summary statistics: Famous people in German speaking countries

	Whole Sample		No Migrants		Migrants	
	mean	sd	mean	sd	mean	sd
Year of birth	1546.86	70.24	1549.20	70.73	1546.24	70.11
Year of death	1608.15	71.65	1610.41	71.50	1607.55	71.68
Latitude birthplace	50.19	2.32	50.10	2.32	50.22	2.31
Longitude birthplace	10.48	3.60	10.51	3.48	10.48	3.63
Latitude place of death	50.08	3.61	50.10	2.32	50.07	3.88
Longitude place of death	10.92	6.20	10.51	3.48	11.03	6.73
No migrant	0.21	0.41				
Emigrant	0.79	0.41				
Religious	0.32	0.47	0.19	0.39	0.36	0.48
Social Sciences	0.51	0.50	0.38	0.49	0.55	0.50
Arts	0.29	0.45	0.31	0.46	0.28	0.45
Science	0.13	0.33	0.13	0.34	0.12	0.33
Diplomacy	0.29	0.45	0.29	0.46	0.29	0.45
Technology	0.09	0.28	0.13	0.34	0.08	0.27
Others	0.03	0.18	0.03	0.18	0.04	0.18
multi	0.36	0.48	0.30	0.46	0.37	0.48
Observations	3670		766		2904	

Notes: The table presents statistics for famous people of German speaking countries obtained from DB. The sample consists of 3,670 individuals out of 127,600 thinkers for whom you can find a short biography at DB. The final sample are those thinkers who were born before 1650 and for whom we have information on both birthplace and lace of death. Whole sample includes all 3,670 observations. No migrant sample includes those who did not migrate, i.e. they were born and died in the same town. Migrant sample includes those who did migrate.

number of famous people born, dead, or that migrated from those cities in the period up to 1650. The first two columns show the the summary statistics for the full sample; the third and fourth columns show the sample of cities that experienced at least a birth and a death of a famous person; then we restrict the sample to cities where no thinker was born in columns 5 and 6; and the last two columns restrict the sample to cities where no thinker died. We observe larger thinker 'activity' in places where both famous people were born and died. In particular they have a larger number of immigrants than in the other subsamples and they are located further north than the subsample of cities where no famous person was born.

Table 7: Summary statistics: Cities with famous people in German speaking countries

	Whole sample		Born and dead		No born		No dead	
	mean	sd	mean	sd	mean	sd	mean	sd
Latitude	49.77	4.88	50.13	2.45	48.68	9.01	50.09	2.44
Longitude	10.63	7.56	10.66	4.02	10.45	13.99	10.66	3.86
Total number emigrants	1.34	2.17	2.73	3.72			1.22	0.67
Total number no migrants	0.28	1.81	1.09	3.46				
Total number born	1.62	3.71	3.83	6.73			1.22	0.67
Total number dead	1.91	6.50	6.19	11.56	1.36	2.43		
Observations	1304		335		304		678	

Notes: The table presents summary statistics for cities where famous people of German speaking countries were born or died up to 1650. Information of famous people was obtained from DB. The full sample, columns 1 and 2, consists of 1,304 cities. In columns 3 and 4 we present statistics from 335 cities where thinkers were either born or dead. Columns 5 and 6 restrict the sample to cities where no thinkers were born. And columns 7 and 8 restrict the sample to cities where no thinkers died. We show geographical coordinates and the average of the total number of famous people born, dead, or that migrated from those cities in the period up to 1650.

Table 8 shows statistics for the sample of cities of the Holy Roman Empire where at least one thinker either was born or died and/or at least an edition of a book was printed between 1450 and 1650. In particular, we collect information on the number of indexed books that were published, the total number of books published in those towns and the statistics regarding the location and migration of thinkers in those towns. For that we calculate the number of thinkers born, the number of emigrants and the number of immigrants of one particular city in each decade between 1450 and 1650. Our sample consists of 1,240 towns from the Holy Roman Empire, built upon the dataset of famous people obtained from the DB mentioned above. Of those 1,240 towns, we create a subsample of 129 cities for which we have information on population in 1500, whether the city was a bishopric in 1517, whether it held a university in 1450 and if it was a free imperial city. We present the statistics at the city-decade observation (1,240 cities or 129 cities for 20 decades).

The first two columns show the summary statistics for the full sample of cities of the Holy Roman Empire; the third and fourth columns show the statistics for the subsample of cities for which we have extra information. We observe larger thinker and printing 'activity' in places

where we have information on population. In particular they have a 7-fold larger number of printed books, independent of whether they are indexed, and they have a between 2.5 and 5 times larger activity of thinkers. This subsample is likely comprised of larger cities or more relevant cities in the political sphere within the Holy Roman Empire.

Table 8: Summary statistics: Cities with famous people and/or printed editions

	(HRE cities)		(Subsample HRE cities)	
	mean	sd	mean	sd
Indexed books	2.19	25.00	15.77	65.76
Published books	11.90	95.58	83.76	248.39
Likelihood famous born	0.06	0.23	0.15	0.36
Number of famous born	0.07	0.32	0.23	0.68
Famous dead	0.08	0.45	0.42	1.08
Emigrants	0.06	0.26	0.15	0.47
Imigrants	0.07	0.41	0.34	0.93
Non-migrants	0.01	0.14	0.08	0.38
Observations	24800		2580	

Notes: The table presents summary statistics for cities where famous people of German speaking countries were born or died from 1450 up to 1650 (20 decades) or cities where at least an edition of a book was printed in the same period. Information of famous people was obtained from DB. The full sample, columns 1 and 2, consists of 1,240 cities that belonged to the Holy Roman Empire in 1500. In columns 3 and 4 we present statistics from 129 cities of the HRE for which we have information on population in 1500, if the city was a bishopric by 1517, if there was a university by 1450 and if the city was a Free Imperial City.

Tables 9 and 10 analyze whether the number of famous people born in, or migrating into, a city are correlated with the number of indexed books printed in that city. In other words, we ask whether'defiant cities', in the sense that they print indexed authors, attract upper-tail human capital. More specifically, column 1 looks at whether any person born the city in time period goes on to become famous. Column 2 counts the number of people born in the city in the time period that goes on to become famous. Column 3 counts the number of emigrants. This is the number of people born in the city in a given time period who die elsewhere. Similarly, column 4 counts the number of immigrants as the number of people who die in the city in the given time period and was born elsewhere. Column 5 takes the difference between the number

immigrants and the number of emigrants to compute net immigration. Finally, column 6 counts the number of famous people who die in a city in the given time period, whether born in the city, or whether they migrated into the city. The main difference between Tables 9 and 10 is that, in the latter, we include population estimates which reduces the number of observations. While Panel A uses 10-year intervals as the time period of interest, Panel B uses 20-year intervals, and Panel C uses 50-year intervals. Throughout the different panels of Tables 9 and 10, a pattern emerges whereby – conditional on the number of books printed overall – cities that publish more forbidden books, attract more migrants, i.e. are attractive locations for upper-tail human capital.

Tables 11 and 12 use data for those 878 cities in our HRE sample that are in the German Empire in its post-1871 borders, for which Becker and Pascali (2019) provide a coding of cities that were Catholic or Protestant in the year 1546. Here, we can look separately at whether the printing of forbidden books differentially affects Catholic and Protestant cities. One might expect that Protestant cities ignore the ILP altogether, so that there is no intensive margin on the number of forbidden books as an attractor for famous people, whereas there is more variation in the set of Catholic cities. We find that this is indeed the case. While in Catholic cities, the number of forbidden books printed is associated with more famous people either born or migrating to and dying in such cities, this gradient does not exist in the set of Protestant cities which may be more open in general to ideas that the Catholic Church declares heretic.

Another relevant dimension is vernacularization, which has been studied by Binzel, Link, and Ramachandran (2020) and shown to influence the attractiveness of cities to famous people. Table 13 splits forbidden books into those in Latin, and those in the vernacular. Results are mixed. Throughout coefficient estimates for forbidden books both in Latin and in the vernacular are positive for our various measures of (attractiveness to) famous people, but point estimates are often statistically insignificant. To the extent that, as our earlier results show, the availability of forbidden books is indicative of freedom of thought and attractiveness to thinkers, we do not

seem to find that it is only forbidden thoughts in the vernacular that attracts them. This is likely the case because thinkers are not constrained by Latin to the same extent 'ordinary readers' are.

We also run the same type of regressions focusing on famous people grouped by occupation. Tables 14 shows the corresponding results. To reduce complexity of the tables, we only display, as outcomes, the number of famous people born in a city, and the number of famous people who die in a city. Tables 9 and 10 indicated that the coefficient estimates on net immigration and on the number of people who die in a city are nearly identical. The results indicate that the effects are particularly pronounced for 'social sciences' which includes religion, and for 'business'.

Table 9: Indexed books printed and famous people

Outcome:	Born	Number born	Emigrants	Immigrants	Net migrants	Number dead
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. City - Decade observations						
Indexed books	0.0003*	0.0002	0.0001	0.0012*	0.0011	0.0011
	(0.000)	(0.0002)	(0.0001)	(0.0007)	(0.0007)	(0.0007)
Published books	0.0001	0.0001**	0.0000	0.0010***	0.0010***	0.0010***
	(0.000)	(0.0001)	(0.0000)	(0.0002)	(0.0002)	(0.0002)
Number born			0.8087***	0.0149	-0.7938***	0.2062***
Observations	24,800	24,800	24,800	24,800	24,800	24,800
R-squared	0.006	0.0057	0.8200	0.0792	0.3354	0.0965
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240
Panel B. City - 20 year interval observations						
Indexed books	0.0003**	0.0004	0.0001	0.0016*	0.0015*	0.0015*
	(0.000)	(0.0003)	(0.0001)	(0.0008)	(0.0008)	(0.0008)
Published books	0.0001	0.0001*	0.0000	0.0010***	0.0010***	0.0010***
	(0.000)	(0.0001)	(0.0000)	(0.0002)	(0.0002)	(0.0002)
Number born			0.7768***	0.0307	-0.7461***	0.2539***
			(0.0473)	(0.0470)	(0.0564)	(0.0564)
Observations	12,400	12,400	12,400	12,400	12,400	12,400
R-squared	0.008	0.0084	0.8040	0.1374	0.3334	0.1580
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240
Panel C. City - 50 year interval observations						
Indexed books	0.0003*	0.0006***	-0.0001	0.0011	0.0012	0.0012
	(0.000)	(0.0002)	(0.0001)	(0.0008)	(0.0009)	(0.0009)
Published books	0.0001	0.0001	-0.0000	0.0013***	0.0013***	0.0013***
	(0.000)	(0.0001)	(0.0000)	(0.0003)	(0.0003)	(0.0003)
Number born			0.7452***	0.0542	-0.6910***	0.3090***
			(0.0549)	(0.1003)	(0.0963)	(0.0963)
Observations	4,960	4,960	4,960	4,960	4,960	4,960
R-squared	0.008	0.0097	0.8146	0.2293	0.3477	0.2605
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240
City FE	✓	✓	✓	✓	✓	✓
Interval FE	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation 3. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

Table 10: Indexed books printed and famous people: Bairoch cities and control for population

Outcome:	Born	Number born	Emigrants	Immigrants	Net migrants	Number dead
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. City - Decade observations						
Indexed books	0.0002	0.0000	0.0002	0.0019**	0.0017**	0.0017**
	(0.000)	(0.0003)	(0.0001)	(0.0008)	(0.0008)	(0.0008)
Published books	0.0001	0.0002*	0.0000	0.0006***	0.0006***	0.0006***
	(0.000)	(0.0001)	(0.0000)	(0.0002)	(0.0002)	(0.0002)
Number born			0.6270***	0.0285	-0.5985***	0.4015***
			(0.0469)	(0.0681)	(0.0745)	(0.0745)
Observations	2,580	2,580	2,580	2,580	2,580	2,580
R-squared	0.035	0.0322	0.6625	0.1223	0.2329	0.1652
Number of Cities	129	129	129	129	129	129
Panel B. City - 20 year interval observations						
Indexed books	0.0003*	0.0003	0.0002	0.0023**	0.0021**	0.0021**
	(0.000)	(0.0004)	(0.0001)	(0.0010)	(0.0010)	(0.0010)
Published books	0.0000	0.0002	0.0000	0.0006**	0.0005**	0.0005**
	(0.000)	(0.0001)	(0.0000)	(0.0002)	(0.0002)	(0.0002)
Number born			0.5874***	0.0784	-0.5089***	0.4911***
			(0.0550)	(0.1046)	(0.1105)	(0.1105)
Observations	1,290	1,290	1,290	1,290	1,290	1,290
R-squared	0.042	0.0357	0.6634	0.2004	0.2629	0.2613
Number of Cities	129	129	129	129	129	129
Panel C. City - 50 year interval observations						
Indexed books	0.0003	0.0005*	-0.0001	0.0020**	0.0020**	0.0020**
	(0.000)	(0.0003)	(0.0002)	(0.0008)	(0.0009)	(0.0009)
Published books	0.0001	0.0002	0.0000	0.0006**	0.0006**	0.0006**
	(0.000)	(0.0001)	(0.0000)	(0.0003)	(0.0003)	(0.0003)
Number born			0.5924***	0.1579	-0.4345**	0.5655***
			(0.0485)	(0.1886)	(0.1886)	(0.1886)
Observations	516	516	516	516	516	516
R-squared	0.070	0.0412	0.7442	0.2787	0.3002	0.3600
Number of Cities	129	129	129	129	129	129
City FE	✓	✓	✓	✓	✓	✓
Interval FE	✓	✓	✓	✓	✓	✓
Population in 1500	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation 3. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

Table 11: Indexed books printed and famous people in Catholic cities from the German Empire

Outcome:	Born	Number born	Emigrants	Immigrants	Net migrants	Number dead
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. City - Decade observations						
Indexed books	0.0008**	0.0006	-0.0008**	0.0016	0.0024	0.0024
	(0.000)	(0.0004)	(0.0003)	(0.0014)	(0.0017)	(0.0017)
Published books	0.0001	0.0002	0.0001	0.0006	0.0005	0.0005
	(0.000)	(0.0002)	(0.0001)	(0.0007)	(0.0007)	(0.0007)
Number born			0.8834***	0.0392*	-0.8442***	0.1558***
			(0.0241)	(0.0225)	(0.0352)	(0.0352)
Observations	8,260	8,260	8,260	8,260	8,260	8,260
R-squared	0.007	0.0067	0.8972	0.0315	0.3825	0.0519
Number of Cities	413	413	413	413	413	413
Panel B. City - 20 year interval observations						
Indexed books	0.0010***	0.0009***	-0.0008***	0.0017	0.0026*	0.0026*
	(0.000)	(0.0002)	(0.0002)	(0.0013)	(0.0014)	(0.0014)
Published books	0.0001	0.0002	0.0000	0.0010	0.0010	0.0010
	(0.000)	(0.0002)	(0.0000)	(0.0007)	(0.0007)	(0.0007)
Number born			0.8673***	0.0861**	-0.7812***	0.2188***
			(0.0334)	(0.0411)	(0.0716)	(0.0716)
Observations	4,130	4,130	4,130	4,130	4,130	4,130
R-squared	0.012	0.0115	0.8871	0.0871	0.3631	0.1186
Number of Cities	413	413	413	413	413	413
Panel C. City - 50 year interval observations						
Indexed books	0.0006**	-0.0001	-0.0008**	0.0025*	0.0033**	0.0033**
	(0.000)	(0.0004)	(0.0003)	(0.0014)	(0.0014)	(0.0014)
Published books	0.0001	0.0002	0.0001	0.0006	0.0006	0.0006
	(0.000)	(0.0002)	(0.0001)	(0.0009)	(0.0009)	(0.0009)
Number born			0.8765***	0.1282**	-0.7482***	0.2518***
			(0.0261)	(0.0614)	(0.0767)	(0.0767)
Observations	1,652	1,652	1,652	1,652	1,652	1,652
R-squared	0.006	0.0031	0.8797	0.1111	0.3060	0.1383
Number of Cities	413	413	413	413	413	413
City FE	✓	✓	✓	✓	✓	✓
Interval FE	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation 3. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

Table 12: Indexed books printed and famous people in Protestant cities from the German Empire

Outcome:	Born	Number born	Emigrants	Immigrants	Net migrants	Number dead
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. City - Decade observations						
Indexed books	-0.0001	-0.0001	0.0001	-0.0000	-0.0002	-0.0002
	(0.000)	(0.0002)	(0.0001)	(0.0006)	(0.0006)	(0.0006)
Published books	0.0002**	0.0003**	-0.0000	0.0019***	0.0019***	0.0019***
	(0.000)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0002)
Number born			0.7737***	-0.0117	-0.7854***	0.2146***
			(0.0500)	(0.0467)	(0.0535)	(0.0535)
Observations	9,480	9,480	9,480	9,480	9,480	9,480
R-squared	0.009	0.0084	0.7857	0.1335	0.3524	0.1483
Number of cityid	474	474	474	474	474	474
Panel B. City - 20 year interval observations						
Indexed books	-0.0001	0.0001	0.0001	0.0001	-0.0000	-0.0000
	(0.000)	(0.0002)	(0.0001)	(0.0007)	(0.0007)	(0.0007)
Published books	0.0002**	0.0003**	0.0000	0.0019***	0.0019***	0.0019***
	(0.000)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0002)
Number born			0.7275***	-0.0099	-0.7374***	0.2626***
			(0.0674)	(0.0713)	(0.0874)	(0.0874)
Observations	4,740	4,740	4,740	4,740	4,740	4,740
R-squared	0.013	0.0116	0.7715	0.2029	0.3680	0.2225
Number of Cities	474	474	474	474	474	474
Panel C. City - 50 year interval observations						
Indexed books	0.0000	0.0004	-0.0000	0.0001	0.0001	0.0001
	(0.000)	(0.0002)	(0.0001)	(0.0010)	(0.0010)	(0.0010)
Published books	0.0002**	0.0003**	-0.0001**	0.0023***	0.0024***	0.0024***
	(0.000)	(0.0001)	(0.0000)	(0.0002)	(0.0002)	(0.0002)
Number born			0.6905***	-0.0319	-0.7224***	0.2776**
			(0.0657)	(0.1288)	(0.1318)	(0.1318)
Observations	1,896	1,896	1,896	1,896	1,896	1,896
R-squared	0.020	0.0127	0.7978	0.3757	0.4799	0.4091
Number of Cities	474	474	474	474	474	474
City FE	✓	✓	✓	✓	✓	✓
Interval FE	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation 3. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

Table 13: Indexed books printed in Latin or vernacular, and famous people

Outcome:	Born	Number born	Emigrants	Immigrants	Net migrants	Number dead
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. City - Decade observations						
Indexed books in Latin	0.0008***	0.0007	0.0001	0.0023	0.0022	0.0022
	(0.000)	(0.0004)	(0.0003)	(0.0016)	(0.0017)	(0.0017)
Published books in Latin	0.0000	0.0001	0.0000	0.0012***	0.0012***	0.0012***
	(0.000)	(0.0001)	(0.0000)	(0.0003)	(0.0004)	(0.0004)
Forbidden books in Vernacular	-0.0002	-0.0003	0.0003	0.0006	0.0002	0.0002
	(0.000)	(0.0004)	(0.0003)	(0.0009)	(0.0009)	(0.0009)
Published books in vernacular	0.0001	0.0001	0.0000	0.0008**	0.0008**	0.0008**
	(0.000)	(0.0001)	(0.0001)	(0.0004)	(0.0004)	(0.0004)
Number born			0.8087***	0.0154	-0.7932***	0.2068***
			(0.0329)	(0.0284)	(0.0347)	(0.0347)
Observations	24,800	24,800	24,800	24,800	24,800	24,800
R-squared	0.006	0.0058	0.8202	0.0784	0.3342	0.0948
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240
Panel B. City - 20 year interval observations						
Indexed books in Latin	0.0007***	0.0001	0.0002	0.0027	0.0025	0.0025
	(0.000)	(0.0003)	(0.0003)	(0.0018)	(0.0020)	(0.0020)
Published books in Latin	0.0000	0.0001	0.0000	0.0013***	0.0013***	0.0013***
	(0.000)	(0.0001)	(0.0000)	(0.0003)	(0.0003)	(0.0003)
Indexed books in vernacular	-0.0001	0.0008	0.0000	0.0010	0.0010	0.0010
	(0.000)	(0.0006)	(0.0004)	(0.0014)	(0.0015)	(0.0015)
Published books in vernacular	0.0001	0.0001	-0.0000	0.0007	0.0007	0.0007
	(0.000)	(0.0001)	(0.0001)	(0.0004)	(0.0004)	(0.0004)
Number born			0.7768***	0.0332	-0.7436***	0.2564***
			(0.0473)	(0.0476)	(0.0573)	(0.0573)
Observations	12,400	12,400	12,400	12,400	12,400	12,400
R-squared	0.008	0.0082	0.8041	0.1415	0.3352	0.1602
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240
Panel C. City - 50 year interval observations						
Indexed books in Latin	0.0007**	0.0007*	0.0001	0.0008	0.0007	0.0007
	(0.000)	(0.0004)	(0.0004)	(0.0020)	(0.0022)	(0.0022)
Published books in Latin	-0.0000	-0.0001	-0.0000	0.0021***	0.0022***	0.0022***
	(0.000)	(0.0001)	(0.0001)	(0.0004)	(0.0004)	(0.0004)
Indexed books in vernacular	-0.0001	0.0007	-0.0001	0.0026	0.0027*	0.0027*
	(0.000)	(0.0006)	(0.0005)	(0.0016)	(0.0016)	(0.0016)
Published books in vernacular	0.0002	0.0002	0.0000	0.0003	0.0003	0.0003
	(0.000)	(0.0002)	(0.0001)	(0.0004)	(0.0004)	(0.0004)
Number born			0.7445***	0.0642	-0.6803***	0.3197***
			(0.0547)	(0.1044)	(0.0993)	(0.0993)
Observations	4,960	4,960	4,960	4,960	4,960	4,960
R-squared	0.009	0.0104	0.8145	0.2426	0.3559	0.2698
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240
City FE	✓	✓	✓	✓	✓	✓
Interval FE	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation 3. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

Table 14: Indexed books printed and famous people

	Born				Dead			
	Social Sciences	Science	Arts	Business	Social Sciences	Science	Arts	Business
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. City - Decade observations								
Indexed books	0.0000	0.0001	0.0001	-0.0001	0.0009*	-0.0000	0.0001	0.0012**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Published books	0.0001*	0.0000	0.0000	0.0000	0.0008***	0.0003***	0.0004***	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	24,800	24,800	24,800	24,800	24,800	24,800	24,800	24,800
R-squared	0.006	0.002	0.002	0.002	0.070	0.027	0.028	0.072
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240	1,240	1,240
Panel B. City - 20 year interval observations								
Indexed books	-0.0000	0.0002	0.0002	0.0000	0.0012*	0.0001	-0.0000	0.0012**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Published books	0.0001*	-0.0000	0.0000	0.0000	0.0008***	0.0003***	0.0004***	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	12,400	12,400	12,400	12,400	12,400	12,400	12,400	12,400
R-squared	0.010	0.004	0.003	0.004	0.135	0.059	0.046	0.103
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240	1,240	1,240
Panel C. City - 50 year interval observations								
Indexed books	0.0001	0.0003**	0.0002	0.0002	0.0005	0.0000	-0.0001	0.0013**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Published books	0.0001	-0.0000	0.0000	0.0000	0.0010***	0.0003***	0.0005***	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4,960	4,960	4,960	4,960	4,960	4,960	4,960	4,960
R-squared	0.010	0.020	0.007	0.008	0.217	0.113	0.123	0.174
Number of Cities	1,240	1,240	1,240	1,240	1,240	1,240	1,240	1,240
City FE	✓	✓	✓	✓	✓	✓	✓	✓
Interval FE	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation3. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

6 The Effects of Censorship: City Growth

6.1 Empirical Strategy

Serafinelli and Tabellini (2017) find a positive association between location of famous people/thinkers and city growth due to institutional frameworks protecting economic and political freedoms.

The results in the previous sections show that censorship by the Catholic Church had a negative effect on the probability of an indexed author to be printed in a city after the Index was issued. This did matter for the attractiveness of cities to upper-tail human capital. In this section, we analyze whether this also affected city growth. To do this we combine our dataset with data on city size from Bairoch, Batou, and Chèvre (1988) and a variety of control variables from Rubin (2014). Because Bairoch, Batou, and Chèvre (1988) only have data for cities that reached above 5,000 inhabitants between 1000 and 1800 (see Dittmar, 2011 for details), the intersection with our data set of printing cities is dramatically restricted. We end up with a total of 187 cities for which we have data on population for 1600 and 1700, and 186 cities for 1800. We further lose 16 cities when we include control variables from Rubin (2014).

We estimate the following model:

$$y_{it} = \alpha y_{it-1} + \beta \Delta indexed\ books_i + X_i\gamma + \varepsilon_{it} \tag{4}$$

where y_{it} is the log of population in city i at time t, with $t = \{1600, 1700, 1800\}$. The variable $\Delta indexed\ books_i$ denotes the change in the share of indexed books printed in in city i before and after 1550, in a window of $+/-$ 30 years. Formally,

$$\Delta indexed\ books_i = \frac{\sum_{\tau=1520}^{1550} indexed_{i\tau}}{\sum_{\tau=1520}^{1550} published_{i\tau}} - \frac{\sum_{\tau=1551}^{1580} indexed_{i\tau}}{\sum_{\tau=1551}^{1580} published_{i\tau}} \tag{5}$$

with $indexed_{i\tau}$ the number of indexed books printed in city i at time τ, and $published_{i\tau}$ the number of books printed in city i at time τ. Books are labeled as indexed if they appear in any

of the indexes considered in the previous section. We chose 1550 since it is in the middle of the century.

In alternative specifications, we include the variable $Defiant\ to\ index_i$, which is a dummy that takes the value of 1 when $\Delta indexed\ books_i > 1$.

X_{it} denotes city level controls from Rubin (2014): a dummy for free imperial cities, a dummy for whether the city had a university in 1450, a dummy for whether the city was a Bishopric in 1517, a dummy for whether the city has access to water, and a dummy for whether the city was part of the Hanseatic league.

6.2 Results

Table 15 shows the results of estimating equation 4. Columns 1-3 only include the log of population in 1500 as a control, while columns 4-6 include all controls. In columns 1 and 4 we find that cities that increased the share of indexed books published grew significantly more: a 1 standard deviation increase in the share of indexed books published increased population in 1600 by 7.5 percent. The effect persists in years 1700 and 1800, although it is less precisely estimated. This result can also be seen in table 15, where cities defiant to the index grew between 10.8 and 12.4 percent more in 1600.

7 Conclusions

Censorship is ubiquitous today. Freedom House's Freedom of the Press Report classifies only 31% of countries as free from censorship. While there is an ample literature studying the effect of media on beliefs, as well as on economic and political outcomes today, there is far less work on the effects of censorship, as pointed out by Chen and Yang (2019).

Yet, censorship goes back hundreds of years, and was equally widespread centuries ago. The printing press, invented in 1450, changed the media landscape forever. While, before the press, written material had to be handcopied to reach wider distribution, suddenly hundreds and

Table 15: The effect of printing indexed books on population growth

	Dependent variable: Log(Population in 1600)			
	(1)	(2)	(3)	(4)
Years considered	± 30	± 30	± 50	± 50
Δ indexed books	0.229**	0.259*	0.226*	0.255*
	(0.116)	(0.151)	(0.119)	(0.147)
Log Population in 1500	0.899***	0.821***	0.887***	0.803***
	(0.029)	(0.048)	(0.030)	(0.047)
Free Imperial City		0.230***		0.232***
		(0.084)		(0.082)
University in 1450		-0.151		-0.166
		(0.155)		(0.151)
Bishop in 1517		0.082		0.102
		(0.079)		(0.072)
Water		0.153**		0.148**
		(0.066)		(0.062)
Hanseatic		0.054		0.067
		(0.095)		(0.092)
Constant	0.512***	0.584***	0.546***	0.635***
	(0.070)	(0.171)	(0.070)	(0.165)
Observations	294	225	312	239
R-squared	0.797	0.783	0.793	0.780

Notes: The table shows regressions based on equation 4. Data: Universal Short Title Catalogue (USTC), Librorum Prohibitorum (ILP), Bairoch, Batou, and Chèvre (1988) and Rubin (2014). Robust standard errors in parenthesis. * p<0.1, ** p<0.05, *** p<0.01.

thousands of copies of printed works could be produced, leading to widespread distribution of printed material. The adoption of the press helped the Protestant movement take roots (Rubin (2014)), challenging the the monopoly of the Catholic Church. To quell the rise of Protestantism, the Catholic Church launched an attack on the freedom of the press and on freedom of expression.

Our paper shows that censorship, via Indexes of Forbidden Books, was effective in reducing printing of books considered heretic by the Catholic Church. We show this using a difference-in-difference setup at the author level, in a dataset at the city-by-decade-by-author level. We uncover important heterogeneity: censorship is more effective geographically closer to the 'in-

dex city', suggesting that either information about censorship, or enforcement of censorship, or both, are stronger closer to the place where the index was issued. We also find that printing cities in proximity to a larger share of locations venerating Catholic saints to be more compliant with censorship. Finally, the Catholic is a supranatural institution without legal power outside the Papal States. Consistent with this, indexes are only effective in the political jurisdiction in which they are issued.

It is important to remember that while the Index of Forbidden Books may have been triggered by the challenge of Protestantism, censorship does not only target Protestant reformers, but any author the Catholic Church considers as being in opposition with church doctrine. Indeed, our results show that not only did the printing of books written by indexed Protestant reformers go down, but also that of Catholic dissenters. That could be seen as a success on two fronts: containing the further spread of the Protestant movement, and reducing the risk of further challenges of Catholic doctrine. Yet, our results also suggest that censorship had consequences beyond containg the printing of heretic material. Cities that complied with censorship were less attractive to famous people: fewer sons and daughters of the city went on to become famous, and the city attracted fewer famous immigrants than cities that defied censorship of the Catholic Church. Also, defiant cities grew faster.

These results suggest that censorship, while in the interest of a higher authority to quell dissent, has consequences for the local economy, as thinkers are more attracted to locations where diversity of thought is tolerated.

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Appendices

A Further evidence on the changing geography of printing

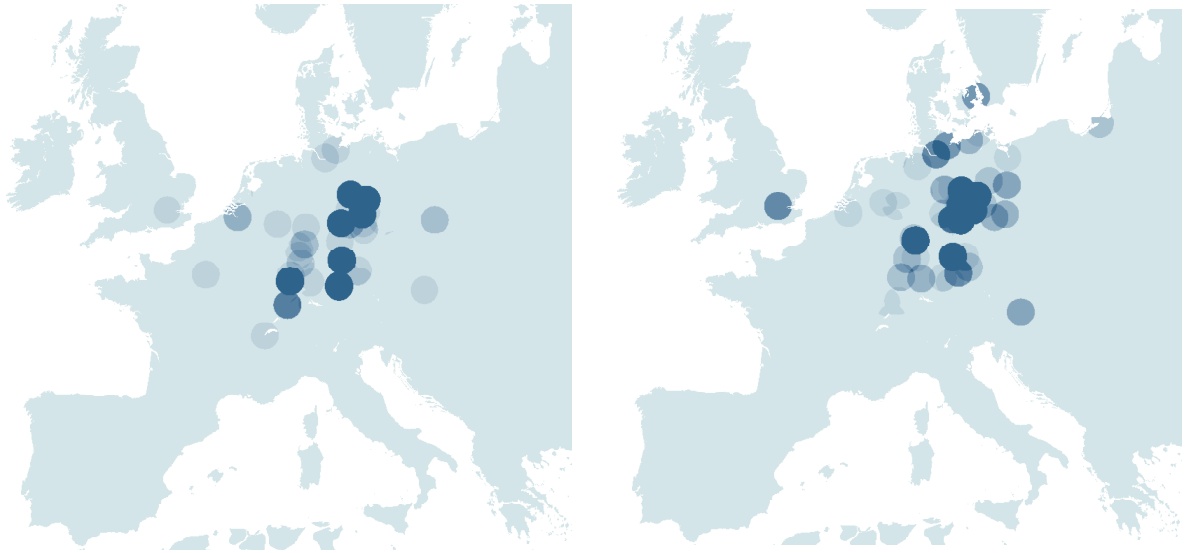
The geographical distribution of printing of indexed books is a broad, but suggestive way to understand whether Catholic censorship had any influence on the printing industry. One of the objectives of the Catholic Church was to stop the advance of Lutheranism, but also to stop the dissemination of heretical ideas across Catholic areas.

If Catholic censorship was effective, we should observe that books included in the ILP would stop being printed in areas that obliged with the censorship. On the opposite side, we should observe that books included in the ILP continued to be printed in cities/areas that did not follow censorship. In the Appendix, to illustrate this point, we look at Martin Luther, who is maybe the most prominent author whose books were forbidden. A simple and visual way to check the impact of the *Index Librorum Prohibitorum* on Luther's works is to check what happened before and after 1564, the year of the first Index from the Pope, the *Tridentine Index*.[32] Figure A.1 shows the geographical distribution of printing places for Luther's works before and after 1564. The map suggest that the printing of Luther's works moved North-East following the publication of the Tridentine Index.

This suggestive evidence is also supported when running simple correlations, using a seemingly unrelated regression (SUR) specification, between latitude and longitude of printing places and an indicator dummy for the period after 1564. Table A.1 suggests that Luther's works were on average printed 75km further north and 11km further East in the period following 1564.

We can repeat the simple graphical analysis by looking at books on religion topics, social sciences and science, for instance. Figure A.2 shows the geographical distribution of printing locations for these topics before and after 1564. We observe a slight move north of the printing of indexed books following 1564.

[32] Our data allow us to replicate this to analyse the influence of local indexes that precede the *Tridentine Index*.



(a) Martin Luther's books printed before 1564

(b) Martin Luther's books printed after 1564

Figure A.1: Geographical distribution of Martin Luther's books printed before and after1564. (a) Books printed before 1564. (b) Books printed after 1564. Notes: The circles represent areas of 20km around the city that printed a book of Luther. Darker colour represents larger number of editions printed in that area.

Table A.1: Geography of printing Luther's books

	Luther's books	
Dep. Variable	Latitude	Longitude
Post 1564	0.699***	0.134***
	(0.047)	(0.032)
Intercept	50.479***	10.942***
	(0.022)	(0.032)
Observations	6,853	6,853
R-squared	0.032	0.001

Notes: ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

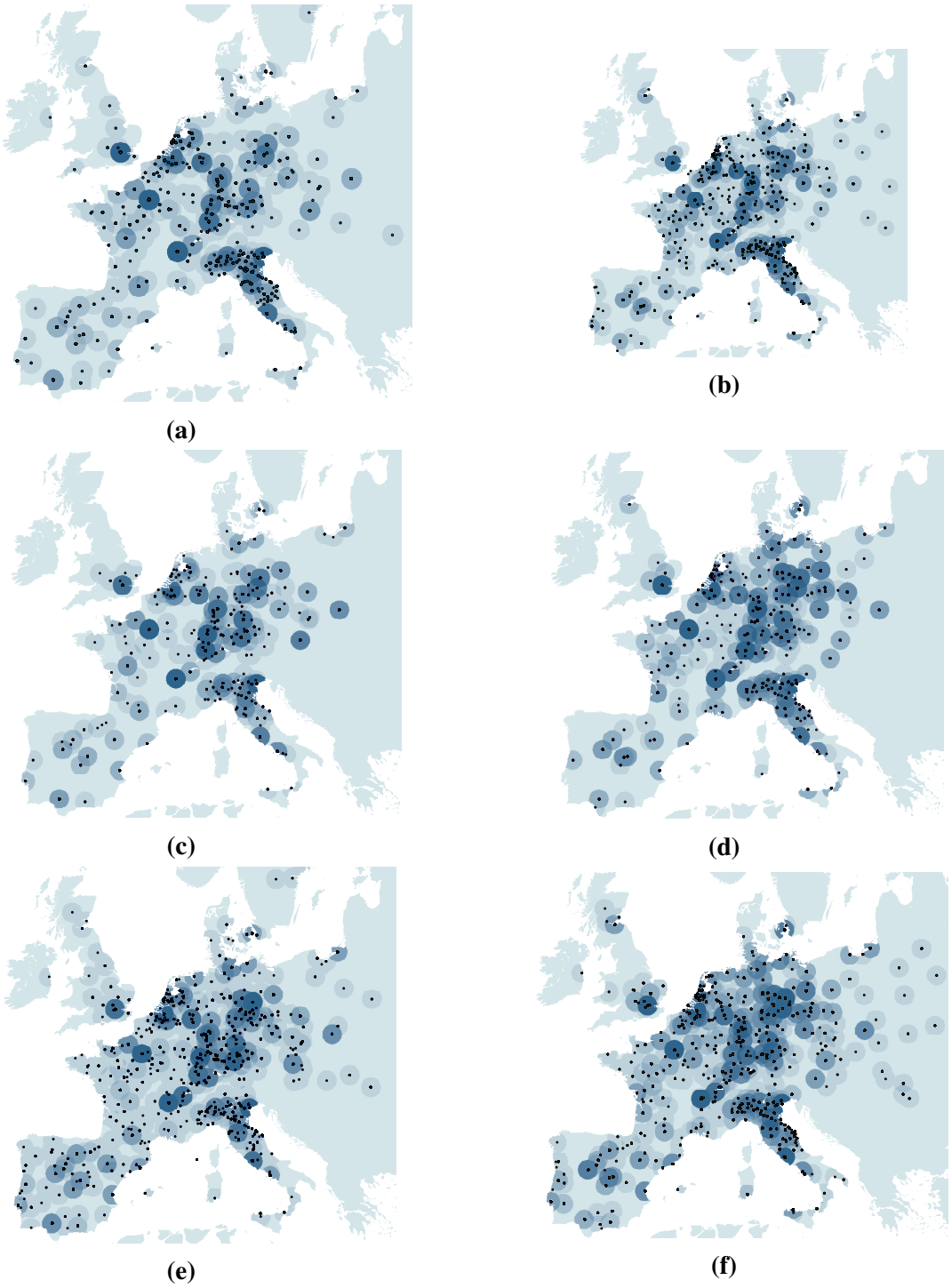


Figure A.2: Geographical distribution of books printed before and after1564. Left column maps represent books printed before 1564 and right column maps represent books printed after 1564.
(a) Social Sciences books printed before and (b) after 1564.
(c) Science books printed before and (d) after 1564.
(e) Religion books printed before and (f) after 1564.

B Robustness Checks

This section presents various robustness checks.

Vintage effects In Table B.1, we probe the role of vintage effects. Authors may be famous for a while and then fall our of fashion. Potentially, there are differences between indexed and non-indexed authors in this regards, which is what we want to check. To do so, we add the year in which an author was first printed in any city, interacted with the Post dummy, as an additional control. The main effect of 'year first printed' is constant within author and hence absorbed by the author fixed effect. But the interaction with the Post dummy is identified. In case there were important differences in vintage effects for indexed and non-indexed authors following indexation, we would expect the main DD coefficient to be affected. However, coefficient estimates are very close to those in Table 1.

Earlier and later editions of the same index Furthermore, in our main results, we use authors indexed in the first edition of an index as 'indexed authors', while those indexed in later editions of the same index are part of the control group. In Table B.2, instead, the treatment group is composed of all authors indexed in any edition (1st or later ones) of an index. Results are very similar to those in Table 1.

Instrumental variables estimation To provide additional evidence in support of whether our estimates described so far can be considered a causal effect of being (newly) indexed on being printed, we implement an instrumental variables strategy. However, before describing our instrumental variables strategy, we want to underline once more the nature of the specifications described in equation (1). Our unit of observation is an author by city by decade. Given the difference-in-differences nature of our analysis, we include author fixed effects and city fixed effects. So, we are effectively controling for "best-seller" authors or anything else that would differentiate different authors from one another. City fixed effects take care of the "taste" of

a city for certain types of works, but also for its inclination to accept interference into local 'business'. Here, we follow the difference-in-differences literature that takes the assignment to treatment as given, and identifies the effect solely based on comparisons between treatment and control groups over time. By showing absence of pre-trends, we perform the usual specification check in the difference-in-differences context.

Yet, going beyond the call of duty, we also consider an instrumental variables strategy where we instrument $\text{index}_a \times \text{post}_t$ by the 'predecessor index' closest in time in a *different* jurisdiction. For instance, we instrument Louvain1546$X\text{post}_t$ with Paris1544$X\text{post}_t$. This is guided by the anecdotal evidence that books had to be indexed in the own jurisdiction to be considered forbidden, as all jurisdictions (France, Low Countries, Portugal, Italy, Spain, Bavaria) either outright refused to accept indexes issued elsewhere, or were only able to give legal force to the indexation of books if issued locally. Yet, at the same time, we know that earlier indexes issued elsewhere informed later indexes. This latter point lets us expect a strong first stage, while the former point gives support to the exclusion restriction, namely that the instrument (being indexed on an earlier index elsewhere) should not affect compliance in the own jurisdiction unless a work is indexed there as well. Results from the difference-in-difference regressions described in the main text support this notion of only a local reach of indexes in their own right.

Table B.3 provides the results. Panel A shows second-stage IV estimates which we can compare to the OLS estimates in Table 1, column (1). Panel B shows the first-stage estimates where we instrument $index_{Louvain1546} X post_{Louvain1546,t}$ by $index_{Paris1544} X post_{Paris1544,t}$. The Kleibergen-Paap Wald rk F statistics seem strong. Throughout, IV estimates are negative and statistically significant. Their magnitude relative to OLS estimates varies depending on the index of interest. For instance, for the Roman index, OLS and IV estimates are identical in magnitude, in other cases IV estimates are larger than OLS estimates. But the takeaway message is that IV estimates confirm the earlier (OLS) difference-in-differences finding that the indexes of forbidden book were overall effective in reducing printing of forbidden authors.

Table B.1: The effect of being indexed on getting printed: number of printed works or being printed at all - Controlling for vintage

Outcome:	Being printed at all			Number of printed works		
Distance to index city:	500km	500km	500km	500km	500km	500km
Time window around index:	± 30	± 20	± 10	± 30	± 20	± 10
	(1)	(2)	(3)	(4)		
Paris X Post 1544	-0.013**	-0.013**	-0.011**	-0.130	-0.116	-0.076
	(0.005)	(0.005)	(0.005)	(0.081)	(0.073)	(0.062)
Mean Dep. Var. (indexed, pre)	0.023	0.026	0.028	0.147	0.149	0.141
Observations	1,510,705	1,079,075	644,906	1,510,705	1,079,075	644,906
Louvain X Post 1546	-0.011**	-0.011**	-0.012**	-0.111	-0.077	-0.043
	(0.005)	(0.004)	(0.005)	(0.086)	(0.050)	(0.027)
Mean Dep. Var. (indexed, pre)	0.026	0.026	0.028	0.152	0.129	0.118
Observations	1,741,754	1,246,649	738,849	1,741,754	1,246,649	738,849
Portugal X Post 1547	-0.002	-0.003	-0.001	-0.008	-0.006	-0.002
	(0.002)	(0.002)	(0.001)	(0.007)	(0.005)	(0.003)
Mean Dep. Var. (indexed, pre)	0.006	0.008	0.009	0.011	0.013	0.015
Observations	246,283	180,269	111,716	246,283	180,269	111,716
Venise X Post 1549	-0.013**	-0.011**	-0.012**	-0.134*	-0.062*	-0.060**
	(0.005)	(0.004)	(0.004)	(0.079)	(0.033)	(0.030)
Mean Dep. Var. (indexed, pre)	0.019	0.018	0.021	0.119	0.080	0.092
Observations	1,404,067	1,002,905	601,743	1,404,067	1,002,905	601,743
Espagne X Post 1551	-0.001*	-0.001	-0.000	-0.004	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)
Mean Dep. Var. (indexed, pre)	0.002	0.002	0.002	0.003	0.003	0.003
Observations	558,580	403,701	248,822	558,580	403,701	248,822
Rome X Post 1559	-0.005**	-0.004*	-0.003	-0.025	-0.024	-0.017
	(0.002)	(0.002)	(0.002)	(0.017)	(0.017)	(0.013)
Mean Dep. Var. (indexed, pre)	0.005	0.006	0.005	0.023	0.027	0.029
Observations	908,962	647,445	388,467	908,962	647,445	388,467
Anvers X Post 1569	-0.003	-0.003	-0.007**	-0.003	-0.001	-0.023
	(0.003)	(0.003)	(0.004)	(0.013)	(0.010)	(0.014)
Mean Dep. Var. (indexed, pre)	0.017	0.016	0.018	0.055	0.050	0.053
Observations	1,843,314	1,325,358	804,863	1,843,314	1,325,358	804,863
Parme X Post 1580	-0.004***	-0.003***	-0.001	-0.022*	-0.014*	-0.007
	(0.001)	(0.001)	(0.001)	(0.012)	(0.008)	(0.004)
Mean Dep. Var. (indexed, pre)	0.011	0.010	0.008	0.046	0.039	0.031
Observations	1,756,988	1,272,039	776,934	1,756,988	1,272,039	776,934
Munich X Post 1582	-0.003	-0.003*	-0.004**	-0.017**	-0.021**	-0.023***
	(0.002)	(0.002)	(0.002)	(0.008)	(0.009)	(0.008)
Mean Dep. Var. (indexed, pre)	0.013	0.014	0.016	0.054	0.065	0.074
Observations	2,518,688	1,835,697	1,127,316	2,518,688	1,835,697	1,127,316
Author FE	✓	✓	✓	✓	✓	✓
City FE	✓	✓	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓	✓	✓
Controls‡	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation 1. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

‡ Controls include the total number of works printed in the city in the given decade.

Table B.2: The effect of being indexed on getting printed: number of printed works or being printed at all - Include authors indexed in **any** issue of an index

Outcome:	Being printed at all			Number of printed works		
Distance to index city:	500km	500km	500km	500km	500km	500km
Time window around index:	± 30	± 20	± 10	± 30	± 20	± 10
	(1)	(2)	(3)	(4)		
Paris X Post 1544	-0.008*	-0.008*	-0.006	-0.081	-0.067	-0.033
	(0.004)	(0.004)	(0.004)	(0.059)	(0.054)	(0.046)
Mean Dep. Var. (indexed, pre)	0.023	0.026	0.028	0.147	0.149	0.141
Observations	1,510,705	1,079,075	644,906	1,510,705	1,079,075	644,906
Louvain X Post 1546	-0.011***	-0.009**	-0.008**	-0.104*	-0.071**	-0.043*
	(0.004)	(0.004)	(0.004)	(0.055)	(0.036)	(0.025)
Mean Dep. Var. (indexed, pre)	0.026	0.026	0.028	0.152	0.129	0.118
Observations	1,741,754	1,246,649	738,849	1,741,754	1,246,649	738,849
Portugal X Post 1547	-0.001	-0.002	-0.004	0.002	0.002	0.000
	(0.003)	(0.003)	(0.003)	(0.007)	(0.008)	(0.007)
Mean Dep. Var. (indexed, pre)	0.006	0.008	0.009	0.011	0.013	0.015
Observations	246,283	180,269	111,716	246,283	180,269	111,716
Venise X Post 1549	-0.011***	-0.009**	-0.009**	-0.090*	-0.042*	-0.040*
	(0.004)	(0.004)	(0.004)	(0.053)	(0.024)	(0.022)
Mean Dep. Var. (indexed, pre)	0.019	0.018	0.021	0.119	0.080	0.092
Observations	1,404,067	1,002,905	601,743	1,404,067	1,002,905	601,743
Espagne X Post 1551	-0.000	0.000	-0.000	0.003	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.005)	(0.004)	(0.002)
Mean Dep. Var. (indexed, pre)	0.002	0.002	0.002	0.003	0.003	0.003
Observations	558,580	403,701	248,822	558,580	403,701	248,822
Rome X Post 1559	-0.004**	-0.004**	-0.003*	-0.019	-0.018	-0.013
	(0.002)	(0.002)	(0.001)	(0.012)	(0.012)	(0.010)
Mean Dep. Var. (indexed, pre)	0.005	0.006	0.005	0.023	0.027	0.029
Observations	908,962	647,445	388,467	908,962	647,445	388,467
Anvers X Post 1569	-0.008***	-0.007***	-0.008***	-0.031**	-0.022**	-0.023**
	(0.003)	(0.002)	(0.002)	(0.015)	(0.011)	(0.009)
Mean Dep. Var. (indexed, pre)	0.017	0.016	0.018	0.055	0.050	0.053
Observations	1,843,314	1,325,358	804,863	1,843,314	1,325,358	804,863
Parme X Post 1580	-0.006***	-0.004***	-0.002**	-0.030**	-0.020*	-0.009**
	(0.002)	(0.001)	(0.001)	(0.015)	(0.010)	(0.004)
Mean Dep. Var. (indexed, pre)	0.011	0.010	0.008	0.046	0.039	0.031
Observations	1,756,988	1,272,039	776,934	1,756,988	1,272,039	776,934
Munich X Post 1582	-0.003	-0.003*	-0.004**	-0.016*	-0.021**	-0.023***
	(0.002)	(0.002)	(0.002)	(0.009)	(0.010)	(0.008)
Mean Dep. Var. (indexed, pre)	0.013	0.014	0.016	0.054	0.065	0.074
Observations	2,518,688	1,835,697	1,127,316	2,518,688	1,835,697	1,127,316
Author FE	✓	✓	✓	✓	✓	✓
City FE	✓	✓	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓	✓	✓
Controls‡	✓	✓	✓	✓	✓	✓

Notes: The table shows regressions based on equation 1. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors clustered a the city level * p<0.1, ** p<0.05, *** p<0.01.

‡ Controls include the total number of works printed in the city in the given decade.

Table B.3: The effect of being indexed on getting printed: IV regressions

Index:	Louvain		Venice		Rome		Antwerp	
	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Panel A. Second Stage								
Louvain X Post 1546	-0.013**	-0.046***						
	(0.005)	(0.016)						
Venice X Post 1549			-0.014***	-0.021**				
			(0.005)	(0.008)				
Rome X Post 1559					-0.005*	-0.005**		
					(0.003)	(0.002)		
Antwerp X Post 1569							-0.004	-0.083***
							(0.003)	(0.027)
Panel B. First Stage								
Paris X Post 1546		0.397***						
		(0.056)						
Louvain X Post 1549				0.642***				
				(0.062)				
Venice X Post 1559						0.692***		
						(0.012)		
Rome X Post 1569								0.131***
								(0.023)
Observations	1,741,754	1,741,754	1,404,067	1,404,067	908,962	908,962	1,843,314	1,843,314
K-P F-test		49.7		105.7		3,546.9		31.9
Author FE	✓	✓	✓	✓	✓	✓	✓	✓
City FE	✓	✓	✓	✓	✓	✓	✓	✓
Decade FE	✓	✓	✓	✓	✓	✓	✓	✓

Notes: For odd columns Panel A shows OLS regressions based on equation 1. For even columns Panel A shows 2SLS estimates, and Panel B the corresponding first stage. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Standard errors, clustered at the city-author level, are presented in parentheses. ***, ** and * indicate statistical significance at the 99%, 95% and 90%, respectively.

C Additional Figures

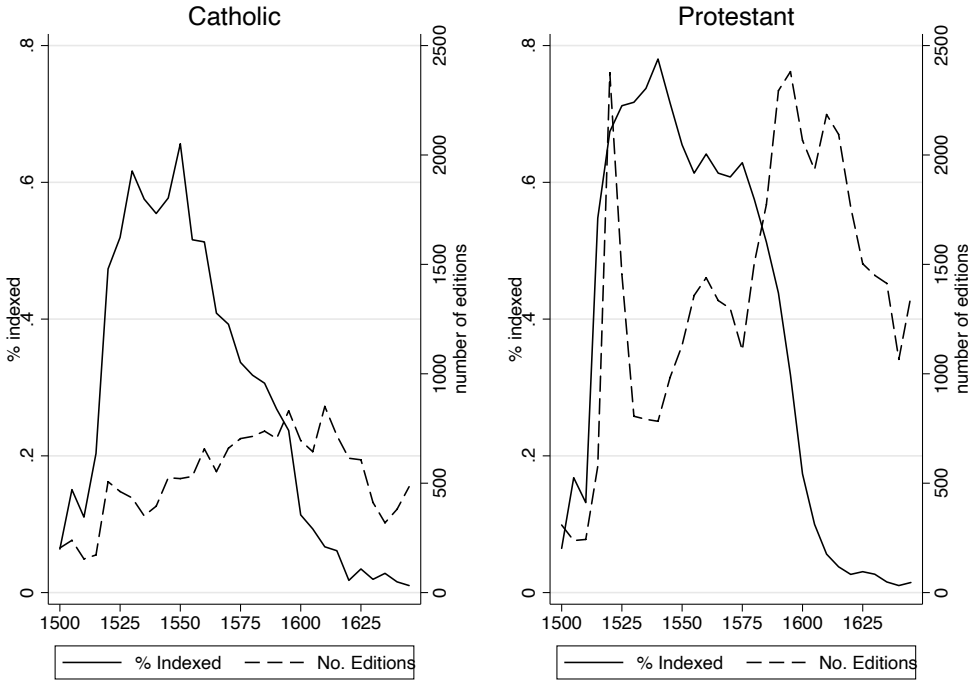


Figure C.1: Censorship of religious books by religious denomination in the HRE. Data: Universal Short Title Catalogue (USTC) and Index Librorum Prohibitorum (ILP). Religious denomination from Becker and Pascali (2019).