Astrology and Matrimony: Social Reinforcement of Religious Beliefs on Marriage Matching in Vietnam*

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Abstract

This paper demonstrates the prevalence, pervasiveness, persistence, and resilience of a system of non-Big God religious beliefs, in absence of religious organizations and moralizing prescriptions, thanks to a self-fulfilling mechanism based on social insurance. We focus on Vietnamese' beliefs in predictions of marriage fortune by the Taoist astrological system of Tử Vi. First, we estimate a structural model of assortative marriage matching, and show that such beliefs' importance in marriage formation amounts to 6.5% of that of the entire age and education profile. Second, we estimate the effect of auspiciousness on couples' outcomes while controlling for selection into marriage using the structural model's predictions. Auspicious couples receive 11% more social transfers from their extended family, and up to 28% under hardship, because they are believed to be more harmonious and lucky. They further enjoy more consumption, income, and other welfare measures. We link the system's long-term persistence and resilience to its potential role as a commitment device between families.

Keywords: Non-Big God Religion, Traditional beliefs, Self-fulfilling prophecy, Marriage market, Social transfers, Social insurance, Second-order belief, Commitment device.
JEL Classification: Z12, O15, D83, G52, D64, J12, D16.

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"If men define situations as real, they are real in their consequences."

—The *Thomas Theorem* by Thomas and Thomas (1928),
as highlighted in Merton's (1948) "The Self-fulfilling Prophecy"

1 Introduction

Since Durkheim (1897) and Weber (1905), modern social sciences including economics have extensively studied religion as a fundamental social phenomenon, and emphasized its role in shaping social relations (Parsons, 1937, Malinowski, 1948, McCleary and Barro, 2006). Among a myriad of religions that have emerged in human history, a key explanation of success is Ari Norenzayan's theory (Norenzayan and Shariff, 2008, Norenzayan, 2013, Norenzayan et al., 2016) that a few religions with powerful, omniscient, interventionist, moralizing gods, dubbed "Big Gods", induce widespread prosocial behaviors, thus enable population expansion and cultural diffusion.[1] The economics of religion has also provided ample evidence of the contributions of Big God religions' norms and organizations to economic development (e.g., Becker and Woessmann, 2009, Chen, 2010, Valencia Caicedo, 2018). In contrast, some non-Big God religious beliefs have been shown to reduce prosociality (Gershman, 2016, Le Rossignol et al., 2021). Such evidence may suggest that those systems of beliefs are unimportant to economic decisions and even detrimental to welfare and development (Stoop et al., 2019). Indeed, traditional beliefs in the supernatural have been mostly overlooked in the economic literature, despite their prevalence throughout the world and especially in developing countries, such as beliefs in astrology, ancestors, witchcraft, and various elements of nature (Thomas, 1971, Bulbulia et al., 2013, Vyse, 2013, Gershman, 2015).[2]

In light of this view, this paper demonstrates significant real consequences of a large-scale, prevalent, persistent, resilient system of non-Big God traditional beliefs about the fortune of marriages in Vietnam, in absence of religious organization and moralizing prescriptions. We show empirically how it shapes marriage formation, and how believers' household welfare is improved by a social mechanism through social insurance. Consequently, those beliefs represent self-fulfilling prophecies (Merton, 1948), without any enforcement from religious organizations (Durkheim, 1912, Iannaccone, 1992). We further discuss the evolutionary benefits that may have helped them persist through centuries, and even revive after a period of strict suppression under communism.

[1] Norenzayan (2013) observes the "Matthew Effect" of religion that "while legions of new religious elements are created, most of them die out, save a potent few that endure and flourish," and argues that the few successful religions co-evolve with large-scale societies thanks to their sustained prosociality.

[2] Le Rossignol et al. (2021) reports from a 2010 PEW survey that 45.6% of Sub-Saharan African respondents believe in witchcraft. Despite such prevalence, major surveys on the economics of religion (McCleary, ed, 2011, Iyer, 2016, Carvalho et al., eds, 2019, Becker et al., 2021) have mostly bypassed topics such as traditional religious beliefs and superstition. A few recent exceptions include Gershman (2016), Nunn and Sanchez de la Sierra (2017), Stoop et al. (2019), Le Rossignol et al. (2021), Deopa and Rinaldo (2024).

Those beliefs are based on Tử Vi, an elaborate Taoist system of fortune predictions originating from ancient Chinese astrology and hemerology (see section 2).[3] From one among multiple divinatory systems in China (Lackner, ed, 2017, Volkov, 2013), it has become the predominant system in Vietnam (Huard and Durand, 1954). Despite its suppression under decades of Communist restraints on religions, its resurgence after Vietnam's Reform since the 1990s has regained widespread popularity all over Vietnam, a testimony to its resilience. We focus on a highly popular and commonly known part of Tử Vi: the prediction on whether marriages will be auspicious, neutral, or inauspicious based on the husband's and the wife's birth years.[4] Built on ancient astrological notions and philosophy, the predictions vary widely from year to year, and do not favor any particular year (e.g., there is no "dragon year effect" as studied by Do and Phung, 2010 and others). Their arbitrariness is particularly useful to study Tử Vi beliefs' on marriage formation and marriage outcomes.

Part I of the empirical analysis (section 3) quantifies the role of astrological beliefs in shaping marriage formation. We consider a Becker-Shapley-Shubik model of assortative matching with transferable utility (Becker, 1973, 1974, Shapley and Shubik, 1971), and estimate it structurally using Galichon and Salanié's (2022) and Dupuy and Galichon's (2014) method on the Vietnamese Censuses of 1989, 1999, and 2009, and the Vietnamese Population Survey from 2006 to 2018. There are two major reasons to take the structural approach instead of linear regressions with shares of different types of marriages. First, there are strong spillover and general equilibrium effects across agents in a marriage market, in the sense that a change in an agent's demand can have broad consequences across other types of agents.[5] While this inherent feature is hard to address in a reduced-form approach, the structural approach provides an explicit, transparent, and comprehensive modeling and estimation of all market features (Chiappori and Salanié, 2016, Chiappori, 2020). Second, Part I's structural approach provides a natural extension to treat the issue of selection into marriage when we inquire on the effects of a couple's auspiciousness on household outcomes in Part II, a point that will be made clear in Part II's methodology in subsection 4.1.

Part I shows that astrology matters significantly to matrimony. Tử Vi's predicted auspiciousness contributes significantly and robustly to the matching surplus function at the heart of the model's explanation of marriage patterns – its role in 2009 ranges from 6.5% to 6.9% of that of the couple's entire age and education profile. Its geographical and chronological patterns further reflect the history of Vietnam's relaxed religious control in the late 1980s, leading to a reversal of religious

[3] In official records, Tử Vi goes back at least as far as the 16$^{\text{th}}$ century CE Taoist Canon *Taozang* (Kalinowski, 1989), while unofficial accounts date from the 10$^{\text{th}}$ century CE.

[4] In subsection 5.2's representative survey among ethnic Vietnamese, 82% of households have some level of knowledge of the predictions on marriage fortune based on birth year. When it comes to their own marriage, 31% did consider Tử Vi to some extent, and 45% report that their family and relatives did.

[5] Several attributes of marriage markets contribute to this feature, including the exclusivity of matches (each agent can only be matched once) and the lack of pricing mechanism with a single price.

importance in urban versus rural areas, and in the North versus the South. Astrology's importance increases with a province's religiosity and strength of social ties, and decreases with its development.

Part II of the empirical analysis (section 4) examines household outcomes of Tử Vi's auspicious couples to study the social mechanism that provides them with an advantage, making the beliefs self-fulfilling. To address the bias due to selection into marriage by auspiciousness, we adapt a control function approach in the spirit of Heckman selection (e.g., Heckman and Vytlacil, 2005) that (i) computes a couple's predicted probability of marriage from Part I's model and Bayes' rule, then (ii) controls for a nonparametric function of this quantity in the regression of household outcome on auspiciousness and other conventional controls. This identification strategy relies on the reasonable assumption that the availability of other types of individuals in the same local marriage market affects a couple's selection probability, given the strong spillover effects on marriage markets, but not the couple's outcomes. It relates to other reduced-form empirical strategies that proxy marriage market opportunities with the gender ratio in a given cohort or region as in Angrist (2002) and Chiappori et al. (2002).

We apply this method on 9 waves of the Vietnam Household Living Standards Survey (2002-2018) to assess the commonly held belief that auspicious couples have better luck, hence help from their families and friends will be more useful. We find that a couple's auspiciousness increases social transfers from their social circles by 11% on average, up to 22% for low-income families, and 28% in case of severe hardship (hospitalization of a family member).[6] Auspicious couples are less likely to liquidate their assets or borrow from outside their social circles. Those results are robust to a battery of robustness checks, including notably a quasi RDD exercise using the months of birth around the lunar year cutoff. The effect is driven by Vietnamese and Chinese ethnics of non-Big God faith(s), and is insignificant among Big-God believers.

In consequence, those couples enjoy 2.9% higher household expenditure and 2.3% higher income, better self-assessed living standards, and their children are less likely to fall behind or drop out of schools, especially in hardship.[7] Auspicious couples thus have significantly better living standards, which confirms Tử Vi's predictions.

We continue to discuss major theoretical explanations of those self-fulfilling beliefs in subsection 5.1. The first involves the common beliefs that auspicious couples are more blessed and harmonious, therefore their social circles are more willing to help in case of needs. While those beliefs are based on rather arbitrary Tử Vi predictions, they may still be sustained in the long run for the reason suggested in Fudenberg and Levine (2006), in that such beliefs can only be refuted at two to three

[6] We also find that the selection bias due to selection by auspiciousness is rather small and inconsequential.

[7] We detect no auspiciousness effect on a couple's fertility decisions and the age and gender compositions of their children, which suggests that the effect on children's education works through social transfers in time of hardship.

steps off the equilibrium path, which may be observed very rarely.[8] The second follows Iannaccone's (1992) theory of religion as a club good, in that auspicious matching is a signal of conformity to religious norms, for which norm-conforming couples can enjoy better social insurance from their social circle.[9] The third considers discrimination of inauspiciousness following Coate and Loury's (1993) theory of self-fulfilling discrimination, in that inauspicious couples work less hard, thus should receive less help.[10] The fourth is about a direct psychological effect on auspicious couples' life satisfaction, which can improve their household welfare.

We delve into those explanations in subsection 5.2 thanks to a representative survey on people's beliefs in Tử Vi. The survey confirms the pervasiveness and importance of this system of beliefs in the life of Vietnamese. Using the same strategy to address selection into marriage, we find evidence that illuminates above all the first explanation of an effect of auspiciousness on beliefs that auspicious couples have better luck and harmony. The effect is markedly stronger on second-order beliefs, i.e., what a couple believe what their social circles think about their auspiciousness, than on first-order beliefs, which further emphasizes the social nature of the mechanism. There is weak evidence on the explanation based on traditional norms, and no evidence on explanations by hard work or direct psychological effect.

To better understand the long-term persistence and resilience of the system of beliefs in Tử Vi, we further study its potential evolutionary benefits in the spirit of Giuliano and Nunn (2021) in subsection 5.3. First, it can explain 39% of the relationship between religiosity and prosociality in Vietnam, which can be a major source of long-term benefits (Norenzayan, 2013). Second, beliefs that restrict the set of potential matches can be a commitment device that enhances cooperation and coordination (Ligon et al., 2002). We find indirect evidence of such mechanism in that astrological beliefs are more important in areas with weaker in-group trust (but not for generalized trust).

This paper contributes a novel angle to the economics of religion since Iannaccone (1988, 1992, 1998), Barro and McCleary (2003), and McCleary and Barro (2006).[11] This literature has particularly stressed the role of religion in providing insurance for consumption (Chen, 2010, Ager and Ciccone, 2018) and happiness (Dehejia et al., 2007) through religious organizations, where religious norms and contributions to religious organizations are seen as requirements of a club good. This combined package of religious beliefs, organizations, and normative prescriptions is also the subject of other pioneering work on Big-God religions (Becker and Woessmann, 2009, Norenzayan, 2013,

[8] Relatedly, some traditional beliefs in Zambia attribute childbirth complications to infidelity, which creates confusion and impedes the rational learning of childbirth risks from experienced complications (Ashraf et al., 2017).

[9] While Tử Vi contains no normative judgments or requirements, Vietnamese couples may still care about Confucianist norms of filial duties, including following their parents' guidance.

[10] While the second explanation is based on hidden types, the third considers hidden actions.

[11] The literature is surveyed in McCleary, ed (2011), Iyer (2016), Carvalho et al., eds (2019), Becker et al. (2021).

Campante and Yanagizawa-Drott, 2015, Benjamin et al., 2016, Valencia Caicedo, 2018, Bryan et al., 2021). In distinction from the literature, this paper demonstrates a self-fulfilling prophecy by a social mechanism (Merton, 1948) of certain non-Big-God, non-moralizing religious beliefs in absence of moralizing norms and organizations. Hence, it suggests an explanation of the persistence and proliferation of some non-Big-God religions, in complement to Norenzayan's (2013) theory of Big-God religions. It also goes beyond the commonly emphasized persistence of cultural values in showing that religious beliefs can be resilient to repression, and resurrect strongly afterwards. This phenomenon contributes to recent investigations of the contexts that shape cultural persistence (Alesina and Fuchs-Schündeln, 2007, Bau et al., 2023, Buggle and Durante, 2021, Giuliano and Nunn, 2021, Nunn, 2021).

This paper thus joins a small set of recent papers that study traditional, non-Big-God religious beliefs around the world. Among them, Nunn and Sanchez de la Sierra (2017) shows a mechanism with long-term benefits among Congolese villagers who fight courageously because of their beliefs in rituals that make them bullet proof, which deters bandits from attacking their villages. Butinda et al. (2023) examines another mechanism by which religious rituals can reduce beer retailers' perceived risk of theft, which makes them invest more and earn more profit.Le Rossignol et al. (2021) provides experimental evidence that beliefs in witchcraft shape prosocial behaviors in the field. Similar to those papers, ours considers how a system of beliefs could sustain itself in the long run thanks to a self-fulfilling mechanism. While those papers highlight psychological mechanisms that work at the individual level, we instead emphasize the predominant role of a social mechanism that works through interactions in social circles.[12]

This paper also connects with the literature on traditional beliefs in astrological predictions and their influences on human behaviors (Do and Phung, 2010, Mocan and Yu, 2020, Agarwal et al., 2021, Beam and Shrestha, 2020, Johnson and Nye, 2011, Bhattacharya et al., 2018, Hirshleifer et al., 2018, Fisman et al., 2022, Wu and Zha, 2024). To explain those predictions' correlation with certain outcomes, this literature has mostly unveiled selection effects, such as Do and Phung's (2010) discovery that Vietnamese children born in auspicious years have better outcomes thanks to their being planned by parents. On pairwise matching, Wu and Zha's (2024) also finds evidence in favor of zodiac compatibility in China, highlighting the prevalence of beliefs in marriage fortune in Sinic cultures.[13] Beyond selection and one-way influence on behaviors, our paper deepens with

[12] Ashraf et al. (2017) discusses a related social mechanism concerning the traditional belief that childbirth complications are due to infidelity, by which mothers may hide indicators of risk for fear of accusation of infidelity.

[13] Most of those papers except Wu and Zha's (2024) consider predictions on individual behaviors and outcomes. Wu and Zha's (2024) findings are close to this paper's Part I, without evidence of an effect on couples' outcomes. Wu and Zha's (2024) zodiac compatibility table is quite different from Tử Vi's, as there exist several competing divinatory systems in China, of which *Ziwei Doushu* is one (Lackner, ed, 2017, Volkov, 2013).

evidence on how those beliefs affect living standards and education through a social mechanism. Our demonstration of their self-confirming property forms the basis of our explanation of their persistence and resilience.

More generally, this paper contributes to the literature on the impact of cultural values and beliefs on family decisions (Banerjee et al., 2013, Fernández and Fogli, 2009). It enriches the literatures on marriage matching (Choo and Siow, 2006, Dupuy and Galichon, 2014, Chiappori, 2020, Chiappori et al., 2024) and marriages in developing countries (Anukriti and Dasgupta, 2018, Corno et al., 2020) with evidence of a novel factor based on cultural values and a mechanism of social enforcement. It also connects with the literature on the transmission of cultural values and norms (Bisin and Verdier, 2000, 2001). Different from Bisin and Verdier's (2001) modeling of parents' decisions, this paper's evidence suggests that beliefs can be transmitted across generations thanks to incentives in the social circle.

The paper's emphasis on the social mechanism through social transfers further highlights the link between traditional beliefs and practices and social insurance in developing countries.[14] The related literature has documented the important role of marriage decisions in shaping households' consumption smoothing (Rosenzweig and Stark, 1989, Corno et al., 2020, Corno and Voena, 2023), with focus on the bride's family. This paper instead considers a married couple's consumption smoothing problem and transfers from their extended family, and emphasizes the mutual reinforcement between social insurance and the alignment of religious beliefs: The alignment of religious beliefs with a household's extended family helps consumption smoothing, so in expectation marriages are shaped by those beliefs. On this link between social insurance and religious beliefs, this paper complements Auriol et al.'s (2020) evidence on how social insurance shapes beliefs in probabilities of disaster in a Big-God religious context.

Through the linkage between Parts I and II, the paper also proposes a novel strategy to deal with selection into marriages. It leverages the strength of the structural approach from the empirical literature on marriage markets (Chiappori and Salanié, 2016, Chiappori, 2020) to build a control function à la Heckman to address selection (Heckman and Vytlacil, 2005) in the reduced-form second stage. As such, the data used in the two parts do not need to be linked by individual, and can come from different sources (such as a census and a panel of household surveys) as long as they refer to the same timeframe and population. This feature may prove useful in other contexts. The paper clarifies this strategy's assumptions and discusses some robustness tests.

[14] Social insurance is the major source of consumption smoothing where there is practically no meaningful state- or market-based mechanisms of consumption smoothing (Townsend, 1994, 1995, Ambrus et al., 2014). In this paper's context, as well as most developing countries, it is based mostly on networks of friends and extended family (Fafchamps and Gubert, 2007, Fafchamps and Lund, 2003) and their commitment capacity (Ligon et al., 2002).

2 "Tử Vi": Taoist astrological beliefs in Vietnam

History of Tử Vi. The Tử Vi system (Tử Vi Đẩu Số in full) contains predictive, divinatory beliefs on the fortune of marriage, birth, death, endeavors, travel, etc. It takes root from its Chinese origin *Ziwei Doushu* (紫微斗数), one of the astrological divinatory texts in the Taoist Canon *Daozang*, and can be dated back to at least the 16th century (Kalinowski, 1989).[15] This system builds on a long tradition of emphasis on divination in Chinese history, especially that by astrology and hemerology, since the third millennium BCE.[16]

The importation of those popular astrological Taoist beliefs was part of the transmission of knowledge of calendrical studies and astrological divination from China towards Vietnam (Pham and Le, 2021). Recorded at least since the Lý dynasty (11th-13th century), all Vietnamese dynasties established a Royal Office of Astrology in charge of those affairs (Volkov, 2013). From the 15th to the 19th century, while Confucianist doctrine emerged dominant from the "Three Teachings" religious equilibrium between Confucianism, Buddhism, and Taoism, various types of Taoist worships penetrated deeply in Vietnamese culture from the royal court down to commoners' daily life. Emperors of the last dynasty, the Nguyễn (1802-1945), held particularly strong beliefs in astrological divination and elevated the nationwide influence of the Directorate of Celestial Observatory (Khâm Thiên Giám) (Nguyễn, 2010, Trần, 1996).[17]

While *Ziwei Doushu* is only one among different major systems of divinatory beliefs in China,[18] in Vietnam Tử Vi has grown to become the sole dominant system that governs fortune beliefs for

[15] In its collection of all divinatory texts in the *Daozang*, Kalinowski (1989) reports the earliest full manual of *Ziwei Doushu* from the 16th century, but also acknowledges that many unofficial sources attribute its origin back to the sanctified Taoist Chen Tuan (陈抟, 9th-10th century CE) (Huard and Durand, 1954). As the proliferation of Buddhism during the Tang dynasty (7th-10th century CE) brought Near Eastern astrological materials to China (Kotyk, 2017a,b), Kalinowski (1989) remarks that *Ziwei Doushu* may be seen as the last stage of a long process of integration of Greco-Indian astrology.

[16] In the famed 2nd century BCE *Shiji* (*Records of the Historian*), China's first systematic, trans-dynastic records of written history, among eight chapters on social history, Sima Qian dedicated chapter four to hemerology and chapter five to astrology and astronomy (Wilkinson, 2013). On this topic, Pankenier (2013) carefully documents astrological beliefs and practices in Ancient China with certain archaeological evidence dating back to the third millennium BCE, and numerous examples from historical and archaeological sources that astrology and astromancy played a predominant role in statecraft and military affairs since the Zhou dynasty in the first millennium BCE, notably in establishing a dynasty's Heavenly Mandate (Pankenier, 1995, 1998).

[17] Its directorship became a major fifth rank mandarin (on a scale from first to ninth), e.g., the same rank as the Chief Royal Medical Doctor. *Đại Nam Thực Lục* (Quốc sử Quán Triều Nguyễn, 2001), the Nguyễn dynasty's official historical records, recounts many episodes during which the Directorate influenced major decisions and were held accountable for major predictions in state affairs.

[18] Kalinowski (1989) collections and categorizes more than 40 texts on divination in the Taoist Canon *Daozang*. Yoshinobu (2000) chronicles the history of divination in China, with recorded and archeological evidence ranging from ancient osteomancy to modern practices of *Fengshui* and *Ziwei Doushu*. Limited to hemerology and astrology, Volkov (2013) details the three major systems of divinatory beliefs in China, of which *Ziwei Doushu* is one. Lackner, ed (2017) examines in depth the many divinatory systems that have emerged and prospered in China, and chapter 6 therein (Steavu, 2017) discusses *Ziwei Doushu* as one among those built on astrology and hemerology.

centuries before the turmoils of the 20th century Vietnamese history. It was first mentioned in Western records by French colonial scholars in Dumoutier (1899, 1914, 1915) and Coulet (1926, 1929), and highlighted by Huard and Durand (1954) as by far the most popular divination system. Therefore, we expect that its impacts on Vietnamese couples and households can be more precisely estimated than in the more diverse Chinese context.

Vietnam's Communist regime imposed very strong restrictions and control on religious beliefs, activities, and organizations, first in the North after the First Indochina War since 1954, and then in the whole country after the Second Indochina War since 1975. As an unorganized system of beliefs, Tử Vi was considered a superstition and social vice, hence restricted and banned from discussion and consideration. The State waged multiple campaigns to eradicate superstitions, in particular divination, which confiscated diviners' tools and books (Văn, 2008). In the South before 1975, the beliefs and practice of Tử Vi were unconstrained, and substantiated by countless books that record and analyze its considerations. By the late 1980s, as the massive wave of Đổi Mới (Reform) since 1986 gradually relaxed religious restrictions (Đặng, 2006, Nguyễn, 2011, 2012, Taylor, ed, 2007), Tử Vi slowly resurrected and regained its popularity throughout Vietnam, especially in the North. We will later examine the impacts of Tử Vi through those recent historical inflections.

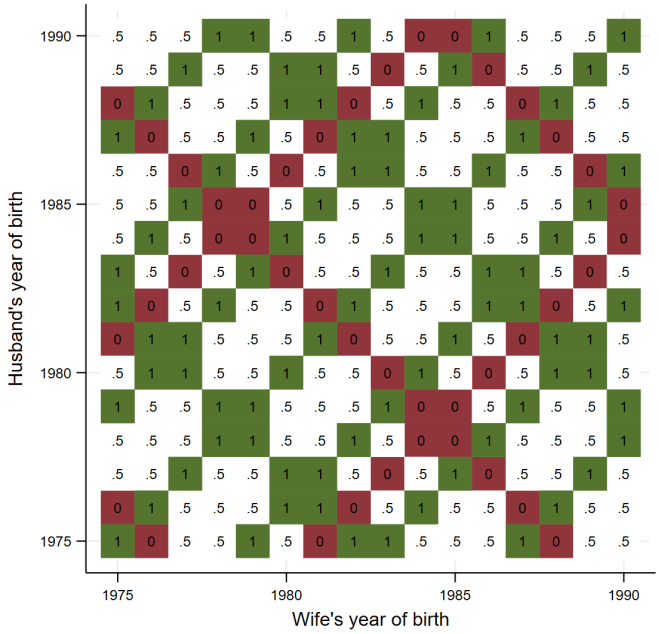
Tử Vi predictions of marriage fortune. The Tử Vi system only involves predictions of fortune, without any normative judgment or assessment of adherents' behaviors. It does not involve any god-like figure, and there is no concept of monitoring, punishment, or reward. Predictions on individuals and couple's fortunes are based on astral settings at individuals' time of birth (genethlialogy), most importantly by the zodiac signs of their lunar birth years. Predictions on the fortune of individuals' intended endeavors (catarchic astrology), such as commencement of travel, opening of business, performance of certain ceremonies, are further calculated in concordance with the date and time of those events. In this paper, we focus on Tử Vi's most fundamental and broadly known form, which is based simply on individuals' lunar years of birth in the 12-year zodiac cycle. We use Hoàng (2011), a popular manual of Tử Vi that can be found in any bookstore across Vietnam, as our main source of Tử Vi. We code each pair of lunar birth years as auspicious, neutral, or inauspicious, as shown in Figure 1.[19] In comparison with the most sophisticated predictions based on precise date and hour of birth, our data on auspiciousness can be seen as measured with some fine-tuning error.

In subsection 5.2's representative survey, 82% of ethnic Vietnamese know some content of the system and/or how to get information on detailed predictions. When it comes to their own marriage, 31% did consider Tử Vi to some extent, and 45% think that their family and relatives did.

[19] As robustness check, we also examine an auxiliary system based on the Five Elements that is much less well known in Vietnam (shown in Figure A1, details in appendix B.2).

Those statistics affirm the belief system's persistence, pervasiveness, and resilience. Its salience is complemented by the salient knowledge of everyone's age and year of birth in Vietnamese culture, especially within their social circle.[20]

Figure 1: Auspiciousness of Match Based on Couple's Zodiac Signs



Notes: This figure plots the auspiciousness score of the match based on the couple's zodiac signs by their lunar birth years. An auspicious match has a score of 1, a neutral match 0.5, and an inauspicious match 0.

3 Part I: Astrological beliefs shape marriage formation

3.1 Model and structural estimation

In this section, we detail a model of marriage market with transferable utility in the tradition of Becker (1973, 1974), Shapley and Shubik (1971), and the estimation approach pioneered by Dupuy and Galichon (2014), Galichon and Salanié (2022). We follow this literature's structural approach for two major reasons. First, the nature of the marriage market, and other matching markets more generally, incorporates very strong spillover effects across all agents in the market. This feature is reinforced by several attributes of such markets, including the exclusivity of matches (each agent can only be matched once) and the lack of pricing mechanism with a single price, all of which leads

[20] In Vietnam, the first purpose of knowledge of everyone's year of birth is usually to establish the correct pronouns to use in direct and indirect speeches in everyday Vietnamese. Small children need to learn how to keep track of age ranking in order to use the correct pronouns. Even strangers of the same generation usually start a conversation with questions about age.

to strong "general equilibrium effects," in the sense that a change in an agent's demand may have broad consequences across many to all other types of agents. In this context, we follow the empirical literature on marriage markets (Chiappori and Salanié, 2016, Chiappori, 2020) in providing a clear model of the marriage market in order to analyze the role of auspiciousness in shaping marriages.

Second, Part I's structural estimation also provides the selection probability that will be used to control for selection into marriage when we investigate the effects of a couple's auspiciousness on household outcomes in Part II. This identification method would not have been possible with a standard reduced form approach, because it requires excludable variations in the control function, which are provided naturally in Part I's structure in the form of variations in alternative matching opportunities on the local marriage market.

3.1.1 Marriage market equilibrium

We consider two large populations of men and women, each characterized by their respective sets of discrete types, $\mathcal{X}$ and $\mathcal{Y}$, of sizes N_x and N_y. We let $x \in \mathcal{X}$ denote a man's type and $y \in \mathcal{Y}$ a woman's type (e.g., his or her age and education). Each agent is located in a region, or "marriage market," $r \in \{1, ..., R\}$. Agents are free to choose a partner within their region r. The marginal distributions of types in region r are given by $f_r : \mathcal{X} \to \mathbb{R}_+$ and $g_r : \mathcal{Y} \to \mathbb{R}_+$. The total size of the population is normalized to one. We omit the subscript r when not needed.

We denote a match as an ordered pair (x, y) of partners' types, and denote male and female singles as $(x, \emptyset)$ and $(\emptyset, y)$. We assume a transferable utility framework (Becker, 1973, 1974, Shapley and Shubik, 1971). In a match between a man i and a woman j, their respective payoffs are the sum of a deterministic component, a transfer, and a stochastic component, $u(x_i, y_j) - t_{ij} + \varepsilon_{iy_j}$ and $v(x_i, y_j) + t_{ij} + \eta_{jx_i}$. The sign of the transfer t_{ij} is unrestricted. Similar to Choo and Siow (2006), we assume that i's taste shock ε_{iy_j} depends only on j's type, and j's taste shock η_{jx_i} on i's type, i.e., agents are indifferent between partners with the same type. These shocks are assumed to be type I extreme-value distributed and independent across types and individuals.

Since we normalize $u(x, \emptyset) = v(\emptyset, y) = 0$ for any x and any y, the total match surplus for a household of type (x, y) is given by:

$$u(x, y) + \varepsilon_{iy} + v(x, y) + \eta_{jx} = \Phi(x, y) + \varepsilon_{iy} + \eta_{jx} \quad \forall (x, y), \tag{1}$$

where $\Phi(x, y)$ is a primitive of the model and corresponds to the (average) gains from marriage for a couple (x, y).

The equilibrium matching is *stable*, i.e., there is no pair of individuals who are willing to break up with their current partners and form a new couple. For given transfers, individuals choose their

mating strategies by maximizing their marriage gains after learning their preferences. Under the logit assumption, the mass of couples (x, y) in equilibrium corresponds to:

$$\mu(x,y) = \exp\left(\frac{1}{2}\Phi(x,y)\right)\sqrt{\mu(x,\emptyset)\mu(\emptyset,y)}, \tag{2}$$

with $\mu(x,\emptyset)$ and $\mu(\emptyset,y)$ being the mass of male singles of type x and female singles of type y.

The equilibrium matching $\mu(x,y)$ must also be *feasible*, i.e., each agent can be matched to at most one partner. Hence, $\mu(x,y)$ depends on the availability of types x and y in the market; if women of type $y' \neq y$ suddenly become more attractive for men of type x, then an increase in $\mu(x,y')$ results in a decrease in $\mu(x,y)$ as the supply of men of type x is fixed (and thus $\mu(x,\emptyset)$ decreases). Spillovers play a paramount role in the model, as changes in the mating strategies of one individual will result in equilibrium adjustments for all couples. For further details on the derivation of equation (2), see appendix C.1.

Based on Choo and Siow (2006) and Galichon and Salanié (2022), the decentralized equilibrium matching μ maximizes aggregate welfare. This result is an extension of the classic finding in Shapley and Shubik (1971) to the case where payoffs are stochastic. Taking into account the stochastic components ε and η, the total welfare is:

$$\begin{aligned}\mathcal{W}(\mu,\Phi) \quad = \quad & \sum_{x,y}\mu(x,y)\Phi(x,y) - 2\sum_{x,y}\mu(x,y)\log(\mu(x,y)) \\ & - \sum_{x}\mu(x,\emptyset)\log(\mu(x,\emptyset)) - \sum_{y}\mu(\emptyset,y)\log(\mu(\emptyset,y)),\end{aligned} \tag{3}$$

where the first term accounts for the total deterministic surplus in equilibrium, and the remaining terms, dubbed the entropy term in total (Galichon and Salanié, 2022), account for the total surplus generated by the stochastic components of utility.[21]

3.1.2 Identification and estimation

Identification. The match surplus Φ is non-parametrically identified from equation (2) with cross-sectional data on the frequencies of matches, $\hat{\mu}(x,y)$, and the frequencies of male and female singles, respectively $\hat{\mu}(x,\emptyset)$ and $\hat{\mu}(\emptyset,y)$. Treating each region as a separate marriage market, the econometrician can identify up to RN_xN_y parameters of Φ exploiting the cross-sectional variation across both types and markets over the space $\mathcal{X}\times\mathcal{Y}\times\{1,...,R\}$. The cross-product ratio between types x, $x' \neq x$, y, and $y' \neq y$ in any region r:

$$\frac{\hat{\mu}_r(x,y)\hat{\mu}_r(x',y')}{\hat{\mu}_r(x,y')\hat{\mu}_r(x',y)} = \exp\left(\frac{1}{2}(\Phi_r(x,y) - \Phi_r(x',y) - \Phi_r(x,y') + \Phi_r(x',y'))\right) \tag{4}$$

[21] Among those three terms, the first arises from stochastic components among married couples, and the latter two among single men and single women respectively. The entropy term is always greater than zero, and is maximized under completely randomized matches.

is the key to measure the strength of attraction between likes in the data.[22]

Specification. In our application, types correspond to the combination of year of birth b and education e so that $x_i = (b_i, e_i)$ and $y_j = (b_j, e_j)$. Astrology matters through an auspiciousness score $Ausp_{ij}$, which is a function of the partners' years of birth that takes value of 0, 0.5, and 1 for inauspicious, neutral, and auspicious matches respectively. We model Φ as the sum of the auspiciousness score's effect $\beta_1 Ausp_{ij}$, a term capturing additional interactions between partners' types $\phi(x_i, y_j)$, and region $\times$ male/female type fixed effects $\delta^m_{x_i,r}$ and $\delta^f_{y_j,r}$:[23]

$$\Phi_{ijr} = \beta_1 Ausp_{ij} + \phi(x_i, y_j) + \delta^m_{x_i,r} + \delta^f_{y_j,r}. \tag{5}$$

Our goal is to estimate both β_1 and ϕ using the $R(N_m - 1)(N_f - 1)$ identifying restrictions provided by equation (4) with data on the distribution of couples $\hat{\mu}_r(x, y)$.[24] In particular, the identification of β_1 hinges on a parametric restriction on the function ϕ. In practice, we restrict ϕ to be a function of the age gap $d_{ij} = b_j - b_i$. From Figure 1, it is clear that couples with the same age gap d_{ij} might be more or less auspicious depending on the particular combination of birth years (b_i, b_j). Since the age gap displays a unimodal distribution in our sample (with the modal age gap being $d_{ij} = 2$, Figure A2), in the baseline specification, we model ϕ as a quadratic polynomial of $d_{i,j}$. We further allow the coefficients of this polynomial to vary by both the husband's and the wife's educational levels:[25]

$$\phi(x_i, y_j) = \sum_{p=0}^{2} \gamma_{p,e_i,e_j} d^p_{ij}. \tag{6}$$

We also consider several alternative specifications as robustness checks, including (i) employing higher order polynomials of the age gap (quartic, quadratic separately for positive and negative age gaps), also fully interacted with education levels, (ii) using a full vector of age gap fixed effects, one for every value of d_{ij} in the sample, and (iii) allowing β_1 to be heterogeneous across regions and/or education levels. For further details on these alternative specifications, see appendix C.2.

[22] For instance, if $\Phi(x, y) = \beta \mathbb{1}\{x = y\}$, then the cross-product identifies β. If x and y are continuous measures, then the log of the cross-product identifies $\partial^2 \Phi / \partial x \partial y$.

[23] When we use data from multiple years from the 2006-2018 Population Surveys, we include year $\times$ region $\times$ male/female type fixed effects.

[24] Note that we do not need data on the number of singles to calculate the cross-product ratios in (4). Under the logit assumption, the fixed effects δ^m_{xr} and δ^f_{yr} disappear from the right hand side of equation (4), and so they do not need to be dealt with in the estimation of β_1 and ϕ. In other words, even without making additional assumptions to define singles in the data, we can consistently estimate the parameters of the interaction terms, although we cannot recover the type fixed effects.

[25] Some coefficients of equation (6) need to be normalized since we do not estimate type fixed effects. Hence, we normalize both the constant terms and the coefficients of the first-degree polynomial term for couples with identical educational levels (these coefficients are set to zero).

Estimation. We estimate $\theta \equiv (\beta_1, \phi)$ using Maximum Likelihood. In each evaluation of the likelihood function, we separately compute the equilibrium matching for each region r, as characterized by the predicted matching frequencies $\mu_r^\theta(x_i, y_j)$, using the Iterative Projection Fitting Procedure (Galichon and Salanié, 2022). The total log-likelihood for a sample of N couples is:

$$\mathcal{L}(\theta|\hat{\mu}) = \sum_{i,j,r} \mathcal{L}_{ijr}(\theta|\hat{\mu}) = \sum_{x,y,r} \hat{\mu}_r(x,y)\mathcal{L}(\theta|\hat{\mu},x,y) = \sum_{x,y,r} \hat{\mu}_r(x,y) \log \mu_r^\theta(x,y). \tag{7}$$

3.1.3 Measurement of the importance of astrology

As the model being estimated is highly nonlinear, it is not straightforward to interpret the magnitude of the estimate $\hat{\beta}_1$. We thus develop several more intuitive measures to evaluate the importance of astrology to marriage arrangements.

Marginal effect of astrology. First, we compare an agent's odds of an auspicious match to that of an otherwise identical inauspicious match. In other words, we can compute a man i's predicted probability of matching with a woman j for when their auspiciousness score is set to 1 (auspicious match), and for when it is set to 0 (inauspicious match), holding everything else fixed including the marriage market equilibrium.[26] As there is large variation in matching probabilities across types, we evaluate the marginal effect of astrology, i.e., the difference between these two predicted probabilities, at specific age gaps and education levels.

Marriage surplus decomposition. Next, we decompose the estimated total welfare measure in equation (3) to single out the contribution of auspiciousness score. We compute two different measures: the first is the ratio of the surplus generated by the auspiciousness score $Ausp$ and the systemic surplus generated through sorting on age and education, i.e., two key dimensions of sorting on marriage markets (Qian, 1998, Chiappori et al., 2024):

$$\frac{\sum_{x,y,r} \mu_r(x,y)\beta_1 Ausp_{ij}}{\sum_{x,y,r} \mu_r(x,y)\phi(x,y)}. \tag{8}$$

The second measure instead uses total match surplus in equation (3) for the denominator:

$$\frac{\sum_{x,y,r} \mu_r(x,y)\beta_1 Ausp_{ij}}{\mathcal{W}(\mu,\Phi)}. \tag{9}$$

Even after taking age and education into account, matching on marriage markets is far from being deterministic; hence the contribution of unobserved characteristics, measured by the entropy term

[26] Equations (2) and (5) imply that the ratio between these two predicted probabilities corresponds to $\exp(\beta_1/2)$.

in the welfare equation (3), will be relatively large. As a result, the second measure is expected to be considerably smaller than the first.

Counterfactual equilibrium. Last, our structural estimation further allows us to investigate how the marriage market equilibrium would change if people did not care about astrology, by simulating a counterfactual equilibrium where β_1 is equal to zero and as a result some people would make different marriage decisions. We can then compare the counterfactual shares of auspicious and inauspicious couples to what we observe in the data. If astrological beliefs are important, we should observe more auspicious matches and fewer inauspicious matches in the real world relative than in the counterfactual world.

3.2 Data used for marriage matching estimation

2009 Census baseline sample. The main dataset for Part I is a representative 15% subsample of the 2009 Vietnamese Census, available from IPUMS (details in appendix A.1). We select all marriages couples in which the husbands were between 21 and 35 and the wives 19 and 33 in 2009.[27] This results in a baseline sample of 916,315 married couples (54% of the full 15% subsample). The descriptive statistics of this sample are shown in Table A1.

As Tử Vi employs the lunar instead of solar calendar, we use lunar birth years to determine a couple's ages and whether the match is auspicious. A person's lunar birth year is imputed based on their solar month and year of birth, as the precise date of birth is not available. The precise date of the lunar new year varies by year and ranges from late January to early February; hence we assign those born in January to the lunar year before the new year and those born in February to the lunar year after. This imputation is precise for those born between March and December, and 86% accurate on average for those born in January or February (details in appendix B.1). In addition, all key results are robust to dropping those born in January and February.

Within the baseline sample, the average husband-wife age gap is 2.5 and 12% of the couples are of the sampe age. Husbands' average age is 29.3 and wives' 27.8. In terms of auspiciousness score, 33.8% of the matches are auspicious (0.4% higher than random matching), 52.5% neutral, and 13.7% inauspicious (2.8% lower than random matching) (Figure 3).

Besides age, education is another important marriage matching variable. The Census' education variable has four levels: "below primary," "primary completed," "secondary completed," and "university completed." The majority of both husbands and wives are "below primary" (30% and 32% respectively) or "primary completed" (54% and 51% respectively), and only 6% (for both husbands and wives) have completed college.

[27] In 2009, around 95% of married Vietnamese men (women) have got married before 36 (34) years old.

1989 and 1999 Censuses. To study the evolution of sorting on marriage markets over time, we also employ a representative 5% sample of the 1989 Vietnamese Census and a representative 3% sample of the 1999 Vietnamese Census, also available from IPUMS (details in appendix A.1). Using the same sample selection criteria described above yields a working sample of 171,430 couples for the 1989 Census and one of 149,804 couples for the 1999 Census. These samples exhibit comparable descriptive statistics to those of the 2009 Census baseline sample (Table A2).

2006-2018 Population Survey. As robustness check, we additionally construct a sample of newlywed couples from 12 Population Survey waves conducted between 2006 and 2018 (details in appendix A.2). Unlike the censuses, the Population Survey does contain information on the timing of marriage, which allows us to more accurately define the pool available for marriage matching in a certain survey year. The working sample then includes 124,906 couples (i) that got married within two years of the survey year, and (ii) in which the husbands were between 21 and 35 and the wives 19 and 33 at the time of the survey (Table A2).

3.3 Effect of astrological auspiciousness on marriage arrangements

Main results on the role of astrology. Table 1 reports the estimates from the baseline specification of the marriage market in Vietnam as detailed in subsection 3.1.2. The main variable of interest is the auspiciousness score based on the couple's zodiac signs. For completeness, we also include a secondary, less well-known auspiciousness measure based on the couple's Five Elements.[28] The baseline estimation considers four separate marriage markets: Northern urban, Northern rural, Southern urban, and Southern rural.[29] This partition is coarse enough to allow for sufficient flexibility within each market. It is also chosen to take into account within-market specific matching preferences (i.e., different sets of type fixed effects) based on Vietnam's long history of marked North-South and rural-urban differences. The estimation samples are constructed from the 1989 Census in column (1), 1999 Census in column (2), 2009 Census in columns (3) and (5), and 2006-2018 Population Survey in column (4).

The results highlight the statistically significant role of auspiciousness in determining matches in the 2009 Census baseline sample. Auspiciousness's role, measured relative to systemic surplus and total surplus (expressions 8 and 9), is also sizable. Columns (3) and (5) report that in 2009, the surplus explained by auspiciousness is as much as 6.5-6.9% of that can be explained by the age and education profile. Table A5 further shows that the results are very robust to employing alter-

[28] See Figure A1 and appendix B.2 for further details.

[29] In alternative specifications, we also consider smaller marriage markets, including (i) 8 statistical regions (Red River Delta, Northeast, Northwest, and North Central, Central Coast, Central Highlands, Southeast, and Mekong River Delta), (ii) 8 statistical regions × urban/rural, and (iii) 63 provinces.

Table 1: Contribution of Auspiciousness to the Marriage Surplus Function

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	**Marriage surplus function**				
Sample:	Census			Population Survey	Census
Period:	1989	1999	2009	2006-2018	2009
Auspicious: Zodiac	0.125**	0.115*	0.171***	0.244***	
	(0.009)	(0.008)	(0.003)	(0.009)	
	[0.044]	[0.052]	[0.000]	[0.001]	
$\mathbb{1}$(Auspicious): Zodiac					0.072*
					(0.003)
					[0.087]
$\mathbb{1}$(Inauspicious): Zodiac					-0.108**
					(0.003)
					[0.032]
Auspicious: Element	-0.066	-0.002	0.153	0.096	0.148
	(0.006)	(0.006)	(0.003)	(0.007)	(0.003)
	[0.598]	[0.978]	[0.120]	[0.360]	[0.136]
% explained by astrology					
vs. age & education	1.226	1.677	6.450	6.330	6.858
vs. total surplus	0.457	0.676	1.935	2.115	2.057
Age gap control polynomial	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic
Market × Husband's type FEs	X	X	X	X	X
Market × Wife's type FEs	X	X	X	X	X
Number of couples	171,430	149,804	916,315	124,906	916,315

Notes: This table reports the results from estimating the marriage market model in subsection 3.1.2 on four marriage markets: Northern urban, Northern rural, Southern urban, and Southern rural, including a quadratic polynomial of spouses' age gap, fully interacted with their education levels. Columns (1) to (3) and (5) use data from Vietnamese Censuses. Column (4) uses data from the Vietnamese Population Survey. Column (5) includes separate indicators for auspicious and inauspicious matches. Standard errors in parentheses come from the structural estimation. p-values in brackets are computed from 1,000 simulations of reshuffled auspiciousness.
*** denotes statistical significance at 1% level, ** 5% level, * 10% level, based on simulated p-values in brackets.

native specifications of ϕ (i.e., age gap polynomial interacted with education levels) and alternative definitions of marriage market (details in appendix C.2).

To validate statistical inference from this estimation procedure, we perform a permutation test by (i) randomly permuting the auspiciousness score in a way that conserves the distribution of auspicious and inauspicious matches for each age, (ii) executing the estimation procedure using the newly generated auspiciousness score, and (iii) plotting the actual estimate against the distribution of simulated placebo estimates. As shown in Figure A3, column (3)'s 2009 actual zodiac auspiciousness score estimate is well above the 99.5^{th} percentile of the corresponding placebo estimate distribution, implying statistical significance at 1%.[30]

In addition, Figures A4, A6, and A7 plot the marginal effects of auspiciousness on probabilities

[30] On the other hand, the actual Five Elements auspiciousness score estimate, also for 2009, is slightly below the 95^{th} percentile of the corresponding placebo estimate distribution (Figure A3), consistent with the fact that auspiciousness based on zodiac signs is more salient and thus more important to marriage matching in our setting.

of marriage by age gap, husband's education level, and wife's education level. This exercise helps us better understand how the importance of astrology varies by spouses' types, especially given the nonlinearity of the marriage market model being estimated. Figure A4 reports that the marginal effect of auspiciousness peaks around the modal age gap of 2, at which point a hypothetical inauspicious couple would be willing to reduce their age gap by up to 0.9 years or increase it by up to 1.7 years (in both cases moving away from the "ideal" age gap of 2) to become auspicious (Figure A5). Similarly, Figures A6 and A7 show that the marginal effect of auspiciousness is generally strongest among couples with the same level of education.

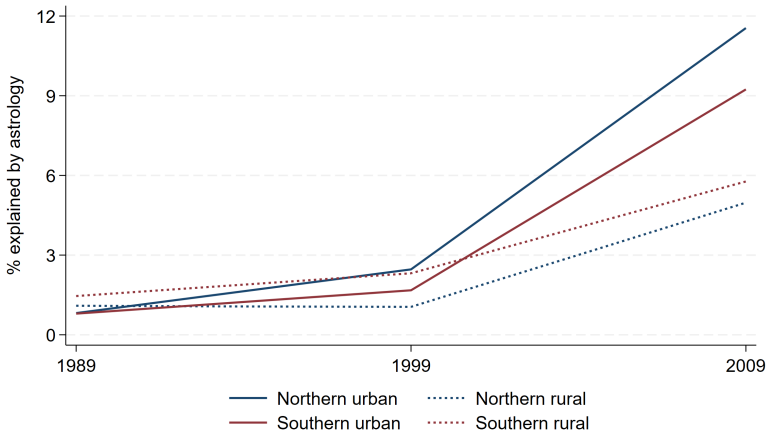
Evolution of the role of astrology. Columns (1) to (3) further reveal an upward trend in the role of astrology in shaping marriage decisions across the censuses, as its proportion of the systemic surplus increases from merely 1.2% in 1989 to 6.5% in 2009, as visualized in Figure A8. When we focus on newlywed couples that can be observed in the Population Survey in column (4), over a more recent period from 2006 to 2018, auspiciousness continues to be important to a much younger and better educated population: its role remains equivalent to 6.3% of that of the age and education profile.

This pattern is highly consistent with Vietnam's recent history since Đổi Mới in 1986, as the Reform wave included broad relaxation of prior restrictions on faith and religion (Section 2). Figure 2 shows this pattern broken down for the four marriage markets. In all markets, auspiciousness makes large gains throughout this period in terms of its influence on marriage decisions. We also see a reversal of order between regions, as the strongest trends are recorded for urban areas, especially in the North, where religious freedom was likely most restricted before Đổi Mới. We observe the smallest role of auspiciousness in the 1989 Census sample (which mostly covers couples that got married before Đổi Mới) in urban areas. Once those constraints were relaxed, the same regions have witnessed a strong revival of traditional religious beliefs, including Tử Vi.[31]

Counterfactual marriage market equilibrium. We simulate the counterfactual distribution of marriages when astrological beliefs play no role at all as an alternative approach to assess the role of astrology in shaping marriage decisions. Figure 3 compares the shares of auspicious and inauspicious couples in different settings, including this counterfactual scenario. In each group, the first bar displays the raw share of the corresponding couple type in the 2009 Census baseline sample. The second bar reports the case of completely randomized matches, which exhibits both fewer auspicious couples and more inauspicious couples than in the raw data. While this provides

[31] Vietnamese scholars have discussed the emergence and propagation of new religious movements during this period at length, e.g., in Đặng (2006), Nguyễn (2011, 2012). Also see Hoang (2016) and Taylor, ed's (2007) collection for in depth discussions in English.

Figure 2: Auspiciousness's Role Relative to Systemic Surplus Over Time by Region



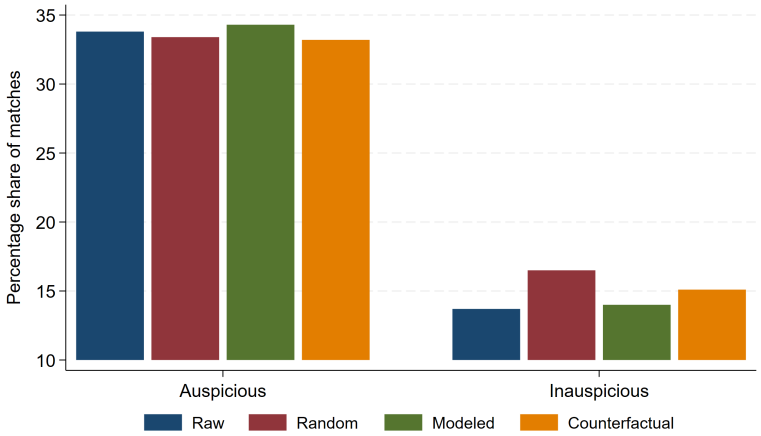
Notes: This figure plots the ratio of the surplus explained by auspiciousness versus that explained by the age and education profile over three censuses in 1989, 1999, and 2009, separately for Northern urban, Northern rural, Southern urban, and Southern rural regions. Corresponding estimates are reported in Table A6.

suggestive evidence that astrology matters, it should be noted that random matching does not take into account matching by other dimensions including age gap. Hence we turn to our structural estimation of the Vietnamese marriage market. The third bar shows the share predicted by the baseline marriage market model, which closely matches the raw data. Last but not least, the fourth bar presents the counterfactual case in which auspiciousness's role in the marriage surplus function is eliminated. In this counterfactual scenario, there are also markedly fewer auspicious couples and more inauspicious couples than the actual model predictions.

Furthermore, even though the gap between the third and the fourth bars for inauspicious couples is smaller than that between the first and the second bars, it is still relatively larger than the corresponding gap for auspicious couples (both gaps are 1.1%, while model predicted shares of inauspicious and auspicious couples are 14.0% and 34.3% respectively). This pattern suggests stronger distaste for inauspicious matches than preference for auspicious matches in marriage decisions. It is also consistent with the column (7)'s result that the negative coefficient of the inauspicious match indicator is both larger in magnitude and more statistically significant than the positive coefficient of the auspicious match indicator.

Heterogeneity by strength of beliefs. In Table 2, we further investigate how the role of auspiciousness varies by measures of the strength of beliefs in Tử Vi. The three dimensions of heterogeneity are respectively religiosity (column 2), the strength of social ties (column 3), and wealth (column 4). Those measures are averaged for each marriage market from VHLSS data on average spending on religious items and activities, average spending on gifts and donations (both

Figure 3: Distributions of Matches in Different Settings



Notes: This figure reports the shares of auspicious and inauspicious couples in different settings, using data from the 2009 Census. In each group, the first bar displays the raw share of the corresponding couple type in the data, and the second bar the case of completely randomized matches. The third bar reports the share as predicted by 3.1.2's baseline marriage market model with four marriage markets, and the fourth bar reports the counterfactual case in which auspiciousness's role in the marriage surplus function is eliminated.

as percentage share of household expenditure), and household income (details in appendix B.5). For this exercise, we shift to the estimation with 16 marriage markets (8 statistical regions $\times$ urban/rural) to guarantee enough variations in those aggregate measures. As we expect, columns (2) and (3) show that auspiciousness matters more in markets that are more religious and that have stronger social ties, while column (4) indicates that wealthier areas tend to care less about auspiciousness. Column (5), which includes all three interactions simultaneously, suggest that the heterogeneity by religiosity is the most salient, which we will get back to in Part II of the paper.

Placebo test with Indonesian data. To explore whether Tử Vi's predictions may matter to marriage decisions in any other way apart from their direct religious meanings, we apply the same estimation procedure to a different setting where, unlike Vietnam, Tử Vi has no religious implication. For this purpose, we focus on Indonesia, Vietnam's neighbor in Southeast Asia with similar geographical and developmental characteristics, and yet very different religious and cultural history.[32] Table A7 thus replicates subsection 3.1.2's baseline marriage market estimation using data from 2000 and 2010 Indonesian Censuses (details in appendix A.3). The auspiciousness score

[32] As Tử Vi is only one among many competing divinatory systems in China (Section 2), we do not use bring the tests to Chinese data. Likewise, in picking a comparison country among Vietnam's neighbors, we avoid those that have a sizable share of population with some partial Chinese heritage (including Singapore, Malaysia, Thailand, and the Philippines), and are left with the only feasible option of Indonesia. The Indonesian population is composed of mostly Muslims (87%), and comprises a very small fraction of those with Chinese heritage (1% to 3%), so the population's exposure to a Taoist-based system like Tử Vi is likely minimal.

Table 2: Contribution of Auspiciousness by Strength of Beliefs

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	**Marriage surplus function**				
Auspicious: Zodiac	0.173***	0.174***	0.169***	0.184***	0.173***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.005)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Auspicious × Religiosity measure		0.043**			0.040**
		(0.005)			(0.006)
		[0.036]			[0.030]
Auspicious × Social ties measure			0.016		0.016
			(0.005)		(0.005)
			[0.253]		[0.241]
Auspicious × ln(Average income)				-0.044**	-0.017
				(0.008)	(0.010)
				[0.024]	[0.360]
Interaction var. s.d.		*0.880*	*0.832*	*0.475*	
% explained by astrology					
vs. age & education	6.263	6.283	6.245	6.299	6.240
vs. total surplus	1.935	1.942	1.936	1.938	1.929
Age gap control polynomial	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic
Market × Husband's type FEs	X	X	X	X	X
Market × Wife's type FEs	X	X	X	X	X
Number of couples	916,315	916,315	916,315	916,315	916,315

Notes: This table reports how the contribution of auspiciousness to marriage surplus varies by marriage market characteristics, including religiosity, strength of social ties, and development level. The estimation (subsection 3.1.2) uses the 2009 Census with 16 marriage markets (i.e., 8 statistical regions × urban/rural), and includes a quadratic polynomial of spouses' age gap, fully interacted with their education levels, together with their Five Elements auspiciousness score. The couple's zodiac auspiciousness score is interacted with religiosity in column (2) (average spending on religious items and activities as percentage share of household expenditure), strength of social ties in column (3) (average spending on gifts and donations as percentage share of household expenditure), and log average household income in column (4). Column (5) include all three interactions. All interaction variables are centered around zero at marriage market level. Standard errors in parentheses come from the structural estimation. p-values in brackets are computed from 1,000 simulations of reshuffled auspiciousness.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level, based on simulated p-values in brackets.

estimates are both small in comparison to those in Table 1 and statistically insignificant based on results from permutation tests. In terms of importance, auspiciousness's contribution relative to systemic surplus and total surplus in Indonesia in 2010 is about 4 times smaller than that in Vietnam in 2009. These results confirm that if not for Tử Vi's role in Vietnamese culture, it would matter very little in a placebo case such as Indonesia.

4 Part II: Marriage outcomes justify astrological beliefs

Part II turns to examine whether astrological beliefs can be justified by their effects on short- and medium-run family outcomes. We focus on the social mechanism of those religious beliefs: While

auspicious couples are believed to be more fortunate, hence help will be useful,[33] inauspicious couples are predicted to face bad luck, hence help will be futile and wasteful. We first start with the methodology to estimate the impact of auspiciousness on household outcomes.

4.1 Selection model and correction

The simple comparison between auspicious and inauspicious couples, even after controlling for the couple's observable characteristics, is not adequate due to the natural issue of selection into auspicious marriages that Part I has highlighted. To understand the extent of this issue and suggest a solution, we first start with the following structural equation that links a couple (a man i and a woman j)'s auspiciousness score $Ausp_{ij}$ and observable controls $\mathbf{X}_{ij}$ to their outcome Y_{ij}:

$$Y_{ij} = \beta_2 Ausp_{ij} + \mathbf{X}'_{ij}\gamma + \epsilon_{ij}. \tag{10}$$

The arbitrariness of auspiciousness. Our strategy to identify β_2 in equation (10) relies first of all on the arbitrariness of the variation in the auspiciousness score. This score is based entirely on the two birth years of the couple, as described in Figure 1. It takes root from the religious system of beliefs Tử Vi, which builds on abstract religious and philosophical concepts such as the harmonious cycles of 10 and 12, and is not based on observations of the society in reality. Its major determinant is the couple's age gap, but with some important deviation. In our analysis we will control carefully for the couple's age gap, hence the remaining variation in auspiciousness is unlikely related to any other substantive social attributes of the couple, except the religious meaning of auspiciousness itself. For example, a couple of husband and wife born in (1980, 1987) are seen as neutral, while another born in (1981, 1988) are seen as auspicious – we argue that the difference between those two couples cannot be related to the couple's social or psychological attributes, except for the religious meaning of their auspiciousness. Furthermore, we note from Figure 1 that the score evolves in a rather periodic way, so that there is no birth year that is more or less privileged than others. That is, for every birth year of a man (woman), there is the same number of birth years of a woman (man) to form an auspicious couple; and we can say the same for neutral and inauspicious couples.

To deepen this point on the arbitrariness of auspiciousness, we can turn to a quasi Regression Discontinuity Design (RDD) based on birth months. For this, we focus on couples with at least one birth in January or February, which roughly corresponds to the last month or the first month of a lunar year. By restricting the comparison to individuals born within these two months, we approach the RDD ideal of comparing individuals born right around the Vietnamese lunar year's beginning,

[33] If helping an auspicious couple is believed to be more useful, it will also be more likely that they can return the favor in the future.

at which threshold all observables and unobservables are uncorrelated with auspiciousness (Lee and Lemieux, 2010).[34]

Let us note that even in case auspiciousness is randomly assigned, since marriages may depend on auspiciousness (as shown in Part I), it may create a selection problem that still bias the estimate of β_2. We will move on to examine this selection bias.

The selection bias. In practice, we can only observe pairs of male and female (i, j) who are actually married. Those observed pairs are subject to selection by marriage status $Married_{ij} = 1$. Hence the empirical expectations in the data must include such selection as follows:

$$\mathbb{E}[Y_{ij}|Ausp_{ij}, \mathbf{X}, Married_{ij} = 1] = \beta_2 Ausp_{ij} + \mathbf{X}'_{ij}\gamma + \mathbb{E}[\epsilon_{ij}|Ausp_{ij}, \mathbf{X}, Married_{ij} = 1]. \quad (11)$$

As the selection condition $Married_{ij} = 1$ depends on $Ausp_{ij}$, the last term of equation (11) is likely dependent on $Ausp_{ij}$ as well. It thus creates a selection bias in the OLS regression based on equation (10) in the sample of observed couples.

To illustrate this selection bias, let us recall Part I's model that pairs of male and female choose to get married based on auspiciousness as well as education, age, and unobservables. Given the same other characteristics, auspicious pairs are more likely to match in marriage. It implies that at the margin, more auspicious pairs tend to have a weaker match (i.e., lower likelihood of marriage) by other characteristics. As those other characteristics may directly affect the couple's outcomes, comparing auspicious and inauspicious pairs will inevitably produce this selection bias, even when auspiciousness does not affect the outcome directly.

Addressing the selection bias. In what follows, we will use the approach and results from Part I to address this selection bias. We first define the probability that any pair of male and female (i, j) get married as $\mathbf{P}_{ij} \overset{def}{\equiv} \mathbf{Pr}[Married_{ij} = 1|i, j] = F(Ausp_{ij}, \vec{\mathbf{X}})$. As modeled in Part I, the set of characteristics in $\vec{\mathbf{X}}$ includes not only (i, j)'s own relevant characteristics $\{\mathbf{X}_m, \mathbf{X}_f\}$, but the distribution of relevant characteristics among all others $\{\mathbf{X}\}_{k\neq i,j}$.

Following the long literature in the tradition of Heckman's work on regressions with selection bias, we subsume all unobserved information that could determine a pair's marriage into a random variable U_{ij} that is assumed to follow the uniform distribution on $[0, 1]$, i.e., $U_{ij} \sim \mathcal{U}[0, 1]$, so that the marriage condition is defined as $Married_{ij} = \mathbf{1}_{\{U_{ij} \leq \mathbf{P}[Married_{ij}=1|i,j]\}}$. The last term in equation (11) can be written as: $\mathbb{E}[\epsilon_{ij}|Ausp_{ij}, \vec{\mathbf{X}}, Married_{ij} = 1] = \mathbb{E}[\epsilon_{ij}|U_{ij} \leq \mathbf{P}_{ij}]$.

As we can further model the joint distribution of (ϵ_{ij}, U_{ij}) by a nondegenerate distribution $\mathcal{D}$, the last expression becomes $K_{\mathcal{D}}(\mathbf{P}_{ij})$, a function of $\mathbf{P}_{ij}$ that does not depend on additional

[34] For privacy reason, the VHLSS does not contain individuals' birthday, so we cannot run a precise RDD.

data. For example, in the often considered case of normality, where $(\epsilon_{ij}, \Phi^{-1}(U_{ij}))$ (with $\Phi(\cdot)$ being the cdf of the standard normal distribution) follows a bivariate normal distribution $\mathcal{N}(\mathbf{0}, \mathbf{\Sigma}_2)$, the function $K_{\mathcal{D}}(\mathbf{P}_{ij})$ becomes the inverse Mill's ratio of the relevant normal distribution, evaluated at $\mathbf{P}_{ij}$. More generally, $K_{\mathcal{D}}(\cdot)$ depends on the distribution $\mathcal{D}$, but not on the data.

We can thus rewrite the specification in (10) as follows:

$$Y_{ij} = \beta_2 Ausp_{ij} + \mathbf{X}'_{ij}\gamma + K_{\mathcal{D}}(\mathbf{P}_{ij}) + \varepsilon_{ij}, \tag{12}$$

where $\mathbb{E}[\varepsilon_{ij}|Ausp_{ij}, \mathbf{X}, Married_{ij} = 1] = 0$. Without assuming the exact functional form of $\mathcal{D}$ and hence $K_{\mathcal{D}}(\cdot)$, we can control nonparametrically for $\mathbf{P}_{ij}$ in order to control for the selection bias in equation (11) and obtain a consistent estimate of β_2.

The selection bias on the estimate of β_2 emerges when the term $K_{\mathcal{D}}(\mathbf{P}_{ij})$ is omitted from the estimation of equation (12). Hence it depends on (i) how much $Ausp_{ij}$ matters to the probability of marriage $\mathbf{P}_{ij}$, and (ii) how much this probability matters to the outcome Y_{ij}.

Computing selection probability. We need to predict the probability $\mathbf{P}_{ij} = \mathbf{P}(Married_{ij} = 1|i, j)$ for each pair (i, j) based on their respective characteristics (x_i, y_j), while Part I's model generates prediction of the share of married couples with those respective characteristics $\mu(x_i, y_j)$. By Bayes' rule, we can write the conversion formula below:

$$\begin{aligned} \mathbf{P}_{ij} &= \mathbf{Pr}(Married_{ij} = 1|x_i, y_j) \\ &= \frac{\mathbf{Pr}(x_i, y_j|Married_{ij} = 1) \times \mathbf{Pr}(Married_{ij} = 1)}{\mathbf{Pr}(x_i) \times \mathbf{Pr}(y_j)}. \end{aligned} \tag{13}$$

We obtain $\widehat{\mathbf{Pr}}(x_i, y_j|Married_{ij} = 1)$, or $\widehat{\mu}(x_i, y_j)$, from Part I's baseline estimation with four marriage markets as reported in columns (1) to (3) of Table 1.[35] In each market, the other expressions $\mathbf{Pr}(Married_{ij} = 1)$, $\mathbf{Pr}(x_i)$, and $\mathbf{Pr}(y_j)$ are calculated respectively as $\frac{\#\text{married couples}}{\#\text{males} \times \#\text{females}}$, the share of males of type x_i out of all males, and the share of females of type y_j out of all females. Putting these elements together in equation (13) yields $\widehat{\mathbf{P}_{ij}}$ for each pair (i, j) based on their age and education profile and astrological auspiciousness. For further details on this computation, see appendix B.3.

Estimation. To estimate equation (12), in our baseline approach, we control for a cubic polynomial of the predicted marriage selection probability $\widehat{\mathbf{P}_{ij}}$. In our first alternative, we apply Robinson's (1988) semiparametric regression to control flexibly for a nonparametric function of $\widehat{\mathbf{P}_{ij}}$. In the second alternative, we implement a matching procedure by $\widehat{\mathbf{P}_{ij}}$ to match households that have similar predicted $\widehat{\mathbf{P}_{ij}}$, but with potentially different values of auspiciousness.

[35] We also show robustness to using estimates from models with more granular marriage markets, as well as more stringent age gap control polynomial.

Identification. As is standard in the selection equation framework, the identification of the parameter β_2 from equation (12) requires an additional source of variation in $\mathbf{P}_{ij}$ that is (i) unrelated to the other variables that enter the right hand side linearly, namely $Ausp_{ij}$ and $\mathbf{X}_{ij}$, and (ii) excluded from equation (12), i.e., it does not have a direct effect on the outcome. As $\mathbf{P}_{ij} = F(Ausp_{ij}, \vec{\mathbf{X}})$, this source of variation comes from the distribution of relevant characteristics of other participants in the marriage market, namely their age and education profiles $\{\mathbf{X}\}_{k\neq i,j}$. In the estimation, $\widehat{K_{\mathcal{D}}}(\widehat{\mathbf{P}_{ij}})$ carries this variation. The key identification assumption is thus the exclusion restriction on this source of variation:

Assumption 1. *The age and education profiles of other individuals in the marriage market do not have any direct effect on a couple's outcome.*

Given this assumption, $K_{\mathcal{D}}(\cdot)$ is identified from the variations in $\{\mathbf{X}\}_{k\neq i,j}$. Once $K_{\mathcal{D}}(\mathbf{P}_{ij})$ is identified, the identification of β_2 and γ follows from the variations in $(Ausp_{ij}, \mathbf{X}_{ij})$.

Threat to identification. In practice, the control function is a function of the predicted probability $\widehat{\mathbf{P}_{ij}}$, whose validity depends on the validity of Part I's model and estimation. Part II's identification may come under threat if the prediction error $\widehat{\mathbf{P}_{ij}} - \mathbf{P}_{ij}$ undermines the control function approach. First, if the prediction error's magnitude is too large, it could introduce too much noise in the control and render it insignificant. This issue can be checked via the statistical precision of the estimated control function in the main specification.

Second, and more importantly, if Part I's model is underspecified, in that there can be a certain unobservable determinant of matching probability W_{ij}, e.g., the difference in wealth between the groom's and the bride's and wife's families, that is not taken into account in Part I's specification of $\mathbf{P}_{ij} = F(Ausp_{ij}, \vec{\mathbf{X}})$, hence $\widehat{\mathbf{P}_{ij}} - \mathbf{P}_{ij}$ will always contain information based on this variable. This misspecification will only matter to the estimation of the coefficient of auspiciouness β_2 if W_{ij} also correlates with the auspiciousness score. Based on our earlier argument on the arbitrariness of auspiciousness, this possibility is improbable for variables that are based on measures of differences or similarity between the couple's families. However, there can still be the case that W_{ij} represents an interaction of auspiciousness with, say, the level of wealth of both families. In this case, the importance of auspiciousness in shaping marriage decisions may vary across dimensions such as wealth or education, e.g., individuals from wealthier families may pay more attention to astrology when selecting their partner. Since this interaction also correlates with auspiciousness, it may create an additional bias for the estimated coefficient β_2. It is generally difficult to control for this type of bias, since we do not observe the husband's and wife's families before their marriage.

To deal with this potential issue, we propose the following approach in the spirit of gauging the

bias due to unobservable factors from coefficient changes due to observable variables as in Altonji et al. (2005) and Oster (2019). We first include the interactions of auspiciousness score with the couple's education levels, with each marriage market's average characteristics (as reported in Table 2), and with both sets of variables, in the marriage market model estimated in Part I. We then use each of these augmented models to compute $\widehat{\mathbf{P}_{ij}}$ for the estimation procedure in equation (12). Ideally, we would like to employ characteristics of the couple's original families in the interactions with auspiciousness. However, if this exercise produces estimates that are close to the baseline results, we can remain quite assured that underspecification is not a first order concern.

4.2 Data used for marriage outcome estimation

VHLSS data and sample restriction. In this part of the paper, we rely mostly on the Vietnam Household Living Standards Survey (VHLSS) for detailed data on Vietnamese households (details in appendix A.4). The data cover all 9 VHLSS waves between 2002 and 2018, with larger samples in 2002 and 2018, and are representative of the population in every year and province.[36] For each household member, we observe the month and year of birth, education level, and relationship to the household head, among others. Similar to Part I, we impute each member's lunar birth year based on their month and year of birth, and show that all key results are robust to dropping those born in January and February. At the household level, we observe detailed incomes and expenditures within 12 months of the surveyed date. Our main outcome variables of interest are (i) total social transfers and loans received, and (ii) total household expenditure per capita. In addition, we also (i) consider other types of transfers and loans, (ii) explore other measures of living standards, most importantly children's education attainment, and (iii) employ information on religious spendings and donations to compute measures of religiosity and social ties. Appendices B.4 and B.5 provide further details on these variables and measures.

We focus on household head couples whose marriage selection probability could be computed, i.e., those could be assigned to a census year among 1989, 1999, and 2009 such that their ages in that year fall into Part I's marriage market model's age range (Table A3, details in appendix B.3). This means that couples too old to be of prime marriage age in 1989 or having too large of an age gap are excluded from the sample. We further drop those whose marriage selection probability is outlier in the top percentile, which is likely the result of measurement errors associated with rare types. All key results are robust to employing alternative census year assignment rule or including the outliers (Tables A9 and A11).

[36] Figure A10 shows that the results are robust to excluding any of the waves.

Baseline sample descriptive statistics. The resulting baseline sample, described in Table A4, includes 62,810 couples as household heads, with husbands born between 1959 and 1988 and wives born between 1961 and 1990. The average husband-wife age gap is 2.3 and 13% of the couples are of the same age. Husbands' average age (at the time of survey) is 41.7 and wives' 39.4. The majority of both husbands and wives have completed primary school but not higher (59% and 60% respectively). Another 17% (13%) among the husbands (wives) have completed secondary school, and only 6% (5%) have completed college. By auspiciousness, 34.6% of the couples are auspicious (1.3% higher than random matching), 51.7% neutral, and 13.7% inauspicious (2.9% lower than random matching). Average household expenditure and expenditure per capita are VND 84.5 million and VND 22.9 million, around USD 3,900 and USD 1,000 respectively. Those numbers correspond to 74% of household income and household income per capita. In terms of transfers from their social circle, 80% of households in the baseline sample receive some amount of domestic transfers or loans from family and friends for an average amount of VND 7.3 million (USD 320), approximately 8% and 6% of household expenditure and income respectively.

4.3 Effect of astrological auspiciousness on social transfers

Main results on social transfers. Using this methodology, we first examine Part II's main result, namely the effect of auspiciousness on social transfers from a couple's social circle. Panel A of Table 3 reports estimates from equation (12) that controls for selection into marriage (subsection 4.1). The control function is a cubic polynomial of the couple's marriage probability, as predicted from subsection 3.1.2's baseline marriage market model with four marriage markets. In addition, we control for the couple's zodiac signs and age gap with both spouses' ages, a dummy for sharing the same age, their age gap (with separate coefficients for positive and negative age gaps), and separate dummies for each of the spouses' zodiac sign. Further controls include separate dummies for each of the spouses' education level, household size, household income (net of social transfers) per capita, dummies for the assigned period of marriage (i.e., the census year used to compute marriage probability), and province × urban/rural and year fixed effects. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

The dependent variable is the inverse hyperbolic sine (IHS) of the sum of domestic transfers and loans from family and friends received by the household within 12 months of the survey.[37] We include these loans in social transfers as they usually have very low or zero interest rates together with flexible or unspecified deadlines, and also because the household bears low cost for their

[37]The inverse hyperbolic sine, or arsinh, transformation of x is $\text{arsinh}(x) = \ln(x + \sqrt{x^2+1})$. This transformation starts at $\text{arsinh}(0) = 0$, and approximates the natural logarithm as x grows. We still interpret effects on $\text{arsinh}(x)$ in terms of percentage changes, as in the case of $\ln(x)$, since $\text{arsinh}'(x) = (x^2+1)^{-\frac{1}{2}} \approx x^{-1} = \ln'(x)$ when $x \gg 1$.

Table 3: Effect of Auspiciousness on Received Social Transfers

Panel A. Effect on received social transfers

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	arsinh(**Transfers and loans received from social circle**)					
Sample:	Full sample	Low income	High income	Has inpatient	No inpatient	Has disasters
Auspicious	0.113**	0.218***	-0.005	0.283***	0.075	0.228**
	(0.048)	(0.057)	(0.070)	(0.088)	(0.058)	(0.110)
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X
Observations	53,699	26,676	27,023	10,599	43,100	5,181

Panel B. Effects on other sources of fund

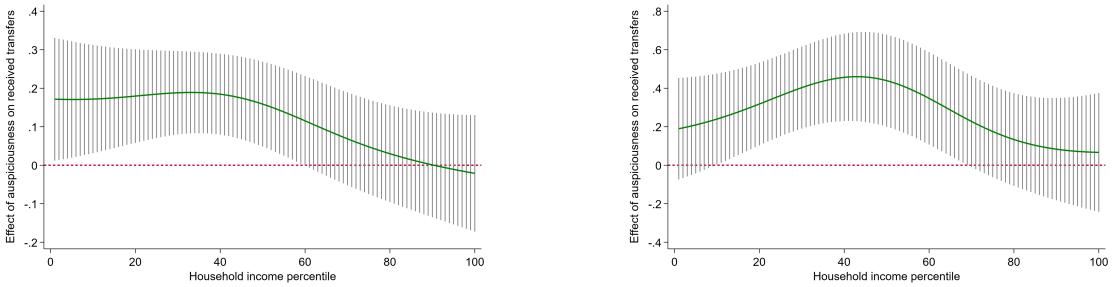
	(1)	(2)	(3)	(4)	(5)	(6)
	arsinh(·)					
Dependent variable:	**Assets**	**Non-social loans**			**Transfers**	
	Liquidation	**Total amount**	**For consumption**	**For capital investment**	**From overseas**	**Sent to others**
Sample period:	2002-2008	2004-2018	2004-2018	2004-2018	2002-2018	2002-2018
Auspicious	-0.185***	-0.158**	-0.106	-0.067	0.013	0.015
	(0.069)	(0.067)	(0.069)	(0.055)	(0.020)	(0.026)
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X
Observations	21,311	43,187	43,187	43,187	53,699	53,699

Notes: This table reports the effects of auspiciousness on total transfers and loans received from social circle (Panel A) and other sources of funds (Panel B), using equation (12) that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) arsinh(household income, minus received social transfers, per capita), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (viii) province × urban/rural and year fixed effects. The sample excludes 2010-2012 due to missing information on loans. **Panel A:** Column (1) considers the full sample. Columns (2) and (3) split the sample by whether the household income (minus total transfers and loans from relatives) is below the province × urban/rural's median. Columns (4) and (5) split the sample by whether a household member has been in inpatient care in the past 12 months. Column (6) restricts the sample to communes that have experienced severe disasters in the past two years, including widespread fire, epidemic (among humans, work animals, or domestic animals), inundation, typhoon, drought, and pest outbreak. **Panel B:** Column (1)'s dependent variable is the household's total liquidated assets in the past 12 months, including means of production and gold and jewelry, and withdrawn savings and investments (available for 2002-2008). Columns (2) to (4)'s dependent variables are total loans from non-relatives (column 2), including loans for housing and living expenses (column 3) and loans for capital expenses (column 4) (available for 2004-2018 except for 2010-2012). Column (5)'s dependent variable is total transfers received from overseas and column (6)'s total transfers sent to others, including cash and in-kind gifts, donations, and support (available for the full sample). Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

socially justifiable delinquencies and defaults.[38] Column (1)'s coefficient of auspiciousness implies a difference of 11.3% (statistically significant at 5% level) in received social transfers between an auspicious couple and an inauspicious one. Columns (2) and (3) further reveal that this effect is concentrated among low-income (below median) families, with a magnitude of 21.8%, while it is practically zero among high-income families. This variation by household income is further confirmed in Figure 4, which plots the semiparametric estimates of the effect of auspiciousness on received social transfers by household income percentile.[39]

Figure 4: Effect of Auspiciousness on Received Social Transfers by Household Income



A. Full sample

B. Has inpatient

Notes: This figure plots the semiparametric estimates of the effect of auspiciousness on total transfers and loans received from social circle as a function of household income, together with their 95% confidence intervals. Household income percentile is computed based on household income net of received social transfers, relative to other households in the same province × urban/rural and year. The point estimate at each percentile of household income is obtained from equation (12)'s baseline specification that controls for selection into marriage, weighted by a Gaussian kernel function of the percentile with a bandwidth equal to 20% of the range (details in appendix D.1). **Subfigure A** considers all households and **subfigure B** households with inpatients. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

This stark difference hints that auspiciousness-induced transfers and loans from social circle may count much more when it comes to difficult situations that happen much more often to poor couples. To explore this idea further, we consider the incidence of hospitalization of a household member in the past 12 months. As in other developing countries, hospital admission of a family member implies a large cost for the family, including large opportunity costs due to discontinued work not just by the inpatient but also by the family members who have to accompany the patient at the hospital.[40] Column (4) examines the effects of auspiciousness in such cases. In a year when the

[38] We can only use the information on the loan amount as the VHLSS data on interest rate and length of loan are plagued with abhorrent measurement errors. Table A8 shows that Panel A's results are quantitatively similar if we exclude all loans and just focus on social transfers.

[39] While income is correlated with education, this variation does not come from education, as Table A13's Panel A shows that the effect is larger among more educated couples.

[40] Most hospitals in Vietnam, save the very few reserved for either senior officials or the very rich, operate with underdeveloped hospital infrastructure and overloading rates up to 200% or more. So an inpatient's family members

family faces such hardship, auspiciousness matters much more, at an estimated difference of 28.3% (statistically significant at 1%) in transfers and loans from the social circle between auspicious and inauspicious couples. Without such hardship, column (5) shows that the effect is much smaller, at only 7.5% and statistically insignificant. In the same spirit, column (6) examines the subsample of communes that have experienced a severe disaster in the past two years, which yields a comparable estimated effect of 22.8% (statistically significant at 5% level).[41]

Effects on other sources of funds. Panel B of Table 3 further investigates the effects of auspiciousness across different sources of funds. Column (1) considers how much a household has to liquidate its assets, including the sale of means of production (such as plough water buffalos), sale of gold and jewelry, and withdrawal of savings and investments. Auspicious couples liquidate around 18.5% less assets than inauspicious ones (statistically significant at 1%), likely thanks to the additional transfers and loans they receive from their social circle. Column (2) further considers total loans borrowed from the credit market outside of the couple's family and friend network, therefore usually at higher interest rates (including exorbitant rates by loan sharks). Again, we see evidence that auspicious couples are less likely to have recourse to those non-social loans. This effect is larger in magnitude when the loans are for consumption purposes (including reparations of residence) (column 3) vis-à-vis when they are for investment in capital expenses (such as means of production) (column 4), suggesting that auspicious couples may use social transfers and loans to substitute for non-social loans more for consumption smoothing, and less for investment.

Next, column (5) reports the effect from a placebo test in terms of transfers from overseas relatives. Most of those transfers come from the Vietnamese overseas community and are often targeted towards investments instead of social insurance.[42] Indeed, the estimated auspiciousness effect is close to zero and statistically insignificant.

Last, column (6) examines out-transfers from auspicious couples towards their social network, and finds no statistical evidence of a difference due to auspiciousness. We can connect this finding to a possible prediction from Iannaccone's (1992) theory of religious organizations as clubs, by

usually play a very active role in providing care at the hospital, and in many cases need to stay almost full time in the hospital with the patient. It is common that a family with a prolonged hospitalization needs to empty savings, sell off assets, and mostly rely on financial help from the extended family and friends.

[41] Table A13's Panel A decomposes the main effect into two comparisons, auspicious versus neutral couples and inauspicious versus neutral couples. In the full sample the effect comes mostly from auspicious couples, while among households hit by a health shock it is essentially due to inauspicious couples. This difference is consistent with the socially shared belief that inauspicious couples predictably face bad luck after bad luck, and help will be futile.

[42] Most of the Vietnamese overseas community left Vietnam during and because of the three Indochina Wars, and likely have little interactions with marriage decisions among the couples in our sample. Transfers from overseas Vietnamese are also usually seen as targeted towards investment in business or real estate, and not aimed for social insurance, especially since the givers cannot participate in the local informal social insurance network.

which participants follow religious norms to gain access to social insurance. Following this club good model, as social insurance is a special kind of public good that entails zero net transfer for the whole community, auspicious couples should be both receiving and sending out more transfers. Hence column (6)'s finding does not support this particular form of the club good model of religion. In addition, it implies that auspicious couples earn positive net in-transfers while inauspicious ones make positive net out-transfers. Those benefits likely produce and accumulate in better family outcomes over time, as we will show in subsection 4.4.

Methodological robustness checks. Table 4 assesses the methodological robustness of our approach to control for selection into marriage as presented in subsection 4.1. Column (1) replicates the baseline specification that employs a cubic polynomial of predicted marriage probability as reported in column (1) of Table 3. The coefficients of the control function terms are jointly statistically significant at 5% level, suggesting that prediction noises are unlikely a major concern.[43] In column (2), we do not control for selection, and find a slightly smaller estimate, corresponding to a selection bias of 6%. This small magnitude of the bias is likely due to the weak influence of auspiciousness on the probability of marriage (in absolute terms). More generally, this result suggests that selection by auspiciousness is not a qualitatively consequential issue on the coefficient of auspiciousness. However, as we will work with several other outcomes throughout the rest of this paper, we will continue to control for the selection bias using the baseline specification.

Column (3) addresses an identification threat to our selection control strategy, in that a certain variable, such as family wealth, may affect how much the husband's and the wife's families care about auspiciousness, which introduces an estimation error in the marriage probability that may also correlate with auspiciousness, thus biasing the coefficient of auspiciousness in equation (12). As discussed in subsection 4.1, we evaluate this potential bias by augmenting Part I's marriage market model to allow for heterogeneous preference for auspiciousness by observable characteristics, including both the couple's education levels and the marriage market's characteristics (religiosity, strength of social ties, and development level). We then use the newly predicted marriage probabilities to estimate equation (12) and gauge if the results change by much. Column (3) shows that the estimated coefficient of auspiciousness remains very close to column (1)'s baseline estimate, suggesting that Part I's model underspecification does not pose a material threat to Part II's identification. This conclusion is rather unsurprising, since the selection bias is likely small.[44]

[43] The estimated coefficients (standard errors) of $\widetilde{\mathbf{P}_{ij}}$, $\widetilde{\mathbf{P}_{ij}^2}$, and $\widetilde{\mathbf{P}_{ij}^3}$ are respectively 0.378 (0.270), -0.612 (0.299), and 0.204 (0.093), with $\widetilde{\mathbf{P}_{ij}} = 10^6\widehat{\mathbf{P}_{ij}}$. (Given the large size of the population, it is natural that individual probabilities $\widehat{\mathbf{P}_{ij}}$ are very small and should be rescaled for expositional purpose.)

[44] Table A9's Panel B shows similar results of this test with various augmented marriage market models.

Table 4: Methodological Robustness of Estimating the Effect of Auspiciousness

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	arsinh(**Transfers and loans received from social circle**)					
Specification:	Baseline	No control function	Augmented marriage market model	Semipara-metric	Propensity score matching	Quasi RDD
Auspicious	0.113**	0.106**	0.107**	0.115**	0.101*	0.247***
	(0.048)	(0.047)	(0.048)	(0.049)	(0.056)	(0.084)
Control function	X		X	Robinson		X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X
RDD group FEs						X
Observations	53,699	53,699	52,918	53,699	53,699	14,682

Notes: This table reports the methodological robustness of estimating the effect of auspiciousness on total transfers and loans received from social circle. Column (1) implements equation (12)'s baseline specification that controls for selection into marriage as reported in column (1) of Panel A of Table 3. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) arsinh(household income, minus received social transfers, per capita), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (vii) province × urban/rural and year fixed effects. The sample excludes 2010-2012 due to missing information on loans. Column (2) drops the control function for selection. Column (3) uses estimates from an augmented marriage matching model that considers 16 marriage markets and allows the coefficient of auspiciousness to vary by spouses' education levels × marriage market characteristics (including religiosity, strength of social ties, and development level). Column (4) implements Robinson's (1988) semiparametric regression instead of using a polynomial control function. Column (5) implements propensity score matching by estimated marriage probability instead of using a polynomial control function, using 1,000 equal-sized bins and bin fixed effects. Column (6) implements a pooled quasi Regression Discontinuity Design by restricting the sample to couples with at least one spouse born within one month of the lunar new year and including fixed effects by the year of the discontinuity. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.
*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Next, we consider alternative approaches to control for selection using predicted marriage probabilities, including (i) Robinson's (1988) semiparametric regression that controls flexibly for $\widehat{\mathbf{P}_{ij}}$ (which is also much more computationally demanding) in column (4), and (ii) propensity score matching by 1,000 quantiles of $\widehat{\mathbf{P}_{ij}}$ in column (5). Again, the results in both columns remain close to the baseline in column (1). Table A9 further reports a range of additional methodological robustness checks, such as alternative control function polynomials, alternative marriage market models, and alternative model assignment rule. Table A10 shows that the results are robust to a battery of alternative specification choices, including (i) other standard error clustering schemes, (ii) restricted estimation samples, (iii) additional controls and fixed effects, especially for age gap, and (iv) alternative outcome transformation (details in appendix D.2).

Last, one may worry that the auspiciousness score is not completely arbitrary and may inhibit unknown social phenomena that affect a household, for example, because the couple's age gap that partly determines the score (Figure 1) may also determine a couple's compatibility. As explained in

subsection 4.1, we address this concern in a quasi Regression Discontinuity Design that compares couples with a spouse born right at the end of a lunar year with couples with a spouse born right at the beginning of the following lunar year. Around the lunar year cutoff, a couple's age gap and school cohorts vary smoothly. Column (7) implements this quasi RDD approach by restricting the sample to those born in either January or February, and finds an even larger auspiciousness coefficient of 24.7% (statistically significant at 1%).

Auspiciousness and religious prosociality. We move on to assess the role of Tử Vi beliefs in shaping religious prosociality in Table 5. First, column (1) confirms that the effect of auspiciousness on social transfers is small and statistically insignificant in the subsample of households following Big God religions, namely Christianity and Islam.[45] The main effect is driven by the remaining sample of followers of traditional, non-Big God religious beliefs, as shown in column (2).

We further examine a general pattern of religious prosociality in Vietnam in columns (3) and (4), by regressing social transfers on provincial religiosity, measured by the standardized average spending on religious items and activities as percentage share of household expenditure, controlling for the standard set of covariates except province fixed effects. Religiosity is broadly associated with social transfers, especially among traditional beliefs, as a one standard deviation change in religiosity is associated with 37% change in social transfers received. It is somewhat surprising that this relationship is even stronger among holders of traditional beliefs than among Big God believers (only 18%, not statistically significant, in column 5). This pattern does not support Norenzayan's (2013) theory of Big God religions' strong prosociality.[46]

Building on this association, we ask how much of it can be attributed to beliefs in marriage fortune according to Tử Vi. As previously done in Table 3, we focus on the phenomenon of social insurance in hardship by restricting the sample to households with an inpatient. Column (5) shows an even stronger association of religiosity and social transfers, with an estimate of 0.44. We then introduce the full interaction between religiosity and the auspiciousness score in column (6),[47] and find that among auspicious families, religiosity is more strongly associated with social transfers. The gap between auspicious and inauspicious couples of 0.17 amounts to 39% of 0.44, the estimate of the relationship between religiosity and social transfers. Hence, beliefs in Tử Vi's predictions of marriage fortune account for a key part of non-Big God religious prosociality in Vietnam.

[45] Since religious syncretism is widespread in Vietnam, especially regarding the adoption of Christianity, it is not surprising that a small share of Christian families still follow some traditional beliefs.

[46] This comparison should be taken cautiously, since we are using the same measure of religiosity for both groups of religions. While religious expenditure can be seen as a much relevant proxy for religiosity in traditional beliefs in Vietnam, it may ignore other dimensions of religiosity, such as worships at pagodas and church attendance.

[47] The coefficient of religiosity is absorbed by the reintroduced province fixed effects.

Table 5: Auspiciousness and Religious Prosociality

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	arsinh(**Transfers and loans received from social circle**)					
Sample:	Big God	Non-Big God	Big God	Non-Big God	NBG & has inpatient	NBG & has inpatient
Auspicious	0.034	0.120**				0.293***
	(0.174)	(0.047)				(0.075)
Religiosity measure			0.182	0.374**	0.443***	
			(0.326)	(0.173)	(0.165)	
Auspicious × Religiosity						0.172**
						(0.068)
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R FEs	X	X				X
Year FEs	X	X	X	X	X	X
Region × U/R FEs			X	X	X	
Observations	4,855	48,840	4,855	48,840	9,542	9,542

Notes: This table reports the heterogeneous effects of auspiciousness on total transfers and loans received from social circle by strength of beliefs, using equation (12) that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) arsinh(household income, minus received social transfers, per capita), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (viii) province × urban/rural (except columns 3 to 5) and year fixed effects. The sample excludes 2010-2012 due to missing information on loans. Columns (1) to (4) split the sample by whether the commune's main religion is monotheist (Christianity or Islam, columns 1 and 3) or non-monotheist (traditional religions, columns 2 and 4). Columns (5) and (6) considers only households with inpatients in communes with non-monotheist main religion. The main explanatory variable in columns (3) to (5) is religiosity, i.e., average spending on religious items and activities as percentage share of household expenditure, computed and centered around zero at province × urban/rural level, with a standard deviation of 1.052. The corresponding specification replaces province × urban/rural fixed effects with region × urban/rural fixed effects. Column (6) interacts auspiciousness score with columns (3) to (5)'s religiosity measure. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.
*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Transfers from parents. We further ask whether the scope of auspiciousness's effect on social transfers is limited to very close links such as that between parents and children, or if it extends further towards the extended family. Since the VHLSS does not offer detailed information on the nature of those links, we make use of the Vietnam National Aging Survey (VNAS), conducted in 12 provinces in 2013, which contains detailed information on transfers between children and parents (details in appendix A.5). Using the same equation (12) to control for selection into marriage, we find small, statistically insignificant effects of auspiciousness on transfers from parents to children or vice versa. These results, reported in Table A14, suggest that auspiciousness needs not matter strongly for the relationship between parents and children. Instead, its large and robust effect on received social transfers presented in this subsection likely arise from a couple's broader social networks beyond their immediate family.

4.4 Effects of astrological auspiciousness on family outcomes

Since auspicious couples receive in net more social transfers from their social circle, they likely attain better living standards. We now move on to examine this causal effect of auspiciousness in detail. Its assertion would confirm the broadly held Tử Vi belief about auspicious couples' fortunate fate, thus its self-fulfilling nature.

Effect on household expenditure. Panel A of Table 6 reports the estimated effect of a couple's auspiciousness on household expenditure, controlling for selection into marriage using the same baseline specification described in subsection 4.3.[48] The estimated coefficient of auspiciousness in column (1) implies that auspicious and inauspicious couples differ by 2.9% in household expenditure per capita (statistically significant at 1%) after taking into account selection issues.[49] Column (2) shows an almost identical effect in the quasi RDD sample, similar to that used in column (6) of Table 4, thus addressing possible concerns of the argued arbitrariness of the auspiciousness score. Tables A11 and A12 further show that auspiciousness's effect on household expenditure is robust to all the methodological and specification robustness checks discussed in subsection 4.3, such as alternative control functions, propensity score matching, alternative and augmented marriage market models, other standard error clustering schemes, and additional controls and fixed effects. In addition, Panel A of Table A15 reports that auspiciousness matters to almost all components of household expenditure.

The rest of Panel A presents additional heterogeneity of the auspiciousness effect. Similar to the effect on social transfers in Table 3, columns (3) and (4) repeat its emphasis among families with a serious health shock: It is almost twice as large among families with an inpatient as among the others. Columns (5) and (6) show that the effect comes mostly from non-Big God believers, while it is not significant among Christians and Muslims, similar to Table 5. Last, column (7) shows that the effect is markedly stronger in provinces with stronger religiosity, measured by the average share of household's religious expenses (which is excluded from the outcome variable used in this column). This finding is further illustrated semiparametrically in Figure A11.

Figure A12 shows that the auspiciousness effect on social transfers does not vary significantly by age, while Figure A13 shows that its effect on household expenditure increases by husband's and wife's age. This difference is consistent with our discussion in subsection 4.3 that auspicious couples enjoy net positive transfers from their social circle, leading to not only instantaneous consumption

[48] As income data in developing countries are usually plagued with seasonal movements and sporadic shocks, we focus on household expenditure as the key measure of living standards.

[49] Table A13's Panel B shows that this effect is driven by both sides of neutral matches, with a markedly strong effect of inauspiciousness among households with a negative health shock, similar to the pattern found in Panel A.

Table 6: Effect of Auspiciousness on Household Living Standards

Panel A. Effect on household expenditure per capita

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ln(**Household expenditure per capita**)						
Sample:	Full sample	Quasi RDD	Has inpatient	No inpatient	Big God	Non-Big God	Full sample
Auspicious	0.029***	0.031***	0.049***	0.025***	0.013	0.031***	0.029***
	(0.006)	(0.011)	(0.013)	(0.007)	(0.019)	(0.006)	(0.006)
Auspicious × Religiosity							0.011**
							(0.005)
Control function	X	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X	X
RDD group FEs							X
Observations	62,810	17,093	12,349	50,461	5,647	57,159	62,810

Panel B. Effect on other measures of living standards and children's education

Observation unit:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Household			Child in schooling age			
Dependent variable:	ln(**HH income p.c.**)	**Improved living stds.**	**Lodging type**	𝟙(**Remains in school**)			**Years of schooling**
Sample:	Full sample	Not asked in 2002	Not asked in 2010	Full sample	Has inpatient	No inpatient	Full sample
Auspicious	0.023***	0.020*	0.017**	0.014***	0.020**	0.012***	0.074***
	(0.006)	(0.011)	(0.008)	(0.004)	(0.009)	(0.004)	(0.022)
Control function	X	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X	X
Child's age FEs				X	X	X	X
Observations	62,788	52,228	58,232	81,100	16,210	64,890	81,100

Notes: This table reports the effect of auspiciousness on household living standards, using equation (12) that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) period of marriage dummies, (vi) spouses' zodiac sign fixed effects, and (vii) province × urban/rural and year fixed effects. **Panel A:** The dependent variable is the natural logarithm of household expenditure per capita. Column (1) considers the full sample. Column (2) implements a pooled quasi Regression Discontinuity Design by restricting the sample to couples with at least one spouse born within one month of the lunar new year and including fixed effects by the year of the discontinuity. Columns (3) and (4) split the sample by whether a household member has been in inpatient care in the past 12 months, and columns (5) and (6) whether the commune's main religion is monotheist (Christianity or Islam) or non-monotheist (traditional religions). Column (7) interacts auspiciousness score with religiosity, i.e., average spending on religious items and activities as percentage share of household expenditure, computed and centered around zero at province × urban/rural level. **Panel B:** Columns (1) to (3)'s dependent variables are respectively the natural logarithm of household income per capita, the household's self-reported living standards relative to 5 years ago (on a scale from 1 to 3 with a standard deviation of 0.642), and the household's lodging type on (on a scale from 1 to 4 with a standard deviation of 0.904). Each observation in columns (1) to (5) is a child between 6 and 19 at the time of the survey in the household. The corresponding specification includes additional child's age fixed effects. Columns (4) to (6)'s dependent variable is whether the child remains in school. Columns (5) and (6) split the sample by whether a household member has been in inpatient care in the past 12 months. Column (7)'s dependent variable is the child's years of schooling. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

but also accumulation of income, such as the prevention of fire sales of assets (Table 3's Panel B). Over time, those benefits accumulate into a larger gap in living standards.

Effects on other living standard measures. In the same spirit, the first three columns of Panel B shows the corresponding results for other household outcome variables. Column (1) reports an estimated effect of auspiciousness on household's total income per capita of 2.3% (statistically significant at 1%). This effect is a reminder that social insurance can help a household avoid disruption to their work and investment, which help accumulate the benefits of the transfers over time. It is 20% smaller than the effect on expenditure, highlighting that auspiciousness also matters through a consumption smoothing mechanism, consistent with the emphasis of the effect on social transfers in time of hardship shown in 4.3. Next, in columns (2) and (3), the outcomes are respectively the household's reported improvement in living standards relative to 5 years ago, on a scale from 1 to 3, and its lodging type, on a scale from 1 to 4. For both outcomes, auspicious couples enjoy better living standards than inauspicious ones. The magnitudes of these effects, 3.1% and 1.9% after normalizing by the standard deviation of the respective outcome variable, are also not far off from that on household expenditure.

In addition, by comparing the distributions of auspicious versus inauspicious couples in repeated cross sections of the Population Survey, Table A16 provides suggestive evidence that among older couples, auspicious ones are less likely to be separated (due to either divorce or death), but it is not the case among younger ones (details in appendix D.3). This difference can be due to either lower divorce rates or higher life expectancy among older auspicious couples.

Effects on children's education. As inauspicious couples receive less help from their social circle, especially in time of hardship, we further investigate on whom the burden of this effect falls. Columns (4) to (7) of Panel B shows that auspiciousness matters to the education of a couple's children in schooling age (6 to 19). Column (4) reports that children of auspicious couples are 1.4% more likely to remain in school (statistically significant at 1%), compared to children of inauspicious couples. Furthermore, this effect increases to 2.0% among families that have experienced hospitalization in the past 12 months (column 5), while it is only 1.2% among families that did not face this kind of hardship (column 6), which resonates with Di Maio and Nistico's (2019) evidence on the effect of parental job loss on children's dropout. These magnitudes are not negligible in comparison with the share of children no longer in school of 12.8% (column 4's sample) and 14.0% (column 5's sample). In the latter subsample, the estimated auspicious-inauspicious gap is equivalent to 14.3% of the number of children no longer in school. Auspiciousness's effect on school dropout then translates into an estimated difference of 0.07 (statistically significant at 1%) in years of schooling

between same-age children of auspicious and inauspicious couples (column 7).

Table A17 further shows that a couple's auspiciousness has no effect on their number of children, their ages at first child, the gender ratio and presence of a son among their children, and the gender gap among their children in terms of school dropout or underperformance. That is, the schooling gap reported in Panel B of Table 6 is unlikely due to an inherent difference in the fertility choice, children composition, or gender preference of auspicious versus inauspicious couples. Instead, it is much more likely due to the occurrence of hardship and the difference in support received from extended family and friends.

5 Potential explanations of Tử Vi's social mechanism

In subsections 4.3 and 4.4, we have uncovered robust evidence that astrological beliefs based on the auspiciousness score are self-confirmed in that auspicious couples on average receive more social transfers and attain better living standards than inauspicious ones, even after controlling for differences in the probability of selection into marriages. This section further discusses potential explanations of the prevalence and persistence of such strong effects of a system of beliefs that were arbitrarily derived from astrology and hemerology, and attempt to assess them with data.

5.1 Discussion of potential medium-run explanations

Direct explanation by beliefs in Tử Vi predictions. The prediction that auspicious couples have better fortune, regarding both the couple's harmony and consonance and their lifetime good luck, implies that help from their friends and extended families will likely be useful to help them get through hard times and develop, and also reciprocate. In contrast, inauspicious couples are predicted to face continual misfortunes, so any help would likely be futile and wasteful, without much chance of reciprocity. As we have seen in the previous section, this difference leads to auspicious couples' advantage in social insurance and living standards, which can reinforce their initial beliefs and make them self-fulfilling. Furthermore, as auspicious couples observe this mechanism more directly and more often, their beliefs are likely reinforced more strongly, leading to even a stronger subsequent gap in beliefs. Based on our long experience of Vietnamese culture and extensive discussions with Vietnamese from different regions and generations, this direct explanation is highly predominant and prevalent.

This self-fulfilling mechanism hinges on an important assumption that agents do not make correct inferences that the auspiciousness score is inherently arbitrary and does not entail any other benefits than the ones created by the social beliefs in itself. In a world where transfers and marriage outcomes by everyone are perfectly observed, couples and their friends and families should

be able to infer that auspicious couples' better fortune is due to their social circle's help, and may update their beliefs to refute Tử Vi's predictions. Their failure to make such inference is most likely due to imperfect learning, possibly for the following reasons.

First, Fudenberg and Levine (2006) highlights an important reason why superstitious beliefs can persist in an equilibrium with learning from realized observations. When such beliefs specify actions and consequences only in cases of one or two steps off the equilibrium, which happen and get observed very infrequently, they avoid being refuted. In our context, the belief about inauspicious couples specifies what happens in case (i) inauspicious couples face a hardship, and (ii) they still receive some help from the extended family, and (iii) the help turns out to be useless. The relatives who may not observe this chain of events often enough cannot refute this belief.

Second, the rare possibility of clear refutation also allows for excuses to resolve apparent inconsistencies between beliefs and facts. From our experience, inauspicious couples frequently pay for expensive religious rituals and donations recommended by fortune tellers to appease the predicted misfortune. In case the couples turn out well, those rituals are seen as excuses why the predictions of misfortune do not materialize; while they are rarely discussed in case of realized misfortune. More generally, it is common for believers to selectively evoke fitting examples of lucky auspicious couples, in a form of selective memory to confirm a biased belief (Chew et al., 2020).[50]

Social versus psychological mechanism. This mechanism has a fundamentally social nature, as it depends on couples' second-order beliefs about their friends and families' beliefs in Tử Vi's predictions, while a couple's own beliefs in Tử Vi are not necessary. This social nature is markedly different from other self-fulfilling mechanisms that function directly through an individual's psychology, e.g., as in Nunn and Sanchez de la Sierra's (2017). An example of an alternative psychological mechanism is that auspicious couples tend to be more satisfied with life, which improve their living standards and perhaps attract more social transfers because of their stronger capacity to reciprocate.

Astrology as norms to join social-insurance club. Imperfect learning needs not be the only explanation of self-fulling beliefs. We also consider two potential explanations using asymmetric information about a couple. The first is the club model (Iannaccone, 1992, Proposition 2) based on a couple's unobserved type, which considers adherence to religious norms and behaviors as a

[50] Levy (2019) points out that systems of religious beliefs usually turn to excuses to resolve apparent inconsistencies between beliefs and facts. For example, Levy and Razin (2012) cites the role of the concepts of forgiveness, atonement, and repentance in the Judeo-Christian tradition as factors that make beliefs about punishment unfalsifiable. Nunn and Sanchez de la Sierra (2017) provides an example how traditional believers are ready to use excuses based on unobservable actions to explain apparent refutations of their beliefs.

signaling mechanism that helps screen couples of the more religious and traditional type, so that the resulting club can produce and benefit from better social insurance (the public good in this context). Accordingly, the more religious couples choose to make auspicious matches because they consider them as norms they should follow. Thence, beliefs of the couple and of their social circle are consistent with the realized equilibrium.

We have previously discussed in subsection 4.3 that the lack of the auspiciousness effect on out-transfers does not support this club-good explanation.

Discrimination by auspiciousness. The second explanation using asymmetric information is that of self-fulfilling discrimination with unobserved actions, as modeled by Coate and Loury (1993) and recently evidenced by Glover et al.'s (2017). In this logic, couples' efforts are an action unobserved by the social circle, yet complementary to their transfer and support. Auspicious couples are believed to make more effort, hence they get rewarded by the social circle, especially when they face hardship. In anticipation, only auspicious couples find it worthwhile to make effort. In this framework, beliefs of the couple and of their social circle are also self-fulfilling.

5.2 Evidence from survey on beliefs in Tử Vi

Survey on beliefs related to Tử Vi. We assess the explanations discussed above in a survey on individuals' beliefs in Tử Vi based on our collaboration with the Mekong Development Research Institute (MDRI), a think tank specialized in development economics research in Vietnam. The survey first inquires on couples' knowledge about Tử Vi, and then on their beliefs regarding whether and how auspiciousness matters to a couple's fortune. The survey further asks each couple about their second-order beliefs on how their friends and extended families think about how their own auspiciousness may matter. MDRI ran the survey in April 2020 on a representative sample of the population of ethnic Kinh in Vietnam. For further details on the survey, see appendix E.

Descriptive statistics of knowledge of and reliance on Tử Vi. First, regarding the population's knowledge of the system, the survey reconfirms our prior that 75% of the Kinh population has some knowledge of the Tử Vi system in terms of marriage fortune prediction. The share increases to 82% when we also count those who know where and how to get the relevant information. Among those with some knowledge, 76% also know about the most popular fortune predictions (auspicious triples and inauspicious quadruples), and 29% know even about the least known ones.

Second, when it comes to their own marriage decision, 31% of the sample say that they did consider Tử Vi to some extent. However, regarding their own marriage, 45% of the sample think that their family and relatives care about Tử Vi. 42% of them also report to consider Tử Vi to some

extent if and when they face the decision on their children's marriages. The similarity between the latter two probabilities suggests that beliefs about how much relatives care about a couple's auspiciousness are quite consistent with how much they really do, and helps strengthen the veracity of survey answers on beliefs.

In addition, many couples do not care about how auspiciousness is predicted to matter directly to themselves, but still care about how auspiciousness shapes their relatives' views about them. This comparison emphasizes the importance of second-order beliefs about relatives' beliefs on a couple's auspiciousness in explaining the effects of Tử Vi predictions.

Beliefs among auspicious couples and alternative explanations. To evaluate the discussed explanations, we apply the same framework presented in subsection 4.1 to estimate the differences in reported beliefs between auspicious and inauspicious couples, while controlling for the selection of auspiciousness. The results are reported in Table 7.

Table 7: Effect of Auspiciousness on Beliefs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		1st order belief about auspicious matches			2nd order belief about auspicious matches by extended family			
Dependent variable:	**Life satisfaction**	**Better harmony**	**Better luck**	**Receive more help**	**Better harmony**	**Better luck**	**Respect traditions**	**More effort**
Auspicious	0.024	0.355*	0.493**	0.502*	0.620**	0.543*	0.441	0.325
	(0.132)	(0.212)	(0.241)	(0.268)	(0.308)	(0.299)	(0.324)	(0.347)
Dependent var. s.d.	*0.828*	*1.470*	*1.430*	*1.610*	*1.522*	*1.506*	*1.593*	*1.563*
Baseline controls	X	X	X	X	X	X	X	X
Control function	X	X	X	X	X	X	X	X
Market × U/R FEs	X	X	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X	X	X
Observations	421	420	420	421	362	366	361	368

Notes: This table reports the effect of auspiciousness on beliefs about auspicious matches, using survey sample and equation (12) that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) period of marriage dummies, (v) spouses' zodiac sign fixed effects, and (vi) region × urban/rural and year fixed effects. Column (1)'s dependent variable is the couple's self-reported life satisfaction. Columns (2) to (4) look at the couple's first-order belief about auspicious matches. The dependent variable is how much the couple agree that auspicious couples have better harmony with each other (column 2), encounter better luck (column 3), and receive more help from their relatives (column 4). Columns (5) to (8) look at the couple's second-order belief about their relatives' beliefs about the couple's auspiciousness. The dependent variable is how much the couple agree that their relatives believe that auspicious couples have better harmony (column 5), encounter better luck (column 6), hold more respect of traditions and filial duties (column 7), and make more effort at work and in life (column 8). All dependent variables range from 1–least satisfied/completely disagree to 5–most satisfied/completely agree. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.
*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

First, we do not detect direct evidence of the psychological self-fulfilling mechanism through

life satisfaction, as column (1) shows that auspicious couples do not enjoy higher life satisfaction.[51]

Next, we examine the direct explanation regarding beliefs about a couple's harmony and luck, as discussed in subsection 5.1. Columns (2) and (3) show that auspicious couples' hold stronger beliefs that auspiciousness causes better harmony and better luck. In parallel, auspicious couples also hold stronger beliefs about getting more help from their extended families, as supported by the strong estimate in column (4). This finding is consistent with subsection 4.3's main result that auspicious couples indeed gain more social transfers from their friends and families, highlighting the key social nature of the mechanism.

The connection with social transfers from a couple's social circle is further examined in columns (5) to (8) through the lens of their second-order beliefs about their extended families' beliefs about the couple's auspiciousness. Columns (5) and (6) show that an auspicious couple's extended family are believed to hold stronger beliefs that the auspicious couple will have better harmony and better luck. Those results strengthen the main explanation regarding beliefs and social transfers. Results from columns (2), (3), (5), and (6) further highlight the reasoning behind how auspiciousness shapes marriage formation. Furthermore, the fact that the effects are larger on second-order beliefs than on a couple's own beliefs emphasizes that this mechanism is fundamentally a social mechanism, as discussed in subsection 5.1.

The two other explanations by club norms and by discrimination (subsection 5.1) receive much less clear support, as shown in columns (7) and (8). The large standard errors can be interpreted as there is little evidence of commonly shared beliefs regarding astrological matching's role as a signal of either respect for traditional norms and filial duties (column 7), or hard work and more effort in life (column 8). While we should not completely rule out those explanations just because of the large standard errors, they are unlikely the main explanation behind the empirical findings.

5.3 Potential evolutionary benefits of astrological beliefs

Tử Vi's predictions on marriage fortune place some restriction on the marriage market, which matters particularly to deter inauspicious couples to match. In this subsection, we consider its restrictiveness in the very long run. Following Giuliano and Nunn's (2021) line of inquiry, we seek to explain how this form of restrictive cultural heuristics can persist over centuries, and even resurrect spectacularly since the late 1980s after heavy repression in the North from 1954 and in the South from 1975. Our explanation underlines the potential long-run benefits of such restrictive

[51]The estimated effect of auspiciousness on income of 2.3% (subsection 4.4) would only produce a tiny indirect effect on life satisfaction. Given Helliwell et al.'s (2022) estimated effect of ln(income) on the Gallup World Poll's life evaluation (scale of 0-10) of 0.10, the indirect effect of auspiciousness on life evaluation amounts to only 0.0023 (scale of 0-10).

rules for the communities that maintain them, so that those practices are sustained in a cultural evolutionary process (Wilson, 2003, Henrich, 2016).

First, as shown in Table 5 (subsection 4.3), beliefs in astrological predictions can explain 39% of the association between religiosity and prosociality across Vietnamese provinces. In Norenzayan's (2013) logic, this evidence shows that astrological beliefs can be a building block in the historical coevolution of religious beliefs, prosociality, and Vietnam's large society, all in absence of Big Gods.

Second, in the spirit of Iannaccone (1992), we posit that beliefs that restrict behaviors likely reduce outside options, thus may improve commitment, hence enhance cooperation and coordination. Consider the historical context of pre-modern Vietnam where marriages were mostly arranged between families (Minh and Huong, 2023). Predictions based on birth years are particularly useful in making early arrangements, when future spouses' attributes are still unknown. Those predictions should not be asymmetric, in which case one party may have an asymmetrically large incentive to break the committed arrangements. Indeed, Tử Vi's predictions satisfy those conditions.

Furthermore, as a commitment device, astrological beliefs are likely substitute of in-group trust, another enforcer of mutual commitment. Table 8's column (1) confirms this intuition, in that the main effect of auspiciousness on marriage formation is heightened in provinces with lower in-group trust (measured from the World Value Survey). Expectedly, this interaction effect is much smaller and more imprecise for the measure of generalized trust, as shown in column (2).

Last, in highly unequal marriage markets, there are fewer choices of potential matches by income, so astrological beliefs are less necessary in providing commitment between families. Column (3) provides suggestive evidence of such substitutability between a province's income inequality and astrological beliefs. In this direction, Table A18 also shows that income inequality lowers the effect of astrological beliefs on household's expenditure and received social transfers.

This subsection has thus provided evidence consistent with our explanation that astrological beliefs' restrictive nature provides long-run benefits to a society by improving commitment and enhancing cooperation.

6 Concluding remarks

This paper has thus demonstrated Tử Vi's astrological predictions on matrimonial fortune as self-fulfilling prophecies that bear perversive, significant consequences on Vietnamese families. Part I estimates structurally that their role in shaping marriage formation is near 7% of that of the couple's age and education profile. Part II employs Part I's predicted probabilities to control for the selection into auspicious matches, and finds that auspicious couples receive on average 11% more social transfers from their social circles. This effect on social transfers goes up to 28% for families

Table 8: Auspiciousness as a Commitment Device

Contribution of auspiciousness to the marriage surplus function

	(1)	(2)	(3)
Dependent variable:		**Marriage surplus function**	
Auspicious: Zodiac	0.174	0.172	0.180
	(0.004)	(0.004)	(0.004)
	[0.000]	[0.000]	[0.000]
Auspicious × In-group trust	-0.237		
	(0.083)		
	[0.302]		
Auspicious × Generalized trust		-0.040	
		(0.050)	
		[0.798]	
Auspicious × Inequality measure			-0.302
			(0.073)
			[0.110]
Interaction var. s.d.	*0.047*	*0.095*	*0.047*
% explained by astrology			
vs. total surplus	1.963	1.929	1.960
vs. age & education	6.331	6.222	6.355
Age gap control polynomial	Quadratic	Quadratic	Quadratic
Market × Spouses' types FEs	X	X	X
Number of couples	916,315	916,315	916,315

Notes: This table reports how trust and income inequality matter to the role of auspiciousness in shaping marriages. The estimation (subsection 3.1.2) uses the 2009 Census with 16 marriage markets (i.e., 8 statistical regions × urban/rural), and includes a quadratic polynomial of spouses' age gap, fully interacted with their education levels, together with their Five Elements auspiciousness score. Columns (1) and (2) interact the couple's zodiac auspiciousness score with marriage market-averages of in-group trust and generalized trust, derived from the World Values Survey questions *"Could you tell me for each whether you trust people you know personally?"* and *"Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?"* (details in appendix B.5). Column (3) interacts auspiciousness score with marriage market-level average standard deviation of ln(household expenditure per capita) over 2002-2008. All interaction variables are centered around zero at marriage market level. Standard errors in parentheses come from the structural estimation. p-values in brackets are computed from 1,000 simulations of reshuffled auspiciousness. *** denotes statistical significance at 1% level, ** 5% level, * 10% level.

suffering a health shock. Auspicious couples end up with 2.9% higher household consumption and 2.3% household income, better self-reported living standards, and under hardship they face lower likelihood of assets liquidation and children's school dropout.

The evidence lends support to a mechanism of social insurance, by which auspicious couples' extended families believe that they have better luck and harmony, hence are more willing to help them. We provide evidence of the role of couples' second-order beliefs about their extended families' beliefs in Tử Vi's prediction, based on a representative survey of beliefs. We also report indirect evidence supporting those beliefs' role in fostering commitment, which helps enhance couple-specific investments and brings long-run benefits to the community. Overall, we emphasize the social nature of a mechanism that firmly fits Merton's (1948) description of a self-fulfilling prophecy in the spirit of the "Thomas theorem" in sociology (Thomas and Thomas, 1928), as cited in the epigraph.

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A Data and sample description

A.1 Vietnamese Censuses

We downloaded the 5%, 3%, and 15% random samples of the 1989, 1999, and 2009 Vietnamese Censuses from IPUMS in April 2019. The samples contain information on the gender, month and year of birth, education attainment, marital status, spouse (if any), and geographical location (together with its urban/rural classification) of each individual. We use an individual's solar month and year of birth to impute their lunar year of birth and corresponding zodiac sign. Specifically, those born in January of a solar year are assigned to the previous lunar year (details in appendix B.1). For consistency across different estimation samples used in this paper, which are constructed from different datasets, we categorize education attainment into four levels: below primary, primary completed, secondary completed, and university completed.

Information on geographical location in the 2009 Census sample is at present-day 63 province level. However, it is coarser in the 1989 and 1999 Census samples, with only 38 unique values, due to numerous changes in province boundaries over time. We use this information to identify four marriage markets at North/South $\times$ urban/rural level, 8 marriage markets at 8 statistical region level (Red River Delta, Northeast, Northwest, North Central, Central Coast, Central Highlands, Southeast, and Mekong River Delta), and 16 marriage markets at 8 statistical region $\times$ urban/rural level in all three census samples, and additionally 63 marriage markets at 63 province level in the 2009 sample.

As is standard in the marriage market estimation literature, we consider only men and women of prime marriage age in the corresponding census year, which is between 21 and 35 for men and 19 and 33 for women, again following literature. Note that to be consistent, we also determine age based on lunar birth year. Furthermore, as we do not need to recover the type fixed effects in equation (5), we further exclude single men and women from the estimation samples and select only married couples.

1989 Vietnamese Census. The 5% random sample of the 1989 Vietnamese Census covers 2.6 million individuals, including 310,721 men between 21 and 35 and 378,260 women between 19 and 33. Within this pool of prime marriage age, 65.0% are married, 33.0% are never married, and only 1.8% are divorced or widowed. We further restrict the estimation sample to married couples with information on both spouses' education levels, which yields 171,430 couples. The descriptive statistics of this sample are shown in Table A2.

1999 Vietnamese Census. The 3% random sample of the 1999 Vietnamese Census covers 2.4 million individuals, including 290,731 men between 21 and 35 and 314,402 women between 19 and 33. Within this pool of prime marriage age, 62.5% are married, 35.9% are never married, and only 1.5% are divorced or widowed. We restrict the estimation sample to married couples with information on both spouses' education levels, which yields 149,804 couples. The descriptive statistics of this sample are shown in Table A2.

2009 Vietnamese Census. The 15% random sample of the 2009 Vietnamese Census covers 14.2 million individuals, including 1,787,682 men between 21 and 35 and 1,870,857 women between 19 and 33. Within this pool of prime marriage age, 62.6% are married, 35.9% are never married, and only 1.6% are divorced or widowed. We restrict the estimation sample to married couples with information on both spouses' education levels, which yields 916,315 couples. The descriptive statistics of this sample are shown in Table A1.

A.2 Vietnamese Population Survey

The Vietnamese Population Survey is conducted annually by the Vietnamese General Statistical Office since 2001 on representative samples of the Vietnamese population in the respective years. Similar to the censuses, the survey also contains information on the gender, month and year of birth, education attainment, marital status, and geographical location (together with its urban/rural classification) of each surveyed households' member, which we employ to impute their lunar birth year, determine their education level (below primary, primary completed, secondary completed, or university completed), and assign them to one of 4, 8, 16, or 63 marriage markets as described in appendix A.1.

From 2006 onwards, the Population Survey incorporates an additional question on the timing of marriage. Specifically, from 2006 to 2013 with the exception of 2009, the survey asks whether the individual's marital status changed in the past two years (often from single to married, especially for the pool of prime marriage age). Then from 2014 to 2018, the survey asks explicitly for the date of the individual's first marriage (if any). This information allows us to more accurately identify the pool available for marriage around each survey, i.e., newlywed couples within two years of the survey date. In addition, we also require that the husbands were between 21 and 35 and the wives 19 and 33 at the time of the survey.

Unlike the censuses, the Population Survey does not provide spousal links but information on the individual's relationship with the household head, e.g., household head, spouse, children, and children in law. We utilize this information, together with the order in which the household members are listed, to identify all primary and secondary married couples in each household. Specifically, a

primary couple composes of two individuals who are (i) both married, (ii) of different gender, and (iii) listed in the same household as household head and spouse, and a secondary couple composes of two individuals who are (i) both married, (ii) of different gender, and (iii) listed consecutively in the same household as children and children in law.

Across 12 Population Survey waves between 2006 and 2018 (excluding 2009), covering 19.9 million individuals in total, there are 2,379,500 men between 21 and 35 and 2,382,783 women between 19 and 33. Marital status is available for 85% of this pool of prime marriage age, out of which 59.4% are married, 38.8% are never married, and only 1.9% are divorced or widowed. We further restrict the estimation sample to newlywed couples with information on both spouses' education levels, which yields 124,906 couples. The descriptive statistics of this sample are shown in Table A2.

A.3 Indonesian Censuses

We downloaded the 10% random samples of the 2000 and 2010 Indonesian Censuses from IPUMS in October 2022, which similarly contain information on the gender, month and year of birth, education attainment, marital status, spouse (if any), and geographical location (together with urban/rural classification) of each individual. We follow the same steps as described in appendix A.1 to construct analogous estimation samples of the marriage market in Indonesia. In these samples, we assign each married couple to one of the 7, 26, and 51 marriage markets, which correspond to respectively 7 statistical regions, 26 combined provinces, and 51 combined province $\times$ urban/rural's.

2000 Indonesian Census. The 10% random sample of the 2000 Indonesian Census cover 20.1 million individuals, including 2,312,201 men between 21 and 35 and 2,495,124 women between 19 and 33. Within this pool of prime marriage age, 63.7% are married, 31.9% are never married, and 4.4% are divorced or widowed. We further restrict the estimation sample to married couples with information on both spouses' education levels, which yields 1,139,094 couples. Comparable to the 1999 Vietnamese Census sample, husbands' average age is 29.7, and 68% of the husbands are "below primary" or "primary completed," 29% "secondary completed," and only 3% "college completed;" wives' average age is 26.0, and 75% of the wives are "below primary" or "primary completed," 24% "secondary completed," and only 2% "college completed." Different from the 1999 Vietnamese Census sample, the average husband-wife age gap is 3.7 and only 6% of the couples are of the same age. In terms of auspiciousness score, 32.6% of the matches are auspicious, 51.6% neutral, and 15.9% inauspicious, i.e., both fewer auspicious matches and more inauspicious matches relative to Vietnam.

2010 Indonesian Census. The 10% random sample of the 2000 Indonesian Census cover 23.6 million individuals, including 3,008,725 men between 21 and 35 and 3,033,399 women between 19 and 33. Within this pool of prime marriage age, 65.8% are married, 32.2% are never married, and 2.0% are divorced or widowed. We further restrict the estimation sample to married couples with information on both spouses' education levels, which yields 1,418,888 couples. Comparable to the 2009 Vietnamese Census sample, husbands' average age is 29.8, and 61% of the husbands are "below primary" or "primary completed," 34% "secondary completed," and only 5% "college completed;" wives' average age is 26.5, and 64% of the wives are "below primary" or "primary completed," 32% "secondary completed," and only 4% "college completed." Different from the 2009 Vietnamese Census sample, the average husband-wife age gap is 3.3 and only 8% of the couples are of the sample age. In terms of auspiciousness score, 32.9% of the matches are auspicious, 52.5% neutral, and 14.6% inauspicious, i.e., both fewer auspicious matches and more inauspicious matches relative to Vietnam.

A.4 Vietnam Household Living Standards Survey

The Vietnam Household Living Standards Survey (VHLSS) was first developed in the 1990s as the small-sample VLSS, with the World Bank's technical assistance as part of its Living Standards Measurement Study program. Starting in 2002, it was renamed VHLSS and fully taken over by the Vietnamese government's General Statistical Office. Since then, the survey has been conducted in every even year and regarded as the most reliable data on living standards in the country. Each survey wave covers a random, representative sample of approximately 9,200-9,400 households in 2,300 communes out of about 11,000 communes and wards in the country, encompassing all districts and provinces. The 2002 and 2018 waves are two exceptions with significantly expanded samples, covering approximately 30,000 and 70,000 households respectively.

At the household level, the VHLSS collects detailed information on the composition and living standards of each household, including household members and their demographic information (more on this below), granular breakdown of the household's annual income and expenditure, sources and amounts of transfers and loans received by the household, lodging type and self-assessed improvement in living standards, as well as cases of hospital admissions and school dropouts. This information is further complemented by commune-level data on the commune's geographical location (together with urban/rural classification), main religion, and recent natural disasters.

At the individual level, the survey contains information on the gender, month and year of birth, education attainment, and marital status of each household member, which we similarly employ to impute their lunar birth year and determine their education level (below primary, primary

completed, secondary completed, or university completed). We focus on household head couples whose marriage selection probability could be computed. This requires both spouses were of prime marriage age in 1989, 1999, or 2009, together with information on their education levels (details in appendix B.3). We further exclude couples whose estimated marriage probability is outlier in the top percentile, which is likely the result of measurement errors associated with rare types (all key results are robust to also including them). This yields a final baseline sample of 62,810 household head couples out of 109,998 identified across 9 VHLSS waves between 2002 and 2018. The descriptive statistics of this sample are shown in Table A4.

In addition, we also employ VHLSS individual-level data to identify the children of each household head couple. As married or older children may already leave the household and therefore could not be observed with reasonable completeness, we focus particularly on unmarried, schooling-age children between 6 and 19 whose education levels are below secondary completed and their schooling outcomes. 45,452 out of 62,810 households in the VHLSS baseline sample have at least one such unmarried, schooling-age child, with a combined total of 81,100 such children.

For further details on the variables constructed from VHLSS data, see appendices B.4 and B.5.

A.5 Vietnam National Aging Survey

The Vietnam National Aging Survey (VNAS) was conducted in 2013 with a representative sample of 4,007 older people in 12 provinces. The survey contains information on the amount of transfers, gifts, and help exchanged between the respondents and each of their children, including those not living in different households. Individual-level demographic data, available for both the respondents and their children, include gender, year of birth, education attaintment, marital status, and geographical location (together with its urban/rural classification). Imputed lunar birth year is the same as solar birth year in the absence of month of birth, and education attainment is similarly categorized into four levels: below primary, primary completed, secondary completed, and university completed.

To construct the estimation sample, we first exclude 210 respondents with adopted or step children. We then identify married couples among the children of the remaining respondents by utilizing the children's relationship with the respondents (children or children in law), their gender and marital status, and the order in which they are listed, similar to how we identify married couples in the Vietnamese Population Survey (details in appendix A.2). Next, we restrict the sample to married couples whose marriage selection probability could be computed and is not in the top percentile, similar to how we construct the VHLSS baseline sample (details in appendix A.4). Last, for cleaner interpretation of the results, we consider only married children couples not

living in the same household as the respondents, which are 87% of all married children couples.

The final VNAS sample includes 7,022 married children couples of 2,715 respondents out of 11,161 identified in the survey. Comparable to the VHLSS baseline sample, husbands' average age is 40.2, and 69% of the husbands are "below primary" or "primary completed," 22% "secondary completed" and only 9% "college completed;" wives' average age is 37.7, and 73% of the wives are "below primary" or "primary completed," 19% "secondary completed" and only 8% "college completed." The average husband-wife age gap is 2.5 and 14% of the couples are of the sample age. In terms of auspiciousness score, 34.0% of the matches are auspicious, 53.1% neutral, and 12.9% inauspicious. The average age of the parent respondents is 68.7 and 30% of them are single or widowed.

For further details on the variables constructed from VNAS data, see appendix B.4.

B Key variable construction

B.1 Lunar year of birth

An individual's zodiac sign is determined based on their lunar year of birth, which mostly, but not perfectly, coincides with their solar year of birth. We thus use additional information on respondents' months on birth (available across the Vietnamese Censuses, Vietnam Population Survey, and VHLSS) to impute their lunar birth years. Specifically, as the precise date of the lunar new year varies by year and ranges from late January to early February, we assign those born in January to the lunar year before the new year and those born in February to the lunar year after.

To gauge the precision of this solar birth month to lunar birth year mapping, we compute the probability that it is correct for those born in January and February. (Note that for those born between March and December, their lunar and solar years of birth are exactly the same with certainty.) For example, the lunar new year in 1987 began on January 29, in which case the mapping is incorrect only for those born between January 29 and January 31, i.e., only 3 out of 59 days in January and February. Assuming that birth rate did not vary across those 59 days, then for 1987, the mapping is correct with $56/59 = 95\%$ probability ($28/31 = 90\%$ for those born in January and 100% for those born in February). Between 1960 and 1990, the probability that the mapping is correct ranges from 68% to 98%, with an average of 86% (92% for those born in January and 80% for those born in February).

Across the different estimation samples used in this paper, the share of individuals born in February or January ranges from 14% to 16%, implying that imputed lunar year of birth is correct for around $15\% \times 86\% + 85\% \times 100\% = 98\%$ of the sample. We also show robustness to dropping those born in January in February in Table A5 and Panels A of Tables A10 and A12.

B.2 Auspiciousness scores

Zodiac auspiciousness score. Tử Vi's prediction of a couple's marriage fortune is based on the 12-year zodiac cycle (Figure 1). We use Hoàng (2011), a popular manual of Tử Vi that can be found in any bookstore across Vietnam, as our main source of Tử Vi, and crosscheck with multiple other sources. Tử Vi's marriage fortune prediction comprises of 4 auspicious sets of Tam Hợp, 6 inauspicious pairs of Lục Xung, 6 auspicious pairs of Lục Hợp, and 6 inauspicious pairs of Lục Hại.

- **Tam Hợp:** Four auspicious sets of Tam Hợp are (i) Rat, Dragon, and Monkey, (ii) Ox, Snake, and Rooster, (iii) Tiger, Horse, and Dog, and (iv) Cat (or Rabbit in Chinese zodiac), Goat (or sometimes Sheep in Chinese zodiac), and Pig. Note that the zodiac signs in each set are 0, 4, or 8 years apart from one another (0 is included as a same-zodiac-sign match is considered

to be auspicious by Tam Hợp).

- **Lục Xung:** Six inauspicious pairs of Lục Xung are (i) Rat and Horse, (ii) Ox and Goat, (iii) Tiger and Monkey, (iv) Cat and Rooster, (v) Dragon and Dog, and (vi) Snake and Pig. Note that the zodiac signs in each pair are 6 years apart from each other.
- **Lục Hợp:** Six auspicious pairs of Lục Hợp are (i) Rat and Ox, (ii) Tiger and Pig, (iii) Cat and Dog, (iv) Dragon and Rooster, (v) Snake and Monkey, and (vi) Horse and Goat. Note that the year gap between the zodiac signs in each pair varies across the pairs.
- **Lục Hại:** Six inauspicious pairs of Lục Hại are (i) Rat and Goat, (ii) Ox and Horse, (iii) Tiger and Snake, (iv) Cat and Dragon, (v) Monkey and Pig, and (vi) Chicken and Dog. Note that the year gap between the zodiac signs in each pair varies across the pairs.

Based on Tử Vi, every zodiac sign has exactly 4 auspicious matches, 2 inauspicious matches, and 6 neutral matches out of 12 possible zodiac sign matches. As noted above, while Tam Hợp and Lục Xung have fixed year gaps between the zodiac signs in the same set or pair, it is not the case for Lục Hợp and Lục Hại. Hence two couples with the same age gap could still have different auspiciousness scores. For example, a couple of husband and wife born in (1980, 1987) are seen as neutral, while another born in (1981, 1988) are seen as auspicious. We also control extensively for the couple's age gap and zodiac signs in all specifications, and even for age gap fixed effects in the most stringent ones.

Element auspiciousness score. In addition to auspiciousness based on the couple's zodiac signs, we also consider auspiciousness based on their Five Elements (Figure A1). The Five Elements are Metal, Wood, Water, Water, and Earth, and an individual's element is also determined by their lunar year of birth. The cycle of creation, considered to be auspicious, is that Fire creates Earth, Earth creates Metal, Metal creates Water, Water creates Wood, and Wood creates Fire. The cycle of destruction, considered to inauspicious, is that Fire destroys Metal, Metal destroys Wood, Wood destroys Earth, Earth destroys Water, and Water destroys Fire. For example, based on the Five Elements, a match between Fire and Wood (or Earth) is considered an auspicious one, while a match between Fire and Water (or Metal) is considered an inauspicious one.

B.3 Marriage selection probability

As presented in subsection 4.1, we use Bayes' rule to compute the marriage selection probability for each pair (i, j) with respective characteristics (x_i, y_j):

$$\begin{aligned} \mathbf{P}_{ij} &= \mathbf{Pr}(Married_{ij} = 1 | x_i, y_j) \\ &= \frac{\mathbf{Pr}(x_i, y_j | Married_{ij} = 1) \times \mathbf{Pr}(Married_{ij} = 1)}{\mathbf{Pr}(x_i) \times \mathbf{Pr}(y_j)}, \end{aligned}$$

where $\mathbf{Pr}(x_i, y_j | Married_{ij} = 1)$ is obtained from Part I's structural estimation with four marriage markets as reported in columns (1) to (3) of Table 1. To operationalize this formula, we need to (i) determine the couple's period of marriage, i.e., the census year among 1989, 1999, and 2009 based on which $\mathbf{Pr}(x_i, y_j | Married_{ij} = 1)$ is estimated, and (ii) compute the corresponding unconditional probabilities $\mathbf{Pr}(Married_{ij} = 1)$, $\mathbf{Pr}(x_i)$, and $\mathbf{Pr}(y_j)$.

Period of marriage assignment. For each couple, we first determine the census years among 1989, 1999, 2009 such that both the husband and the wife were of prime marriage age (i.e., between 21 and 35 for men and between 19 and 33 for women) in those years. If there is no such assignable census year for the couple (often because the couple are too old to be of prime marriage age in 1989 or because their age gap is too large), we drop them from the estimation sample. If there is only one assignable census year, we assign the couple to that year as their period of marriage. If there are two assignable census years, we assign the couple to the earlier one as their period of marriage, guided by the fact that the couple were much more likely to be their early twenties than in their early thirties when they got married. Based on this rule, the oldest cohort of prime marriage age in 1989 would be assigned to census year 1979, which we do not have access to. Hence for consistency, we exclude them from the estimation sample (all key results are robust to also including them). Table A3 reports the mapping between a couple's years of birth and their assigned period of marriage. We also show robustness to using alternative assignment rule in which a couple is assigned to the later one when there are two assignable census years in Panels B of Tables A9 and A11.

Computing unconditional probabilities. We compute $\mathbf{Pr}(Married_{ij} = 1)$, $\mathbf{Pr}(x_i)$, and $\mathbf{Pr}(y_j)$ from the same census sample used for estimating $\mathbf{Pr}(x_i, y_j | Married_{ij} = 1)$ but also including the singles. For each marriage market (Northern urban, Northern rural, Southern urban, or Southern rural), $\mathbf{Pr}(x_i)$ is computed as the share of males with characteristics x_i out of all males in the sample, and $\mathbf{Pr}(y_j)$ the share of females with characteristics y_j out of all female in the sample; note that x_i and y_j are defined based on age (or equivalently year of birth) and education level. Also for each marriage market, $\mathbf{Pr}(x_i, y_j | Married_{ij} = 1)$, the unconditional probability the pair (i, j)

are married, is computed as the number of married couples over the number of all possible couples, i.e., $\frac{\#\text{married couples}}{\#\text{males}\times\#\text{females}}$. As the samples are constructed from random samples of the censuses, we need to scale this ratio by 5% for the 1989 Census sample, 3% for the 1999 Census sample, and 15% for the 2009 Census sample.

As robustness checks, we also consider alternative marriage market models used to estimate $\mathbf{Pr}(x_i, y_j|Married_{ij} = 1)$, including those with 8 or 16 marriage markets (Panels B of Tables A9 and A11). Then the unconditional probabilities $\mathbf{Pr}(Married_{ij} = 1)$, $\mathbf{Pr}(x_i)$, and $\mathbf{Pr}(y_j)$ are computed at the corresponding marriage market level.

B.4 Household outcomes

Received social transfers. Part II's main outcome variable, received social transfers, is computed as the sum of (i) domestic transfers received by the household within 12 months of the survey and (ii) loans from family and friends received by the households, often at very low or zero interest rates and with flexible or unspecified deadlines. Across the VHLSS waves, between 75% and 85% of the loans from family and friends are interest free, while only between 3% and 6% of the loans from other sources are interest free. As the VHLSS does not ask information on loans in 2010 and 2012, received social transfers is also missing for these two years. We also consider only received domestic transfers, available across all VHLSS waves, as an alternative measure of received social transfers. Table A8 replicates Table 3 using this alternative measure, which yields qualitatively similar results of comparable magnitude. We employ the inverse hyperbolic sine transformation for received social transfers to account for zero values, and show robustness to using alternative transformations in Panel B of Table A10.

Other sources of fund. In addition to received social transfers, we look at a range of related variables in Panel B of Table 3. Regarding assets, we compute the total amount of assets liquidated by the household as the sum of sales of means of production, sales of gold and jewelry, and withdrawals of savings and investments, all within 12 months of the survey. This information is available only from 2002 to 2008. Regarding loans, we consider the total amount of loans that are not from family and friends received by the household, often at higher interest rates, split into loans for housing and living expenses and loans for capital expenses. These variables are available from 2004 to 2018 except for 2010 and 2012. Regarding transfers, we consider total transfers received by the household from overseas and total transfers sent from the household to others, both within 12 months of the survey and available across all VHLSS waves. We employ the inverse hyperbolic sine transformations for all of these variables to account for zero values.

Transfers from and to parents. Table A14's data on transfers, gifts, and help exchanged between parents and children come from the VNAS (details in appendix A.5). The variables we consider include (i) whether the parent, i.e., the respondent, sent money to the children couple and vice versa; (ii) the category of the amount of money sent, including 0–nothing, 1–less than VND 500 thousand (around USD 25 in 2013), 2–between VND 500 thousand and VND 2 million; 3–between VND 2 and VND 5 million, 4–between VND 5 and VND 10 million, and 5–more than VND 10 million; (iii) whether the parent sent gifts valuing above VND 500 thousand to the children couple and vice versa; and (iv) whether the children couple contribute economically to the parent's household; all within 12 months of the survey.

Household expenditure and income. Part II's other main outcome variable, total household expenditure per capita, is computed by the GSO from detailed questions on spending made by the household in the VHLSS. We also look at total household income per capita, similarly computed by the GSO, although we focus on household expenditure as the key measure of living standards as income data in developing countries are usually plagues with seasonal movements and sporadic shocks. We employ the natural logarithm transformation for total household expenditure per capita (as well as total household income per capita) and show robustness to using alternative transformations in Panel B of Table A12. The VHLSS also provides breakdown of total household expenditure into expenditure on food and non-food daily consumption, expenditure on durable goods and housing, and expenditure on education and health, and breakdown of total household income into income from wages, income from non-agricultural and agricultural activities, income from rents, and other income. We consider these components of household expenditure and income in Table A15 and employ the inverse hyperbolic sine transformation to account for zero values.

Other measures of living standards. Besides household expenditure and income, we consider two other measures of living standards in Panel B of Table 6. The first is the household's response to the question *"Have the living conditions in your household improved, compared with 5 years ago?"*, which takes value 1–worsened or the same as before, 2–yes, slightly, or 3–yes, substantially. The second is the household's lodging type, which takes value 1–temporary houses or other types of house, 2–semi-permanent houses, 3–houses with a shared kitchen or bathroom, or 4–houses with a private kitchen and bathroom, or villas. The VHLSS collects information on living standards improvement and lodging type in all survey waves except for respectively 2002 and 2010.

Children's education. We employ two measures of children's education also in Panel B of Table 6. The first is whether the child remains in school, and the second is their completed years

of schooling, both at the time of the survey. Note that in this table we focus only on children in schooling age (between 6 and 19). To also account for non-schooling-age children, we construct an additional indicator that takes value 1 if the child remains in school or has already completed secondary education. We use this "remains-on-track" indicator to compute the children's gender schooling gap as explained below.

Fertility and household composition. Table A17 looks at the couple's fertility choice and their household composition. In terms of fertility choice, we consider the couple's number of children and their ages at first child birth. In terms of household composition, we consider whether the couple has a son and the share of sons among their children. We also look at their children's gender schooling gap, computed as the difference between the share of schooling-age sons remaining in school and the analogous share for daughters, and the difference between the share of sons remaining on track (as described above) and the analogous share for daughters.

B.5 Commune and region characteristics

Main religion. We obtain information on religion from the commune-level portion of the VHLSS, which, among other questions, asks the commune head to select the most prevalent religion in the commune. The choices include Buddhism, Catholicism, Protestantism, Cao Đài (an indigenous religion), Hoà Hảo (an indigenous branch of Buddhism), Islam, other religion, and no religion. We classify Catholicism, Protestantism, and Islam as monotheist (Big God) religions, as the rest as non-monotheist (traditional) ones (Tables 5 and 6). Between 2002 and 2018, around 7% of all communes in the VHLSS baseline sample have monotheist main religions, covering around 9% of all households in the sample.

Religiosity. We measure religiosity by total spending on religious items and activities as percentage share of total household expenditure. We first calculate this share in at household level, then compute its average over 2002-2008 at the level of 8 statistical regions × urban/rural in Part I (Table 2) and at the level of 63 provinces × urban/rural in Part II (Tables 5 and 6) before averaging it again across the years. The means (standard deviations) of the average percentage share of spending on religious items and activities (before being centered around zero) at statistical region × urban/rural level and province × urban/rural level are respectively 2.518 (0.880) and 2.683 (1.052).

Strength of social ties. We measure strength of social ties by total spending on gifts by donations as percentage share of total household expenditure. We first calculate this share in at household level, then compute its average over 2002-2008 at the level of 8 statistical regions ×

urban/rural in Part I (Table 2) and at the level of 63 provinces × urban/rural in Part II (Figure A11). The means (standard deviations) of the average percentage share of spending on religious items and activities (before being centered around zero) at statistical region × urban/rural level and province × urban/rural level are respectively 3.538 (0.832) and 3.813 (1.235).

Development level. We use average household income as a proxy for development level. Specifically, in Table 2, we first average household income at 8 statistical region × urban/rural level, then apply the natural logarithm transformation to these averages. This variable is then centered around zero also at statistical region × urban/rural level.

Inequality. We measure inequality as the average standard deviation of the natural logarithm of household expenditure per capita over 2002-2008 at the level of 8 statistical regions × urban/rural (Table 8) and at the level 63 provinces × urban/rural (Table A18). Both variables are then centered around zero also at statistical region × urban/rural level and province × urban/rural level respectively.

Trust. We derive Table 8's measures of trust from the World Values Survey in Vietnam. Generalized trust is measured based on responses to the question *"Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?"*, which we recode to take value 1–*"Most people can be trust"* or 0–*"Need to be very careful."* In-group trust is measured based on responses to the question *"Could you tell me for each whether you trust people you know personally?"*, which we similarly recode to take value 1–*"Trust completely/Trust somewhat"* or 0–*"Do not trust very much/Do not trust at all."* The World Values Survey also contains information on respondents' geographical locations, which allows us to average the responses to the aforementioned trust questions to construct corresponding trust measures at the level of 8 statistical regions × urban/rural. The means (standard deviations) of the resulting generalized trust and in-group trust measures (before being centered around zero) are respectively 0.445 (0.095) and 0.767 (0.047).

C Part I: Astrology and marriage arrangements

C.1 Marriage market model solution

Under our distributional assumptions on the taste shocks $\{\varepsilon_{iy}\}_{y\in\mathcal{Y}}$ and $\{\eta_{jx}\}_{x\in\mathcal{X}}$, individuals are indifferent between partners with the same type. The equilibrium transfers are the same for all pairs with the same types (x, y), so that $t_{ij} = \tau(x_i, y_j)$. Individuals maximize marriage payoffs:

$$\max\{\max_y\{u(x_i, y) - \tau(x_i, y) + \varepsilon_{iy}\}, 0\} \qquad \text{and} \qquad \max\{\max_x\{v(x, y_j) + \tau(x, y_j) + \eta_{jy}\}, 0\},$$

where individual rationality requires that, in order to be matched in equilibrium, individuals must receive a payoff larger than zero, which corresponds to the value of staying single.

We denote $\mu_m(y|x)$ and $\mu_f(x|y)$ the conditional choice probabilities of men and women, respectively. These functions correspond to the model's type-specific demand equations. Thanks to Choo and Siow's (2006) logit structure, they can be expressed as:

$$\begin{aligned}
\mu_m(y|x) &= \frac{\exp(u(x, y) - \tau(x, y))}{1 + \sum_{y'} \exp(u(x, y') - \tau(x, y'))} && \forall x \in \mathcal{X}, y \in \mathcal{Y}, \\
\mu_m(\emptyset|x) &= \frac{1}{1 + \sum_{y'} \exp(u(x, y) - \tau(x, y'))} && \forall x \in \mathcal{X}, \\
\mu_f(x|y) &= \frac{\exp(v(x, y) + \tau(x, y))}{1 + \sum_{x'} \exp(v(x', y) + \tau(x', y))} && \forall x \in \mathcal{X}, y \in \mathcal{Y}, \\
\mu_f(\emptyset|y) &= \frac{1}{1 + \sum_{x'} \exp(v(x', y) + \tau(x, y))} && \forall y \in \mathcal{Y}.
\end{aligned}$$

Since $\mu_m(y|x) = \mu(x, y)/f(x)$, $\mu_m(\emptyset|x) = \mu(x, \emptyset)/f(x)$, $\mu_f(x|y) = \mu(x, y)/g(y)$, $\mu_f(\emptyset|y) = \mu(\emptyset, y)/g(y)$, the matching function (2) results from:

$$\frac{[\mu(x, y)]^2}{\mu(x, \emptyset)\mu(\emptyset, y)} = \frac{\mu_m(y|x)}{\mu_m(\emptyset|x)} \frac{\mu_f(x|y)}{\mu_f(\emptyset|y)} = \exp(\Phi(x, y)).$$

The matching is feasible if the following constraints are respected:

$$f(x) = \mu(x, \emptyset) + \sum_y \mu(x, y) \qquad \text{and} \qquad g(y) = \mu(\emptyset, y) + \sum_x \mu(x, y). \tag{14}$$

Galichon and Salanié (2022) show that, for a given function Φ, equations (2) and (14) form a system of $N_x + N_y$ equations with as many unknowns, namely $\{\mu(x, \emptyset)\}_{x\in\mathcal{X}}$ and $\{\mu(\emptyset, y)\}_{y\in\mathcal{Y}}$, with a unique solution, which characterizes the equilibrium matching and can be computed through an Iterative Projection Fitting Procedure (IPFP).

C.2 Alternative specifications

We run several robustness checks using alternative specifications, alternative marriage market definitions, and alternative estimation samples. The results are reported in Table A5, for both the 2009 Vietnamese Census sample (Panel A) and the Population Survey sample (Panel B). Column (1) of both panels replicate the Table 1's results from employing subsection 3.1.2's baseline specification (i.e., quadratic polynomial of the age gap, fully interacted with the spouses' education levels, and four marriage markets).

Alternative specifications. In column (2), we model ϕ as a quartic polynomial of the age gap, a straightforward extension of the baseline specification. In column (3), we employ separate quadratic age gap polynomials for positive and negative age gaps to capture potential gender asymmetries, together with a same age dummy to further capture potential discontinuities due to possible benefits from belonging to the same cohort:

$$\phi(x_i, y_j) = \gamma_{1,e_i,e_j}\mathbb{1}\{d_{i,j} = 0\} + \gamma_{2,e_i,e_j}d^+_{i,j} + \gamma_{3,e_i,e_j}(d^+_{i,j})^2 + \gamma_{4,e_i,e_j}d^-_{i,j} + \gamma_{5,e_i,e_j}(d^-_{i,j})^2, \tag{15}$$

where $d^+_{i,j} = \max\{d_{i,j}, 0\}$ and $d^-_{i,j} = \min\{d_{i,j}, 0\}$. The age gap polynomials in both specifications are fully interacted with spouses' education levels.

Next, we fit the age gap profile nonparametrically using a fully flexible specification with age gap fixed effects:

$$\phi(x_i, y_j) = \sum_{k=-12}^{16} \gamma_k \mathbb{1}\{d_{i,j} = k\} + \kappa_{e_i,e_j}. \tag{16}$$

Note that we do not fully interact age gap fixed effects with spouses' education levels in this specification as doing so leads to underidentification. Furthermore, to have sufficient variation in astrological auspiciousness conditional on a particular value of the age gap, we only estimate this specification using the Population Survey sample, which contains a larger number of birth cohorts. The results are reported in column (4) of Panel B.

As we control more flexibly for the age gap, the age profile automatically takes up more variation that can be explained by auspiciousness. This both decreases the numerator and increases the denominator in expression (8), resulting in an expected reduction in the ratio of the surplus explained by auspiciousness and that explained by the age and education profile, as shown in columns (1) to (3) of both panels. Despite this, the auspiciousness score estimates remain both statistically significant and non negligible in magnitude.

Last, to capture heterogeneous preferences for auspiciousness, we allow the auspiciousness score coefficient β_1 in equation (5) to vary by spouses' education levels or marriage market characteristics,

or both (while specifying ϕ as in the baseline specification). We then re-estimate Part II's equation (12) using the predicted marriage probabilities from these augmented marriage market model and report the results in column (3) of Table 4 and columns (4) to (5) in Panel B of Tables A9 and A11. As explained in discussed subsection 4.3 and appendix D.2, this exercise enables us to evaluate Part I's model underspecification as an identification threat to Part II's estimation.

Alternative marriage market definitions. We consider more granular definitions of marriage market in columns (4) to (6) of Panel A and columns (5) to (7) of Panel B. These include (i) 8 marriage markets that are 8 statistical regions (Red River Delta, Northeast, Northwest, and North Central, Central Coast, Central Highlands, Southeast, and Mekong River Delta) in column (4) of Panel A and column (5) of Panel B, (ii) 16 marriage markets that are 8 statistical regions $\times$ urban/rural in column (5) of Panel A and column (6) of Panel B, and (iii) 63 marriage markets that are 63 provinces in column (6) of Panel A. The results reported in these columns are quantitatively similar to the baseline results reported in column (1).

Alternative sample restriction. In column (7), we exclude from the estimation sample couples in which either of the spouses was born in January or February, whose astrological auspiciousness could not be precisely determined. The results are again quantitatively similar to the baseline. If anything, the coefficients and surplus contributions of auspiciousness in column (7) of both panels are slightly larger than the corresponding baseline results, as one would expect when measurement errors are eliminated.

Separately, in Table A6, we estimate the baseline marriage market model separately for each the four marriage markets (Northern urban, Northern rural, Southern urban, and Southern rural) using the 1989, 1999, and 2009 Census samples, which captures the evolution of the importance of astrology in each region over time.

D Part II: Astrology and marriage outcomes

D.1 Semiparametric estimation of heterogeneous effects

We follow Do et al.'s (2017) method by considering the effect of auspiciousness β_2 in equation (12) as $\beta_2(x)$, a nonparametric function of a covariate x (such as household income or religiosity). We first define the percentiles of x as $p_x \in [0, 1\%, \ldots, 100\%]$. At each point p_x, the function $\beta_2(\cdot)$ is estimated from local linear regressions of equation (12), in which each observation at a percentile q_x is weighted by a Gaussian kernel function $\frac{1}{\sqrt{2\pi}} \exp\left[-\frac{1}{2}\left(\frac{q_x - p_x}{h}\right)^2\right]$, with a bandwidth $h = 20\%$. The shapes of the estimated functions $\beta_2(x)$'s remain robust to a broad range of bandwidths and kernel functions, with x being household income in Figure 4, religiosity and strength of social ties in Figure A11, and spouses' ages and age gap in Figures A12 and A13.

D.2 Robustness checks

Tables A10 and A12 report a range of robustness checks for Tables 3 and 6's results on the effects of auspiciousness on received social transfers and household expenditure respectively, using alternative specification choices as described below.

Alternative standard error clustering schemes. In both tables, columns (1) and (2) of Panel A show that the effects of auspiciousness remain robust to alternative standard error clustering schemes. Specifically, in column (1), we cluster standard errors by province × urban/rural, as household outcomes such as received social transfers and household expenditure could be correlated within the same province × urban/rural. In column (2), we follow Abadie et al. (2023)'s advice to cluster at the level of the source of variation in treatment, which is husband's zodiac sign × wife's zodiac sign in our setting. (Note that in the baseline specification, standard errors are clustered two ways by both province × urban/rural and husband's zodiac sign × wife's zodiac sign.)

Alternative sample restrictions. In column (3), we exclude from the estimation sample couples in which either of the spouses was born in January or February, whose astrological auspiciousness could not be precisely determined. In column (4), we directly compare auspicious matches to inauspicious matches without including neutral matches. Both restrictions result in considerably smaller estimation samples, yet in both cases and for both outcomes the coefficients of auspiciousness are statistically significant and of comparable magnitude to the baseline results.

Additional controls and fixed effects. In column (5), we additionally include the couple's Five Elements auspiciousness score (details in appendix B.2). For both outcomes, the coefficients of this

Five Elements auspiciousness score are small and not statistically different from zero, consistent with both Part I's results and the fact that auspiciousness based on the Five Elements is less salient. As a result, the inclusion of the Five Elements auspiciousness score does not materially changes the coefficients on the zodiac auspiciousness score.

In columns (6) to (8), we further control more flexibly for spouses' ages and age gap, first by employing quadratic (instead of linear) polynomials of the age gap separately for positive and negative age gaps in column (6), then by fully interacting column (6)'s age gap polynomial (including the same age dummy) with spouses' education levels in column (7) (similar to equation 15), last by adding spouses' age fixed effects to column (7) in column (8). It is reassuring that the effects of zodiac-based auspiciousness on both outcomes are quantitatively robust to these increasingly stringent age and age gap controls.

Alternative dependent variable transformations. In Panel B of each table, we consider alternative transformations of the respective outcome variable. Specifically, for Table A10's received social transfers, we employ the $\ln(1+\cdot)$ (instead of IHS) transformation in column (1), and look at per capita (instead of total) received social transfers without and with control for household size in columns (4) and (5), all of which yield statistically significant auspiciousness coefficients of comparable magnitude to the baseline results. In column (2), we use the level (instead of log-like transformations) of received social transfers (right winsorized at 1% to account for outliers). The resulting auspiciousness coefficient of VND 467.7 thousand (statistically significant at 5% level) implies an auspiciousness effect of around 7.7% of average received social transfers. This figure is smaller than the baseline estimate of 11.3%, consistent with Table 3 and Figure 4's results that the effect of auspiciousness on received social transfers is concentrated among low-income households. In column (3), the dependent variable is whether the household receives any transfers or loans from its social network. The resulting auspiciousness coefficient of 0.011 (statistically significant at 5% level) implies an extensive margin effect of only around 1.4%, suggesting that auspiciousness's effect on received social transfers works through both extensive and intensive margins.

For Table A12' household expenditure per capita, we employ the IHS (instead of natural logarithm) transformation in column (1), use winsorized level in column (2), consider only living expenditure in column (3), and look at total (instead of per capita) household expenditure without and with control for household size in columns (4) and (5). These exercises all yield statistically significant auspiciousness coefficients of comparable magnitude to the baseline results.

Last, in column (6) of both tables, we measure received social transfers and household expenditure as shares of household income. For received social transfers share, the resulting auspiciousness coefficient is positive and statistically significant, yet of smaller magnitude compared to the baseline,

consistent with the fact that astrological auspiciousness also has a direct positive impact on household income (Panel B of Table 6). For household expenditure share, the resulting auspiciousness coefficient similarly implies a smaller and not statistically significant auspiciousness effect, also due to the same reason. Nevertheless, its positive sign is consistent with astrological auspiciousness's having a larger effect on expenditure than on income, as discussed in subsection 4.4.

D.3 Additional results

Effect on couples' separation. Table A16 reports the effect of astrological auspiciousness on couples' separation, either due to divorce or death. The table's main dependent variable is the change in the share of the respective couple type in each marriage market, computed using data from the representative Population Survey by exploiting its repeated cross section structure and question on the timing of marriage. For example, to calculate these changes between 2004 and 2006, we first calculate the share of each couple of type in 2004, then calculate the corresponding share among non-newlywed couples in 2006. Note that as newlywed couples between 2004 and 2006 are not included, differences in the computed couple shares come only from couples' separations. However, we cannot distinguish between divorce and death as the cause of such separations. Consistent with the rest of the paper, we define couple type based on the spouses' years of birth and education levels and consider four separate marriage markets (Norther urban, Northern rural, Southern urban, and Southern rural). Using the Population Survey, we can compute the changes in the shares of couple types from between 2004 and 2006 to between 2016 and 2018.

Throughout the table, the auspiciousness coefficients are positive (i.e., auspicious couples are less likely to be separated/more likely to last, driven by both positive changes for auspicious matches and negative changes for inauspicious matches as shown in column 3), yet they are small in magnitude (compared to the average change) and not statistically significant when all couples (columns 1 to 3) or only younger couples (column 4) are considered. However, column (5) reports that this effect is considerably larger among older couples and statistically significant at 5% level, consistent with either that older auspicious couples are less likely to get divorced (relative to older inauspicious couples), or that they live longer.

E Survey on beliefs in Tử Vi

We collaborate with the Mekong Development Research Institute (MDRI), a think tank specialized in development economics research in Vietnam, on a survey on beliefs in Tử Vi. The survey first inquires on couples' knowledge about Tử Vi, and then on their beliefs regarding whether and how auspiciousness matters to a couple's fortune. The survey further asks each couple about their second-order beliefs on how their friends and extended families think about how their own auspiciousness may matter.

Survey sample. MDRI ran the survey in April 2020 on a representative sample of the population of ethnic Kinh in Vietnam. For each couple, we have information on their months and years of birth, their education levels, together with their geographical location at at least province × urban/rural level. This allows us to determine the couple's auspiciousness score and compute their marriage selection probability (details in appendices B.1 to B.3). Out of 652 survey respondent couples, we consider 423 couples whose marriage selection probability could be computed and not in the top percentile, similar to how we construct the VHLSS baseline sample (details in appendix A.4). Among these couples, 36.2% of the matches are auspicious, 51.1% neutral, and 12.8% inauspicious.

Survey questions. Below is the English translation of the Vietnamese survey questions used to elicit respondents' beliefs in Tử Vi and their life satisfaction.

1a. I would like to ask about your knowledge of the concept of auspicious matching between couples. Have you ever heard of the concept that matches between couples can be auspicious or inauspicious? E.g., the Tiger zodiac sign is considered an inauspicious match with the Monkey zodiac sign, but an auspicious match with the Horse zodiac sign. *Please select Yes or No. If the answer is Yes, proceed to questions 1b and 1c; otherwise proceed to question 2.*

1b. Have you ever heard of the following concepts? *For each concept, please select Yes or No.*

   i. Tam Hợp (e.g., Tiger, Horse, and Dog zodiac signs)

   ii. Lục Xung (e.g., Tiger and Monkey zodiac signs, Snake and Pig zodiac signs)

   iii. Lục Hợp (e.g., Rat and Ox zodiac signs, Dragon and Chicken zodiac signs)

   iv. Lục Hại (e.g., Tiger and Snake zodiac signs, Horse and Ox zodiac signs)

1c. When needed, could you seek information on whether the match between any two zodiac signs is auspicious using the following sources? *For each source, please select Yes or No.*

i. Your own knowledge

ii. Books and online resources

iii. Family, friends, and acquaintances

iv. Reputable experts

2. I would like to ask about your view on the concept of auspicious matching between couples. Do you agree with the following statements about married life? *For each statement, please select 1–completely disagree, 2–somewhat disagree, 3–neither agree nor disagree, 4–somewhat agree, or 5–completely agree.*

   i. Auspicious couples are more harmonious than inauspicious couples.

   ii. Auspicious couples encounter more advantages in life than inauspicious couples.

   iii. Auspicious couples receive more help from family and relatives than inauspicious couples.

3. Now, I would like to ask about the views of your family and relatives (not your own view) on the concept of auspicious match between couples. Do many members of your extended family agree with the following statements about married life? *For each statement, please select 1–most members disagree, 2–more members disagree, 3–some members agree and some disagree, 4–more members agree, or 5–most members agree.*

   i. Auspicious couples are more harmonious and likeable. Therefore, family and relatives would like to help them.

   ii. Auspicious couples encounter more advantages in life. Therefore, they make better use of the help from family and relatives.

   iii. Auspicious couples demonstrate stronger respect for tradition and greater sense of filial duties. For this, family and relatives would like to help them.

   iv. Auspicious couples put more effort into their life and work. Therefore, family and relatives would like to help them.

4. Please tell us your lunar birth years. Are you two an auspicious match? *Please select Yes or No.* Are you two an inauspicious match? *Please select Yes or No.*

5. When making decision regarding your own marriage, how important was auspicious matching between couples in the following aspects? *For each aspect, please select 1–not at all important, 2–little important, 3–moderately important, 4–very important, or 5–completely important.*

   i. For your own consideration

ii. For support from your family and relatives

6. When making decisions regarding your children's marriages, do you consider auspicious matching between couples? *Please select Yes or No.*

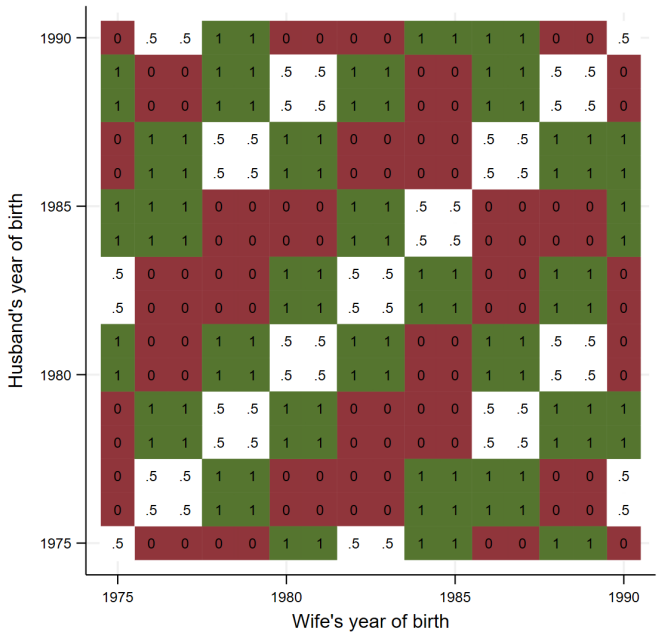
7. Please answer the following questions about your life satisfaction. *For each question, please select 1–very little, 2–little, 3–moderately, 4–much, or 5–very much.*

   i. In general, are you satisfied with your current life?

   ii. Yesterday, how happy did you feel with your life?

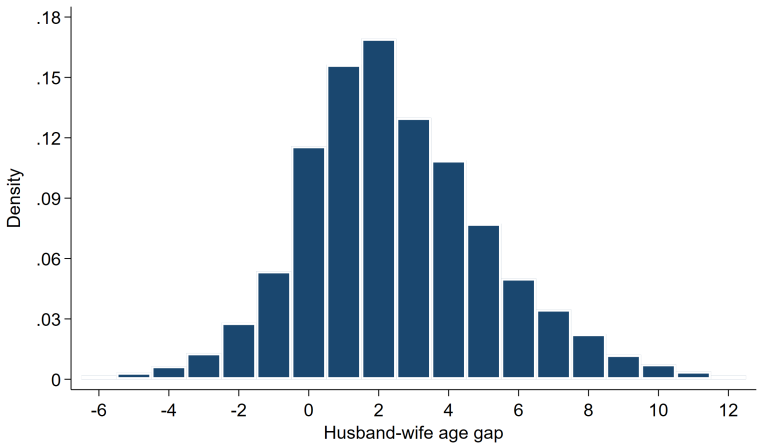
   iii. Yesterday, how anxious did you feel about your life?

Figure A1: Auspiciousness of Match Based on Couple's Five Elements

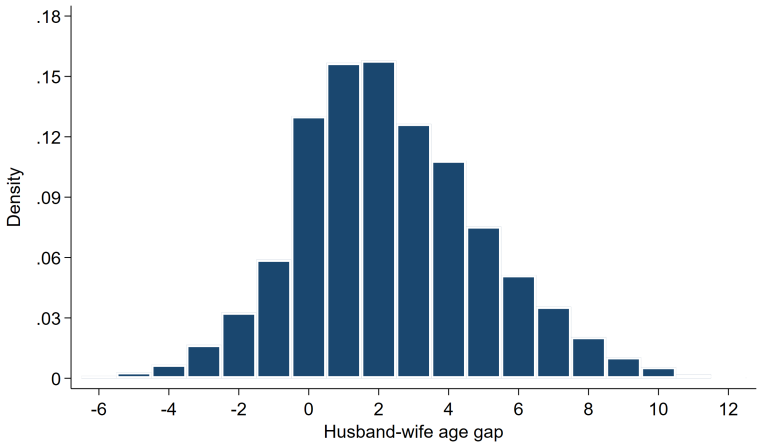


Notes: This figure plots the auspiciousness score of the match based on the couple's Five Elements by their lunar birth years. An auspicious match has a score of 1, a neutral match 0.5, and an inauspicious match 0.

Figure A2: Distribution of Spouses' Age Gap



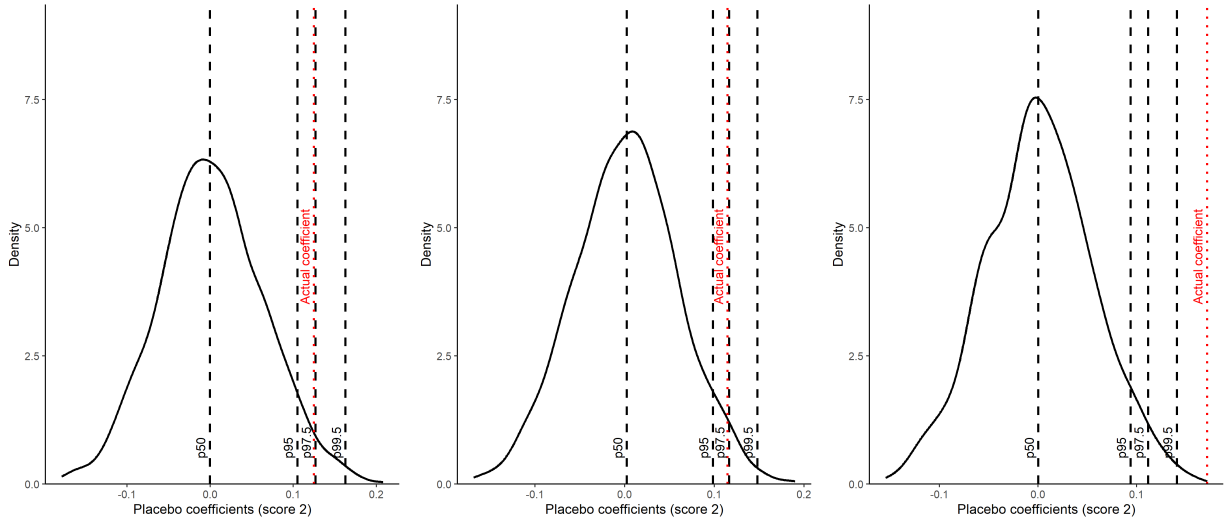
A. 2009 Census sample



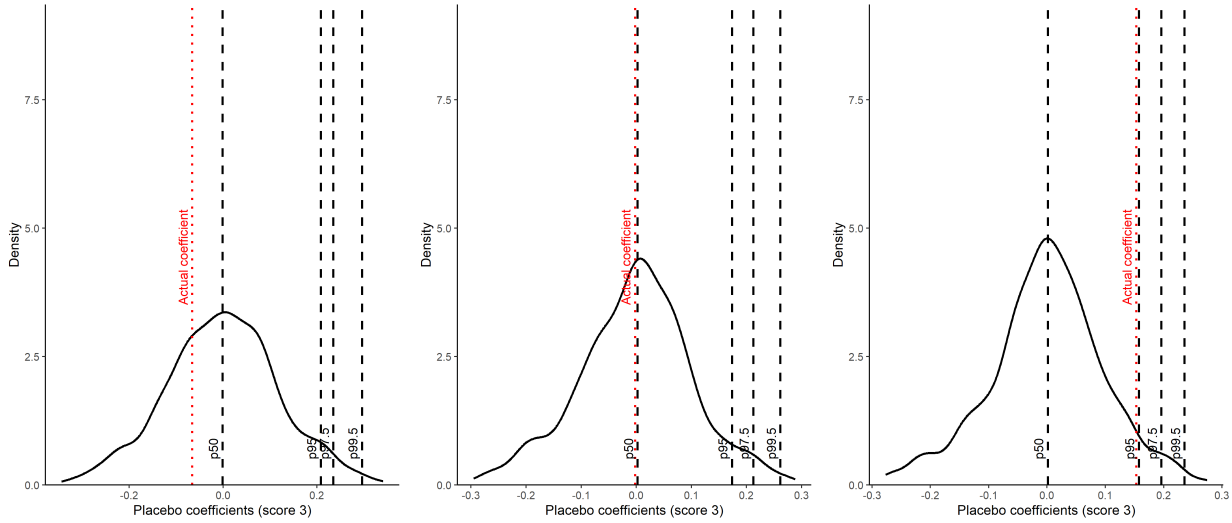
B. 2002-2018 VHLSS sample

Notes: This plots the distribution of the husband-wife age gap in the 2009 Census baseline sample, which includes 916,315 married couples in which the husbands were between 21 and 35 and the wives 19 and 33 in 2009 (**subfigure A**), and in the 2002-2018 VHLSS baseline sample, which includes 62,810 married couples in which the husbands were born between 1959 and 1988 and the wives 1961 and 1990 (**subfigure B**).

Figure A3: Permutation Tests with Randomized Auspiciousness Scores



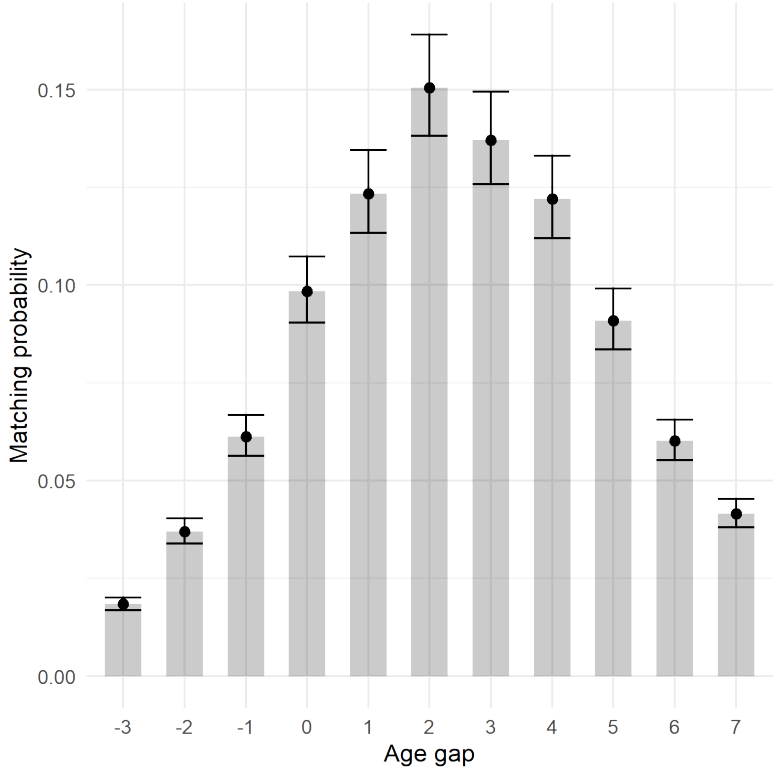
A. 1989 zodiac score coefficient B. 1999 zodiac score coefficient C. 2009 zodiac score coefficient



D. 1989 element score coefficient E. 1999 element score coefficient F. 2009 element score coefficient

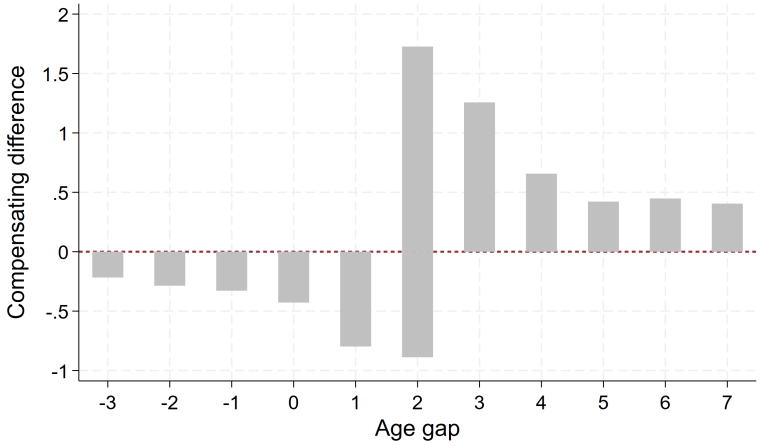
Notes: This figure plots the distribution of simulated placebo estimates of the zodiac auspiciousness score (top panel) and the Five Elements auspiciousness score (bottom panel) over three censuses in 1989, 1999, and 2009. The baseline estimation of the marriage market, as explained in subsection 3.1.2, considers four marriage markets and includes a quadratic polynomial of spouses' age gap, fully interacted with their education levels. For each distribution, the corresponding auspiciousness score is randomly permuted in 1,000 simulations, while preserving the marginal distributions of auspiciousness by wife's and husband's ages, as explained in subsection 3.3.

Figure A4: Marginal Impact of Auspiciousness Conditional on Age Gap



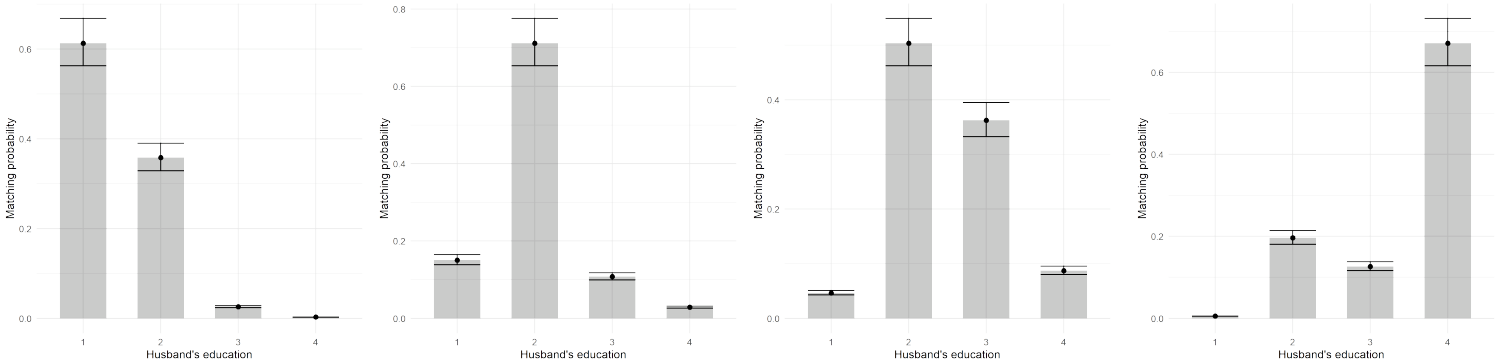
Notes: This figure plots the marginal effect of auspiciousness on marriage matching probability conditional on spouses' age gap, using data from 2009 Census. Each bar's upper bound (lower bound) represents the probability of an auspicious (inauspicious) match with the corresponding age gap, *ceteris paribus*. The estimates are obtained from the baseline estimation of the marriage market as reported in column (3) of Table 1.

Figure A5: Compensating Difference Conditional on Age Gap



Notes: [UPDATE NOTES]

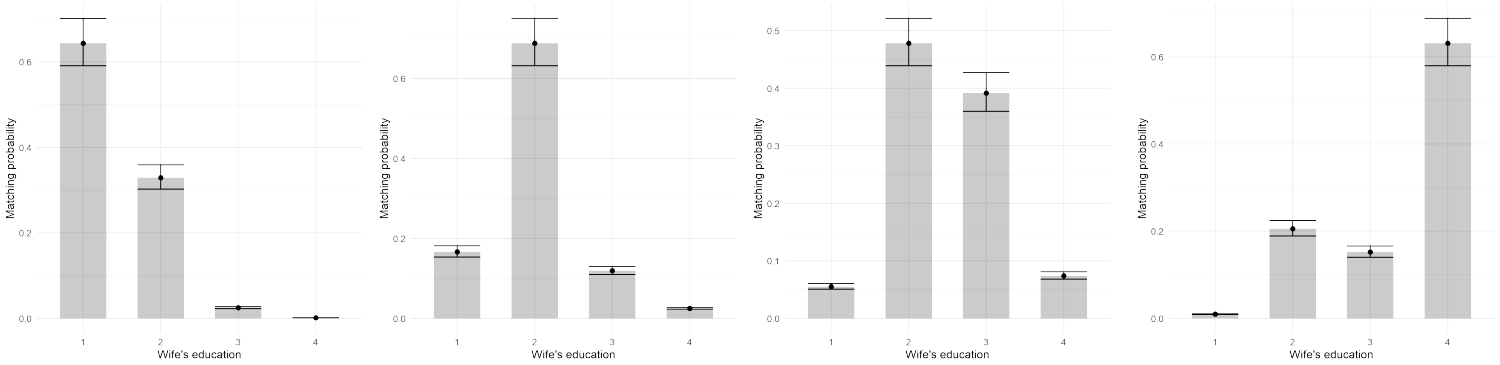
Figure A6: Marginal Impact of Auspiciousness Conditional on Wife's Education



A. Less than primary B. Primary C. Secondary D. University

Notes: This figure plots the marginal effect of auspiciousness on the wife's marriage matching probability conditional on spouses' education levels, using data from 2009 Census. For each wife's education level, the bars' upper bounds (lower bounds) represent the probabilities of her choosing a husband with given education levels if the match is auspicious (inauspicious), *ceteris paribus*. The estimates are obtained from the baseline estimation of the marriage market as reported in column (3) of Table 1.

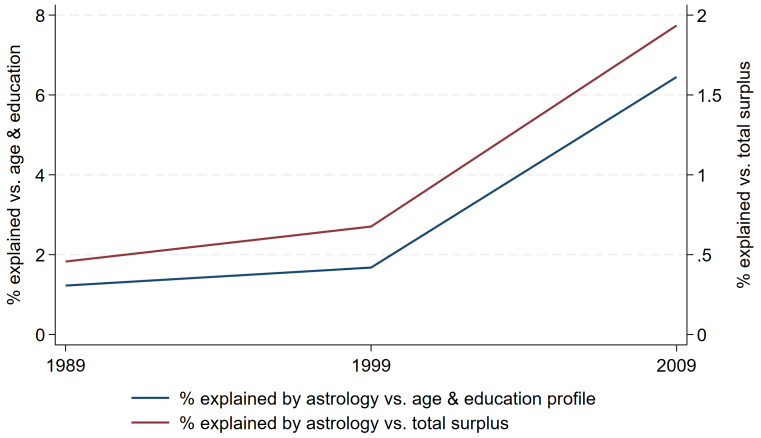
Figure A7: Marginal Impact of Auspiciousness Conditional on Husband's Education



A. Less than primary B. Primary C. Secondary D. University

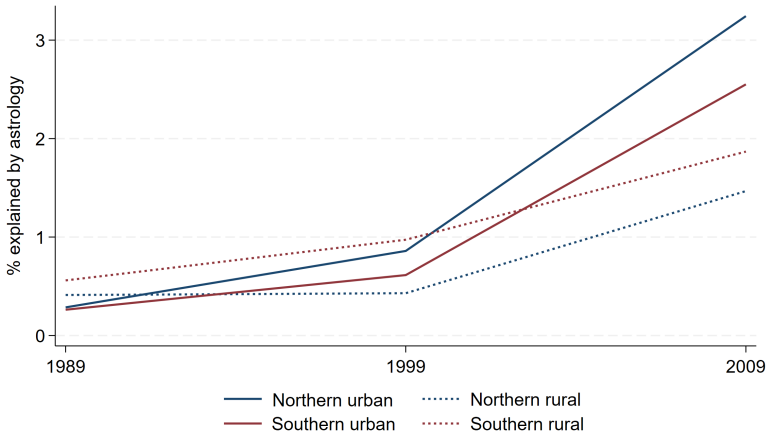
Notes: This figure plots the marginal effect of auspiciousness on the husband's marriage matching probability conditional on spouses' education levels, using data from 2009 Census. For each husband's education level, the bars' upper bounds (lower bounds) represent the probabilities of his choosing a wife with given education levels if the match is auspicious (inauspicious), *ceteris paribus*. The estimates are obtained from the baseline estimation of the marriage market as reported in column (3) of Table 1.

Figure A8: Auspiciousness's Role Relative to Systemic and Total Surplus Over Time



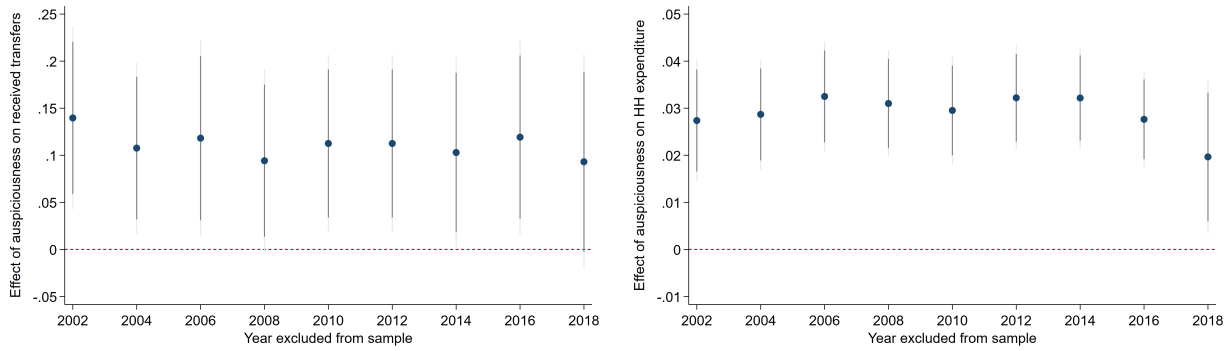
Notes: This figure plots the measures of the role of auspiciousness versus the total match surplus, and versus that explained the age and education profile, over three censuses in 1989, 1999, and 2009. Corresponding estimations are reported in columns (1) to (3) of Table 1.

Figure A9: Auspiciousness's Contribution to Total Surplus Over Time by Region



Notes: This figure plots the ratio of the surplus explained by auspiciousness versus total match surplus over three censuses in 1989, 1999, and 2009, separately Northern urban, Northern rural, Southern urban, and Southern rural regions. Corresponding estimates are reported in Table A6.

Figure A10: Effect of Auspiciousness When Each VHLSS Year Is Excluded

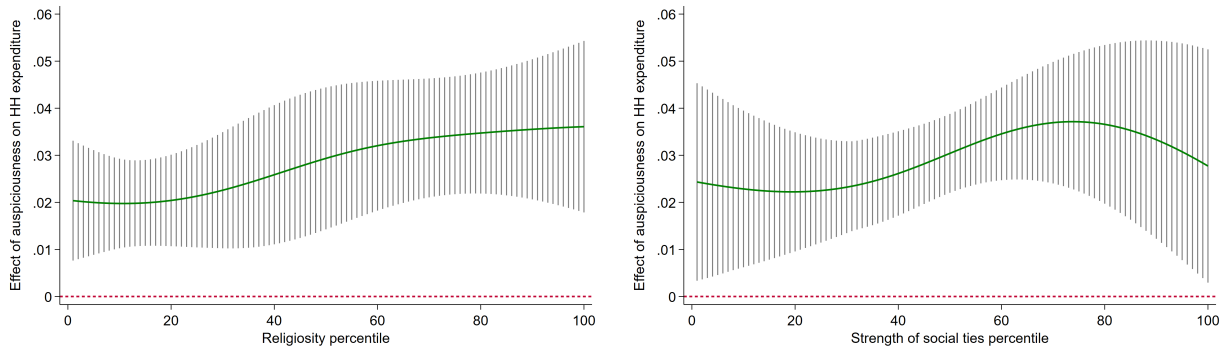


A. Received social transfers

B. Household expenditure

Notes: This figure plots the jackknife estimates of the effects of auspiciousness on total transfers and loans received from social circle (**subfigure A**) and household expenditure per capita (**subfigure B**), using equation (12) that controls for selection into marriage. In both subfigures, each point estimate and its 95% confidence interval corresponds to a year that is excluded from the estimation sample. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

Figure A11: Effect of Auspiciousness on Household Expenditure by Religiosity and Social Ties

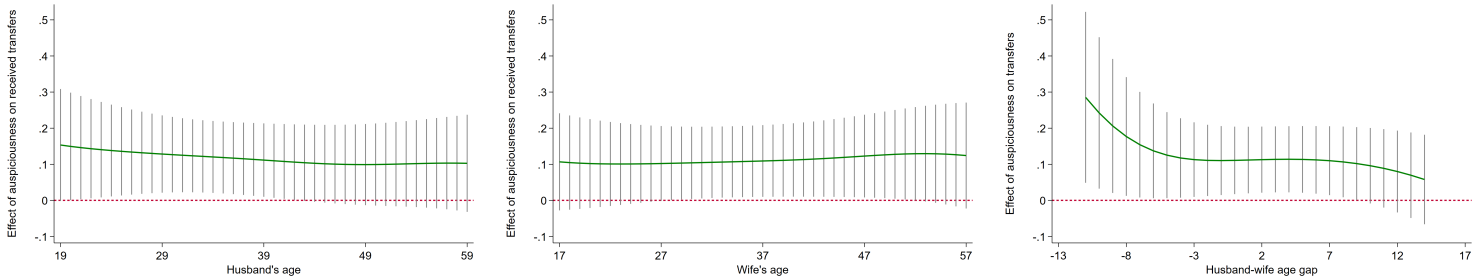


A. Religiosity

B. Social ties

Notes: This figure plots the semiparametric estimates of the effect of auspiciousness on household expenditure per capita as a function of religiosity (**subfigure A**) and strength of social ties (**subfigure B**), together with the estimates' 95% confidence intervals. Religiosity is measured as average spending on religious items and activities as percentage share of household expenditure. Strength of social ties is measured as average spending on gifts and donations as percentage share of household expenditure. Both measures and their percentiles are computed at province × urban/rural level. The point estimate at each percentile of the X-axis variable is obtained from equation (12)'s baseline specification that controls for selection into marriage, weighted by a Gaussian kernel function of the percentile with a bandwidth equal to 20% of the range (details in appendix D.1). Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

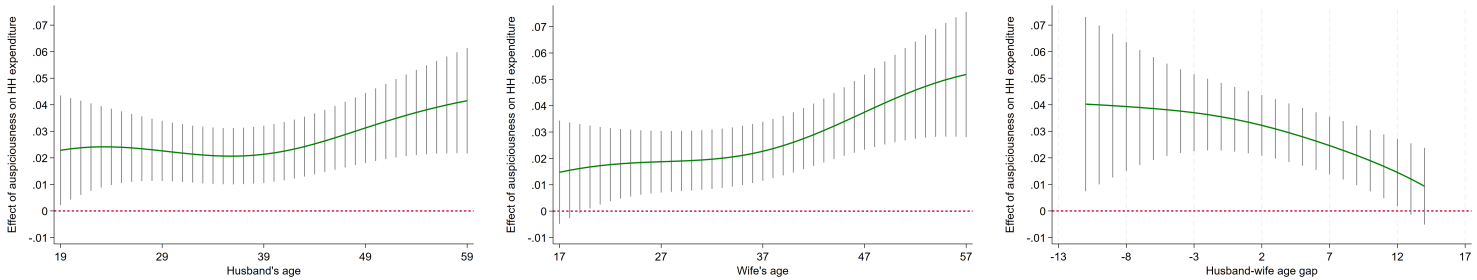
Figure A12: Effect of Auspiciousness on Received Social Transfers by Spouses' Ages and Age Gap



A. Husband's age B. Wife's age C. Husband-wife age gap

Notes: This figure plots the semiparametric estimates of the effect of auspiciousness on total transfers and loans received from social circle as a function of the husband's age (**subfigure A**), the wife age's age (**subfigure B**), and their age gap (**subfigure C**), together with the estimates' 95% confidence intervals. The point estimate at each value of the X-axis variable is obtained from equation (12)'s baseline specification that controls for selection into marriage, weighted by a Gaussian kernel function of the percentile with a bandwidth equal to 20% of the range (details in appendix D.1). Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

Figure A13: Effect of Auspiciousness on Household Expenditure by Spouses' Ages and Age Gap



A. Husband's age B. Wife's age C. Husband-wife age gap

Notes: This figure plots the semiparametric estimates of the effect of auspiciousness on household expenditure per capita as a function of the husband's age (**subfigure A**), the wife age's age (**subfigure B**), and their age gap (**subfigure C**), together with the estimates' 95% confidence intervals. The point estimate at each value of the X-axis variable is obtained from equation (12)'s baseline specification that controls for selection into marriage, weighted by a Gaussian kernel function of the percentile with a bandwidth equal to 20% of the range (details in appendix D.1). Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

Table A1: Descriptive Statistics: 2009 Census Sample

Variables:	(1) # couples	(2) Mean	(3) Standard deviation	(4) 25^{th} percentile	(5) Median	(6) 75^{th} percentile
𝟙(Auspicious match)	916,315	0.338	0.473	0	0	1
𝟙(Neutral match)	916,315	0.525	0.499	0	1	1
𝟙(InAuspicious match)	916,315	0.137	0.344	0	0	0
Husband's year of birth	916,315	1979.7	3.7	1977	1979	1982
Wife's year of birth	916,315	1982.2	3.6	1979	1982	1983
Husband's age at time of survey	916,315	29.3	3.7	27	30	32
Wife's age at time of survey	916,315	26.8	3.6	24	27	30
Husband-wife age gap	916,315	2.5	2.8	1	2	4
𝟙(Husband-wife same age)	916,315	0.116	0.320	0	0	0
𝟙(Husband: below primary)	916,315	0.296	0.457	0	0	1
𝟙(Husband: primary completed)	916,315	0.535	0.499	0	1	1
𝟙(Husband: secondary completed)	916,315	0.108	0.310	0	0	0
𝟙(Husband: university completed)	916,315	0.061	0.239	0	0	0
𝟙(Wife: below primary)	916,315	0.320	0.466	0	0	1
𝟙(Wife: primary completed)	916,315	0.506	0.500	0	1	1
𝟙(Wife: secondary completed)	916,315	0.116	0.320	0	0	0
𝟙(Wife: university completed)	916,315	0.059	0.235	0	0	0
𝟙(Northern urban)	916,315	0.095	0.293	0	0	0
𝟙(Northern rural)	916,315	0.435	0.496	0	0	1
𝟙(Southern urban)	916,315	0.117	0.321	0	0	0
𝟙(Southern rural)	916,315	0.353	0.478	0	0	1

Notes: This table reports the descriptive statistics of all married couples in IPUMS representative 15% subsample of the 2009 Vietnamese Census in which the husbands were between 21 and 35 and the wives 19 and 33 in 2009.

Table A2: Descriptive Statistics: 1989 Census, 1999 Census, and 2006-2018 Population Survey Samples

Sample:	(1)	(2)	(3)	(4)	(5)	(6)
	1989 Census		1999 Census		2006-2018 Pop. Surveys	
Variables:	# couples	Mean	# couples	Mean	# couples	Mean
𝟙(Auspicious match)	171,430	0.331	149,804	0.351	124,906	0.360
𝟙(Neutral match)	171,430	0.541	149,804	0.524	124,906	0.503
𝟙(Inauspicious match)	171,430	0.128	149,804	0.125	124,906	0.137
Husband's year of birth	171,430	1960.1	149,804	1969.7	124,906	1985.3
Wife's year of birth	171,430	1962.2	149,804	1972.1	124,906	1988.2
Husband's age at time of survey	171,430	28.9	149,804	29.3	124,906	27.0
Wife's age at time of survey	171,430	26.8	149,804	26.9	124,906	24.1
Husband-wife age gap	171,430	2.0	149,804	2.4	124,906	2.9
𝟙(Husband-wife same age)	171,430	0.140	149,804	0.124	124,906	0.124
𝟙(Husband: below primary)	171,430	0.285	149,804	0.271	124,906	0.046
𝟙(Husband: primary completed)	171,430	0.555	149,804	0.583	124,906	0.176
𝟙(Husband: secondary completed)	171,430	0.133	149,804	0.171	124,906	0.637
𝟙(Husband: university completed)	171,430	0.028	149,804	0.021	124,906	0.141
𝟙(Wife: below primary)	171,430	0.367	149,804	0.301	124,906	0.042
𝟙(Wife: primary completed)	171,430	0.491	149,804	0.535	124,906	0.160
𝟙(Wife: secondary completed)	171,430	0.125	149,804	0.147	124,906	0.645
𝟙(Wife: university completed)	171,430	0.018	149,804	0.011	124,906	0.153
𝟙(Northern urban)	171,430	0.142	149,804	0.195	124,906	0.328
𝟙(Northern rural)	171,430	0.356	149,804	0.305	124,906	0.214
𝟙(Southern urban)	171,430	0.198	149,804	0.219	124,906	0.248
𝟙(Southern rural)	171,430	0.303	149,804	0.281	124,906	0.210

Notes: Columns (1) and (2) (columns 3 and 4) report the descriptive statistics of all married couples in IPUMS representative 5% (3%) subsample of the 1989 (1999) Vietnamese Census in which the husbands were between 21 and 35 and the wives 19 and 33 in 1989 (1999). Columns (5) and (6) report the descriptive statistics of all married couples in 12 Vietnamese Population Survey waves conducted between 2006 and 2018 (i) that got married within two years of the survey, and (ii) in which the husbands were between 21 and 35 and the wives 19 and 33 at the time of the survey.

Table A3: Distribution of Birth Years and Assignment to Census

Husband's year of birth:	Wife's year of birth											
	1961-1965		1966-1970		1971-1975		1976-1980		1981-1985		1986-1990	
	Census year	Sample count	Census year	Sample count	Census year	Sample count	Census year	Sample count	Census year	Sample count	Census year	Sample count
1959-1963	1989	9,318	1989	3,558	-	647	-	79	-	16	-	4
1964-1968	1989	3,297	1989	9,42	1999	3,818	-	524	-	67	-	9
1969-1973	-	141	1999	2,754	1999	8,631	1999	3,190	-	467	-	47
1974-1978	-	12	-	135	1999	2,068	1999	6,193	2009	2,117	2009	217
1979-1983	-	2	-	16	-	91	2009	1,297	2009	3,956	2009	1,149
1984-1988	-	0	-	3	-	1	2009	41	2009	795	2009	1,760

Notes: This table shows the distribution of husbands' and wives' years of birth in the 2002-2018 VHLSS baseline sample, and the mapping between a couple's birth years and the census year (1989, 1999, or 2009) used to compute their marriage selection probability.

Table A4: Descriptive Statistics: 2002-2018 VHLSS Sample

Variables:	(1) # households	(2) Mean	(3) Standard deviation	(4) 25^{th} percentile	(5) Median	(6) 75^{th} percentile
𝟙(Auspicious match)	62,810	0.346	0.476	0	0	1
𝟙(Neutral match)	62,810	0.517	0.500	0	1	1
𝟙(Inauspicious match)	62,810	0.137	0.344	0	0	0
Husband's year of birth	62,810	1970.1	7.0	1964	1969	1975
Wife's year of birth	62,810	1972.4	7.2	1967	1972	1978
Husband's age at time of survey	62,810	41.7	7.8	36	41	47
Wife's age at time of survey	62,810	39.4	7.9	33	39	45
Husband-wife age gap	62,810	2.3	2.7	1	2	4
I(Husband-wife same age)	62,810	0.130	0.337	0	0	0
𝟙(Husband: below primary)	62,810	0.186	0.389	0	0	0
𝟙(Husband: primary completed)	62,810	0.589	0.492	0	1	1
𝟙(Husband: secondary completed)	62,810	0.168	0.374	0	0	0
𝟙(Husband: university completed)	62,810	0.056	0.230	0	0	0
𝟙(Wife: below primary)	62,810	0.221	0.415	0	0	0
𝟙(Wife: primary completed)	62,810	0.595	0.491	0	1	1
𝟙(Wife: secondary completed)	62,810	0.134	0.341	0	0	0
𝟙(Wife: university completed)	62,810	0.050	0.218	0	0	0
Household size	62,810	4.3	1.2	4	4	5
Transfers and loans received	53,699	7,307	32,072	160	1,120	4,000
Household expenditure p.c.	62,810	22,930	28,355	9,774	17,299	28,413
Household income p.c.	62,810	30,880	42,210	11,203	21,684	39,246
arsinh(Transfers and loans)	53,699	6.650	3.615	5.773	7.714	8.987
ln(Household expenditure p.c.)	62,810	9.731	0.761	9.187	9.758	10.255
ln(Household income p.c.)	62,788	9.961	0.856	9.325	9.985	10.578
𝟙(Northern urban)	62,810	0.094	0.292	0	0	0
𝟙(Northern rural)	62,810	0.416	0.496	0	0	1
𝟙(Southern urban)	62,810	0.145	0.352	0	0	0
𝟙(Southern rural)	62,810	0.345	0.475	0	0	1

Notes: This table reports the descriptive statistics of all household head couples in the baseline sample constructed from the Vietnam Household Living Standards Survey (VHLSS). The data cover all 9 VHLSS waves between 2002 and 2018, and are representative of the population in every year and province.

Table A5: Contribution of Auspiciousness to the Marriage Surplus Function

Panel A. 2009 Census sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	**Marriage surplus function**						
Auspicious: Zodiac	0.171	0.134	0.074	0.172	0.173	0.171	0.189
	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)
Auspicious: Element	0.153	0.111	0.017	0.151	0.153	0.077	0.159
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
% explained by astrology							
vs. age & education	6.450	4.839	1.904	6.319	6.319	5.978	6.963
vs. total surplus	1.935	1.473	0.584	1.926	1.935	1.899	2.086
Exclude Jan/Feb							X
Number of marriage markets	4	4	4	8	16	63	4
Age gap control polynomial	Quadratic	Quartic	2-sided quadratic	Quadratic	Quadratic	Quadratic	Quadratic
Market × Spouses' types FEs	X	X	X	X	X	X	X
Number of couples	916,315	916,315	916,315	916,315	916,315	916,315	662,924

Panel B. 2006-2018 Population Survey sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	**Marriage surplus function**						
Auspicious: Zodiac	0.244	0.185	0.102	0.022	0.242	0.241	0.274
	(0.009)	(0.009)	(0.010)	(0.015)	(0.009)	(0.009)	(0.010)
Auspicious: Element	0.096	0.075	0.050	0.044	0.095	0.095	0.110
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)
% explained by astrology							
vs. age & education	6.330	4.458	2.673	1.082	5.909	5.472	7.020
vs. total surplus	2.115	1.587	0.940	0.384	2.059	2.014	2.378
Exclude Jan/Feb							X
Number of marriage markets	4	4	4	4	8	16	4
Age gap control polynomial	Quadratic	Quartic	2-sided quadratic	Fully flexible	Quadratic	Quadratic	Quadratic
Market × Spouses' types FEs	X	X	X	X	X	X	X
Number of couples	124,906	124,906	124,906	124,906	124,906	124,906	89,361

Notes: This table reports robustness checks of the estimation of the marriage market model as presented in subsection 3.1.2. **Panel A** uses data from the 2009 Vietnamese Census. Column (1) replicates the benchmark specification in column (3) of Table 1, which considers four marriage markets and includes a quadratic polynomial of spouses' age gap, fully interacted with their education levels. Column (2) alternatively employs a quartic polynomial of spouses' age gap, and column (3) quadratic polynomials of spouses' age gap separately for positive and negative values, both also fully interacted with spouses' education levels. Columns (4) to (6) alternatively consider as marriage markets 8 statistical regions (column 4), 8 statistical regions × urban/rural (column 5), and 63 provinces (column 6). Column (7) excludes from the estimation sample all couples with at least one spouse born in January or February, whose lunar birth year could not be precisely determined. **Panel B** uses data from the Vietnamese Population Survey from 2006 to 2018. Column (1) also replicates the benchmark specification in column (4) of Table 1. Column (2) alternatively employs a quartic polynomial of spouses' age gap, column (3) quadratic polynomials of spouses' age gap separately for positive and negative values, both fully interacted with spouses' education levels, and column (4) a full set of spouses' age gap dummies, together with interacted spouses' education dummies. Columns (5) to (6) alternatively consider as marriage markets 8 statistical regions (column 5) and 8 statistical regions × urban/rural (column 6). Column (7) excludes from the estimation sample all couples with at least one spouse born in January or February. Standard errors in parentheses come from the structural estimation. (See appendix C.2 for further details.)

Table A6: Importance of Auspiciousness to Marriage Matching Over Time

Panel A. Northern regions

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	Marriage surplus function					
Region:	Northern urban			Northern rural		
Census year:	1989	1999	2009	1989	1999	2009
Auspicious: Zodiac	0.074	0.137	0.298	0.146	0.073	0.125
	(0.031)	(0.032)	(0.011)	(0.011)	(0.012)	(0.006)
Auspicious: Element	-0.033	-0.001	0.235	-0.102	-0.000	0.121
	(0.026)	(0.025)	(0.009)	(0.009)	(0.010)	(0.004)
% explained by astrology						
vs. age & education	0.817	2.462	11.548	1.094	1.051	4.974
vs. total surplus	0.286	0.859	3.244	0.412	0.430	1.467
Age gap control polynomial	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic
Market × Spouses' types FEs	X	X	X	X	X	X
Number of couples	24,298	29,256	86,990	61,103	45,659	398,959

Panel B. Southern regions

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	Marriage surplus function					
Region:	Southern urban			Southern rural		
Census year:	1989	1999	2009	1989	1999	2009
Auspicious: Zodiac	0.034	0.119	0.229	0.133	0.164	0.167
	(0.024)	(0.024)	(0.009)	(0.013)	(0.013)	(0.006)
Auspicious: Element	0.010	-0.027	0.191	-0.054	0.003	0.151
	(0.020)	(0.019)	(0.007)	(0.011)	(0.011)	(0.005)
% explained by astrology						
vs. age & education	0.797	1.675	9.238	1.459	2.315	5.773
vs. total surplus	0.262	0.614	2.551	0.560	0.973	1.868
Age gap control polynomial	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic
Market × Spouses' types FEs	X	X	X	X	X	X
Number of couples	33,980	32,801	104,785	52,049	42,088	323,581

Notes: This table reports the results from estimating the marriage market model as presented in subsection 3.1.2, separately for each marriage market. The baseline estimation includes a quadratic polynomial of spouses' age gap, fully interacted with their education levels. **Panel A**'s columns (1) to (3) consider the Northern urban marriage market using data from the 1989, 1999, and 2009 Vietnamese Censuses. Columns (4) to (6) consider the Northern rural marriage market. **Panel B**'s columns (1) to (3) consider the Southern urban marriage market using data from the 1989, 1999, and 2009 Vietnamese Censuses. Columns (4) to (6) consider the Southern rural marriage market. Standard errors in parentheses come from the structural estimation. (See Figures 2 and A9 for visualization.)

Table A7: Importance of Auspiciousness to Marriage Matching in Indonesia

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	Marriage surplus function					
Census year:	2000			2010		
Auspicious: Zodiac	0.050	0.056	0.056	0.038	0.037	0.037
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	[0.368]			[0.388]		
Auspicious: Element	-0.043	-0.042	-0.042	0.049	0.048	0.047
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	[0.649]			[0.572]		
% explained by astrology						
vs. age & education	0.196	0.299	0.290	1.549	1.484	1.426
vs. total surplus	0.078	0.120	0.118	0.509	0.497	0.489
Number of marriage markets	7	26	51	7	26	51
Age gap control polynomial	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic
Market × Spouses' types FEs	X	X	X	X	X	X
Number of couples	1,139,094	1,139,094	1,139,094	1,418,888	1,418,888	1,418,888

Notes: This table reports results from estimating the marriage market model as presented in subsection 3.1.2 for Indonesia. The baseline estimation includes a quadratic polynomial of spouses' age gap, fully interacted with their education levels. Columns (1) to (3) use data from the 2000 Indonesian Census. Columns (4) to (6) use data from the 2010 Indonesian Census. Columns (1) and (4) consider 7 marriage markets; columns (2) and (5) 26 marriage markets; and columns (3) and (6) 51 marriage markets. Standard errors in parentheses come from the structural estimation. p-values in brackets are computed from 1,000 simulations of reshuffled auspiciousness.

Table A8: Effect of Auspiciousness on Received Domestic Transfers

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	arsinh(**Domestic transfers received from social circle**)					
Sample:	Full sample	Low income	High income	Has inpatient	No inpatient	Has disasters
Auspicious	0.124**	0.243***	0.005	0.335***	0.076	0.166
	(0.051)	(0.065)	(0.071)	(0.080)	(0.061)	(0.103)
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X
Observations	53,621	26,658	26,963	10,582	43,039	5,181

Notes: This table reports the effects of auspiciousness on domestic transfers received from social circle, using equation (12) that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) arsinh(household income, minus received social transfers, per capita), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (viii) province × urban/rural and year fixed effects. The sample excludes 2010-2012 due to missing information on loans. Column (1) considers the full sample. Columns (2) and (3) split the sample by whether the household income (minus total transfers and loans from relatives) is below the province × urban/rural's median. Columns (4) and (5) split the sample by whether a household member has been in inpatient care in the past 12 months. Column (6) restricts the sample to communes that have experienced severe disasters in the past two years, including widespread fire, epidemic (among humans, work animals, or domestic animals), inundation, typhoon, drought, and pest outbreak. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A9: Methodological Robustness of Controlling for Selection

Panel A. Alternative control function approaches

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	arsinh(**Transfers and loans received from social circle**)							
Specification:	Alternative control functions				Propensity score matching			Incl. top pct.
Auspicious	0.113**	0.113**	0.113**	0.115**	0.097*	0.101*	0.140**	0.109**
	(0.048)	(0.048)	(0.048)	(0.049)	(0.050)	(0.056)	(0.067)	(0.047)
Control function order	1st	5th	3rd	Robinson				3rd
Interaction with model FEs			X					
Number of matched bins					100	1,000	1,000	
Selection probability control					X		X	
Baseline controls	X	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X	X	X
Observations	54,224	53,699	53,699	53,699	53,699	53,699	53,699	54,235

Panel B. Alternative marriage market models

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	arsinh(**Transfers and loans received from social circle**)							
Specification:	Alternative marriage market definitions			Augmented models with heterogenous preferences			Alternative assignment rule	
Auspicious	0.113**	0.109**	0.108**	0.108**	0.107**	0.108**	0.103**	0.101**
	(0.048)	(0.047)	(0.049)	(0.049)	(0.049)	(0.049)	(0.048)	(0.047)
Number of marriage markets	4	8	16	16	16	16	4	4
Heterogenous preference								
by education				X				
by market characteristics					X			
by educ. × mark. chars.						X		
Including top percentile								X
Baseline controls	X	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X	X	X
Observations	53,699	52,931	52,708	52,708	52,708	52,708	53,799	54,318

Notes: This table reports the methodological robustness of estimating the effect of auspiciousness on total transfers and loans received from social circle. Column (1) of Panel B implements equation (12)'s baseline specification that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) arsinh(household income, minus received social transfers, per capita), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (viii) province × urban/rural and year fixed effects. The sample excludes 2010-2012 due to missing information on loans. **Panel A:** Column (1) controls for a linear polynomial of estimated marriage probability, column (2) a quintic polynomial, and column (3) separate cubic polynomials by period of marriage. Column (4) implements Robinson's (1988) semiparametric regression. Columns (5) to (7) implement propensity score matching by estimated marriage probability, using 100, 1,000, and 1,000 equal-sized bins respectively and bin fixed effects. Columns (5) and (7) additionally controls for estimated marriage probability separately within each bin. Column (8) includes the top 1% in estimated marriage probability in the main sample. **Panel B:** Columns (2) to (6) use estimates from alternative marriage market models that consider 8 (column 2) and 16 (columns 3 to 6) marriage markets. Columns (4) to (6)'s models further allow the coefficient of auspiciousness to vary by spouses' education levels (column 4), marriage market characteristics (including religiosity, strength of social ties, and development level) (column 5), and spouses' education levels × marriage market characteristics (column 6). Columns (7) and (8) consider an alternative way to assign couples to a census year used to compute their marriage probability (details in appendix B.3). Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.
*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A10: Effect on Received Social Transfers: More Robustness Checks

Panel A. Alternative clustering schemes, sample restrictions, and controls and fixed effects

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	arsinh(**Transfers and loans received from social circle**)							
Specification:	Alt. clusterings		Alt. samples		Additional controls and fixed effects			
Auspicious: Zodiac	0.113**	0.113***	0.093*	0.096*	0.112**	0.115**	0.125**	0.129**
	(0.056)	(0.043)	(0.053)	(0.049)	(0.048)	(0.048)	(0.056)	(0.056)
Auspicious: Element					0.040	0.042	0.035	0.034
					(0.038)	(0.037)	(0.046)	(0.047)
Clustering scheme	Province × U/R	Spouses' zodiacs						
Excluded from sample			Jan/Feb births	Neutral matches				
Control function	X	X	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X	X	X
Augmented age gap controls						X	X	X
Interacted w. education FEs							X	X
Spouses' ages FEs								X
Observations	53,699	53,699	38,830	25,964	53,699	53,699	53,699	53,698

Panel B. Alternative dependent variable transformations

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	arsinh(**Transfers and loans received from social circle**)					
	Household total			Per capita		Share of
Transformation:	$\ln(\mathbf{1}+\cdot)$	Winsorized	$\mathbb{1}(\cdot>0)$	arsinh(·)	arsinh(·)	HH income
Auspicious	0.105**	467.7**	0.011**	0.092**	0.095**	0.006***
	(0.045)	(179.7)	(0.005)	(0.042)	(0.042)	(0.002)
Dependent var. mean		*6,050*	*0.805*			*0.073*
Exclude HH size control				X		
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X
Observations	53,699	53,699	53,699	53,699	53,699	53,699

Notes: This table reports the robustness checks for the effect of auspiciousness on total transfers and loans received from social circle (received social transfers), using equation (12) that controls for selection into marriage. In the baseline specification, the dependent variable is the inverse hyperbolic sine (IHS) of received social transfers. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) arsinh(household income, minus received social transfers, per capita), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (viii) province × urban/rural and year fixed effects. The sample excluded 2010-2012 due to missing information on loans. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign. **Panel A:** Column (1) clusters standard errors by province × urban/rural and column (2) by husband's zodiac sign × wife's zodiac sign. Column (3) excludes all couples with at least one spouse born in January or February, whose lunar birth year could not be precisely determined. Column (4) excludes all neutral matches. Column (5) additionally includes the couple's Five Elements auspiciousness score. Column (6) further controls for quadratic polynomials of spouses' age gap separately for positive and negative values. Column (7) further interacts column (6)'s age gap polynomials with spouses' education levels. Column (8) further adds spouses' age fixed effects. **Panel B:** Column (1)'s dependent variable is the natural logarithm of 1 + received social transfers, column (2)'s winsorized received social transfers, and column (3)'s an indicator for positive received social transfers. Columns (4) and (5)'s dependent variable is the IHS of received social transfers per capita, respectively with and without control for household size. Column (6)'s dependent variable is the received total transfers share of household income.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A11: Methodological Robustness of Controlling for Selection

Panel A. Alternative control function approaches

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln(**Household expenditure per capita**)							
Specification:	Alternative control functions				Propensity score matching			Incl. top pct.
Auspicious	0.030***	0.030***	0.029***	0.030***	0.028***	0.027***	0.024***	0.030***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.007)	(0.008)	(0.006)
Control function order	1st	5th	3rd	Robinson				3rd
Interaction with model FEs			X					
Number of matched bins					100	1,000	1,000	
Selection probability control					X		X	
Baseline controls	X	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X	X	X
Observations		62,810	62,810	62,810	62,810	62,810	62,810	63,443

Panel B. Alternative marriage market models

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln(**Household expenditure per capita**)							
Specification:	Alternative marriage market definitions			Augmented models with heterogenous preferences			Alternative assignment rule	
Auspicious	0.029***	0.031***	0.030***	0.030***	0.030***	0.030***	0.024***	0.024***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Number of marriage markets	4	8	16	16	16	16	4	4
Heterogenous preference								
by education				X				
by market characteristics					X			
by educ. × mark. chars.						X		
Including top percentile								X
Baseline controls	X	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X	X	X
Observations	62,810	61,899	61,634	61,634	61,634	61,634	62,911	63,545

Notes: This table reports the methodological robustness of estimating the effect of auspiciousness on household expenditure. Column (1) of Panel B implements equation (12)'s baseline specification that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) period of marriage dummies, (vi) spouses' zodiac sign fixed effects, and (vii) province × urban/rural and year fixed effects. **Panel A:** Column (1) controls for a linear polynomial of estimated marriage probability, column (2) a quintic polynomial, and column (3) separate cubic polynomials by period of marriage. Column (4) implements Robinson's (1988) semiparametric regression. Columns (5) to (7) implement propensity score matching by estimated marriage probability, using 100, 1,000, and 1,000 equal-sized bins respectively and bin fixed effects. Columns (5) and (7) additionally controls for estimated marriage probability separately within each bin. Column (8) includes the top 1% in estimated marriage probability in the main sample. **Panel B:** Columns (2) to (6) use estimates from alternative marriage market models that consider 8 (column 2) and 16 (columns 3 to 6) marriage markets. Columns (4) to (6)'s models further allow the coefficient of auspiciousness to vary by spouses' education levels (column 4), marriage market characteristics (including religiosity, strength of social ties, and development level) (column 5), and spouses' education levels × marriage market characteristics (column 6). Columns (7) and (8) consider an alternative way to assign couples to a census year used to compute their marriage probability (details in appendix B.3). Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A12: Effect on Household Expenditure: More Robustness Checks

Panel A. Alternative clustering schemes, sample restrictions, and controls and fixed effects

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln(**Household expenditure per capita**)							
Specification:	Alt. clusterings		Alt. samples		Additional controls and fixed effects			
Auspicious: Zodiac	0.029***	0.029***	0.024***	0.031***	0.030***	0.028***	0.026***	0.025***
	(0.007)	(0.006)	(0.007)	(0.004)	(0.005)	(0.005)	(0.007)	(0.007)
Auspicious: Element					-0.008	-0.008	-0.008	-0.007
					(0.007)	(0.007)	(0.007)	(0.007)
Clustering scheme	Province × U/R	Spouses' zodiacs						
Excluded from sample			Jan/Feb births	Neutral matches				
Control function	X	X	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X	X	X
Augmented age gap controls						X	X	X
Interacted w. education FEs							X	X
Spouses' ages FEs								X
Observations	62,810	62,810	45,580	30,343	62,810	62,809	62,810	62,809

Panel B. Alternative dependent variable transformations

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	ln(**Household expenditure**)					
	Per capita			Household total		Share of
Transformation:	arsinh(·)	Winsorized	ln(Liv. exp.)	ln(·)	ln(·)	HH income
Auspicious	0.029***	676.8***	0.025***	0.032***	0.029***	0.019
	(0.006)	(162.9)	(0.006)	(0.006)	(0.006)	(0.013)
Dependent var. mean		*22,141*				*0.887*
Exclude HH size control				X		
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X
Observations	61,810	62,810	62,810	62,810	62,810	62,810

Notes: This table reports the robustness checks for the effect of auspiciousness on household expenditure per capita, using equation (12) that controls for selection into marriage. In the baseline specification, the dependent variable is the natural logarithm of household expenditure per capita. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) period of marriage dummies, (vi) spouses' zodiac sign fixed effects, and (vii) province × urban/rural and year fixed effects. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign. **Panel A:** Column (1) clusters standard errors by province × urban/rural and column (2) by husband's zodiac sign × wife's zodiac sign. Column (3) excludes all couples with at least one spouse born in January or February, whose lunar birth year could not be precisely determined. Column (4) excludes all neutral matches. Column (5) additionally includes the couple's Five Elements auspiciousness score. Column (6) further controls for quadratic polynomials of spouses' age gap separately for positive and negative values. Column (7) further interacts column (6)'s age gap polynomials with spouses' education levels. Column (8) further adds spouses' age fixed effects. **Panel B:** Column (1)'s dependent variable is the inverse hyperbolic sine of household expenditure per capita, column (2)'s winsorized household expenditure per capita, and column (3)'s the natural logarithm of living expenditure (excluding that on durable goods and housing) per capita. Columns (4) and (5)'s dependent variable is the natural logarithm of total household expenditure, respectively with and without control for household size. Column (6)'s dependent variable is the expenditure share of household income.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A13: Heterogeneous Effects of Auspiciousness

Panel A. Heterogeneous effects on received social transfers

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	arsinh(**Transfers and loans received from social circle**)					
Sample:	Full sample	Has inpatient	Full sample	Has inpatient	Full sample	Has inpatient
𝟙(Auspicious)	0.091***	0.078				
	(0.032)	(0.079)				
𝟙(Inauspicious)	-0.010	-0.224***				
	(0.035)	(0.076)				
Auspicious × Northern			0.145*	0.239**		
			(0.067)	(0.118)		
Auspicious × Southern			0.078	0.339***		
			(0.062)	(0.122)		
Auspicious					0.105*	0.284***
					(0.049)	(0.092)
Auspicious × Education					0.076	0.066
					(0.066)	(0.131)
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X
Observations	53,699	10,599	53,699	10,599	53,699	10,599

Panel B. Heterogeneous effects on household expenditure

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	ln(**Household expenditure per capita**)					
Sample:	Full sample	Has inpatient	Full sample	Has inpatient	Full sample	Has inpatient
𝟙(Auspicious)	0.013***	0.009				
	(0.005)	(0.009)				
𝟙(Inauspicious)	-0.017***	-0.045***				
	(0.006)	(0.014)				
Auspicious × Northern			0.033***	0.060***		
			(0.009)	(0.018)		
Auspicious × Southern			0.025***	0.035*		
			(0.008)	(0.019)		
Auspicious					0.026***	0.038***
					(0.006)	(0.013)
Auspicious × Education					0.004	0.030**
					(0.007)	(0.015)
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R & Year FEs	X	X	X	X	X	X
Observations	62,810	62,810	62,810	62,810	62,810	62,810

Notes: This table reports the heterogeneous effects of auspiciousness on received social transfers (Panel A) and household expenditure (Panel B), using equation (12) that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's baseline marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) arsinh(household income, minus received social transfers, per capita) (only Panel A), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (viii) province × urban/rural and year fixed effects. **Panel A:** The dependent variable is the inverse hyperbolic sine of total transfers and loans received from social circle. The sample excluded 2010-2012 due to missing information on loans. **Panel B:** The dependent variable is the natural logarithm of household expenditure per capita. In both panels, columns (1), (3), and (5) consider the full sample and columns (2), (4), and (6) only households with inpatients in the past 12 months. Columns (1) and (2) include separate indicators for auspicious and inauspicious matches. Columns (3) and (4) interact auspiciousness score with indicators for Northern and Southern regions. Columns (5) and (6) interact auspiciousness score with the education level of the more educated spouse (-1–below primary, 0–primary completed, 1–secondary completed, or 2–university completed, with 0 being both the mode and the median). Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.
*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A14: Effect of Auspiciousness on Transfers From and To Parents

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	From parents to children			From children to parents			
Dependent variable:	**𝟙(Sent money)**	**Amount sent**	**𝟙(Sent gifts)**	**𝟙(Sent money)**	**Amount sent**	**𝟙(Sent gifts)**	**𝟙(Help out)**
Auspicious	0.001	0.003	-0.017*	0.023	0.002	-0.011	0.014
	(0.010)	(0.021)	(0.009)	(0.019)	(0.038)	(0.020)	(0.019)
Dependent var. mean	*0.044*	*0.100*	*0.031*	*0.433*	*0.689*	*0.292*	*0.254*
Control function	X	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X	X
Parent controls	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X	X
Observations	7,014	7,010	7,002	7,022	6,859	7,022	7,017

Notes: This table reports the effect of auspiciousness on transfers from and to parents, using equation (12) that controls for selection into marriage. The sample is constructed from the Vietnam National Aging Survey (VNAS), conducted in 2013 in 12 provinces, and is restricted to children not living in the same household as the surveyed parent. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) period of marriage dummies, (v) surveyed parent's age, education dummies, marital status dummies (married, widowed, or others), and numbers of biological and in-law children, each interacted with gender, (vi) spouses' zodiac sign fixed effects, and (vii) province × urban/rural fixed effects. Column (1)'s dependent variable is whether the parent sent money to the children in the past 12 months, column (2)'s the category of the amount sent (which ranges from 0–nothing to 5–above VND 10 million), column (3)'s whether the parent sent gifts valuing above VND 500 thousand to the children in the past 12 months. Columns (4) to (6)'s dependent variables are analogous to columns (1) to (3)'s but in opposite direction. Column (7)'s dependent variable is whether the children contribute economically to the parent's household. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A15: Effect of Auspiciousness on Components of Expenditure and Income

Panel A. Components of household expenditure

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	arsinh(**Household expenditure per capita**)						
Expenditure category:	Total	Food	Non-food	Durables & housing	Education	Health	Others
Auspicious	0.029***	0.019***	0.028***	0.057***	0.105**	0.016	0.045***
	(0.006)	(0.006)	(0.008)	(0.019)	(0.050)	(0.020)	(0.016)
Average share of total	*100%*	*45%*	*22%*	*17%*	*6%*	*5%*	*7%*
Control function	X	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X	X
Observations	62,810	62,810	62,810	62,810	62,810	62,810	62,810

Panel B. Components of household income

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	arsinh(**Household income per capita**)					
Income category:	Total	Wages	Non-agriculture	Agriculture	Rents	Others
Auspicious	0.031***	0.031	0.068	-0.033	0.009	0.009
	(0.007)	(0.064)	(0.078)	(0.045)	(0.021)	(0.038)
Average share of total	*100%*	*41%*	*26%*	*23%*	*1%*	*8%*
Control function	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X
Observations	62,810	62,810	62,810	62,810	62,810	62,810

Notes: This table reports the effect of auspiciousness on different components of household expenditure (Panel A) and household income (Panel B), using equation (12) that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) period of marriage dummies, (vi) spouses' zodiac sign fixed effects, and (vii) province × urban/rural and year fixed effects. **Panel A:** The dependent variables are the inverse hyperbolic sine (IHS) of per capita total household expenditure (column 1), expenditure on food and non-food daily consumption (columns 2 and 3), expenditure on durable goods and housing (column 4), and expenditure on education and health (columns 5 and 6). **Panel B:** The dependent variables are the IHS of per capita total household income (column 1), income from wages (column 2), income non-agricultural and agricultural activities (columns 3 and 4), income from rents (column 5), and other income (column 6). Average shares of total are calculated before taking the IHS transformation. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.
*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A16: Effect of Auspiciousness on Couples' Separation

Dependent variable:	(1)	(2)	(3)	(4)	(5)
	Change in share among married couples after 2 years				
Sample:	Full	Auspicious vs. inauspicious	Northern vs. Southern	Younger couples	Older couples
Auspicious	0.276			0.267	1.663**
	(0.311)			(0.683)	(0.721)
𝟙(Auspicious)		0.128			
		(0.277)			
𝟙(Inauspicious)		-0.149			
		(0.270)			
Auspicious × Northern			0.440		
			(0.476)		
Auspicious × Southern			0.136		
			(0.326)		
Absolute dep. var. mean	*52.824*	*52.824*	*52.824*	*53.873*	*55.816*
Control function	X	X	X	X	X
Baseline controls	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X
Marriage market FEs	X	X	X	X	X
Year FEs	X	X	X	X	X
Observations	184,853	184,853	184,853	83,968	74,306

Notes: This table reports the effects of auspiciousness on couples' separation (due to divorce or death), using equation (12) that controls for selection in marriage. The sample is constructed using repeated cross sections of the Vietnamese Population Survey from 2004 to 2018. Each observation is a cell of year × marriage markets (Northern urban, Northern rural, Southern urban, and Southern rural) × husband's year of birth × wife's year of birth × husband's education × wife's education. The dependent variable is the change in the share of the respective couple type (among married couples in the respective marriage market) after two years, multiplied by 1,000,000. The control function is a third order polynomial of selection probability, estimated from subsection 3.1.2's marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) period of marriage dummies, (v) spouses' zodiac sign fixed effects, and (vi) marriage market and year fixed effects. Column (1) considers the full sample. Column (2) includes separate indicators for auspicious and inauspicious matches. Column (3) interacts auspiciousness score with indicators for Northern and Southern regions. Column (4) considers younger couples, i.e., husband's age between 18 and 38 and wife's age between 16 and 36, and column (5) older couples, i.e., husband's age between 39 and 59 and wife's age between 37 and 57. Standard errors are clustered by husband's zodiac sign × wife's zodiac sign.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A17: Effect of Auspiciousness on Fertility and Household Composition

	(1) HH size	(2) Age at 1st child birth	(3)	(4) Gender composition	(5)	(6) Gender schooling gap	(7)
Dependent variable:	**No. of children**	**Husband's**	**Wife's**	**Son ratio**	**Has son**	**𝟙(Remains in school)**	**𝟙(Remains on track)**
Auspicious	-0.008	-0.029	-0.033	-0.002	0.001	0.012	0.012
	(0.008)	(0.054)	(0.055)	(0.007)	(0.006)	(0.021)	(0.017)
Dependent var. mean	*1.984*	*25.855*	*23.490*	*0.569*	*0.807*	*0.001*	*-0.046*
Control function	X	X	X	X	X	X	X
Baseline controls	X	X	X	X	X	X	X
Spouses' zodiac FEs	X	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X	X
Observations	62,788	58,510	58,543	58,638	58,656	8,101	13,059

Notes: This table reports the effects of auspiciousness on the couple's fertility choice, household composition, and gender preference, using equation (12) that controls for selection into marriage. The control function is a third order polynomial of selection probability, estimated from subsection 3.1.2's marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) ln(household income per capita), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (viii) province × urban/rural and year fixed effects. Column (1)'s dependent variable is the couple's number of children, column (2)'s husband's age at first child birth, and column (3)'s wife's age at first child birth. Column (4)'s dependent variable is the share of sons among the couple's children and column (5)'s whether the couple has a son. Column (6)'s dependent variable is the difference between the schooling-age sons' and daughters' remaining in school. The sample includes households having at least one dropout among schooling-age children. Column (7)'s dependent variable is the difference between sons' and daughters' being on track with their schooling. The sample includes households having at least a child whose education is not on track. Columns (4) to (7) additionally controls for the couple's children count. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.

Table A18: Commitment Device: Importance of Auspiciousness by Inequality

Effect of auspiciousness on living standards and received social transfers

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	arsinh(**Transfers + loans received**)			ln(**Household expenditure p.c.**)		
Sample:	Full	Low inequality	High inequality	Full	Low inequality	High inequality
Auspicious: Zodiac	0.106**	0.149**	0.069	0.029***	0.041***	0.014*
	(0.047)	(0.066)	(0.074)	(0.006)	(0.006)	(0.008)
Auspicious × Inequality measure	-1.045			-0.154		
	(0.787)			(0.148)		
Baseline controls	X	X	X	X	X	X
Control function	X	X	X	X	X	X
Province × U/R FEs	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X
Number of couples	53,699	31,320	22,379	62,810	36,425	26,385

Notes: This table reports the heterogeneous effects of auspiciousness on received social transfers and household expenditure by income inequality, using equation (12) that controls for selection into marriage. The control function is a cubic polynomial of marriage probability, estimated from subsection 3.1.2's marriage market model with four marriage markets. Other controls include (i) spouses' ages, (ii) same age dummy and age gap, separately for positive and negative values, (iii) spouses' education dummies, (iv) household size, (v) arsinh(household income, minus received social transfers, per capita) (only columns 1 to 3), (vi) period of marriage dummies, (vii) spouses' zodiac sign fixed effects, and (viii) province × urban/rural and year fixed effects. Columns (1) to (3)'s dependent variable is the inverse hyperbolic sine of total transfers and loans received from social circle. The sample excludes 2010-2012 due to missing information on loans. Columns (4) to (6)'s dependent variable is the natural logarithm of household expenditure per capita. Columns (1) and (4) interact auspiciousness score with inequality measure, i.e., average standard deviation of ln(household expenditure per capita) over 2002-2008, computed and centered around zero at province × urban/rural level, with a standard deviation of 0.052. Columns (2), (3), (5), and (6) split the sample the median of columns (1) and (4)'s inequality measure at province × urban/rural level. Standard errors are clustered two ways by province × urban/rural and husband's zodiac sign × wife's zodiac sign.

*** denotes statistical significance at 1% level, ** 5% level, * 10% level.