"Haste makes Waste": Exploring the Hidden Cost of XiangQin on Marital Mental Health

Abstract

Across global societies, marriage formation models have a profound impact on marital stability, life satisfaction, and individual mental health. "Xiangqin" is an expedited, low-autonomy marriage model prevalent since ancient China but rare in the Western setting. Given its enduring prevalence in contemporary China, investigating its implications for mental health holds significant theoretical and practical value. Using 2012–2022 longitudinal data from the China Family Panel Studies (CFPS), we examine this marriage model's effects. Our primary result reveals that "XiangQin" behavior is found to exert significant negative effects on people's mental health, with spousal mismatch as the key mediation mechanism. Based on a dynamic learning framework, we propose a marital mismatch learning model where limited premarital information under XiangQin, particularly regarding unobservables, speeds up the post-marriage revelation of mismatch and, in turn, affects mental health. Additionally, heterogeneity is observed in the effects: (1) Urban areas experience stronger negative impacts from XiangQin due to higher social pressures; (2) Women face more significant negative effects than men, likely due to societal expectations; (3) In traditional village areas, the impact is weaker due to stronger community support; (4) Small families suffer more from XiangQin, as the lack of extended family support exacerbates isolation; (5) Those with limited economic decision-making power face worse mental health outcomes, as they lack control over financial matters and experience higher stress. These findings identify XiangQin as a key social determinant of marital mental health, highlighting marriage formation models' role in shaping people's psychological outcomes and providing a basis for targeted mental health support for different marriage formation unions.

Keywords: Marriage, mental health, family economy, mismatch, learning model

1 Introduction

Mental health stands as a pressing global public health concern, with the WHO (2022) estimating over 1 billion people worldwide living with conditions like anxiety or depression, costing 1 trillion dollars annually in lost global productivity. Beyond individual well-being, mental health underpins core human functions: emotional regulation, interpersonal relationships, and overall life thriving (Keyes, 2002), making it

a cornerstone of societal progress. This concern is deeply intertwined with societal structures, and among the most influential societal dynamics is the marriage market, which significantly shapes individual well-being. The dynamics within marriage markets influence mental health through pathways like relationship satisfaction and social support, underlining the importance of understanding marriage formation mechanisms in improving mental health outcomes. Research consistently shows that marriage can either buffer individuals against stress or amplify depression risk (Horwitz et al., 1996; Holt-Lunstad et al., 2008; Persson and Rossin-Slater, 2018). However, existing literature has largely focused on marital status (e.g., married vs. single) or post-marital dynamics, with a notable gap in exploring how marriage formation patterns, the diverse pathways through which romantic and marital unions are forged, shape psychological outcomes. These patterns encompass a broad spectrum of forms across societies, ranging from individual-initiated freelove courtship, third-party-mediated matchmaking, to family-arranged unions. Among them, matchmaking stands out as a particularly distinct and contextually variable type that differs markedly in its operational logic and cultural embeddedness across the globe. Its key features include an accelerated timeline for marriage, driven by family and social pressures, and limited premarital interaction. In the Chinese context, XiangQin (localized matchmaking) carries unique historical and cultural connotations that distinguish it from its Western counterparts. However, scholarly inquiry into such context-specific matchmaking variants and their comparative analysis against other marriage formation patterns, remains extremely limited. This gap is crucial because matchmaking continues to be a major institution for marriage formation in many societies, and by reshaping search frictions and the available information during the premarital stage, the way matchmaking is conducted can systematically affect match quality and post-marital outcomes. Exploring how different marriage formation patterns, such as XiangQin, impact mental health is crucial for addressing broader public health challenges.

Matchmaking as a universal social practice is not unique to China; forms such as assemblies and evening receptions prevail across the globe, all crafted to serve the specific purpose of facilitating romantic or marital bonds between individuals. However, China's XiangQin emerges as a distinctive derivative of this global matchmaking model, which retains the core characteristic of third-party intervention in marriage formation yet is deeply marked by the unique historical shadow and cultural context of Chinese society. Following the passage of the 1950 Marriage Law, XiangQin evolved into a more self-directed practice, differing from the previous system of arranged marriages by offering some degree of autonomy. XiangQin is characterized by low individual autonomy in partner selection, where the process is heavily influenced by third parties, such as parents or marriage agencies, rather than spontaneous romantic attraction. Unlike traditional arranged marriages, XiangQin allows some interpersonal contact, but still involves significant external influence. It also differs from free love, which emphasizes emotional attraction and individual autonomy, by prioritizing efficiency and external criteria like socioeconomic status and family background. Unlike similar intermediary matchmaking practices in other regions, XiangQin is prevalent across both urban and rural China, making it a representative and widespread social practice in Chinese society.

The widespread prevalence and enduring persistence of XiangQin in China highlight its immense societal significance, with profound implications for mental health both nationally and globally, given China's population scale. According to data from the China Family Panel Studies (CFPS), 41 percent of married individuals in our sample formed their unions through XiangQin, with higher proportions in rural areas and among marriages formed before 2000. Despite advances in urbanization and individualization by 2022, XiangQin remains a major marriage pathway, particularly in smaller cities and rural areas, where family networks and social pressures to marry young continue to be influential. Given its wide prevalence, large affected population, and long-term persistence in China, XiangQin exerts a significant impact on individuals' mental health. This issue is not only crucial for China but holds global relevance as well, as the world's most populous country grapples with these mental health challenges. Improving mental health outcomes associated with XiangQin in China will not only benefit hundreds of millions of Chinese people but also contribute significantly to global mental health progress, as addressing China's issues essentially addresses a key part of the world's mental health challenges, also providing a transferable framework for cross-cultural research on marital psychological well-being.

Despite its importance, research on XiangQin's psychological impacts remains fragmented. From a domestic perspective (comparatively), existing studies on marriage and mental health in China have either focused on traditional arranged marriages (Xiaohe and Whyte, 1990) or generalized marital status effects (Zhai et al., 2024), without systematically unpacking XiangQin's unique mechanisms. From a global perspective, while matchmaking has been studied across different regions, including the UK, South America, and elsewhere, research on XiangQin in China remains sparse. International studies have largely overlooked the particular features of XiangQin, such as the speed of union formation and the significant third-party influence, as well as its long-term mental health consequences. Additionally, while studies have linked spousal mismatch (e.g., in education, social status) to marital dissatisfaction (Schwartz and Mare, 2005; Wang and Schwartz, 2018), they have not explored how XiangQin—by limiting premarital information exchange—exacerbates such mismatches and thereby harms mental health. This gap leaves critical questions unanswered: Does XiangQin indeed negatively affect mental health? What role does spousal mismatch play as a mediator? And how do contextual factors (e.g., urban-rural setting, gender, family structure) shape these effects?

To answer these research questions, we construct a theoretical model with a sequence of empirical analyses, which examines the impact of XiangQin marriages on the mental health of China's married population. Using nationally representative survey data, our baseline results show that XiangQin is significantly associated with higher depressive symptoms, challenging the uniform mental health benefit of marriage. With province and year fixed effects, the CESD-8 score of people who get married through XiangQin is 0.134 higher than that of free-love people, which is consistent with the theory that marriage in different contexts leads to different post-marriage outcomes.

Additionally, we dive further into the underlying mechanism through which XiangQin negatively influences people's mental health. Given that the mismatch of

some unobservable aspects is potentially greater for XiangQin couples, we explore the mediating role of spousal mismatch to provide insights into this relationship. Our findings of mediation analysis reveal that spousal mismatch exerts a partial mediating effect (matchmaking increases mismatch, which exacerbates depression), which accounts for 2.63% of the total effect and is consistent with social exchange theory. By introducing the dynamic learning model, we also find that the negative effect of XiangQin strengthens with longer marriage duration, playing a role through higher learning efficiency among XiangQin couples. Moreover, heterogeneity analysis indicates stronger negative impacts in urban areas, for women, small families, and those with limited economic decision-making power, while traditional villages have weaker effects. Overall, under the proposed "process-outcome" framework, matchmaking harms mental health directly through institutional stressors and indirectly via spousal mismatches, with dynamic effects across marriage duration, suggesting targeted policies.

Combining models with the corresponding findings, our contributions to the literature are threefold: First, we add to research on marriage and mental health by shifting attention from marital status and within-marriage dynamics to the formation of marriage. Specifically, we provide the first systematic empirical evidence that XiangQin exerts a significant negative effect on mental health (measured by depressive symptoms), even after accounting for individual, family, and regional confounders. This distinction matters because the formation channel shapes information, search frictions, and third-party involvement at the matching stage, which can generate systematic differences in match quality and subsequent well-being. Second, we contribute to the literature on spousal mismatch and marital outcomes by providing a structured decomposition of how matchmaking may translate into psychological costs through multi-dimensional mismatches. Third, we extend theoretical understanding by incorporating a dynamic learning framework. Finally, we explore heterogeneity in these effects across urban-rural areas, gender, family size, and economic decision-making power, offering nuanced insights for targeted interventions.

Practically, our findings address urgent social realities: XiangQin is often tied to commodified views of marriage (e.g., prioritizing real estate or income over emotional compatibility), triggering anxiety and depression among participants and deterring young people from marriage due to perceived emotional and economic risks. By clarifying how XiangQin shapes mental health, we provide a basis for re-evaluating unhealthy marriage norms, guiding psychological interventions for couples formed through intermediated matching, and informing policies to optimize the dating environment—ultimately reducing youth's marital burdens, boosting marriage willingness, and enhancing family stability and social productivity.

The remainder of the paper is structured as follows: Section 2 reviews relevant literature on marriage formation, spousal mismatch, and mental health, identifying key research gaps. Section 3 outlines our data, methodology, and analytical framework, providing a foundation for our empirical analysis. Section 4 presents baseline results and mediation analysis. Section 5 explores heterogeneity in effects, considering factors such as gender, urban-rural location, and family background. Section 6 reports

robustness checks to validate our findings. Section 7 concludes with theoretical and practical implications to address the mental health challenges linked to XiangQin.

2 Literature

2.1 Marriage and mental health

Despite the wealth of research on the relationship between marriage and mental health, there is a notable gap in the study of how XiangQin, a unique form of marriage in China, impacts psychological well-being. This paper aims to fill this gap by focusing on XiangQin as a distinct marriage formation model and exploring its psychological consequences. A large body of literature has explored how marital status and dynamics influence mental health outcomes across diverse populations. Keyes (2002) enriched this research field by developing the mental health continuum, a framework that emphasizes the close association between positive mental states—an essential component of overall well-being—and life experiences, including marital relationships. Building on this foundational theoretical work, Zhai et al. (2024) conducted a large-scale cross-national study involving over 100,000 individuals from seven countries (the United States, the United Kingdom, Mexico, Ireland, South Korea, China, and Indonesia), and their findings indicated that married individuals face a lower risk of depression compared with those who are single, divorced, or widowed.

However, the relationship between marital status and mental health is not fixed across all contexts. From a comparative perspective proposed by Hu (2021), the marriage–health relationship should not be assumed to be universal; instead, it must be interpreted within specific social contexts and norms. This contextual sensitivity is particularly salient in China, where unique marital practices offer valuable insights into how cultural norms shape marital dynamics during pre-marital behaviors. Parentally arranged marriages are the historical origin of the Chinese marriage landscape, and modern XiangQin retains core features of low individual autonomy and external pressure. Previous findings have underscored the need to examine how arranged marriage in China itself influences couples' mental health. For example, Xiaohe and Whyte (1990) used multiple regression analysis to show that wives in love-matched marriages in Chengdu reported higher marital satisfaction than those in arranged marriages, with this difference remaining significant even after accounting for background factors like marriage duration. As a derivative of arranged marriage, however, XiangQin in modern China receives less attention.

2.2 Institutional background: What is XiangQin

To understand the unique role of XiangQin in contemporary China, we must first define it as a marriage formation practice that blends traditional arranged marriage features with modern elements, offering limited autonomy to individuals while retaining external pressure. Chinese XiangQin refers to a structured marriage-formation practice facilitated by third parties such as family members, relatives, friends, or professional matchmakers, or institutional platforms, including offline XiangQin events and online dating apps tailored to Chinese preferences (Yan, 2003). The primary goal

is to achieve "marital matching" through the evaluation of mutual criteria. Its historical origin can be traced to traditional parental arranged marriages, but it has undergone significant adaptation in modern society. The promulgation of the Marriage Law in 1949 established the legislative foundation for free love in China and abolished the rigid traditional arranged marriage system, marking a fundamental shift in the country's marital institution. Despite this normative move towards free love, arranged marriage has persisted and evolved into XiangQin, a form of self-selection in marital decision-making, which is a spontaneous marital model shaped by people's actual living conditions in different social stages. This evolution embeds XiangQin deeply into the broader process of China's economic development: as the economy advances and individual self-awareness rises, social attitudes towards marriage have continued to evolve, and XiangQin has accordingly adapted to such changes in social consciousness, rather than remaining a static practice. While retaining some core elements of external involvement and normative pressure, it grants individuals limited but meaningful autonomy in partner selection, distinguishing it from the rigid, family-dominated arranged marriages of the past (Yan, 2003; Freedman, 2021).

XiangQin's uniqueness lies in three defining characteristics that set it apart from other global marriage-formation patterns. The first is strong external pressure. Individuals engaging in XiangQin often face substantial pressure from families, such as parental expectations for "timely marriage" and social norms such as the "marriage clock" for women and men of reproductive age (Farrer and Zhongxin, 2003; Ji, 2015), which accelerates the courtship and marriage process. The second is the over-reliance on "hard indicators." Chinese marriage matching criteria often prioritize quantifiable, material, or institutional attributes such as educational attainment, income level, household registration (hukou), occupation, social status, and family background over emotional compatibility, shared values, or interpersonal chemistry (Yu and Xie, 2015). Institutional constraints, particularly the hukou system, further structure marriage choices by shaping access to housing, welfare benefits and urban residency, making hukou status a central consideration in XiangQin-based matching (Lui, 2017). XiangQin behavior is a much more distinct example of utilizing this value comparison in Chinese marriages. Third, there is an inherent high risk of mismatches. The emphasis on hard indicators and the compressed timeline due to external pressure limit in-depth premarital interaction, making it more likely that couples will face mismatches in core life dimensions such as communication styles and life goals after marriage.

XiangQin is not a marginal practice but a mainstream marriage-formation pathway in contemporary China, with broad penetration across demographics and regions. Geographically, it is prevalent in both urban and rural areas. Urban XiangQin often leverages digital platforms and professional matchmakers, while rural XiangQin remains rooted in family and community networks (Yan, 2003). Demographically, it spans all age groups of marriageable individuals, from young adults aged 20 to 30 facing pressure to "settle down" to older singles above 30 seeking stable partnerships (Ji, 2015). The national survey report, China Family Panel Study, shows that in the year 2020, 41 percent of the married population met through channels of XiangQin. Culturally, despite the rise of modern individualism and love-based courtship, XiangQin still

retains strong cultural legitimacy precisely because it is deeply rooted in the ancient Confucian ethics espoused by Confucius himself. The Confucian ethical system of the Three Cardinal Guides and Five Constant Virtues, a core part of Confucius' ancient philosophical thoughts, anchors marriage firmly in the primacy of family and clan order rather than individual romantic desire or personal compatibility, framing marital matching as a familial and clan affair rather than a purely personal one. This inherent orientation of Confucius' ethics, which prioritizes family interests over individual compatibility, lays the fundamental foundation for the emergence of spousal matching systems in XiangQin.

To further grasp the uniqueness of XiangQin in China, it is essential to compare it with both traditional arranged marriages and other global marriage formation practices, such as those in Latin America, to highlight its cultural and institutional distinctions. In terms of Chinese XiangQin versus traditional arranged marriage, while XiangQin evolved from historical arranged marriages, the two patterns diverge sharply in decision-making power, individual autonomy, and core logic. In terms of dominant actors, XiangQin involves third-party facilitation from family or matchmakers with individual participation in decision-making, whereas traditional arranged marriage features full control by the family (parents) with no individual autonomy. Regarding individual autonomy, XiangQin offers moderate autonomy as individuals can reject mismatched partners and negotiate criteria, while traditional arranged marriage provides extremely low autonomy as marriage is a family decision with no individual choice. The core matching logic of XiangQin centers on hard indicators plus limited emotional exploration, while traditional arranged marriage prioritizes family interests such as wealth, social status, and kinship alliances. Temporally, XiangQin is a dynamic, adaptive model blending tradition and modernity, while traditional arranged marriage is a static, rigid model rooted in feudal patriarchal norms. In terms of outcome focus, XiangQin emphasizes individual marital stability alongside family expectations, while traditional arranged marriage prioritizes family honor and intergenerational continuity.

A comparison with Latin American marriage formation further highlights XiangQin's distinctive logic. Marriage practices in many Latin American societies are shaped by Catholic moral frameworks, extended family networks, and communal norms that emphasize emotional bonding, interpersonal trust, and long-term courtship prior to marriage (Hirsch, 2003). Gaining approval from the partner's extended family is often a prerequisite, and marriage decisions are embedded within dense kinship and community relations. By contrast, Chinese XiangQin is influenced by Confucian family ideology and modern institutional structures, emphasizing instrumental matching based on resource exchange, status equivalence, and institutional compatibility, such as education and hukou status. This contrast illustrates that XiangQin's emphasis on hard indicators and external pressure is not a universal feature of mediated marriage but rather a product of China's specific cultural and institutional context, differing fundamentally from relationally oriented marriage systems found elsewhere. This aligns closely with the structural theory of family systems that marriage formation practices should be understood as institutional adaptations to broader social and economic structures (Goode, 1963).

2.3 Mismatches in XiangQin and its relation to mental health

The distinctiveness of Chinese XiangQin, including its prevalence, reliance on hard indicators, external pressure, and high mismatch risk, creates a unique empirical context to test the marriage-mental health link. Unlike arranged marriages with no individual autonomy or Latin American marriages rooted in communal and emotional bonds, XiangQin's blend of limited autonomy and structural constraints amplifies the need to unpack the underlying mechanisms linking matchmaking and mental health.

As previous research has advanced, scholars have shifted from examining overall marital status to probing the specific micro-features of marital relationships, recognizing that not all marriages exert uniform effects on mental health, and spousal characteristic mismatches emerge as a critical boundary condition that modulates the relationship between marriage and psychological well-being. Researchers have narrowed their focus to specific features of marital relationships, identifying spousal characteristic mismatches as critical moderators of mental health outcomes. Specifically, five key dimensions have emerged as particularly relevant: educational attainment, age gap, socio-economic status (including hukou, income, and social status). For instance, mismatches in educational attainment, such as when a wife has a higher educational level than her husband, can reduce marital satisfaction and increase women's risk of depression, with this effect amplified in arranged marriages due to traditional norms (Schwartz and Mare, 2005). Regarding age gaps, Kim et al. (2015) found that spousal age differences shape relationship dynamics and marital challenges, while Chinese native researchers noted gender disparities in satisfaction within age-diverse marriages. Beyond these, family background—encompassing parental education, hukou (household registration status), and socioeconomic status also influences marital satisfaction. Parental socioeconomic status shapes children's education, occupation, and social capital, in turn affecting their partner choices (Rözer and Brashears, 2018). Bourdieu (2018) further suggests that class origins shape individual attitudes and behaviors, meaning cross-class partnerships may induce psychological unease. Collectively, these findings highlight that mismatches in education, age, hukou, income, and social status are vital to understanding marital well-being.

In the context of XiangQin, clarifying these mechanisms is crucial to explaining how XiangQin, through the mediating role of mismatches, ultimately affects individuals' psychological well-being, and can be effectively interpreted using classic theoretical frameworks in social psychology and marital research. These mechanisms can be explained using both social exchange theory and the stress-adaptation model. Social exchange theory posits that marriage is fundamentally a contractual relationship involving resource exchange (Nakonezny and Denton, 2008). When resources like economic capital tied to education or hukou are invested, and the returns on matchmaking are imbalanced, marital satisfaction declines. The stress-adaptation model, meanwhile, highlights the cumulative impact of persistent stressors due to mismatches on mental health. Colodro-Conde et al. (2018) confirmed that ongoing marital stressors, such as social discrimination stemming from hukou mismatch, activate individuals' stress response systems, potentially leading to long-term depressive symptoms.

These pathways are likely stronger under XiangQin because matchmaking often prioritizes "hard" indicators and proceeds under external pressure, compressing premarital information and accelerating commitment. Mismatches in XiangQin are not random, but often rooted in the core evaluation criteria of this matchmaking model, which typically prioritize tangible resources (e.g., education, hukou, income, family socioeconomic status) over emotional compatibility or personal values. With a strong intention for compatible resources and efficiency, XiangQin leaves less pre-marital time for couples to exchange information about other unobservable characteristics, resulting in a higher level of post-marriage revealing. Therefore, mismatches are often not recognized by both families before marriage, creating "anticipatory stress" that exacerbates psychological harm. For instance, it is common in XiangQin for families to arrange meetings based on perceived "resource equivalence," but discrepancies that are overlooked or downplayed during the short matchmaking process (such as differing views on gender roles, family planning, or caregiving responsibilities) often surface as prominent mismatches after marriage. Based on these ideas, the hasty progression of matchmaking marriages, resulting from external pressure, means couples lack sufficient premarital understanding, making it harder to cope with post-marital mismatches and further amplifying stress responses, such as unmet expectations about household division of labor, conflicting attitudes toward supporting elderly parents, or gaps in communication style. These general explorations of the marriage-mental health link lay a foundational theoretical framework for subsequent in-depth investigations.

2.4 Key gaps and core contributions of our research

Although existing studies have tentatively explored the mechanisms by which mismatches in matchmaking marriages influence mental health, there remain notable gaps that limit our comprehensive understanding of the core causal chain (XiangQin $\rightarrow$ mismatch $\rightarrow$ mental health). From a domestic perspective, most relevant research either focuses on traditional arranged marriages or generalizes the effects of marital status, failing to systematically unpack the unique mismatch transmission mechanisms specific to contemporary Chinese XiangQin. From a global perspective, while cross-national research on intermediated marriage formation has been extensive, especially in Western countries and South America, the specific characteristics of XiangQin—such as the speed of union formation and the influence of third parties—remain largely unexplored. Moreover, no in-depth comparison has been made between XiangQin and other global intermediated matching models in terms of their mismatch-driven mental health consequences. Cross-sectional data obscures causality, Zhang et al. (2024)'s 3-year longitudinal work misses long-term effects, analyses focus narrowly on individual factors (ignoring macro influences), and mechanisms are underdeveloped. Our study addresses these gaps by using longitudinal data and focusing on both individual-level factors and macro-level influences, thus advancing the field's understanding of this important relationship.

This paper contributes to the literature in three key ways: first, we examine XiangQin's relationship with marital depressive symptoms over an extended timeframe, using five matching features (age, education, hukou, income, social status)

with the normalization method. With the result indicating that educational attainment and social status take up most of the proportion in spousal mismatch, we finally identify the composite of these two factors as mediators to clarify long-term dynamics. Second, we explore how XiangQin's impacts on depressive symptoms (including mediation effect) shift over the life course by introducing the learning model, moving beyond static individual-level analyses to capture context-dependent effects. Third, we examine urban-rural differences, gender, family size, traditional culture, and economic decision-making power, exploring the multi-level mechanisms that not only explain how but also why XiangQin shapes mental health, thus filling the mechanism and macro-factor gaps in existing work.

3 Methodology&Data

3.1 Model

To capture the dynamic effect of XiangQin on mental health, we proposed a simple XiangQin model based on the framework of Altonji and Pierret (2001). By using the employer learning model, they primarily addressed the issue of gradual revelation of ability under information asymmetry, in which employers dynamically observe workers' performance signals to continuously update their perceptions of workers' true ability, and ultimately adjust wage levels to achieve a precise match between wages and actual ability. This core logic actually can be transferred and adapted to the research context of marital relationships, thereby forming a unique learning model for analyzing marital mismatch in XiangQin marriages.

In the marriage market, marriage formation plays a functional role highly analogous to the initial screening mechanism in the labor market. Since it's almost impossible for the husband and wife to fully know about each other, there exists a mismatch level measuring the extent of unknown information between couples. During the premarital time couples spend staying together, they gradually get some easy-to-observe information, which helps to form an expectation of mismatch after getting married. In this process, some of them may overlook some unobservable but critical traits, such as personality compatibility, emotional management ability, value orientation, and life rhythm consistency. Then, during the marriage, couples still can get new information of their partners, beginning to know some difficult-to-observe traits over time. These novel shocks after getting married let couples learn the true mismatch between them and allow them to adjust their perceived mismatch gradually closer to the true level.

Based on this idea, from the perspective of marriage formation, how couples marry each other affects the extent of them knowing about each other. For the sake of speed and efficiency, XiangQin serves as a market intermediary that either promotes assortative matching along observable background characteristics or enables preference-based search by filtering candidates to meet specified criteria, which leaves other unobservable characteristics behind. Therefore, after marriage, although they know little about each other's personality, as partners spend more time together, they gradually learn previously overlooked unobservable traits. If these intrinsic characteristics turn out to be increasingly mismatched, the resulting marital mismatch can substantially undermine mental well-being within the marriage. Based on the learning model developed

by Altonji and Pierret (2001), there is also a learning process between the wife and the husband in some unobservable characteristics, especially for those who got married by XiangQin. Hence, we proposed the following model.

$$z = \lambda q + v + \eta m \tag{1}$$

where:

z = mismatch between couples;
q = known latent incompatibility;
v = latent mismatch revealed over time;
m = indicator of whether or not the couple get married by XiangQin;

The real mismatch after marriage is affected by known latent incompatibility and latent mismatch revealed over time. We allow m to directly enter the mismatch formation equation, because third-party screening imposes criteria that are not aligned with spouses' latent compatibility. Based on the assumption, both coefficients η and λ should be positive.

At the time of marriage, partners do not fully observe the true mismatch z. Instead, they form expectations based on easily verifiable pre-marital information.

$$z \mid_{\tilde{z}} \sim \mathcal{N}(\mu_0, \sigma_0^2), \quad \sigma_0^2 = \sigma_F^2 + \Delta_\sigma m \tag{2}$$

where μ_0 summarizes the pre-marital assessment of compatibility and σ_0^2 captures remaining uncertainty. A key institutional feature of XiangQin is information compression, which is reflected by $\Delta_\sigma m$. XiangQin marriage decisions are made quickly and rely heavily on a limited set of hard traits, while soft compatibility that requires time to learn is underweighted. As a result, the initial uncertainty about true mismatch is larger for XiangQin couples. We capture this by allowing the prior variance to depend on m.

After marriage, couples gradually learn about their true mismatch through repeated interactions. In each period t, they receive a noisy but unbiased signal $\tilde{z}_t$ about z.

$$\tilde{z}_t = z_t + \epsilon_t, \quad \epsilon_t \sim \mathcal{N}(0, \sigma_\epsilon^2) \tag{3}$$

Based on the learning process for t periods, couples' expectation of mismatch turns out to be the combination of the prior and later noisy signals, and let $\overline{z}_t = \sum_{i=0}^{t} \tilde{z}_i$

$$\hat{z}_t = E(z \mid \tilde{z}_1, \tilde{z}_2, ..., \tilde{z}_t) = \omega_t \mu_0 + (1 - \omega_t)\overline{z}_t, \quad \omega_t = \frac{\sigma_\epsilon^2}{\sigma_\epsilon^2 + t\sigma_0^2} \tag{4}$$

The weight on the prior is $\omega_t = \frac{\sigma_\epsilon^2}{\sigma_\epsilon^2 + t\sigma_0^2}$, which decreases with marital exposure t. Hence, as couples spend more time together, their beliefs rely less on pre-marital assessments and more on realized post-marital information. Moreover, because σ_0^2 is larger for XiangQin couples when $\Delta_\sigma > 0$, the prior receives less weight and learning is effectively faster in the sense that signals shift beliefs more rapidly.

Since the mismatch gradually relies more on the later learning process, in this study, we introduce an effective learning rate $\theta_t(m) \in [0,1]$, which summarizes the extent to which latent mismatch is revealed and internalized over time.

$$\theta_t(m) = 1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t} \tag{5}$$

where $\theta_t(m)$ is monotone increasing and concave in t, and converges to 1 as t increases. The parameter $\tau_1 > 0$ captures the hypothesis that XiangQin marriages exhibit a steeper revelation path of latent mismatch.

We then define the psychologically revealed mismatch.

$$z^R = \underbrace{\lambda q + \eta m}_{\text{pre-marital expectation}} + \theta_t v \tag{6}$$

where v denotes the latent incompatibility component that is not fully recognized at marriage but becomes apparent through post-marital interaction. When θ_t is small, only a limited fraction of v is revealed. As θ_t becomes large, more of the mismatch translates into realized friction and conflict.

Back to the interest of this study, mental health outcomes are assumed to respond to the mismatch. Let MH denote depressive symptoms. We can introduce the following relationship.

$$MH_t = \alpha + \beta z^R + \zeta_t \tag{7}$$

where $\beta > 0$ means that greater revealed mismatch increases mental problems, and ζ_t captures other determinants of mental health.

Then, combining the expression of z^R into the above equation, we can get the final reduced-form relationship between mental health and the true mismatch between couples. For derivation, see Appendix A.

$$MH_t = A_t(m) + \beta[1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t}]z + \zeta_t \tag{8}$$

$$\frac{\partial MH}{\partial z} \mid_{m=1,t=T} = \beta[1 - \mathrm{e}^{-(\tau_0+\tau_1)T}], \quad \frac{\partial MH}{\partial z} \mid_{m=0,t=T} = \beta[1 - \mathrm{e}^{-\tau_0 T}] \tag{9}$$

where $\beta[1-\mathrm{e}^{-(\tau_0+\tau_1 m)t}]$ captures the dynamic effect of real mismatch on mental health over time. As for $t = T$, the effect of mismatch for XiangQin group is larger than other marriage group because of $\tau_1 > 0$.

This framework captures the different dynamic effects of mismatch between XiangQin and free-love marriages, in which XiangQin potentially leads to greater mismatch between couples and its revelation after marriages causes larger impact on post-marriage mental health. As an application of the learning model, our model expands the content by introducing a concept of the learning rate in the marriage market. This adaptation and extension not only retain the core logic of the employer learning model regarding information asymmetry and dynamic cognitive update, but also effectively integrate the unique characteristics of XiangQin marriages and the practical concerns of marital mental health, forming a practically explanatory analytical framework.

In the following part, we built up an empirical design examining the relationship between XiangQin and mental health, followed by a mediation analysis of mismatch. We have also designed more empirical methods to prove that the mismatch effect of blind date people in our theory will be more prominent and serious than other people.

3.2 Empirical Design

In this study, to initially examine the relationship between XiangQin and mental health, we first adopted Ordinary Linear Squares (OLS), and its function can be written as follows:

$$MH_{it} = \alpha + \beta_1 XQ_{it} + \mathbf{X}'_{it}\gamma + \epsilon_{it} \tag{10}$$

where i represents individuals, and t refers to survey years. MH is the dependent variable measuring the mental health status of individuals, and XQ indicates whether the individual i gets married through XiangQin ($XQ = 1$) or not ($XQ = 0$). $\mathbf{X}'_{it}$ is a vector containing all our control variables at individual level, with an error term ϵ_{it}.

To further examine the relationship under fixed effect model, we also include province and year fixed effects into the model:

$$MH_{it} = \alpha + \beta_1 XQ_{it} + \mathbf{X}'_{it}\gamma + \mu_p + \lambda_t + \epsilon_{it} \tag{11}$$

where μ_p and λ_t represent province and year fixed effects, respectively to account for regional characteristics and time-specific changes. And the rest of equation 11 is the same as equation 10.

Based on the previous model, we proposed that XiangQin affects the formation of marriage, in which couples have less time to pay attention to figuring out unobservable characteristics of their partner, leading to a higher level of mismatch that they need to perceive and adapt to after getting married. Hence, besides the direct effect of XiangQin on mental health, mismatch should play as an indirect approach influencing individuals' mental health. The direct effect stems from the inherent characteristics of XiangQin marriage, such as the lack of autonomous partner selection, stronger involvement of family or third parties, and the potential absence of emotional compatibility, which may directly influence psychological well-being over time (Zhang et al., 2024).

In addition to this direct impact, we propose an indirect mechanism through which XiangQin may affect mental health via the degree of compositional difference between couples. Prior studies in the literature review have shown that mismatches in key spousal characteristics, such as education, hukou, and age, are associated with lower marital satisfaction and greater psychological distress (Schwartz and Mare, 2005; Zhang et al., 2024; Wang and Schwartz, 2018; Kim et al., 2015). In the context of XiangQin, such mismatches may be more likely due to the involvement of family or third parties, who tend to prioritize social status indicators over emotional support (Huang et al., 2017; Bai et al., 2022). Traditional norms such as the "husband-higher-than-wife" expectation in education often guide partner selection in blind dating (Palos et al., 2012), and deviations from these norms may lead to social or family pressures, contributing to long-term mental health risks (Qian and Qian, 2017; Lei et al., 2014).

Therefore, as for the indirect mechanism, entering marriage via XiangQin could firstly increase the likelihood of composite difference mismatch, which then could contribute to poorer mental health outcomes. To empirically assess this mediating process, we apply a stepwise estimation strategy based on the causal mediation framework (Baron and Kenny, 1986) as below. In this framework, the first step examines the direct effect of XiangQin marriage on mental health. Since this specification is identical to our baseline model in equation 11, we do not reproduce it here and proceed to the subsequent steps:

$$Mediator_{ft} = \alpha + \beta_2 XQ_{it} + \mathbf{X}'_{it}\gamma + \mu_p + \lambda_t + \epsilon_{it} \tag{12}$$

$$MH_{it} = \alpha + \beta_3 XQ_{it} + \sigma Mediator_{ft} + \mathbf{X}'_{it}\gamma + \mu_p + \lambda_t + \epsilon_{it} \tag{13}$$

where the $Mediator_{ft}$ denotes the degree of composite mismatch between individual i and his/her partner at time T . Furthermore, to assess the statistical significance of the mediation effect, we also applied the Sobel Test as a robustness check. Based on the mediation analysis, the total effect of XiangQin on mental health satisfies the decomposition:

$$\beta_1 = \beta_3 + \sigma\beta_2 \tag{14}$$

where β_3 captures the direct effect of XQ on mental health, while the indirect effect operating through the mediator is given by $\sigma\beta_2$.

3.3 Data

3.3.1 China Family Panel Survey (CFPS)

The data used in this study are derived from the China Family Panel Studies (CFPS), which has been conducted in seven waves up to now: 2010, 2012, 2014, 2016, 2018, 2020, and 2022, a large-scale, nationally representative longitudinal survey launched by Peking University. CFPS aims to monitor the long-term trends in Chinese residents' economic, social, and health conditions at both the individual and household levels. It offers rich panel data covering variables such as mental health, demographic characteristics, household composition, and economic well-being.

Our key dependent variable of this research is mental health, measured by the CESD-8 scale, which consists of eight self-reported items. All respondents are required to evaluate the frequency of depressive symptoms experienced over the past week, such as feeling depressed and unable to sleep well. Each item is rated by respondents on a four-point Likert scale ranging from 0 ("never") to 3 ("most of the time"), with higher total scores (ranging from 0 to 24) indicating greater severity of depressive symptoms.

The CESD scale has been widely adopted in both medical and public health research as a reliable instrument for assessing psychological well-being (Siddaway et al., 2017; Bi et al., 2023). And using CESD-8 in our study rather than CESD-20 potentially has two advantages. First, the 2010 and 2014 waves of CFPS did not administer the full set of CESD-8 questions, so our analysis is limited to the waves conducted in 2012, 2016, 2018, 2020, and 2022. Second, there are many missing values for CESD-20, whereas the CESD-8 shows much greater consistency and completeness across waves.

Taken together, both empirical and practical considerations make CESD-8 a suitable measure of mental health for our analysis. Some previous studies have focused on the CESD-8, and when tested against the CESD-20, the CESD-8 has been shown to be a reliable and valid abbreviated scale in the general Chinese population (Jiang et al., 2024; Karim et al., 2015).

3.3.2 XiangQin(XQ) Definition

Our key independent variable is a binary indicator denoted as XQ, which equals 1 if the individual is married through XiangQin, and 0 otherwise. This variable is constructed based on detailed marriage history records collected in each wave of the CFPS. For each respondent, we consolidate their marriage-related information across all available survey years from 2012 to 2022 and identify their marital status on a yearly basis to ensure longitudinal consistency. To ensure consistency in measurement, we harmonize the marital data across all years and restrict our analysis to respondents with valid introduction responses. Because the method by which individuals find their partners typically takes place before or at the beginning of their marriage and stays the same afterward, unless their marital status changes, the key independent variable in our panel data remains constant over time. This allows us to examine how the initial conditions of marriage formation, specifically whether the individual entered marriage via XiangQin, are associated with long-term mental health problems, measured through repeated observations over time.

Among individuals who are currently married (the in-marriage group), we use the CFPS survey item "How did you get to know your couple?" to determine whether the marriage resulted from XiangQin or not. This question offers multiple answer categories that contain various channels through which couples met. Following the definitions adopted in prior literature (Huang et al., 2017), we classify respondents as having married through XiangQin ($XQ = 1$) if their response belongs to any of the following answers: "introduced by relatives," "arranged by parents," or "introduced by a marriage agency." These responses are interpreted as indicating an arranged or inter-mediated process of partner formation, which typically involves third-party facilitation, often with strong family participation. In contrast, other answers are classified as non-XiangQin marriages ($XQ = 0$).

Based on this identification, with regard to our dataset, in Figure 1a, the proportion of people getting married through match-making is relatively high in most provinces before 2000. While after 2000, as shown in Figure 1b the proportion declined, probably due to modernized concepts of marriage. This variable provides a meaningful way to explore whether and how the institutional structure of marriage formation may influence psychological well-being over the life course, particularly in the context of changing social norms, rising individual autonomy, and evolving family dynamics in China.

3.3.3 Construction of Mismatch

The distinction between XiangQin and non-XiangQin marriages is theoretically based on sociological and demographic research. Existing studies argue that XiangQin marriages differ systematically from self-initiated unions in several important dimensions,

including partner selection mechanisms, emotional intimacy levels, the role of family mediation, and post-marital power dynamics (Lei et al., 2014; Huang et al., 2017; Cheung, 1972). While fully traditional XiangQin has declined over time, XiangQin marriages remain common in contemporary China, particularly in rural areas and smaller cities, where parents and relatives often actively participate in the partner selection process (Bai et al., 2022; Wei and Zhang, 2011). Therefore, as a result of third-party involvement in the spouse selection process, individuals often lose substantial autonomy in evaluating potential partners. Rather than assessing compatibility based on personal preference and emotional alignment, they are subject to parental and institutional priorities, which would increase the likelihood of marital mismatch.

In addition, significant mismatches, whether in values, socioeconomic status, or even life goals, often require spouses to invest in greater emotional and cognitive resources to accommodate the partner (Colodro-Conde et al., 2018). Such mismatches can bring barriers to emotional and practical adaptation, eroding marital intimacy and further psychological health. Since many previous studies examined different perspectives of mismatches separately, such as age and education, we adopt a comprehensive approach by constructing a composite measure that could capture multidimensional mismatch, which enables us to evaluate the joint effect of incompatibilities on spouses' mental health.

To construct this composite difference indicator mismatch, based on existing literature, we first utilize five dimensions of individual characteristics that are reported for both the respondent and their couple in the CFPS: educational level, age, relative local income level, perceived local social status, and hukou (household registration) condition. Education level is measured on an 8-point ordinal scale ranging from 1 (illiterate/semi-illiterate) to 8 (doctoral degree), while age is calculated as the difference between the survey year and the respondent's birth year. Income level and local social status are both reported on a 1 to 5 scale, with higher values reflecting better relative positioning. Hukou condition is coded with 0 for agricultural and 1 for non-agricultural registration. For each of these five variables, we calculate the absolute difference between the respondent and their partner to reflect the extent of disparity in each dimension. Since the variables are measured on different scales thus incomparable, we standardize all five different measures into one uniform scale with average 0 and standard difference 1 to ensure comparability and to prevent variables with larger variances from dominating the composite measure.

Inspired by Deming (2009), we conducted a method of normalization comparison on these five elements between xiangqin group and free-love group (Table 1). The results suggest that mismatch between xiangqin spouses is mostly revealed on educational attainment differences and social status differences. With the third column indicating differences between the 2 groups greater than zero in these 2 dimensions by comparison. Therefore, in order to maintain the representativeness of our identification in mismatch, here we only select these two significantly influential aspects for consideration. Therefore, the definition of mismatch in our research is the composite variable deriving from the educational attainment differences and the social status differences.

3.3.4 Control Variables

To mitigate omitted variable bias and to more accurately identify the relationship between marriage formation and mental health, we also include a set of control variables that are commonly adopted in the literature on family and health outcomes. These controls cover demographic, socioeconomic, and health dimensions of the respondent. Gender is coded as a binary variable (1=female, 0=male), and age is measured in years. Residential location is defined according to the official urban–rural classification of the National Bureau of Statistics (0=rural, 1=urban). Health condition is captured by a five-point self-assessment scale, where higher values indicate poorer health. Educational attainment is measured by a dummy variable equal to 1 if the respondent has completed at least senior high school and 0 otherwise. Employment status is coded as 1 if the respondent is currently employed and 0 otherwise. Duration is defined as the number of years an individual has been married. Finally, we incorporate two subjective measures of socioeconomic standing: perceived income level relative to the local community and perceived local social status, both reported on a five-point scale, where higher scores indicate a more favorable position.

Table 2 includes definitions of all variables that we would use in our study. Based on Table 3, our dataset contains 106,787 valid CESD-8 values after processing the raw database, with a mean value of 5.50, standard deviation of 4.06, which means a wide variation of individuals' mental health status. In our dataset, there are 53,287 people got married through XiangQin. As for the mediator, mismatch, since its conduction requires identification of both couples in the dataset by matching their unique couple ID, there are missing mismatch values of some married individuals, whose couples are not covered by the survey. Therefore, there are 77,887 valid values for the variable mismatch.

4 Main Results

4.1 Baseline Regressions

Based on our results in Table 4, Column (1) reports a simple OLS regression without any control variables, showing that XiangQin is positively and significantly associated with depressive symptoms (0.299, $p<0.01$), which suggests that individuals who marry through XiangQin report worse mental health compared to those who marry through free choice. When we add individual-level control variables in Column (2), the main independent variable loses some of its significance, and the coefficient becomes smaller (0.103, $p<0.05$), indicating that the association observed in Column (1) is largely driven by other individual characteristics.

However, once province and year fixed effects are introduced in Columns (3) and (4), the effect of XiangQin on people's mental health is significant again (0.134, $p<0.01$). This change shows a potential correlation between these covariates and broader regional and temporal factors. Thus, by considering province and year fixed effects, the model isolates the effect of XiangQin on mental health, purging the estimates of confounding regional and temporal characteristics.

Among the control variables, being female is positively linked to depressive symptoms, meaning that women report higher levels of depression compared to men. Older age, urban residence, better health, higher education, income, and social status all reduce depression symptoms, consistent with previous research (Wang et al., 2018; Zhang et al., 2024) on socioeconomic characteristics mitigating distress. Employment is positively linked to depression, possibly reflecting work stress. Although the explanatory power is modest ($R^2 = 0.137$), the consistency of coefficients across model specifications lends credibility to the observed associations.

The results challenge the monolithic view of marriage as uniformly beneficial: while marriage broadly protects mental health, the process of XiangQin introduces unique risks. This underscores the need to analyze marital outcomes through the lens of how unions form, not just whether they exist. The socioeconomic gradients further reveal that structural advantages shape mental health resilience, even within the context of marriage.

4.2 Mechanism: Mediation Analysis

Previous research (Schwartz and Mare, 2005; Wang and Schwartz, 2018; Kim et al., 2015) has indicated that marriage exerts an impact on the mental health of couples across various dimensions, including age gap, educational disparity, and socioeconomic factors (including hukou, income, and social status). XiangQin marriage, being a particular form of pre-arranged marriage, is also influenced by these differences to a certain extent. In this study, we utilize the normalization method to construct a composite variable of differences. This composite variable serves to illustrate the overall top two serious "mismatch" indicators(educational attainment differences, social status differences) between spouses, with the intention of uncovering its potential role in the relationship between XiangQin marriage and mental health. Specifically, to explore whether the composite mismatch acts as a mediator in the relationship between XiangQin marriage and depressive symptoms, we adopt the three-step Baron and Kenny (1986) mediation framework proposed in 1986, combined with the Sobel test. This framework allows us to systematically assess the mediating effect, enabling a more in-depth understanding of the underlying mechanisms through which XiangQin marriage may influence depressive symptoms via the composite mismatch variable. By doing so, we can gain valuable insights into the complex interplay between these factors and contribute to the existing body of knowledge on the impact of marriage-related factors on mental health.

Table 5 reports the mediation effect of mismatch in the relationship between the spouse's XiangQin and mental health. The column (1) shows that XiangQin significantly predicts CESD-8, indicating that individuals in XiangQin marriages exhibit higher depressive symptoms. Column (2) confirms that XQ is also significantly associated with a higher composite difference mismatch, suggesting that institutional pressures are involved in XiangQin. Parents may be more concerned about factors like the other family's economic status, social status, etc., rather than whether the two individuals are truly compatible in terms of their personalities, interests, and long-term life goals. This kind of resource-prioritized approach in XiangQin systematically amplifies structural mismatches in dimensions like age, education, and income. For

example, if a family emphasizes the economic strength of the potential in-laws, they may encourage their child to marry someone with a higher income but a significant age gap or a large educational disparity, which is considered reasonable as it is demonstrated that both education and age/experience exert positive, statistically significant effects on earnings (Mincer, 1974). In column (3), mismatch retains a strong positive impact on CESD-8, while the coefficient of XQ decreases, providing evidence of partial mediation.

From the perspective of social exchange theory (Nakonezny and Denton, 2008), marriage can be seen as a form of resource exchange, encompassing both socioeconomic and socio-emotional resources. In this mismatching pattern, people may end up with disparities in different aspects because of the emphasis on certain resources. For instance, a person may marry someone with a good family background to gain economic stability, but may sacrifice on the emotional compatibility side. This ultimately results in systematic mental health failures in the "XiangQin" marriage market.

This result reveals a dual pathway (here we name it as "process-outcome" framework) through which XiangQin marriage affects mental health: first, an immediate process effect arising from the institutional features of XiangQin, which directly induce psychological stress regardless of match quality; second, an outcome effect whereby the structural mismatches generated by XiangQin act as chronic stressors, exacerbating depression through ongoing relational conflicts such as resource inequality and status discrepancies. This framework transcends the simplistic view of XiangQin as the sole stressor, demonstrating that XiangQin's negative impact stems from both the institutional defects in its formation process and the structural flaws in its matching outcomes. Even after accounting for composite mismatch, the institutional context of XiangQin remains a distinct source of stress, while it produces further eroding psychological well-being over time. As it may hinder intra-household cooperation, increase bargaining asymmetries, and reduce marital surplus, thereby deteriorating subjective well-being, which is in line with the previous study by Zhang et al. (2024) showing heterogamous marriage patterns (heterogamy refers to marriages between people with dissimilar traits) are highly likely associated with poor marital quality, and even divorce, which are related to depressive symptoms.

According to our results, the mediation effect of mismatch, the proportion of the total effect that is mediated is about 2.6%. Furthermore, the Sobel test confirms the validity and statistical significance of this mediation effect, with a p-value of 0.072 for the Sobel test, indicating that mismatches in couple characteristics play a critical indirect role in the relationship between XiangQin behaviors and health.

4.3 Dynamic Learning: Marriage Duration

Based on the Table 6, in column (1), the direct effect of XQ on depressive symptoms is not significant. However, the interaction term has a statistically significant positive impact on depressive symptoms (0.109, $p<0.1$), indicating that the longer the marriage duration, especially for those who marry through XiangQin, the more severe their depressive symptoms are. This suggests that while the standalone effect of XiangQin on depressive symptoms is not apparent, when combined with marriage duration, the negative impact becomes significant. This finding aligns with the predictions of

our model, which suggests that at the beginning of the marriage, individuals may not perceive potential issues. However, in XiangQin marriages, these issues gradually become apparent over time, intensifying the negative impact on mental health.

In addition, marriage duration is positively associated with depressive symptoms (0.135, $p<0.01$), indicating that as marriage duration increases, depressive symptoms worsen. In other words, individuals in longer marriages are more likely to experience depressive symptoms, suggesting that long-term factors in marriage gradually amplify mismatches and stress, thereby having a long-term negative impact on mental health. This aligns with the finding of Bradbury et al. (2000), who suggest that the long-term adaptation process in marriages and the dynamic evolution of marital relationships gradually expose underlying structural mismatches, which exacerbate mental health problems.

According to Ma et al. (2018), there is a significant change in divorce rates when the marriage duration reaches 3 years. This finding further supports the idea that the effect of marriage duration on depressive symptoms evolves dynamically, with longer marriages likely exposing and amplifying mismatches in the relationship, thereby intensifying depressive symptoms. Overall, these results suggest that the interaction between XiangQin marriage and marriage duration exacerbates negative mental health outcomes, especially in longer marriages.

We also examine the relationship between mismatch and marriage duration. Table 6 shows that mismatch significantly impacts depressive symptoms for individuals who marry through XiangQin, but not for those who marry through free choice. Specifically, in Column (2), for individuals in free-choice marriages, mismatch does not have a significant effect on depressive symptoms. However, in Column (3), the coefficient for mismatch (0.226, $p<0.01$), indicating a strong and significant impact on mental health. This highlights the stark contrast in how mismatch influences depressive symptoms across the two groups, reinforcing the earlier evidence from the Table 5, and further validating the differential role of mismatch in these two marriage groups.

Further analysis in Column (4) and Column (5) introduces the interaction term, exploring how marriage duration moderates the relationship between mismatch and depressive symptoms. Specifically, in Column (4), for individuals in non-XiangQin marriages, both the mismatch term and its interaction with duration are not significant, indicating no clear relationship between mismatch, marriage duration, and depressive symptoms. However, in Column (5), for individuals in XiangQin marriages, the interaction term is significant (0.305, $p<0.05$), with a large coefficient, showing that as marriage duration increases, the negative impact of mismatch on mental health becomes more pronounced. This suggests that the effect of mismatch in XiangQin marriages is revealed more quickly over time, and its impact grows stronger. This finding supports our earlier model, which predicted that individuals in XiangQin marriages have a faster learning rate regarding mismatch, and that the negative consequences of this mismatch are more significant over time.

Figure 2 shows the relationship between mismatch and marriage duration for XiangQin marriages and non-XiangQin marriages. For XiangQin marriages, the negative impact of the mismatch on depressive symptoms becomes more pronounced

as marriage duration increases, with a stronger and more significant effect. In contrast, for non-XiangQin marriages, the impact of mismatch on depressive symptoms is weaker and less consistent, especially at shorter marriage durations. This suggests that the mismatch in XiangQin marriages may have a greater long-term impact on mental health over time.

5 Heterogeneity Test

5.1 Urban-rural Divide

Table 7 presents the heterogeneity test results for urban and rural areas. The analysis shows that the psychological health impacts of XiangQin marriages and mismatches differ significantly between urban and rural areas.

For Column (1), it indicates that the impact of XiangQin marriage on depressive symptoms in rural areas is not significant. The coefficient for mismatch is 0.028, also not significant, suggesting that mismatch does not have a significant effect on mental health in rural areas. For Column (2), it shows that XiangQin marriage significantly increases depressive symptoms in urban areas (0.135, $p<0.05$). Additionally, the coefficient for mismatch in urban areas is 0.109, and it is significant at the 1% level, indicating that mismatch has a significant positive effect on depressive symptoms in urban areas. These results suggest that the psychological impacts of XiangQin marriages and mismatch are significantly higher in urban areas than in rural areas. The greater social expectations and pressures in urban environments may explain why individuals in urban areas experience a more pronounced psychological impact from these factors. In contrast, the impact in rural areas is smaller, which may be due to different cultural norms or lower levels of social pressure.

5.2 Family Size

With irreversible globalization, long-term changes in family structure may affect family function, thereby affecting the mental health of family members. Chinese families not only provide the functions of production, education, maternity, and pension, but also that of psychological comfort and support (Cheng et al., 2017). In families formed through XiangQin, emotional intimacy may be initially weak or underdeveloped, which makes the availability of alternative emotional buffers, such as intergenerational support, especially important.

To capture the role of household size in shaping the psychological impact of XiangQin marriage, we classify the sample based on family size. Specifically, we divide households into two groups: those with more than 4 members (column 4) and those with fewer than 4 members (column 3). We use 4 as a criterion for grouping because it is close to the transition point between nuclear and multigenerational families in contemporary China. According to national census data, the average household size in China steadily decreased from 3.94 persons in 1990 to 3.10 in 2010 (Zeng and Wang, 2018). Our dataset also shows that the average size of a current Chinese family is between 3 and 4 persons, i.e., a couple with 1-2 children. Generally, households with more than 4 members remain indicative of multigenerational arrangements often

including grandparents or extended relatives, whereas households with 4 or fewer members typically represent nuclear or smaller family units.

Based on Table 7, column (4) shows that for individuals in larger households, the coefficient is statistically insignificant (0.066, $p>0.1$). In column (3), the coefficient of XiangQin marriage is positive and significant (0.167, $p<0.05$), suggesting that individuals in small households are significantly more likely to get higher levels of depression. These imply that the mental health associated with XiangQin marriage is strongly related to household demographic context. The results reflect the relationship between family size and mental health. Other empirical studies in China also support these views. In small families, especially those with limited adult social interactions, the lack of a romantic basis for marriage may lead to diminished emotional companionship, which may cause feelings of loneliness or dissatisfaction. For example, living in a multigenerational family is associated with fewer depressive symptoms in older adults due to stronger emotional and instrumental support (Sun et al., 2022). These environments can provide individuals with alternative emotional support and share family responsibilities, all of which can help to reduce the psychological stress that can come with less emotionally driven marital bonds.

5.3 Financial Information Advantage

Economic decision-making power refers to the authority to manage household finances, including controlling income, making budgeting decisions, and overseeing expenditures. It often reflects who is most familiar with and responsible for the family's financial situation. It not only affects the allocation of resources but also profoundly shapes power structures and psychological feelings in marriage (Majlesi, 2016). There are two main reasons why economic decision-making power has significant psychological implications. The autonomy and empowerment in life depend on several personal and partner-related characteristics, including socioeconomic status. Furthermore, low autonomy is associated with higher perceived stress and anxiety and probable depression and domestic abuse (Bou Malhab et al., 2021). Moreover, individuals who lack financial decision-making authority often remain unaware of the household's income sources, financial stability, or future planning. This lack of transparency and information control can exacerbate feelings of uncertainty, insecurity, and helplessness. When one partner is excluded from financial discussions and decisions, they may experience a diminished sense of control over their lives, increasing their psychological vulnerability (Anderson and Eswaran, 2009; Majlesi, 2016). In the context of XiangQin marriages, who holds the economic initiative may influence how financial and familial expectations are distributed, shaping distinct psychological outcomes for each partner.

We conduct a heteroscedasticity test based on the respondent's familiarity with household finances. Specifically, as Table 7 demonstrates, individuals are classified according to whether they are identified as the most financially knowledgeable person in the family (column 6) or not (column 5). This distinction serves as a representative for economic decision-making power, which in turn reflects an individual's bargaining position, autonomy, and perceived agency within marriage.

The results demonstrate clear divergence in mental health outcomes between these two groups. For those who are not the primary financial decision-makers, the coefficient on XQ is positive and statistically significant at the 5% level (0.118, $p<0.05$), indicating that XiangQin marriage is associated with higher depression scores. In contrast, for individuals who are the most familiar with family finances, the coefficient is statistically insignificant (0.112, $p>0.1$), suggesting no clear evidence of mental health effect from XiangQin marriage in this subgroup.

These findings suggest that economic decision-making power plays a meaningful role in shaping the psychological consequences of XiangQin marriage. In households where the individual lacks control over financial decisions, the potential constraints imposed by XiangQin marriage, such as limited emotional intimacy or family pressure, may be compounded by a diminished sense of autonomy and self-efficacy. For example, studies have found that women with higher household decision-making autonomy in the country are less likely to report depression and symptoms of anxiety relative to those with the lowest levels of autonomy (Antabe et al., 2025; Lee et al., 2022). The absence of financial decision-making power may exacerbate feelings of dependency and reinforce hierarchical family roles, ultimately increasing psychological vulnerability. In contrast, individuals who hold financial authority may better overcome the emotional complexities of XiangQin marriage. Financial literacy and control often translate into greater bargaining power, increased respect from other family members, and enhanced capacity to assert personal preferences, all of which can foster psychological resilience.

5.4 Gender Differences

According to existing literature, gender roles and differences in marital mental health are significant, with women's mental health being more susceptible to social expectations, limited autonomy, and an imbalance in family responsibilities. Motivated by this, we estimate the models separately for male and female samples in the table.

Column (7) represents the male sample, and Column (8) represents the female sample. The Table 7 shows that the negative psychological impact of XiangQin marriages is significantly stronger for women than for men (0.183, $p<0.01$). In contrast, for the male sample, the coefficient is not significant, suggesting that men in XiangQin marriages do not show significant differences in mental health.

These results indicate that the psychological burden of XiangQin marriages is disproportionately higher for women. One possible mechanism for this difference is that women often bear more social and family pressure and are in a more passive role in marriage decisions. This passivity may amplify their psychological burden, while men, with more control and social bargaining power in XiangQin processes, experience relatively weaker psychological impacts.

5.5 Village Density

The psychological impact of XiangQin marriage may vary depending on the surrounding cultural environment. In rural China, social support embedded in kinship ties and collectivist norms has been shown to buffer against psychological distress; for example, phone contact with children and pension support significantly reduce depression risk

among the rural elderly (Bai et al., 2020). Among urban older adults, neighborhood support plays a key role, reflecting the saying that "close neighbors are better than distant relatives" (Zhang and Axinn, 2021; Huang et al., 2025). Cultural capital further "ensures a common basis of conversation, provides confirmation of one's norms and values, and reduces friction within marriage that may arise from dissimilarity in tastes" (Zhou, 2019). In regions with a strong presence of traditional villages, XiangQin and neighborhood interactions remain frequent, making such marriages more socially legitimate and acceptable. Therefore, we test whether the mental health consequences of XiangQin marriage differ according to the cultural embeddedness of one's residential context.

Guided by this insight, we categorize provinces based on whether the number of officially recognized traditional villages exceeds the national median in Table 7. Column (9) presents regions for below-average villages, while column (10) focuses on provinces with high-tradition villages. Column (10) presents the effect of XiangQin marriage in regions with a higher proportion of traditional villages, where the coefficient is statistically insignificant, indicating no clear relationship between XiangQin marriage and depressive symptoms in these areas. In contrast, column (9) reports a positive coefficient and is significant (0.162, $p<0.05$) in regions with fewer traditional villages, suggesting that individuals in XiangQin marriage are more likely to experience higher levels of psychological distress when embedded in less traditional cultural environments.

This reflects the buffering effect of embedded social structures in rich cultural regions. Empirical research has documented that neighborhood social capital and community embeddedness significantly enhance mental health in China. Traditional villages as local carriers of indigenous norms are often characterized by dense relationship ties, strong community engagement, and interpersonal networks. For example, community-level civic trust and participation are positively associated with self-rated mental health across rural and urban areas, demonstrating the role of collective networks in psychological support (Lin et al., 2019). So, XiangQin marriages may receive greater cultural legitimacy and emotional support, which makes people there more accepting of XiangQin as a way of getting married. Across the world, populations with different numbers of villages are viewed as having distinct values, attitudes, and tastes (Zhou, 2019). Conversely, in areas with fewer traditional villages where collectivist ties are looser and individual autonomy is culturally emphasized, XiangQin marriages may be perceived as misaligned with local values, leading to social scrutiny, internal tension, and increased mental burden. The absence of strong community-based support likely magnifies these emotional costs for individuals in arranged marriages in such contexts.

6 Robustness Check

6.1 Placebo Test

In response to the concern that unobserved trends in XiangQin choice are also influencing individuals' mental health status, we perform a placebo test to check our design. Figure 3 shows the results of assigning the placebo marriage formation method to our

married samples. The figure is a histogram of 1000 placebo simulations of the estimated coefficients of XiangQin combined with a vertical line indicating the original estimated effect from Table 4, column 4 (0.134***). For each simulation, we assign each individual who gets married a random marriage formation method, XiangQin or not, and estimate the main regression on these samples by using the new marriage formation method, even though they did not actually get married through that method. The result indicates that XiangQin is indeed the factor driving the increase in people's mental health.

6.2 Alternative Definition of XiangQin

In Table 8, we reidentify the match-making process as being conducted by the external institution itself, as this is the only professional and strict definition of a third-party associated match-making process. here we found that although the significance of the regression result slightly decreased, the level of how match-making behavior influences depressive symptoms increased. This may indicate that more rigorous pressure from the external third party may impose a greater risk on the potential mental health burden of the married couple compared to the broader category of match-making behaviors.

7 Conclusion

In this study, we examine the impact of XiangQin marriages on mental health within the married population in China, with a particular focus on the mediating role of spousal mismatch, providing an important insight into causes of mental health problems, which is a currently serious global challenge. Using nationally representative survey data and multiple robustness checks, we find that marriages formed through XiangQin, especially blind dating, are linked to significantly higher depressive symptoms.

Baseline regression, accounting for province and year fixed effects, reveals that XiangQin is significantly associated with higher depression among married individuals, challenging the notion that marriage uniformly benefits mental health. Mediation analysis employs a "mismatch" mediator—constructed via PCA method to capture two dimensions of spousal differences (including educational disparity, and social status)—which exerts a partial mediating effect: XiangQin pronouncedly increases spousal mismatch, and this mismatch in turn exacerbates depression significantly, aligning with social exchange theory that frames marriage as resource exchange, where mismatch may cause emotional sacrifice and relational stress.

For marriage duration, this study finds that the interaction between XiangQin marriage and marriage duration significantly impacts mental health. The negative effect of XiangQin on depressive symptoms becomes more pronounced as marriage duration increases. Specifically, while the direct effect of XiangQin on depressive symptoms is not significant, the interaction term reveals that, over time, the negative consequences of mismatch in XiangQin marriages become more apparent. These results align with the dynamic interaction model, which suggests that issues in marriage gradually emerge and amplify, leading to more severe psychological effects over time.

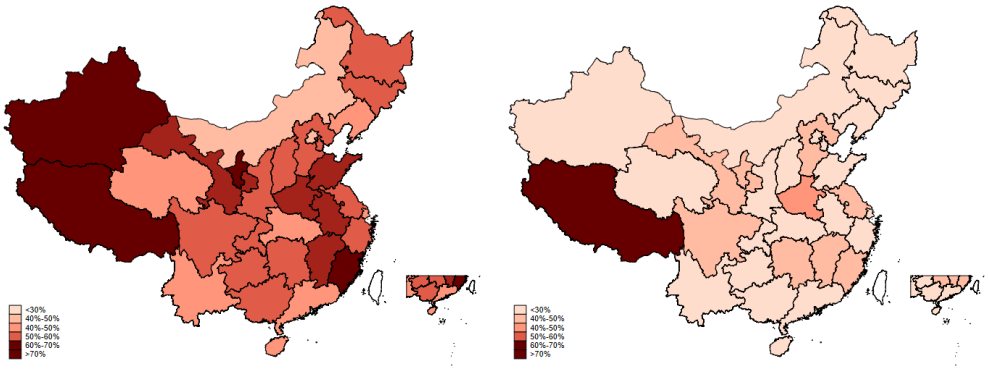
Overall, under the "process-outcome" framework we propose, XiangQin harms married individuals' mental health directly through institutional stressors of the process and indirectly via spousal mismatches as chronic stressors, with these effects together evolving dynamically across marriage duration stages.

We also explore heterogeneity through traditional cultural factors and family background to understand their role in shaping this dynamic. The results show that: urban areas experience stronger negative impacts from XiangQin due to higher social pressures; women face more significant negative effects than men, likely due to societal expectations; in traditional village areas, the impact is weaker due to stronger community support; small families suffer more from XiangQin, as the lack of extended family support exacerbates isolation; and those with limited economic decision-making power face worse mental health outcomes, as they lack control over financial matters and experience higher stress. Taken together, these findings reveal that the impact of XiangQin on mental health is not uniform but is shaped by various dimensions, suggesting that related policies and interventions should pay greater attention to the heterogeneity of people's contexts.

In conclusion, our study highlights the importance of marriage formation methods in the field of mental health issues. By putting forward the mechanism of how XiangQin negatively influences individuals' mental health, we show a novel and unique way to understand current global mental health challenges, especially in the marriage market. Although our evidence is drawn from the Chinese context, where XiangQin remains a prevalent institutional arrangement, the underlying mechanisms are not unique to China.

For related policies trying to stabilize the national marriage market, which is quite critical in both economic development and the labor market, they should focus not only on promoting marriage rates but also on improving the quality of marital formation, which can promote more comprehensive benefits. Meanwhile, regulating marriage intermediaries and ensuring transparency in the XiangQin process are essential to foster emotionally supportive rather than resource-driven unions. In this way, people would have more motivation to develop and invest in their family development.

Finally, this study still leaves room for further development. XiangQin isn't a purely exogenous arrangement, because individuals' decisions to participate in XiangQin are likely shaped by their own personal characteristics and comparative advantages, which may also influence mental health outcomes. This leads to the concern of potential self-selection bias that future research can address with more identification strategies. In addition, the reasons behind engaging in XiangQin may vary across different historical periods and social cohorts, indicating the possibility of cohort effects. Exploring these dynamics by designing a cohort analysis might provide a more nuanced understanding of how the consequences of XiangQin on mental health evolve over time.

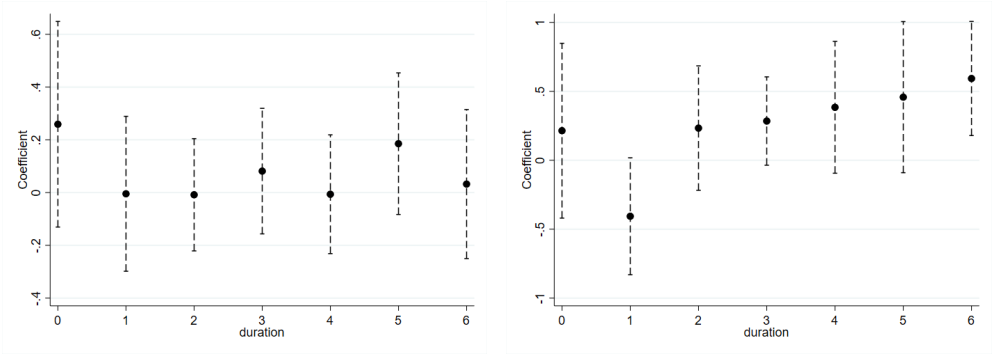


(a) Share of marriages formed through XiangQin before 2000.

(b) Share of marriages formed through XiangQin in 2000 and later.

Fig. 1: Provincial Distribution of XiangQin Marriages in China: Pre-2000 vs. Post-2000.

Note: This figure maps the provincial share of marriages formed through XiangQin in China. Panel (a) reports marriages formed before 2000, and panel (b) reports marriages formed in 2000 and later. The XiangQin share is calculated as the proportion of marriages in each province whose marriage formation is reported as XiangQin. Darker shading indicates a higher XiangQin share.



(a) Free-love marriages (b) XiangQin marriages

Fig. 2: Effects of Spousal Mismatch on CESD-8 Across Marriage Duration, by Marriage Formation.

Note: Two figures show the dynamic change of mismatch effect on mental health within the first 7 years of marriage for free love (a) and XiangQin (b) group respectively, among those who married after 2012. 0 represents the year of marriage, and 6 stands for the sixth year after marriage.

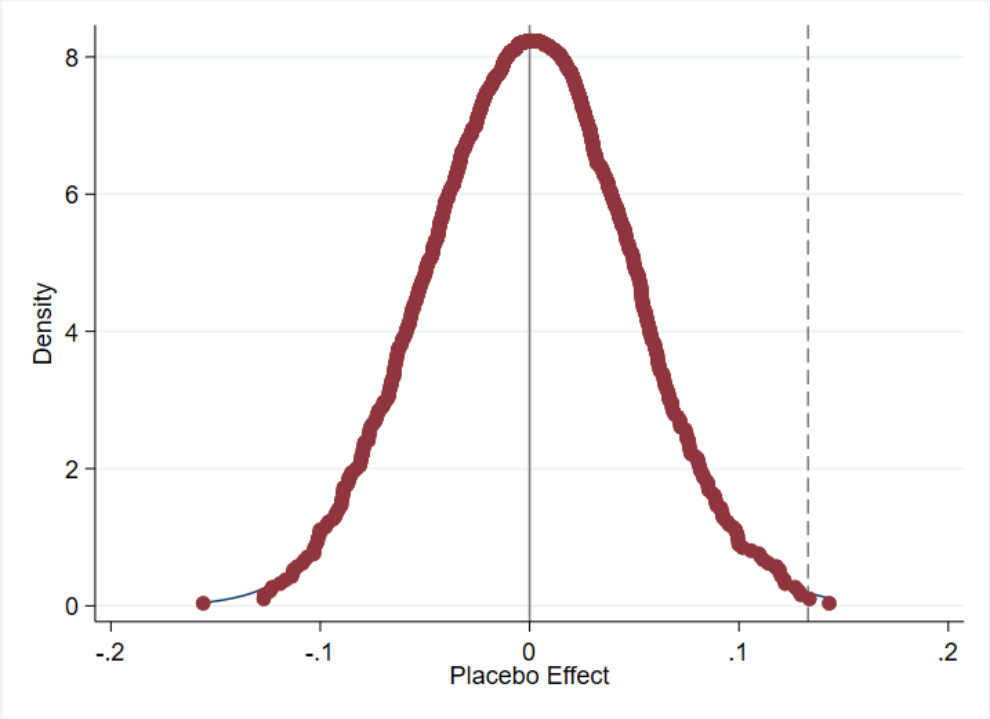


Fig. 3: Histogram of Simulated Placebo Effects

Note: The Figure shows a histogram of 1000 placebo simulations of the estimated effect of XiangQin. The vertical line represents the real coefficient 0.134. Each simulation assigns married individuals a random marriage formation method and estimates the main regression on these samples by using the new marriage formation method, even though they did not actually get married through that method.

Table 1: Mismatch by Marriage Formation

	Marriage Formation		XiangQin–Free love difference (in SD units)
Mismatch	Free Love	XiangQin	
Age	0.00	-0.03	-0.03
	(1.01)	(0.93)	
Education	-0.03	0.08	0.11
	(0.97)	(1.04)	
Income	0.04	-0.18	-0.24
	(0.99)	(0.75)	
Social Status	0.01	0.03	0.01
	(0.99)	(1.02)	
Hukou	0.05	-0.11	-0.16
	(1.06)	(0.85)	
Couples	8,476	7,046	

Note: Means and standard deviations are reported separately for free love and XiangQin marriages. Each mismatch is constructed as the absolute spousal difference and then standardized to have mean zero and standard deviation one. The mismatch value is identical for both spouses within a pair, therefore, the unit of observation is the couple.

Table 2: Variable Definition

Variable	**Definition**
cesd8	Score of depressive symptoms ranging from 0 to 24, with higher scores indicating worse mental health.
XQ	The XiangQin marriage indicator, where 1 represents married through relatives, friends, or an agency; 0 represents otherwise.
female	Whether the respondent's gender at birth is female.
age	The age of the respondent (years).
urban	Whether the respondent is currently living in urban areas.
health	A self-reported health condition scale ranging from 1 (very healthy) to 5 (very unhealthy).
hs	Whether the respondent has attained a high school degree or above.
work	Whether the respondent is currently employed.
inclevel	Individual income relative to the local community, on a scale from 1 to 5, with higher scores indicating better income.
sociallevel	Perceived social status relative to the local community, on a scale from 1 to 5, with higher scores indicating higher standing.
mismatch	Normalized index of spousal mismatch across two dimensions: education, and social status.
duration	The number of years an individual has been married.
familysize	Equal to 1 if the total number of family members living in the same household is above the national average of 4, and 0 otherwise.
financefamiliar	Whether the respondent is in charge of the family's financial condition.
village	The number of villages in the province where the sample is located.

Note: For dummy variables, value 1 represents Yes and 0 represents No.

Table 3: Descriptive Statistics

Variable	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
cesd8	106,787	5.50	4.06	0	24
XQ	53,287	0.41	0.49	0	1
female	122,938	0.50	0.50	0	1
age	122,938	46.85	17.86	16	104
urban	117,963	0.50	0.50	0	1
health	121,640	3.00	1.23	1	5
hs	122,786	0.30	0.46	0	1
work	106,540	0.77	0.42	0	1
inclevel	99,853	2.76	1.07	1	5
sociallevel	107,031	2.98	1.08	1	5
duration	146,335	25.50	15.63	0	85
mismatch	77,887	0.00	1.00	-1.30	6.34
familysize	118,560	4.21	2.10	1	21
financefamiliar	126,090	0.37	0.48	0	1
village	137,843	116.40	153.65	0	724

Note: Mismatch is the standardized spousal mismatch index. The number of observations varies across variables due to missing values.

Table 4: Baseline Regression Results

VARIABLES	(1) cesd8	(2) cesd8	(3) cesd8	(4) cesd8
XQ	0.299***	0.103**	0.294***	0.134***
	(0.041)	(0.041)	(0.041)	(0.041)
female		0.648***		0.614***
		(0.041)		(0.040)
age		-0.015***		-0.014***
		(0.002)		(0.002)
urban		-0.470***		-0.301***
		(0.041)		(0.042)
health		0.942***		0.936***
		(0.019)		(0.019)
hs		-0.642***		-0.548***
		(0.042)		(0.042)
work		0.148***		0.093*
		(0.053)		(0.052)
inclevel		-0.191***		-0.251***
		(0.024)		(0.024)
sociallevel		-0.193***		-0.204***
		(0.024)		(0.024)
Constant	5.320***	4.475***	5.322***	4.576***
	(0.025)	(0.120)	(0.025)	(0.121)
Observations	38,367	36,583	38,366	36,583
R-squared	0.001	0.111	0.030	0.137
Year FE	NO	NO	YES	YES
Province FE	NO	NO	YES	YES

Note: Columns (1)–(4) report estimates from four alternative specifications: columns (1) and (2) are OLS regressions without and with control variables, respectively; columns (3) and (4) are fixed-effects regressions without and with control variables, respectively. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Mediation Results and Effect Proportions

	(1) step1 cesd8	(2) step2 mismatch	(3) step3 cesd8
Panel A: Three-step regressions			
mismatch			0.062**
			(0.027)
XQ	0.122**	0.051***	0.118**
	(0.057)	(0.018)	(0.057)
Constant	4.454***	-0.277***	4.471***
	(0.161)	(0.049)	(0.162)
Observations	28,375	28,375	28,375
R-squared	0.141	0.017	0.141
Panel B: Effect decomposition			
Total effect		0.1215	
Direct effect		0.1183	
Indirect effect		0.0032	
Effect proportion		2.63%	
Sobel test (p-value)		0.072*	

Note: Panel A reports the three-step mediation regressions using the same specification as column (4) of Table 4, including the full set of control variables as well as year and province fixed effects. To ensure consistency in the mediation analysis, all three regressions are estimated on the same sample, restricted to observations with valid values of the mediator, mismatch. Panel B presents the effect decomposition: the total effect and direct effect are taken from the coefficient on XQ in Panel A columns (1) and (3), respectively, and the indirect effect is computed as the difference between the total and direct effects. The Sobel test evaluates the statistical significance of the indirect effect. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: Results for marriage duration

VARIABLES	(1) cesd8	(2) Free-love	(3) XiangQin	(4) Free-love	(5) XiangQin
XQ	-0.002				
	(0.103)				
XQdura	0.109*				
	(0.059)				
mismatch		0.077	0.226***	0.012	0.058
		(0.052)	(0.086)	(0.075)	(0.127)
misdura				0.084	0.305**
				(0.072)	(0.123)
duration	0.135***			0.182**	0.248*
	(0.035)			(0.080)	(0.137)
Constant	6.488***	6.222***	5.343***	6.232***	6.405***
	(0.120)	(0.320)	(0.448)	(0.345)	(0.579)
Observations	35,846	5,671	2,195	5,421	1,878
R-squared	0.067	0.082	0.090	0.083	0.095

Note: All regressions include the full set of control variables as well as year and province fixed effects. $XQdura$ and $misdura$ denote interaction terms between duration and XQ and between duration and mismatch, respectively. Column (1) uses the full sample to examine how the effect of XiangQin marriage varies with marriage duration. Columns (2)–(5) restrict the sample to couples married after 2012, as the impact of mismatch becomes weaker in long-duration marriages and we aim to focus on the early years of marriage. Columns (2) and (3) compare the effect of mismatch under free-love versus XiangQin marriages. Columns (4) and (5) further test whether the effect of mismatch evolves with marriage duration within each marriage-formation group. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Heterogeneity Analysis

VARIABLES	(1) rural cesd8	(2) urban cesd8	(3) small family cesd8	(4) large family cesd8	(5) unfamiliar cesd8	(6) familiar cesd8	(7) male cesd8	(8) female cesd8	(9) fewer villages cesd8	(10) more villages cesd8
XQ	0.073	0.135**	0.167**	0.066	0.118**	0.112	0.051	0.183***	0.162**	0.060
	(0.068)	(0.062)	(0.065)	(0.065)	(0.058)	(0.077)	(0.061)	(0.069)	(0.081)	(0.068)
mismatch	0.028	0.109***	0.052	0.072**	0.074**	0.048	0.032	0.089**	0.048	0.050
	(0.034)	(0.031)	(0.033)	(0.032)	(0.030)	(0.038)	(0.031)	(0.035)	(0.040)	(0.034)
female	0.744***	0.518***	0.640***	0.640***	0.618***	0.698***			0.675***	0.636***
	(0.069)	(0.061)	(0.064)	(0.064)	(0.057)	(0.078)			(0.080)	(0.067)
age	-0.002	-0.024***	-0.017***	-0.011***	-0.013***	-0.013***	-0.017***	-0.011***	-0.008***	-0.011***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
urban			-0.353***	-0.283***	-0.254***	-0.387***	-0.221***	-0.400***	-0.272***	-0.274***
			(0.070)	(0.066)	(0.059)	(0.080)	(0.063)	(0.071)	(0.087)	(0.067)
health	0.889***	0.976***	0.974***	0.895***	0.921***	0.968***	0.911***	0.955***	0.943***	0.925***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.027)	(0.035)	(0.029)	(0.032)	(0.037)	(0.031)
hs	-0.559***	-0.506***	-0.559***	-0.464***	-0.464***	-0.561***	-0.431***	-0.598***	-0.534***	-0.489***
	(0.078)	(0.061)	(0.068)	(0.068)	(0.061)	(0.079)	(0.063)	(0.074)	(0.084)	(0.069)
work	-0.264***	0.260***	0.099	0.119	0.116	0.091	-0.086	0.197***	0.222**	0.122
	(0.097)	(0.081)	(0.086)	(0.086)	(0.076)	(0.104)	(0.109)	(0.073)	(0.107)	(0.090)
inclevel	-0.206***	-0.325***	-0.273***	-0.245***	-0.218***	-0.344***	-0.310***	-0.226***	-0.268***	-0.285***
	(0.038)	(0.037)	(0.038)	(0.038)	(0.034)	(0.045)	(0.037)	(0.039)	(0.045)	(0.040)
sociallevel	-0.160***	-0.238***	-0.184***	-0.202***	-0.193***	-0.193***	-0.217***	-0.166***	-0.185***	-0.215***
	(0.038)	(0.037)	(0.037)	(0.038)	(0.034)	(0.044)	(0.036)	(0.039)	(0.045)	(0.039)
Constant	4.249***	4.678***	4.607***	4.451***	4.317***	4.768***	5.039***	4.818***	3.973***	4.371***
	(0.187)	(0.197)	(0.205)	(0.188)	(0.169)	(0.241)	(0.211)	(0.180)	(0.238)	(0.199)
Observations	13,344	15,032	14,911	13,422	17,577	10,413	14,990	13,386	9,022	12,534
R-squared	0.142	0.142	0.142	0.147	0.140	0.146	0.134	0.132	0.157	0.139

Note: All regressions include year and province fixed effects. As for columns (3) and (4), we define the family structure as small if family size is less than four, and vice versa. For columns (9) and (10), if the number of villages in the province where the sample resides is less than the median number of villages across all provinces, this province is classified as "small". Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Regression Results for the Alternative Definition of XiangQin

	(1)	(2)	(3)	(4)
	OLS	OLS+CV	FE	FE+CV
VARIABLES	cesd8	cesd8	cesd8	cesd8
XQ	0.202***	0.029	0.235***	0.087**
	(0.041)	(0.041)	(0.041)	(0.041)
female		0.651***		0.616***
		(0.041)		(0.040)
age		-0.014***		-0.013***
		(0.002)		(0.002)
urban		-0.476***		-0.304***
		(0.040)		(0.042)
health		0.942***		0.936***
		(0.019)		(0.019)
hs		-0.651***		-0.554***
		(0.042)		(0.042)
work		0.152***		0.095*
		(0.053)		(0.052)
inclevel		-0.192***		-0.251***
		(0.024)		(0.024)
sociallevel		-0.192***		-0.204***
		(0.024)		(0.024)
Constant	5.363***	4.481***	5.351***	4.575***
	(0.025)	(0.120)	(0.024)	(0.121)
Observations	38,367	36,583	38,366	36,583
R-squared	0.001	0.111	0.029	0.137
Year FE	NO	NO	YES	YES
Province FE	NO	NO	YES	YES

Note: Columns (1)–(4) report four specifications identical to those in Table 4. The newly defined XQ restricts the sample to couples married after 2012 and further excludes parent-arranged marriages, thereby providing a stricter definition of XiangQin marriage. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix A Derivations

Begin from the mismatch formation model, we can get the expression for v.

$$v = z - (\lambda q + \eta m), \quad \theta_t(m) = 1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t}$$

Replace v and θ_t in the z^R with equations above.

$$z^R = \lambda q + \eta m + [1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t}][z - (\lambda q + \eta m)]$$

Then, replace z^R in the MH_t with the equation above.

$$\begin{aligned} MH_t &= \alpha + \beta[\lambda q + \eta m + (1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t})(z - (\lambda q + \eta m))] + \zeta_t \\ &= A - \beta(1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t})(\lambda q + \eta m) + \beta(1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t})z + \zeta_t, \quad A = \alpha + \beta(\lambda q + \eta m) \end{aligned}$$

To focus on the effect of mismatch from those unobservable characteristics, we further use $A_t(m)$ instead of A.

$$MH_t = A_t(m) + \beta(1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t})z + \zeta_t, \quad A_t(m) = \alpha + \beta(\lambda q + \eta m) - \beta(1 - \mathrm{e}^{-(\tau_0+\tau_1 m)t})(\lambda q + \eta m)$$

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