

The Written Word and the Development of the State in China and Europe ¹

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Abstract

State formation depends not only on demand-side factors, such as military competition, but also, fundamentally, on the supply of ideas and techniques in a society. We argue that these ideas can sometimes come from unexpected quarters before then being adopted by those who rule. Using prefecture level data for China during the Tang and Song dynasties, we show how woodblock printing techniques first developed by Buddhists in competition with Taoists and Confucians provided for a technology that could give a broad number of people access to the written word. This was critical for the development and expansion of the Imperial Examination system, which aided in constructing a state bureaucracy. In Medieval Western Europe, by contrast, the religious monopoly held by the Catholic Church gave it little incentive to develop new techniques to broaden access to the written word. This then helped contribute to the political divergence between China and Western Europe, as European rulers seeking to construct a bureaucracy had a more limited pool of talent to draw upon. The broader lesson here is that in order to better understand state formation, we may need to consider the incentives for social actors outside the state itself to develop new techniques.

Introduction

It is known that China developed a powerful and extensive state bureaucracy many centuries before this same development took place in Western Europe. It is also known that The Chinese Imperial Examination played a critical role in leading to this outcome. Many recent scholars, as well as early scholars going back to Ping-ti Ho, have emphasized how the examination system also had an influence on social mobility as well as on binding China together territorially.¹ Existing scholars have spent less time asking how in China it was possible to give a broad number of people access to the written word, a necessary precondition for sitting the exam. This is question we ask in this paper, and in so doing we draw a comparison with Medieval Europe where access to the written word remained extremely limited.

From the late Tang dynasty onward, for potential exam candidates who could not afford expensive hand copied manuscripts the use of books produced by woodblock printing became an alternative, and more easily available form of access. The puzzle about woodblock printing is that the core techniques and materials necessary to develop it existed in both China and Medieval Europe, but only in China did this method of giving access to knowledge take root and spread widely, in fact widely throughout East Asia. So why China and not Europe?

We argue that an environment of religious competition in China under the Tang dynasty helped kick start the invention of woodblock printing. The first printed texts in China were not those produced to train exam candidates, and this simple fact does not bode well for the idea that woodblock printing developed in China simply because there was a need to have a broad pool of candidates to take the Imperial Examination. It was instead Buddhist monks who took the first steps in developing woodblock printing as they sought to spread the word about their faith. From its origins, Buddhist doctrine had emphasized how spreading the Buddhist canon via the written word was a sacred act.² In China under the Tang dynasty an environment of religious competition made

¹There are a number of excellent recent political economy studies on the examination system and its consequences for development, social mobility and territorial integration, particularly from the Song dynasty onward (Wen, Wang, and Hout, 2023. Chen, Kung, Ma 2020. Bai and Jia 2016. Jiang and Kung 2020. Kung 2022, Ho 1962).

²In a fascinating study, Constance Miller (1983) has previously emphasized the importance of Buddhism for the development of woodblock printing in China, and she has contrasted this with Europe. She does not emphasize the

this all the more necessary, as Taoism was well established as something resembling an official religion. The Buddhists were also in practice challenging well entrenched Confucian doctrine, even though Confucianism was not strictly speaking a religion.

The situation in Medieval Europe could hardly have been more different as an environment of religious monopoly weighed against the spread of printing in the way that had occurred in China.³ The Catholic Church faced no incentive to modify its longstanding doctrine which did not emphasize any need for the great mass of the people to have direct access to the word of God. In this environment it sufficed to have religious texts be hand copied. In other words, religion failed to kick start the development of printing. Things would, of course, be very different after the arrival of Protestantism, an event that occurred after the time period we consider, but which only reinforces the idea of a link between religious competition and the spread of the written word via printing.⁴

The quantitative empirical basis for our claims comes from prefecture level analysis of printing, schooling, and examination outcomes during the Tang and Song dynasties in China. Given that Buddhism was key to the early development of printing, we hypothesize that the presence of a Buddhist monastery (or monasteries) in a prefecture during the Tang dynasty should be associated with (1) the development of centers for woodblock printing, (2) the subsequent development of schools, and (3) a higher degree of social mobility in examination outcomes. The core idea here is that the presence of a monastery would make it more likely to see the accumulation of individuals who had the skills necessary for woodblock printing, and these skills could subsequently be passed on. They could also be applied to the development of the sort of secular texts that would be critical for study for the examination.⁵

To make any sort of causal claim we would need to be able to show that local presence of a role of religious competition as we do.

³Like several recent important contributions, we emphasize the role the Catholic Church played in European state formation. Anna Grzymala-Busse (2022) and Jørgen Møller and Jonathan Doucette (2022) have emphasized how institutional practices developed within the church were subsequently adopted by secular rulers. Bruce Bueno de Mesquita and Anna Grzymala-Busse have emphasized the importance of competition between Catholic and secular rulers, though each in very different ways. Our account is distinct in emphasizing the lack of competition between the Catholic Church and other religious entities.

⁴Buringh and van Zanden (2009) have documented the continuous increase in book production in Western Europe between the sixth and the eighteenth centuries. Starting from a very low base there was a steady increase and most notably after the development of movable type printing.

⁵In Europe book production was also correlated with the presence of monasteries, as Buringh and van Zanden (2009) have shown. The key difference is that European monks were hand copying books rather than printing them, which required substantially more labor per copy.

Buddhist monastery was both exogenous and uncorrelated with any unobserved factors that might also lead to our three outcomes of printing centers, local schools, and social mobility as a result of the exam. In other words we have a difficult task at hand.

We proceed initially by considering cross-sectional estimates where our three outcomes at the prefecture level are regressed on Buddhist monastery presence while controlling for province fixed effects, in addition to total population by prefecture. The results of these specification could still be influenced by many unobservables correlated with the presence of monasteries, so we suggest that they should be taken as suggestive of support for our main hypotheses but not more. Our estimates presented in tables one through four show a significant positive correlation between the presence of a Buddhist monastery, or monasteries, and our three outcomes.

We then adopt a more robust empirical strategy that exploits the differential impact across provinces of a persecution of Buddhists that took place late in the Tang dynasty. This occurred in the year 845 CE under the Emperor Wuzong, who was a fervent adherent of Taoism. As this was towards the end of the Tang dynasty, we should expect any effect of Buddhism on our key outcomes during the subsequent Song dynasty to be dependent on the differential severity of the persecution across localities.

The Buddhist persecution of 845 CE involved repossession of lands controlled by monasteries and the establishment of a quota for each Chinese province that limited the number of Buddhist monks that could be present. This number was based on total provincial population, a feature that is controlled for in our regressions via the inclusion of province fixed effects. Importantly, the initial number of Buddhist monasteries in a province was not correlated with total population, so this quota system was not simply capturing the initial strength of Buddhism in an era. To the extent that assignment of this quota was uncorrelated with unobserved factors that might drive our key outcomes (printing centers, schools, and social mobility), we would be identifying a causal effect of Buddhism in an environment of religious competition. As this is a preliminary draft, we should still be cautious here. The extent to which we can actually make any causal claim may depend on further tests.

We conduct a second set of empirical tests by augmenting our existing specifications with an interaction term that multiplies the number of Buddhist monasteries in a prefecture during the Tang era with a variable capturing the severity of the Buddhist persecution by province in the year 845

CE. If the number of Buddhist monasteries did indeed have an impact on our key outcomes, and if the persecution had a long term effect, then we would expect the coefficient on this interaction term to be negative while the coefficient on the linear term for the number of Buddhist monasteries should remain positive and statistically significant.

The results of this second set of tests continue to suggest that the presence of Buddhist monasteries was associated with the subsequent development of printing centers, the establishment of county schools, and also social mobility via the presence of *jinshi* from families who had not yet had a member attain this status. Importantly, in all cases the interaction term involving Buddhist temples and severity of persecution is negative and statistically significant. This is supportive of the idea that it was Buddhist temples, and not simply some unobservable factor correlated with the presence of Buddhist temples, that is driving our results.

We make no claim that our empirical results—with their focus on Buddhism—explain on their own the political divergence between China and Western Europe, as that began well before the medieval era. What we take them as instead illustrating is how a particular environment of religious competition helped lead to the development of a woodblock printing, an important new technology that helped allow for the construction of a robust bureaucratic state. This implies that because demand alone does not automatically generate a supply of innovations necessary to construct a state, then the supply of innovation can often come from unexpected places. Said otherwise, borrowing someone else's innovation—perhaps created with a totally different purpose in mind—can help to build a state. In biology this is an example of what is called *exaptation*.⁶ Joel Mokyr (1997) has argued that there are many cases of exaptation in the process of economic innovation. Perhaps this is also the case with state formation.

That woodblock printed was invented for one purpose and then borrowed to serve another should perhaps not surprise us when we consider the link between writing and the state in a broader context. Throughout history the presence of writing has been strongly predictive of state development, yet writing as we think of it today is thought to have been independently invented in only three societies, in Ancient Sumeria, among the Olmecs of Mesoamerica, and in China during the Shang dynasty.

⁶This is a term that was coined by Gould and Vrba (1982) to refer to situations where a particular trait evolves for one purpose and then ends up being used for a different purpose. The classic example offered is that of feathers on birds. Some think that in bird ancestors, such as *archaeopteryx* feathers evolved first as a means of temperature regulation, but then were subsequently used for flight.

Everyone else was a borrower.⁷

Different State Trajectories in China and Europe

While China and Western European countries each eventually developed strong state bureaucracies, the two regions arrived at this outcome through very different trajectories. By the medieval era—and in fact long before—China had a state bureaucracy while bureaucratic arrangements in Western Europe remained rudimentary.

A first way to see this difference is through government revenues raised relative to the size of the economy, given that a bureaucracy collects revenue and in fact needs revenue to be able to function. In China during the early part of the Song dynasty, revenues regularly stood at ten percent of GDP and even higher. In the kingdoms of England and France at about the same time, revenues stood at about one percent of GDP.⁸ A difference as big as an order of magnitude in this setting is very large. It also implies that even in the presence of possible measurement error, the true gap in revenues between the two regions must have been very sizeable.

A second way to see the difference in state development is to look at the size of state bureaucracies during this period. In China in the year 1041 CE the Emperor Renzong is said to have had ten thousand “capital and court” officials, and these would have been supplemented by many more lower level officials than that.⁹ Now contrast this with the situation in England, where as late as the fifteenth century the Exchequer had only forty salaried bureaucrats at Westminster. The Exchequer in the medieval era has been described as being “more of an occasion than an institution.”¹⁰

A more extensive bureaucratic state in China went hand in hand with a more systematic method of recruitment. Ideas about selection based on merit with some form of examination dated back to the Han dynasty in China (Li, 2018). It would, however, take several more centuries before a full blown examination system emerged. First developed during the Sui dynasty in the year 587 by the Emperor Yang, and further enhanced with the development of the *jinsi* exam in 605 CE,

⁷Stasavage (2021) presents results to how how proximity to one of these original three centers of writing increased the likely that a society adopted it while also increasing the likelihood that a state was present.

⁸These statistics are reported in Stasavage (2020, p.12). The underlying Chinese revenue data come from Guo (2019). The underlying English revenue data come from the Bank of England.

⁹See Hartman (2015) and Smith (2009) for discussions of the Song bureaucracy

¹⁰See Stasavage (2020 p.157) on the Exchequer and Barratt (2004) for a discussion of the Exchequer’s functioning in the thirteenth century.

the Imperial Examination was expanded and regularized during the Tang dynasty that followed. During the subsequent Song dynasty it became the primary means of entry into upper officialdom.

In contrast with China, those medieval Western European monarchs who had something resembling a bureaucracy—although a very thin one—most often opted to outsource by relying on members of the clergy and monastic orders. By doing this European monarchs were taking advantage of the fact that these were the people, by training, who already knew how to write, but in following this route they also fundamentally limited themselves. The church relied on communication in Latin, a language that was foreign to all but a few, and in its operations it placed little emphasis on spreading the Word of God widely. The use of Latin did allow for individuals from different countries to communicate, but it also then limited access.

One might ask whether China during the Song dynasty was able to maintain a more extensive state bureaucracy simply because it was substantially richer than any Western European society at the time. In practice, this seems unlikely to have been the case. While the gap between China and Western European countries in terms of both revenue and numbers of bureaucrats was an order of magnitude or more, the estimated difference in per capita GDP was sizeable, but still only about fifty percent.¹¹

Religious Competition and the Written Word in China

Buddhism's arrival in China was a gradual process that started around the first half of the first century BCE, primarily through the Silk Road, entering the Chinese territory at Dunhuang and spreading through Gansu to the "region within the Passes" and the North China plain. By the middle of the first century CE, Buddhism was being documented in contemporary Chinese sources.¹² Initially, it was predominantly observed within foreign merchant communities in larger cities. However, from the fourth century CE, Buddhism began to permeate all tiers of Chinese society, encompassing the court, aristocratic families, the peasantry, and urban inhabitants. The development of Buddhism was further propelled by the establishment of monasteries across China, often funded by affluent patrons, contributing to the religion's widespread acceptance and deep roots within the social fabric

¹¹This is based on the comparison by Broadberry, Guan, and Li (2018) between per capita GDP under the Song dynasty and in England at roughly the same time.

¹²Zurcher (2007), 22-23.

of China.¹³

Buddhism's Competition with Confucianism and Taoism

Buddhism's expansion in China was met with considerable opposition, primarily from Confucian officials who were troubled by the increasing wealth and tax-exempt status of Buddhist monasteries. The assertion by Buddhist monks that their allegiance was not to the state or family but to a higher, spiritual cause sparked outrage among these officials. They perceived this as a potential threat to the stability of Chinese society and its institutions.¹⁴ In contrast to India, where Buddhism competed with similar religious groups, in China, it came into direct conflict with the imperial bureaucracy and the government itself.¹⁵

Buddhism's gradual expansion among the rural populace in China, beginning around 300 CE, also significantly eroded the influence of Taoism – an indigenous Chinese religion – leading to an intensified anti-Buddhist stance among Taoist leaders and their court representatives. Taoism, a religious movement originating in later Han times, aimed at achieving bodily immortality through various practices, including the use of certain drugs, physical exercises, meditative techniques, and social virtues. The primary doctrine, found in numerous scriptures, was believed to have been revealed by avatars of the Old Master (*Laozi*), with the *Daode jing* being the fundamental text. This gave rise to the 'huahu theory' around the second century CE, suggesting that Buddhism was merely a version of Taoism modified for foreign populations. Taoists frequently employed this theory to contest Buddhism, arguing it was a diluted, debased form of Taoism unsuitable for Chinese society, which had preserved the pure teachings of the Old Master. This rivalry further complicated the religious landscape and intensified the competition between Taoism and Buddhism in China.¹⁶

During the Tang Dynasty, Buddhism and Taoism vied fiercely for court patronage, with the preference often hinging on the personal background and inclinations of individual rulers.¹⁷ The Tang Dynasty, with its lineage allegedly tracing back to *Laozi*, the legendary founder of Taoism,

¹³Weinstein (1987), 3.

¹⁴Weinstein (1987), 3.

¹⁵Zurcher (2007), 255-6.

¹⁶Zurcher (2007), 289-290.

¹⁷See detailed accounts of each Tang emperor in Weinstein (1987), 5-53.

was the first to prioritize Taoism over Buddhism. In 625, the Tang's founding emperor, Gaozu (618–626 CE), issued an edict establishing Taoism and Confucianism as the state's main pillars, relegating Buddhism to a foreign religion's status. However, the second emperor, Taizong (626–649 CE), after suffering a significant military defeat later in his life, shifted his stance, proclaiming Buddhism superior to both Confucianism and Taoism. Furthermore, in 678, Gaozong (649–683 CE) elevated Taoist scripture, the *Daode jing*, to the same status as Confucian classics in civil service examinations. The only female sovereign in Chinese history, Empress Wu (665–705 CE), raised in a family with strong Buddhist leanings, sought to legitimize her rule amidst Confucian and Taoist opposition. She pivoted towards Buddhism and, in 691, issued an imperial edict that placed Buddhism above Taoism, arguing that Buddhism enabled the changing of the “Mandate of Heaven.” Despite this fluctuating favor, all Tang emperors acknowledged Buddhism's profound influence over their subjects, indicating the complex interplay between Buddhism, Taoism, and political power during the Tang Dynasty.¹⁸

During the Tang era, significant hubs of Buddhism were the capital cities (Chang'an and Luoyang), the Yangtze River region, and Sichuan Province. The transportation facilities in Chang'an, Luoyang, and along the Yangtze River, facilitated the dissemination of Buddhism. However, Sichuan, with its unique geographical positioning, emerged as a critical epicenter for Buddhism.¹⁹

Bordered by protective mountains and rivers, Sichuan often became a haven for monks amidst turbulent dynastic transitions. For instance, at the end of the Sui Dynasty, numerous monks sought refuge in Chengdu – the capital city of Sichuan Province – preserving and perpetuating their teachings there. One notable figure among them was the renowned Tang-era monk, Xuanzang. His religious quest began in Chengdu, later leading him on a journey to India. He managed to acquire over 657 Indian texts, which he brought back to China. Remarkably, he translated the majority of these texts into Chinese, significantly enriching the Buddhist literary corpus in the country.²⁰

The tumultuous period marked by An Lushan's insurrection (755–763 CE) and the resulting social upheaval ignited a religious fervor. Post-An Lushan era Buddhism, distinct from the complex metaphysical systems of the Buddhist schools in the first half of the Tang, was characterized by its popular appeal. This shift indicates that Buddhism, even before the rebellion, contained

¹⁸Barratt (2008) makes a case that the Empress Wu also favored the early development of woodblock printing.

¹⁹For an in-depth exploration of the development of Buddhism in Sichuan, refer to Li (2004), 205-208.

²⁰Weinstein (1987), 24-27

elements that resonated broadly with the Chinese people, facilitating its mass acceptance and further outreach.²¹

Religious Competition and the Invention of Printing

Woodblock printing in China, a practice dating back at least a thousand years to the Tang Dynasty, involves a meticulous process.²² Typically, pear or jujube wood blocks are planed and shaped to mirror the dimensions of two pages. A paste or size, often derived from boiled rice, is then spread over the surface to prepare it for character reception. A professional scribe transcribes the pages on thin, transparent paper, which, while still damp from the paste, is adhered to the block in a reversed position. Once the paper is rubbed off, the reversed inked writing remains visible on the wood. The workman, armed with a sharp graver, then carefully carves away the uninked portion of the wood, leaving the characters raised. Errors may be corrected by inserting small pieces of wood, but due to the process's efficiency, it is often simpler to replace and recut the entire block. Unlike Western printing, Chinese printing employs no press; rather, a printer uses two brushes on a shared handle, one to ink the characters and another to press the paper onto the block, capturing the impression. The work can be divided, with one person inking the block and another taking the impression. Due to the speed and precision of this method, a single worker can produce thousands of copies per day. Each thin, one-sided printed sheet is then folded back, with blank sides inward, and stitched together at the outer edge.²³

Religious competition was a major driving force for the invention of woodblock printing. Buddhism, Taoism, and Confucianism, driven by the imperative of duplicating and disseminating their teachings to broaden their followers, each innovated technologies to affordably replicate texts on a large scale. In the words of Thomas Francis Carter, "It can be said with equal truth that every advance into new territory made by printing has had as its motive an expanding religion."²⁴ Among the three, it was Buddhism that played the most crucial role in the emergence of printing technology.²⁵

²¹Weinstein (1987), 58-63.

²²For an introduction to the origin of printing in China, see Brokaw (2005), 8-23; Chia (2002), 7-13; Twitchett (1983), 68-86.

²³Carter (1925), 34-35.

²⁴Carter (1925), 26.

²⁵Xin (2018), 16.

Chinese printing's inception was profoundly intertwined with Buddhism, starting with image printing, progressing to mantras, and finally culminating in the printing of sutras.²⁶ The practice of creating Buddha images with "Buddha seals," originating from India, was introduced to the Tang Dynasty circa 660 CE.²⁷ Utilizing these seals, Buddhists replicated a myriad of Buddhist images, adhering to the belief that duplicating a sutra or a Buddhist image was a virtuous deed with the potential to cure illnesses and purify souls.²⁸ Often, single sheets of paper carried hundreds, if not thousands, of Buddha figures, each seal generating numerous prints, thus sparking the early development of printing.

The transition from Buddhist seals to woodblock printing in China was driven by two key factors. Firstly, the widespread use of Buddhist seals stemmed largely from the constraints experienced by sutra scribes. While capable of transcribing text, they required seals and subsequently, woodblock printing, to generate images.²⁹ Such printing catered to a significant social demand for affordable religious images.³⁰ Secondly, the progression towards woodblock printing was further influenced by the necessity to print in Sanskrit, an unfamiliar and unwritable script for most Chinese Buddhists, presenting a challenge possibly greater than creating drawings for printing.³¹

The advent of printing in Taoism originated with talisman seals. Historically, Taoist practitioners often carried large seals, typically made from jujube wood, when traversing mountainous and riverine terrains. These seals, engraved with as many as 120 characters, were employed to exorcise evil spirits.³² Taoist priests also utilized the impressions of wooden seals, spanning several inches square and bearing the name of *Laozi* or another eminent figure, as charms.³³ Even though it appears that Taoists may have developed the seal impression into something akin to a block print before the Buddhists, motivated by their need for charms, the correlation between Taoist seals and woodblock printing remains more indistinct and uncertain.³⁴

Initially, seals were carved using a mold. When pressed onto a flat surface, they required inking,

²⁶Xiang (2001), 126.

²⁷Xin (2018), 19.

²⁸Zhang (2006), 38.

²⁹Xin (2018), 20.

³⁰Carter (1925), 57.

³¹Xin (2018), 22.

³²Xin (2018), 19.

³³Carter (1925), 11.

³⁴Carter (1925), 13.

typically with vermilion, which resulted in white characters on a red background. However, an innovative shift occurred when the concept of carving seals in relief was introduced. These new seals, when inked with vermilion, produced red characters on a white ground. This marked a significant development, playing a pivotal role in the early history of printing, as it necessitated characters to be carved in reverse and in relief.³⁵

The Confucian tradition significantly contributed to the early development of printing through the technique of ink rubbings from stone inscriptions. This practice entailed moistening a thin, resilient paper, placing it onto the stone's surface, and pushing it into all grooves using a stiff brush. After drying, a padded silk or cotton swab, dipped in sized ink, was gently passed over the paper. Once removed, the paper bore a clear and lasting impression of the inscription in white on a black background. This technique resembled block printing but differed in that the characters were incised into the stone rather than embossed in relief, as in wood. Importantly, the text direction remained the same as on the original stone, given the ink's application on the paper's side facing away from the stone.³⁶

As asserted by Thomas Francis Carter, it was the union of these two processes, the Buddhist and Taoist seals, and the Confucian rubbing, that produced the great official block printing.³⁷ In the same vein, Xin Deyong contends, "The origin of woodblock printing technology, with seals and stone rubbings, is the combination of stone rubbing transmission and seal technology, which is sufficient to promote the development of woodblock printing."³⁸ When the Confucian Classics were cut in wood—the event that marked the beginning of large-scale block printing—those in charge of the work had no idea of printing. They thought they were continuing the ancient practice of cutting inscriptions, using wood instead of stone, after the analogy of certain Buddhist and Taoist prints that they had seen, for the sake of ease and economy. It was thus that the wooden block and its printed impression developed naturally from the stone inscription and its rubbing. The Buddhist and Taoist prints—which had developed from charms and seals—gave the idea of cutting the inscription in reverse and gave also a new technique for taking the rubbing.³⁹

³⁵Carter (1925), 12-13.

³⁶Carter (1925), 19.

³⁷Carter (1925), 21.

³⁸Xin (2018), 16.

³⁹Carter (1925), 22.

Buddhist Monasteries and the Spread of Printing and Education

In the wake of printing's inception, Buddhists held a profound conviction that reproducing a sutra or a Buddhist image was an act of profound virtue. This sentiment catalyzed a widespread devotion to printing activities, involving not only private individuals but also authoritative figures, culminating in voluminous production.⁴⁰ A testament to this reverence is evident in the discovery of the Diamond Sutra in Dunhuang. A dedication from 868 CE indicates it was printed for the welfare of Wang Jie's parents, earning it global recognition as the world's oldest surviving printed book.⁴¹ Sutra-printing institutes, typically situated within Buddhist monasteries, produced a plethora of materials, ranging from religious texts to secular books.⁴² Notably, between 972-83, the entire Buddhist canon, the Tripitaka, was published in Chengdu. This monumental task required the carving of 130,000 blocks to create over 5,000 volumes, marking a pivotal milestone in printing history.⁴³

Religious institutions had unique advantages in the printing industry. For instance, to promote Buddhism, fervent followers often raised funds independently for the carving and printing of scriptures.⁴⁴ Moreover, monasteries had the advantage of accessing nonprofessional labor, such as religious devotees, women, and idle peasants, enabling them to carve blocks inexpensively.⁴⁵

Therefore, Buddhist monasteries in medieval China functioned as crucial educational establishments. They bridged the transition from private schools during the Han era to large academies or '*shuyuan*' during the Song Dynasty.⁴⁶ These monasteries were strategically located in tranquil, secluded areas, equipped with expansive libraries containing both secular and Buddhist texts and staffed by learned monks, making them prime venues for focused study. Students often resided within the monastic premises for independent study of classical texts without distraction in preparation for civil service examinations. These monasteries, funded by income from monastic land, offered a democratic form of education, providing free lodging and food to commoners aspiring for

⁴⁰Zhang (2006), 38.

⁴¹Zhang (2006), 23-4.

⁴²Zhang (2006), 49-60.

⁴³Carter (1925), 89.

⁴⁴Zhang (2006), 64.

⁴⁵Brokaw (2005), 8-10.

⁴⁶Scholars have argued that Buddhist methods for training monks served as the catalyst for the development of academies. See Kieschnick (1997), 118; Zhou (1933), 79; Yan (2009), 886-894.

success in the civil service exams.⁴⁷ The monasteries, with their substantial and stable book collections, served as reliable and inexpensive sources of knowledge, a function particularly crucial in an era where local libraries were scarce, and only aristocratic families had private book collections.⁴⁸ The fourth century had already witnessed the monasteries evolve as centers of secular learning and education, attracting talented individuals from lower social classes and allowing them to participate in the cultural life traditionally exclusive to the gentry. This development marked a significant shift in Chinese social history as it blurred rigid class boundaries and created a platform for intellectual pursuits irrespective of social origin. Consequently, the influence of Buddhism permeated various fields, with monks participating in ‘*qingtán*’ discussions,⁴⁹ visiting imperial courts, and interacting with the aristocracy, while visits to monasteries for prayer, incense burning, sermons, or scholarly conversations became regular practices among the ordinary Chinese.⁵⁰

Printing in the Song Dynasty

Woodblock printing was the mainstay of the Chinese printing industry, particularly during the Song Dynasty. At this time, printing was largely employed for religious and commercial purposes, with religious scriptures, calendars, and almanacs being the dominant forms of printed material. The government, recognizing the potential of this technology for mass reproduction, began to use it for the dissemination of standardized editions of the Classics and other ideologically important texts during the Five Dynasties period and subsequently in the Song era. The rise of the examination system in the Song Dynasty further amplified the need for orthodox texts for study, thereby propelling the growth of the printing industry. By the twelfth century, commercial publishers had begun to take the lead in the book trade, even though the scarcity of surviving Song and Yuan imprints makes it difficult to fully assess the impact of this publishing boom.

According to one anecdote, in 1005 the chancellor of the Directorate of Education trumpeted a recent surge in the number of carved woodblocks deposited in his office:

At the beginning of the dynasty the number of book woodblocks was fewer than four

⁴⁷Zhou (1933), 77; Yan (2009), 925-927.

⁴⁸Zurcher (2007), 9.

⁴⁹‘*Qingtán*’ involved “pure conversation” concerning metaphysics and philosophy in the form of informal gatherings for discourse and debate.

⁵⁰Zurcher (2007), 75.

thousand. But, now they are over one hundred thousand, with the Classics, the histories, and their proper commentaries all provided for. When I was young and made a career of Confucian learning, I observed that fewer than 1 or 2 percent of school students could be supplied with the Classics and their commentaries. Now woodblock editions are abundant and all families of scholars as well as commoners have them.⁵¹

By the Song dynasty's end, books had been printed in at least 91 prefectures scattered throughout 15 of its 17 circuits. One twentieth-century scholar estimates possible print runs of 84,000 copies in the tenth century.⁵² Unfortunately, we as of yet lack more complete estimates of the total number of books produced in China by century during the Tang and Song eras. This would allow us to make a more direct comparison with the figures produced for the important study by Buringh and van Zanden (2009) for Western Europe during the same time period.

Despite the development of movable-type printing in the eleventh century, the industry continued to prefer woodblock printing. This was largely due to the Chinese language's complexity, which necessitated the reproduction of several thousand characters, making movable-type fonts economically unfeasible for many printers.

In spite of the increasing popularity of printed texts, much was still handwritten and hand copied.⁵³ The enduring relevance of manuscripts and hand-copied text in China can largely be attributed to the high esteem in which the art of calligraphy was held.⁵⁴ Nevertheless, Lucille Chia's examination of the Jianyang publishing industry from the Song to the end of the Ming posits that the range of imprints in the Song was not markedly less than in the late Ming, and the societal impact of printed materials was substantial, highlighting the transformative role of printing in the Song era.⁵⁵

⁵¹McDermott (2005), 55.

⁵²McDermott (2005), 56-9.

⁵³For a discussion of the continuing importance of handwritten manuscripts, see Brokaw (2005), pp. 15-16.

⁵⁴Book collectors often commissioned copies of error-free editions in exquisite calligraphy; in these instances, the manuscript copy would have higher value than other, inferior, printed editions. Economic constraints also played a role in the perpetuation of hand-copying; a reader unable to afford text purchases might borrow books to copy, as long as they could locate a generous collector willing to lend their books—a rarity. The practice of book copying was also seen as a way to demonstrate reverence and accumulate merit; this is particularly evident in the common practice of copying sutras (occasionally using one's own blood) or funding the copying of sutras as a popular method of exhibiting devotion to Buddha and earning religious merit. Although the publishing industry undeniably thrived by the early twelfth century of the Song Dynasty, some researchers argue that print only became widespread among both the educated and uneducated during the Ming Dynasty, from the mid- to late sixteenth century. See e.g., McDermott (2005). This hypothesis is bolstered by the continued prevalence of manuscripts over printed material in collections.

⁵⁵Chia (2002), pp. 12-13.

The Development of Religious Monopoly in Europe

The religious landscape of medieval Western Europe could hardly have been more different from that of China. Instead of having three distinct doctrines, each of which vied for support, the Catholic Church had a near monopoly on adherents. Under these conditions, the church faced little incentive to alter its longstanding attitude that the masses did not need to have direct access to the written word of the Old and New Testaments. The end result for Medieval Europe was that while there was one similarity in having a common written administrative language (Latin as opposed to Chinese), access to the written word remained limited to either the clergy, monks, or scattered inhabitants of the towns. For those who would have liked to construct a bureaucratic state, they had a limited supply of talent to draw upon.

Constance Miller (1983) has argued that medieval Europeans had the raw skills and materials necessary to develop woodblock printing, and so the explanation for their failure to develop this technology must lie elsewhere. Europeans knew of carving; they had ink; they had a history of printing seals; and they had various raw materials that could be used for making paper. In spite of this, block printing of text first appeared in Europe only a few decades before Gutenberg's movable type printing.⁵⁶ This same point about seals helping to lead to the development of woodblock printing in China was already made by Carter (1925), almost a century ago.

To see how relationship between Christianity (and subsequently Catholicism) and the written word developed we can start with the beginning. Within a few decades after the death of Jesus, the movement that would come to bear his name quickly became an urban phenomenon as has been abundantly documented in the classic account by Meeks (1983). For this reason, we can presume that a number of church members by nature of the trade they exercised and the fact that Latin and Greek were still both written and spoken languages would have been literate. With this said, prior estimates of high literacy in the Ancient Mediterranean world are not supported by historical evidence.⁵⁷ Under these conditions, Christian rituals—taking place often in secretive locations—quickly took on a character where those few who were literate would read to the many who could not (Gamble 1995). It is hard to escape the idea that at this very early date it was already the origin of the Latin Mass. In this case those listening could understand the Greek or Latin that

⁵⁶The earliest known European block print is from 1423 (Miller 1983 p.54).

⁵⁷The main text arguing that there was not widespread literacy in the Ancient World is Miller (1991)

was spoken, but centuries later for medieval Europeans this would no longer be the case.

If we move forward to the early medieval period, and the Carolingian era in particular, by now the fact that affairs of church or state were conducted in Latin certainly made access to the written word a challenge for all but a lucky few Europeans. The monopoly position of the Catholic Church during this era did not only result in those outside the church having restricted access to Old and New Testaments; it also had consequences for the lower clergy within the Church itself. Some have argued that an emphasis on a very high level of written Latin, which by now had diverged from spoken language for three centuries, meant that many regular clergy could read and understand only a number of simple texts (Nelson 1990 p.264).

The other obstacle to literacy in Carolingian Europe was that in the absence of a technology for printing, book production was a luxury pursuit, further restricting access. As evidence of this, consider the following statement by Lupus of Ferrières, who in the year 858 was considering sending a book to Archbishop Hincmar of Reims.

I have been afraid to send you Bede's *Collectanea* on the apostle taken from the works of Augustine, chiefly because the book is so large that it cannot be concealed on one's person nor very easily contained in a bag. And even if one or the other were possible, one would have to fear an attack of robbers who would certainly be attracted by the beauty of the book, and it would therefore probably be lost to both you and me.⁵⁸

Later in the Medieval era, it is apparent that there were numerous attempts to translate both the Old and New Testaments into the vernacular, particularly into French. At first, in some cases these efforts appear to have been tolerated by church authorities. Some within the church argued that the Bible, if carefully and accurately translated into the vernacular, could help support the orthodoxy.(Sneddon, 2012). In the end, however, this opinion does not appear to have carried the day. By the thirteenth century, with the rise of sects such as the Cathars that were considered to be heretical, the Catholic Church acted much as one might expect a monopoly under threat to react: it restricted access to the written word once again. The difference with the situation in China, where Taoists had seen Buddhist scriptures as a threat, is that in this case it was the Catholic Churches own texts—the gospels themselves—that it thought were being used against it. To see the logic here

⁵⁸Lupus of Ferrières as quoted in McKitterick (1989) p.135

consider the following statement by the Council of Toulouse, held in the year 1229 to formulate a reaction to the Cathars.

We prohibit also that the laity should be permitted to have the books of the Old or the New Testament; unless anyone from motives of devotion should wish to have the Psalter or the Breviary for divine offices or the hours of the blessed Virgin; but we most strictly forbid their having any translations of these books.⁵⁹

In sum, as Catholic Christianity acquired a near monopoly on religious adherents in Western Europe, it at first developed a technology of worship that compensated for the fact that most adherents were illiterate. The maintenance of this technology—most people only hearing the Old and New Testaments in a language that they could not understand—further reinforced this tendency.

Initial Empirical Tests With Chinese Data

Our initial empirical tests are based on cross-sectional estimates where we examine the correlation between the number of Buddhist monasteries in a prefecture and three key outcomes. The first of these is the number of printing centers in the prefecture, and we consider this separately for the the Song era. The second measure is the number of “county schools.” in the prefecture during the Song dynasty (Northern Song period). These schools were state supported. The third measure is what we call, for lack of a better name, the number of “commoner” *jinshi*, a category that we will define below.

The principal observable we control for is prefecture population during the late Tang era. Lacking a prefecture population measure from the beginning of the dynasty, this does introduce some risk of post-treatment bias into our results. However, there is then no such risk for our Song era regressions when we include late Tang population. We also include province fixed effects in some of our estimates in order to control for unobservables at that level. As we emphasized in the introduction, there are plenty of ways in which unobservables at the prefecture level could be biasing our estimates, so these initial results should be taken as preliminary and suggestive.

⁵⁹Statement from the Council of Toulouse (1229) as reported in Peters (1980) pp.194-195.

Data Sources

CBDB

We utilized the China Biographical Database (CBDB) as the primary data source to investigate the relationship between Jinshi, their kinship networks, and geographic locations during the Song dynasty (960-1279).⁶⁰ Specifically, we extracted information on 35,003 individuals who passed the civil service exam in the Jinshi subject (c_entry_code = 36), and whose entrance (c_enter_year) fell between the years 960 and 1127, the Northern Song period. Subsequently, we focused on pre-processing this dataset to obtain three key pieces of information for each Jinshi.

First, we computed the kinship relationship for each Jinshi with their paternal and maternal clans using the KINSHIP_CODES data in the CBDB. We hypothesized that individuals with bureaucrats within their family in near ancestry may have had an advantage in acquiring printed material and accumulating knowledge across generations. To control for family background, we assigned a generation number to each person starting with the individual as generation 1, and incrementally by 1 for each level of ancestry appearing in the CBDB Database. We then counted the minimum generation assigned to an individual apart from themselves and determined whether they were within 5 generations (approximately 1 century) of a bureaucrat within their extended family. If the answer to this question was “yes,” then they could not be considered a commoner Jinshi.

Second, we extracted the choronyms of each Jinshi from the BIO_MAIN data in the CBDB. This information was used to identify whether the individual came from an aristocratic family in the Tang Dynasty. If the answer to this question was “yes,” then they could not be considered a commoner Jinshi.

Third, we retained a single location for each Jinshi by prioritizing the “basic affiliation” (ji guan) in the CBDB, which represents the scholar’s registered hometown. If this information was missing, we used the “actual residence” (luo ji), “household registration address” (ben guan), “moved to” (qian zhu di), “alternate basic affiliation,” or “place of refuge” (bi bing zhi di), in that order. We then mapped the Jinshi individuals to an original Northern Song administrative map to obtain prefecture information using x y coordinates in the CBDB address data.

⁶⁰CBDB, Aug. 2022

The Historical Atlas of China

The present study employed *The Historical Atlas of China*, which was published by the China Cartographic Publishing House between 1982 and 1988, as a valuable resource for the historical maps of the Tang and Northern Song Dynasties.⁶¹ In order to accurately capture the territorial boundaries and provincial and prefectural divisions of these periods, we performed a process of georeferencing whereby the historical atlas was matched to a contemporary geo-coded map of China. Specifically, for the Tang territory and administrative map, we utilized the administrative map of 741 AD from *The Historical Atlas of China*, while for the Northern Song Dynasty, we employed the corresponding map from 1111 AD. By aligning the contemporary borders on the historical maps with those on the modern geo-coded map, we were able to accurately georeference both sets of maps. Subsequently, we marked the locations of prefectural governments in accordance with the georeferenced maps for both the Tang and Northern Song Dynasties.

Printing Centers

The present study relied on two primary sources to collect data on printing centers and Northern Song county schools. For the former, we utilized Xiumin Zhang's *The Invention of Chinese Printing and Its Influence*, which provided a comprehensive list of major cities known for woodblock printing during the Tang and Song Dynasties.⁶² To ensure the accuracy of our data, we cross-referenced these locations with those recorded in Joseph Needham and Tsien Tsuen-Hsuei's *Science and Civilisation in China*. Once we had identified the relevant printing locations, we marked the cities as printing centers within corresponding prefectures.

Buddhist Temples

For Buddhist monasteries, we use the data from the Buddhist Geographical Information System (BGIS), *Tang wudai fosi jikao (Catalog of Buddhist Monasteries in Tang and Five Dynasties)*, digitized by Professor Jiang, Wu. 2022.⁶³ The data include Buddhist temples, their establishment and demolition years, and geo-coded x y coordinates. We subset the data for temples that existed

⁶¹Tan, 1982.

⁶²Zhang, 2009

⁶³Li, 2006; Wu, 2022.

between 618 and 845 AD.

County School

For the Northern Song county schools, we drew on the research of Yuwen Zhou, whose 1996 publication *Prefectural and County Schools in the Song Dynasty* provided valuable information on the county schools of the period.⁶⁴ Specifically, we recorded the counties that had at least one county school by the end of the Northern Song Dynasty (960-1127 AD). Although Zhou's work included establishment dates for some county schools, the proportion of missing information led us to adopt a binary indicator of whether a county had a public school by the end of the Northern Song Dynasty, as well as the number of counties within each prefecture that had at least one public school by this time.

Tang Population

For population in the Tang Dynasty, we use the data from *The History of Chinese Population* (Volume II) published by Fudan University Press.⁶⁵ The data include prefecture-level household figures from four reigns – Zhenguan (627–649 CE), Kaiyuan (713–741 CE), Tianbao (742–756 CE), and Yuanhe (806–821 CE). For the empirical analysis, we use the data from the Yuanhe era as a proxy for economic activity in the late Tang period.

Locations of Buddhist Temples and Printing Centers

Figures 1 through 3 show first the distribution of Buddhist temples across China during the Tang dynasty, then the correspondence between Buddhist temples and printing centers during the Tang dynasty, and then finally the correspondence between Buddhist temples and printing centers under the subsequent Song dynasty.

⁶⁴Zhou (1996), 25-64

⁶⁵Dong (2002).

Figure 1: This figure presents the location of Buddhist monasteries that existed at any point during the Tang dynasty (618-907 CE).

Tang Buddhist Monasteries

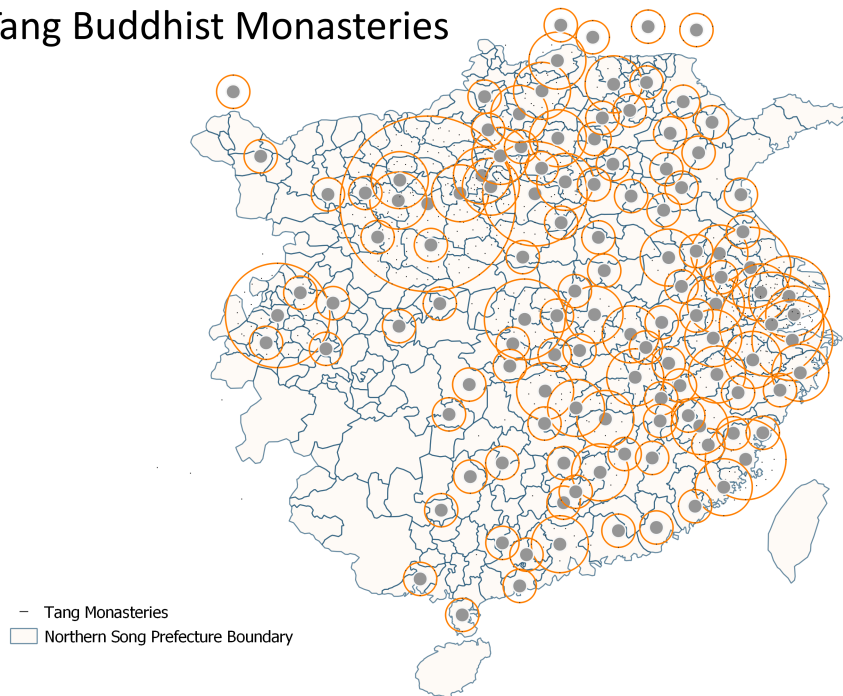


Figure 2: This figure presents the location of Buddhist monasteries and of printing centers during the Tang dynasty (618-907 CE).

Tang Buddhist Monasteries

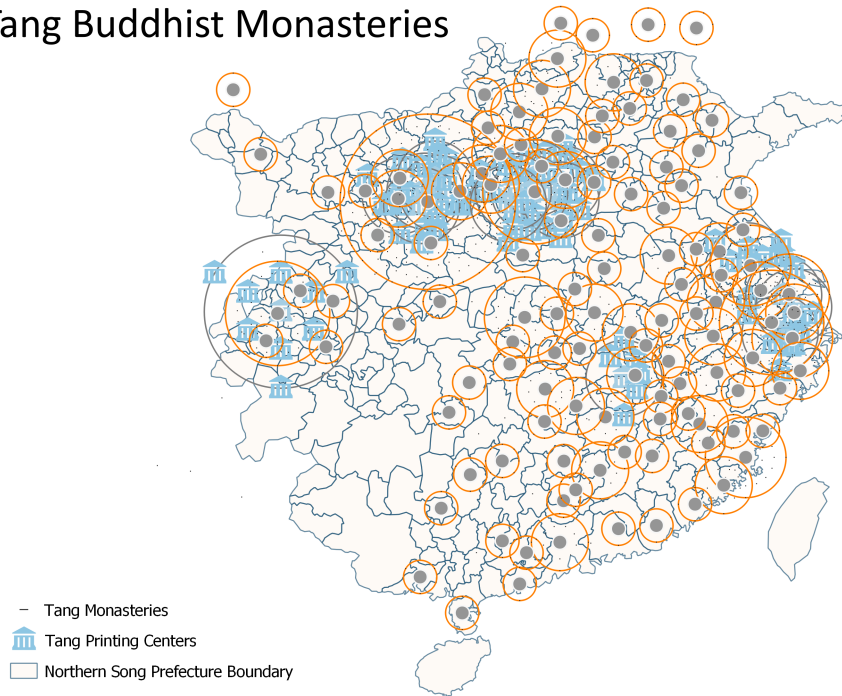
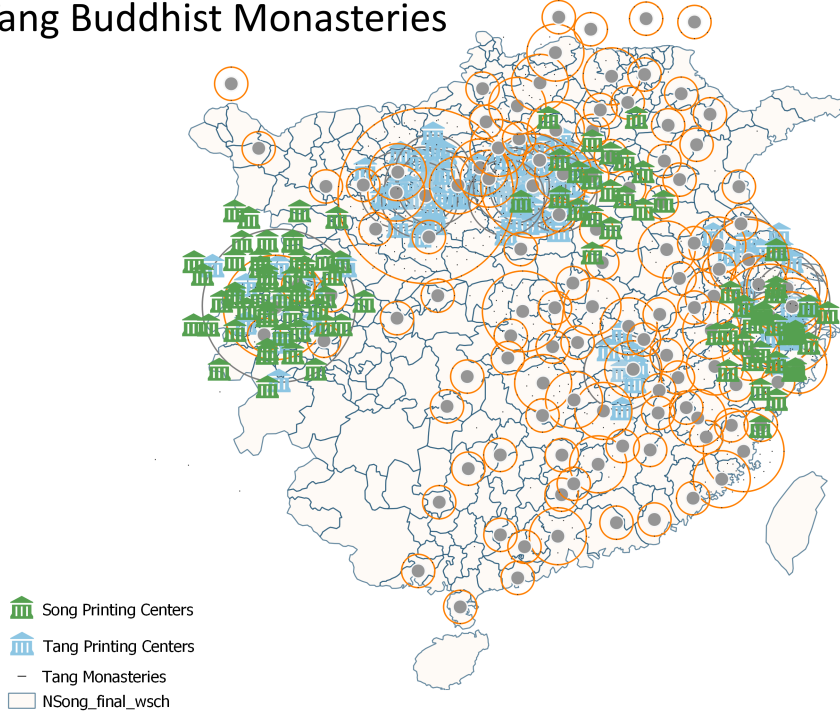


Figure 3: This figure presents the location of Buddhist monasteries and of printing centers during the Tang dynasty (618-907 CE) and the Song dynasty (Northern Song period) (960-1127 CE).

Tang Buddhist Monasteries



Empirical Results

Our baseline empirical investigation focuses on examining the cross-sectional associations between the presence of Buddhist temples and various critical outcomes, namely the number of Tang and Song printing centers, the number of counties with county schools, and the presence of “commoner” Jinshi in the Northern Song Dynasty. In our analysis, we control for the late Tang population ($Population_i$) and consider whether the prefecture has a prefectural or provincial government on the 741 AD Tang administrative map ($TangGovernment_i$). We include the presence of prefectural and provincial governments as controls since they are typically situated in urban areas, which serve as a proxy for economic prosperity during the Tang Dynasty. Moreover, we incorporate provincial fixed effects (λ_j) to account for unobserved regional characteristics that may have contributed to the prosperity of printing technology. Our preliminary analysis is based on the following basic specifications, where i indicates prefecture ID, and j denotes provincial ID. The baseline findings are reported in Tables 1-4.

$$\begin{aligned}
Y_i = & \beta_0 + \beta_1 \ln(TangMonastery_i + 1) \\
& + \gamma TangGovernment_i + \mu \ln(Population_i) + \lambda_j + \epsilon_i
\end{aligned} \tag{1}$$

In Table 1, we present the first set of results of equation 1, where $Y_i = \ln(TangPrintCenter_i + 1)$, by regressing the natural logarithm of the number of Tang printing centers within a prefecture on the natural logarithm of the number of monasteries. We alter the specification by regressing printing center on monastery, controlling for population in column (1). We then add in provincial fixed effects in column (2), add in the Tang prefecture government binary indicator to the baseline model in column (3), and then control for both provincial fixed effect and the presence of prefecture government in column (4). The results in Table 1 demonstrate that the presence of Tang monasteries within a prefecture is positively associated with the number of printing centers within the prefecture, and the coefficients remain significant despite changes in the specifications. While our analysis is not immune to post-treatment bias, it provides evidence that from the outset, printing has been closely linked to Buddhist temples.

	<i>Dependent variable:</i>			
	Tang Printing Center (ln)			
	(1)	(2)	(3)	(4)
Tang Monastery (ln)	0.077*** (0.029)	0.071** (0.036)	0.077*** (0.029)	0.071* (0.036)
Population 806-821 (ln)	0.004 (0.020)	0.009 (0.023)	0.004 (0.020)	0.009 (0.024)
Constant	0.424 (0.375)	0.116 (0.707)	0.458 (0.493)	0.129 (0.811)
Provincial FE	No	Yes	No	Yes
Tang Pref. Govt.	No	No	Yes	Yes
Observations	146	146	146	146
R ²	0.102	0.124	0.102	0.124
Adjusted R ²	0.090	0.031	0.083	0.023

Note: We use a cross-sectional dataset comprising 314 prefectures from 17 provinces based on the 741 AD administrative map, with the number of county-level printing locations, logged. The left-hand side variables include the logged number of monasteries within each prefecture in 617-845 AD, the logged number of households between 806-821 AD, and a binary variable indicating the presence of Tang prefectural or provincial government. We also control for provincial fixed effects in columns (2) and (4). *p<0.1; **p<0.05; ***p<0.01.

Table 1

Subsequently, we conduct an analysis to estimate the long-term relationship between Buddhism and printing by conducting a regression of the logarithmic number of printing centers in the Northern Song Dynasty ($Y_i = \ln(NSongPrintCenter_i + 1)$) on the number of Buddhist temples in the Tang Dynasty, as outlined in equation 1. The outcomes are presented in Table 2. Like in Table 1, we alter the control variables across columns by only controlling for population in column (1), adding provincial fixed effect in column (2), adding a prefecture government indicator in column (3), and then including both provincial fixed effect and prefecture government indicator in column (4). The results reveal a statistically significant positive correlation between Tang Buddhist monasteries and the emergence of Northern Song printing centers. Notably, we also find that when we control for

provincial fixed effect, late Tang population also becomes significant, suggesting that economic prosperity is positively associated with the emergence of printing centers.

	<i>Dependent variable:</i>			
	Northern Song Printing Centers (ln)			
	(1)	(2)	(3)	(4)
Tang Monastery (ln)	0.121*** (0.034)	0.057** (0.028)	0.120*** (0.035)	0.060** (0.029)
Population 806-821 (ln)	−0.019 (0.024)	0.007 (0.022)	−0.019 (0.024)	0.006 (0.023)
Constant	0.156 (0.197)	1.032*** (0.199)	0.149 (0.209)	1.051*** (0.206)
Provincial FE	No	Yes	No	Yes
Tang Pref. Govt.	No	No	Yes	Yes
Observations	268	268	268	268
R ²	0.052	0.519	0.052	0.519
Adjusted R ²	0.045	0.471	0.041	0.469

Note: The data is a cross-sectional dataset comprising 333 prefectures from 23 provinces based on the 1111 AD administrative map, with the number of county-level printing locations, logged. The left-hand side variables include the logged number of Tang monasteries within each prefecture in 617-845 AD, the logged number of households between 806-821 AD, and a binary indicator for Tang prefectural or provincial government. We control for provincial fixed effects in columns (2) and (4). *p<0.1; **p<0.05; ***p<0.01.

Table 2

Next, we investigate the association between Tang Buddhist temples and the availability of public education during the Northern Song Dynasty. Our results, displayed in Table 3, suggest a positive relationship between the presence of Tang monasteries and the number of public county schools in the Northern Song Dynasty. Consistent with our earlier analysis (Table 1 and 2), we vary the specification across column (1)-(4) and observe the robustness of our results.

	<i>Dependent variable:</i>			
	Counties with Public Schools (ln)			
	(1)	(2)	(3)	(4)
Tang Monastery (ln)	0.389*** (0.040)	0.328*** (0.040)	0.384*** (0.041)	0.311*** (0.042)
Population 806-821 (ln)	0.102*** (0.029)	0.073** (0.032)	0.105*** (0.029)	0.081** (0.033)
Constant	-0.503** (0.237)	-0.039 (0.284)	-0.553** (0.252)	-0.163 (0.293)
Provincial FE	No	Yes	No	Yes
Tang Pref. Govt.	No	No	Yes	Yes
Observations	268	268	268	268
R ²	0.434	0.549	0.432	0.552
Adjusted R ²	0.459	0.597	0.465	0.613
<i>Note:</i>		*p<0.1; **p<0.05; ***p<0.01		

Note: The data are a cross-sectional dataset comprising 333 prefectures from 23 provinces based on the 1111 AD administrative map, with the number of counties that had at least 1 public school in the Northern Song Dynasty. The left-hand side variables include the logged number of Tang monasteries within each prefecture in 617-845 AD, the logged number of households between 806-821 AD, and a binary indicator for Tang prefectural or provincial government. We control for provincial fixed effects in columns (2) and (4). *p<0.1; **p<0.05; ***p<0.01.

Table 3

Furthermore, we find that the rise of “commoner” Jinshi in the Northern Song Dynasty is also strongly correlated with the presence of Tang monasteries, as shown in Table 4, where we estimate equation 1, $Y_i = CommonerJinshi_i$. As described previously, we define “commoner” Jinshi as individuals without any prior Jinshi in their family within five generations and without a choronym. Our findings remain robust when we use alternative model specifications, as demonstrated in column (1)-(4) of Table 4.

	<i>Dependent variable:</i>			
	Jinshi, w/o Bureaucrats in 5 Gen, No Choronym			
	(1)	(2)	(3)	(4)
Tang Monastery (ln)	0.703*** (0.100)	0.458*** (0.074)	0.705*** (0.104)	0.432*** (0.077)
Population 806-821 (ln)	0.260*** (0.072)	0.128** (0.059)	0.259*** (0.073)	0.138** (0.059)
Constant	-1.467** (0.587)	0.586 (0.521)	-1.451** (0.622)	0.411 (0.536)
Provincial FE	No	Yes	No	Yes
Tang Pref. Govt.	No	No	Yes	Yes
Observations	268	268	268	268
R ²	0.316	0.733	0.316	0.735
Adjusted R ²	0.311	0.706	0.308	0.707

Note: The data is a cross-sectional dataset with 333 prefectures, 23 provinces based on the 1111 AD administrative map, with Jinshi data from CBDB (Aug. 2022 version). The left-hand side variables include the logged number of Tang monasteries within each prefecture in 617-845 AD, the logged number of households between 806-821 AD, and a binary indicator for Tang prefectural or provincial government. We control for provincial fixed effects in columns (2) and (4). *p<0.1; **p<0.05; ***p<0.01.

Table 4

A Second Empirical Strategy Using the Buddhist Persecution of 845 CE

In this section we report results of a second empirical strategy where we use the differential effects by province of the Buddhist persecution of 845 CE.

Background of the Buddhist Persecution

Our empirical strategy exploits a religious persecution during Emperor Wuzong's reign (840–846 CE) in the Tang Dynasty. Emperor Wuzong was marked by his deep-rooted aversion towards

Buddhism, which was not only politically and economically motivated, but also stemmed from his fascination with Taoism. He believed in the Taoist alchemists who promised to use various potions and elixirs to make him immortal, a practice that ultimately shortened his life. His animosity was further intensified by the perceived threat from the Uighurs, whose Manichaean religion was introduced into China by Persians in the year 694. Wuzong's resentment of Buddhism mirrored the frustrations of the Taoist clergy, who had long been eclipsed by the Buddhists, and who sought to regain their prominence.⁶⁶

In the year 845, Wuzong issued two comprehensive edicts targeting monastic property and the Buddhist clergy. The first edict prohibited Buddhist monasteries from holding estates and mandated the surrender of all monastic wealth, such as slaves, cash, grain, or cloth, to the secular authorities for governmental use. The second edict demanded the laicization of all Buddhist monks and nuns under the age of forty. Later that year, a third decree was issued, restricting the size of the clergy and the geographical distribution of monasteries. The emperor imposed a quota of maximum monasteries and clergies to each province based on its "grade." And the "grade" of provinces was determined according to their population sizes.⁶⁷ As a result, only 49 monasteries were permitted to operate in the whole of China, accommodating a mere 800 monks. Strict enforcement of these policies was ensured by dispatching censors to various regions.

The aggressive prosecution of Buddhist monasteries during Wuzong's reign had a profound impact on Buddhism in China. Over 4,600 monasteries were dismantled, more than 260,500 monks and nuns were defrocked, and over 40,000 chapels and hermitages were destroyed. The confiscation of vast tracts of monastic land and the addition of 150,000 ex-slaves to the tax registers signified the scale of the dismantlement. Despite the court's orders, pro-Buddhist military commanders in certain regions refused to implement the edicts, providing refuge to large numbers of monks.⁶⁸ In the following analysis, we will use these autonomous prefectures as the "control group." Nevertheless, the destruction of scriptures, particularly Chinese commentaries and treatises, posed a significant

⁶⁶For background of the persecution, see Weinstein (1987), 115-130.

⁶⁷Changan would be permitted only four monasteries, each with a maximum of thirty resident monks. Luoyang was, likewise, to be allowed four monasteries with a total of one hundred and twenty monks. Outside Changan and Luoyang, a single monastery would be permitted in each of 41 specified provinces, with its number of monks and nuns to be determined in accordance with the "grade" of the province: 17 provinces would be allowed a maximum of 20 clerics each; 15 provinces, 10 clerics each; 8 provinces, 5 clerics each. And one province, 13 clerics. For details of the decree, see Weinstein (1987), 132-3.

⁶⁸Li (2004), 93-97.

threat to the preservation of ‘orthodox’ interpretations of the Buddhist canon nurtured over centuries within each of the Buddhist schools.⁶⁹

Long-Term Legacy of the Persecution

To examine the long-term impact of the persecution, we repeat our earlier estimates for the Song dynasty outcomes while adding an interaction term that is the number of Buddhist monasteries in a prefecture during the Tang era multiplied by the severity of persecution (by province) in the year 845.

We introduce a discrete variable, *PurgeLevel_i*, to represent the severity of purges, with values ranging from 0 to 4, denoting different levels of purges from low to high. A purge level of 0 indicates that an administrative unit was not under the control of the Tang central government, while a purge level of 1 signifies a very light level of purge in Chang’an and Luoyang. A level 2 purge represents a light level of purge, while level 3 indicates a moderate level of purge, and level 4 is reserved for severe purges. At present, the persecution is treated as a numeric variable for rough estimation purposes. We investigate the impact of Buddhist purges on the emergence of printing centers and public schools during the Northern Song dynasty with varying monastery numbers (*TangMonastery_i*). In addition to the variables themselves, we include the interaction term between persecution severity and the monastery number, and the same control variables as the previous empirical section. The specification is represented by equation 2. The prefecture ID is denoted by *i*, and the provincial ID is denoted by *j*.

$$\begin{aligned}
 Y_i = & \beta_0 + \beta_1(TangMonastery_i * PurgeLevel_i) \\
 & + \gamma TangMonastery_i + \tau PurgeLevel_i + \rho TangGovernment_i \\
 & + \mu \ln(Population_i) + \lambda_j + \epsilon_i
 \end{aligned} \tag{2}$$

Similar to the baseline empirical analysis, we maintain the model specification and change the dependent variable in Table 5-7. In Table 5, we estimate the impact of Buddhist persecution on the rise of Song printing centers in columns (1) and (2) ($Y_i = SongPrintCenter_i$) and public county

⁶⁹Weinstein (1987), 135-147.

schools ($Y_i = NorthernSongCountySchool_i$) in column (3) and (4). The results in column (1) follow equation 2, but only include the indicator for Tang prefectural or provincial government as a control variable, while column (2) has both prefecture government indicator and provincial fixed effects. We adopt this specification pattern for the following tables.

	<i>Dependent variable:</i>			
	Song Printing Center		Northern Song County Schools	
	(1)	(2)	(3)	(4)
Monastery*Purge Level	−0.079*** (0.021)	−0.086*** (0.017)	−0.078*** (0.020)	−0.054*** (0.020)
Tang Monastery	0.219*** (0.042)	0.218*** (0.033)	0.302*** (0.040)	0.235*** (0.040)
Purge Level	0.100 (0.120)	0.238** (0.095)	−0.069 (0.119)	−0.079 (0.119)
Population (806-821, logged)	−0.046 (0.082)	−0.020 (0.072)	0.455*** (0.080)	0.264*** (0.091)
Constant	0.182 (0.762)	2.749*** (0.687)	−2.941*** (0.746)	−1.161 (0.856)
Prov FE	No	Yes	No	Yes
Tang Pref Govt	Yes	Yes	Yes	Yes
Observations	268	268	248	248
R ²	0.140	0.635	0.525	0.669
Adjusted R ²	0.124	0.594	0.516	0.630

Note: The data are a cross-sectional dataset with 333 prefectures, 23 provinces based on the 1111 CE administrative map, with printing centers and counties that had public schools. The left-hand side variables includes the severity of the Buddhist persecution, the number of Tang monasteries within each prefecture in 617-845 AD, an interaction term for persecution and monastery, the logged number of households between 806-821 AD, and a binary indicator for Tang prefectural or provincial government. We control for provincial fixed effects in columns (2) and (4). *p<0.1; **p<0.05; ***p<0.01.

Table 5

The coefficient of the Monastery and purge level interaction term, combined with that of the Tang Monastery level, represents the marginal effect of having a Buddhist temple on the rise of

printing centers on having more counties equipped with at least one public school. The marginal effect of the Buddhist persecution is the sum of the coefficient for the interaction term and that of the purge level. The marginal effect of Buddhist persecution can be interpreted as follows: compared to the prefectures not under central government control during the persecution, the prefectures that were under Tang control have, on average, -0.079 fewer printing centers per purge level increase, without controlling for provincial fixed effects. When controlled for provincial fixed effects this effect remains negative, statistically significant, and is slightly larger.

We proceed to estimate the effect of the Buddhist persecution on the rise of “commoner” Jinshi in Tables 6 and 7, where Y_i represents the number of “commoner” Jinshi in prefecture i . We modify the specification for “commoner” Jinshi in these tables to test the robustness of our results. Specifically, in Table 6, we define “commoner” Jinshi in the most strict sense based on our available data, as a Jinshi (c_entry_code=36) with no bureaucrats in either paternal or maternal kin within 5 generations, and without a choronym. We then relax the choronym restriction in columns (3) and (4). In Table 7, we further relax the definition to exclude bureaucrats within 3 generations and without a choronym in columns (1) and (2), and also remove the choronym restriction in columns (3) and (4).

	<i>Dependent variable</i>			
	Jinshi 1 in 5 Gen, No Choronym		Jinshi 1 in 5 Gen	
	(1)	(2)	(3)	(4)
Monastery*Purge	−4.490*** (0.585)	−2.517*** (0.570)	−4.508*** (0.589)	−2.541*** (0.576)
Tang Monastery	10.568*** (1.177)	5.777*** (1.151)	10.618*** (1.186)	5.831*** (1.162)
Purge Level	2.234 (3.387)	5.442* (3.289)	2.274 (3.413)	5.600* (3.320)
Population (806-821,ln)	9.428*** (2.308)	2.099 (2.500)	9.489*** (2.326)	2.186 (2.524)
Constant	−80.425*** (21.577)	−15.840 (23.735)	−81.043*** (21.744)	−15.100 (23.957)
Prov FE	No	Yes	No	Yes
Tang Pref Govt	Yes	Yes	Yes	Yes
Observations	268	268	268	268
R ²	0.363	0.597	0.362	0.595
Adjusted R ²	0.351	0.552	0.350	0.550

Note: The data is a cross-sectional dataset with 333 prefectures, 23 provinces based on the 1111 AD administrative map, with Jinshi data from CBDB (Aug. 2022 version). The left-hand side variables include the Buddhist persecution severity, number of Tang monasteries within each prefecture in 617-845 AD, interaction term for persecution and monastery, the logged number of households between 806-821 AD, and a binary indicator for Tang prefectural or provincial government. We control for provincial fixed effects in columns (2) and (4). *p<0.1; **p<0.05; ***p<0.01.

Table 6

	<i>Dependent variable:</i>			
	Jinshi, 1 in 3 Gen, No Choronym		Jinshi, 1 in 3 Gen	
	(1)	(2)	(3)	(4)
Monastery*Purge	−4.554*** (0.588)	−2.563*** (0.573)	−4.579*** (0.596)	−2.585*** (0.582)
Tang Monastery	10.742*** (1.183)	5.913*** (1.157)	10.822*** (1.200)	5.968*** (1.175)
Purge Level	2.288 (3.405)	5.534* (3.305)	2.311 (3.452)	5.693* (3.356)
Population (806-821, (ln)	9.516*** (2.320)	2.170 (2.512)	9.624*** (3.473)	2.277 (3.588)
Constant	−81.294*** (21.691)	−16.123 (23.848)	−82.281*** (21.993)	−15.259 (24.219)
Prov FE	No	Yes	No	Yes
Tang Pref Govt	Yes	Yes	Yes	Yes
Observations	268	268	268	268
R ²	0.368	0.600	0.366	0.598
Adjusted R ²	0.356	0.556	0.353	0.553

Note: The data is a cross-sectional dataset with 333 prefectures, 23 provinces based on the 1111 AD administrative map, with Jinshi data from CBDB (Aug. 2022 version). The left-hand side variables include the Buddhist persecution severity, number of Tang monasteries within each prefecture in 617-845 AD, interaction term for persecution and monastery, the logged number of households between 806-821 AD, and a binary indicator for Tang prefectural or provincial government. We control for provincial fixed effects in columns (2) and (4). *p<0.1; **p<0.05; ***p<0.01.

Table 7

Table 6 and Table 7 reveal a positive correlation between the rise of “commoner” Jinshi and the presence of Tang Buddhist monasteries. Specifically, our findings show that as the severity of persecution decreases or the number of temples within a prefecture increases, there is an increase in the production of “commoner” Jinshi during the Northern Song Dynasty.

Conclusion

State formation depends fundamentally not only on the desire or demand for a state, but also on the supply of ideas and techniques that allow people to construct one. We have argued that these ideas and techniques can sometimes originate in unsuspected places. In China during the Tang dynasty, competition between the Buddhist and Taoist religions, as well as with Confucian doctrine, prompted the creation and diffusion of a form of woodblock printing that gave a great number of people access to the written word. This allowed for the development of an Imperial Examination system that drew upon a vast pool of candidates from different areas of China and different social ranks. In other words, it strengthened the Chinese state. In Medieval Western Europe a very different set of developments took place, as absent competitor religions, the Catholic Church had little incentive to develop new techniques to expand access to the written word. In fact, the individual monks and clerics who had access to hand copied manuscripts in Latin had every incentive to restrict it.

We are not by any means arguing that religious competition provides the sole explanation for the political divergence between China and Western Europe at this time. In fact the political divergence began long before this date. What we are suggesting is that building a state often depends on new inventions, and it is often easier to borrow an invention from someone else rather than trying to invent one by oneself. We know that the written word has been critical to state development in a great many societies, yet only three societies are thought to have invented writing on their own. Everyone else borrowed it from their neighbors. And so it makes sense that the same conclusion should apply in the case of further innovations, such as printing, that allow for spreading the written word more widely. Ultimately, the Chinese state borrowed woodblock printing from the Buddhists who had the idea first. Other rulers in East Asia would then borrow this technique from the Chinese, along with a broader model of state development. In Medieval Western Europe many innovations in state development were also borrowed from social actors, and in particular the Catholic Church (Grzymala-Busse 2022, Møller and Doucette, 2022). Yet, this did not include a model based on broad access to the written word.

As a final observation, we can suggest that if state formation sometimes depends upon ideas borrowed from social actors, then it may also be likely to occur in the presence of a certain type

of society, one in which there is a degree of competition between different actors giving them an incentive to innovate.

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