The Persistence of Son Preference:

Cultural Transmission of Chinese Migrants in Taiwan

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Abstract

This study explores the persistence and transmission of son preference. Son preference is measured by exploiting a cultural feature, ancestor worship, which emphasizes the importance of having a son in China. To isolate the effect of son preference culture from institutions, a historical experiment, Kuomingtang's (KMT) Retreat to Taiwan, is employed to explore the cultural transmission of son preference. Between 1945 and 1954, KMT resettled approximately one million Chinese in Taiwan, without regard for their cultural background, to meet the party's needs. This bold move resulted in local Taiwanese and Chinese migrants being exposed to groups with vastly different son preference beliefs and behaviors. By combining KMT Retreat and the introduction of sex-selective abortion in 1985, I identify the effect of migrants' ancestor worship on sex selection by using a difference-in-differences framework. The effect is stronger for culturally closer groups and when adopting migrant cultures is less costly. Additionally, I dissect the cultural transmission of son preference in three categories: transmission from migrants to locals, through family, and within migrant communities. I also find migrants' ancestor worship permanently altered individuals' beliefs about ancestors, family, and sons.

1

1 Introduction

The prevalence of cultures favoring or discriminating against specific groups is a recurring global phenomenon. This can manifest in various forms, such as discrimination, expulsion, and even extreme violence. It is important to understand the mechanisms that sustain and transmit these cultural preferences over time. This study examines the complex process of son preference, which results in over one million missing women annually. The aim is to shed light on the underlying dynamics that shape social norms and contribute to gender inequality.

Scholars have long argued that cultural barriers in developing countries hinder progress in gender equality (Jayachandran, 2015). However, culture is an endogenous variable influenced by institutions and multiple historical shocks. Identifying the cultural persistence of gender inequality requires taking a group of people from the current society, randomly assigning them to a different society, and the behavioral outcomes of them and their descendants; which is impossible to do in both either field or lab experiments. This study aims to dissect son preference culture by exploring cultural transmission from complex social environments across social groups and across generations (Bisin and Verdier, 2023). By analyzing a mass migration in human history, I isolate son preference culture from institutions and uncover three simultaneous ways of the son preference transmission: from migrants to locals, through family lineage, and within migrants' communities.

To examine the cultural transmission of son preference, this study leverages the unique historical context of the Kuomingtang (KMT) Retreat to Taiwan (hereafter, KMT Retreat). The KMT Retreat is an ideal context for studying cultural transmission because: (1) Son preference differs widely among Chinese of different origins. (2) Before KMT Retreat, Taiwan was relatively homogeneous in both culture and

institutions. (3) Migrants moved to Taiwan for political and military reasons regardless of culture. (4) The first migrant settlements were determined by KMT, leaving little room for the self-selection of mass migrants.

After the Chinese Civil War, the defeated KMT relocated about one million people, including half a million fighters, from mainland China to Taiwan. The proportion of Chinese migrants reached a peak of 15% of the total population in the 1950s but gradually declined to 10% in the 2000s due to the low reproduction of Chinese migrants. While many KMT fighters lived in military camps and had little interaction with locals, other migrants were able to freely interact with locals on a daily basis.

The impact of culture and beliefs on real-world outcomes depends on the available means. During the mid-1980s, increasing demand for safe abortions led Taiwanese lawmakers to legalize abortion for women to induce an abortion up to the 24th week of pregnancy. The Legalization of Abortion in 1985 and ultrasound technology combined to created an efficient, legal, and inexpensive method for parents to choose the sex of their children – prenatal sex selection. Before that, Taiwan had only two least efficient or illegal means of sex selection after birth: neglect of girls and infanticide. It is easy to expect that areas with stronger son preference will have a more male-biased sex ratio after 1985.

To measure migrants' son preference, this study uses a unique cultural feature of son preference in ancient China, ancestor worship.[1] Only males are allowed to participate in these ritual celebrations designed to commemorate and worship the spirits of one's deceased forebears. However, both males and females with ancestor worship hold the belief that their afterlife is insecure without a male descendant

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[1]Scholars in Sociology generally share the view that ancestor worship is a representative cultural feature of son preference (Lee and Feng, 1999).

([Das Gupta, Jiang, Li, Xie, Chung and Bae, 2003](#)).[2] To construct the measure of ancestor worship, I explore the local festivals from 2,467 county gazetteers and construct the share of local festival days of ancestor worship out of the total days with festival ceremonies. To the best of my knowledge, I am the first one to extract the cultural meanings from festivals to construct cultural variables.

The random assignment of migrants in terms of culture is crucial for identifying the horizontal transmission of son preference. To show that the allocation of migrants across towns is unrelated to their culture or the culture of the locals, I collect serveral historical data from the 1920-1956 Taiwan Census and other data sources. I find that both fraction of males aged 0-10 in 1920 and local ancestor worship in 1926 are unrelated to the ancestor worship brought by Chinese migrants. I also document the balance across towns with different ancestor worship (migrants) for other historical variables, such as fraction of males, population density, and fraction of Japanese; and fraction of migrants and fraction of males of migrants.

Next, I show the effect of ancestor worship (migrants) on missing women and test for horizontal transmission from migrants to locals. With and without prenatal sex selection, areas with higher ancestor worship (migrants) have a significantly higher share of boys. After prenatal sex selection is allowed, the effect is concentrated at the third and higher order of birth. With one standard deviation increase in ancestor worship (migrants), local Taiwanese parents are 0.59 p.p. more likely to have a male child at the third and higher order of birth. These results are robust to both different empirical specifications and to controls for a large number of confounders, alternative measures of ancestor worship, and alternative cultures. In addition, I also find that

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[2]There are also some pieces of survey evidence that ancestor worship practices strongly and positively correlate with individuals' son preference in mainland China ([Li and Lavely, 2003](#); [Murphy, Tao and Lu, 2011](#); [Hu and Tian, 2018](#)).

the fraction of males positively correlates with ancestor worship (migrants) only for cohorts that were born after 1965, over 10 years after the end of KMT Retreat. It suggests that cultural transmission from migrants to locals is not abrupt, but gradual. The cultural transmission is more likely to occur between the second-generation migrants and locals rather than between the first-generation migrants and locals.

In order to identify the vertical transmission through lineage (hereafter family heritage channel), I mirror the epidemiological approach introduced by (Fernández, 2011). The epidemiological approach compares migrants who or whose parents were born in different places in mainland China and experienced different levels of ancestor worship, but who now live in the same places in Taiwan and therefore face similar social and local institutional constraints when making decisions. I find that among migrant fathers, one s.d. increase in the fathers' ancestor worship is associated with a 1.9 p.p. increase in the probability of having boys in birth order 3+ after 1985. In contrast, the effect of mothers' ancestor worship is relatively small and insignificant, suggesting cultural transmission is through the interest group. This family heritage channel is larger than the previous horizontal transmission from migrants to locals.

I also investigate a novel horizontal transmission within migrant communities by testing the average ancestor worship of neighbors from different origins on parents' sex selection. The marginal effect of the within-group horizontal transmission is only 10% of the previous family heritage channel. The total effect is more than one and a quarter times that of the family heritage channel given the relatively large size of migrants from different origins relative to migrants from the same origin. In addition, I show that the effect is larger when the share of migrants is larger.

These findings are related to three main bodies of literature. First, My study is in line with the sizable literature on missing women. Many studies have shown that with the spread of ultrasound technology, sex selection sharply increases on the

5

higher order of birth in China, India, Korea, and Taiwan (Arnold, Kishor and Roy, 2002; Chen, Li and Meng, 2013; Lin, Liu and Qian, 2014). Almond, Li and Zhang (2019) finds that, once parents earn more income, they are more likely to have a boy if they did not have one. These parents can afford the expensive medical test fees of diagnostic ultrasound. Qian (2008) finds that, when women have comparative advantages in economic production, more girls will be born and the survival girls will have a better education attainment. Abrevaya (2009) shows individual son preference is persistent, where China-born and Indian-born mothers are more likely to have boys at birth even when they live U.S., a country without son preference culture. What sets my study apart from the above literature is that most previous literature on missing women did not have a precise cultural measure of son preference, without considering the cultural transmission process and did not isolate the effect of culture from institutions in identification (Alesina and Giuliano, 2015).

Second, by identifying the contemporary effect of ancestor worship, I contribute to a broad literature on how historical legacy shapes the current comparative economic conditions (Acemoglu, Johnson and Robinson, 2005). Various studies show that historical shocks alter the economic conditions of women in subsequent generations. Grosjean and Khattar (2019) shows that the male-biased sex ratio in eighteenth-century Australia due to the arrival of large number of British male convicts had adverse long-run consequences for female labor force participation and gender norms. Michalopoulos, Putterman and Weil (2019) shows that pre-modern agricultural participation in Africa still influences current individuals' beliefs and economic outcomes. Teso (2019) finds that the lack of male labor force generated by the transatlantic slave trade induced current higher female labor force participation. In Alesina, Giuliano and Nunn (2013), they find that half of the impact of plough use in agricultural society on contemporaneous attitudes to gender roles is due to the

6

vertical transmission of culture from ancestors to descendants rather than any other institutional changes. With a more systematic approach, I show that both socialization and lineage are kep for son preference persistence. This implies a crucial aspect for analyzing the roles of individuals in generating historical and cultural persistence. My results further suggest that socialization cannot be neglected in understanding how culture persists and transmits.

Third, this study contributes to a series of growing literature that decomposes how cultures emerge and persist over time (Giuliano and Nunn, 2021). Studies in horizontal cultural transmission usually examine the locals' behaviors and attitudes affected by culture from external or internal migrants (Clingingsmith, Khwaja and Kremer, 2009; Giuliano and Tabellini, 2020; Miho, Jarotschkin and Zhuravskaya, 2019). Many studies in vertical cultural transmission employ the epidemiological approach concluded by Fernández (2011) to identify impacts and transmission of culture. The persistence of fertility culture and female working culture is well documented from vertical cultural transmission Blau, Kahn and Papps (2011); Fernández and Fogli (2006); Gay (2019); Michalopoulos and Xue (2021). While in many studies, the migration decisions are self-selected and may confound the outcomes of interest; in this study, the allocations of one million Chinese migrants are quasi-random to local cultures and institutions. With the exogenous culture brought by migrants, this study reduces potential biases when migration is endogenous and uncovers both horizontal and vertical channels of cultural transmission in the same context.

The remainder of this paper is organized as follows. Section 2 briefly introduces the historical background of ancestor worship and migration in Taiwan after WWII. Section 3 describes the data for empirical usage. Section 4 shows the random variants of ancestor worship (migrants) and cultural transmission from migrants to locals. Section 5 discusses family heritage channel and cultural transmission within

7

migrant communities. Section 6 presents that ancestor worship (migrants) shapes individuals' beliefs about ancestors, family, and sons. Finally, Section 7 draws a conclusion for this study.

2 Historical Background

2.1 Ancestor Worship

2.1.1 Ancestor Worship in China

China has a long history of son preference. Son preference can be traced back to the origins of ancestor worship in the third millennium B.C. Ancestor worship emphasizes both the influence of deceased relatives on the living and the influence of the living on the welfare of the deceased soul. The living who do not practice ancestor worship will suffer misfortune and lose family and friends. One's afterlife will be uncertain without male descendants, and s/he will end up as a hungry ghost. Males who share the same patrilineal ancestors and bear their family practice their ancestor worship together in festivals or major days of their family clan to "feed" their ancestors. The communal practices include offering sacrifices to the ancestors, burning joss paper, and sweeping ancestors' graves. When people care more about their ancestors, there is no doubt that they will have more ancestor worship practices.

The practice of ancestor worship is not only about venerating the deceased relatives, but it also requires family bequests, such as bearing sons to carry the family name and taking care of the elderly of the family (Twitchett, Fairbank and Feuerwerker, 1978). Males are the majority to carry family names to the next generation and be added to the family genealogy. In ancient China, when women marry, their

names are replaced by their husbands' names. Also, men and their wives are mainly responsible for the duty of taking care of elders in the men's families. Women play little role in caring for their own parents when they are married, they care for their husbands' parents and grandparents. Daughters, therefore, were not only considered culturally inferior, they were also perceived by most families as a net economic and emotional loss.[3], Today, even though women can keep their original family names when they marry and have the duty of support to their own parents, that is the long-term care channel of son preference is weakened; their offspring still carry on their husband's family name.[4] Ancestor worship still influences parents' gender selection mainly through the importance of patrilineal family continuation. Ancestor worship can be seen as an important cultural feature of son preference.

After 1949, the founding of the People's Republic of China, ancestor worship was severely damaged in mainland China. Especially, during the 1966-1976 Cultural Revolution, ancestor worship was regarded as an "Old Custom". The practice of ancestor worship was strictly forbidden and thousands of ancestral halls were destroyed during this period. After the 1966-1976 Cultural Revolution, ancestor worship was gradually revived, ancestor worship. Two of the traditional national festivals related to ancestor worship, Chinese New Year's Eve and Tomb Sweeping Festival, were designated as official festivals by the central government. Nowadays, the practices of ancestor worship still widely exist in mainland China; there are 182 million Chinese adults who embrace ancestor worship practices and beliefs (Yang and Hu, 2012).

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[3]The common saying that "a married daughter is like water spilled on the ground" — one you cannot retrieve

[4]According to the Chinese Names Report: 2020, only 1 out of 13 newborns in 2020 will carry their mothers' surname, others carry their fathers' surname. http://www.gov.cn/fuwu/2021-02/08/content_5585906.htm, last access: 20/09/2021.

2.1.2 Ancestor Worship and Confucianism

Many scholars suggest that ancestor worship in China is related to Confucianism (Baker, 1979; Yang, 1967; Zhuo, 2012). Therefore, it is not surprising that the many moral requirements in Confucianism are similar to those of ancestor worship. Although Confucius himself did not express his views on the subject of the afterlife, he did emphasize the importance of sacrificing ancestors "as if present" and maintaining patrilineal family continuity.

The Confucian scholars share similar attitudes towards patrilineal family continuity and ancestor worship. Mencius, a well-known Confucian philosopher, emphasized the importance of having sons, stating that "There are three things which are 'unfilial', and to have no posterity is the greatest of them". The term "posterity" is usually interpreted as sons, as they will be the primary labor force for families in the future and they can continue the patrilineal family line. Where "posterity" is interpreted similarly in ancestor worship.[5] Furthermore, the presence of son preference in Confucianism is evident in the three cardinal guides and the three obedience for women.[6] It is important to note that these guides and obediences reflect the patriarchal nature of Confucianism. Ancestor worship, which was also influenced by Confucianism, underwent significant evolution as a result. It is clear that Confucianism had a significant impact on these cultural practices.

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[5] An analysis by Baker (1979) in discussing ancestor worship for the living: "The living individual knew that he had a continued existence after death only if he could ensure his own posterity. Hence, the desire for a 'hundred sons and a thousand grandsons' may be seen to be a very understandable one".

[6] The three cardinal guides are: ruler guides subject, father guides son, and husband guides wife. The three obedience for a woman: she is required to obey her father before marriage, and her husband during married life, and her sons in widowhood.

2.1.3 Ancestor Worship in Taiwan

Due to the fact that most of the local Taiwanese are originally from two provinces of mainland China – Fujian and Guangdong; ancestor worship was wildly practiced in Taiwanese society.[7] Following the First Sino-Japanese War in 1895, Taiwan was colonized by Japan until 1945. During this period, the colonial government restricted the practice of ancestor worship in order to promote Shinto, the Japanese national religion. Ancestor worship was considered as a "vulgar culture" and many ancestor tablets were burned in a series of cultural campaigns. (Tsai, 1991). As a result of forced assimilation, Taiwanese people replaced ancestor tablets with *Jingu Taima* at home and participated in Shinto activities rather than ancestor worship practices.[8]

After World War II, the forced assimilation ended with the departure of the Japanese colonizers. Migrants from mainland China revived the ancestor worship of local Taiwanese and transmitted ancestor worship from all over mainland China, not just from Fujian and Guangdong only. According to Yang and Hu (2012), 87.4% of adults in Taiwan are ancestor worshippers. Cultural transmission by migrants from mainland China after World War II may have played an important role in the emergence of ancestor worship in Taiwan.

2.2 Chinese Migrants in Taiwan

2.2.1 Three Major Waves of Migrants in Taiwan

There have been three major waves of migrants to Taiwan since the 17th century. The first wave is Taiwan under Qing rule (1683-1895). Many peasants from Fujian

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[7]People who or whose ancestors lived in Taiwan before 1945 are clarified as local Taiwanese.

[8]There are no precise statistics available regarding the prevalence of ancestor worship or Shinto in history. According to the *Taiwan Governor-General's Archives*, in 1944, 71% of Taiwanese were able to speak Japanese, which suggests that forced assimilation was effective.

and Guangdong migrated to Taiwan to work in agriculture. Today, over 95% of local Taiwanese are descendants of first-wave migrants.[9] The second wave is Taiwan under Japanese colonial rule (1895-1945). During this period, migrants from mainland China are strictly restricted and controlled. Most of the migrants are from Japan and Korea, making up about 7% of the total population. After World War II, with the surrender of Japan, most of the Japanese and Koreans leave Taiwan. The third wave is due to the 1945-54 KMT Retreat to Taiwan. The KMT brings over one million migrants from mainland China to Taiwan within 10 years. The one million migrants represent about 15% of the total population in Taiwan. They are the focus of this research.

2.2.2   The KMT Retreat

Immediately after the end of World War II, the KMT and the Chinese Communist Party fought a civil war from 1945 to 1949. The former was defeated and retreated to Taiwan. Various studies have suggested that the number of civil war migrants to Taiwan is around one million, while the local population of Taiwan in the 1950s was only 6 million(Barclay, 1954; Jacoby et al., 1966; Lin, 2002). After 1954, the last retreat of the KMT army in Thailand and Myanmar, there was virtually no immigration to or emigration from the island.

After the migrants arrived on the island, they were assigned to places based on their occupations or the occupations of their relatives. Many migrants are soldiers, government administrators, or their relatives; their settlements are determined by the KMT. The distribution of migrants may have been guided by KMT's ideas of reforming both economic and political institutions. Military dependents' villages and

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[9]The remaining 5% of local Taiwanese are indigenous peoples.

their neighborhoods are important places for migrants to live. Although many migrants were free to choose their residents after their initial settlement, there was little movement. With the outbreak of the Korean War in 1950, many migrants believed they would soon return back to China with the help of the American army, and paid little attention to their residents in Taiwan (Lin, 2009).

2.2.3 Cultural Transmission through Migrants

In the 1950s, many local Taiwanese could not speak Mandarin Chinese, but they could speak some dialects of Fujian and Guangdong. Because of the language barriers, first-generation migrants (except those from Fujian and Guangdong migrants) have more social interactions with other migrants than local Taiwanese. The historical documents suggest both the horizontal transmission of ancestor worship within the first-generation migrants and the importance of language in cultural transmission. But for the second-generation migrants, there is no clear separation between them and local Taiwanese, they study and work together which creates the opportunity for the transmission of ancestor worship from migrants to locals. Moreover, due to the huge gender imbalance among migrants, 15% to 20% of local Taiwanese women married a migrant man in the 1950s and 1960s (Wang, 1993a,b). Intergroup marriage may also contribute to the horizontal transmission of ancestor worship.

3   Data

3.1   Ancestor Worship in China

Ancestor worship practices are common in ancient China. However, there is no measure of ancestor worship to date. To construct a proxy for ancestor worship

13

prevalence, I digitized the local festivals from 2,467 county gazetteers which were published in the 1980s.[10] I treat the festival practices involving the contents of tombs and ancestors as ancestor worship practices. The construction of the ancestor worship density at the county level is as follows:

$$AW\_Density_c = \frac{\#\ of\ days\ of\ ancestor\ worship\ practices}{total\ days\ of\ local\ festivals}$$

As shown in Figure B.1, there are large regional differences of $AW\_Density$ within provinces in mainland China. Southeast China has a higher prevalence of ancestor worship. It is hard to say why people in Southeast China practice ancestor worship more often. There may be several reasons, such as natural disasters, aptitude for agriculture, Confucianism, and many others. The process of the evolution of ancestor worship is complex and there is little consensus among historians and sociologists. However, they all agree that ancestor worship is a cultural feature of son preference in ancient China. I use ancestor worship to represent the cultural part of son preference and to study the transmission of son preference. And if we compare Figure B.1 and B.2, it is not hard to see that geographically, $AW\_Density$ and the fraction of males are positively correlated in mainland China. Appendix B contains more detailed discussions of ancestor worship and son preference in mainland China.

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[10]Many local festivals have the same name but the practices associated with them vary widely by region. For example, within Fujian Province, people in Fuqing County sacrifice deceased ancestors on the winter solstice, but people in Wuping County only make rice wine on the same festival.

3.2 Ancestor Worship in Taiwan

To construct the town-level ancestor worship introduced by Chinese migrants after 1945, I collected the geographic distribution of migrants' origins in each town from the 1956 Taiwan Census. There are 50 provincial-level origins in mainland China and 348 towns in Taiwan. Accordingly, I can construct the ancestor worship (migrants) as follows:

$$AW\_Migrants_a = \frac{\sum_{a,p}(Migrant_{a,p} * AW\_Density_p)}{Migrant_{a,p}}$$

where $Migrant_{a,p}$ is the number of migrants from province p in mainland China living in town a in Taiwan, $AW\_Density_p$ is the ancestor worship density of the province.[11] Figure 1 shows the geographic distribution of ancestor worship (migrants). There is no clear geographic pattern to ancestor worship (migrants). It is not concentrated in any region.

Since over 95% of local Taiwanese are originally from mainland China, they also bring their ancestor worship and other pre-1945 cultures to Taiwan. I construct ancestor worship (locals) to represent the local ancestor worship. *Investigation of Han Ancestral Home in Taiwan*, a survey conducted by Ogawa Naoyoshi in 1926, documents the origins of local Taiwanese from 10 prefectures in China and their corresponding residents at the town level of Taiwan.[12] The construction process of ancestor worship (locals) is similar to the previous equation:

$$AW\_Locals_a = \frac{\sum_{a,d}(Local_{a,d} * AW\_Density_d)}{Local_{a,d}}$$

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[11] I aggregate the original ancestor worship density from the county level to the province level in mainland China.

[12] The ten prefectures are Quanzhou, Zhangzhou, Tingzhou, Longyan, Fuzhou, Xinghua, and Yongchun in Fujian Province; and Chaozhou, Jiaying, and Huizhou in Guangdong Province.

where $Local_{a,d}$ is the number of locals originally from prefecture d in mainland China and live at town a in 1926 Taiwan. $AW\_Density$ is ancestor worship density at the prefecture level.

Figure 2 shows the map of ancestor worship (locals). It is clear to see that western areas have higher ancestor worship (locals). The distribution pattern is strongly influenced by geographic characteristics. The western plain areas are close to mainland China and suitable for cultivation, but the central and eastern areas are mountainous and have few Chinese locals. Most of the residents in the central and eastern areas are indigenous Taiwanese who do not have an ancestor worship culture. Accordingly, ancestor worship (locals) is zero in many middle and eastern towns.

3.3   Taiwan Population Census

1980 and 1990 Censuses. The universe micro-samples of the 1980 and 1990 censuses naturally avoid measurement bias due to stratification. The two samples include about 18 million and 20 million individuals. Figure 3 shows the trend of the fraction of males by birth cohort from the 1980 and 1990 censuss. The fraction of males is higher than the biological normal fraction of males at birth (51 p.p.) in 90% of the birth cohorts except 1957-1960. It shows that son preference is persistent in Taiwan.[13] Figure 3 further motivates my focus on the cultural transmission of ancestor worship: since there is no strong demographic shock in the 1970-84 period, the fraction of males gradually increased with birthyear, the trend could be due to the gradual cultural transmission of ancestor worship.

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[13]Infanticide of female children was widespread in ancient China including Taiwan (Chen, 1989; Lee, Feng and Campbell, 1994). The Taiwanese have apparently not practiced infanticide since the twentieth century(Lee, 1981). However, parents may neglect their daughters or allocate more resources to sons given the son preference, so that the fraction of males is higher than biological normal.

In the 1990 census, I match the parents and children based on their family relationships and construct the birth order by the age of their children. I compare the data pattern with Lin et al. (2014) which uses Taiwan's National Birth Registries. Figure 4 shows the trend of the fraction of males from the 1990 census. Its trends are consistent with the fraction of males from Lin et al. (2014) using another confidential dataset shown in Figure A.1. Both figures show that sex selection after the Legalization of Abortion is concentrated in the third and higher order of birth.

1920 - 1956 Censuses. To construct explanatory variables and some historical controls, I digitize the 1920, 1930, 1940, and 1956 Taiwan censuses. From 1920, 1930, and 1940 censuses, I extract information on ethnic distribution, the fraction of males, and population density. The 1956 census records the residence of migrants at the town level with their origin at the province level in mainland China. It also includes other migrant characteristics such as the migrant rate and the fraction of males among migrants.

3.4   Other Controls

In this section, I list the data sources for the set of covariates used in the empirical analysis. I control for factors that may be correlated with son preference.

Proxies for Confucianism. I constructed two historical variables, Confucian scholars (*jinshi*) density and Confucian clan density, to capture the influence of Confucianism.[14] The information on Confucian scholars comes from the China Biographical Database Project created by Harvard University.[15] Confucian clan data is

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[14]*Jinshi* are the people who pass national-level bureaucratic examinations. Most of the political elites in ancient China have the title of *jisnshi* .

[15]link:https://projects.iq.harvard.edu/cbdb/home. Last access: 05/08/2022.

from Comprehensive Catalogue of Chinese Genealogies created by Yuhua Wang.[16]. Historical population data is extracted from Ge (2000). With the three data from different sources together, I can construct the Confucian scholars density and the Confucian clan density in ancient China.

Geographic Characteristics. I collected a broad set of geographic characteristics. I use these variables to test the exogeneity of ancestor worship (migrants) and as controls in regressions. Data on the soil suitability index of wheat, wet rice, maize, white potato, cotton, and tea are from FAO GAEZ (v4.0).[17] I also constructed the logarithmic distance to Taipei (capital of Taiwan) and the logarithmic distance to the seashore based on the GIS data of the Taiwan administrative map.[18]

Family Characteristics. I include a number of family characteristics to control for the family heterogeneity in sex selection. The controls include the years of schooling of the parents, the age of parents at the birth of the child, and the birth order of the child.

I report the summary statistics of town level characteristics in Table A.1 and the individual characteristics from the 1990 census in Table A.2.

4 Cultural Transmission from Migrants to Locals

In this section, I first present the main specifications of horizontal cultural transmission, discuss identification assumptions, and present estimation results.

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[16]link:https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/POOVF6. Last access: 05/08/2022.

[17]link:https://gaez.fao.org/. Last access: 23/01/2022.

[18]link:https://data.gov.tw/dataset/7441. Last access: 23/01/2022.

4.1 Empirical Strategies

To examine the impact of ancestor worship (migrants) on the sex ratio, my first approach is to compare the sex of aged 0-4 children across towns in 1980 and 1990 census and estimate the following specification:

$$Y_{ia} = \alpha + \beta AW\_Migrants_a + \boldsymbol{\omega} \boldsymbol{X}'_{\boldsymbol{a}} + \theta_c + \epsilon_{ia} \tag{1}$$

where Y_{ia} is the outcome of interest. $\boldsymbol{X}'_{\boldsymbol{a}}$ is a set of town-level historical controls and geographic characteristics.[19] θ_c is the county fixed effects. I cluster standard errors at the town level.

Differences in having males as children across towns identified through the above strategy could be only achieved by neglecting girls, as infanticide and prenatal sex selection were forbidden in 1970s. Prenatal sex selection through ultrasound has been the main means of generating missing girls since the 1980s. When parents can easily select the sex of their children, the effect of ancestor worship (migrants) can be fully seen.

To better account for the horizontal transmission of son preference, I focus on local parents who were both born after 1954 to ensure their socialization with migrants in early childhood. I interact ancestor worship (migrants) with a policy shock, the Legalization of Abortion which allowed parents to choose the sex of their children at birth.[20] As discussed earlier, the increase in the fraction of males at

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[19]Historical controls are ancestor worship (locals), fraction of males aged 0-10 in 1920, fraction of Japanese in 1940, faction of males in 1940, population density in 1940, fraction of migrants in 1956, fraction of males of migrants in 1956. Geographic characteristics include the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei.

[20]Before 1985, ultrasound technology is widely available in Taiwan. Parents can observe the sex of fetuses but cannot choose them because abortion is prohibited.

birth is mainly driven by the sex selection in the third and higher order of birth. I implement a Difference-in-Differences empirical strategy on the sex of children aged 0-9 in the third and higher birth order in the 1990 census:

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\begin{aligned}
Male_{ifat} =& \alpha + \beta AW\_Migrants_a \times Post_t + \boldsymbol{\omega} \boldsymbol{X'_a} \times Post_t \\
& + \boldsymbol{\phi} \boldsymbol{X'_f} \times Post_t + \lambda_a + \theta_{ct} + \epsilon_{ifat}
\end{aligned}
\tag{2}
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where $Male_{ifat}$ is indexed as one if the child i is born at year t in family f of town a is male, otherwise is zero, $Post_t$ equals one if the child is born after 1985 (including 1985). $\boldsymbol{X'_f}$ is a matrix of family characteristics including years of schooling of parents, the age of parents at childbirth, and the birth order of child. λ_a and θ_{ct} are town fixed effects and county-birthyear fixed effects which capture all of the unobserved town-specific variants and county-year specific shocks. Standard errors are all clustered at the town level.

4.2   Identification Assumptions

The main identification assumption to establish the causal effects of ancestor worship (migrants) is that the destination choices of migrants with different cultures are not affected by local ancestor worship culture and gender norms. In other words, ancestor worship (migrants) should be orthogonal to all observed and unobserved determinants of local son preference. This identification assumption is untestable because it concerns unobservables. However, both the historical narrative and the regression analysis presented below provide strong support for this assumption.

I address the identification challenge in four ways: (1) by presenting the trend of the fraction of males for local Taiwanese in 1920-1956 by the three groups of towns

with low, medium, and high levels of ancestor worship (migrants); (2) by presenting a comparative analysis varied by cohorts in 1915-80; (3) by regressing ancestor worship (migrants) on a number of cultural and demographic characteristics before 1945, as well as some migrant characteristics and geographic characteristics; (4) by reporting a balance test of the estimation of historical characteristics with ancestor worship (migrants).

In addition, I show that the size of migrants is strongly related to population and population density, but not related to ancestor worship and other historical controls in Table A.4. It also supports the argument that the decisions of migrants are not driven by ancestor worship because they were sent to Taiwan by military and political orders.

4.2.1 Historical Narratives

The assigment of migrants to their destination was designed by KMT and guided by the idea of total control over Taiwan, e.g. healthy and strong migrant men were assigned to military service or manual force, and educated individuals were sent to teach Mandarin Chinese. Since Taiwan was under martial law from 1949 to 1987, both the occupation and the destination of migrants were determined by KMT authority. Historians also argue that under the propaganda of KMT and the begining of the Korean War, migrants generally believed that the American army would soon help them retake mainland China; most of them did not care about the residents.

The local population was relatively homogeneous within counties before 1945. In 1940, 5% of the population are Japanese concentrated in the urban or suburban areas in the western plain of Taiwan.[21] 91% of the population are originally from

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[21]However, due to the defeat of World War II, most of the Japanese left Taiwan after 1945.

Guangdong and Fujian provinces of mainland China. They also concentrate in the western plain of Taiwan. The rest are indigenous people who live in the eastern mountainous area. This homogeneity makes it implausible that migrants from different origins would have different preferences for different towns within counties. This premise is supported by the following balance tests.

4.2.2 Balance Tests

First, in Figure A.2, I show the relative trends of the fraction of males for local Taiwanese across three groups that experienced high, medium, and low ancestor worship (migrants). Towns with different levels of ancestor worship (migrants) have little different trends in the fraction of males in the pre-KMT Retreat period. This suggests that ancestor worship (migrants) has little correlation with the changes in local gender norms prior to KMT Retreat.

To further test that sex selection before KMT Retreat is not correlated with ancestor worship (migrants), I conduct an analysis that allows the effect of ancestor worship (migrants) to vary by birth cohort. Effects are estimated conditional on town fixed effects, county-birthyear fixed effects, and origin-birthyear fixed effects by comparing with the 1935-44 birth cohort. The estimates in Figure A.3 support ancestor worship (migrants) with both trends and absolute levels of the fraction of males before and during KMT Retreat. Ancestor worship (migrants) has effects after the 1965 cohort. It also suggests that the gradual horizontal transmission of ancestor worship on son preference from migrants to locals.

To see whether the destination choice of migrants from different origins is least correlated with local son preference, I regress ancestor worship (migrants) on a set of historical characteristics in culture and demography, as well as geographic char-

acteristics; and report the estimates in Table 1. In the first two columns, I find no predictive power of the pre-period son preference behavior, the fraction of males aged 0-10 in 1920. By adding a set of observable historical and geographic characteristics in columns 3 and 4, it is hard to see any observables with strong predictive power on ancestor worship (migrants). Moreover, all controls can only explain 6.6% of the variance in ancestor worship (migrants). The analysis supports the assumption that most of the variance in ancestor worship (migrants) is orthogonal to many gender-related local characteristics.

Conversely, I conduct a balance test by estimating a town-level analog of Specification 1 and letting the outcomes be historical characteristics that might affect son preference. Figure 5 shows the estimates for this exercise. The estimates suggest that, conditional on the county fixed effects and geographic characteristics, towns that happen to have higher ancestor worship (migrants) are generally not significantly different from counties that have lower ancestor worship (migrants). These results provide additional support for treating ancestor worship (migrants) as exogenous to local son preference.

4.3   Results

Baseline estimates. Table 2 shows the simple cross-sectional analysis following Specification 1 on the sample of children aged 0-4 from the 1980 and 1990 census. The estimate in column 1 implies that towns with one s.d. (0.022) increase in ancestor worship (migrants) will lead to 0.09 p.p. increase in the fraction of males from the 1980 census. I repeat the analysis with the 1990 census and with the subsample by birth order. The estimate in column 2 shows that when prenatal sex selection is available, towns with one s.d. (0.018) increase in ancestor worship (migrants) will

lead to 0.11 p.p increase in the fraction of males. The estimates in columns 3 and 4 show that the sex selection driven by ancestor worship is concentrated in children of 3+ birth order. This finding is consistent with a series of empirical evidence that sex selection is concentrated at the 3+ birth order in the countries without fertility control.[22]

Main result. From now on, let us focus on the children with 3+ birth order and examine the possible channels of cultural transmission of son preference. I first check the horizontal transmission from migrants to locals by looking at the sex selection of local parents who were both born after 1954, the end of KMT Retreat. Table 3 presents the results from estimating Specification 2 . The difference-in-differences specification allows the probability of having a son at each birth to follow different trends over time in each town following their historical and geographic characteristics. In column 1, I include town fixed effects and county-birthyear fixed effects to account for the sex selection effect of town-specific trends and time-varying shocks across counties. In column 2, I control for the historical legacies that may affect both ancestor worship (migrants) and sex selection. For example, I use two proxies for the local gender norm: fraction of males aged 0-10 in 1920 and fraction of males in 1940. The interaction of these variables with the Legalization of Abortion captures the possibility that parents in more historically conservative towns may have been on a different trajectory with respect to sex selection. Similarly, in column 3, I include geographic characteristics interacted with the Legalization of Abortion. Despite the limited self-selection of migrants, the distribution of migrants is determined by KMT to meet the needs of local land reform. Thus, this specification accounts

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[22]Chinese migrants select children's sex mainly at the 3+ birth order in Canada (Almond, Edlund and Milligan, 2013), United States (Abrevaya, 2009), and Spain (Castelló, Urquia, Rodríguez-Arenas and Bolúmar, 2019).

for the possibility that sex selection followed different trends in different towns with different needs of local society and land reform for migrants. Finally, in column 4, I add child's birth order, ages of parents at child's birth, and years of schooling of parent; interacted with the Legalization of Abortion. This flexibly accounts for the heterogeneity of family backgrounds and women's biological capacities that could affect parents' sex selection behavior before and after the Legalization of Abortion.

The estimates of interest are stable across different specifications. The estimates in columns 1-4 show that one s.d. (0.018) increase in ancestor worship (migrants) leads to 0.59 p.p. increase in the probability of having a male in the 3+ birth order, or approximately 600 excess males every year. This accounts for about 20% of the excess males in the 3+ birth order after 1985. Both estimates in Specifications 1 and 2 together suggest that the effect of ancestor worship (migrants) is stable and consistent under different policy environments.

4.4   Robustness Check

In this section, I report estimates from a series of exercises that I perform to assess the robustness of the estimated results. For the sake of exposition, from now on I focus on children aged 0-9 with 3+ birth order in the 1990 census.

Parallel Trend Assumption.   As discussed above, ancestor worship (migrants) correlates little with the trend of sex selection before 1945. However, sex selection could be salient due to a series of family planning policies that were introduced in Taiwan since the 1950s. The parallel trend assumption could be violated if the family planning policies changed both the sex selection trend and the son preference. To test this assumption, I reproduce the estimate in column 4 of Table 3 by allowing the effects of ancestor worship (migrants) and all controls to vary by

children's birthyear. Figure 6 shows the event study that there is little pre-trend difference before the Legalization of Abortion. The dynamic effects of ancestor worship (migrants) are positive and persistent by birthyear after 1984.

Alternative Specifications. I run Specification 2 with several variants and report them in Table A.5. In column 1, I cluster the standard errors at the county level with 21 clusters. The standard errors change little and the coefficient of interest remains statistically significant at the 1 percent level. In column 2, I cluster standard errors over two dimensions, as suggested in Cameron, Gelbach and Miller (2011): at town and county-birthyear level. Similar to column 1, the coefficient of interest remains statistically significant at the 1 percent level.

In column 3, I eliminate the heterogeneity in family culture by adding the parents' origin-birthyear fixed effects. The estimated coefficient of interest remains quantitatively unchanged and statistically significant at the 1 percent level. To validate that the interpretations of the empirical results are not sensitive to the choice of policy time, I change *Post* to 0 for the 1985 cohort and report the estimate in column 4. The estimate decreases by 0.06 units and the standard error increases somewhat, but the coefficient of interest remains statistically significant at the 1 percent level. In columns 5 and 6, estimates are robust to the choice of regression models. The estimates from Logit model and Probit model are both statistically significant at the 1 percent level. Besides, the marginal coefficients of Logit and Probit model evaluated at the mean of the covariates are similar to OLS coefficients in Table 3.

Alternative Measures. The choice of aggregation methods of ancestor worship density from county level to province level in mainland China may damage the estimates of interest. In the main analysis, I use ancestor worship density at the province level which is the average of the county level data to construct ancestor worship (migrants). Ancestor worship density in mainland China will be mismea-

sured if the number of Chinese migrants differs across counties within a province. Then, ancestor worship (migrants) in Taiwan would also be mismeasured. Alternatively, I use the county population from the 1953 China Population Census and the county area to proxy the number of Chinese migrants from each town within each province. I then construct the province level ancestor worship density with county level population and area weights and construct two alternative ancestor worship (migrants). Another concern might be the representative of ancestor worship density. The effects of ancestor worship could be biased if the number of local festivals (other than ancestor worship) is correlated with the local son preference. Therefore, I use the number of ancestor worship festivals with and without weights as alternative measures of ancestor worship in mainland China.

Table A.6 shows the correlation of original ancestor worship (migrants) with alternative measures of migrants' ancestor worship. It is easy to see that the original ancestor worship (migrants) is positively and significantly correlated with the alternative measures. Moreover, the measure of ancestor worship (migrants) is highly consistent through weights. The adjusted R-squared in columns 1 and 2 suggests that about 90% of the variance of ancestor worship is unchangeable by weighted methods. Although adjusted R-squared drops in columns 3-5, the lowest adjusted R-squared is in high 0.223 in column 5. Overall, the estimates in the table collectively support that original ancestor worship (migrants) is an appropriate measure of ancestor worship.

In Table A.7, I replace the original ancestor worship (migrants) with the above alternative measures in Specification 2. For comparability across variables, we report the standardized coefficients in square brackets. The estimates are consistent in columns 1-3 and columns 4-6. Compared to columns 4-6, the lower standardized coefficients in columns 1-3 suggest that the estimated effect of ancestor worship (mi-

grants) is a lower bound of the ancestor worship culture in the analysis.

Alternative Cultures. In addition to ancestor worship, other types of culture may also be transmitted and affect son preference. If these cultures are correlated with ancestor worship, previous estimates will be biased. To validate the cultural transmission of ancestor worship, I consider three types of alternative cultures: Confucian culture, tea culture, and rice culture. Table A.8 shows that the alternative cultures may have effects on sex selection in some specifications, but do not damage the effect of ancestor worship (migrants).

4.5   Cultural Distance and Cultural Transmission

A reasonable hypothesis is that the magnitude of the effect depends on the cultural distance of the local society to ancestor worship.[23] I use two different cultural variables, distance to Confucian schools and foot-binding rate in 1920, to measure the cultural similarity of the local society to ancestor worship before KMT Retreat. There are two main advantages to using these two variables: first, the similarity to ancestor worship. Many moral ideas of Confucianism are similar to ancestor worship and foot-binding is widely considered as a harmful gender norm for women. Second, Confucian schools and foot-binding have been banned by the Japanese government. Most Confucian schools were banned and replaced by Japanese schools after 1895. Since 1915, women have been forbidden to bind their feet except for elders.

I estimate the heterogeneity of the effect of ancestor worship (migrants) by applying Specification 2 to different subsamples separated by the values of distance to Confucian schools in 1895 or foot-binding rate in 1920. The results are shown in

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[23]Spolaore and Wacziarg (2022) and Beach and Hanlon (2023) together show that cultural transmission is more efficient in people/places who have a closer cultural distance to the home culture.

Table A.9. Every subsample contains 174 towns which are separated by the median distance to Confucian schools or the median value of foot-binding rate. It is easy to see that the effects of ancestor worship (migrants) are larger and significant at the 1% level in towns that are closer to Confucian schools or with higher foot-binding rate in columns 1 and 4. Conversely, the effects of ancestor worship (migrants) are smaller and insignificant at the 10% level in columns 2 and 3. The differences in the estimates between columns 1 and 2, and between columns 3 and 4 jointly suggest the effect of cultural transmission depends on the cultural distance in local society.

5 Cultural Transmissions within Migrants

5.1 Epidemiological Approach

To identify the cultural transmission within migrant groups, I consider both vertical transmission within migrant families (family heritage channel) and horizontal transmission within migrant communities (community channel). I use empirical strategies that mirror the epidemiological approach to cultural transmission proposed by Fernández (2011). Given that the relationship between inherited beliefs and behaviors may be co-determined by institutional factors and the socioeconomic environment, this approach identifies cultural transmission through the behaviors of individuals with different places of origin but who reside in the same environment and thus face similar constraints in their decision-making.

Ancestor worship is a cultural feature of son preference, which has a dispreference for girls in Chinese history. The dispreference for girls may materialize girls and treat girls as a kind of "collateral" such as bride price. If the collateral effect persists, the incentive structure faced by parents would be systematically different in places

29

with different son preference. That ancestor worship culture is mixed with the local marriage market. To identify the portable component of son preference and disentangle cultural transmission from confounding institutional factors, I exploit variations in the sex selection among migrant parents who make decisions under similar local conditions but whose places of origin differ and whose migrant communities differ in their exposure to ancestor worship.

5.2   Family Heritage Channel

The descendants of migrants are defined by the origin of their fathers' places. Thus, the family heritage of ancestor worship identified by the epidemiological approach originates from the paternal line. I first explore the role of fathers' origins. The empirical specification is as follows:

$$
\begin{aligned}
Male_{ifat} =& \beta AW\_Density_j \times Post_t \\
& + \boldsymbol{\omega_1} \boldsymbol{X'_j} \times Post_t + \boldsymbol{\omega_2} \boldsymbol{X'_f} \times Post_t + \sigma_j + \lambda_{kt} + \delta_{at} + \epsilon_{ifat}
\end{aligned}
\tag{3}
$$

Where $AW\_Density$ is the ancestor worship culture of father j from his ancestry. $\boldsymbol{X'_j}$ contains historical controls from the father's origins: Confucian scholar density, Confucian clan density, and suitability index of tea, wet rice, and wheat. $\boldsymbol{X'_f}$ is a matrix of family controls containing the parents' years of schooling, age at birth of the child, birth order, and whether parents are from the same origin. σ_j and λ_{kt} are fathers' origin fixed effects and mothers' origin-birthyear fixed effects which can absorb unobserved effects from the fathers' origin and control for the potential channel of mothers' original culture. δ_{at} is town-birthyear fixed effects to absorb time-variant shock at the town level including the impact of horizontal cultural transmission estimated in Section 4. Standard errors are all two-way clustered

30

at the fathers' origin level and resident town level.

In Table 4, I report the results for the family heritage channel of fathers. In column 1, the estimate is statistically significant at the 1 percent level. Including all of the fixed effects enlarge the estimate from 0.10 to 0.50 in columns 1-2. Adding the father's origin controls and family controls with the interaction of the policy makes the estimates only slightly larger. The coefficient of interest in column 4 is 0.56 and is statistically significant at the 1 percent level. It implies that migrant fathers with one s.d. (0.034) higher ancestor worship will be 1.90 p.p. more likely to have a boy when prenatal sex selection is available. The migrant fathers' family heritage channel is 0.7 times larger than the horizontal cultural transmission from migrants to locals in Section 4.

In column 5, I replicate column 4 estimation by restricting the sample to both parents who are migrants. The resulting estimate is larger and statistically significant at the 5 percent level. The assortative marriage in culture seems to have little impact on the family heritage of ancestor worship. The ancestor worship of man is stubborn and somehow independent from the cultural backgrounds of his wife.

Next, I reproduce the above analysis with the mother's ancestor worship from her origin. The estimates in Table A.10 are all positive (except for column 1), but on small scales and not significant at the 10 percent level. The family heritage channel through women is weaker than men. This suggests that only the group of people, who benefit from the unequal culture, men, have incentives to adopt and transmit this culture.

5.3 Community Channel

When the first-generation migrants moved to Taiwan, most of them settled down in the military dependents' villages, which are composed of migrants from different places. Combining the feature of migrant communities with the theory raised by Panebianco and Verdier (2017), which emphasizes the importance of social networks in cultural transmission. I examine the cultural transmission within migrant networks, which in this section I call the community channel.

I construct a variable indicating that migrants are influenced by their migrant neighbors from other origins within the migrant community. The variable is similar to the previous ancestor worship (migrants), but captures the variation at the individuals' origin-town level. The variable is constructed:

$$AW\_Neighbors_{pi,a} = \frac{\sum_{a,p \neq pi}(Migrant_{a,p \neq pi} * AW\_Density_{p \neq pi})}{Migrant_{a,p \neq pi}}$$

where the migrant from origin pi is influenced by the culture of other migrants from other origins $p \neq pi$ within the migrant community of town a.

The estimation function is similar to Specification 3 and to estimate the horizontal cultural transmission with migrants, where I pool the migrant fathers of different origins in the same town:

$$Male_{ifat} = \alpha + \beta AW\_Neighbors_{j,pi,a} \times Post_t + \boldsymbol{\omega_2}\boldsymbol{X}'_{\boldsymbol{f}} \times Post_y + \phi_{ft} + \delta_{at} + \epsilon_{ifat} \tag{4}$$

Where ϕ_{ft} absorbs parents' origin-birthyear fixed effects, in which the family heritage channel of ancestor worship is absorbed. Standard errors are all three-way clustered in the fathers' origin, mothers' origin, and resident town. β is identified from varia-

tions in the sex selection of migrant fathers from the same origin, but surrounded by migrant neighbors from different origins. I also show that the effect of β is mainly driven by the relative size of the migrant community, proxied by the migrant rate in 1956.

I report the results from the community channel in Table 5. The estimates in columns 1 and 2 imply that migrant fathers living in the migrant community surrounded by neighbors with one s.d. (0.013) higher ancestor worship will be 2.34 p.p. more likely to have a boy when prenatal sex selection is available. This is about one and a quarter times of the family heritage channel. After rescaling the coefficient to account for the group size of migrants with different origins, the magnitude is about 10% of the coefficient of column 4 in Table 4.[24] The estimate in column 3 suggests that the effect of the community channel is mainly driven by the relative size of the migrant community. In other words, one p.p. increase in the migrant rate will generate 6.44% increase in the effect of the community channel.

I reproduce the above analysis for mothers. The estimates in Table A.12 are all on a smaller scale and not significant at the 10 percent level. The community channel of mothers is imprecise. Similar to the family heritage channel above, women are excluded from both vertical family transmission and horizontal community transmission. The reasons could be either the nature of ancestor worship, which requires the son to worship the male ancestors, so that women are automatically excluded; or the patrilineal culture is not welcomed and disliked by women, so that they have no incentive to accept and transmit the ancestor worship.

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[24]On average, the group size of migrants with different origins in a town is 36 times the group size of migrants with the same origin. Accordingly, when rescaling the community diffusion channel by the relatively average size of migrants with different origins, the marginal effect of an increase in the population to higher ancestor worship to migrants with different origins is $1.80/36 = 0.05$, which is about 10% of the increase in the same level of ancestor worship in the family heritage channel.

6 Changes in Preferences toward Son and Ancestor

To account for the above results on sex selections, I argue that Chinese migrants altered preferences toward son and ancestor of their children and social relationships. These changes translated into sex selections in subsequent generations. Since individuals form preferences early in life from learning and socializing with their parents, peers, and neighbors (Bisin and Verdier, 2023), people who grew up with gender-biased parents or in an environment with higher son preference, should form conservative attitudes to son and ancestor. To explore the validity of this argument, I analyze the long-run implications of ancestor worship brought by Chinese migrants for attitudes toward son and ancestor.

6.1 Data and Empirical Strategy

Taiwan Social Change Survey 1994 and 1999 proposed three statements related to attitudes toward son and ancestor to respondents, whether they think is 'not important at all', 'not important', 'neutral', 'important', or 'really important'. The statements are (1) 'To carry on the ancestral line, you should have at least one son', (2) 'You should bring honors to your family clan', (3) 'After death, people should be memorized and worshiped by their descendants'. I assign 0 to 'disagree' and 1 to 'agree', and use 0.25-point increments for responses in between, so that higher values indicate more conservative attitudes toward son and ancestor. To ensure respondents have interaction with migrants in their early life, I restrict the sample to people who were born after 1954. The summary statistics of preference on son and ancestor is shown in Table A.3. The subsample of males has higher valuations for son and ancestor than the whole sample.

Applying a similar approach as Specification 1, I test the horizontal transmis-

sion by comparing respondents who live in the town with different ancestor worship (migrants) :

$$Y_{ia} = \alpha + \beta AW\_Migrants_a + \boldsymbol{\omega} \boldsymbol{X}'_{\boldsymbol{a}} + \boldsymbol{\delta} \boldsymbol{X}'_{\boldsymbol{i}} + \theta_c + \sigma_t + \phi_s + \epsilon_{ia} \qquad (5)$$

where Y_{ia} denotes the one-point scale values of interest for respondent i who lives in town a. $\boldsymbol{X}'_{\boldsymbol{a}}$ is a set of historical controls and geographic characteristics assigned at the town level. I also include a set of individual controls $\boldsymbol{X}'_{\boldsymbol{i}}$, gender, number of children, marriage, and years of schooling. Besides, three types of fixed effects are included, county fixed effects θ_c, birthyear fixed effects σ_t, and survey fixed effects ϕ_s. I cluster standard errors at the town level. β is identified from variations in attitudes held by respondents of the same cohort but live in towns that experienced different ancestor worship (migrants).

6.2   Results

I report results in Table 6. The corresponding coefficients toward son preference, ancestor worship, and family honor are separately presented in Panel A, B, and C. With and without controls, the coefficients of interest are all significant at the 1% level or 5% level. Column 1 implies that respondents who live in the towns that experienced one s.d. higher ancestor worship (migrants), hold more conservative attitudes to son preference, ancestor worship, and family honor: the value of interest will be 2.2 pp, 1.3 pp, and 0.8 pp higher; which correspond to 5.2%, 1.8%, and 1.3% of the mean. Adding controls only slightly changes the estimates in Panel A and B from column 1 to 4, except for estimates in Panel C, which increase about 150%

35

from column 1 to 4.

7 Conclusion

Due to the specificity of Taiwan, this paper is the first to empirically investigate both horizontal and vertical cultural transmission in the same context. Taking advantage of the random assignment of migrants during KMT Retreat and a policy shock, Legalization of Abortion, I identify the causal effect of ancestor worship on sex selection and son preference through three different cultural transmissions: horizontal transmission between groups, vertical transmission through (paternal) family, and horizontal transmission with migrant communities.

I find that one s.d. increase in ancestor worship (migrants) can account for about 20% of excess males through horizontal transmission from migrants to locals alone, suggesting that the effect of culture is unignorable in both son preference and gender inequality. Consistent with Spolaore and Wacziarg (2022); Beach and Hanlon (2023), I explicitly show that cultural similarity matters for horizontal cultural transmission. The effect of vertical transmission is stronger. It is consistent with models of vertical transmission that cultural transmission through the family has the strongest effect. I show a novel way of cultural transmission, transmission within migrant communities. The marginal effect of transmission within migrant communities is only 10% of vertical transmission through family. However, when we consider the relative population of migrants with different backgrounds, the total effects of transmission within migrant communities are substantial and even larger than those of vertical transmission.

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Figures and Tables

Figure 1: The Geographic Distribution of Ancestor Worship (Migrants)

(0.35,0.40]
(0.30,0.35]
(0.26,0.30]
(0.21,0.26]
[0.16,0.21]
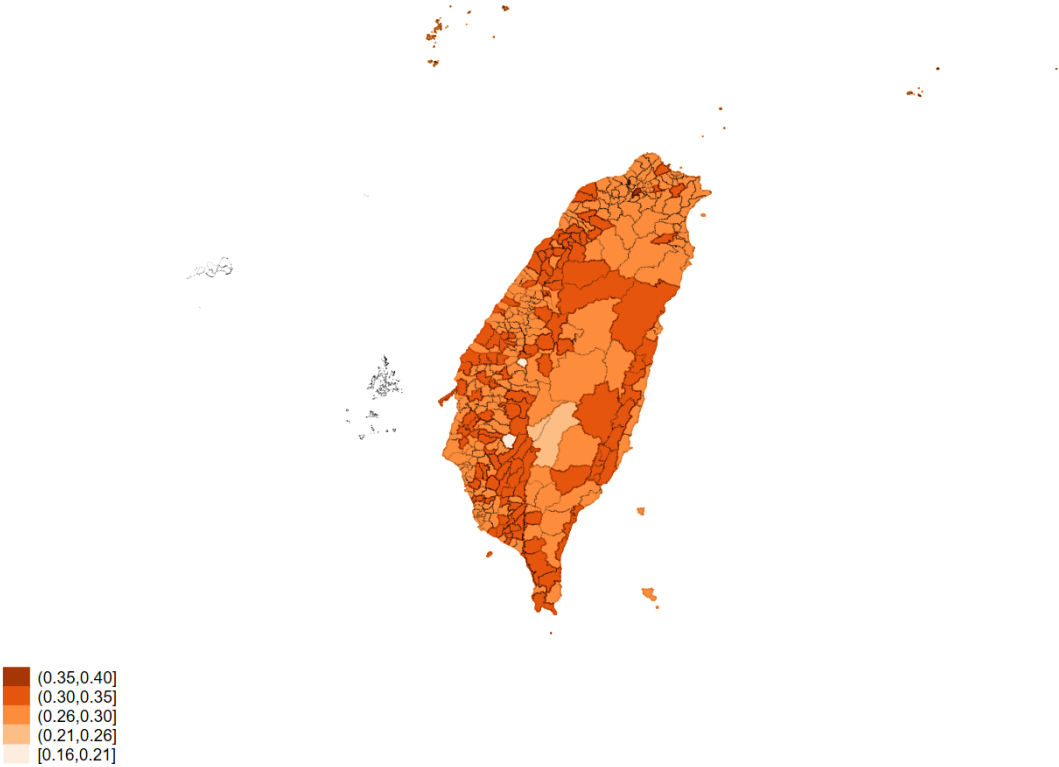
Figure 2: The Geographic Distribution of Ancestor Worship (Locals)

(0.44,0.55]
(0.33,0.44]
(0.22,0.33]
(0.11,0.22]
[0.00,0.11]
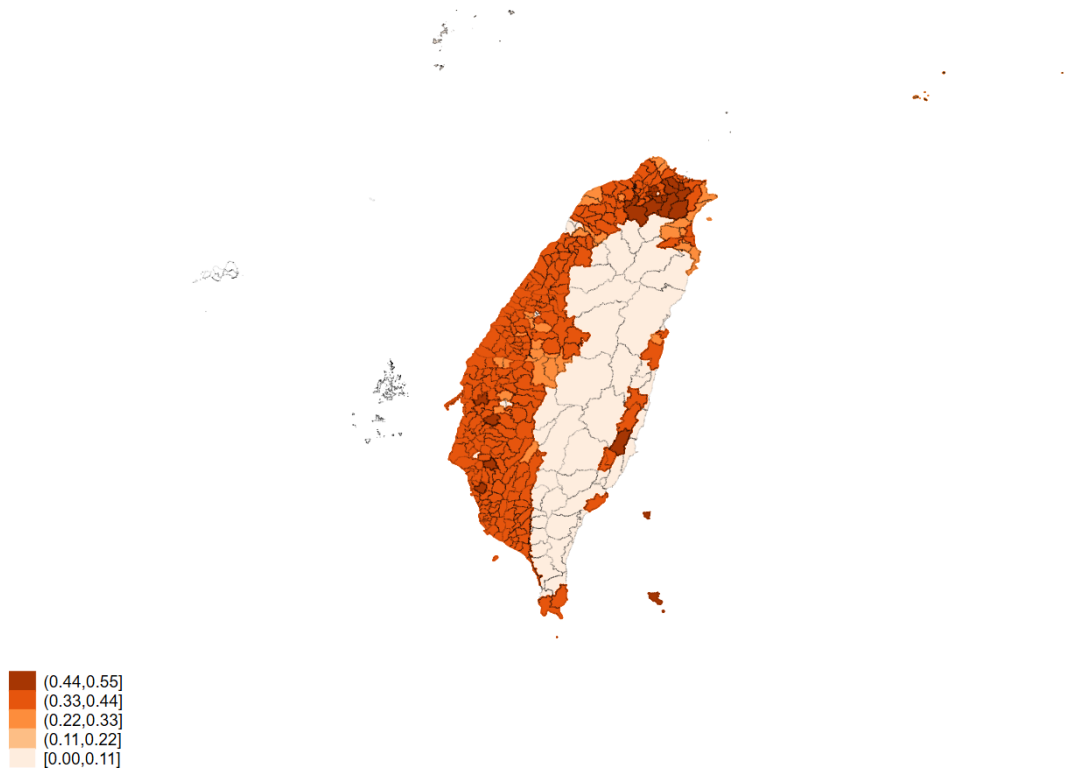
Figure 3: Fraction of Male over Time (1940-1990)

Data sources: 1980 and 1990 Taiwan Population Census
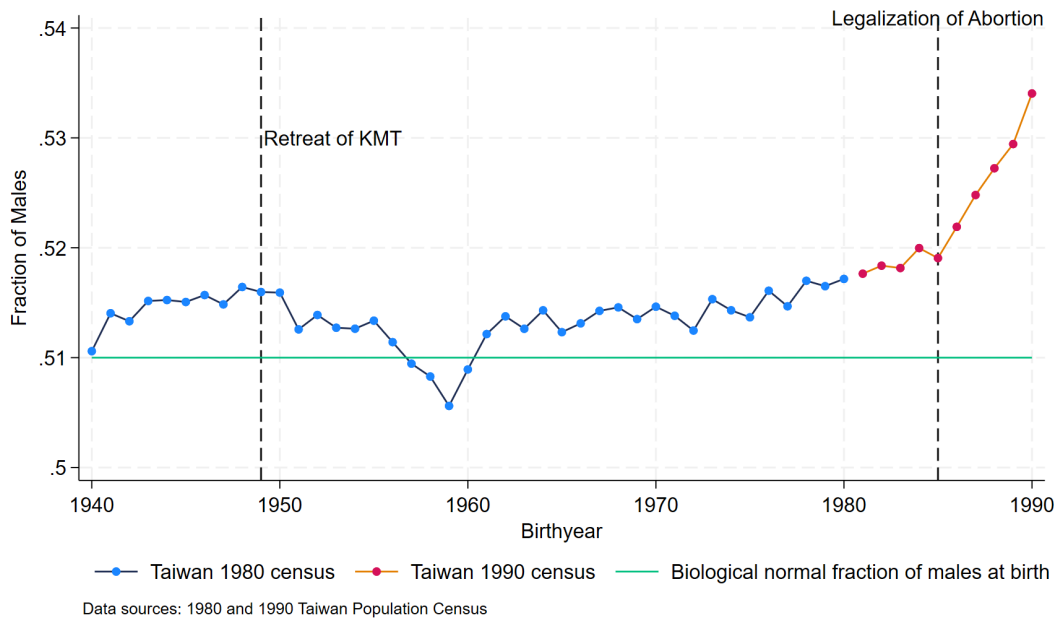
Figure 4: Fraction of Male by Birth Order (1981-1990)

Data sources: 1990 Taiwan Population Census
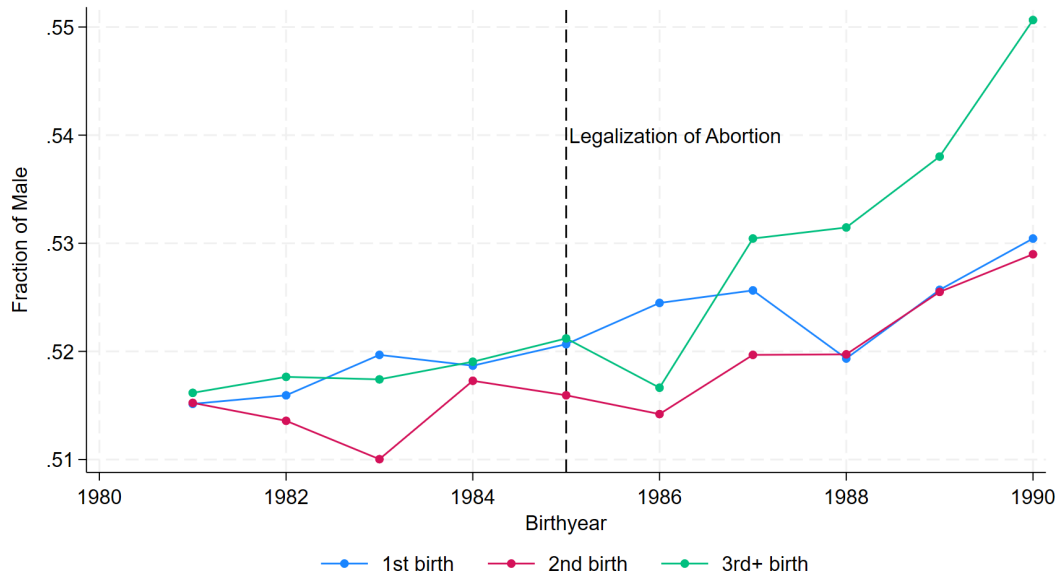
Figure 5: Historical Characteristics and Ancestor Worship (Migrant)
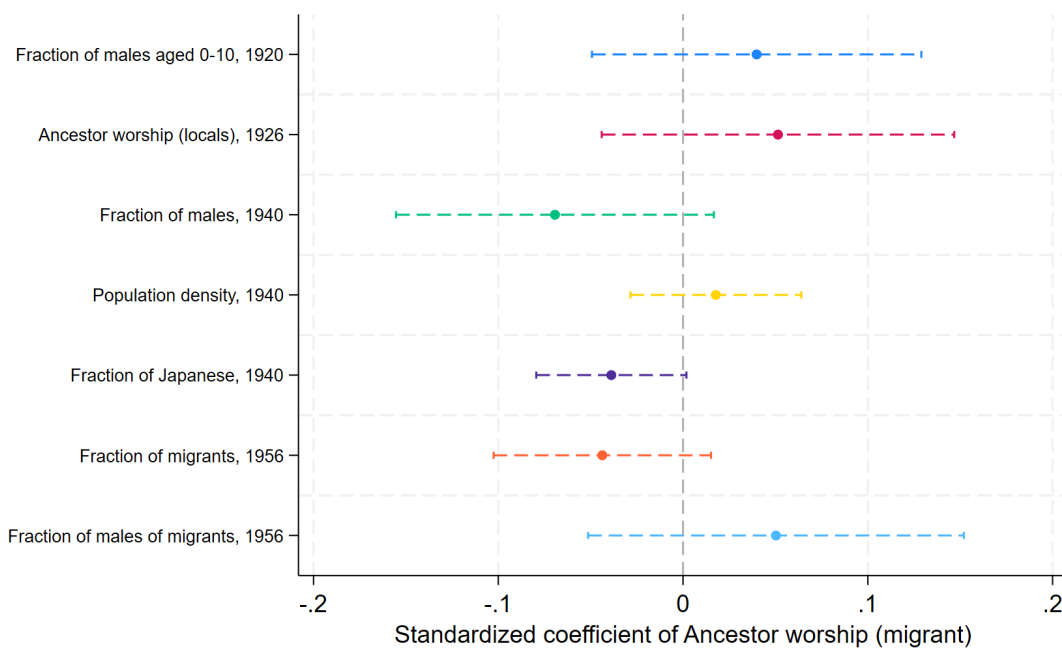
Note: The figure presents the estimated standardized coefficients and respective 95 percent confidence interval from estimating Specification (1) on various historical characteristics at town level (denoted on the y-axis), conditional on county fixed effects and geographic characteristics.

Figure 6: Event Study of the Ancestor Worship (Migrants) on Male (1981-1990)

95% Confidence Intervals Shown
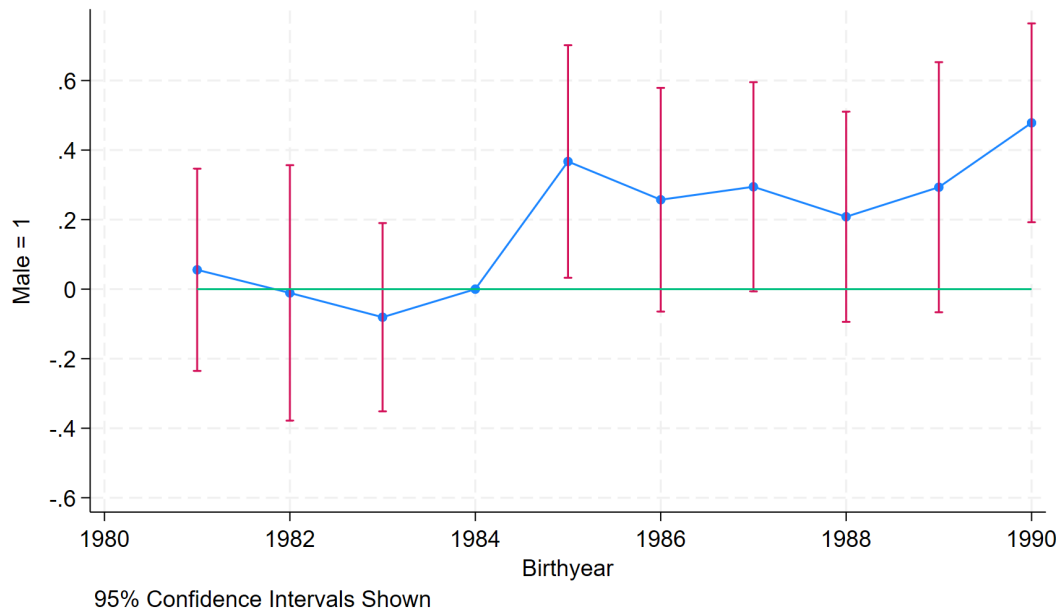
Note: The figure presents the event study by estimating an alternative version of Specification (2), which allows the estimators of ancestor worship (migrants) to vary by birthyear and uses the birthyear=1984 cohort as the baseline comparison group. With this, I can examine the trend of estimators before the Legalization of Abortion and the dynamic effects of ancestor worship (migrants) after the Legalization of Abortion.

Table 1: Ancestor Worship (Migrants) and Historical Characteristics

Dependent variable	Ancestor worship (migrants)			
	(1)	(2)	(3)	(4)
Fraction of males aged 0-10 in 1920	0.00	0.04	0.02	0.05
	(0.05)	(0.05)	(0.05)	(0.05)
Ancestor worship (locals) in 1926			0.11	0.10
			(0.07)	(0.08)
Fraction of males in 1940			-0.07	-0.09
			(0.06)	(0.07)
Population density in 1940			0.00	0.05
			(0.02)	(0.03)
Fraction of Japanese in 1940			-0.03	-0.05
			(0.05)	(0.06)
Fraction of migrants in 1956			-0.05	-0.02
			(0.04)	(0.03)
Fraction of males of migrants in 1956			0.09*	0.05
			(0.06)	(0.05)
County FEs	No	Yes	No	Yes
Geographic characteristics	No	No	Yes	Yes
# of Towns	348	348	348	348
Adj. R^2	0.000	0.033	0.028	0.066

Notes: This table reports standardized coefficients from regressing ancestor worship (migrants) on various demographic characteristics before 1945, migrant characteristics measured in 1956, and geographic characteristics. *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. Robust standard errors are in parentheses.
*** Significant at the 1 percent level. ** 5 percent level. * 10 percent level.

Table 2: The Effect of Ancestor Worship (Migrants) on Male Birth

Dependent variable	Male = 1			
Sample	1980 census	1990 census		
Birth order	All		1st&2nd birth	3rd+ birth
	(1)	(2)	(3)	(4)
Ancestor worship (migrants)	0.04**	0.06***	0.03	0.11***
	(0.02)	(0.02)	(0.02)	(0.04)
County FEs	Yes	Yes	Yes	Yes
Historical controls	Yes	Yes	Yes	Yes
Geographic characteristics	Yes	Yes	Yes	Yes
# of Towns	348	348	348	348
# of Observations	1,887,290	1,096,199	769,759	326,440
Outcome mean	0.516	0.528	0.525	0.534
Ancestor worship (migrants) s.d.	0.022	0.018	0.018	0.018

Notes: This table reports OLS coefficients from estimating Specification (1) on the sample of aged 0-4 children from 1980 census in column 1 and from 1990 census in column 2-4. The estimated results in column 3 and 4 only consider the first two birth order children and the third and higher order birth children. They jointly suggest that the sex selection driven by ancestor worship concentrates on the third and higher birth order children. The results from regressing male indicator county fixed effects, and a set of historical controls, as well as a series of geographic characteristics. *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. Standard errors are all clustered at the town level.
*** Significant at the 1 percent level. ** 5 percent level. * 10 percent level.

Table 3: The Effect on Male Birth after Legalization of Abortion (1990 Census)

Dependent Variable	Male = 1			
	(1)	(2)	(3)	(4)
Ancestor worship (migrants) X Post	0.33***	0.34***	0.33***	0.33***
	(0.08)	(0.08)	(0.08)	(0.08)
County-birthyear FEs	Yes	Yes	Yes	Yes
Town FEs	Yes	Yes	Yes	Yes
Historical controls X Post	No	Yes	Yes	Yes
Geographic characteristics X Post	No	No	Yes	Yes
Family controls X Post	No	No	No	Yes
# of Towns	348	348	348	348
# of Observations	353,136	353,136	353,136	353,136
Outcome mean	0.527	0.527	0.527	0.527
Ancestor worship (migrants) s.d.	0.018	0.018	0.018	0.018

Notes: This table reports OLS coefficients from estimating Specification (2) on the sample of aged 0-9 child of the third and higher order. The results from regressing male indicator on county-birthyear fixed effects, town fixed effects, and a set of historical controls, as well as a series of geographic characteristics and family controls. *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents. Standard errors are all clustered at the town level.

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table 4: The Effect of Migrant Father's Ancestor Worship on Their 3+ Birth Order
Children's Sex after Legalization of Abortion

Dependent variable	Male = 1				
	(1)	(2)	(3)	(4)	(5)
Ancestor worship (father) X Post	0.10***	0.50***	0.55***	0.56***	0.77**
	(0.01)	(0.17)	(0.24)	(0.24)	(0.38)
Town-birthyear FEs	No	Yes	Yes	Yes	Yes
Father's origin FEs	No	Yes	Yes	Yes	Yes
Mother's origin-birthyear FEs	No	Yes	Yes	Yes	Yes
Origin controls (father) X Post	No	No	Yes	Yes	Yes
Family controls X Post	No	No	No	Yes	Yes
# of Father's origins	46	46	46	46	41
# of Towns	300	300	300	300	272
# of Observations	30,437	30,437	30,437	30,437	21,112
Outcome mean	0.529	0.529	0.529	0.529	0.526
Ancestor worship (father) s.d.	0.034	0.034	0.034	0.034	0.034

Notes: This table reports coefficients from estimating Specification (3) on the sample of aged 0-9 children whose father is originally from mainland China in column 1-4, and whose parents are both originally from mainland China in column 5. The results from regressing male indicator on town-birthyear fixed effects, father's origin fixed effects, mother's origin-birthyear fixed effects, and origin controls (father) as well as a series of family controls. *Origin controls (father):* Imperial scholars density, Confucian clan density, and suitability index of wheat, wet rice, and tea of father's origin. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents, as well as whether parents are from the same origin. Standard errors are all clustered at the town level and migrant father's origin level.
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table 5: The Effect of Ancestor Worship Transmission within Migrants' Community on the 3+ Birth Order Children's Sex after Legalization of Abortion

Dependent variable	Male = 1		
	(1)	(2)	(3)
Ancestor worship (neighbors, father) X Post	1.76*	1.80*	1.00
	(1.03)	(1.01)	(1.05)
Ancestor worship (neighbors, father) X Post			6.44**
X Fraction of migrants in 1956			(3.01)
Town-birthyear FEs	Yes	Yes	Yes
Parents' origins-birthyear FEs	Yes	Yes	Yes
Family controls X Post	No	Yes	Yes
# of Father's origins	38	38	38
# of Towns	272	272	272
# of Observations	21,067	21,067	21,067
Outcome mean	0.526	0.526	0.526
Ancestor worship (neighbors, father) s.d.	0.013	0.013	0.013

Notes: This table reports coefficients from estimating Specification (4) on the sample of aged 0-9 children whose parents are both originally from mainland China. The results from regressing male indicator on town-birthyear fixed effects, parents' origins-birthyear fixed effects, and a series of family controls. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents, as well as whether parents are from the same origin. Standard errors are three-way clustered at the town level, migrant father's origin level and migrant mother's origin level.

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table 6: The Effect of Ancestor Worship (Migrants) on Preferences on Son and Ancestor

	(1)	(2)	(3)	(4)
Panel A: *Son Preference*				
Dependent variable	The importance of having at least one son			
Ancestor worship (migrants)	1.51***	1.19***	1.17***	1.54**
	(0.55)	(0.36)	(0.34)	(0.59)
# of Towns	73	73	73	73
# of Observations	2,263	2,263	2,263	2,263
Panel B: *Ancestor Worship*				
Dependent variable	The importance of being memorized and worshiping after death			
Ancestor worship (migrants)	0.84***	1.13***	1.13***	1.01**
	(0.29)	(0.35)	(0.34)	(0.43)
# of Towns	78	78	78	78
# of Observations	2,315	2,315	2,315	2,315
Panel C: *Family Honor*				
Dependent variable	The importance of bringing honor to your family clan			
Ancestor worship (migrants)	0.51**	0.59**	0.65**	1.33**
	(0.19)	(0.29)	(0.28)	(0.64)
# of Towns	73	73	73	73
# of Observations	2,263	2,263	2,263	2,263
County FEs	No	Yes	Yes	Yes
Birthyear FEs	No	Yes	Yes	Yes
Survey FEs	No	Yes	Yes	Yes
Individual controls	No	No	Yes	Yes
Historical controls	No	No	No	Yes
Geographic characteristics	No	No	No	Yes
Ancestor worship (migrants) s.d.	0.015	0.015	0.015	0.015

Notes: This table reports OLS coefficients from estimating Specification (5) on the sample of respondents born after 1954 in the Taiwan Social Change Survey (1994&1999). The results from regressing attitudes of interest on county fixed effects, birthyear fixed effects, survey fixed effects, and a set of historical controls, as well as a series of geographic characteristics and indivudal controls. *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. *Individual controls:* gender, marriage, number of children, years of schooling. Due to the missing information of survey sample, the number of children and years of schooling are neither controlled in Panel B.
*** Significant at the 1 percent level. ** Significant at the 5 percent level.

A   Appendix Figures and Tables

Figure A.1: Fraction of Male of Births by Birth Order (1982-1989) by Lin, Liu and Qian (2014)

Figure 3A: The Fraction of Males by Birth Year and Birth Order

Figure A.2: Trends of Fraction of Males in total and of locals (1920-1956)
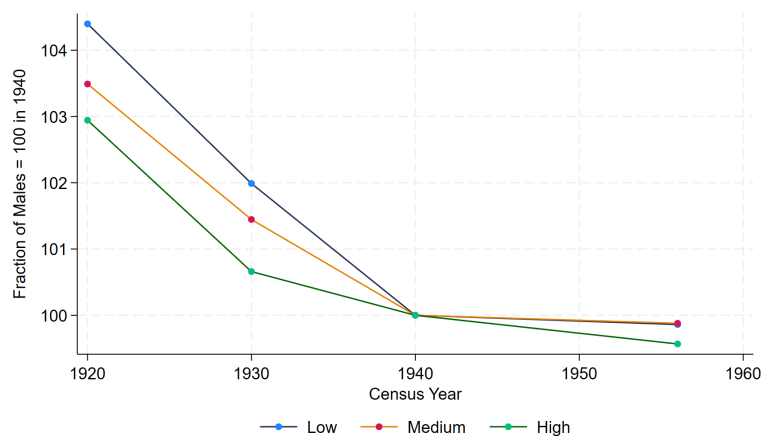
(a) Fraction of Males
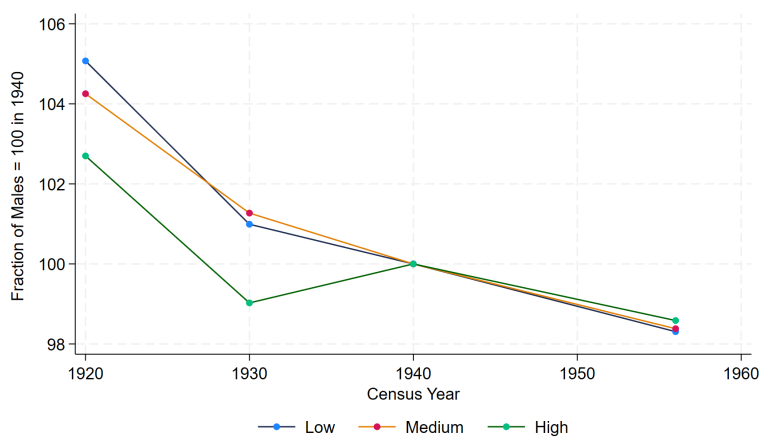
(b) Fraction of Local Males

Note: Relative trends of fraction of males and fraction of local males across groups of 116 towns with high, medium, and low ancestor worship (migrants) in 1920-1956 Taiwan census.

Figure A.3: Estimates Ancestor Worship (Migrants) by Cohorts (1915-1980)

95% Confidence Intervals Shown
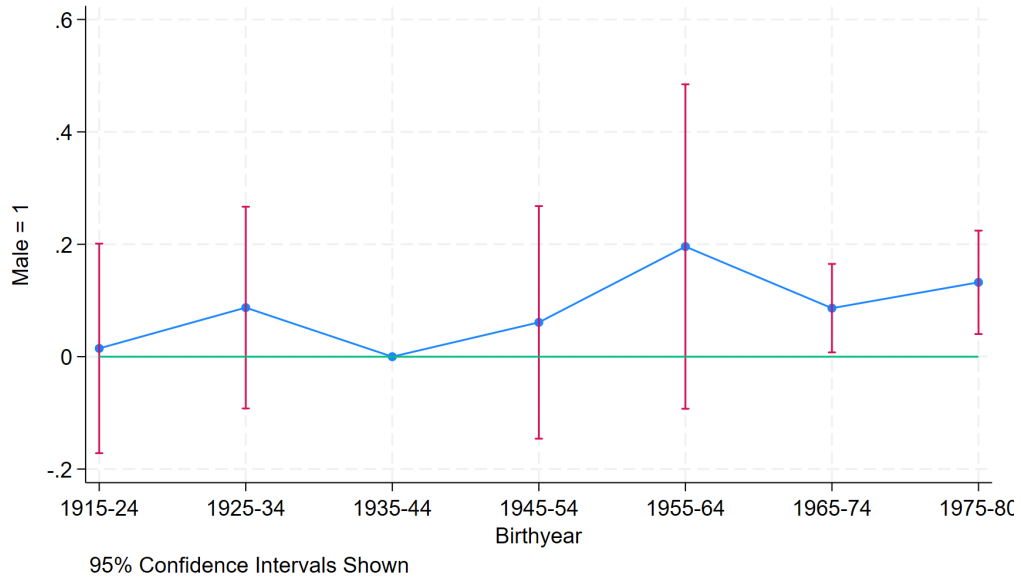
Note: I add town fixed effects, county-birthyear fixed effects, and origin-birthyear fixed effects in this analysis. The 1935-44 birth cohort is the comparison group in the graph. No clear culture selection patterns in determining the sex of residents before and during the 1945-54 KMT Retreat period. Ancestor worship (migrants) only has positive and significant effects on 1965 and later cohorts.

Table A.1: Summary Statistics of Town Level Characteristics

	Obs.	Mean	SD
Ancestor worship (migrants), 1956	348	0.300	0.0148
Ancestor worship (locals), 1926	348	0.331	0.132
Fraction of males aged 0-10, 1920	348	0.512	0.0143
Fraction of males, 1940	348	0.508	0.0162
Fraction of Japanese, 1940	348	0.0405	0.0625
Population density (per km^2), 1940	348	3164.8	12599.6
Fraction of males of migrants, 1956	348	0.653	0.0975
Fraction of migrants, 1956	348	0.0614	0.0915
Ln cotton suitability	348	6.901	1.955
Ln maize suitability	348	7.277	1.497
Ln tea suitability	348	8.039	1.165
Ln wet rice suitability	348	7.627	1.953
Ln white potato suitability	348	7.157	1.341
Ln wheat suitability	348	7.350	1.404
Ln distance to seashore	348	2.699	0.725
Ln distance to Taipei	348	4.777	1.047

Table A.2: Summary Statistics of Aged 0-9 Children with 3+ Birth Order in 1990 Census

	Obs.	Mean	SD
Male	353,136	0.527	0.499
Birth order	353,136	3.482	0.972
Father's age at child's birth	353,136	28.80	3.121
Father's birthyear	353,136	1958.38	2.962
Father's year of schooling	353,136	8.887	2.665
Mother's age at child's birth	353,136	26.38	3.327
Mother's birthyear	353,136	1960.96	3.417
Mother's year of schooling	353,136	7.938	2.545

Table A.3: Individual Preferences on Son and Ancestor in 1994 and 1999 Taiwan Social Change Survey

	All			Male		
	Obs.	Mean	SD	Obs.	Mean	SD
The importance of having at least one son	2,263	0.417	0.369	1,115	0.457	0.371
The importance of being memorized and worshiping after death	2,315	0.738	0.287	1.066	0.753	0.278
The importance of bringing honor to your family clan	2,263	0.593	0.319	1,115	0.615	0.314

Table A.4: Migrants and Home Characteristics

Dependent variable	Log Migrant population			
	(1)	(2)	(3)	(4)
Log Population of home province	1.38***	1.36***	1.26***	1.24***
	(0.14)	(0.11)	(0.17)	(0.18)
Log Population density of home province		38.89***	37.58***	31.40***
		(10.45)	(10.80)	(11.59)
Ancestor worship density			2.69	2.28
			(2.86)	(3.09)
Confucian scholars density				-0.01
				(0.04)
Clan density				0.90
				(0.67)
Social organization density				0.01
				(0.01)
# of Provinces	48	48	48	48
Adj. R^2	0.612	0.689	0.690	0.691

Notes: The sample is provinces in mainland China. This table reports coefficients from regressing log migrant population on log home population in 1953, home population density in 1953, ancestor worship density, Confucian scholars density, clan density in 1911, and social organization density in 1935. Robust standard errors are in parentheses. *** Significant at the 1 percent level. ** 5 percent level. * 10 percent level.

Table A.5: Robustness: The Effect on the Fraction of Males of Aged 0-9 Children with the 3+ Birth Order after Legalization of Abortion (1990 Census)

Dependent variable	Male = 1					
	County clustering (1)	Two-way clustering (2)	Parents' origins (3)	Year 1985 as pre-period (4)	Logit (5)	Probit (6)
Ancestor worship (migrants) X Post	0.33***	0.33***	0.34***	0.27***	0.32***	0.33***
	(0.08)	(0.08)	(0.08)	(0.09)	(0.08)	(0.08)
Town FEs	Yes	Yes	Yes	Yes	Yes	Yes
County-birthyear FEs	Yes	Yes	Yes	Yes	Yes	Yes
Parents' origins-birthyear FEs	No	No	Yes	No	No	No
Historical controls X Post	Yes	Yes	Yes	Yes	Yes	Yes
Geographic characteristics X Post	Yes	Yes	Yes	Yes	Yes	Yes
Family controls X Post	Yes	Yes	Yes	Yes	Yes	Yes
# of Counties	21	21	21	21	21	21
# of Towns	348	348	348	348	348	348
# of Observations	353,124	353,124	353,124	353,124	353,124	353,124
Outcome mean	0.527	0.527	0.527	0.527	0.527	0.527
Ancestor worship (migrants) s.d.	0.018	0.018	0.018	0.018	0.018	0.018

Notes: This table reports coefficients from estimating Specification (2) plus different variants, on the sample of aged 0-9 children. *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents. Standard errors are all clustered at the town level. Standard errors robust are clustered at town level, except in column 1, where I allow for clustering at county level and in column 2, where I allow for two-way clustering at town level and county-birthyear level. In column 3, I include parents' origin-birthyear fixed effects to control the heterogeneous effects of family culture. In column 4, I change *Post* to 0 if the birthyear is 1985. In column 5 and 6, I report the marginal effects of Logit and Probit model at the mean of covariates.

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table A.6: Corrlation of Ancestor Worship (Migrants) with Itself Generated by
Population and Area Wrights and Ancestor Worship Festivals

Dependent variable	Ancestor worship (migrants)		Ancestor worship (festivals)		
Weights	Pop	Area	None	Pop	Area
	(1)	(2)	(3)	(4)	(5)
Ancestor worship (migrants)	1.05***	0.85***	9.09***	9.98***	7.54***
	(0.02)	(0.01)	(0.72)	(0.86)	(0.75)
Towns (Observations)	348	348	348	348	348
Adj. R^2	0.881	0.897	0.312	0.278	0.223

Note: The table is to present the correlation between different statistics of ancestor worship culture, i.e. aggregating ancestor worship density and the number of ancestor worship festivals from county to province with weighted in population and area and without weights. Population data is from 1953 China Population Census. Area data is from the China Historical Geographic Information System. Standard errors are in parentheses.
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table A.7: Alternative measures of Ancestor Worship Culture Brought by Chinese Migrants

Dependent variable	Male = 1					
Variable Z	Ancestor worship (migrants)			Ancestor worship (festivals)		
Weights of Z	None	Pop	Area	None	Pop	Area
	(1)	(2)	(3)	(4)	(5)	(6)
Variable Z X Post	0.33***	0.29***	0.36***	0.03***	0.02***	0.03***
	(0.08)	(0.08)	(0.08)	(0.01)	(0.01)	(0.01)
Outcome mean	0.527	0.527	0.527	0.527	0.527	0.527
Explanatory variables s.d.	0.018	0.018	0.017	0.241	0.270	0.236

Notes: This table replicates column 6 of Table 3 with alternative measures of ancestor worship culture brought by Chinese migrants. The alternative measures are mentioned in Table A.6. All the fixed effects and covariates are controlled in each column. Estimate in the column 1 is the baseline estimate in column 4 of Table 3. *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents. Standard errors are all clustered at the town level.

*** Signicant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table A.8: Placebo Cultures introduced by Chinese Migrants

Dependent variable	Male = 1						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ancestor worship (migrants) X Post	0.33***						0.38***
	(0.08)						(0.11)
Clan (migrants) X Post		0.01					0.01
		(0.01)					(0.01)
Confucian scholars (migrants) X Post			0.01				0.00
			(0.01)				(0.00)
Tea (migrants) X Post				0.00			-0.03*
				(0.01)			(0.02)
Wet rice (migrants) X Post					0.03*		0.04*
					(0.01)		(0.02)
Wheat (migrants) X Post						0.02	-0.04
						(0.03)	(0.03)
# of Towns	348	348	348	348	348	348	348
# of Observations	353,136	353,136	353,136	353,136	353,136	353,136	353,136
Outcome mean	0.527	0.527	0.527	0.527	0.527	0.527	0.527

Notes: This table replicates column 4 of Table 3 with measures of other placebo cultures brought by Chinese migrants. The placebo cultures are family clan culture, Confucian culture, tea culture, rice culture, and wheat culture. The constructions of placebo cultures are similar to the ancestor worship (migrants) except replacing ancestor worship density by the corresponding measures of cultures in equations. The Estimate in column 1 is the baseline estimate in column 4 of Table 3. All the fixed effects and covariates are controlled in each column. *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents. Standard errors are all clustered at the town level.
*** Signicant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table A.9: The Heterogeneous Effect by Cultural Similarity

Dependent Variable	Male = 1			
Subsamples	Distance to Confucian School		Foot-binding Rate	
	< median	> median	< median	> median
	(1)	(2)	(3)	(4)
Ancestor worship (migrants) X Post	0.48***	0.02	0.18	0.58***
	(0.07)	(0.31)	(0.19)	(0.10)
# of Towns	174	174	174	174
# of Observations	234,242	118,894	144,850	208,286
Outcome mean	0.527	0.527	0.528	0.527
Ancestor worship (migrants) s.d.	0.018	0.018	0.018	0.018

Notes: This table reports OLS coefficients from estimating Specification (2) in different subsamles. All columns contain county-birthyear fixed effects, town fixed effects, and a set of historical controls, as well as a series of geographic characteristics and family controls. *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents. Standard errors are all clustered at the town level.
*** Significant at the 1 percent level.

Table A.10: The Effect of Migrant Mother's Ancestor Worship on Their 3+ Birth Order Children's Sex after Legalization of Abortion

Dependent variable	Male = 1				
	(1)	(2)	(3)	(4)	(5)
Ancestor worship (mother) X Post	0.10***	0.19	0.01	0.01	0.25
	(0.02)	(0.27)	(0.35)	(0.35)	(0.38)
Town-birthyear FEs	No	Yes	Yes	Yes	Yes
Mother's origin FEs	No	Yes	Yes	Yes	Yes
Father's origin-birthyear FEs	No	Yes	Yes	Yes	Yes
Origin controls (mother) X Post	No	No	Yes	Yes	Yes
Family controls X Post	No	No	No	Yes	Yes
# of Mother's origins	46	46	46	46	46
# of Towns	299	299	299	299	272
# of Observations	30,848	30,848	30,848	30,848	21,183
Outcome mean	0.531	0.531	0.531	0.531	0.526
Ancestor worship (mother) s.d.	0.034	0.034	0.034	0.034	0.034

Notes: This table reports coefficients from estimating Specification (3) on the sample of aged 0-9 children whose mother is originally from mainland China in column 1-4, and whose parents are both migrants in column 5. The results from regressing male indicator on town-birthyear fixed effects, mother's origin fixed effects, father's origin fixed effects and origin controls (mother) as well as a series of family controls. *Origin controls (mother):* Imperial scholars density, Confucian clan density, and suitability index of wheat, wet rice, and tea of mother's origin. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents, as well as whether parents are from the same origin. Standard errors are all clustered at the town level and migrant mother's origin level.
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table A.11: The Effect of Migrant Parents' Ancestor Worship on Their 3+ Birth Order Children's Sex after Legalization of Abortion

Dependent variable	Male = 1		
	(1)	(2)	(3)
Same X Ancestor worship (parents) X Post	0.29	0.41	0.32
	(0.22)	(0.32)	(0.34)
Different X Ancestor worship (father) X Post	0.52	0.82**	0.98**
	(0.39)	(0.39)	(0.42)
Different X Ancestor worship (mother) X Post	-0.18	-0.37	-0.24
	(0.31)	(0.36)	(0.38)
Town-birthyear FEs	Yes	Yes	Yes
Mother's origin FEs	Yes	Yes	Yes
Father's origin FEs	Yes	Yes	Yes
Origin controls (parents) X Post	No	Yes	Yes
Family controls X Post	No	No	Yes
# of Observations	21,183	21,183	21,183
Outcome mean	0.526	0.526	0.526
Ancestor worship s.d.	0.034	0.034	0.034

Notes: This table reports coefficients from estimating a modified Specification (3) on the sample of aged 0-9 children whose parents are originally from mainland China in column 1-3, town-birthyear fixed effects, mother's origin fixed effects, father's origin fixed effects and origin controls (parents) as well as a series of family controls. *Same* and *Different* indicate whether parents are from the same origin. *Origin controls (parents):* Imperial scholars density, Confucian clan density, and suitability index of wheat, wet rice, and tea of parents' origin. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents, as well as whether parents are from the same origin. Standard errors are all three-way clustered at the town level, migrant father's origin level and migrant mother's origin level.
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table A.12: The Effect of Ancestor Worship Transmission within Migrants' Community through Mother on the 3+ Birth Order Children's Sex after Legalization of Abortion

Dependent variable	Male = 1		
	(1)	(2)	(3)
Ancestor worship (neighbors, mother) X Post	0.93	0.98	0.98
	(1.03)	(1.00)	(1.06)
Ancestor worship (neighbors, mother) X Post X Migrant rate			-0.04
			(3.06)
Town-birthyear FEs	Yes	Yes	Yes
Parents' ancestry-birthyear FEs	Yes	Yes	Yes
Family controls X Post	No	Yes	Yes
# of Mother's origins	38	38	38
# of Towns	272	272	272
# of Observations	21,067	21,067	21,067
Outcome mean	0.526	0.526	0.526
Ancestor worship (non-father's origin) s.d.	0.013	0.013	0.013

Notes: This table reports coefficients from estimating Specification (4) on the sample of aged 0-9 children whose parents are both migrants. The results from regressing male indicator on town-birthyear fixed effects, parents' ancestry-birthyear fixed effects, and a series of family controls. *Family controls:* birth order of the child, age of parents at child's birth, and years of schooling of parents, as well as whether parents are from the same origin. Standard errors are three-way clustered at the town level, migrant father's origin level and migrant mother's origin level.
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table A.13: Impacts on Women's Fertility and Marriage

Dependent variable	Lifetime fertility	Childless	Never married	Age at 1st marriage
	(1)	(2)	(3)	(4)
Ancestor worship (migrants)	5.02***	-0.20***	-0.79***	-22.51***
	(1.60)	(0.04)	(0.10)	(4.25)
Birthyear FEs	Yes	Yes	Yes	Yes
Historical controls	Yes	Yes	Yes	Yes
Geographic characteristics	Yes	Yes	Yes	Yes
# of Counties	23	23	23	23
# of Observations	5,581	5,581	5,581	5,252
Outcome mean	2.25	0.027	0.06	23.47
Ancestor worship (migrants) s.d.	0.012	0.012	0.012	0.012

Notes: The sample is women born in 1954-1963 in the Taiwan Knowledge, Attitudes, and Practice of Contraception Survey (2003). The dependent variables are the number of children ever born to the women (column 1), the probability of being childless (column 2), the probability of keeping unmarried (column 3), and age at the first marriage (column 4). All specifications include birthyear fixed effects, a set of historical controls, and a series of geographic characteristics *Geographic characteristics:* the suitability index of cotton, maize, wet rice, white potato, wheat, and tea; (ln)distance to seashore, (ln)distance to Taipei. Standard errors are all clustered at the county level.
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

B   Ancestor Worship and Son Preference in China

B.1   Ancestor Worship and Missing Girls

Figure B.1 and B.2 jointly suggest that $AW\_Density$ is positively correlated with fraction of males at birth. I first use the location-based approach to regress the fraction of males at birth on $AW\_Density$ at the county level from the 2000 China Population Census. The estimation function is as followed:

$$Y_c = \alpha + \beta AW\_Density_c + \mathbf{X}_c^G + \mathbf{X}_c^C + \lambda_g + \epsilon_c \tag{6}$$

where Y_c is the fraction of male at birth in county c on 2000. $AW\_Density_c$ (mean = 0.28, s.d. = 0.13) is at the county level, $\mathbf{X}_c^G$ is a matrix with geographical characteristics which includes the suitability index of wheat, wet rice, maize, white potato, cotton, and tea. λ_g absorbs the prefecture fixed effects. As the pre-modern historical controls are all at the prefecture level, it is absorbed by λ_g. Standard errors are allowed to be correlated within prefecture.

Estimates are reported in Table B.1. Comparing column 1 and 2, it implies that about 70% impact of ancestor worship on missing girls can be explained by unobserved factors among prefectures. For the rest of the 30% effect, which is consistent with added controls from column (2) to column (3). They show that one s.d. increase in the $AW\_Density$ is associated with a 0.1 p.p. increase in the fraction of males at birth. Considering the fraction of males at birth is 53.5 p.p., 2.5 p.p. higher than biological normal; the estimator of $AW\_Density$ is modest. However, as we cannot have an exogenous variant in generating ancestor worship and distract it from the mixture of cultures and institutions, the estimator could be over or under reported. A series of communist movements in the 1950s to 1970s in improving gender gaps and changed the social norms a lot which may explain the relatively

small effects of ancestor worship in China. Booth, Fan, Meng and Zhang (2019) and Lippmann, Georgieff and Senik (2020) both show that communist movements in mainland China and East Germany improve gender gaps in multi-dimensions.

B.2 Ancestor Worship and Beliefs of Son and Patrilineality

I test the effects of ancestor worship on individual beliefs, with the use of 2010 and 2014 China Family Panel Survey (CFPS).[25] As ancestor worship emphasizes the consistency of a patrilineal family and the importance of afterlife, people with higher ancestor worship prevalence should naturally think of the patrilineal family continuation, after death life, ancestors and sons are more important. In 2010 CFPS, people are asked questions about the importance of the continuation of your male family line (hereafter, patrilineality) and the importance of you will be remembered and venerated by your offspring (hereafter Memorial after death). In 2014 CFPS, people are asked questions about the importance of bring honours to your ancestors (hereafter, ancestors' honour) and the importance of you should have at least one son (hereafter, at least one son). The importancy index in the both survey are ranged 0, 0.25, 0.5, 0.75, and 1. The higher the value, the more important they are for individuals. I estimate the following specification:

$$Y_i = \alpha + \beta AW\_Density_c + \mathbf{X}_c^G \Omega + \mathbf{X}_c^C \Theta + \mathbf{X}_g^H \Phi + \mathbf{X}_i^I \Delta + \gamma_t + \Psi_p + \epsilon_{ic} \qquad (7)$$

Where Y_i is the variables of interest for individual beliefs i. $\mathbf{X}_c^G$ is a matrix with geographical characteristics which includes the suitability index of wheat, wet rice, maize,

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[25]CFPS is a large-scale, almost nationally representative panel data survey conducted by the Institute of Social Science Survey at Peking University. Through a multi-stage probability sampling procedure, CFPS completes interviews with a total of 14,960 sampled households and all individuals living in these households, amounting to 42,590 completed individuals. The 25 provinces of China covered by CFPS represent about 95% of the Chinese population in mainland China, with Hainan, Inner Mongolia, Ningxia, Qinghai, Tibet and Xinjiang excluded from the overall sample.

71

white potato, cotton, and tea. $\mathbf{X}_i^I$ is a matrix of individual controls including han ethnic, gender, years of schooling, and Chinese communist party membership. $\mathbf{X}_g^H$ is a matrix of historical human and social capital accumulation in the g prefecture level, which includes the density of imperial scholars (*jinshi*), and Confucian clan. γ_t and Ψ_p are birthyear fixed effects the province fixed effects. I allow error term ϵ_{ic} to be correlated within county.

I report the results in Table B.2. It shows that people in the areas with higher ancestor worship prevalence, care more about and have a higher desire for patrilineal family continuation, being memorial after death, and ancestors' honours as well as the existence of sons These results also provide support for *AW_Density* as a proper proxy for ancestor worship belief and practices.
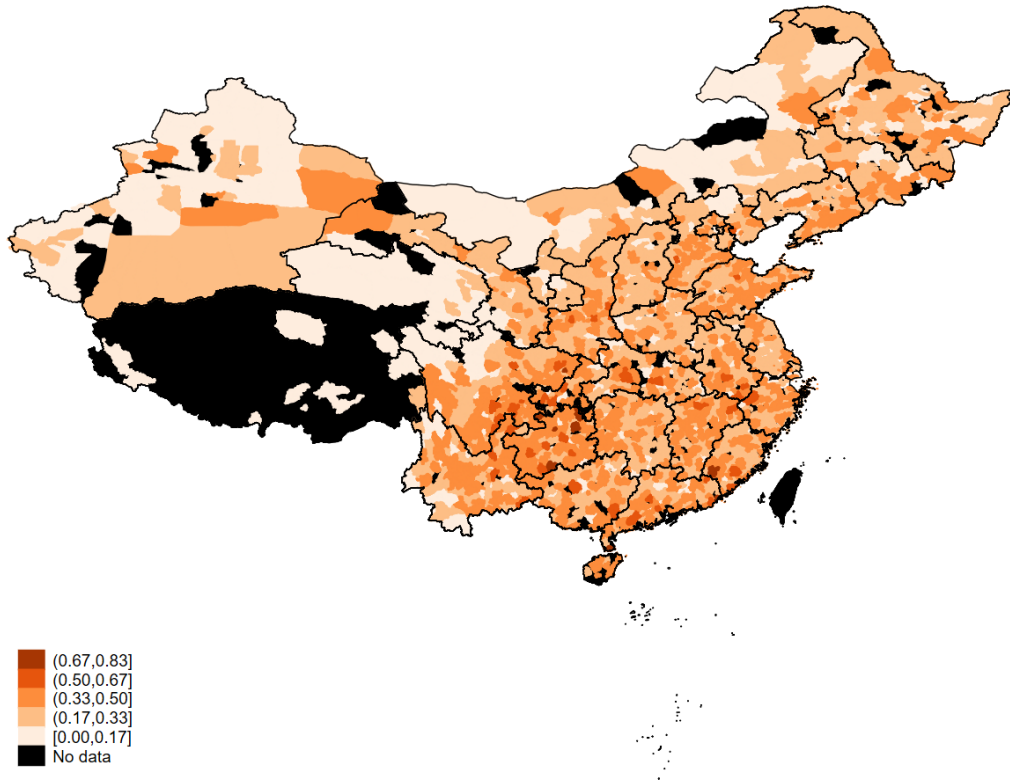
Figure B.1: Distribution of Ancestor Worship Density across Counties in China
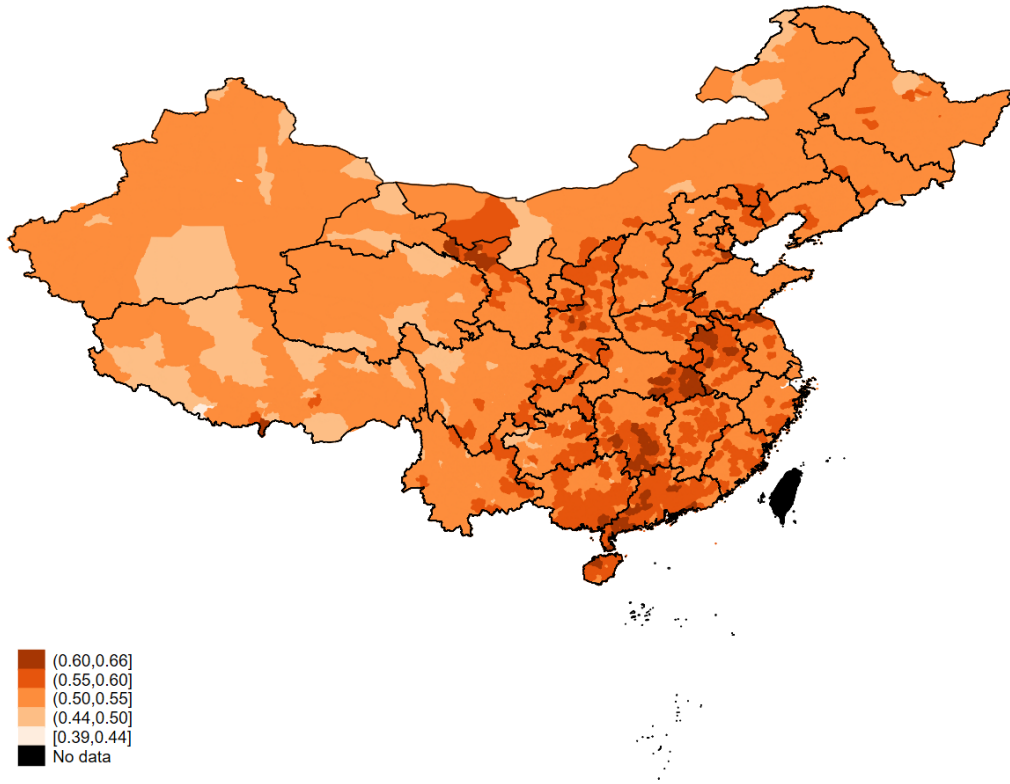
Figure B.2: Fraction of Male at Birth in China (2000)

Table B.1: The Impact of Ancestor Worship on Fraction of Male at Birth in China

Dependent Variable	Fraction of Male at Birth		
	(1)	(2)	(3)
AW_Density	0.031***	0.009**	0.008**
	(0.006)	(0.004)	(0.004)
Prefecture FEs	No	Yes	Yes
Geographic characteristics	No	No	Yes
# of Prefectures	324	324	324
Observations (Counties)	2,365	2,365	2,365
Outcome mean	0.535	0.535	0.535
Outcome s.d.	0.027	0.027	0.027

Notes: This table reports OLS coefficients of AW_Density on fraction of male at birth in China Population Census 2000. *Geographic characteristics:* the suitability index of wet rice, wheat, white potato, maize, cotton and tea.
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.

Table B.2: The Impact of Ancestor Worship on Beliefs in China

Dependent Variable: Importance of	Patrilineality	Memorial after death	Ancestors' honours	At least one son
	(1)	(2)	(3)	(4)
AW_Density	0.16***	0.26***	0.13**	0.23***
	(0.06)	(0.08)	(0.05)	(0.08)
Province FEs	Yes	Yes	Yes	Yes
Birthyear FEs	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes
Geographic characteristics	Yes	Yes	Yes	Yes
Historical controls	Yes	Yes	Yes	Yes
# of Counties	94	94	92	92
Observations	20,124	20,124	9,838	9,838
Outcome mean	0.770	0.612	0.766	0.660
Outcome s.d.	0.273	0.318	0.276	0.360

Notes: This table reports OLS coefficients of AW_Density on individual beliefs. The first two columns are estimated from CFPS 2010 and the last two columns are estimated from CFPS 2014. *Patrilineality* is the continuation of the patrilineal family line. *Memorial after death* is individual will be remembered and venerated by their descendants after death. *Ancestors honours* is individual should do things which make their ancestors and family glory rather than ashame. *At least one son* is individual should have at least a son. The values of dependent variables in column 1-4 range from 0 to 1; the higher the value, the more important they are. *Individual controls:* han ethnic, gender, Chinese Communist party membership, and years of schooling. *Geographic characteristics:* the suitability index of wet rice, wheat, white potato, maize, cotton, and tea. *Historical controls:* both imperial scholars density and Confucian clan density. Standard errors are all clustered in the county level. Estimates are computed using the sample weights provided in CFPS 2010 and 2014.
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 1 percent level.