The Cultural Origins of Educational Success

Thang Dang[*]

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Abstract

I exploit exogenous variation in regional exposure to Confucian cultural heritage by drawing on a unique historical evolution in Vietnam and employ a spatial regression discontinuity design to estimate the causal effect of culture on educational success. My results show that exposure to Confucian cultural heritage increases schooling years and degree achievement for adults as well as school enrolment and test scores for children. I provide evidence to suggest that these effects work through positive cultural values and beliefs towards schooling and increased human capital investments. Exposure to Confucian cultural heritage further ameliorates intergenerational educational mobility.

Keywords: Cultural heritage; Confucianism; Meritocracy; Education; Vietnam

JEL Codes: I21, I28, N35, N45, O53, Z10

[*] PhD Job Market Candidate in Economics, Department of Economics, University of York, Heslington, York, YO10 5DD, United Kingdom (e-mail: thang.dang@thangdang.org; webpage: https://thangdang.org). I am indebted to Thomas Cornelissen for his wonderful advice and support. I would like to thank Emma Tominey for her helpful comments and suggestions. Comments during talks with Giorgio Brunello, Giulia Tura, James Fenske, Jeremiah Dittmar, José Montalbán Castilla, Marc Suhrcke, Saurabh Singhal, and seminar participants at the 2019 Bergen Summer School on Socioeconomic Inequality at Norwegian School of Economics (June 2019), the 4th Workshop on Labour and Family Economics (WOLFE) at University of York (September 2019), Applied Microeconometrics (AME) research cluster at University of York (November 2019) are greatly acknowledged. Errors are only mine. Please visit my webpage for the lastest version of this paper.

1. Introduction

While educational attainment generates considerable economic and nonpecuniary returns (Angrist and Krueger 1991; Card 1999, 2001; Clark and Royer 2013; Duflo 2001; Heckman et al. 2018; Oreopoulos and Salvanes 2011), it varies substantially across various ethnic groups and geographic regions both across and within countries (Barro and Lee 2013; Lee and Lee 2016). Understanding what fundamentally affects schooling is therefore indispensable to account for inequalities in socioeconomic outcomes. Economists have focused on economic factors and educational policies to explain disparities in educational success. Cross-country evidence has pointed to income, school resources, and institutions (Hanushek and Woessmann 2011; Woessmann 2016). Numerous micro-level studies have documented the roles of multiple factors that broadly span from family background (Björklund and Salvanes 2011; Black et al. 2005; Dizon-Ross 2019) to school quality and resources (Case and Deaton 1999; Pop-Eleches and Urquiola 2013; Laliberté forthcoming), school-related policies and interventions (Meghir and Palme 2005; Angrist and Krueger 1991), technology (Muralidharan et al. 2019), neighbourhood effects (Åslund et al. 2011), public welfare programmes (Aizer et al. 2016), and environmental factors (Ebenstein et al. 2016). Scholars from other disciplines such as psychology, sociology, and education have long recognized the importance of culture for educational achievement.[1] Yet, it is challenging to identify the causality of this relationship because an ethnic group or a region with a culture that likely drives schooling outcomes typically differs from other groups or regions along climate, historical, institutional, and socioeconomic characteristics.

In this paper, I explore a unique historical setting in Vietnam to study the effect of Confucian cultural heritage on present-day educational success. Confucianism, which originated in ancient China and is named after the scholar Confucius,[2] represents a compilation of ancestral philosophical thoughts

[1] Culture is defined as beliefs, values, and preferences shared by individuals within communities or ethnic groups (Fernández 2011; Tabellini 2008).

[2] Although Confucius or *Kong-Fuzi* in Chinese (551-479 B.C.) was the formal founder and also the initial instructor of Confucianism, he was not the original inventor of what made up Confucianism which was already present before the time he had lived. Confucius was actually the first person systematically collecting and documenting traditional philosophical wisdoms and thoughts of his past generations, who was followed by other two influential Confucian philosophers Mencius (371-289 B.C.) and Xunzi (310-235 B.C. or 314-217 B.C.) among others to compose Confucian texts which have been well-known as *Four Books and Five Classics* (Yao 2000).

on political, social, and family values. Due to its dominant influence throughout regional history, Confucianism has been recognized as the fundamental component creating the Northeast Asian culture up until present times (Kim et al. 2017; Bell 2010; Paramore 2016).[3] Confucianism is particularly well-known for its emphasis on education (Tan 2017), and its positive values towards schooling are presumed to have persisted into modern society, strongly affecting people's preferences and beliefs (Wang 2016). Inspired by Confucianism, historical states developed meritocratic institutions, such as using academic performance on imperial civic examinations to recruit and allocate public servants. Educational achievement, therefore, played a crucial role in deciding whether a male, regardless of his initial status or social class, would become a state bureaucrat and enjoy the immense benefits and respects that this career entailed. Cultural values towards education were therefore firmly established and rooted in Northeast Asian societies due to the extended joint evolution of Confucianism and exam-based meritocratic institutions (Chen et al. 2020). As a result of one millennium years of Chinese occupation between 111 B.C. and 938, Chinese culture and institutions were imported and rooted into pre-modern Vietnamese society, which was aboriginally established by the Kinh people[4] in the region known as Northern Vietnam today (Thuc 1967; Whitmore 1997). After gaining self-rule in 938, the Kinh people formally assumed the colonial legacy of Chinese culture and institutions to construct their historical state of Dai Viet.[5] Confucianism was not only formally accepted as the state ideology but also actively promoted and expanded in parallel with the meritocratic institutions used for public personnel recruitments in the Dai Viet kingdom.

Based on a similar approach as the one developed in Dell et al. (2018), my study draws on marked cultural and institutional differences in the 10th century between the historical states of what is today

[3] The term 'Confucianism' was invented by the 16th century Jesuit missionaries in pre-modern China when they started to fully acknowledge the focal position of Confucius amongst the intellectual traditions of ancient China. Confucianism is typically mentioned as *Rujiao* in Chinese, *Jukyo* in Japanese, *Yukyo* in Korean, and *Nho giao* in Vietnamese, which all approximately convey a message of *the teaching of traditional scholars* (Goldin 2014; Yao 2000).

[4] The Kinh people is the ethnic majority in Vietnam's today, which amounts to about 89% while other remaining 62 ethnicities only occupy 11% of the total population (Population and Housing Census 2009).

[5] Dai Viet, which has a meaning of 'Great Viet', was the name used for the longest time (732 years) among the names the pre-modern Vietnamese states used between 938 and 1858 compared to other short-time names such as Tinh Hai Quan (30 years), Dai Co Viet (86 years), Dai Ngu (7 years), Giao Chi (20 years), Viet Nam (35 years) and Dai Nam (19 years). For that reason, I use the name of Dai Viet to mention all Vietnamese states throughout pre-modern times for the purpose of simplification.

Northern and Southern Vietnam. As demonstrated in Figure 1, the territory of today's Vietnam comprised three kingdoms in the 10th century: Dai Viet, Champa, and Khmer, which were respectively located in the northern, middle, and southern parts of modern-day Vietnam. While Dai Viet possessed all the necessary characteristics to be identified as one of the Sinic states of Confucianism-based Northeast Asian societies, Champa and Khmer belonged to Southeast Asian states of the Indic cultural trajectory, which were not influenced by ancient Chinese culture and institutions. Between the 11th and 19th century, Dai Viet engaged in a politically idiosyncratic process of southward territorial expansion, exporting its Confucian culture and meritocratic institutions to Champa and then Khmer. Due to the gradual southward conquest, different parts of modern Vietnam were exposed to the Dai Viet culture and institution for varying amounts of time ranging from 25 to 920 years. This is depicted in Figure 1, in which the differently shaded areas which were generated by different historical boundaries established at different times mark different lengths of rule by the Confucian Dai Viet kingdom. Years of exposure to the Dai Viet rule are calculated as the time span between when an area was first annexed by Dai Viet and the start of French colonization in 1858 when the Western-style institution used for exploitation colonialism replaced Dai Viet rule.

[Insert Figure 1 about here]

Although Dai Viet's historical ideology of Confucianism and its inspired exam-based meritocracy do not formally exist in modern times, their legacies may still be surviving through Confucian cultural heritage bequeathed from generation to generation. However, Confucian cultural inheritance would have different levels of concentration in different parts of modern-day Vietnam, and it would be expected to be more intensive in regions with longer exposure times to Dai Viet rule. Motivated by the strong positive relationship between years of exposure to Dai Viet rule and contemporary educational outcomes, as illustrated in Figure 2, my study seeks to answer the questions of whether and how Confucian cultural heritage causally improves educational outcomes in modern-day Vietnam. To control for potential confounding factors[6] along with the treatment of Confucian

[6] This is because various parts of today's Vietnam, spanning from northern to southern regions, have different characteristics in terms of climate, demographic traits, historical formation, local labour markets, and economic development.

cultural heritage, my empirical strategy relied on a spatial regression discontinuity design (SRDD) by exploiting the second-to-last historical boundary of Dai Viet's southward expansion, which was formed in 1698 as depicted in Figure 1. As I discuss in Section 2.4, the 1698 boundary was arbitrarily established as a result of exogenous political shocks within both the Dai Viet and Khmer kingdoms, dividing the southernmost region of today's Vietnam into two distinct parts in terms of the duration of exposure to Dai Viet's culture and institution: the right-hand side part having nearly 160 years and the left-hand side part having only 25 years. The differences in length of annexation led to differences in the strength of Confucian culture, given that a culture can be expected to become more deeply rooted into local society with increased exposure time (Alesina et al. 2013; Giuliano and Nunn 2020; Voigtländer and Voth 2012). I, therefore, use the region to the right of the boundary to construct my treatment regions of Confucian cultural heritage, with the regions to the left of the boundary acting as control regions more strongly influenced by Khmer rather than Dai Viet culture. Focusing on a narrow geographic area around the 1698 boundary allows my empirical analysis to disregard confounders stemming from differences in regional characteristics.[7]

I find robust positive effects of Confucian cultural heritage on modern-day educational outcomes. It increases adults' educational attainment by 0.7 schooling years and also increases their degree achievement by 4 percentage points for completing primary school, 8 percentage points for completing lower secondary school, 6 percentage points for completing upper-secondary school, and nearly 3 percentage points for obtaining a college degree. Confucian cultural heritage increases children's post-compulsory school enrolment by 5.8 percentage points and improves test scores for high school graduates on their national high school exams.

To interpret these results, I analyse several channels. Firstly, I show that Confucian cultural heritage improves positive values and beliefs towards schooling. Individuals living in treatment regions particularly show stronger preferences towards aspiring to additional education and are more likely to have positive beliefs regarding the importance of higher education beyond compulsory schooling for

[7] In Section 4, I provide evidence that potential confounding factors are smooth at the 1698 boundary, lending support to the spatial regression discontinuity design.

their lives than those living in control regions. Secondly, I show that Confucian cultural heritage raises human capital investments, which have been well documented as being a vital determinant of long-run educational achievement. In particular, school-aged children in treatment regions enjoy higher investments in their school and learning activities than those in control regions. Moreover, I find that Confucian cultural heritage enhances social mobility across generations by helping reduce the dependence of child education on parental education, suggesting a favourable effect on intergenerational educational mobility.

My paper has several key contributions. Firstly, it contributes to a body of literature exploring the causal link between culture and schooling outcomes which has been understudied but received an increasing interest from economists. The psychology, sociology, and education literatures have long recognized that learning aspirations, study effort, educational attainment, and academic performance of students are related to cultural background (for example, Li 2012; King and McInerney 2014; Sullivan 2001). However, these studies have been suggestive without having established causal links between culture and educational outcomes.[8] A rare study in economics by Tramonte and Willms (2010) provides a largely correlational analysis pointing towards positive associations between parental cultural behaviours and children's educational performance. Recent causal works in economics (Ashraf et al. 2020; La Ferrara and Milazzo 2017) show that *visible* cultural practices in the areas of bequests and marriages affect educational decisions. My research is more interested in the direct role of cultural values and beliefs *towards* education in shaping educational outcomes which has been rarely investigated (Becker et al. 2020; Figlio et al. 2019). My paper further makes a broader contribution in advancing our understanding of how culture in which traits have been shown to be persistent across centuries (Alesina et al. 2013; Giuliano and Nunn 2020; Voigtländer and Voth 2012) interacts with economics (Eugster and Parchet 2019; Eugster et al. 2017; Fernández 2008; Fernández and Fogli 2006; Guiso et al. 2006; Lowes et al. 2017; Nunn forthcoming).

[8] An exception is Jæger (2011), who uses household panel data to net out family fixed effects and finds evidence for a positive relationship between culture and academic achievement. By focusing on within-family differences between siblings, this analysis may however miss important dimensions of cultural background that differ between families.

Secondly, my paper provides evidence to help understand the role of cultural values towards schooling in explaining cross-country differences in academic performance. An intriguing example is the Programme for International Student Assessment (PISA), which measures the academic performance of 15-year-old students across the globe in an internationally comparable way. Students from Confucianism-originated countries such as South Korea, Hong Kong, China, Taiwan, Japan, Macao, Singapore, and Vietnam are surprisingly consistently among the top-ranked positions (see Appendix Table A.1. for the top-ten-performing countries across the PISA waves).[9] Their PISA success stories have received enormous attention from both academics and policymakers around the world but have not been fully understood. Casual observation and anecdotal evidence suggest that Confucian cultural heritage in which high value is placed on education may be a factor in helping to explain PISA results (Jerrim 2015; Jerrim and Choi 2014).[10] Yet, whether such cultural differences causally affect test scores is largely unknown. My findings support the hypothesis that Confucian cultural heritage likely plays an important role in accounting for Northeast Asian success.

Thirdly, my paper contributes to another literature strand that documents the long-run effects of historical institutions on contemporary economic development (Dell et al. 2018; Nunn 2007, 2020; Michalopoulos and Papaioannou 2020). My paper suggests that a pro-schooling-culture-inspired institution may contribute to long-run development via the human capital channel. A paper close to mine is one by Dell et al. (2018), which shows that historical exposure to the Dai Viet kingdom has positive effects on Vietnam's modern-day economic development. The authors argue that these benefits originated from Dai Viet's strong historical institutions of village-level local governance, which created persistent norms in favour of cooperation and community engagement that favour economic development today. My study complements their findings through an in-depth analysis of the effects of Dai Viet exposure on modern-day educational outcomes. Differently from their paper, I highlight the *meritocratic* character of Dai Viet's institution as an important factor. Since I document the roots of

[9] Northeast Asian students are also ranked at top positions in other competitions such as the Trends in International Mathematics and Science Study (see Provasnik et al. 2016).

[10] Public discussions also mentioned Confucian culture as a potential driver of the Northeast Asian success. For instance, the Economist (in 2016) and the Guardian (in 2014) respectively ran articles "Culture or policy? What the world can learn from the latest PISA test results," and "Culture, not just curriculum, determines East Asian school success."

these institutions in ancient Confucian culture and philosophy and argue that the persistent effects are based on the transmission of cultural values and beliefs, I interpret my results as the effects of culture on educational outcomes. Given that recent evidence in economics suggests that culture and institutions evolve jointly, influence each other over time, and likely affect long-run development (Nunn 2012; Bisin and Verdier 2017; Alesina and Giuliano 2015; Lowes et al. 2017; Tabellini 2010), fully disentangling the effects of historical culture from those of historical institutions is, however, typically unfeasible.

The remainder of my paper is structured as follows. Section 2 provides the cultural and historical background. Section 3 describes the data, and Section 4 discusses my empirical strategy. Section 5 presents the empirical results, while Section 6 explores the potential mechanisms. Section 7 provides results on intergenerational educational mobility. Section 8 concludes my paper.

2. Cultural and historical background

2.1. Confucianism and its emphasis on education

Confucianism arose as one of many doctrines of thought for constructing society under the Zhou dynasty (1046-256 B.C.) in ancient China. Confucianism was formally chosen as the imperial ideology which played the role of providing philosophical keystones for governing society (Kung and Ma 2014). Rulers invested large amounts of resources to root Confucian traditions into social life by spreading Confucian knowledge to local communities via teaching Confucian lessons and constructing Confucian temples in villages.

Confucianism particularly highlighted the role of education as being essential for societal transformation and advancement (Dutton et al. 2012).[11] It firmly valued high standards for the ruling class's competence, demonstrating that rulers and bureaucrats should be distinguished from commoners through their par excellence scholarship with the highest moral merits (Confucius 1993). Confucianism valued educational success not only for the ruling class but also among males from lower social classes

[11] Confucius once said, 'by nature men are pretty much alike, it is learning and practice that set them apart' and 'education breeds confidence, confidence breeds hope, hope breeds peace' (de Bary and Bloom 1960, XVII, pp. 2).

who, in the Confucian perspective, should achieve educational success through rigorous schooling to pursue a public service career (Tan 2017). While Confucianism highlighted educational success as a core ethical conformity for any male in society, it promoted an equal openness of access to schooling because 'in education, there are no class distinctions' (de Bary and Bloom 1960, IV, pp. 38). The emphasis on education has, therefore, been well-established as one of the central values of Confucianism (see Online Appendix 1 for the Confucian perspective on education).

In pre-modern independent Vietnam, since defeating ancient Chinese colonists, the historical state of Dai Viet used Confucianism as a formal imperial doctrine for constructing its monarchical regime's ethical, political, and social orders throughout its ruling times spanning from the late 10th to early 20th century (Duiker and Spielvogel 2008; Kiernan 2017; Kim 1971). Dai Viet's Confucianism-inspired rulers valued the quality of state officials and thus education for the state's development.[12] Dai Viet, therefore, invested in its educational system as a fundamental means for creating the state's talents (Mo 2003). Governors, in particular, constructed systems of universities and schools in both the capital and localities to educate people as well as extensively opened access to school not only for royal clans and noblemen but also for those among talented commoners without discrimination based on a person's background (Thang 2005).[13] Moreover, learning societies were developed across Dai Viet due to informal teaching activities in villages (Hong 1992).

2.2 Exam-based meritocracy

Confucian ideology manifested its meritocratic essence by using talents for social governance (Elman 1991). Being inspired by Confucianism, monarchical rulers used educational performance shown via imperial civic exams to recruit well-learned males to serve in the bureaucracy (Elman 1991).

[12] Emperor Le Thanh Tong once said that 'mandarins are the fundamental origin of the order or the disturbance. Virtuous and talented people holding state positions would make society in order. Otherwise, immoral and untalented people would cause a disordered society' and 'therefore, it is necessary for any emperors in any dynasties to emphasize training the talented, recruiting the intellectuals, and growing the national vitality' (Quoc Su Quan Trieu Nguyen 1998).

[13] In 1070, Dai Viet established the Temple of Literature (*Van Mieu*) in the capital of Thang Long, which was known as the imperial temple presenting the statues of Confucius and his following intellectuals to manifest Dai Viet's recognition of Confucian values towards learning and education and also to encourage citizens acquiring knowledge (Son 1968; Vien Khoa hoc Xa hoi Vietnam 2001). Subsequently, Dai Viet constructed the first university of the empire the Imperial Academy (*Quoc Tu Giam*) in 1076 and the National Institute of Learning (*Quoc Hoc Vien*) in 1253 to establish key infrastructures for education at the central government level.

The first exam-based meritocratic institution that initiated in ancient China was known as *keju*, the oldest exam-based meritocratic institution in the world, which was then spread to neighbouring states, including pre-modern Vietnam (Chen et al. 2020).[14]

Imperial civic exams which were broadly accessible to all males (but not for female candidates) regardless of a male's origin and social status would, to a large extent, provide talented citizens with significant 'equality of opportunity' to become bureaucrats and receive large material benefits and the prestigious reputation entitled with a public servant position. A paper by Chen et al. (2020) has found that this meritocratic institution promoted intergenerational economic mobility in historical China. The benefits of exam success are evocatively illustrated in the poem '*Advice on Studying*' written by Emperor Zhenzong (968-1022) of the Song dynasty (920-1279); this poem aimed to encourage the emperor's citizens to join exams:

> *There is no need to buy land to make the family rich, for there are tons of grains in the books. There is no need to set the frame to build a house, for there are golden places in the books. There is no need to feel sorry for the lack of matchmakers for marriage, for there are jade-like beauties in the books. There is no need to worry about having no followers, for there are carriages and horses in the books. To fulfill his life ambition, men should bend over to the Confucian classics in front of the window* (Gu 2014, pp. 106).

Given strong economic motivation, the exams were competitive with large numbers of participants. The exam system was thus a focal point in political and social life, making it exceptional as a key *meritocratic* character of historical institutions in Northeast Asia. Exam-based meritocracy and Confucianism jointly evolved in a two-way interaction in which meritocracy was initiated via the inspiration of Confucianism, and meritocracy, in turn, helped strengthen the roots of Confucianism in social life. As the exam curricula mainly relied on Confucian texts such as *Four Books and Five*

[14] Prior to exam-based meritocracy, public official vacancies were mainly chosen via an aristocratic mechanism in which the elite class with advantaged background and political connection occupied most of appointments. Such an aristocratic institution strongly violated Confucian perspective on fairness and efficiency in selecting civil servants. Identifying these problems, Emperor Wu of the Han dynasty (141-87 B.C.) in ancestral China was the first ruler to initiate imperial exams to select the best talents for governmental officials, opening a new era using the exam system as a key means for recruiting public servants.

Classics, learning and teaching activities of Confucian knowledge were substantially expanded. Confucian values would therefore lead to the forming of positive beliefs about the importance of schooling among not only exam takers but also the general population. This process repeated across generations for a long time and thus made Confucian values towards education prevalent during lengthy historical time periods (Elman 1991).

Dai Viet developed its Confucian examination system to serve as the key means for public official recruitment which was highly similar to the Chinese system in terms of its format, curricula, and admissions. The system lasted over 844 years starting in 1075 under the rule of the Ly dynasty and ending in 1919 under the rule of the last Nguyen dynasty[15] (see Online Appendix 2 for a description of Dai Viet's exam system structure).

When the French colonists arrived in Vietnam, Confucianism and its inspired exam-based meritocracy were formally removed until today. Yet, Confucianism and its exam-based meritocratic institutions continue to be mentioned as the 'national essences' characterizing Vietnamese culture and traditions (Dinh 1969, 1970; Nghia 2005; Kim 1971). Historians and anthropologists strongly believe that, although Confucianism and exam-based meritocracy are no longer formally present in present-day Vietnam, their legacies are nonetheless alive through cultural values towards education that were created and have persisted over time to influence current generations' educational decisions (Anh 1950; Thuc 1967; Dinh 1970; Giau 1988; Khieu 1997; Truong et al. 2016).

2.3 Khmer's culture and institution

The Khmer culture and institutions were markedly different from those of Dai Viet (Whitmore 1997; Wolters and Wolters 1999). While Dai Viet was a Sinic-style state of Northeast Asia, Khmer belonged to the Indic civilization of Southeast Asia (Lieberman 1993). Khmer's culture was strongly influenced by the Indian religions of Buddhism and Hinduism, making it an intensively religious society (Hansen 2004). The influence of Indian culture on the Khmer kingdom has been revealed through not

[15] Dai Viet's exam-based meritocracy was gradually replaced by other institutions since the French commenced in 1858.

only religion, ways of life, social norms, language, and arts but also architecture, all being imported from India and amended with local traditions (Tully 2006).[16]

In the religiously driven society of Khmer, education was not the focal point of social life. Educational activities were narrowly related to Buddhist monastic education, which was typically delivered by monks at temples (Kalab 1976). Moreover, monastic education was only available to a limited number of people because the main role of temples was to manage elites' economic resources (Hall 2010). Importantly, individuals from low social classes had fewer opportunities to access schooling because Khmer was predominantly influenced by 'the Indian traditions that remove ordinary people from literary consideration' (Chandler 2018, p. 83).

Khmer's political institution relied on a decentralized system in which semi-independent administrative systems at the local level were mainly used by the central government in royal courts as bureaucratic tax collectors (Lieberman 1993; Tarling 1999; Woodside 1971). Given such a decentralized regime, to maintain the central government's political control over local authorities, Khmer applied aristocratic rule for political appointments as well as public servant positions in which personal relationships with the kings and rulers played a key role (Chandler 1983; Hall 2010; Osborne 1969). In such an aristocracy, the members of the royal family and the religious orders (Brahman priests) particularly enjoyed the highest chances of being chosen as governors and bureaucrats, while ordinary individuals were generally excluded from public positions (Tully 2006, p. 39). This aristocracy was in contrast to the meritocracy of Dai Viet.

2.4. Dai Viet's southward advance and the 1698 boundary

Between the 11th and 19th centuries, Dai Viet engaged in a southward conquest to expand its territory by taking over the Champa and Khmer empires (Taylor 1993, 2013; Quoc Su Quan Trieu Nguyen 1972; Ngo et al. 2001). The conquest process, which occurred through multiple waves of territorial annexation in different times, was completed in 1833 when Emperor Minh Mang of the Nguyen dynasty accomplished the final conquest of the easternmost part of the Khmer empire, which

[16] For example, Angkor Wat, which was constructed by the Khmer King Suryavarman II in the early 12th century in Yaśodharapura, the capital of the Khmer kingdom, is so far the greatest Hindu temple in the world.

is the southernmost part of today's Vietnam and is additionally known as the Mekong River Delta. Figure 1 depicts the complete process of Dai Viet's southward expansion. Historians strongly emphasize that idiosyncratic political conditions independent of climate, geographic, and socioeconomic issues influenced the timing of Dai Viet's conquest process and southernmost borders (Taylor 1993, 2013). Civil conflicts between two ruling families, the Trinh and the Nguyen, that started in the late 1620s divided the state into two rival governments, including the Trinh in the north and the Nguyen in the south (Taylor 2013, p. 307; Sakurai 2004, p. 40). The Nguyen attempted to expand its land southwardly; however, periodic fighting against the Trinh reduced its capacity to conquer Champa and Eastern Khmer by the late 17th century.

The focus of my study is on the second-to-last boundary, which was established in 1698 and separated the area around the boundary into two geographic regions with a gap of 135 years of exposure to Dai Viet culture and institutions before the commencement of French occupation in 1858. This boundary was originally derived from a defence treaty between the Nguyen and Khmer in early 1620 which helped both governments to have additional resources to fight against their rivals. Based on this treaty, the Nguyen married Princess Ngoc Van to King Chey Chetta II of Khmer and provided Khmer with naval armed forces to combat its western neighbouring state of the Siam kingdom. In exchange, Khmer granted the Nguyen the right to collect taxes for five years in Khmer's easternmost counties of Prei Nokor and Kampong Krabei,[17] which were later formally organized into Dai Viet's territory in 1698 (named as Gia Dinh in Vietnamese). Khmer planned to retrieve these counties after five years. However, the unexpected death of Chey Chetta II in 1628 caused this plan to fail (Vo 2011). The Nguyen broke the treaty's initial term of returning Prei Nokor and Kampong Krabei back to Khmer. Then, with significant support from Ngoc Van[18] within Khmer's royal, the Nguyen successfully seized these counties and added them to Dai Viet, thus formally establishing the new administrative province of Gia Dinh in 1698 (Taylor 2013; Vo 2011). The Nguyen then reorganized this new land in a traditional

[17] The Nguyen was not allowed to make any interventions on formal governance in these counties during these years.

[18] Ngoc Van was appointed as Khmer's Queen. After Chey Chatta II died, Ngoc Van became Khmer's Queen Mother, who had a strong political influence within Khmer's royal.

Dai Viet manner by organizing a collective society that was based on Confucianism and northern institutions (Kiernan 2017; Taylor 1993; Wook 2004).

The boundary became a formal state border between Dai Viet and Khmer from 1698 until 1833. Although the Nguyen was ambitious in capturing all the remaining parts of Eastern Khmer, its involvement in civil wars prevented it from completing this plan around 1698. When the Trinh-Nguyen civil war ended in the late 17th century through a ceasefire agreement, the Nguyen persisted in involving itself in a new war with the Tay Son family, which arose from peasant revolts against the ruling class in the late 1770s. In Northern Dai Viet, the Tay Son defeated the Trinh in the late 1780s. In Southern Dai Viet, a series of periodic conflicts between the Nguyen and the Tay Son made the southward expansion process stall at the 1698 boundary. Moreover, given the lack of resources for directly conquering the entire eastern part of Khmer, the Nguyen changed its strategy by cultivating patrons within the Khmer's royal court to maintain its political influence (Chandler 2018). In 1802, the Nguyen finally defeated the Tay Son to reunify the entire country and become the only political holder in Dai Viet. After this, with all political powers, the Nguyen expanded its southward conquest directly. It finally organized the remaining territory of Champa in 1832 and the remaining counties of Easternmost Khmer in 1833, closing Dai Viet's nine-century 'March-to-the South' process.

2.5 Qualitative evaluation of the validity of the 1698 boundary

I rely on the 1698 boundary to construct my treatment status of Confucian cultural heritage. In this section, I provide several qualitative arguments supporting this boundary being the ideal choice for constructing the treatment and applying a SRDD approach. Firstly, rich historical evidence marks the fact that the 1698 boundary was established as a result of exogenous political circumstances within both the Dai Viet and Khmer kingdoms rather than as a result of climate, natural environment, or socioeconomic reasons, as discussed in Section 2.4.

Secondly, available historical and archaeological studies document similarities in natural environmental conditions and socioeconomic characteristics between the two sides of the 1698 boundary before its establishment (Marchand et al. 2014; Nguyen 1971; Sakurai 2004; Taylor 2013). Before being conquered by Dai Viet, the entire area around the boundary was highly identical in terms

of natural conditions. The area was particularly described as a backwater with highly scattered settlements of local people (Biggs 2005; Nguyen 1971; Sakurai 2004). Furthermore, both sides of the boundary were uniquely under Khmer rule. As an easternmost part of Khmer located relatively far from the capital of Angkor, this area was less developed compared to other regions around the capital. Local livelihoods on both sides of the 1698 boundary mainly relied on agriculture with homogeneous cultivation techniques as well as productivity. As Khmer was a weak state with an insignificant focus on education, public investments in schooling were relatively trivial for regions that were distant from the central government. For that reason, educational activities were rare on both sides of the boundary before 1698 (Nguyen 1971; Sakurai 2004).

Thirdly, both treatment and control communes in my study area experienced the same institutions during colonial and post-colonial times (Taylor 2013). These institutions included French Cochinchina (1862-1945), the Empire of Vietnam (1945-1954), the Republic of Vietnam (1955-1975), and the Socialist Republic of Vietnam (1975-present). Treatment and control communes received similar policies and rules during these times, making both treatment and control communes highly comparable in terms of other characteristics except for their years of exposure to Dai Viet.

Fourthly, the 1698 boundary provided control regions with the shortest duration (25 years) of exposure to Dai Viet, making them tenuous regarding the influence of Confucian culture compared to the treatment regions while nonetheless satisfying other key requirements as discussed above. The geographic area, which was added into Dai Viet in 1832, as depicted in Figure 1, could be considered for another potential set of control regions, as it nearly provided the shortest time of exposure to Dai Viet (26 years) as well. However, both its northeast and southwest boundaries were the same administrative borders of the Champa kingdom before the area was conquered by Dai Viet (Taylor 2013; Quoc Su Quan Trieu Nguyen 1972; Ngo et al. 2001), violating the assumption of exogeneity of the treatment.

All of these qualitative arguments support the validity of the 1698 boundary for creating the exogenous treatment of exposure to Confucian cultural heritage for the SRDD analysis. In Section 4.2,

I further provide quantitative and causal evidence that other climate and socioeconomic characteristics apart from the treatment were not statistically different between the treatment and control communes.

3. Data

3.1 Main analysis data

I use several datasets for my main analysis. These include the 15% sample of the 2009 Vietnam Population and Housing Census (hereafter 'Census') and the 2016 Vietnam National High School Completion Examination Scores (hereafter 'Exam Scores'). In order to hold the ethnic background constant throughout my study, I restrict the samples to individuals of Kinh ethnicity, who, on average, make up 86% of the population. Table 1 presents the summary statistics for the samples.

[Insert Table 1 about here]

The Census is one of the largest micro datasets in Vietnam containing information about demographics, schooling and housing for approximately 14 million observations from approximately 3.5 million households surveyed across the country. I exploit its schooling section to construct educational measures, including schooling years and degree achievement (primary, lower secondary, and upper secondary school diploma, and a college degree) for adults and school enrolment for school-aged children. I restrict the adult sample to those aged 25–64[19] and the children sample to those aged 15–17.[20] My final adult and children samples respectively contain 341,930 and 42,028 observations. Panel A of Table 1 presents the summary statistics for this sample, with 9.3 average years of schooling, 82% of primary school completion, 68% of lower secondary school completion, 38% of upper secondary school completion, and 17% of college degree attainment. Children's post-compulsory school enrolment is nearly 71%.

[19] I use the 25-64 age range because 25 is reasonably a stopping age for the highest educational level while 64 is still a well-representative age among the aging population in 2009. Therefore, those aged 25 and older would have in principle their lifetime schooling outcomes while excluding those aged over 64 would be a good strategy to avoid selection bias because the well-educated tend to live longer (over 64 years old) and thus have a higher likelihood to be included in the Census.

[20] In Vietnam, children start primary school (grade 1) at age 6 and complete high school (grade 12) at age 17 in Vietnam. In 2009, the ages for post-compulsory education are 15-17.

The Exam Scores dataset is the administrative data containing the test scores of core subjects (including compulsory and selective ones) which are annually taken by *all* 12th-grade Vietnamese students at their national high school completion examinations among other types of students such as part-time students.[21] I exploit the 2016 Exam Scores data to construct the test score outcomes for compulsory subjects (mathematics, literature and English) and selective subjects (physics, chemistry and biology). I restrict the sample to 12th-grade students of the 1998 birth cohort, which account for approximately 80% of the exam takers. As the Exam Score data only has information about students' residential locations at the province level but not at the commune level, I restrict the sample to students living in the provinces around the 1698 boundary, acting as treatment regions (Ho Chi Minh City and Dong Nai) as well as control regions (Binh Duong, Tay Ninh, and Long An). The score for each subject is measured by a 10-point scale which ranges from zero (the lowest score) to 10 (the highest score). The sample sizes vary by subject, and compulsory subjects have larger samples relative to selective subjects. Panel B of Table 2 presents the mean scores and the number of students for these subjects, including 4.8 for mathematics (93,767 students), 5.1 for literature (93,730 students), 3.7 for English (84,996 students), 5.9 for physics (59,818 students), 5.3 for chemistry (45,787 students), and 5.2 for biology (13,451 students). To make my interpretation of the results more straightforward, I standardize the continuous variables of the logs of the scores into a mean of zero and a standard deviation of one.

3.2 Mechanism data

I additionally use several datasets to explore potential mechanisms behind the causal effects of interest, including cultural values and beliefs towards schooling and human capital investments. I firstly rely on the Asian Barometer Survey (ABS) to construct my measures of cultural values towards schooling. The ABS is an international survey carried out in 18 countries and territories in East and Southeast Asia, including Vietnam. The ABS elicits respondents' opinions about political attitudes and behaviour, social capital, traditionalism and culture, international affairs and globalization. To construct the sample, I particularly use three ABS waves of 2003, 2004 and 2006 for Vietnam and restrict the

[21] These exams are held in a nationally comparable way in which their institutional arrangement and contents such as problems and solutions are identical across schools and provinces. The results from these exams are used for ranking students' high school graduation class (excellent, good, average, nearly passed, and failed) and also for university admissions.

data to those living in four provinces around the 1698 boundary, including Ho Chi Minh City and Ba Ria-Vung Tau for treatment regions, and Tien Giang and Can Tho for control regions. I rely on two main proxy measures for cultural values towards schooling. I particularly exploit the following question to construct an indicator for *a preference for having better educational attainment as already achieved*: 'Please tell me how satisfied or dissatisfied you are with your educational attainment in your life: (1) Very satisfied; (2) Somewhat satisfied; (3) Neither satisfied nor dissatisfied; (4) Somewhat dissatisfied; (5) Very dissatisfied'. The indicator has a value of one if the answer is (4) or (5), and zero otherwise. For the second measure, I construct an indicator for having *beliefs about the importance of access to higher education beyond compulsory schooling* using the following question: 'Of the following lifestyle aspects or life circumstances, please select five that are important to you: (1) Having enough to eat; …; (7) Having access to higher (beyond compulsory education) education; (8) Owning lots of nice things…'. The indicator takes a value of one if the choice set includes (7) and zero if the choice set does not include (7).

Secondly, I use the 2010, 2012, 2014 and 2016 waves of the Vietnam Household Living Standards Survey (VHLSS). The VHLSS is a biannual household survey including about 40,000 individuals from 9,000 households drawn from the Census population. I extract information on children's education to construct several specific measures of parental spending on school-related activities over the last 12 months: school tuition, books and learning materials, learning tools and instruments, private tutoring, and total overall spending on education. These monetary expenditure variables are measured in 1,000 Vietnam Dong (VND) in 2010 prices, with the exchange rate equalling roughly 20,000 VND per 1 U.S. Dollar in 2010.

4. Empirical strategy

4.1. Estimation methods

I start with a simple descriptive confirmation of whether educational outcomes change with the length of time exposed to Dai Viet. I estimate the following ordinary least squares (OLS) equation using a full sample of individuals living across all Vietnamese regions involved in the Kinh ethnicity's territorial expansion:

$$Y_{ir} = \alpha_0 + \alpha_1 Duration_{ir} + \alpha_2 Duration_{ir}^2 + \alpha_3 \boldsymbol{X'}_i + \epsilon_{ir} \quad (1)$$

where Y_{ir} is an educational outcome for individual i living in region r. $Duration_{ir}$ is the duration of exposure to Confucian culture measured by one hundred years between the year the region was added to Dai Viet and 1858 when the French arrived in Vietnam. $\boldsymbol{X'}_i$ is the set of control variables, including birth cohort fixed effects and a dummy for gender (male). ϵ_{ir} is an error term. Standard errors are clustered at the commune level. I allow for a quadratic in $Duration_{ir}$ in order to allow for decreasing effects of annexation duration. I expect smaller effects at higher levels of duration because at high levels of duration (say, 600 years in the treatment regions versus 500 years in the control regions), the control region as well had ample time to absorb the culture in order that a 100-year difference could make less of a difference. The marginal effect of annexation duration is $ME_{Duration} = \alpha_1 + 2\alpha_2 Duration_{ir}$ and indicates how the educational outcome changes with an additional 100 years of exposure to Confucian culture. The coefficient α_1 can be interpreted as the effect of the first 100 years of annexation.

In producing the estimates of causal treatment effects, however, the OLS estimates using equation (1) are, arguably, possibly biased due to potential confounders. The economics literature has shown that many factors other than culture can drive schooling outcomes and thus possibly play the role of being potential confounders. These factors include climate and weather (Park et al. 2020; Randell and Gray 2019), natural disasters (Takasaki 2017), historical formation (Gallego 2010), political regimes (Fuchs-Schündeln and Masella 2016), conflicts (Shemyakina 2011; Chamarbagwala and Morán 2011), and opportunity costs of schooling (Carrillo 2020; Shah and Steinberg 2017). In the context of Vietnam, these confounding factors are possible, as there are obvious regional differences in several characteristics across the country. Firstly, climate differences are well documented across Vietnamese regions. For instance, while increases in annual temperatures are higher in southern than in northern regions (Nguyen et al. 2014; Phan et al. 2009), provinces in the middle region are more likely to suffer from annual natural disasters such as typhoons and storms than those in northern and southern regions (Noy and Vu 2010). Secondly, regarding the history of state formation, different regions have experienced the rules of different sets of institutions. While northern provinces purely belonged to the rule of a Chinese-style statecraft (also known as the Sinic state of Northeast Asia), provinces in the

middle and southern regions were primarily governed by a Hindu-Buddhist statecraft (also known as the Indic state of Southeast Asia) during pre-modern times (Wolters and Wolters 1999). Thirdly, during the Vietnam war (1955-1975), northern Vietnam was uniquely a Soviet Union-style socialist state, whereas southern provinces enjoyed a United States-style market system. The distribution of bombings dropped by American air forces was additionally uneven across Vietnamese provinces (Miguel and Roland 2011). Last but importantly, educational policies in Vietnam have potential regional heterogeneity in their impacts, leading to various changes in schooling attainment (Cornelissen and Dang 2020). These possible differences across Vietnamese regions spanning from natural to social and historical characteristics make causal inference from the OLS estimates unreliable.

In an attempt to disentangle the causal impact of Confucian cultural heritage on modern-day educational success, I follow Dell et al. (2018) to draw my main empirical analysis on a SRDD. I particularly estimate the following equation:

$$Y_{ict} = \beta_0 + \beta_1 Confucian_{ic} + f(Geo_c) + \sum_{j=1}^{n} \beta_2 Seg_{cj}$$

$$+ \beta_3 Dist_c + \beta_4 \boldsymbol{X'}_i + \theta_t + \varepsilon_{ict} \quad (2),$$

where Y_{ic} is the educational outcome for individual i living in commune c. $Confucian_{ic}$ is an indicator for the individual living in a treatment commune, implying a 135-year longer historical exposure to Confucian cultural heritage compared one living a control commune. $f(Geo_c)$ is a linear polynomial function of latitude and longitude of the corresponding commune (which I extend to a quadratic polynomial in a robustness check). The length of the 1698 boundary is divided into 20 segments (n=20). In Equation (2), Seg_{cj} is segment j of the 1698 boundary to which commune c is adjacent. The term $\sum_{j=1}^{n} Seg_{cj}$ indicates boundary segment fixed effects. $Dist_c$ is the distance from the commune to Saigon, the central area of Ho Chi Minh City. $\boldsymbol{X'}_i$ is the set of control variables including birth cohort fixed effects and a dummy for gender. θ_t indicates survey year-fixed effects.

The survey year fixed effect θ_t controls for potential time trends across survey years in specifications using the ABS and VHLSS data consisting of several survey waves, and it is removed in

specifications using the Census and Exam Scores data with only one year. ε_{ict} is an error term. My parameter of interest is the coefficient β_1, which provides the causal effect of Confucian cultural heritage on the educational outcome. Standard errors are clustered at the commune level, which is the level of spatial characteristics.

It is important to note that I interpret the coefficient of β_1 as the effects of Confucian cultural heritage on the schooling outcome although this estimate only provides a reduced-form effect of exposure to Dai Viet rather than a direct effect of Confucian culture. This is because while Confucianism, that has strong connections with valuing education, was deeply rooted in treatment regions, institutions and policies in both treatment and control regions were changed and unified under the French and the subsequent political regimes as described in Section 2.5. For that reason, the persistent difference in schooling must have been driven by Confucian culture that is passed on from parents to children. Moreover, I show that cultural values and beliefs today are affected by the treatment in Section 6.1, which indirectly supports the idea that the cultural transmission of Confucianism is the mechanism of the persistent effect.

4.2 Examining potential confounders

To ensure that the effects of interest could be interpreted as causal treatment effects, it is essential for the SRDD strategy to satisfy the key identifying assumption that all relevant factors apart from the treatment and the educational outcomes must change smoothly at the 1698 boundary. To evaluate the plausibility of this assumption, I provide a series of balance tests using the commune-level data from the 2010, 2012, 2014, and 2016 waves of the VHLSS and estimate the baseline SRDD specification using Equation (2), in which the explanatory variables include a dummy for the treatment status, a linear function of latitude and longitude, dummies for boundary segments, the distance from the commune to *Sai Gon*, and boundary segment fixed effects. The results are present in Table 2, focusing on geo-climatic characteristics, local organization and infrastructure (panel A), local economic structure and labour market costs (panel B), central and local government policy (panel D), and demographic characteristics and local school organization (panel E). I find that all of these pre-determined characteristics smoothly work through the boundary.

[Insert Table 2 about here]

Columns 1–2 of panel A show that there are no statistically significant differences in geo-climatic characteristics, including with indicators for mountainous terrain (column 1) and the number of natural disasters that had occurred in the commune over the previous 12 months (column 2). Additionally, columns 3–6 of panel A present statistically insignificant effects on local organization and infrastructure, in particular an indicator for the high quality of commune roads (column 3), an indicator for having a post office (column 4), an indicator for having a local radio station (column 5), and an indicator for having a community house (column 6).

Columns 1–3 of panel B document the similar results for local economic structure for both sides of the boundary. The effects on indicators for main economic activities such as agriculture (column 1), and aquaculture (column 2) are all statistically insignificant. In the same manner, the estimates in columns 3–6 of panel B demonstrate that labour prices for economic activities are balanced between the treatment and control regions. I use an average price of agricultural production (column 3) and component prices for specific main tasks, including land preparation (column 4), caring (column 5), and harvesting (column 6). While the opportunity costs of schooling may affect educational decisions in less developed countries (Carrillo 2020; Shah and Steinberg 2017), my results suggest that labour prices, which are effective proxies for the opportunity costs of schooling, are fairly equal across local labour markets, as this is the case in both the treatment and control regions of my study.

Another concern could be that the implementation of development policies such as public infrastructure investments possibly differ across treatment and control regions (Do et al. 2017) and could drive schooling outcomes. As seen in panel C of Table 2, I examine the treatment effects on the implementation of both central and local government policies. I use an indicator for the receipt of a development project operated by the central government over the last three years as a proxy for the central government policies in column 1 (panel C) and find no differences at the boundary. In columns 2–6, panel C, I examine the effects on various measures of the local government policies which were carried out by the province and district authorities over the previous 12 months, including the percentage of households receiving financial support (column 2), the percentage of households receiving support

from aid programmes due to natural disasters and production loss (column 3), the percentage of households receiving vocational training (column 4), the percentage of households receiving business tax exemptions (column 5), and an indicator for having an irrigation system (column 6). I find no statistically significant effects on these outcomes, suggesting that disparities in educational outcomes between the treatment and control regions are not potentially driven by the execution of development policies at both the central and local government levels across regions.

Finally, I further find no differences around the 1698 boundary for the effects on key demographic characteristics and local school organization, as seen in panel D. I find that the distribution of the Kinh ethnicity, who are the ethnic majority in present-day Vietnam, is balanced across regions (column 1). An indicator for giving births at the hospital as opposed to a traditional home birth (column 2), which possibly captures traditional versus modern norms, changes smoothly at the boundary as well. In terms of local school organization, I do not find differences in the measures of the supply side of schooling, including an indicator for having a nursery school (column 3), an indicator for having a kindergarten school (column 4), an indicator for having a primary school (column 5), and an indicator for having a lower or upper secondary school (column 6).

5. Empirical results

5.1. Stylized facts

I start my discussion of the empirical results by presenting the OLS estimates of the association between the duration of exposure to Dai Viet rule and present-day schooling outcomes using Equation (1). I use two samples: one countrywide sample (the country sample being 3,638,776 individuals)[22] and one sample restricted to those living within 20 kilometres of the 1698 boundary (the SRDD sample being 341,930 individuals).

[Insert Table 3 about here]

[22] I exclude those living in the provinces: Gia Lai, Kon Tum, Dak Lak, Dak Nong, and Lam Dong, which were out-of-the conquest process engaged by the Dai Viet kingdom.

The estimates in Table 3 show that the duration of exposure to Dai Viet rule is statistically significantly related to increases in present-day schooling outcomes using both the country and SRDD samples. The coefficients are all highly statistically significant at the 1% level. In the overall country sample, the coefficient on the linear term of $Duration$ (α_1 in equation 1) is the marginal effect of duration evaluated at zero duration. It can be approximately interpreted as the effect of 100 years of Dai Viet rule compared to zero years of Dai Viet rule. As shown in panel A, for adults aged 25–64, this leads to an increase of 0.9 schooling years (column 1), 8.4 percentage points for primary school completion (column 2), 10.2 percentage points for lower secondary school completion (column 3), 6.2 percentage points for upper secondary school completion (column 4), and 3.7 percentage points for achieving a college degree (column 5). A zero-to-100-year increase in exposure to Dai Viet rule additionally raises post-compulsory school enrolment for children aged 15–17 by 7.4 percentage points (column 5). For all outcomes presented in panel A, the coefficient on the squared term of $Duration$ is negative, implying that the effect of duration diminishes at higher values of duration, as expected (see the discussion of Equation (1) above). For example, for years of schooling, the marginal effect of an additional 100 years of annexation declines from 0.9 when evaluated at zero year to 0.3 when evaluated at 500 years of duration.

For the SRDD sample (panel B), it is not possible to identify a non-linear specification of annexation duration because the duration only assumes two values (160 years versus 25 years). Panel B therefore only reports a linear effect. The results show considerably higher associations between the duration of exposure to Dai Viet rule and schooling outcomes in the SRDD sample as compared to the overall sample. In particular, an additional 100-year duration of Dai Viet exposure is related to an increase in the number of schooling years by about two years (column 1), primary school completion by nearly 14 percentage points (column 2), lower secondary school completion by 21 percentage points (column 3), upper secondary school completion by 20 percentage points (column 4), and college degree completion by 11 percentage points (column 5).[23]

[23] Several reasons might explain the higher effects in the SRDD sample. There might be regional effect heterogeneity, and the regions covered by the SRDD sample might simply have higher effects compared to regions at comparable margins of duration

5.2. Effects on adults' educational attainment and degree achievement

Next, I present my empirical results for the treatment effects on adults' lifetime educational outcomes in Table 4, including schooling years (panel A), primary school completion (panel B), lower secondary school completion (panel C), upper secondary school completion (panel D), and a college degree (panel E). For each outcome, I use several different specifications in addition to the baseline SRDD specification to check how robust the estimates are.

For comparison purposes, column 1 presents the simple OLS estimates in which I exclude from the baseline SRDD specification in Equation (2) all spatial terms (a linear polynomial function of latitude and longitude of the corresponding commune, the boundary segment fixed effects, and the distance from the commune to *Saigon*). In principle, these regressions are similar to those presented in Table 3, but for comparability with the SRDD approach, the effects are then scaled differently. While, as shown in Table 3, the coefficients are scaled for a 100-year increase in historical exposure to Confucianism, the effects presented in Table 4 are scaled for a 135-year increase (corresponding to the difference observed at the 1698 boundary). As expected, the effects shown in column 1 of Table 4 are greater than those shown in Table 3 by a factor of 1.35, confirming the substantially positive and highly statistically significant associations between duration of exposure to Dai Viet rule and schooling outcomes.

[Insert Table 4 about here]

Column 2 of Table 4 presents the baseline SRDD estimates which are used as my main results. The treatment effects considerably lessen to between one-fifth and one-quarter of the OLS effects, suggesting that there are upward biases in the OLS estimates when excluding all spatial terms. Panel A shows that Confucian cultural heritage increases schooling years by an average of 0.69 years (statistically significant at the 1% level). The estimates in panels B, C and D show that Confucian cultural heritage increases the probability of completing basic school levels by 3.8 percentage points (statistically significant at the 5% level) for primary school, 7.8 percentage points (statistically

in the country sample. Alternatively, the parametric nonlinear specification in panel A as a quadratic might be restrictive and may lead to an under-estimate of the duration effect at low margins of duration.

significant at the 1% level) for lower secondary school, and 6.1 percentage points (statistically significant at the 1% level) for upper secondary school. Importantly, the cultural effect further reaches tertiary education. Panel E indicates that a person living in a region with Confucian cultural heritage is, on average, more likely to obtain a college degree by about 2.7 percentage points (statistically significant at the 10% level).

As seen in the remaining columns, I perform several robustness checks for the baseline SRDD model. Firstly, the literature on applied RDD methods documents a debate regarding the choice between a linear polynomial function and high-order polynomials of the cut-off variable (Gelman and Imbens 2019; Imbens and Wager 2019). To check whether my baseline results change when using a higher-order polynomial function of the geographic running variable, I use a quadratic polynomial function instead of a linear polynomial function of latitude and longitude, as shown in column 3 of Table 4. This specification produces highly similar estimates compared to the baseline SRDD approach in terms of both their effect sizes and the statistical significance levels.

Secondly, regional economic development has been shown to link to educational attainment. My treatment regions include observations from Ho Chi Minh City's urban areas, which are the most developed areas in Vietnam. A possible concern is therefore that this inclusion could drive the baseline treatment effects. I, therefore, estimate another version of the SRDD sample that excludes individuals living in urban Ho Chi Minh City from the treatment regions. All the estimates remain statistically significant (column 4, Table 4), and treatment effects reduce by 20–30% compared to the baseline SRDD effects. These findings confirm that the inclusion of urban Ho Chi Minh City does not largely drive my baseline treatment estimates.

Thirdly, there is the possible issue that urbanicity either acts as a confounder (although this is unlikely due to the smoothness of placebo outcomes, as demonstrated in Table 2) or that effects are purely driven by urban areas. For that reason, in column 5 of Table 4, I present estimates using another sample that excludes all individuals living in urban areas from the SRDD sample. The results show that the treatment effects remain highly robust for nearly all outcomes. Among the statistically significant

effects, the effect sizes range from 4–26% of the baseline effects. An exception is the effect on primary school completion, shown in panel B, which is statistically insignificant at the 10% level.

Fourthly, the 1698 boundary comprises both river and non-river segments. River segments possibly play a role as a natural physical barrier inhibiting social interactions across the boundary, leading to the stronger preservation of distinct cultures on both sides. Non-river segments, in contrast, possibly facilitate social interaction leading to a dilution of historical cultural differences, subsequently possibly leading to smaller treatment effects when focusing on non-river segments of the border. To check whether this is the case, I estimate a sub-sample that excludes all individuals living on both sides of the boundary's river segments. The results shown in column 6, Table 4 do not provide clear evidence of any dilution of the treatment effects. While the estimates for the effect on primary school completion (panel B) and lower secondary school completion (panel C) are smaller than the baseline effects, the estimates for the effect on schooling years (panel A), upper secondary school (panel D), and a college degree (panel E) are larger than the baseline estimates.

Furthermore, I explore heterogeneity in the baseline SRDD estimates by various age groups (25–34, 35–44, 45–54, and 55–64). If effects were absent for the oldest age groups, for example, this would cast doubt on the interpretation of the effects as stemming from the intergenerational transmission of historical culture. The results are in Appendix Table A.2. I find statistically significant effects for all age groups in nearly all schooling outcomes. There is a pattern by which increases in lower degrees (primary and lower secondary schooling) are driven by older age cohorts, and increases in higher degrees (in particular, for college) are driven by younger age cohorts. This is consistent with a general increase in educational attainment over time. When examining the overall measure of years of schooling, the youngest (25–34) and oldest (55-64) groups have the largest effects. Thus, there is no sign that either the youngest or the oldest group is entirely driving the results.

5.3. Effects on children's school enrolment and academic performance

Table 5 presents the results for the effects of Confucian cultural heritage on the post-compulsory school enrolment of children aged 15–17 years old. While school enrolment is likely a commonly used proxy for quantity of education, I specifically focus on children aged 15–17 because schooling is

compulsory for children aged 14 and younger in Vietnam (Cornelissen and Dang 2020). I estimate a set of specifications similar to those presented in Table 4, including OLS (column 1), baseline SRDD (column 2) and other robustness specifications (columns 3–6). The OLS estimate shown in column 1, Table 5 indicates that Confucian cultural heritage increases school enrolment among school-aged children by 8.9 percentage points (statistically significant at the 1% level).

[Insert Table 5 about here]

The baseline SRDD estimate shows an increasing effect of Confucian cultural heritage on school enrolment by 5.8 percentage points (statistically significant at the 5% level). The baseline SRDD estimate is smaller than the OLS estimate by approximately 35%, implying a potential upward bias in the OLS estimate. This baseline estimate is additionally strongly robust compared to the estimates using other robustness specifications, as shown in columns 3–6, Table 5. For example, the specification using a quadratic polynomial function of geographic locations in column 3 produces an effect of 7.9 percentage points (statistically significant at the 1% level). When excluding the observations from urban Ho Chi Minh City and all urban areas from the baseline sample, the treatment effects are 5.1 percentage points (statistically significant at the 5% level) and 5.4 percentage points (statistically significant at the 5% level), respectively, as shown in columns 4 and 5. Finally, in column 6 of Table 5, when excluding the observations of persons living around river segments from the baseline sample, I obtain an effect of 8.3 percentage points (statistically significant at the 1% level).

Next, I investigate the cultural effects on academic performance by focusing on standardized test scores from the 2016 Exam Scores data. The sample sizes vary by specific subject, and mathematics, literature, and English have higher numbers of students, while smaller numbers of students study selective subjects. I regress each of the test score outcomes on Confucian cultural heritage and a set of controls (dummies for gender and birth months). In the model, all spatial terms in Equation (2) are not included because information about the location of students at the commune level is not available in the dataset. The model is thus similar to the OLS model presented in the previous tables, and I expect the effects to be biased upwards. I could therefore interpret my results as upper-bound estimates. The estimates are present in Table 6.

[Insert Table 6 about here]

The results demonstrate that students from Confucian cultural heritage regions perform much better than those in control regions for all subjects. Panel A presents the estimates for compulsory subjects, which show that Confucian cultural heritage increases the scores for mathematics by 37% of a standard deviation (column 1), literature by 24% of a standard deviation (column 2), and English by 44% of a standard deviation (column 3). Similarly, panel B documents substantial and positive effects of Confucian cultural heritage on performance in selective subjects, with 21%, 22%, and 46% of a standard deviation for physics (column 1), chemistry (column 2), and biology (column 3), respectively. All these estimates are highly statistically significant at the 1% level.

6. Potential mechanisms

6.1. Cultural values and beliefs towards education

To study the main mechanism for the effect of Confucian cultural heritage on educational success, I investigate two proxy measures for cultural values and beliefs towards schooling constructed from the ABS data. These include an indicator for *a preference for having better educational attainment as already achieved*, and an indicator for *beliefs about the importance of access to higher education beyond compulsory schooling*. For each measure, I present estimates on two samples: one entire sample of all the observations of persons living in all available provinces and another sample restricted to the observations of persons who only reside in the two largest cities: Ho Chi Minh City (treatment regions) and Can Tho (control regions).

[Insert Table 7 about here]

The estimates in Table 7 show that individuals living in Confucian culture regions have highe postive values and beliefs towards schooling than those living control regions. Confucian cultural heritage particularly raises the probability of a preference for having better educational attainment as already achieved by 5.6 percentage points (statistically significant at the 1% level) for both samples (columns 1 and 2). Confucian cultural heritage raises beliefs about the importance of access to higher education beyond compulsory schooling by 2.7 percentage points (statistically significant at the 10%

level) when estimating the entire sample (column 3) and by 3 percentage points (statistically significant at the 10% level) when estimating the restricted sample (column 4).

6.2. Household investments in children's human capital

Another mechanism contributing to the causal link between Confucian cultural heritage and educational success is household investments in children's human capital. In Table 8, I present my exploration of Confucian cultural heritage effects on a range of monetary expenditures on children's school and learning activities using data from the VHLSS. While school enrolment is a measure of school quantity, these investments are likely good proxy measures for school quality and are therefore helpful for predicting my main results for educational success and, particularly, academic performance. I estimate a pooled sample of 3,444 children aged 6–17 using the baseline SRDD specification in Equation (2).

[Insert Table 8 about here]

Column 1, Table 8, shows that Confucian cultural heritage increases spending on children's school tuition by 7.4% of a standard deviation, statistically significant at the 10% level. Semi-public and private schools which would typically provide better school quality result in higher tuition fees than traditional public schools in Vietnam (Glewwe and Patrinos 1999). The increase in tuition fees could therefore reflect higher school quality. Confucian cultural heritage also increases other expenditures. In particular, the estimates in columns 2, 3 and 4, respectively, show positive and statistically significant effects on books and learning materials (11.1% of a standard deviation, statistically significant at the 1% level), learning tools and instruments (9.5% of a standard deviation, statistically significant at the 5% level), and private tutoring (10% of a standard deviation, statistically significant at the 5% level). Finally, column 5 shows the effect on total educational expenditures covering all expenditures related to children's school and learning activities. The treatment increases this total spending by 11.7% of a standard deviation (statistically significant at the 1% level).

7. Intergenerational educational mobility

In this section, I present my investigation of whether Confucian cultural heritage affects intergenerational schooling mobility. I rely on the Census data and restrict the sample to those aged 25–64 who have available information on their schooling and that of their parents. To examine the Confucian cultural heritage effects on the intergenerational persistence of education, I estimate the following equation:

$$S_{ic}^{o} = \gamma_0 + \gamma_1 S_{ic}^{p} + \gamma_2 Confucian_{ic} + \gamma_3 S_{ic}^{p} \times Confucian_{ic} + f(Geo_c) + \sum_{j=1}^{n} \gamma_4 Seg_{jc}$$

$$+ \gamma_5 Dist_c + \gamma_6 \boldsymbol{X'}_i + \zeta_{ic} \quad (3),$$

where S_{ic}^{o} is the educational outcome for offspring i living in commune c. S_{ic}^{p} is the educational outcome for the parent of the corresponding offspring. $\boldsymbol{X'}_i$ is a set of controls for child birth cohort fixed effects. ζ_{ic} is the error term. Other terms are similarly defined as in Equation (2). The coefficient γ_1 indicates the baseline intergenerational elasticity (IGE) of schooling. The coefficient γ_3, which is my parameter of interest, measures how Confucian cultural heritage affects IGE. I also cluster standard errors at the commune level, which is again the level of geographic chracteristics.

[Insert Table 9 about here]

Table 9 presents the coefficients for intergenerational schooling persistence for different child-parent pairs. The coefficients on parental schooling document a baseline IGE of around 0.5 years of schooling. The interaction effects indicate that the schooling of individuals residing in Confucian cultural heritage regions are less dependent on their parents' schooling than the schooling of those living in control regions. Interestingly, the moderating effects of Confucian cultural heritage are stronger for child-mother than for child-father pairs. Confucian cultural heritage reduces the dependence of offspring's schooling on fathers' schooling by 0.04 (weakly statistically significant at the 10% level) for sons, as seen in column 1, and by nearly 0.05 (statistically significant at the 5% level) for daughters, as shown in column 3. The reduction is about 0.06 (statistically significant at the 5% level) for son-mother pairs, as shown in column 2, and 0.09 (statistically significant at the 1% level) for daughter-mother pairs, as presented in column 4. My results suggest that culture towards schooling is helpful in

promoting intergenerational mobility through lessening the dependence of offspring's schooling on parents' schooling.

My findings in this section complements an increasing literature in economics devoted to explain considerable heterogeneity in intergenerational social and economic mobility across locations (Chetty et al. 2014), time (Chetty et al. 2017a), and socio-economic status (Chetty et al. 2020; Fletcher and Han 2019). Previous studies have shown the roles of the neighbourhood environment during childhood (Chetty and Hendren 2018a, 2018b), the timing of parental income during childhood (Carneiro et al. forthcoming), compulsory schooling laws (Cornelissen and Dang 2020; Demirel and Okten 2020), type of college education (Chetty et al. 2017b), and income shocks (Bütikofer et al. 2018). My findings indicate that a culture towards schooling helps promote the educational mobility across generations.

8. Conclusion

Education sciences, education psychology, and sociology have long recognized culture as a potentially important determinant of educational outcomes. Yet, whether culture causally affects educational decisions and academic performance is less clear because such educational effects of culture are difficult to isolate from confounding factors. In identifying the causal effect of culture on education, economists primarily focus on *visible* daily cultural practices in modern societies (Ashraf et al. 2020; La Ferrara and Milazzo 2017). However, what people think or believe in their minds about the importance of schooling is a crucial cultural component that may affect educational decisions (Figlio et al. 2019). This has been rarely investigated, as it is typically difficult to disentangle empirically (Becker et al. 2020). Furthermore, understanding which determinants fundamentally drive such beliefs and preferences is important but remains unclear.

To shed light on these questions, I exploit a unique historical territorial expansion of historical Vietnam to study the effects of Confucian cultural heritage on educational attainment and academic performance in present-day societies. Based on a spatial regression discontinuity approach, I find that adults living in regions of Confucian cultural heritage has significantly higher average schooling years and qualification achievement than those residing in regions without Confucian cultural heritage. School-aged children who have inherited Confucian culture have higher school enrolment and also

perform much better at school than their counterparts living in the former Khmer culture. These findings held in different samples and are strongly robust to various empirical specifications. In exploring potential interpretations of these results, I find evidence to suggest that my main effects are mediated via positive cultural values and beliefs towards education as well as increased investments in children's school and learning activities.

Inequality in schooling is the most vital cause of inequality in socioeconomic outcomes. Therefore, the implementation of educational policies and programmes to promote educational attainment and thus reduce inequality in schooling continues to be the central focus of initiatives fighting against poverty worldwide, particularly for poor countries in the years to come. Understanding the importance of traditional culture in general and cultural values and beliefs towards schooling in particular for educational success can therefore offer policymakers significant implications in designing their educational policies, and tailoring policies to specific cultural contexts is essential for obtaining the highest effectiveness rather than using one-size-fits-all programmes (Ashraf et al. 2020; Rao and Walton 2004; World Bank 2015).

Lastly but as importantly, although my paper specifically focuses on Vietnam, there are reasons to believe that its results could be generalized to the broader region of Northeast Asian countries, which are parts of the Confucian cultural sphere. Confucianism and the exam-based meritocratic institutions that it engendered were the core elements of historical Chinese societies, which were then imported to pre-modern Korea and Japan in addition to Vietnam via Chinese colonial legacies. In the early modern era, Confucian culture has continued to expand its influence on other territories such as Taiwan, Macao, Hong Kong, and Singapore via the flows of Chinese immigrants (see Online Appendix 3 for a detail of the spread of Confucian culture). Although no longer formally used in today's Northeast Asia countries and having been replaced by other ideologies – for example, communist ideology – in China and Vietnam, the results of my study suggest that Confucianism remains influential on social lives via the values it has firmly implanted into societies.

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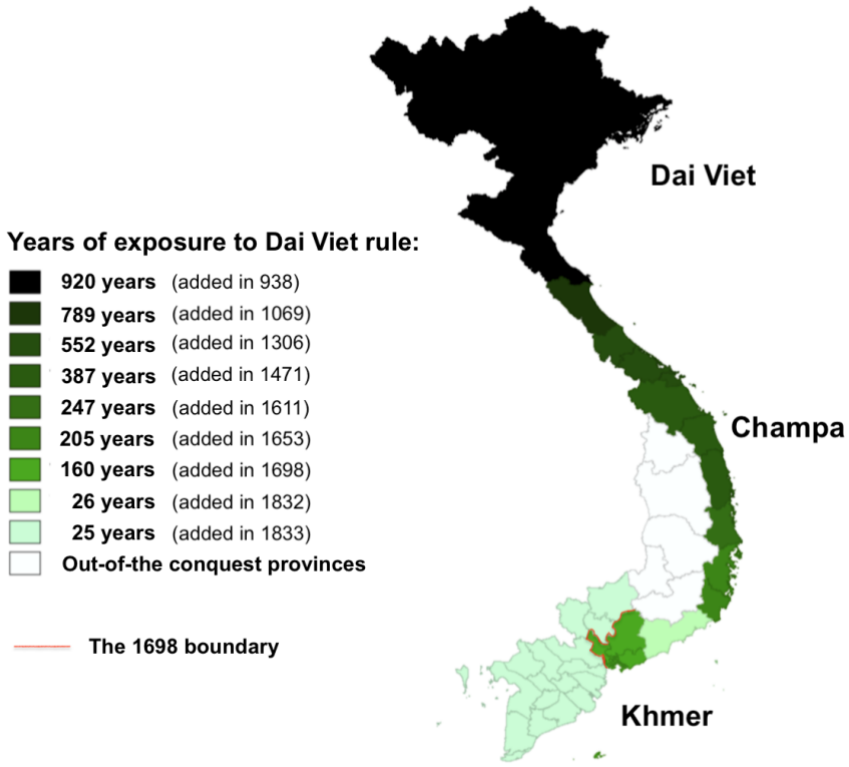
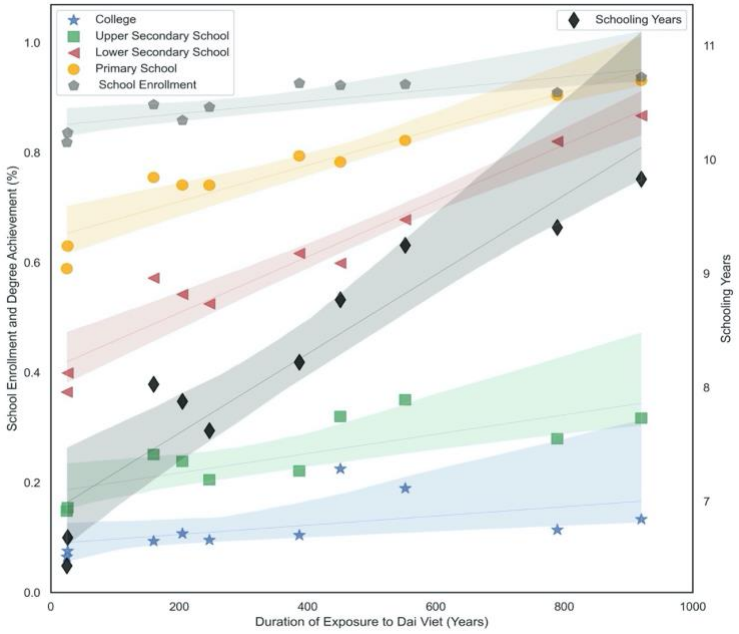
FIGURES AND TABLES

Figure 1. Dai Viet's Southward expansion and the 1698 boundary



Sources: Taylor (2013); Quoc Su Quan Trieu Nguyen (1972); Ngo et al. (2001)

Figure 2. Correlations between duration of exposure to Dai Viet and contemporary schooling outcomes



Notes: This figure shows the correlations between years of exposure to Dai Viet and contemporary educational outcomes. The outcomes include schooling years, educational level completion rates (primary school, lower secondary school and upper secondary school) and rate of a college degree for adults aged 25-64, and school enrollement rate for children aged 6-17. Shaded areas represent 95% confidence intervals.

Data source: Vietnam Population and Housing Census (2009, 15% sample).