The Interrelationship Between Migration and Family Behaviours

Internal Migration within China and International Migration from China to the U.S.

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To my parents, Hongming and Zhaonan.

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Abstract

The dissertation investigates the interrelationship between migration and family behaviours, marriage and fertility, in the Chinese context. I apply event history techniques using data from an ethno-survey, several national-level censuses and population sample survey. Chapter 2 explores the effect of international migration on marriage chance for males and females separately. Chapter 3 studies how international migration affects fertility under the condition that the country of origin experienced strong family policies, e.g., the one-child policy. Chapter 4 explores how spousal separation due to migration affects marital fertility at couple level. The dissertation adds an interesting country case of understanding the interrelationship between migration and family events. Moreover, it accounts for the correlation between events due to unobserved characteristics. Lastly, it emphasizes the importance of socio-economic status in shaping the migration and family dynamics.

Resum

La investigació tracta la interrelació entre la migració i els comportaments familiars, el matrimoni i la fertilitat, en el context xinès. S'apliquen tècniques d'història de l'esdeveniment, mitjançant l'ús de dades d'una enquesta etnogràfica, diversos censos de nivell nacional i enquestes de mostres de població. El capítol 2 explora l'efecte de la migració internacional sobre la possibilitat de contraure matrimoni tant per a homes i dones. El capítol 3 estudia com la migració internacional afecta la fertilitat, en aquelles persones que el seu país d'origen tingui polítiques familiars fortes, per exemple, la política d'un únic nen a la Xina. El capítol 4 explora com la separació conjugal causada per la migració afecta la fertilitat a nivell de parella. La investigació afegeix un cas interessant per a la comprensió de la interrelació entre migració i esdeveniments familiars. A més, representa la correlació entre els esdeveniments a causa de les característiques no observades. Finalment, l'estudi destaca la importància de l'estatus socioeconòmic en la configuració de la migració i la dinàmica familiar.

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Chapter 1

INTRODUCTION

China is the most populous country in the world. Its population accounts for about 18.5% of the world's total population[1]. In 2016, the Chinese population was characterized by delayed marriage and a very low total fertility rate of 1.6 children per woman, even after the one-child policy had been abolished. On the one hand, strong family policies like the "later-longer-fewer" and the one-child policy promoted late marriage, late first birth, longer birth intervals, and smaller family size. On the other hand, rapid economic growth might have ushered in modern family values. According to modern family values, marriage and giving birth(s) is not the only way of constructing a family. Living in a small family might be a nice choice in a society with very high costs of getting married and raising a child. Lifetime singlehood and childless is no longer unacceptable, as it was in traditional society. Family policies and socio-economic development have made the country a unique case in family dynamics.

Migration adds another layer of complexity to this demographic situation. Today, one-quarter of the world's 500 largest urban areas are located in China due to huge rural-to-urban migration[2] even though *hukou* policy limits internal migrants' access to social welfare. Since the 1980s, the population in the eastern coastal ar-

[1]Countries in the world by population (2018), Worldometers.
[2]Karen C. Seto.(2007). Urban Growth in China: Challenges and Prospects.

eas has become a potential stage for international migration to more developed regions like the U.S., Europe and elsewhere in East Asia. This international migrant flow consists of labour migrants who have likely arrived without legal documents and rarely return to China.

In spite of the mass internal and international migration flow, a unique family policy and dramatic economic growth, which brings with it modern family values, e.g., later marriage and childbearing, the interrelationship between migration and family dynamics is still an under-researched topic. Migration, marriage, and fertility are interrelated events for the Chinese. A potential migrant would typically make decisions on all three of these events in their early twenties. Their timing, therefore, is very similar, not to mention the fact that some migrants even experience more than one of these three events in the same year. Moreover, the simultaneity or interrelationship between these events signifies the importance of the socio-economic status of the migrant and migrant household. This is because all three events can entail high costs, physically and emotionally.

The aim of this thesis is to understand how both internal and international migration affects family behaviours. The research questions are as follows.

(1) how does international migration affect marriage?

(2) how does migrating to the U.S. affects fertility in the context of China's family policies?

(3) how does spousal separation and reunification due to internal and international migration affects marital fertility?

To answer the first research question, I conducted a study by gender on Fujianese who had migrated from rural areas to the U.S. during the period 1978-2000. The empirical analysis in response to the second research question is focused on Chinese international migrants to the U.S. during the period 1965 - 2005. I answer the third question by studying Chinese internal and international migrants from Fujian province, who were born between 1950 and 1980.

Chapter 2 and 3 is focused only on international migration, while Chapter 4 approaches internal and international migration as separate processes and draws comparisons between the effects of spousal separation due to these two types of migration on marital fertility. Both internal and international migration might result in the couple's geographical separation and depress marital fertility, but the

dynamics and determinants behind are very different. Internal migration within China means there is less distance between partners and more frequent visits home. Moreover, internal and international migrants face different migration policies, labour markets, marriage markets and language environment at the destination. It might take longer for international migrants to adapt to the environment at the destination because of a lack of language proficiency or network support. International migration entails higher costs. For example, international migrants from Fujian province might need to pay a smuggling fee to facilitate their migration (Liang and Miao, 2013). Furthermore, internal and international migrants might be selective based on different socio-economic status. It seems that education is a more important determinant of internal migration than of international migration from Fujian (Liang and Miao, 2013).

In Chapter 2, I ask how migration affects marriage timing by gender. Furthermore, marriage timing possibly has a substantial effect on fertility. International migration is a gendered behaviour, so migration and marriage dynamics for males and females must be modelled separately. Socio-economic factors are important for marriage chances. This is because culturally, marriage is costly for Chinese families, on the groom's side. International migration to the U.S. is another high-cost household investment. Migration might be a sign of a better socio-economic status and thus may lead to earlier marriage or improved chances of getting married. However, it might also lower the chances of marriage for those with limited human resources, e.g., low educational attainment.

As international migration affects marriage, it might have a substantial effect on fertility outcome. In Chapter 3, the result of collaborative work with Dr. Pau Baizán, we ask how international migration affects fertility in the China-U.S. migration system. In this context, the country of origin implemented a strict family planning policy as of the mid-1970s. Meanwhile, the country of destination granted birthright citizenship which provided migrants who gave birth in the U.S. opportunities to attain legal immigration status (Lindstrom and Giorguli Saucedo, 2007). Hwang and Saenz (1997) proposed the "emancipation hypothesis", which argues that the fertility of Chinese women was kept low by China's family policy and would bounce back after they migrate to the U.S.. We elaborate on this hypothesis and compare the fertility outcome of Chinese international migrants with

non-migrants who were subject to different family planning policies in China by province of residence, *hukou* status (rural or urban), sex of the first child, etc. This paper also sheds light on the interrelationship between international migration and fertility. Moreover, it adds to our understanding of migration adaptation and disruption theories. The China-U.S. international migration case is particularly interesting in studying migration adaptation theory because the total fertility rate of the destination country surpassed that of the origin country in the mid-1990s.

When studying the effect of migration on fertility, I learned that the disruption effect of migration on fertility partly comes from the physical separation of the couple. Spousal separation due to migration might have a significant effect on preventing births because Chinese international migrants rarely return. Mathematical estimation of the effect of spousal separation on marital fertility was given by Menken (1979), Bongaarts and Potter (1979) and Millman (1984), however, empirical evidence is still scarce. In Chapter 4, I study how spousal separation due to internal and international migration affects marital fertility at the couple level. This paper sheds light on the disruption effect of spousal separation and catch-up effect of spousal reunification on marital fertility. Moreover, it shows how couples' employment status is related to their living arrangement. Lastly, it illustrates how household income is an important component in the positive covariance between spousal separation and marital fertility.

The innovative addition to the literature of this thesis is the application of existing theories of family transitions and migration in a less studied context; internal migration within China and the China-U.S. migration system. This paper studies in detail how the Chinese migration to U.S. and internal migration is linked to family formation. The results show that this link is context-specific. It can be very different than in previous studies such as Mexico-U.S., etc. China is an interesting context to study migration and family events because of its vast and rapidly increased internal and international migration flow during the 1980s and 1990s, unique family policies, e.g., the one-child policy, fast-declining fertility levels which were even below those of the U.S. after the mid-1990s, and changing family values.

The introduction section is structured as follows. Firstly, I present a review of theoretical frameworks and gaps I am planning to fill. Secondly, I describe the two

unique data sources employed in this dissertation which provide rich individual-level data on Chinese internal and international migration. Lastly, I provide a summary of the three articles.

1.1 Theories, Mechanisms, and Existing Gaps

1.1.1 How Marriage and Migration Processes Affect Each Other?

Theoretically, the causality between migration and marriage may run in both directions, i.e., from marriage to migration and the other way around, because each process could shed light on the other. According to Kulu and Milewski (2007), both processes are "parallel careers" in a person's life time. They may also interact with each other. Stark (1988) argues that migration and marriage affects each other because of the significant interaction between labour markets and marriage markets and that finding a match in the labour market would also influence the outcome in the marriage market. On the other hand, marriage could be a way for women to gain access to the urban economy (Rao and Finnoff, 2015) and urban *hukou* (Fan and Huang, 1998) through migration.

Jang et al. (2014) argue that there are contradicting theories on the effect of migration on marriage. One argues that migration would improve marriage chances (Oppenheimer, 1988). The other illustrates that the temporary effect of migration on marriage might be negative, since individuals need time to adjust to a new environment. This is known as the disruption theory (Jampaklay, 2006). The mechanisms through which migration affects marriage positively are improved socio-economic status (Cadwallader, 1992) and a wider marriage market at the destination (Oppenheimer, 1988). When migrating for marriage reasons, international migrants might find a partner with a similar education level or trade their higher education for better living conditions through marriage migration (Çelikaksoy et al., 2006). It seems that achieved socio-economic status, e.g., education, is more important in the marriage market than ascribed status, when it comes to marriage decision-making process (Kalmijn, 1998; Hooghiemstra, 2001). Furthermore, migration extends the pool of marriageable candidates because migrants can search outside of the local marriage market (Jampaklay, 2006), as in the case of internal

migration in Thailand.

Migration might also lead to poorer chances of marriage. For example, individuals postpone marriage until after migration if being married prevents such migration (Stark, 1988). Migrants move to a location where the marriage market may be very different, in which he/she may be disadvantaged or have little chances of getting married. For international migrants, if marriage at the destination is culturally and ethnically segregated, an unbalanced sex ratio of co-ethnics can be a problem for the migrant population. On the other hand, migrants are not cut off from the country of origin's marriage market. In many cases, migrants "import" partners from the country of origin to Belgium (Lievens, 1999). A more balanced sex ratio among the ethnic group means less of a need to import partners from the country of origin to Germany (González-Ferrer, 2007). The decision between importing a partner and marrying a native depends on one's degree of integration: weak integration with the social environment would affect the probability of marriage migration (Hooghiemstra, 2001).

Studies on the effect of marriage on migration often distinguish between two scenarios, whether both partners live in the country of origin or one has already been living in the destination country. In the first scenario, marriage reduces the chances of migration because it represents ties with the origin country and a higher opportunity cost of leaving jobs and obligations at the origin country (Mulder and Wagner, 1993). However, the relationship between marriage and migration is reversed after accounting for a synchronized event of getting married and migrating simultaneously, in the case of internal migration in Germany (Mulder and Wagner, 1993). In the second scenario, marriage might mean later family reunification or "living apart together across borders" (González-Ferrer, 2007).

The empirical evidence on the effects of migration on marriage provides mixed conclusions. The effect might differ by gender: in France, migration delays marriage for females but increases nuptiality for males (Courgeau, 1989). Landale (1994) found that Puerto Rican female migrants to the U.S. marry earlier than non-migrants. In the Mexico - U.S. migration context, Raley et al. (2004) showed that Mexican migrants to the U.S. marry earlier than non-migrants in Mexico, but U.S.-born Mexicans are less likely to marry than non-Hispanic white U.S. citizens.

Socio-economic status is closely related to the chances of both migration and marriage. Mate selection process follows educational assortative matching like that in the labour market (e.g., Kalmijn (1991)). Males with higher socio-economic status have an advantage in the marriage market, since the opportunities of marriage are fewer if the labour market is unstable (Oppenheimer, 2003). Migration increases Mexican men's marriage chances after returning to their origin communities due to their improved economic situation, e.g., higher wages due to labour migration (Parrado, 2004).

Migration, migration policies and anti-immigrant sentiment lead to increased migrant singlehood or delayed marriage. For example, in the U.S., rising female labour participation rates in Mexico and family migration strategies lead to a higher chance of Mexican migrants remaining single (men in particular) in the 1980s than in the 1970s (Dávila and Mora, 2001). Migration might also lead to delayed marriage for adolescent girls through two mechanisms. First, migration empowers girls to choose their marriage timing. Second, family elders lose control over the girls' decision-making process, in the case of Mali internal migration (Hertrich and Lesclingand, 2012). On the other hand, the simultaneity between marriage and migration is not negligible. The negative effect of marriage on migration was reversed after introducing a synchronized variable "marrying", i.e., marry and migrate in the same year, in Germany (Mulder and Wagner, 1993).

Regarding the effect of marriage on migration, in the context of international migration from Puerto Rico to the U.S., Ortiz (1996) found that unmarried women are more likely to migrate than married women. Using a West German sample, Mulder and Wagner (1993) confirmed that married individuals are more committed to the local environment and have strong local ties, so they are less likely to migrate than unmarried ones, but this is true only for long-distance migration. Taking Anhui and Sichuan provinces as examples, Roberts, Connelly, Xie, and Zheng (2004) found that single women migrated internally before the mean age of marriage, while married women migrated after the mean age of marriage, implying that marriage does not prevent internal migration.

However, not many studies have analysed the effect of migration on marriage by gender. A few exceptions include Courgeau (1989), Cerrutti and Massey (2001), **?** and Jampaklay (2006). Also, numerous factors have the opposite effect

on family behaviours by gender (Courgeau, 1989). Moreover, male and female fertility responds differently to employment status (Nedoluzhko and Andersson, 2007). These non-symmetrical gender roles might exist in marriage and fertility in response to migration and the socio-demographic context, which is another existing gap to be filled.

1.1.2 How Migration and Fertility Affect Each other?

Research on migration and fertility treats fertility as the dependent variable and migration as the independent variable. The two common mechanisms linking these two events are disruption and adaptation, (Lindstrom and Giorguli Saucedo, 2007). Except for selectivity theory, which was mentioned in section 1.1.1, there are three other central theories related to migration and fertility studies: disruption, adaptation and emancipation. The disruption hypothesis states that fertility is temporarily depressed by migration due to spousal separation or temporary economic difficulties but recovers afterward (Lindstrom and Giorguli Saucedo, 2007). The adaptation theory argues that a migrant's fertility level would converge with that of the destination natives as the length of their stay increases (Milewski, 2007). This is because migrants can adapt to the new economic, cultural and social environment (Andersson, 2004; Hervitz, 1985). The emancipation theory states that the fertility of migrants from a country with strong birth control policies should bounce back after international migration because of the absence of these kinds of policies, using evidence from the Asia-U.S. migration case (Hwang and Saenz, 1997).

Studies on the effects of migration on fertility have explored the disruption and adaptation hypotheses and proposed the emancipation hypothesis in the China-U.S. context. Regarding the disruption theory, migration leads to delayed marriage, spousal separation, reduced fecundity and postponed births (Lindstrom, 2003). Moreover, women who undergo geographic movement between marriage and births presented longer birth intervals, which implies disrupted fertility due to migration (Goldstein and Goldstein, 1983). The disruption effect of migration on fertility may come in the form of lower fertility of Mexican-origin first-generation migrants compared with natives in the U.S. (Stephen and Bean, 1992),

lower fertility of recent migrants compared with others who have stayed for more than 5 years in Australia (Abbasi-Shavazi and Mcdonald, 2000), reduced birth rates in the short-term due to spousal separation (Lindstrom and Saucedo, 2002), and longer birth interval of migrants compared with non-migrants (Jensen and Ahlburg, 2004).

The adaptation effect of migration on fertility holds in Malaysian internal migration (Goldstein and Goldstein, 1983), Thailand (Goldstein and Goldstein, 1981), Mexico-U.S. migration (Lindstrom and Giorguli Saucedo, 2007; Lindstrom and Saucedo, 2002; Stephen and Bean, 1992), the Hispanic population in the U.S. (Parrado and Morgan, 2008), and Philippine internal migration (Jensen and Ahlburg, 2004). On the other hand, there is evidence of incomplete adaptation or cultural maintenance. For example, Italian and Greek Australians do not fully adapt to the fertility norms in their destination country (Abbasi-Shavazi and Mcdonald, 2000). Bledsoe (2004) also illustrated that migrants' fertility would not assimilate to that of Europeans until their status became secure.

Unfortunately, though many studies contributed to the understanding of the effect of migration on family behaviours, little has been determined regarding the Chinese context. This is surprising considering China's unique culture related to migration and family behaviours, particular family policies, changing fertility intentions, rapid demographic transition, increasing urbanisation, out-migration, and large population. All these characteristics can provide promising opportunities for future research that addresses the interrelationship between life events. Spousal separation, however, a form of migration disruption, calls for more attention. Its impact on fertility can be substantially different from, for example, temporary economic difficulties after migration. It is interesting to rethink the disruptive effect of migration on fertility from an innovative framework of couples' living arrangements when data on both partners are available.

Studies on the effect of fertility on migration yields mixed results. The classic mobility model suggests that age, homeownership and fertility influence the likelihood of migration (Clark and Withers, 2009). Having children means more family ties, which would depress the probability of migrating. Clark and Huang (2003) found that for the London area, a birth does not trigger a move, but at the national level in the UK, households are more likely to move after the first birth.

However, this triggering effect is only significant in a longitudinal model.

1.1.3 The Interrelationship Between Migration, Marriage, and Fertility

The empirical analysis of the interrelationship between migration, marriage, and fertility relies on theories in the life course approach. Social changes during the 1960s prompted questions on the interrelationships between one's life history, cohort, and historical context (Mayer and Tuma, 2003). To better understand the interaction between social change and individual development, the life course approach studies one's "parallel career", which involves different life domains of the same individual (Kulu and Milewski, 2007). It also studies the changes in the life of other members in one's social network, known as the "linked life" (Elder et al., 2004). Empirical studies following the life course approach go beyond the assumption that life events in one domain are independent of events from other domains. This thesis looks at the interaction between one's different decision-makings processes, i.e., regarding migration, marriage and fertility.

Marriage, migration, and fertility are interrelated events and part of the same family formation process (Kulu and Milewski, 2007). Four mechanisms emerge in support of the existence of a correlation between these events. The first mechanism is that the events are similar in terms of timing. Second, one of the events could serve as motivation for another. Third, one event could be an instrument for others. And lastly, some unobserved heterogeneity might lead to a higher likelihood of both migration and certain family behaviour.

First, empirical evidence has shown that the timing of the three events is very similar. For example, the first year of migration is related to higher chances of entering a union and then a higher likelihood of having a first-born in the context of Guatemala rural-to-urban migration and Mexico-U.S. migration (Lindstrom, 2003; Lindstrom and Giorguli Saucedo, 2007). Andersson (2004) and Milewski (2007) found similar patterns of migrants presenting a higher level of fertility shortly after migration in Sweden and Germany.

Second, migration, marriage, and fertility are correlated events, particularly if one of them is motivation for another. For example, migration motivated by mar-

riage increases fertility immediately after settlement in Kyrgyzstan (Nedoluzhko and Andersson, 2007). Fertility could be motivated by marriage migration, too: females who moved due to union formation showed an elevated first birth rate in Austria and Poland (Kulu, 2006).

Third, one of these interrelated events sometimes serves as an instrument for others. Females might move to marry: a substantial share of rural-to-urban movement in India and other developing countries involves female migrants moving for marriage reasons to mitigate income risks and reduce household food consumption (Rosenzweig and Stark, 1989). Marriage migration happens either when people migrate for marriage reasons or the other way around, which implies the nature of instrumental events. In the UK, the logic behind marriage migration ranges from social mobility maximisation to opportunities for travel (Charsley et al., 2012).

Lastly, some constant unobserved heterogeneity leads to the selectivity of a particular marriage rate or fertility level for migrants. Unobserved heterogeneity is an example of where correlations between observables and unobservables can be expected (Arellano, 2003). Arellano (2003) explained that longitudinal data would help to control for correlated, time-invariant heterogeneity, without observing it. An example of the possible time-invariant, unobserved heterogeneity is value orientations, which may lead to the interrelation of events like cohabitation, marriage and first births (Baizán et al., 2003). Unobserved heterogeneity might drive up the likelihood of both migration and marriage; omitting this positive component leads to an upward biased estimation of the effect of migration on family behaviour, in the U.S. (Jang et al., 2014).

Theory on interrelationship between migration and fertility, or the migrant selectivity hypothesis, argues that migrants are self-selected for certain observed characteristics, e.g., education (Goldstein and Goldstein, 1981), and unobserved characteristics, e.g., fertility aspiration, which suggests a certain fertility level (Chattopadhyay et al., 2006). As fertility and educational attainment are negatively related, a difference in the educational composition of migrants and non-migrants might well account for the observed selectivity of rural-to-urban migrants on fertility in Thailand (Goldstein and Goldstein, 1981). A recent study comparing fertility of Ghanaian migrants with non-migrants confirmed the im-

portance of education in explaining the lower fertility of migrants(Wolf and Mulder, 2018). Regarding fertility aspiration, Lindstrom and Giorguli Saucedo (2007) suggests that settled migrants are selective of lower fertility due to a different family size preference. This selectivity of migrants on lower fertility intentions might stem from a desire to achieve upward social mobility (Macisco et al., 1969).

Goldstein and Goldstein (1983) argued that the interrelationship between migration and fertility differs across cultures: rural-to-urban migration means lower fertility for a Chinese person while it is the opposite for an Indian. Mexico-U.S. temporary migrants are selective of higher fertility since returning migrants presented higher fertility in Mexico (Lindstrom and Saucedo, 2002). This is the opposite in Peru and Guatemala: in Peru, unmarried women and women with fewer children are more likely to move (White et al., 1995). Lindstrom (2003) confirmed that rural-to-urban migrants in Guatemala are selective of some characteristics associated with lower fertility.

The thesis involves different types of comparison, for example, a comparison between migrants and non-migrants, internal and international migrants, and men and women. Migrants and non-migrants differ in the migration experience in that migrants have, at some stage, been away from their village of origin, while it is the opposite for non-migrants. The comparison between migrants and non-migrants allows us to estimate the effect of migration status, i.e., migrated or not, on family behaviour. Internal migrants refer to those who move to another village and stay there for more than 3 months with or without *hukou* at the destination, while international migrants refer to those who migrate to the U.S. for more than 3 months. The comparison of family behaviours for internal and international migrants would shed light on the different effects of these two types of migration on marriage and fertility. The analysis of the gendered perspective on migration and family behaviour would contribute to our understanding of the different opportunities for men and women and the power structure between them when making decisions regarding migration and family events. Migration and family behaviours are linked at the micro-level according to the data structure and the analysis unit is person year.

In terms of methodology, the "Special Collection 6: Interdependencies in the Life Course" collected in Demographic Research, volume 17 edited by Hill

Kulu and Nadja Milewski highlighted the importance of understanding individual life trajectories in the life-course approach, applying (multilevel) event-history techniques. The principles of the life course approach include timing, linked lives, time and place, life-span development and agency (Lindstrom and Giorguli Saucedo, 2007; Elder et al., 2004). This life-course approach benefits from longitudinal data thus avoiding poor measurements when the outcome precedes the change in covariates recorded by the survey time (White et al., 1995). It seems that the identification of an interrelationship between migration, marriage, and fertility depends on a set of controls included in the analysis. The set of controls depends on data availability, ideally, longitudinal data with complete life trajectories.

However, more refined answers are needed, since movement is better described as diverse than dichotomous, as are family structures (Clark and Davies Withers, 2007). It is worth exploring different forces driving fertility, for example, the short-term and long-term cultural, institutional and economic factors (Kulu and Milewski, 2007). Furthermore, there is hardly any consensus on the existence of selectivity of migrants on family behaviours. Kulu (2005) and Jensen and Ahlburg (2004) found little evidence to support strong migrant selectivity on fertility preference for Estonian women born from 1944 to 1973 and women from the Philippines, respectively. Moreover, it remains interesting to explore what the interrelationship between these events would be if we controlled for different sets of socio-demographic factors, e.g., socio-economic status, and which factors might have driven the selectivity of migrants on family behaviours. Lastly, as suggested by the principle of "linked lives", married men and women's migration and family decision-making is interdependent (Elder et al., 2004; Lindstrom and Giorguli Saucedo, 2007). This calls for more efforts to analyse family dynamics at the couple level.

1.2 Migration and Family Behaviour in the Chinese Context

Internal temporary migration, or the floating population (Liang and Miao, 2013)[3], was characterised by male labour migration and female marriage migration. These two types of migration flow significantly increased during the period of transitional economy. Until the 2010s, the reform of the *hukou* system was only successful in small towns where it is easier to implement, but not in big cities where *hukou* policies restricted the floating population from access to social benefits like education and healthcare (Liang and Miao, 2013). Fan (1999) argued that internal migration resulted from a combination of state-planned migrations and market mechanisms during the socialist transitional economy period in the 1990s. There is complementarity between cities and villages as sending regions: cities send human capital, i.e., highly educated labour, while villages provide workers (Liang and Miao, 2013).

During the 1990s, planned and non-planned migration mechanisms in the form of "job transfers" (with *hukou*) and "industry/business" (without *hukou*), selected heterogeneous migrants into centres of economic growth and labour-intensive production locations (Fan, 1999). By 2000, the eastern coastal area, especially Guangdong, received the largest floating population (Liang and Miao, 2013). Internal migration is gendered: male migration is strongly related to work, while women normally migrate for social reasons (He and Gober, 2003), for example, marriage. Female marriage migration reflected a strong economic rationale as women could gain local *hukou* through marriage and internal migration (Fan, 1999; Fan and Huang, 1998). Labour migration is also gendered: while heavy industries attract male labourers, light industries draw women (Fan, 2007; He and Gober, 2003).

The literature on international migration from China highlights how globalisation has connected the Chinese transnationally and across the wide scope of destination countries (Pieke et al., 2004). Kwong (1997) argued that illegal Chi-

[3] According to Liang and Miao (2013), floating population refers to temporary migrants, who, unlike permanent migrants, had not changed their household registration (also called *hukou* in Chinese), normally from rural to urban status.

nese migrants in the U.S. should be understood from a labour market perspective, which involves employers' demands for cheap labour. Chin (2003) described the mass irregular migration flow from China, mainly from the Zhejiang and Fujian provinces, to the EU, which began in the 1980s, as perhaps the largest irregular migration flow from East Asia. Let us take Spain as an example. It is estimated that about 50,000 Chinese nationals landed in Spain before reaching other EU countries as tourists in the 1990s, through fake marriage or trade delegations. It raised concerns over competition between restaurants, human trafficking, slave labour, etc. (Chin, 2003). Concerns for a slowdown in migrant assimilation are negated by the pro-integrationist stance of immigration organisations and sending-country officials (Portes and Zhou, 2012).

From the sending country perspective, the selectivity of international migrants from Fujian, the leading sending province, shifted from urbanites to rural dwellers (Liang, 2001a). Positional power, i.e., if a household member is a cadre, plays an important role in sending a family member abroad (Liang et al., 2008). Together with labour capacity, migrants from Canton and Fuzhou brought religious beliefs like Buddhism, Daoism, etc, into Chinatowns in the U.S. (Guest, 2003). China's diaspora strategy for Chinese international migrants shifted from granting privileges in the 1970s to calling upon new migrants' cultural loyalties in the 1980s (Thunø, 2001). In response to human trafficking, the Chinese government tightened and formalised its passport policy (Chin, 2003). Private agents should be considered as part of Chinese governance rather than autonomous entities, who are needed by the Chinese government to make migrants manageable, protectable and agents punishable (Xiang, 2012).

Internal and international migration are sometimes linked events. International migration might happen after internal migration or the other way around. The development of transportation infrastructure and professionalization of Chinese labour has made migrating to Europe "the same as going to Fuzhou, Xiamen, Beijing or Shanghai" (Thunø et al., 2005). This implies that the skill and experience that earn migrants a life in the big cities in China could be very similar to the skills needed to migrate and live in Europe as Chinese migrants in Europe usually do in low-paid, menial jobs (Thunø et al., 2005). These similarities in migration make international migration following internal migration plausible.

Many studies have explored family behaviour, e.g., marriage and fertility, in China with particular focus on its unique culture and family policies. Fan and Huang (1998) study marriage migration among female internal migrants aiming to obtain the local *hukou* at their destination city. There have been debates over the driving forces of fertility after the 1980s in China. Gu et al. (2007) argue that the one-child policy remains to the core element and continues to influence demographic trends. Cai (2010) added that socio-economic development would be crucial in driving down the total fertility rate. Other relevant studies that draw similar conclusions include Bongaarts and Greenhalgh (1985) and Goodkind (2017), etc. These studies found the rapidly declining fertility in China to be a result of both socio-economic development and fertility control policies. However, little empirical work was done on the intersection between migration, especially international migration and family behaviours.

In this thesis, for family behaviour like marriage and fertility, both total fertility and marital fertility, are covered. Unmarried cohabitation, on the other hand, could be a strategy to postpone marriage in a context where both marriage and international migration is costly. Unfortunately, unmarried cohabitation is not discussed in this thesis mainly due to a lack of data. For example, in the newest national census 2010, marital status is categorized as unmarried, married, divorced and widowed (National Statistics Bureau). The absence of a separate category of unmarried cohabitation makes it impossible to differentiate unmarried cohabitation from unmarried or married. The revised version of the "Law of Marriage" in 2001 stated that all individuals who want to marry should be registered as "married", which excludes unmarried cohabitation from the system of legitimate marital status. This implies that property rights and child custody, among others, of unmarried cohabiting couples, are not fully protected by the "Law of Marriage".

In China, marriage timing might be determined by the groom's economic situation since self-sufficiency is considered a premise for marriage, similar to the logic in Mexico (Parrado, 2004). In this scenario, both marriage and migration are perceived as costly in China. Though marriage cost varies according to socio-economic status, geography and culture, it could be a heavy burden for some families, especially that of the groom, who is normally supposed to pay the bride price and provide housing (plus car) for the newly established family. An anec-

dotal "National Bride Price Map" shows that the average bride price for Fujian province, the region of origin for some migrants studied here, can be as much as 39,000 euros, which is the country's highest.[4] International migration from Fujian to the U.S. is also very costly, and it is therefore very difficult for a family to support more than one member's migration during a short period of time (Liang and Miao, 2013). In this scenario, it is likely that a budget-constrained family will have to decide which event they will opt for, or which to happen first, if both are desirable. Decision-making when it comes to migration and marriage are not independent but there are correlations.

China's total fertility rate has declined dramatically since the 1960s. This is a result of the interaction between strong family policies and socio-economic development (e.g., Cai (2010)). Chinese couples responded to the institutional changes, for example, the enactment of the one-child policy, and calculated the costs and benefits of having children given such a fertility policy (Greenhalgh, 1988). The existence of family policies that depress fertility has given rise to the "emancipation" hypothesis. This argues that migrants have been freed from the surveillance of the one-child policy and, therefore, have the full number of children they desire (Hwang and Saenz, 1997). This full number of children is normally higher than that allowed by China's family policies. This hypothesis was tested under the condition of both international migration to the U.S. (Hwang and Saenz, 1997) and rural-rural migration within China (Yang, 2000). The first birth was delayed due to temporary migration, and rural-rural migrants within China take advantage of the loophole in family policies that aim to reduce fertility (Yang, 2000). Goldstein et al. (1997), on the other hand, found that though Chinese rural-to-urban migrants are assumed to be free from family planning surveillance, they do not present higher fertility levels than non-migrants.

International migration from China to the U.S. is the main topic discussed in this thesis. Internal migration within China serves as a different case as compared with international migration in terms of its implications on spousal separation and marital fertility, as discussed in Chapter 4. Song and Liang (2016) presented three themes of research which linked internal and international migration. First, mass

[4]The urban and rural per capita disposable income for Fujian residents was 5466 euros and 2308 euros in 2018.

emigration resulted in internal immigration filling in the labour vacuum (De Haas, 2000). Second, internal and international migration are two competing events which share similarities and show differences (Bohra and Massey, 2009). Lastly, migrants move internally within the destination countries after international migration (Borjas, 2006).

The literature on both types of migration could be linked in the Chinese context, partly because both internal and international migration flows increased significantly after China's 1978 economic reform. International migration from Fujian province during the 1980s and 1990s (Liang, 2001a), which was a time of substantial and sustained rural-to-urban migration and urbanization (Liang, 2001b). Studies in the Chinese context linked the two types of migration by comparing the different selectivity of migrants, for example, socio-economic status (Liang and Miao, 2013), and showing the increased likelihood of migrating internally for emigrant related households because of enhanced economic profiles (Song and Liang, 2016), etc.

1.3 Dataset, Case Selection and Methodology

This dissertation benefits from several data sources for studying migration, marriage and fertility in the Chinese context: the micro-level data of China's 2000 Census, the U.S. 2000 Census and the 2005 American Community Survey by IPUMS, data from China's 2005 1% population survey and the Chinese International Migration Project, provided by Professor Zai Liang.

The U.S. and Chinese 2000 censuses, 2005 American Community Survey and China's 2005 1% population survey provide retrospective data on fertility for first- and 1.5-generation migrants (people who migrated before age 15) and Chinese non-migrants. Applying the "own-child method", children and mothers are merged in all datasets. The own-child method uses data on the mother and the co-resident children from the household survey or census (Coleman and Dubuc, 2010). It assumes that the number of children recorded is equal to the number of all children born to the mother in the household, and still alive. Only those cases where the number of marital children matched the number of children born are included in the analysis to avoid biases coming from, e.g., children moving out of

the household.

A nice feature of China's 2000 Census and the 2005 1% population inter-census sample survey is that it provides information on the province of residence and sex of each child for non-migrants. This allows certain conditions to be identified which, once met, mean that a second child can be granted according to the time-varying family policies at province-level in China. Since migrants and non-migrants were from different data sources and sampled with different frameworks, we applied exact matching to attain a comparable population of migrants and non-migrants. This large-scale national census data is a powerful tool for understanding the migration and fertility behaviour of a country with a population as large as China's. To the best of our knowledge, these are also among the newest micro-level datasets to understand the fertility behaviour of women born between 1950 and 1990 who have experienced a number of changes in family planning policies since the 1970s, for example, the "later-longer-fewer" and the "one-child" policy and its later changes.

The Chinese international migration project adopted the ethno-survey approach as per the Mexican Migration Project. The survey covers internal and international migration from Fujian province, which is located in Southeast China. International migrants from Fujian province has increased dramatically over the past decades. Most of the migrants are undocumented, to more developed destinations, such as New York City (Liang et al., 2008). The survey design was to select 8 towns in northeastern Fujian, where many Fujianese immigrants in New York City came from, and 4 villages were systematically sampled from each town. Within each village, 50 households were sampled applying the systematic sampling method. For each household, one member was interviewed, usually the household head or his/her spouse. Also, 25-40 migrants were interviewed from each of the 8 towns in New York City. This is a representative sample of the population in the sending region. The survey design follows the tradition of the Mexican Migration Project, enabling findings based on this survey to be compared with other migration flows in the world (Liang et al., 2008). A detailed description of this data source can be found in Liang et al. (2008).

The project provides information on internal and international migration histories, marriage and fertility, socio-economic status, e.g., up to 6 changes of occupa-

tions in Fujian and New York. The project includes a household and community survey in Fujian, the province of origin, and at the destination, New York City. The household survey covers socio-demographic information for both migrants and non-migrants. The complete history of marriage, fertility, and changes of occupation is available for the household head and their spouse. Migration histories are available for up to two-time internal and international migrants.

One of the key variables, migration status, is coded as 0 if the person is a non-migrant at that given year and age, and 1 if the person has migrated internally or internationally. Marital status is coded as 0 if the person has never married, and 1 if she/he is married. Only first-time marriage is considered. We follow a woman's fertility until her third birth, and for each birth order, the variable of fertility is coded as 0 if the birth order is not observed, and 1 if this is not the case.

The Chinese internal and international migration covered in this dissertation differs from other migration systems like Mexico-U.S. and Africa-Europe in that the countries of origin and destination do not share borders, nor are they even close to each other. This geographical remoteness means higher migration costs, less cultural similarity and lower visit frequency. In terms of family dynamics, the country of origin experienced rapid economic growth and enacted strong family planning policies favouring late marriage and smaller family size. China's TFR dropped from more than 6 in the 1960s to 1.62 in 2016, which could be among the rapidest declines in the world. Understanding the effect of migration on family behaviours would shed light on the effectiveness of family planning policies since international migrants are no longer subject to Chinese policies. Moreover, rapid economic growth might well bring down fertility intentions even without strong family planning policies (Cai, 2010), because of increased return to education and a trade-off between quality and quantity.

Culturally, both migration and family-building activities are costly: putting either into practice would easily consume the savings of a rural household. The cost of migration and family behaviours include, but are not limited to, "smuggling fees" for some undocumented migrants, "bride prices" for the groom's family, housing expenses and savings for the next generation. Prioritising any one of these over another, for example, choosing to migrate while postponing fertility, might signify a negative selection of fertility for migrants.

However, these are not necessarily competing events, but rather instrumental to each other, for example, getting married to facilitate migration or the other way around. This means a positive selection of marriage for migration. Lastly, given the high cost of migration and family-building activities, the socio-economic status of the individual and the household could be at the centre of decision-making regarding these life events. Households with lower incomes might be more vulnerable to spousal separation and eager for more children due to their attachment to agricultural production. The high cost of these events, strong family policies in favour of late marriage and lower fertility, and cultural preference all make China a unique context for understanding the interrelationship between migration and family dynamics.

1.4 Outline of the Dissertation

The three empirical articles, chapters 2 to 4, are dedicated to understanding the dynamics between migration and family events in the Chinese context. To be specific, it explores the interrelationship between migration and marriage, migration and fertility, and marital fertility and spousal separation due to migration, respectively.

Article 1: "The Effect of Migration on Marriage: Chinese international migration to the U.S." explores the gendered effect of international migration on marriage timing and chances. Migration has different consequences in this regard for males and females. In the Chinese culture, marriage is rarely possible before "settling down" and having enough economic resources. Economic uncertainties during migration might hinder marriage chances, especially for males. On the other hand, it is likely that an improved socio-economic status after migration would bring better chances of marriage for males. While for females, it is likely that potential migrants use marriage as a tool for international migration. Socio-economic status is an important driving force in marriage and migration timing. Given the cultural preference of assortative matching in the marriage market, male migrants with a lower socio-economic status might face more difficulties in finding a partner in the destination country.

Article 2: "Does Migration Matter for Higher Fertility? The fertility of Chi-

nese International Migrants to the U.S. and Non-Migrants During China's One-Child Policy Period" explores the effects of international migration on fertility from four perspectives: the selection effect, the emancipation effect for international migrants not subject to family policies in China, the disruption effect and the adaptation effect. The China-U.S. migration and fertility case during the period 1965-2005 is worth being studied for several reasons. First, circular migration is uncommon due to geographical distance. Second, China enacted strict family policies as of the 1970s, while the U.S. granted birthright citizenship. Third, relative fertility levels reversed in the mid-1990s, since when the total fertility rate of the U.S. surpassed that of China. The fertility of Chinese non-migrants is not the exact counterfactual for migrants in terms of the effect of China's family policies, since the latter face selection, disruption and adaptation effects brought about by the migration process. However, the comparison between the fertility of migrants and non-migrants who met certain conditions for a second birth and others who didn't would shed light on the emancipation effect of international migration on fertility.

Article 3: "Spousal Separation and Marital Fertility: Chinese Internal and International Migration" investigates the effect of spousal separation and reunification due to internal and international migration on marital fertility by birth order for Fujianese born between 1950 and 1990 at couple level. This study considers some unobserved heterogeneity that influences both a couple's living arrangement, e.g., spousal separation, and marital fertility. By doing so, it isolates the effect of spousal separation from the disruption effect of migration to rethink the disruption effect from a "couple's living arrangement" framework. It seems that spousal separation due to migration can last for a long time and depress marital fertility. Spousal reunification either at the origin or destination does not necessarily guarantee catch-up in fertility. Spousal separation is positively related to a traditional division of labour, i.e., husband-breadwinner-wife-caregiver.

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Chapter 2

THE EFFECT OF MIGRATION STATUS ON MARRIAGE

Chinese international migration to the U.S.

Abstract

This paper explores the effect of migration on marriage for Fujianese international migrants to the U.S. during a period of mass Chinese-U.S. migration, 1978-2000. It sheds light on the significant gender differences on the impact of migration on marriage. I used data from Chinese International Migration Project on Chinese international migration to the U.S. with detailed information on respondents' migration and marriage history. I employed discrete-time event history techniques allowing for correlation across migration and marriage. Results show that migration decreased males' marriage chances, while it only temporarily disrupted females' marriage probabilities. The negative effect of migration on marriage for males could be due to the different selection of education for male and female migrants, which makes assortative matching less likely at destination, especially for lower educated males. The results also show that migrants are a selected group with a higher probability of marriage than non-migrants.

Keywords— marriage, international migration, China

2.1 Introduction

Both labour migration and marriage decision-making occur during the young adult stage of one's life (Stark, 1988). Exploring the effect of migration on marriage helps to understand how these two vital life events interact with each other. This paper investigates the gendered effect of international migration on marriage and the interrelationship between these two events. The research question is: how does international migration from Fujian province to the U.S. affect men and women differently when it comes to the likelihood of their getting married? This paper adds a country case to the study of the gendered effect of migration on marriage in the context of Fujianese international migration to the U.S. during the period 1978-2000.

Regarding the effect of marriage on migration, the consensus in the literature is that being married reduces the risk of migration. On the other hand, studies on the effect of migration on marriage showed different effects. Jang et al. (2014) found no substantial impact of migration on marriage, while Jampaklay (2006) among others pointed out a positive effect of migration on marriage. Guzzo (2006) illustrated that there are gender differentials in terms of marriage and migration timing: men are less likely to marry or cohabit one or two months before and after long-distance migration. Surprisingly, there has been little empirical work considering the separate effect of migration on marriage probabilities for men and women. This is puzzling considering that there are important and obvious gender differences in the effect of migration on marriage.

Motivations for migration differ by gender (**?**). Men and women migrate for different reasons; men more often migrate for economic related reasons while women are more likely to migrate for family reunification (Cerrutti and Massey, 2001; Fan, 1999). The different migration opportunities by gender are shaped by the gender-linked power differences in the household, and social institutions that are gendered themselves (Cerrutti and Massey, 2001). The difference in migration opportunities for both sexes depends on both the gendered division of housework and labour market opportunities at the origin and destination countries (Cerrutti and Massey, 2001). Socio-economic status has different effects on male and female migration: higher educational attainment implies a higher chance of migration for women, however, for men, this relationship is negative or zero (**?**). The likelihood of family reunification also differs by gender: more educated women are likely to join their husbands more quickly than less educated ones, while husbands' education does not have an effect on the timing of family reunification (González-Ferrer, 2007).

Previous scholarship on the effect of migration on marriage has not yet estimated separate models for men and women (for exceptions, see eg., Cerrutti and Massey (2001)). Partner choice varies by cultures, values, and norms (**?**). In China, the traditional norm of "marrying to matching door" implies the importance of parents' socio-economic status in shaping the choice of partner (Hu, 2016). Fujianese migrating to the U.S. provides an interesting context to explore the relationship between migration and marriage for the following reasons. Traditionally, Chinese people consider migration as a process full of economic uncertainties and difficulties to maintain emotional attachment, which hinders marriage. In the Chinese culture, marriage usually takes place only after the male has enough economic resources for starting a family. Moreover, both internal and international migration might facilitate marriage because one person may join their partner's household in another county or city to change *hukou* status, e.g., from rural to urban (Fan and Huang, 1998), or marry someone in the U.S. to migrate with a spouse visa [1].

This paper covers a long period of time in the history of China-U.S. migration, from 1978 to 2000. During this period, migration-related laws at the origin and destination have undergone substantial changes. China's emigration policy evolved from relaxed to tightened control in 1992, and even amended laws to punish smuggling. However, the migration flow from Fujian province increased dramatically from 1978 to 2000, making Fujian a leading migrant-sending province in the mid-1990s ((Liang, 2001a); see Figure 2.1 first panel). Some determinants of international migration underwent substantial change during this period. For example, the selectivity of socio-economic status has changed its role in determining emigration: in 1990, education level was a reasonable key selector for emigration; however, by 1995, a high level of education was less of a factor (Liang, 2001a). Positional power, on the other hand, persisted as a strong factor in shaping a household's migration decision-making: having a household member who was a cadre significantly increases their chances of migration (Liang et al., 2008). Education level, positional power and changes in China-U.S. migration-related policies were included in the models, the analytical strategy for which will be discussed later.

This paper adds to the previous literature in the following ways. First, the life course approach adopted here may offer a comprehensive insight into the simultaneous decision-making of family formation and migration by looking into the timing of marriage and

[1] Charsley et al. (2012) explained that the legal process of spouse visa involves a would-be spouse to someone who has settled at the destination (e.g., having permanent residence) enter the UK as the (potential) spouse. The U.S. spouse visa process shares similar logic, which makes it possible that potential migrants using marriage as a tool to migrate.

migration (Kulu and Milewski, 2007). Second, modelling the effect of migration on marriage for both genders in separate models helps shed light on the different challenges each faces during the migration process and in the marriage market. Third, it accounts for common factors that influence the decision-making process of both marriage and migration. More specifically, it is very likely that some unobservable personal characteristics determine both events since decisions about them are made during the same period of one's life, the early 20s'.

Results show that the effect of migration on marriage is gendered. Migration predicts a lower likelihood of getting married for men but has no significant impact on the marriage chances for women. It could be that men encounter matching barriers after arriving at the destination because international male migrants are selective of lower educational attainment, while female migrants usually achieve at least a senior high school education [2]. Women's marriage chances are not significantly affected by migration in the long run, except for a strong disruptive effect during the first five years after migration. Female migrants who departed China with a spouse visa are more likely to get married and to migrate during the same year. While it is not surprising that marriage comes shortly after the engagement, the simultaneous occurrence of both events could be due to the legal process related to migration to the U.S.

2.2 Literature Review

It is still not conclusive if migration has a substantial impact on marriage, or if it does whether this effect is positive or negative. Using the U.S. internal migration data, Jang et al. (2014) found no significant effect of migration on marriage. They suggested that migration is driven by other life-history opportunities strongly related to marriage like education and job opportunities. On the other hand, the positive effect of migration on marriage might hold if migration leads to higher socio-economic status (Cadwallader, 1992) or a larger marriage market (Lichter et al., 1995). From the theoretical perspective, neoclassical theory of factor mobility argues that individuals move because of interregional wage differentials (Cadwallader, 1992). The increased wage after migration helps to improve one's "price" in the marriage market. Becker's "competition in the marriage market"

[2] In the data, 20% of male non-migrants have an educational level higher than senior high school, while only 15% of male migrants are with equal educational attainment. Among female non-migrants, about 17% are with at least senior high school education, while almost 20% of female migrants have senior high school diploma.

theory suggests that economic resources offer better chances of marriage (Becker, 1991; Raley et al., 2004). In particular, demographic theories have traditionally emphasized the effect of men's economic resources on marriage in Western societies (Oppenheimer et al., 1997).

Empirical evidence also suggests that young adults moving from smaller cities to metropolitan areas gained higher socio-economic achievement after migration, thus expanding their marriage opportunities. For example, Raley et al. (2004) found that Mexican migrants in the U.S. are more likely to marry than the Anglos. Jampaklay (2006) found that internal migrants in Thailand have a higher marrying probability compared with non-migrants. Landale (1994) found that Puerto Rican female migrants are more likely to form unions early and to enter informal union than non-migrants due to migrant selection of social origins.

Migration means a major disruption which requires a substantial period to adapt to the new environment, thus it might affect family behaviours (Landale, 1994). On the other hand, marriage represents achieving greater stability, career immaturity or job uncertainties leads to staying in cohabitation rather than entering into marriage (Oppenheimer, 2003). Long distance moves might make union formation less likely (Guzzo, 2006). This is because migration is a stressful event that might involve separation of the couple for a considerable period (Frank and Wildsmith, 2005). Also, geographic separation due to migration impedes post-marital socialization, resulting in more reliance on selection process and hence a postponed marriage (Oppenheimer, 1988). Dávila and Mora (2001) found that recent Mexican immigrants in the U.S. are less likely to get married within five years of migration in the 1990s than their counterparts did in the 1980s.

On the other hand, risk preference shapes the timing of life events, delayed marriage can also be attributed to greater risk tolerance (Schmidt, 2008). Search theories in economics argue that the searching process in the marriage market involves uncertainty. A risk-tolerant individual ascribes greater value to an acceptable partner, so he or she will be less likely to find a suitable partner or succeed in a later age (Schmidt, 2008). Thunø et al. (2005) noticed that Fujianese international migrants to Europe are risk-tolerant, the pioneers of whom even migrate to unlikely destinations. If this risk preference applies to their marriage decision-making, we should observe delayed marriage among migrants. Furthermore, long-distance moves ensure women's empowerment because they emancipate female migrants from obeying the marriage arrangement of their families, leading to delayed marriage (Hertrich and Lesclingand, 2012). In other words, female migrants are able to challenge their family's authority over their lives since the separation from their

families allow them to independently decide when to enter into marriage.

In the sub-Saharan area, migrant couples usually endure a long "living apart together" process (Baizán et al., 2014). The "LAT" arrangement implies that men and women do not share similar intentions or opportunities for migration. The gendered effect of migration on marriage is prominent (Jampaklay, 2006). A general idea of the gendered effect of migration is that men move for better employment opportunities, whereas women are motivated by family reasons, for example, to follow their spouses (Cerrutti and Massey, 2001), or to build up "trousseau" to be ready for future marriage (Hertrich and Lesclingand, 2012). Bohra and Massey (2009) argued that women have fewer chances migrating internationally in a patriarchal society like Nepal where women's domains were family and household. On the other hand, migration has a positive effect on men's assortative mating process since it improves their socio-economic status (Oppenheimer, 1988). International migration for Fujianese are quite gendered; married couples applied the "LAT" arrangement involving those husbands migrated overseas, leaving the wife working in small factories near their villages (Pieke et al., 2004). The gendered marriage and migration pattern results in different sequences of marriage and migration and living arrangement for couples. Unfortunately, there is insubstantial empirical evidence for the gendered effect of migration on marriage, although some studies have implied different mechanisms through which relationships exist for each gender, e.g., He and Gober (2003).

Chinese internal and international migrants were selected for different socio-economic status. Chinese temporary internal migrants, or floating population (Liang and Ma, 2004), were young, single, and somewhat educated. They moved from villages to cities during the period of the transitional economy in the 1990s (Fan, 1999). Women poured into light manufacturing industries while men dominated the heavy industry, resulting in a segregated labour market in China (He and Gober, 2003). In contrast to internal migrants who were better educated than non-migrants, international migrants to the U.S. did not have a significantly higher education than non-migrants because their expected occupations in the U.S. did not require a high level education (Liang and Miao, 2013). Fujian international migrants, who were particularly selective of lower education and economic poverty, looked for jobs in lucrative places in Japan, South Asia, and later, Europe (Pieke et al., 2004).

2.3 Theoretical Perspectives and Hypotheses

2.3.1 Gendered Effect of Migration on Marriage

The effect of migration on marriage is gendered (Jampaklay, 2006): men gain better chances of marriage due to improved socio-economic status, while female migrants delay marriage because they are empowered by the migration process. Jang et al. (2014) argued that if the hypothesis of "migrating for better marriage chances" holds, then we should observe a higher likelihood of marriage after migration. For example, Mexican migrants who returned to Mexico tend to be more advantaged in the marriage market due to their improved socio-economic status (Parrado, 2004). In this scenario, migrant achieves upward occupational mobility or increased annual income at the destination, which makes the migrant more economically advantaged in the marriage market.

Oppenheimer (1988) argued that the difference in marriage timing resulted partly from the variation of difficulty to find an assortative mate depending on one's socio-economic status. Ideal data that includes a complete history of marriage, migration, occupational and income mobility is usually absent in migration-related data sets[3]. Educational level, a proxy for human capital, might be a good indicator of potential in socio-economic status improvement (Choi and Mare, 2012). Marriage is increasingly associated with socio-economic status, e.g., education, since the 1978 economic reform in China. One-quarter of recent male cohorts with less than primary school education are excluded from marriage market in China (Yu and Xie, 2015). International migration to the U.S. is normally accompanied by changes in working location and language, to which the well-educated are more advantaged in adapting.

However, the marriage probability would not increase if the marriage market at the destination is not favorable for migrants, marriageable mates are scarce, or there is an unbalanced sex ratio at the destination. Lower educated Mexicans have chances to "marry up" on the educational ladder in the U.S. (Esteve and McCAA, 2006). However, the same situation might not apply to Chinese men since traditional values suggest that women "marrying to a family of similar rank" or "marrying up" regarding ascriptive status, e.g., father's occupational class (Hu, 2016; Kalmijn, 1991). Furthermore, there is a tendency of matching by the achievement, for instance, educational attainment, than ascriptive status (Kalmijn, 1991).

[3]In Chinese international migration project (CIMP), the source of data of this paper, complete occupational history is only available for household heads and their spouses but not for all the household members.

Given the importance of socio-economic status in shaping one's marriage chances and the tradition of women to "marry up", the effect of migration on marriage could be gendered. It is possible that Chinese women prefer marrying men with higher educational attainment and this cultural value persists even after migrating to the U.S. since Chinese live in ethnic enclaves. The lower educated men and highly educated women benefit the least from this marriage pattern. If an individual finds it hard to gain economic resources or assortative mating is not feasible, then marriage would be unlikely for a Chinese male with lower educational attainment.

Hypothesis 1: The probability of getting married for men, especially those with lower education levels, decreases after migration.

On the other hand, women's marriage decision-making depends on the opinions of the elders in the family in rural Mali (Hertrich and Lesclingand, 2012). However, family elders lose control of the girls after they migrate for labour reasons. This empowerment due to migration hypothesis holds for young women but not for men, since the union formation of the latter did not challenge the family elders. The effect of women empowerment due to migration on marriage timing depends on cultural settings. This empowerment could result in an early marriage because of a shortened negotiation process (e.g., on "bride price"). However, it is more likely that Chinese female migrants extend the search process and present delayed marriage because of female empowerment.

Hypothesis 2: For women, international migration leads to marriage postponement.

2.3.2 The Disruption Effect of Migration on Marriage

The short-term effect of migration on marriage might be negative since the new arrivals need time to adapt to the new environment and meet marriageable mates (Jang et al., 2014). Migrants have the intention to delay marriage until some uncertainties brought about by migration fade out since moving is an unstable process which might involve couples living apart together. Carlson (1985) argued that the disruptive effect of migration on union formation is short-term rather than persistent in the long-run since migrants can always adapt to the new environment. In other words, the likelihood of marriage should recover and catch up with those non-migrants later once the disruption effect of migration disappears (Jang et al., 2014).

Hypothesis 3: Marriage probability decreases around the year of migration and recovers as years stay at the destination increase. However, this won't be the case for marriage migration, see Hypothesis 4.

2.3.3 The Simultaneity of Marriage and Migration

Migration and marriage are often linked events. Short-distance migration, in particular, is often made for marriage-related reasons (Mulder and Wagner, 1993). Courgeau (1989) found that migrants to urban areas in France are mostly single or married individuals who migrated because of their partners. In the UK, a large share of singles moves during the first year of their marriage (Flowerdew and Al-Hamad, 2004). This simultaneous occurrence of related life events, marriage and migration, calls for more attention.

In China, the migrating for marriage approach finds evidence in the case of internal migration where female migrants at marriage age migrated from inland China to the coastal provinces (Fan and Huang, 1998). This is because internal migration for marriage reason is treated as permanent migration by the state, and the migrated wife is granted local *hukou*, i.e., official registration status, which is linked to the access to various social benefits. This simultaneity of migration and marriage is fostered by the willingness of achieving social mobility, i.e., gaining *hukou*, through marriage [4](Fan, 1999).

However, this simultaneity hypothesis has yet to be explored in the context of Chinese international migration. Both border control, e.g., migration restriction policy, and *hukou* system in China can be migration frictions for Chinese migrants to the U.S. and Chinese rural dwellers to the urban area. If marriage/fiancée visa is to international migration what urban *hukou* is to internal migration, we should observe a dramatic increase of marriage likelihood around the year of migration. This holds for women but not men due to the cultural norm of "women marrying up" in terms of socio-economic status including *hukou*. For internal migration, this is because non-plan migration initiated by marriage was among the only exceptions that were considered permanent migration entitled to *hukou* and social benefits. Empirical studies showed that more than 80 percent of the women in the southwest Guangdong Province were those that migrated there due to their marriage (Fan, 1999). Those migrants whose migration is motivated by marriage or the other way around are more likely to migrate in the same year they marry, under the condition that marrying a partner at the destination would facilitate migration. For international migration, marrying in the exact year of migration reflects the urgency of going through the marriage paperwork (to obtain a spouse visa) to be eligible for family migration.

[4]Fan (1999) explained that agricultural *hukou* only grants the right to farm, while the non-agricultural *hukou* grants benefits and welfare policy, the latter is difficult to obtain. Furthermore, the agricultural and non-agricultural *hukou* is not only a geographical label, but also stands for one's socio-economic status.

Hypothesis 4: Marriage migration, i.e., migrating the same year as marrying, is more likely for women than men.

2.3.4 The Correlation between Unobserved Heterogeneity

Jang et al. (2014) demonstrated that there is unobserved heterogeneity affecting both migration and marriage. Failure to include this common component might lead to a biased estimation of the effect of migration on marriage. This unobservable component is usually constant over one's life course, e.g., value orientations that lead to either higher or lower migration and marriage probability. For instance, Jampaklay (2006) found that internal Thai migrants are selected into some value orientations related to a higher probability of marriage compared with non-migrants. These value orientations could be related to family migration norms which determine whether people move or stay, marry or not. These values could be among the followings which De Jong (2000) found to be related to migration decision-making (and might also affect marriage decision-making): the desire of obtaining higher income, living in a comfortable place, entertainment, educational opportunities, or joining family members, etc.

Another source of interrelationship between marriage and migration is that the two events are sometimes instrumental for each other. This implies a positive correlation term between these two events. Chinese rural women used marriage as a strategy to achieve the goal of migration. Thus men living in the coastal area are more advantaged in marriage market than those in inland or mountainous areas (Fan and Huang, 1998). Since women's inter-provincial migration pattern is related to gaining a city *hukou* through marriage (Fan, 1999), we can infer that individuals preferred a metropolitan life, which is fast-paced and of high consumption level.

We know little about how long-distance (international) migration interact with union formation; it could be more relevant to marriage decision-making than short-distance migration, where day-to-day space does not change a lot (Guzzo, 2006). Unlike Mexicans who could migrate to the U.S. for a temporary period, Chinese migrants, who originated mainly from Guangdong and Fujian province, stayed in the U.S. for indefinite periods of time (Portes and Zhou, 2012). Although temporary labour migration might have prevented union formation for Mexican men, international migration facilitated union formation after their return from the U.S. (Parrado, 2004). On the other hand, the Fujianese migrants who did not return to China might consider migration and marriage as simultaneous household decision-making events. This household decision-making involved a

long-term family migration strategy that led to both higher likelihood of migration and marriage for both genders. A model that ignores this selection effect would overestimate the effect of migration on marriage due to a failure to control for this positive component.

Hypothesis 5: There is an unobserved heterogeneity that leads to a positive correlation between marriage and migration.

2.4 International Migration and Marriage for the Chinese

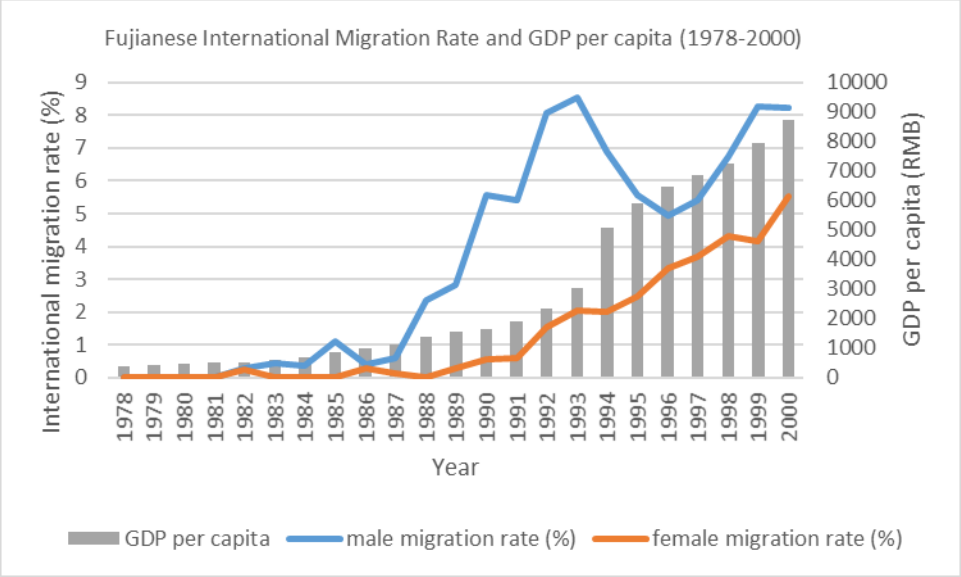
This paper documents the marriage and international migration from Fujian province to the U.S. from 1978 when China opened its economy to 2003. During this period, the international migration rate increased dramatically from almost zero to 9% for men and from almost zero to over 5% for women. Nowadays, Chinese international migrants have high visibility in developed regions like North America and Europe because of running some business for daily life, e.g., restaurants, bars. Fujian province, the second-largest source of migrants after Guangdong, started to send migrants to North America since the early 20th century, but the migration flow accelerated in the late 1980s (Portes and Zhou, 2012).

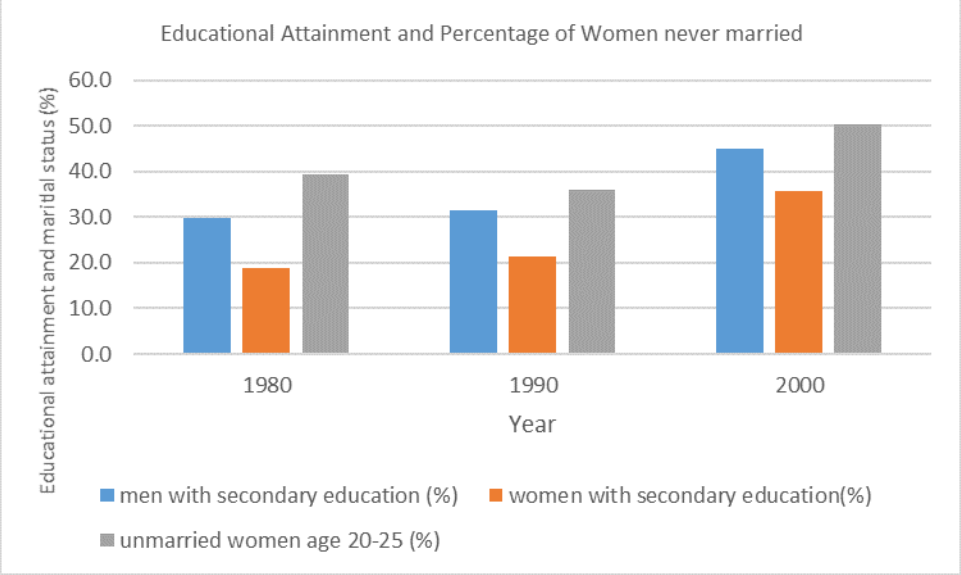
From 1978 to 2000, there were several changes in migration-related policies in China. Before 1992, hardly any emigration policies were aimed at curbing illegal migrants. On 1 April 1992, the first official document was enacted which urged the police departments of the five provinces near the borders, i.e., Fujian, Zhejiang, Guangdong, Yunnan and Guangxi, to tighten border controls (Chin, 2003). Another significant change in migration policies happened in March 1997, when articles related to irregular emigration, e.g., penalties for smuggling, were added to the Criminal Law (Chin, 2003). On the destination side, the Chinese exclusion act was abolished by the Immigration and Nationality Act of 1965, since when there were no significant changes to immigration policies targeting Chinese[5].

China experienced a rapid economic development from 1978 to 2000 due to its economic liberalization (See Figure 2.1). Fujian province changed from being one of the most economically backward province to one of the most prosperous coastal regions in China (Pieke et al., 2004). International migration flow from Fujian province increased rapidly. At the beginning of the 21st century, approximately 9 millions of the Chinese

[5]Wolgin, Philip (October 16, 2015). "The Immigration and Nationality Act of 1965 Turns 50"

Figure 2.1: Self-calculation of international migration rate (%) for men and women from Fujian province based on Fujianese international migration data, 1978-2000. China's GDP per capita (in RMB), the percentage of men and women with secondary education and the percentage of unmarried women age 20-25 in China is from the National Statistics Bureau.





abroad originated from cities in Fujian province, such as Lianjiang, Changle, Fuqing and Fuzhou (Portes and Zhou, 2012).

Almost during the same period, the marriage rate and total fertility rate started to drop dramatically. In China, the proportion of unmarried women age 20-25 increased from less than 40% in 1980 to about 50% in 2000 (See Figure 2.1), indicating a delay in marriage timing. Apart from urbanization and economic development, the demographic transition is also attributable to the state's preference through family planning policies, e.g., the marriage law, "later-longer-fewer" policy and one-child policy (Bongaarts and Greenhalgh, 1985). The 1980 Marriage Law, revised from the 1950 Marriage Law, favored late marriage and childbirth, where minimum age of marriage was increased to 22 years-old for men and 20 years-old for women from that in the 1950 Marriage Law, i.e., 20 years-old for men and 18 years-old for women. The 1980 Marriage Law also stated that both partners have the freedom to pursue work and education. From 1980 to 2000, the proportion of both men and women with at least secondary education increased, but the gender gap in education persisted (See Figure 2.1).

The 1980 Marriage Law was not the first to encourage late marriage. The "later-longer-fewer" family planning policy enacted in the mid-1970s suggested that individuals should marry later in life, i.e., 25-years-old for men and 23-years-old for women. This is even higher than the legislative minimum age at marriage in the 1980 Marriage Law. The "later-longer-fewer" policy, though without legal enforcement, were implemented through social welfare programs, e.g., pension, and property rights of urban workers' allocated housing and rural dweller's collective land-use. By 1978, when China opened its economy, potential candidates in the marriage market were well informed of the state's family planning program to increase the age at marriage. From 1978 to 2000, Fujian province experienced strong economic growth and tremendous international migration, which brought considerable overseas remittances, accumulated human capital and obvious demographic transitions, e.g., delayed marriage.

2.5 Data and Methods

The data is from Chinese international migration project collected from 8 villages well-known for sending migrants abroad from Fujian province to the U.S., especially the New York City (Liang, 2001a). One should bear in mind that it is representative of residents in migrants-sending villages (Liang et al., 2008) where emigration rate climbed dramatically from 1% in the 1980s to 10% in the 2000s among Fujianese population (see Figure 2.1).

Chinese International Migration Project took place between October 2002 and March 2003. It provided information on around 1800 households and 10000 individuals. These households are normally extended households which involves two or three generations living together. The distribution of the number of members in these households is shown in the Appendix, in Table A.2.[6]. This project focus on Fujian towns where Fujianese living in New York City came from and draw a stratified random sample from each town and village (see Liang et al. (2008) for details). In this study, complete information on every variable included is available for 1716 households and 4891 individuals born between 1960 and 1985. Those born in 1960 turned 18 in 1978 and were 43 in 2003. Individuals are censored at 43 and not 50, because even for the 1950 cohort, i.e., people born between 1950 and 1959, there were no marriages after people turned age 43. This is perhaps because first-time marriage normally happens quite early in China. Only first-time marriage is included[7]. International migration is defined as staying in the U.S. for at least one year. Before migrating to the U.S., some migrants first moved to other Asian destinations, among which, Japan and Hong Kong are the most popular ones. Only the migration of which the U.S. being the destination country is included in the analysis.

The data provide retrospective information on the year of outmigration, time stayed at destination and year of returning for the first/second-time migration[8] to the U.S.. This study is based on the whole sample including all household members. Unfortunately, cohabitation history is not available. For the purposes of the analyses, I constructed two data files in the person-year format. One data file records the first migration to the U.S., by following an individual from age 18 to the age at migration. This file includes individuals who are at risk of migration (i.e. living in China). The observation of the first marriage is saved in a second data file which follows individuals from when they are 18 until their first marriage. This data file includes all unmarried people aged 18 who are at risk of

[6]The households contain members who are the spouse, child, parent, sibling, parent-in-law, grandparent, child-in-law, grandchild, sibling's spouse, niece/nephew, uncle/ant, sibling's spouse, etc. Moreover, it is not necessary that the members live together. It could be that these people live very close to each other in the village. It could also be likely that the information of some migrants living in the U.S. are reported by the household head at the village, thus they are also treated as members of the household.

[7]Complete marital history is only available for the household head, which showed low divorce rate after the first marriage and low rate of remarriage. This suggests that only covering the first marriage would not substantially underestimate the marriage rate.

[8]This is because complete migration information, e.g., year of migration and return, is only available for the first-time and last-time migration. Only about 0.5% of migrants migrated more than three times. Unlike Mexican migrants in the U.S., Chinese migrants in the U.S. stay for an indefinite time period.

marriage. At the beginning of each process (aged 18), all individuals in the sample are at risk of experiencing both processes. Individuals are censored at age 43 or age at the survey time in both data files.

In the life course study of the correlation between two events, one typically considers that some unobserved heterogeneity might influence both events. Baizán et al. (2003) confirmed the existence of strong selection effects which influence on both processes, first union formation and first birth. Unobserved values are a potential source of heterogeneity among individuals including some constant personal traits. The heterogeneity between individuals includes value orientations, attitudes toward gender roles, behaviour intention, etc. (Baizán et al., 2003; Lillard, 1993).

Life course approach and event history analysis help to examine simultaneous decision-making (Kulu and Milewski, 2007). To address the unobserved heterogeneity mentioned above, I apply an event history model with unobserved heterogeneity to capture the correlation between marriage and migration. The two equations of international migration and marriage are modelled jointly with two different error terms, ϵ and λ.

$$ln\left\{\frac{Pr(y_i^{Mig}=1|X_i)}{1-Pr(y_i^{Mig}=1|X_i)}\right\}=\beta_1 x_{it}+\beta_2 w_{it}+\epsilon_i \tag{2.1}$$

$$ln\left\{\frac{Pr(y_i^{Mar}=1|X_i)}{1-Pr(y_i^{Mar}=1|X_i)}\right\}=\beta_1 x_{it}+\beta_2 w_{it}+\lambda_i \tag{2.2}$$

where the subscript i refers to the individual, and t to each time unit, i.e., year. The X_i denotes a vector of covariates, x_{it} denotes the marital or migration status variable, and w_{it} is a set of control variables.The individual-level random variables ϵ and λ are assumed to have a joint bivariate normal distribution:

$$\begin{pmatrix}\epsilon\\ \lambda\end{pmatrix}\sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix},\begin{pmatrix}\sigma_\epsilon^2 & \rho_{\epsilon\lambda}\\ \rho_{\epsilon\lambda} & \sigma_\lambda^2\end{pmatrix}\right) \tag{2.3}$$

Table 2.1 shows the descriptive statistics for all the independent variables for men and women. There are two data files, one on marriage and the other on migration. In the migration data file, some of these time-varying variables, i.e., China-U.S. migration policies and marital status one year before, are shown in person-years. This is the same for the variable of migration status in the marriage data file. The paper covers both migrants and non-migrants. The migrants sample includes both those who were already married before migration and those who married after migration. Variables of interest are marital and mi-

gration status. The analysis is based on migration status, meaning whether the individual lives in China or U.S. in a given year. It does not refer to if the person has once been a migrant or not. Migration status is coded 1 if the individual is in the U.S. at that year and 0 if not. Marital status is coded in a similar way: 0 represents unmarried, and 1 married. Control variables include individual-level demographic indicators as age, sex, birth cohort, educational attainment and household characteristics including migration network, i.e., having household member abroad or not, and positional power, i.e., having a household member once as a cadre or not. All these control variables are time-varying except for sex and birth cohort.

Educational attainment is a time-varying variable, which is constructed based on the Chinese education system, time-varying age, education status, i.e., at school, graduated or dropped out, and the highest education level attained. Regarding positional power, Liang et al. (2008) found that individuals from households with village cadre have better chances of migration. This is because the cadre is capable to trade permission of recruiting migrants for less smuggling fee for the potential migrant in the household with the smuggler. The variable of positional power was coded 0, if no one in the same household has ever been a cadre in a given year and 1, if this is not the case. Migration related policies were coded as 1 for years earlier than 1992, when there was very little in the way of border control, 2 for the period between 1992 and 1997 when the official document on tightening controls was enacted, and 3 for the years later than 1997 when the law was amended to include penalties for smuggling.

The birth cohorts under study are those born between 1960 and 1985 who were still at their marriageable ages at the survey year, whose marriage and migration events took place during the period of economic liberalization, 1978-2003. In our sample, only 2.65% of the respondents are with at least a college degree, meaning that the distribution of educational attainment is skewed. I recategorized the educational attainment as: (1) at most primary school; (2) junior high school; and (3) senior high school and above, because Fujianese educational attainment heavily concentrated in these groups.

2.6 Results

Figure 2.2 and Table 2.2 provide some descriptive results regarding the survival function from age 18 to 50, proportion of population who migrated and married, and the distribution of some typical marriage and migration sequences for the whole Fujianese

Table 2.1: A Descriptive Table of Independent Variables in Multivariate Analysis

	Men		Women	
	Frequency	Proportion	Frequency	Proportion
Age				
18-24	544	21.40%	474	20.18%
25-29	616	24.23%	608	25.88%
30-34	610	24.00%	588	25.03%
35-39	500	19.67%	406	17.28%
40-43	272	10.70%	273	11.62%
Birth cohort				
born 1960-1964	349	13.73%	348	14.81%
born 1965-1969	521	20.50%	422	17.97%
born 1970-1974	629	24.74%	619	26.35%
born 1975-1979	585	23.01%	564	24.01%
born 1980-1985	458	18.02%	396	16.86%
Highest educational level				
at most primary	764	30.06%	759	32.31%
junior high school	1311	51.57%	1153	49.08%
senior high school	467	18.37%	437	18.60%
Have household member as a cadre				
yes	658	25.89%	617	26.27%
no	1884	74.11%	1732	73.73%
Total	2542	100.00%	2349	100.00%
China - U.S. migration policies (in person-year)				
little border control	8602	34.63%	8149	29.23%
official document on tightening controls 1992	6702	26.98%	7763	27.85%
law amendment on penalties for smuggling	9538	38.39%	11967	42.92%
Married one year before				
yes	10149	40.85%	16466	59.06%
no	14693	59.15%	11413	40.94%
Total person years in the migration file	24842	100.00%	27879	100.00%
Migration status (in person-year)				
non-migrated	13898	76.96%	11011	89.54%
year of international migration	776	4.30%	400	3.25%
internationally migrated	3385	18.74%	886	7.21%
Total person years in the marriage file	18059	100.00%	12297	100.00%

population[9]. From the theories presented above and the descriptive statistics, we have reasons to believe that men and women follow different migration and marriage schedule, suggesting that it is necessary to separate the presentation of results by sex. Regarding the migration schedule, Fujianese men not only migrate at earlier ages but also are more likely to migrate than women.

However, it is a different story in terms of marriage schedule for men and women: it seems that women enter into marriage earlier than men, which is not surprising if considering that women normally marry to elder men. The difference in marriage schedules by gender and migration status is noteworthy. Male migrants are less likely to marry than male non-migrants. While there is hardly a difference in the survival fraction between female migrants and non-migrants except for a difference in timing: female migrants delayed marriage. This descriptive pattern of lower marriage chances for male migrants and delayed marriage for female migrants is consistent with those in the empirical regressions.

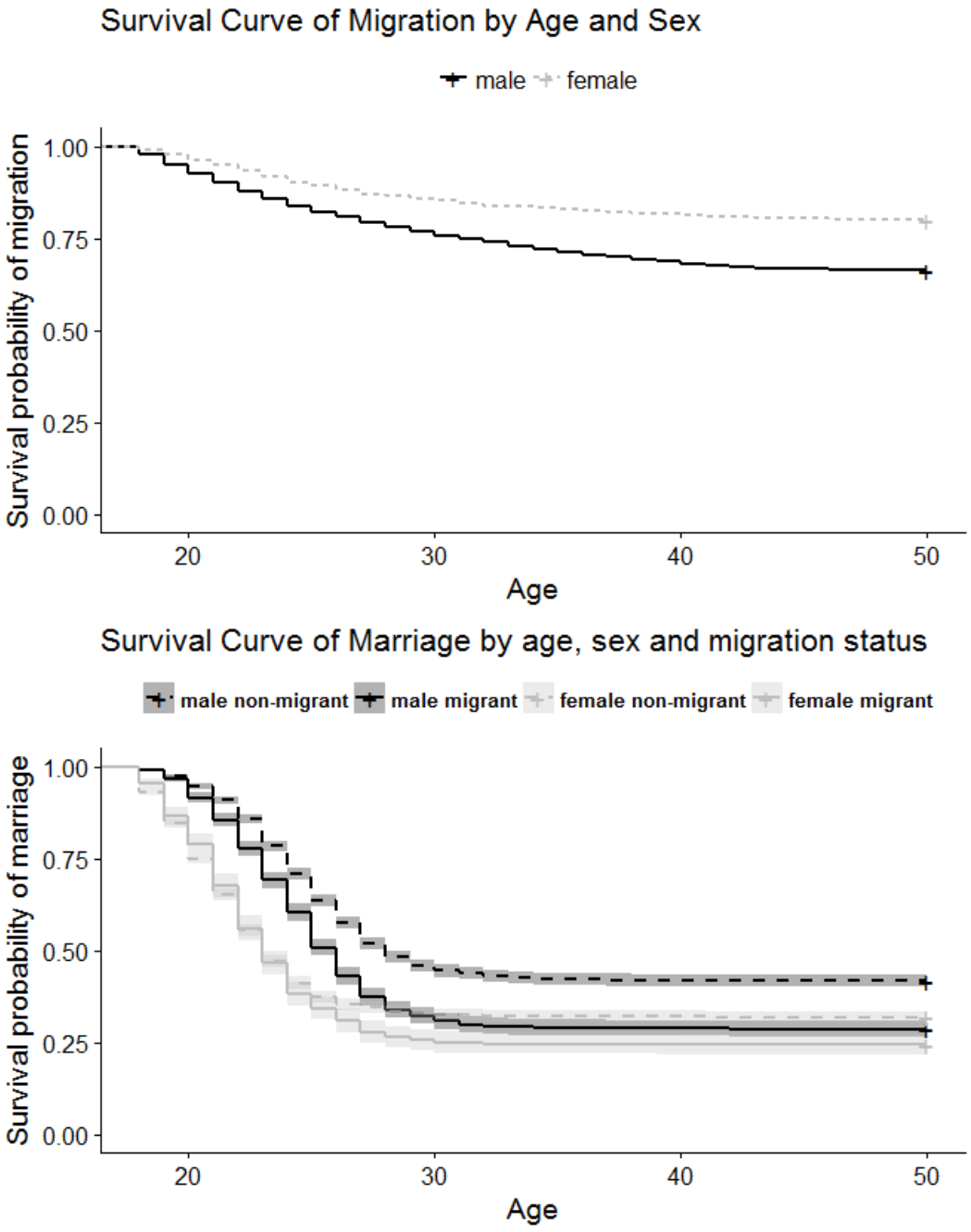
Table 2.2 shows the distribution of marital and migration status and the relative sequence between marriage and migration for Fujianese during 1978-2000, which was characterized by mass migration flow to the U.S. and dramatic demographic transition including delayed marriage. These figures are consistent with that shown in the survival function that migration is more popular among men while women are more likely to be ended up married. For both male and female migrants, better marriage chances exist before migration than after it. In general, it seems that migration means fewer chances of getting married for both genders.

2.6.1 The Effect of Migration Status on Marriage for Men

Table 2.3 shows the likelihood of marriage by migration status for men, with (multi-process model) and without (single-process model) considering the correlated unobserved heterogeneity components between international migration and marriage. Marriage probability declined after migration for men. In other words, migrating abroad predicts a lower probability of getting married or delayed marriage for men. Regarding the simultaneity of marriage and migration, marriage is 63% less likely to happen in the same year of migration than if the person stays in China. This odds ratio gets even lower if the correlation between marriage and migration is considered. In the Chinese culture, both Chinese migration to the U.S. (Liang et al., 2008) and Chinese marriage are costly, especially for the

[9]I did not apply weights because the data is systematically sampled, thus is representative of the population in the eight Fujianese villages studied. The original data does not provide weights.

Figure 2.2: Survival function of migration by sex and age, and survival function of marriage by age, sex and migration status for Fujianese from 1978-2000.



Note: This is a description of the whole sample which is representative of the marriageable population in the villages studied.

Table 2.2: Descriptive statistics of marital and migration status and sequence for the whole sample

	Men	Women	
Marital status			
unmarried	1868 (37%)	1319 (30%)	X-squared=49.20
married	3129 (63%)	3012 (70%)	p-value < 0.05
Migration status			
non-migrated	3398 (68%)	3507 (81%)	X-squared = 202.42
migrated once	1553 (31%)	809 (19%)	p-value < 0.05
migrated twice	46 (0.9%)	15 (0.3%)	
Marriage and Migration sequence			
Married before migration	802 (16%)	404 (9.3%)	X-squared=92.52
Married at the year of migration	44 (0.8%)	72 (1.7%)	p-value < 0.05
Married after migration	353 (7%)	176 (4%)	
Unmarried or non-migrated	3792 (76%)	3679 (85%)	
Total	4997	4331	

groom's family. Perhaps men are not likely to make the two events happen simultaneously due to financial constraint.

The single-process model shows that migrating abroad brings down 40% of the likelihood of getting married after migration for men. Male migrants are only 24% as likely to get married after migration as their counterparts in China once accounting for the correlation between these two events. This means that ignorance of the correlation between marriage and migration leads to an under-estimation of the negative effect of migration on marriage. It is essential to differentiate between probability and timing effect (Bernardi, 2001). The survival fraction of marriage for non-migrant men and migrant men are 39% and 49%, until age 43, respectively. This means that coefficients in the discrete-time model point to a lower possibility of marriage rather than a delayed marriage for a male migrant.

In Figure 2.3, I show the predicted probability of marriage for a simulated male aged 21, born between 1965 and 1969[10] from 10 years before the first migration to 10 years after the first migration by education. Each year was treated as a dummy. The marriage likelihood is estimated with specification as the "Male multi-process" model in Table 2.3. For male migrants with junior high school education, the marriage probability declined around migration time and did not recover even after 10 years of stay in the U.S. compared

[10]Age 21 and birth cohort of 1965-1969 is both the median statistics for men under study.

Table 2.3: Marriage Probability by Migration Status for Males

	Men single-process			Men multi-process		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
International Migration						
Constant	0.02	0.01-0.03	***	0.00	0.00-0.00	***
Age	1.01	0.98-1.04		1.09	1.05-1.13	***
Birth Cohort (Ref. born 1960-1964)						
born 1965-1969	1.57	1.29-1.91	***	2.12	1.62-2.78	***
born 1970-1974	2.31	1.79-2.98	***	3.85	2.78-5.33	***
born 1975-1980	3.50	2.44-5.03	***	5.95	3.91-9.06	***
born 1980-1985	3.99	2.46-6.47	***	6.17	3.51-10.84	***
Educational level (Ref. at most primary)						
junior high school	1.05	0.92-1.20		1.10	0.91-1.32	
senior high school	0.80	0.67-0.95	**	0.74	0.58-0.95	**
Have household member once being cadre	1.07	0.92-1.24		1.10	0.91-1.34	
China - U.S. immigration policy (Ref. little border control)						
official document on tightening controls 1992	1.31	1.02-1.68	**	1.42	1.08-1.89	**
law amendment on penalties for smuggling	1.06	0.74-1.52		1.24	0.83-1.86	
married one year before	1.33	1.12-1.58	***	1.11	0.89-1.38	

Taula2.2: Marriage Probability by Migration Status for Males (continued)

	Men single-process			Men multi-process		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Marriage						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	5.88	4.80-7.20	***	10.52	5.83-18.99	***
Age squared	0.97	0.97-0.97	***	0.97	0.96-0.97	***
Birth Cohort (Ref. born 1960-1964)						
born 1965-1969	0.85	0.73-1.01	*	0.85	0.61-1.20	
born 1970-1974	0.55	0.47-0.65	***	0.35	0.22-0.57	***
born 1975-1980	0.30	0.25-0.37	***	0.13	0.06-0.26	***
born 1980-1985	0.03	0.01-0.09	***	0.01	0.00-0.06	***
Educational level (Ref. at most primary)						
junior high school	0.96	0.83-1.11		0.92	0.71-1.20	
senior high school	0.74	0.63-0.88	***	0.54	0.38-0.75	***
Migration status (Ref. non-migrated)						
year of international migration	0.37	0.17-0.78	***	0.25	0.11-0.60	***
internationally migrated	0.60	0.47-0.76	***	0.24	0.14-0.44	***
Educational level * migration status						
(Ref. at most primary and non-migrated)						
junior high school * year of migration	2.39	1.01-5.63	**	2.85	1.08-7.54	**
senior high school * year of migration	1.81	0.59-5.57		2.16	0.59-7.91	
junior high school * migrated	0.96	0.71-1.29		0.96	0.58-1.59	
senior high school * migrated	1.53	1.05-2.23	**	2.04	1.04-4.03	**
Standard deviation of unobserved factor, migration				1.25		***
Standard deviation of unobserved factor, marriage				1.9		***
Correlation between migration and marriage				0.22		***
log-Likelihood	-9575			-9541		

The Chinese educational system contains primary school, junior high school, senior high school, college and university. The junior high school and senior high school forms the secondary education. Individuals who are enrolled in the junior high schools are normally of age 12 to 15, while others in senior high school usually are at age 15 to 18.

with those with at most primary school education. This means that matching barrier, for example, difficulties of assortative mating and unbalanced sex ratio, somehow exists after migration for men with moderate education. This is less likely the case for men with at least senior high school education whose marriage probability fluctuated all along the migration process.

Unbalanced sex ratio, or men surplus, at the destination is not a plausible mechanism to explain the low marriage probability for male migrants in the New York City, the major destination city for Fujianese migrants (Liang et al., 2008). Figure 2.4 shows the sex ratio of first-generation Chinese migrants aged 18-50, in the New York City and Fujianese natives in China from 1980 to 2000[11]. The sex ratio of first-generation Chinese migrants in New York City is on average 0.93 in general and 1.23 for singles, while sex ratio of Fujianese natives is higher: 1.07 in general and 1.76 for singles age 18-50[12]. Unlike Mexican migrants in the U.S. among whom there is a surplus of single men (Choi and Mare, 2012), Chinese migrants in the New York City have a more balanced sex ratio. This implies that mating barrier for male migrants might come from the difficulty of finding a female who accepts his socio-economic status rather than unbalanced sex ratio, or men surplus.

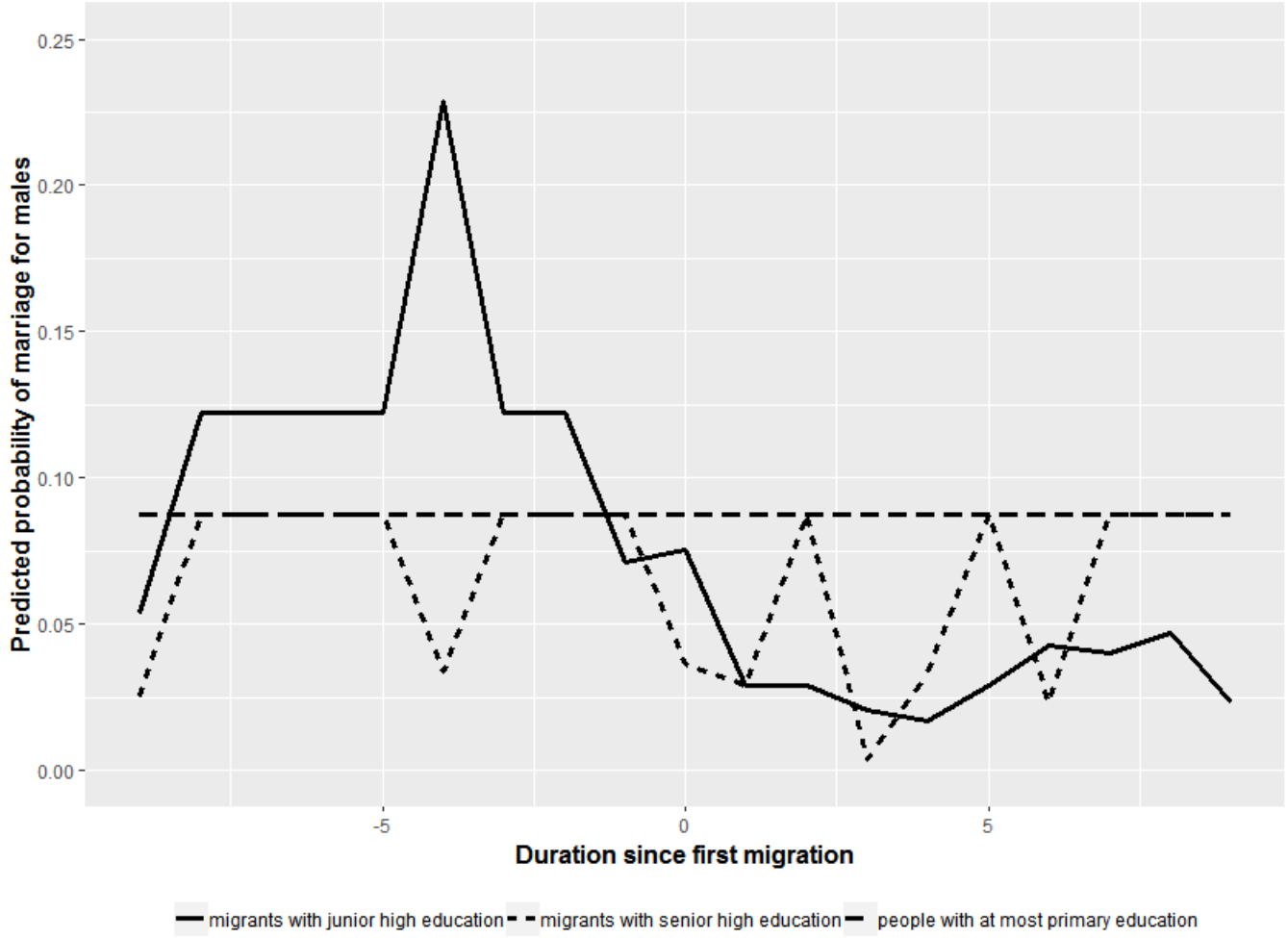
What lowers men's chances in the marriage market at the destination is if there are not enough marriageable women even though the sex ratio at the destination is more balanced. A skewed sex ratio results in cross-regional marriage (Mukherjee, 2013) and inter-caste marriage (Mishra, 2013). This also holds true when there are more women than men, for example, from 1990 to 2000 in New York City (see Figure 2.4). Asian women are more likely to intermarry than Asian men (Liang and Ito, 1999). In the U.S., Asian men are 15% less likely than Asian women to marry Whites using the 1990 census data (Qian and Lichter, 2001). Similar gender difference in intermarriage rate was also found in the Mexico-U.S. migration context (Dávila and Mora, 2001).

Moreover, different selectivity of education for men and women might be relevant in explaining the negative effect of migration on men's marriage chances. To be specific, male and female migrants are selective of different educational levels: male migrants are

[11]Self-calculation from IPUMS-U.S. 1980, 1990 and 2000 census data and China 1982, 1990 and 2000 census data. Steven Manson, Jonathan Schroeder, David Van Riper, and Steven Ruggles. IPUMS National Historical Geographic Information System: Version 12.0 [Database]. Minneapolis: University of Minnesota. 2017. http://doi.org/10.18128/D050.V12.0

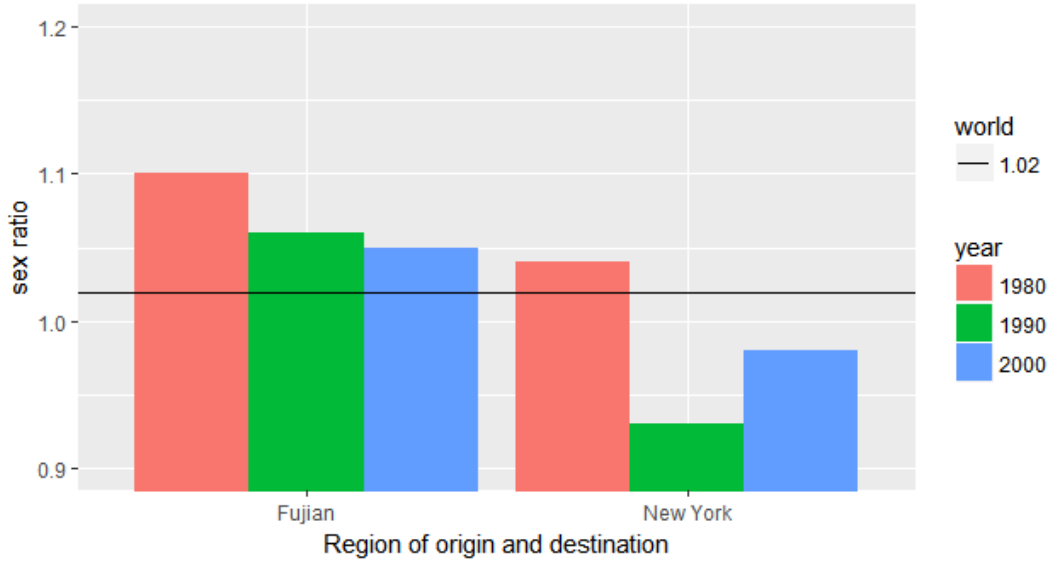
[12]The world's average sex ratio is around 1.02 for people aged 18-50. The sex ratio of rural Fujianese population which the data covered is normally higher than the region's average since the 1980 one-child policy allowed rural dwellers to have a second child if the first one was a female if assuming zero immigration of singles into the villages.

Figure 2.3: Predicted conditional annual probability of marriage chances for a simulated male aged 21, born during 1965-1969 with junior high school education (solid line) and senior high school education (dashed line) by duration since first migration.



The reference group include men aged 21, born during 1965-1969 with at most primary school education (horizontal long dashed line). Logits not statistically significant (at significance level 90% or above) are adjusted to 0.

Figure 2.4: Sex Ratio for single first-generation Chinese migrants aged 18-50 in New York City and Chinese natives aged 18-50 in Fujian, 1980-2000



Note: Sex ratio for Chinese migrants aged 20-30 in New York City and Chinese natives aged 20-30 in Fujian is not qualitatively different from the descriptive statistics shown here for age group 18-50.

negatively selected of education while female migrants are positively selected of education (see Table 2.3 and Table 2.4). This gender difference in the selectivity of education also holds for Mexican migrants in the U.S. (Cerrutti and Massey, 2001). Social exchange theory explains interracial marriage as the result of compensating racial status with educational or economic status (Kalmijn, 1993). For out-marriage among Asian Americans, educational attainment is more important: the intermarriage rate with Whites among well-educated Asian Americans was very high by 2000 (Qian and Lichter, 2007). In this sense, intermarriage would be more prominent among Chinese women than Chinese men if the woman's socio-economic status is higher than the man's.

On the other hand, Chinese men do not intermarry very often, which is a result of the fact that the Chinese men who move to the U.S. form a selective group. Chinese male migrants are selective of lower education, perhaps because migration and higher educational attainment are competing choices (Kandel and Kao, 2000). About 32% of male migrants are with at most primary school education, and only 16% of them have senior high school degree. While there is a similar share of female migrants who are with at most primary school education (25%) and senior high school education (20%).

A different selection of migration on education for male and female migrants, potential candidates in the marriage market at the destination, might result in more interracial marriages for Chinese women and prevent intracultural assortative mating from happening. This effect can be stronger if the marriage market in the U.S. is racially segregated as is the case especially for Chinese-born male migrants. The different selection of education for men and women might neutralize the effect of a more balanced sex ratio of co-ethnics at the destination on marriage probabilities (see Figure 2.4). It would affect men with lower education more than others due to the "marrying up" norm for women in Chinese tradition. The effect of migration on marriage differs by male migrants' educational attainment. This means that socio-economic status is crucial for marriage: male migrants with at least senior high school degree, i.e., most human capital, are 1.53 times more likely to marry after migration than do other migrants with lower educational attainment (see Table 2.3).

The analysis covers a long period of time, from 1978 to 2000, which means that there was enough time for potential changes in the likelihood of migration and marriage as well as in birth cohort. Table 2.3 shows that for men, the younger birth cohort has a greater likelihood of migrating abroad or hastening migration. It is possible that younger birth cohort members have a more extensive migration network, which provides information and resources that reduce the cost of migration. The period effect is represented by that of "China-U.S. migration policy", which shows that international migration has been more frequent in more recent years despite tightened border policies after 1992. On the other hand, men from younger birth cohorts were more likely to be single or to delay marriage.

2.6.2 The Effect of Migration Status on Marriage for Women

Table 2.4 shows that the marriage opportunities of women are not substantially affected by international migration status. Female migrants' marriage chances at the year of migration or after migration do not substantially differ from that of others who stayed in China. Regression based on internal migrants sample[13] shows that internal female migrants are more likely to migrate and marry in the same year (see Table A.1 in Appendix[14]). For

[13]The Chinese International Migration Project includes both internal and international migrants, which makes it possible to explore marriage and migration dynamics for internal migrants.

[14]Table A.1 shows the result of joint estimation of internal migration, international migration and marriage, with two standard deviations of the error terms, one share by international and internal migration, and the other for marriage. Internal and international migration likelihood is modelled in a multinomial logistic regression, treating internal and international migration as competing events, and marriage is modelled in a logistic regression. The main result is not qualitatively

internal migration, women move to the husband's household at the year of marriage because of traditional values like joining the male's household as labour. On the other hand, female international migrants are not likely to migrate and marry in the same year except for some women who travel with a spouse visa.

This paper illustrates that the independence between migration and marriage differs by gender: men's marriage chances are related to migration status, while women's marriage chances are not. This finding is consistent with Jang et al. (2014) who argued that migration might be driven by life events other than marriage. Chinese women's marriage opportunities are attributable to some demographic fundamentals like age, birth cohort, and educational attainment. Younger cohort postponed marriage more than others born during 1960-1964 (Courgeau, 1989). Opposite to men, female migrants are selective of higher education, which signifies that more human capital is required in a woman's migration process. Meanwhile, highly educated women are more likely to delay marriage. Regarding the period and cohort component of migration effects, which is slightly different form men, women of different birth cohorts presented a similar likelihood of international migration except for the youngest birth cohort, which has significantly higher chances of migration. The likelihood of migration for women increased dramatically across time: they were 9 times more likely to migrate after 1997 compared with the period before 1992.

The single-process model in Table 2.4 shows that women with senior high school degree are almost half likely to marry than others with at most primary school education. The survival fraction of marriage for those with at least senior high school education at age 43 is 30%, while for those with primary education the fraction is only 8%. This means that the effect of education on women's marriage chances is mainly on the dimension of probability rather than timing. Furthermore, unlike for male migrants, higher education does not predict a better marriage chance or earlier marriage for women after migration. In the marriage market at the destination, men having at least senior high school diploma is considered as an advantage. However, this does not hold for women.

The effect of migration on marriage for women is mainly a timing effect: the survival fraction of marriage at age 50 is very similar for female non-migrants (79%) and female migrants (78%). Figure 2.5 shows the predicted conditional annual probability of marriage for a simulated female age 20, born during 1965-1969 and with junior high school

different from that only include international migration and marriage as shown in Table 2.3 and 2.4.

Table 2.4: Marriage Probability by Migration Status for Women

	Women single-process			Women multi-process		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
International Migration						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	1.93	1.63-2.29	***	3.04	2.24-4.14	***
Age squared	0.99	0.99-0.99	***	0.98	0.98-0.99	***
Birth Cohort (Ref. born 1960-1964)						
born 1965-1969	0.68	0.48-0.97	**	0.83	0.51-1.33	
born 1970-1974	0.62	0.40-0.96	**	1.02	0.54-1.92	
born 1975-1980	0.84	0.48-1.48		1.92	0.81-4.54	
born 1980-1985	1.13	0.55-2.33		3.02	1.00-9.09	**
Educational level (Ref. at most primary)						
junior high school	1.41	1.16-1.72	***	1.62	1.22-2.16	***
senior high school	1.14	0.89-1.46		1.22	0.85-1.74	
Have household member once being cadre	1.67	1.39-1.99	***	1.87	1.47-2.37	***
China-U.S. migration policies (Ref. little border control)						
official document on tightening controls 1992	7.18	4.39-11.75	***	6.22	3.77-10.27	***
law amendment on smuggling penalties	9.75	5.08-18.73	***	9.50	4.89-18.49	***
married one year before	0.33	0.26-0.43	***	0.19	0.13-0.29	***

The variable "have household member once being cadre" means whether or not any of the household member was once the cadre of the village. Liang et al. (2008) argues that having a household member who was a cadre significantly increases members' chances of migration. C.I. is short for confidence interval.

Taula 2.4: Marriage Probability by Migration Status for Females (continued)

	Women single-process			Women multi-process		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Marriage						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	5.70	4.41-7.36	***	9.14	6.10-13.70	***
Age squared	0.97	0.96-0.97	***	0.96	0.96-0.97	***
Birth Cohort (Ref. born 1960-1964)						
born 1965-1969	0.76	0.63-0.91	***	0.66	0.50-0.89	***
born 1970-1974	0.57	0.48-0.67	***	0.39	0.29-0.53	***
born 1975-1980	0.39	0.32-0.46	***	0.21	0.15-0.30	***
born 1980-1985	0.15	0.11-0.22	***	0.07	0.04-0.12	***
Educational level (Ref. at most primary)						
junior high school	0.73	0.64-0.83	***	0.58	0.46-0.73	***
senior high school	0.50	0.43-0.60	***	0.31	0.23-0.43	***
Migration status (Ref. non-migrated)						
year of international migration	1.15	0.58-2.25		1.03	0.47-2.27	
internationally migrated	0.87	0.52-1.46		0.73	0.33-1.60	
Educational level * migration status						
(Ref. at most primary and non-migrated)						
junior high school * year of migration	1.04	0.48-2.24		1.01	0.41-2.48	
senior high school * year of migration	0.91	0.34-2.45		0.84	0.26-2.69	
junior high school * migrated	1.30	0.75-2.26		1.17	0.52-2.64	
senior high school * migrated	1.48	0.78-2.78		1.22	0.49-3.03	
Standard deviation of unobserved factor, migration				1.56		***
Standard deviation of unobserved factor, marriage				1.51		***
Correlation between migration and marriage				0.20		***
Log-Likelihood	-9288			-9226		

education[15] from 10 years before to 10 years after the first migration (solid black line). The reference group is female non-migrants (dashed black line). We could see that marriage is obviously disrupted by migration. The marriage probability dropped significantly around years of international migration but recovered after 5 years of migration to a level not significantly different from that of non-migrants within 5 years of stay in the U.S.. Different from female internal migrants (see Appendix Table A.1), female international migrants do not have a better chance of getting married than female non-migrants at the year of migration. Moreover, the marriage likelihood for female migrants is not significantly different from that of female non-migrants more than 5 years before migration. This means that marriage is not planned years in advance of migration as preparation for family migration.

Female migrants are a heterogeneous group regarding marriage and migration timing. The blue line in Figure 2.5 shows the predicted annual probability of marriage for women who migrated with a marriage/fiancée visa near the migration year, i.e., from 3 years before to 3 years after the first migration[16]. Women who migrated with a spouse visa are more likely to experience migration and marriage in the same year. Marriage chances of women migrated with a spouse visa do not significantly differ from that of non-migrants in years other than the year of migration. This signifies the urgency of completing the marriage paperwork for migration among those travelled with spouse visa. This finding is consistent with Charsley et al. (2012) that Chinese women migrants usually married to a settled partner in the UK.

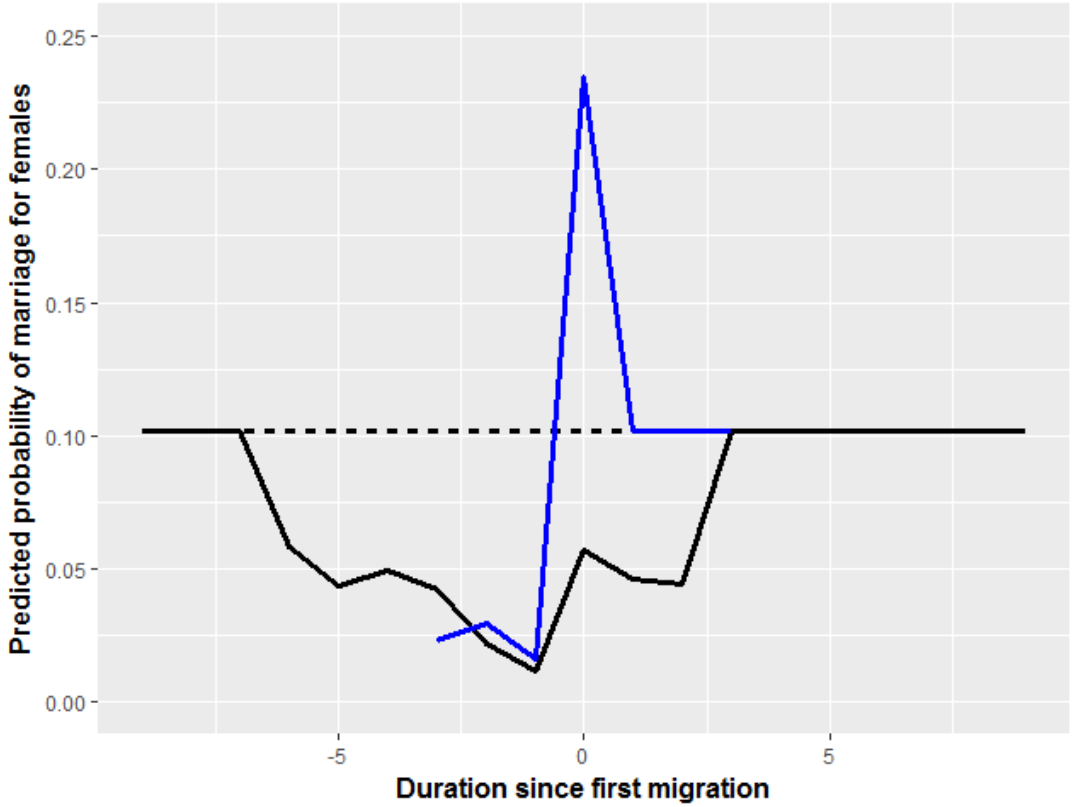
2.6.3 Unobserved Heterogeneity between Marriage and Migration

Table 2.3 and 2.4 show that there is an unobserved positive component that leads to both higher risks of marriage and migration. Not modelling this component like in the single-

[15] Age 20 and birth cohort of 1965-1969 are both the median value of age and birth cohort for women under study.

[16] Marriage likelihood for female migrants by duration since migration (shown in solid black line) and marriage likelihood for female migrants departure with marriage/spouse visa (shown in solid blue line) controlling for other departure document are estimated in separate models. The estimated intercept and coefficients of controls of the latter model (of female with marriage visa) are fixed as that of the former (of female migrants), which is the reason why the predicted probability of the marriage chances of the reference group, i.e., non-migrants, are the same, shown in Figure 2.5 in dash line. However, freeing the coefficient and intercept of the latter model results in only slightly different predicted probability of marriage for non-migrants (0.15 versus 0.1).

Figure 2.5: Predicted conditional annual probability of marriage for a simulated female age 20, born during 1965-1969 with junior high school education by duration since first migration (solid black line). The reference group are female non-migrants (dash line). Predicted probability of marriage for a simulated female age 20, born during 1965-1969 with junior high school education, and with spouse visa (solid blue line).



Note: Specification as in Model "Female multi-process" in Table 2.4. Logits not statistically significant (no less than 90% significance level) are adjusted to 0. The result accounts for the correlation term between migration and marriage.

process models shown in Table 2.3 and 2.4, would lead to upward biased estimation of both the effect of marriage on migration and the effect of migration on marriage. This unobserved heterogeneity is on the individual level. It could be some living strategy, e.g., to run a small family business abroad, which brings the decision-making of marriage and migration together.

On the other hand, individuals of the same household could share some unobserved characteristics and have correlated behaviours like migration and marriage. Table A.3 in the Appendix shows the results of a two-level model: level 1 the household, and level 2 the individual. Though the odds ratio differs slightly, it does not change qualitatively.

2.7 Conclusion

There are substantial gender differences in the effect of migration on marriage. Male international migrants are less likely to get married after migration; this remains so even after 10 years in the U.S. Instead of finding better marriage opportunities abroad, men have more difficulties searching for a partner in the U.S. This might be related to the different selection of educational attainment for male and female migrants. The traditional values of "marrying families of equal rank (men dang hu dui)" and "women marrying up (jia ru gao men)"[17] suggest that women should marry men with at least equal, or if possible, higher socio-economic status, e.g., higher educational attainment. The different selection of educational attainment between female and male migrants could dampen men's chances of marriage, especially those with lower education. This mediation effect of education between migration and marriage for men is proven by the fact that all other characteristics being homogeneous, men with higher educational attainment have better chances in the marriage market at the destination (Courgeau, 1989), see Table 2.3.

Furthermore, Chinese men are less likely to intermarry than Chinese women in the New York City (Liang and Ito, 1999). Results show a persistently lower probability of getting married for Chinese male after migrating to the U.S. This could also be due to limited economic resources or socio-economic status. The post-migration matching barrier is not significantly alleviated by the more balanced sex ratio among Chinese co-ethnics at the

[17] It is arguable if these traditional strategies are still the norm in the marriage market as younger generations in China started to embrace gender equality values. "Men dang hu dui" means marrying someone whose family shares similar social status and economic condition, defined by the seventh version of "Contemporary Chinese Dictionary". "Jia gao men", or marrying into a better family, means that a female should marry a man with higher social status and better economic condition.

destination. This finding is consistent with the empirical work on Australian foreign-born single young adults whose marriage was delayed due to international migration (Carlson, 1985).

Contrast to that of men, the marriage likelihood of women is not subject to the migration status. Results show that female migrants typically experience a temporary disruption of marriage around the years of migration; however, their marriage chances become comparable to that of female non-migrants as the years in the U.S. increase. This postponement of marriage might be a result of them searching for a partner with sufficient economic resources (Parrado, 2004) or the lower sex ratio of Chinese co-ethnics at destination country (White et al., 2005) or woman's empowerment (Hypothesis 2).

Migration has a different effect on marriage for individuals with different departure documents. The marriage likelihood of those who migrate with a spouse visa increased sharply during the same year as the migration. However, this does not hold for female migrants with other departure documents. This implies that female migrants are heterogeneous group, within which are a group that tended to migrate through marriage, and another group whose marriage chances are temporarily interrupted due to migration. Women's marriage probability is mainly determined by some demographic characteristics, e.g., age, birth cohort, and educational attainment among others, rather than migration status.

There is unobserved heterogeneity that leads to both higher risk of moving abroad and getting married for both men and women. The unobserved heterogeneity might be personal traits, such as strong motivation and good health, that lead to a certain level of individual income and occupational mobility (Choi and Mare, 2012). A typical marriage-migration story of Chinese in Europe is that, after serving in a Chinese restaurant/shop, the young man desires to establish his own family-run restaurant/shop, for whom one option is to achieve it by marrying a young Chinese woman at the destination. Furthermore, the positive correlation between international migration and marriage might suggest selection into formal family formation, i.e., marriage, rather than cohabitation. For women, some values or preference, e.g., family reunification strategy, the desire of building a family abroad with better chances for the next generation, might drive women to be both more likely to migrate and to marry.

Regarding the effect of marriage on migration, in the single process model for men, getting married promotes migrating abroad. However, the coefficient is no longer significant when unobservable components are taken into account. The negative effect of marriage on migration is stronger for women than for men (Courgeau, 1989). Woman's

migration likelihood decreased by 81% if one was married in the previous year, but man's migration likelihood is only slightly disrupted by marriage.

This paper is among the first to explore the effects of international migration on marriage for Chinese men and women separately. It adds a country case to previous studies and shows the importance of the gendered effect of migration on marriage. It confirms the importance of socio-economic status as a mediator between migration and marriage for men. Women's marriage timing, on the other hand, is closely linked to the existence of a marriage visa. Future research should emphasize the different relationship between migration and marriage for men and women and to incorporate, when data is available, other aspects of one's socio-economic status. This includes, but is not limited to, the complete history of income and occupational mobility.

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Appendix

A.1 Marriage, Internal and International Migration

	Men			Women		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Internal Migration						
Constant	0.20	0.00-17.11		0.00	0.00-0.44	**
Age	0.86	0.61-1.21		1.21	0.83-1.77	
Age squared	1.00	0.99-1.01		0.99	0.99-1.00	*
Educational level (Ref. at most primary)						
junior high school	0.93	0.63-1.38		0.99	0.67-1.46	
senior high school	2.01	1.32-3.07	***	1.65	1.04-2.62	**
proportion of relatives abroad	0.19	0.09-0.44	***	0.11	0.04-0.26	***
looser hukou policy since 1999	3.03	2.08-4.42	***	1.36	0.89-2.09	
International Migration						
Constant	0.01	0.00-0.01	***	0.00	0.00-0.01	***
Age	1.06	0.94-1.20		1.31	1.07-1.59	***
Age squared	1.00	1.00-1.01	*	0.99	0.99-1.00	***
Educational level (Ref. at most primary)						
junior high school	0.91	0.77-1.07		1.40	1.08-1.83	**
senior high school	0.73	0.59-0.91	***	1.57	1.12-2.20	***
proportion of relatives abroad	2.33	1.78-3.05	***	4.61	3.04-6.98	***
China-U.S. migration policies (Ref. little border control)						
first set of migration law 1985	19.07	10.97-33.15	***	5.89	2.29-15.17	***
tightened border controls 1992	35.54	20.30-62.22	***	36.59	14.77-90.62	***
law amendment on smuggling penalties	43.34	24.47-76.76	***	64.01	25.45-161.00	***

A.1 Marriage, Internal and International Migration (continued)

	Men			Women		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Marriage						
Constant	0.00	0.00-0.01	***	0.00	0.00-0.00	***
Age	7.52	4.51-12.56	***	7.46	3.90-14.27	***
Age squared	0.97	0.96-0.98	***	0.97	0.96-0.98	***
Educational level (Ref. at most primary)						
junior high school	0.71	0.56-0.90	***	0.43	0.31-0.61	***
senior high school	0.62	0.45-0.85	***	0.23	0.14-0.39	***
Migration status (Ref. non-migrated)						
year of internal migration	1.17	0.56-2.44		29.59	14.62-59.92	***
internally migrated	0.38	0.24-0.61	***	0.66	0.31-1.39	
year of international migration	0.35	0.22-0.54	***	1.19	0.79-1.80	
internationally migrated	0.19	0.11-0.32	***	1.06	0.73-1.55	
Log-likelihood		-8456			-6746	

A.2 Distribution of Household Size

Number of Household Members	Frequency	Number of Household Members	Frequency
2	22	11	418
3	477	12	432
4	1692	13	143
5	2180	14	140
6	1710	15	45
7	1155	16	32
8	816	19	19
9	666		
10	500		

A.3 Marriage Probability by Migration Status with Unobserved Heterogeneity at both individual and household level

	Men multi-process			Women multi-process		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
International Migration						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	3.20	2.10-4.88	***	3.04	2.26-2.26	***
Age squared	0.98	0.98-0.99	***	0.98	0.98-0.98	***
Birth Cohort (Ref. born 1960-1964)						
born 1965-1969	2.97	1.81-4.87	***	0.81	0.52-0.52	
born 1970-1974	7.98	4.14-15.36	***	1.10	0.61-0.61	
born 1975-1980	15.73	7.21-34.30	***	2.00	0.90-0.90	*
born 1980-1985	17.55	7.17-42.97	***	3.06	1.10-1.10	**
Educational level (Ref. at most primary)						
junior high school	1.18	0.86-1.63		1.48	1.13-1.13	***
senior high school	0.60	0.39-0.92	**	1.13	0.80-0.80	
Have household member once being cadre	1.12	0.83-1.52		1.81	1.44-1.44	***
China - U.S. immigration policy (Ref. little border control)						
official document on tightening controls 1992	1.80	1.25-2.61	***	6.35	3.93-3.93	***
law amendment on penalties for smuggling	1.90	1.09-3.33	**	9.26	4.91-4.91	***
Married one year before	0.66	0.48-0.91	**	0.19	0.13-0.13	***

A.3 Marriage Probability by Migration Status with Unobserved Heterogeneity at both individual and household level (continued)

	Men multi-process			Women multi-process		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Marriage						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	9.46	5.37-16.63	***	15.62	4.82-4.82	***
Age squared	0.97	0.96-0.97	***	0.96	0.94-0.94	***
Birth Cohort (Ref. born 1960-1964)						
born 1965-1969	0.90	0.67-1.20		0.62	0.41-0.41	**
born 1970-1974	0.42	0.27-0.64	***	0.31	0.18-0.18	***
born 1975-1980	0.17	0.09-0.33	***	0.13	0.05-0.05	***
born 1980-1985	0.02	0.00-0.07	***	0.04	0.01-0.01	***
Educational level (Ref. at most primary)						
junior high school	0.94	0.73-1.20		0.51	0.35-0.35	***
senior high school	0.56	0.39-0.79	***	0.23	0.12-0.12	***
Migration status (Ref. non-migrated)						
year of international migration	0.23	0.10-0.52	***	1.17	0.53-0.53	
internationally migrated	0.21	0.12-0.36	***	0.86	0.35-0.35	
Educational level * migration status (Ref. at most primary and non-migrated)						
junior high school * year of migration	2.72	1.05-7.05	**	0.95	0.38-0.38	
senior high school * year of migration	2.06	0.59-7.22		0.72	0.22-0.22	
junior high school * migrated	0.93	0.58-1.48		0.95	0.37-0.37	
senior high school * migrated	1.88	1.01-3.52	**	0.92	0.30-0.30	
Standard deviation of unobserved factor on individual level, migration	2.39		***	1.44		***
Standard deviation of unobserved factor on individual level, marriage	1.00			1.50		
Correlation between migration and marriage on individual level	0.59		***	0.26		**
Standard deviation of unobserved factor on household level, migration	1.52		***	0.59		
Standard deviation of unobserved factor on household level, marriage	1.37		***	1.51		*
Log-likelihood	-9502			-7580		

Chapter 3

DOES MIGRATION MATTER FOR HIGHER FERTILITY?

Fertility of Chinese International Migrants to the U.S. and Non-Migrants During China's One-Child Policy Period

Abstract

This paper investigates the interrelationships between international migration and fertility in the context of the Chinese family policies. It examines the effect of China's fertility policies by comparing Chinese who did not leave the country (non-migrants) to those who moved to the United States (migrants). The combination of no longer being subject to China's family policy and being affected by the migration process determine the fertility of migrants. We use data from the U.S. census of 2000, the American Community Survey 2005, the Chinese census of 2000 and the Chinese 1% Population Survey of 2005. Discrete-time event history models are used to analyse parity-specific fertility and migration as joint processes, thus accounting for selection effects. Results show that migrants are selective of lower fertility. Regarding the emancipation effect, the results show that migrants have substantially higher childbearing probabilities after migration. This suggests that Chinese family policies were effective in lowering the fertility of its citizens.

Results on the disruption hypothesis differ by birth parity. Migrants are less likely to have the first birth at the year of migration; however, the second and third births hazards were found to be higher at and after the year of migration. There is a mixed result concerning the adaptation effect on the fertility of migrants to the U.S. context.

Keywords— fertility, international migration, one-child policy, China, emancipation effect.

3.1 Introduction

The main purpose of this paper is to understand the fertility of Chinese international migrants by taking non-migrants as the reference group. We examine whether the different fertility tempo and quantum of migrants' and non-migrants' fertility is attributable to four effects: the possible selection effect of migrants in terms of (unmeasured) characteristics leading to a particular fertility behaviour, the effect of no longer being subject to the Chinese population policy (that we denote as "emancipation" effect), the disruption caused by migration, and the adaptation of fertility to the new environment after migration. The word "emancipation" is borrowed from Hwang and Saenz (1997), who argued that the "fertility of Chinese women, which was kept low by the Chinese fertility policies, should bounce back after emigration to the U.S.". This is because China's one-child policy allows for only one child in most cases. Only under some circumstances, are two children allowed. Having more children than allowed leads to huge penalties. Furthermore, we are interested in how the four effects mentioned above jointly influence the fertility of Chinese international migrants. Finally, this paper assesses the effectiveness of different fertility policies for Chinese non-migrants and compares their fertility to that of Chinese migrants.

There were many debates on the drivers of the declined fertility in China. Some argued that the one-child policy was powerful in depressing fertility (e.g., Gu et al. (2007)), while others have commented that the below-replacement fertility level in China is "to a great extent" driven by social and economic development (e.g., Cai (2010)). Moreover, a fundamental shift in fertility intention has appeared: among those eligible to have two children, many of them voluntarily chose to have only one child (Zheng et al., 2009). On the other hand, the country of destination did not have a substantially restrictive birth control policy that urges low fertility during the period studied. The exception to this was

that in 1965, the U.S. Supreme Court gave married couples the right to use birth control[1]. This means that, theoretically, after migrating to the U.S., migrants could have as many children as they desire. This paper does not argue that migration provides a counterfactual environment where everything remains equal except the absence of the one-child policy. Moreover, migrants are a selective group who might have some selective fertility level, e.g., lower fertility.

The interrelationship between migration and fertility matters for explaining migration and fertility behaviour of international migrants to the U.S. for the following reasons. First, it is not clear the extent to which Chinese migrants' beliefs and attitudes about fertility converge towards those in American society. On the one hand, the educational and occupational achievement improved dramatically for Chinese migrants in America (Wong, 1980). Research from the Pew research center showed that by 2015, Chinese Americans attain a bachelor's degree or above at a higher rate than U.S. natives. A considerable proportion of Chinese migrants in the U.S. are exposed to the norms at the destination through the educational system. On the other hand, migrants and their descendants often formed segregated ethnic communities in several locations, including New York City, which hindered their assimilation (Zhou and Logan, 1991). Second, both a massive migration flow to the U.S. and the one-child policy happened during the 1980s and the 1990s, implying that migration and fertility are firmly related events for the Chinese. Third, Chinese migrants in the U.S. are predominantly coming from Canton, Zhejiang province before the economic reform in 1978, and Fujian province since the mid-1990s (Liang, 2001a; Lu et al., 2013), which are historically the regions of higher fertility.

One of the innovations of this paper is that we examine the interrelationship between fertility and migration in the China-U.S. migration that few scholars have explored. The U.S. is the most popular overseas destination for the Chinese and the largest one outside Asia. There are around 3.8 million Chinese (except Taiwanese) living in the U.S. by 2010 (United States Census Bureau)[2]. China-U.S. migration stands out from other migration systems in that there is no geographic proximity nor historically cultural or language connection between the origin and destination. Unlike the Mexico-U.S. migration route, circular migration is not prevalent and return migration is not frequent in the China-U.S. migration system (Liang and Zhang, 2004). Contrary to other migration systems that

[1]This amendment to the law was aimed to protect the "right to privacy." Further details could be found at `https://www.thirteen.org/wnet/supremecourt/rights/landmark_griswold.html`

[2]Race Reporting for the Asian Population by Selected Categories: 2010. U.S. Census Bureau.

often involve immigrants moving from a country of higher fertility level to another of lower fertility level, the total fertility rate of the U.S. surpassed that of the country of origin for Chinese-U.S. migration since 1995 (see Figure 3.1). It is rare in other migration settings that some significant family planning program lasted for more than 30 years and country of origin experienced a sharp drop of the total fertility rate, while destination country granted birthright citizenship and experienced a more stable fertility level (TFR at around 2). This gives us an opportunity to study the "emancipation" effect, the adaptation, disruption, and selection effects of migration on fertility, by focusing on the 40 years from 1965 to 2005. During this period several family policies were enacted in China, including the one-child policy, when the fertility level of origin and destination countries showed different trends, involving that the U.S. total fertility rate exceeded that of China since the mid-1990s. All these factors make the Chinese-U.S. migration a particularly relevant case of study.

Furthermore, many papers have discussed the influence of the one-child policy on Chinese natives. This paper does not provide an evaluation of China's one-child policy, but we believe that it sheds new light on the policy's effects. It does so by comparing those who were emancipated from the policy (international migrants) with those who were not (non-migrants). To do so, the fertility of Chinese women that were subject to each particular family policy by province of residence is compared to the migrants living in the U.S., who are no longer subject to these policies. We are not arguing that migrants are an exact counterfactual to non-migrants under the one-child policy. Migrants and non-migrants face different sets of circumstances. Apart from being liberated from the one-child policy, migrants are subject to selection, disruption and adaptation effects that are related to the migration process.

Previous findings showed that Chinese international migrants have lower fertility than Chinese non-migrants (Abbasi-Shavazi and Mcdonald, 2000) and natives at the destination (Coleman and Dubuc, 2010). This paper shows that migrants are selective of lower fertility, and that controlling for such selection is crucial for assessing the effects of their "emancipation" from Chinese policies, as well as for a non-biased estimation of disruption and adaptation effects. Consistent with Hwang and Saenz (1997), who argued that fertility of Chinese women would bounce back after migration, this paper shows that Chinese international migrants postpone first, second, and third births before migration and accelerate their timing after migration. This is particularly the case for second births, which is the parity most affected by the one-child policy. There is evidence of emancipating from fertility policy for the second birth, since the fertility level of the second birth

rebounds right away after migration (see Figure 3.4). After migration, the probability of progressing to the second birth increases dramatically, unlike for the first or third birth, implying adapting to a fertility level which is very close to that of U.S.. Almond and Edlund (2008) found that the sex ratios of the third baby born to Asian parents in the U.S. are particularly skewed: boys outnumbered girls by 50% if there were no boys before. This paper shows that son preference is altered by migration. If a woman's all previous births are females, those who are migrants are less likely to continue giving birth with respect to non-migrants, signifying adapting to a society with less son preference.

However, Chinese migrants' attitudes towards the number of children continue to mirror that of non-migrants even as their years in the U.S. increase. The year 1995 features reversing TFR of the destination historically surpassed that of the country of origin. As observed in the fertility level until survey year of the two groups, the gap of fertility level between non-migrants and migrants as years stay in the U.S. increased during the period of 1965-2005 is similar to that from the period of 1965-1995 (see Figure 3.4 and Appendix A.4). This means that there is hardly converged fertility towards that at the destination country as migrants spend more and more time in the U.S.

3.2 Theoretical Frameworks and hypotheses

3.2.1 Migration Status and Family Policy

Chinese traditional culture explicitly favors higher fertility. This is reflected in the saying "more sons more happiness" ("duo zi duo fu"). The more sons one has, the more likely that the surname would survive and flourish (Bongaarts and Greenhalgh, 1985). From 1980 to 2015, the Chinese government implemented the one-child policy across China with the aim of lowering the national fertility level by imposing a gradient of limitation on the first, second, third and higher births. Given that Chinese traditional culture prefers more children, one can assume that the Chinese fertility rate would have been higher without the one-child policy. The one-child policy, and its changes, allows for only one child. Under a few circumstances, two children are allowed. International migrants are no longer subject to China's family policy which allows for only one or two children. If this is true, we should observe higher fertility after international migration.

It is obvious that one-child policy allows for the first birth, however, the "later-longer-fewer" policy started in 1974 promoted delayed marriage, which might affect the timing of first births (Bongaarts and Greenhalgh, 1985). Within the framework of the one-child

policy, second births were sometimes allowed; this was contingent upon many factors, such as the province in which an individual resided and whether this person had an agricultural *hukou* (rural household registration, as opposed to an urban registration). The third birth was almost never permitted after 1980 with few exceptions, e.g., herders in Tibet could give birth to at most three.

Existing literature explored rural-to-urban migrants within China and yielded mixed conclusions on the emancipation hypothesis. Yang (2000) found that rural-to-urban temporary migrants, who registered as rural dwellers but lived in the urban area, circumvented the one-child-per-family policy since fertility policies were stricter for urban residents than rural ones. While Liang et al. (2014) found rural-to-urban migrants decreased their fertility, urban-to-rural migrants increased theirs. Goldstein et al. (1997) found that the fertility of temporary internal migrants does not significantly differ from that of non-migrants. By contrast, the test of the "emancipation" hypothesis that applies to Chinese international migration case is under-researched in the previous literature. An exception is Hwang and Saenz (1997) who, using the 1990 U.S. census, showed that female Chinese migrants to the U.S. from mainland China have achieved a higher fertility level than those who migrated from other East Asian societies without fertility restrictions (mostly from Taiwan, Hong Kong, and Vietnam). This higher fertility outcome is attributed to an "emancipation" effect, meaning that fertility should increase once policy restraints are released, i.e., after migrating to the U.S.. Hwang and Saenz (1997), therefore, did not compare the fertility of Chinese international migrants with Chinese non-migrants living in mainland China, as we do here. Furthermore, they employed cross-sectional data and methods, which limits the reliability of their results.

Overall, the "emancipation" hypothesis has not been properly tested before the present paper. This hypothesis holds that the fertility levels of migrants should increase once they leave the country and are no longer subject to the family policies existing in China. Given the different effect of the fertility policy on each birth parity, also the "emancipation" effect should differ between them, being higher for second and third births than for first births.

H1: If the "emancipation" hypothesis holds, migrants should have a higher fertility level than Chinese non-migrants on the transition to the second and third birth but less so on the first birth.

Furthermore, it should be taken into account that the rapid socio-economic change in the P.R. of China during the period examined also involved a decline with respect to the pre-existing fertility preferences and levels, independently or in interaction with

the family policies (Cai, 2010). Therefore, we will also explore the possible presence of changes over time in the "emancipation" effect, with the inclusion in the analyses of an interaction effect between the individual's birth cohort and her migration status. The impact of the policy may have diminished over time as suggested for instance by Zhao and Zhang (2018). This implies that also the "emancipation" effect should diminish over time (or for more recent birth cohorts).

H2: The "emancipation" effect should decline for younger cohorts.

3.2.2 Migration Adaptation Hypothesis

International migrants not only differ from non-migrants in that they are not subject to Chinese fertility policies but are also selective in the economic situation, housing, income, etc. That is why it is problematic to attribute the differences between migrants and non-migrants to Chinese fertility policies only. The adaptation hypothesis argues that the fertility of migrants might converge towards that of the natives in typically less than 10 years (Milewski, 2010) through the adoption of social, economic and cultural norms (Chattopadhyay et al., 2006). Unlike disruption hypothesis, adaptation hypothesis focuses on the medium-term effect of migration on fertility.

At least two factors contribute to whether the fertility level of Chinese converged towards that of the U.S.: the segregation of Chinese in American society and the complex socio-economic condition of Chinese Americans. First, Chinese are a segregated ethnic group in the U.S., who form ethnic communities that symbolize and sustain ethnic identity (Logan et al., 2002). Zhou and Logan (1991) argued that the residential choice of the Chinese Americans is driven by their preference of proximity and accessibility to the ethnic enclave economy. This is a sign of resisting assimilation and keeping one's preference for cultural familiarity. Second, from the 1940s to 1970s, the American economy expanded continually, and Chinese Americans have experienced the most significant improvement in education and occupation (Wong, 1980). While provided the opportunities to adopt American values, considerable differences between Chinese and other ethnic groups in the U.S. remained. For example, Chinese males earned less than Whites (Wong, 1980). This could have prevented migrants adapting the norms at the destination. Surprisingly, the socio-economic status of Chinese women in the U.S. has not been explored given that it is another important determinant of fertility behaviour.

From the 1960s on, period TFR of China dropped dramatically from more than 6 to well below replacement level, while the U.S. period TFR fell only slightly from 1960 to

1975 but bounced back and kept stable at around two children per woman. The period TFR lines of the two countries intersected during the mid-1990s, as shown in Figure 3.1. If the adaptation hypothesis holds, we should find the fertility of international migrants converge to that of the destination country, no matter if they are from a country of lower or higher fertility levels than the destination country. Most international migrants come from a less developed country with higher fertility levels than the destination country, for example, from Mexico to the U.S., from Africa to Europe, etc. The declining fertility of international migrants after arriving at the destination country could be seen as a sign of adopting fertility norms associated with lower fertility. However, this is not the full story. According to the adaptation hypothesis, fertility of migrants from a country of higher fertility levels should decrease after migration, and that fertility of migrants from a country of lower fertility levels should increase as years stay in the U.S. increase. The latter case is less discussed. The reverse of the relative total fertility rate of China and the U.S. provided an opportunity to shed light on the adaptation hypothesis. Compared with non-migrants in China, fertility levels should be lower or should converge to lower levels as the length of the stay in the U.S. increases, during a period when China's TFR is higher than that of the U.S.. Similarly, the fertility of Chinese migrants should be higher than that of non-migrants during a period when the U.S.' TFR surpasses that of China, as migrants stay longer in the U.S..

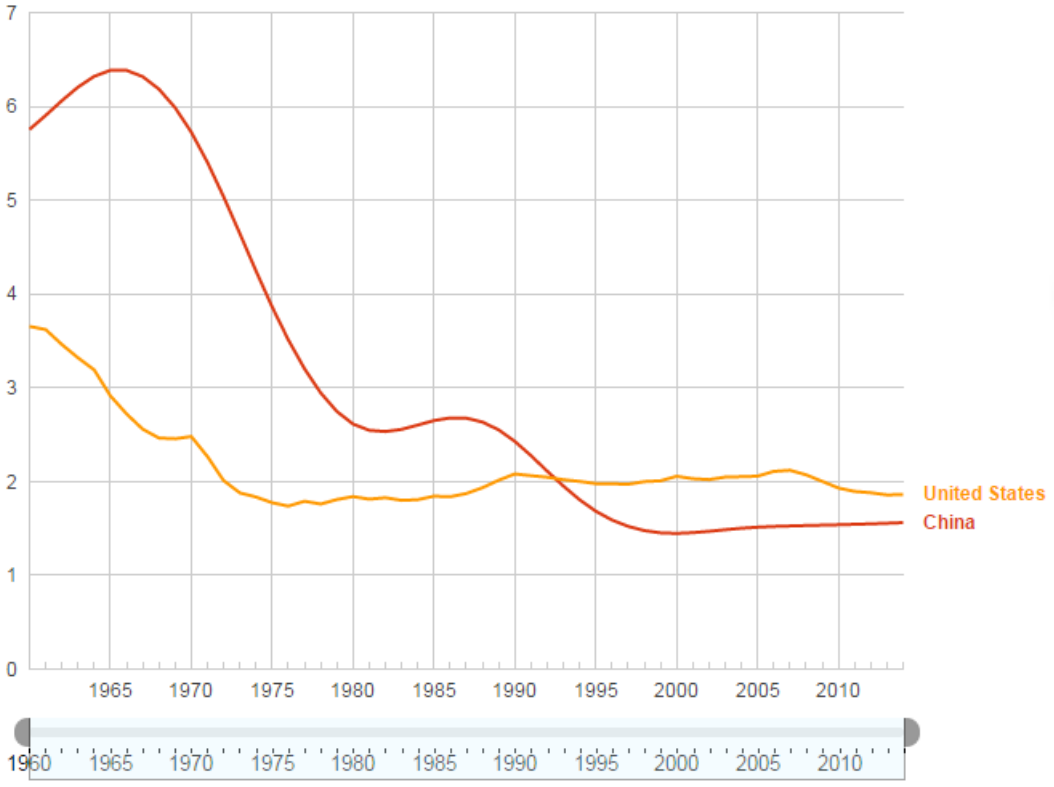
H3: If fertility adaptation hypothesis holds, as the duration of stay in the U.S. increased, migrants' fertility level should be lower before 1995 and higher after than that of non-migrants.

3.2.3 Migration as a Disruption to the Fertility Process

The disruption hypothesis argues that moving itself is a stressful process for migrants, which depresses fertility around migration time, especially international migrants (Milewski, 2010). Difficulties of giving birth around migration are related to the physical separation of spouses, uncertainty about the future, including in particular job instability, and practical concerns such as considering that childbearing might impede economic success or a temporary lack of resources. Migration disruptive effect leads to postponed birth and accelerated fertility behaviour after the uncertainty or difficulties brought by migration disappear (Goldstein et al., 1997).

A different situation emerges when migration is triggered by marriage, in which case migration should lead to higher fertility just after migration since the couple starts their

Figure 3.1: Total fertility rate, China, and the U.S, 1960-2010



Source - World Bank.

family at the same time of the migration of (one member of) the couple (Hoem and Nedoluzhko, 2008). Yet, once a control for the duration of the marriage is made, this effect should disappear. Unfortunately, marriage migration cannot be identified in our analyses, since age at first marriage is not available in the U.S. 2000 census. However, data on Fujianese migrants to the U.S. illustrated that marriage chances at the year of migration are only 25% of that before migration for male migrants, and that for women, marriage chances at the same year of migration are not significantly different from that before migration (See Chapter 2 of the thesis). Marriage migration is not prevalent in Chinese-U.S. migration though for some women who migrated with spouse visa, the urgency of getting married and migrating in the same year does exist (see Chapter 2 for details). This means that marriage migration is not driving our results about the probability of having a birth during the year of migration.

Greenhalgh (1988) argues that in a culture in which economic rationality is prevalent, one's fertility is adjusted to achieve socio-economic mobility and security. It is likely that some Chinese calculate the benefits and costs of giving birth, which resulted in rapidly declining fertility (Greenhalgh, 1988). Their fertility depends on the sensitivity to costs and benefits and their socio-economic mobility orientation. This could also be true for Chinese international migrants around migration time, if they are economically rational and prioritize other goals than fertility during the challenging time surrounding migration.

H4: If the migration disruption hypothesis holds, migrant's fertility level should decrease around migration time and recover afterwards.

3.2.4 Migrant Selection Hypothesis

Most previous literature dealing with the interrelationship between migration and fertility discovered that migrants are negatively selected in terms of fertility, with respect to the non-migrants of the origin population. Although this selection effect is generally difficult to prove empirically, some evidence of its existence has been shown in different migration contexts. This includes Chinese Malaysian rural-to-urban migration (Goldstein and Goldstein, 1983), long-term or settled Mexico-U.S. migration (Lindstrom and Saucedo, 2002), Ghana rural-to-urban migration (Chattopadhyay et al., 2006), and Africa-Europe migration (Baizán, 2017). These studies consider some socio-economic status, for example, education. Migrants might also be selective of some unobserved characteristics, for example, a couple's desire to achieve higher socio-economic status. These types of variables are generally unavailable in migration quantitative data, potentially leading to

endogeneity between the processes of migration and fertility. Biased results can then be obtained in the statistical analyses if a proper control of these selection effects is not made (Lillard, 1993).

In most countries, the fertility of Chinese is lower than the one of other ethnic groups (Poston et al., 1994), but little research has seriously addressed their actual fertility selectivity. Coleman and Dubuc (2010) found the fertility level of Chinese international migrants the lowest among all ethnic migrant groups and much lower than white British from 1996 to 2005. The TFR was 1.23 and 1.24 for Chinese migrants during 1996-2000 and 2001-2005, and the TFR was 1.72 and 1.71 for White British during 1996-2000 and 2001-2005, respectively. Another work on Australian context found similarly lower fertility level for Chinese international migrants (Abbasi-Shavazi and Mcdonald, 2000). However, it is still not clear which fertility level is lower, that of Chinese international migrants or non-migrants. Furthermore, these results suggest that Chinese international migrants may be highly selective for very low fertility levels.

The selection hypothesis posits that migrants are selective of specific observed or unobserved characteristics, e.g., education, age at marriage, tendency to postpone childbearing, etc., that are linked to a lower or higher fertility level than non-migrants (Chattopadhyay et al., 2006). Chinese women migrated to the U.S. might be positively selective on socio-economic status, income, and education as shown in Chapter 2. This is because migration cost was high for the Chinese household, and anti-immigration policy on the U.S. side limited the migration of lower-skilled migrants. This is likely to result in lower fertility intentions and a stronger orientation towards improving social status for migrants. As this paper focuses on the fertility of migrant women, Hypothesis 5 would be only about migrant women, although the selectivity of migrant men should also be relevant for migrants' fertility.

H5: Migrant women are selective of some (unobserved) characteristics, including own income, occupation, education, and age at marriage, that predict a relatively low fertility level.

3.3 A Brief Review of China's Family Policy

The China TFR decreased dramatically from 6 in 1965 during the baby boom period to 2.5 in 1980 during the initial implementation of the one-child policy. This is followed by several changes over time for particular groups that were subject to special conditions, for instance, rural residents, minority ethnic groups, and economically disadvantaged fami-

lies. These changes took place in different years ranging from 1982 to 2012 and were active until the end of the one-child policy in 2016, see the Annex A.1 for details of the starting year of these changes by provinces.

During 1970s, "later-longer-fewer (Wan-Xi-Shao)" was introduced, which refers to a) postponed marriage, i.e., 28/25 and 25/23 for men and women of urban and rural residence, respectively, b) four years interval between two births, and c) at most three children for rural dweller and at most two children for urbanites (Bongaarts and Greenhalgh, 1985). The "later-longer-fewer" policy was still implemented during the one-child policy and was regulated by the planned birth regulations. The 1984 "report on the progress of family planning" stated that "Local authorities should strictly limit marriage before the minimum age at marriage as in the 1980 Law of Marriage, i.e., 22 for males and 20 for women, but those that insist to get married, after being persuaded not to, can get married. However, they should be suggested to give birth later by the local authorities". The channels through which couples could have more births than allowed are very limited. One well-known way to do so is by contributing a "social support" fee as a form of penalties. This "social support" fee usually equals to or being multiple of household total income of last year[3].

The one-child policy started around 1980 with very strict conditions under which a second child is permitted. In April 1984, the "(national) report on the progress of family planning" expanded the conditions under which couples can have a second child while being stricter with an unplanned second child. Those conditions under which two births are allowed include, but are not limited to, couples in which both partners have no siblings ("Shuang Du Liang Hai"), one of the partners have no siblings ("Dan Du Liang Hai"), and agriculturally registered couples with a first child being a girl ("Yi Hai Ban"). Most provincial Family planning committee stated that the birth interval between the first and second should be more than 4 years, but this was not applicable to women that were older than 30.

The overall TFR of Mainland Chinese is higher than the one suggested by the one-child policy because the policy varies by regions, rural-urban status, and ethnicity, and because couples paid the social pension fee for having additional children. Furthermore, one-child policy regulations changed over time. Gu et al. (2007) pointed out two critical indicators to classify different implementation of the one-child policy: rural-urban status

[3]The payment of social support fee, though lack of official statistics, is assumed to be prevalent for above-quota births since endorsement of *hukou* and thus accessibility to social welfare for this above-quota birth heavily depends on the legitimacy through contributing this social support fee.

and province of residence. Building on these indicators, we account for the various starting years of these provincial-level regulations on fertility and individual-level sex of the first child. This sheds light on the strength of one-child policy in restricting its citizens' fertility. In the Annex A.1, we list the conditions of provinces, periods and *hukou* status (rural/urban) under which only one or two children are allowed, respectively.

3.4 Chinese International Migration to the U.S.

Since the 1960s, U.S. immigration policy has facilitated migration from China by eliminating the pre-existing quota system and by permitting network migration. In 1996, the U.S. enacted the "Illegal Immigration Reform and Immigrant Responsibility Act", which assigned a quota for Chinese subject of the one-child policy to claim asylum in the United States. Soon after allowing migration to the U.S. in 1977 and introducing economic reforms in 1978, China initiated the ever-strict fertility policy known as the "one-child policy" in 1980. This interaction of immigration policy in the U.S. and one-child policy in China is relevant since it may involve a selection of migrants linked to higher desired fertility.

On the other hand, the Chinese government kept tightening strict control of the emigration flow abroad, especially from the seven coastal provinces which show higher international emigration. In November 1985, the first migration policy was enacted including border control and application to passports. This policy regulates and provides the punishment for illegal emigration and the administrative process for Chinese citizens to travel abroad and return. In April 1992, an official document was released that urged coastal provinces to tighten up border controls. In 1997, the National People's Congress amended the criminal law by adding punishment on human smuggling. Until late 1999, a policy was enacted which normalized the process of migrating abroad. The history of Chinese emigration policy was well documented in Chin (2003). The result of U.S. immigration policy and Chinese emigration policy is a dramatic increase of Chinese migrants in the continent of America, which grew from around 700,000 to 3.226 million in 1990 (Poston et al., 1994). This vast migration flow during the 1980s and 1990s is captured in this article.

3.5 Data and Measurement

This paper uses data on Chinese migrants in the U.S. and non-migrants living in China. For Chinese migrants in the U.S., we consider both the first-generation and the 1.5-generation, i.e., people who migrated before age 15 or before the starting point of reproductive ages. We focus on the period before and after the one-child policy dominated in Mainland China, i.e., between 1965 and 2005. For migrants, we use the 5% sample of U.S. census 2000 and the 2005 American Community Survey, and for non-migrants the Chinese census of 2000 and a sub-sample of the China 1% National Population Sample Survey 2005.[4] We randomly resampled 1% of the non-migrant women for the sake of faster computation process. We have 18922 non-migrants and 12332 migrants in the final sample.[5]

We identified the women in reproductive ages, 15-49, who were born between 1950 and 1990 and were living either in China or the U.S. at survey year, i.e., first- and 1.5-generation migrants. The reason why the analysis is only undertaken for women is that only the number of children born to the mother is available[6]. We used three criteria for censoring observations if no further births are observed: 15 years after the previous birth, age at census time, and age 50. We selected one of these conditions for censoring the observations based on its chronological order, i.e., which condition comes first in terms of time. Return migrants are not considered, which might only slightly bias the result since Chinese international migrants have a remarkably low return rate (Liang and Zhang, 2004)).

We reconstructed the fertility history of all women by applying the own-child technique (Coleman and Dubuc, 2010). We link the first, second and third child born to the mother using the information on relationship to the household head, children ever born, age of children and mother. Among migrants, we only included women whose self-reported number of children born matched the number of children that were linked to her in the household. This is so the result would not be affected by missing information for those children that have moved out of the household. To adjust for reverse causation, in the analyses, we included the approximate date, when the mother probably noticed the

[4]The U.S. 1980 and 1990 census data is not employed because there is no information on the exact year of migration which makes the construction of complete migration history not possible.

[5]The result of main indicators does not change substantively when the different 1% samples of the non-migrants were used, meaning that the result is not sensitive to the re-sampling from the original data.

[6]The disruption effect is likely to be higher for males since the separation ends typically when the woman arrives at the destination.

pregnancy, calculated as one year before the delivery to account for the 9 months pregnancy period.

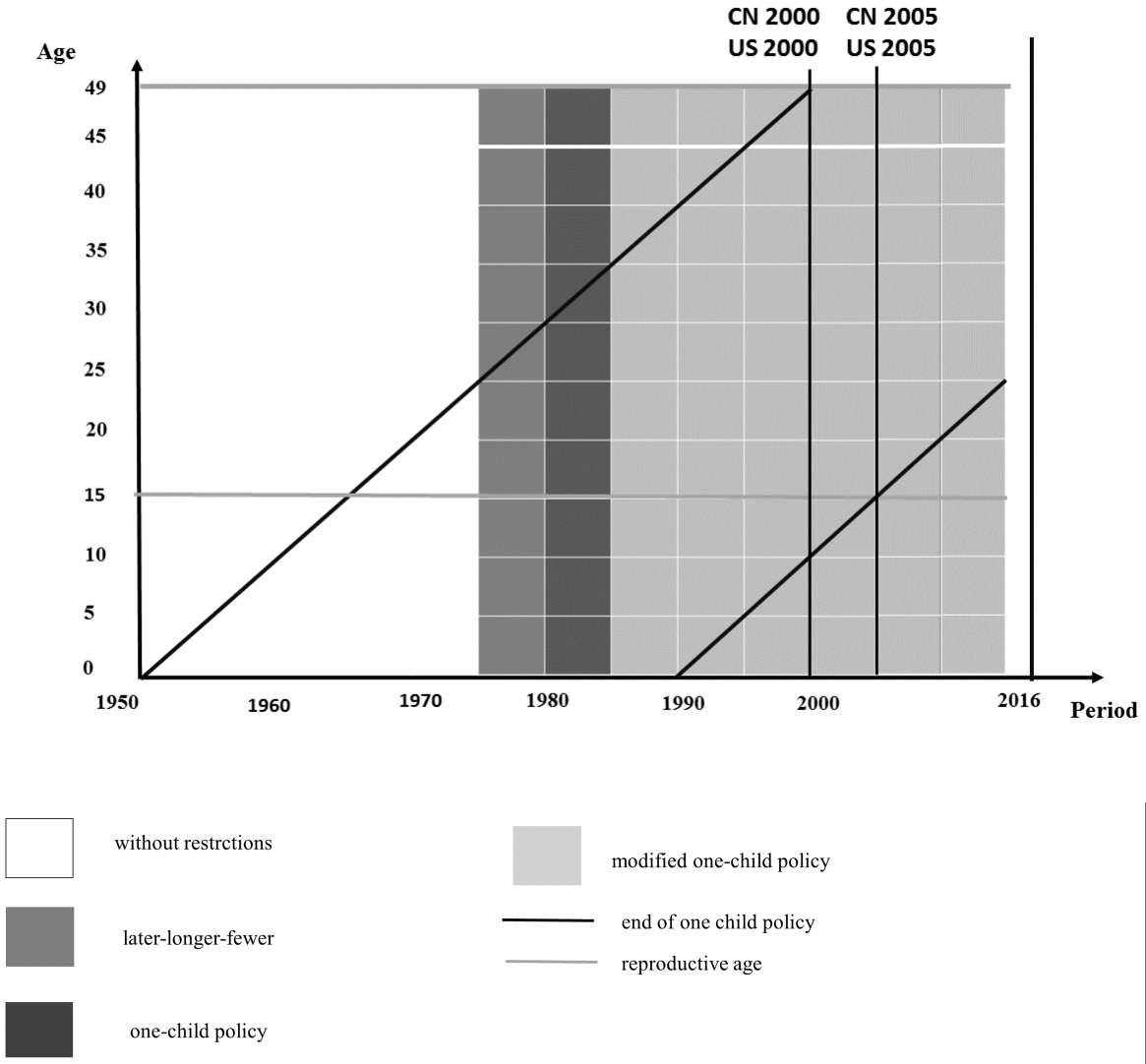
Figure 3.2 shows women who were born between 1950 and 1990 encountered different fertility policies across reproductive ages (in solid grey line). The one-child policy roughly started the year 1980 and ended on the first day of 2016. The white grids represent the period without firm birth control. The period of 1974 to 1979 witnessed the "later-longer-fewer" policy. The darker area between 1980 and roughly 1985 represent the strictest version of the one-child policy, and the lighter grids stand for several amendments of the one-child policy that varied across the country. We can observe that the fertility decisions made by the members of the cohort born from 1950 to 1990 are heavily influenced by the one-child policy, though married women stayed for different length of time under different policies.

In China, no one was allowed to have three or more births, except, for instance, herders in Tibet, i.e. numerically marginal groups. There were, however, no restrictions on the first birth. Fertility policies differ by provinces during the one-child policy period, regarding when and how a second birth is allowable. Table A.1 in the Appendix shows the starting year of a change in the provincial fertility policy, when a second was allowed under certain conditions, e.g., couples are both only children, and its applicability to rural and urban residents. Conditions under which a second child was allowed were also documented in Gu et al. (2007). Since the census data do not provide information on whether the couples themselves are only children, there is some inference with upper and lower bound. Under the condition that all couples in China fulfil the "both couple members being the only child" condition, thus all could give birth to a second child as long as the province and *hukou* status allows, we obtain the upper bound estimation of a second child. This will overestimate the power of the policy changes. While assuming all couples have at least one sibling, or "no couple being the only child", provides the lower-bound condition that may underestimate the elasticity of the policy changes[7]. Before modelling the effect of migration status and fertility policy on the first, second and third birth, migrants and non-migrants were matched by a matching technique explained in Appendix A.5.

To analyse the possible interrelationship between the processes of fertility and migration, we used structural-equation event history models with the correlated unobserved het-

[7]The two approaches report similar result of policy changes on fertility except that the coefficient of "more than 1 child allowed" is negative under the lower-bound condition that "no couple being the only child" and positive under the upper-bound condition that "both couples being the only child" in the regression for the first birth equation. Table 3.1 shows the results following the "both couples being the only child" approach.

Figure 3.2: One-child policy by age and cohort



erogeneity of the type introduced by Lillard (1993). We compute simultaneous equations for all three birth orders and first-time migration. The endogeneity of fertility and migration was specifically addressed by allowing unobserved heterogeneity to be correlated across the two processes. In that way, it is possible to control for shared unmeasured factors that simultaneously influence births and first migration. Furthermore, parity-specific selection effects were accounted for by modelling each parity with one equation (Kravdal, 2001). Equation 3.1 to 3.4 is formulated following equation 10.1 in Rabe-Hesketh and Skrondal (2012).

$$ln\left\{\frac{Pr(y_i^{1B}=1|X_i)}{1-Pr(y_i^{1B}=1|X_i)}\right\} = \beta_1 x_{it} + \beta_2 w_{it} + \epsilon_i \tag{3.1}$$

$$ln\left\{\frac{Pr(y_i^{2B}=1|X_i)}{1-Pr(y_i^{2B}=1|X_i)}\right\} = \beta_1 x_{it} + \beta_2 w_{it} + \epsilon_i \tag{3.2}$$

$$ln\left\{\frac{Pr(y_i^{3B}=1|X_i)}{1-Pr(y_i^{3B}=1|X_i)}\right\} = \beta_1 x_{it} + \beta_2 w_{it} + \epsilon_i \tag{3.3}$$

$$ln\left\{\frac{Pr(y_i^{M}=1|X_i)}{1-Pr(y_i^{M}=1|X_i)}\right\} = \beta_1 w_{it} + \lambda_i \tag{3.4}$$

where the subscript i refers to the woman, and t to each time unit, i.e., year. The X_i denotes a vector of covariates, x_{it} denotes the fertility policy and migration status variable, and w_{it} is a set of control variables. The left side of the equations are the logarithms of the odds conditional on a set of covariates and the error term (heterogeneity term). The values of a time-varying covariate change at discrete times in the spell (time period) and are constant over the time span between those changes. To apply discrete-time event history models, a person-year file was constructed. Women enter the risk set when they reach 15, and they leave it when they reach 50 or 2000/2005 (census or survey time). Thus, each woman can contribute with several spells, according to each parity and whether she has ever migrated. We applied logistic regression with the dependent variable coded as 1 having the corresponding birth order and 0 not yet having the birth parity. The women-specific random variables ϵ and λ capture unobserved heterogeneity, and are assumed to have a joint bivariate normal distribution:

$$\begin{pmatrix} \epsilon \\ \lambda \end{pmatrix} \sim N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_\epsilon^2 & \rho_{\epsilon\lambda} \\ \rho_{\epsilon\lambda} & \sigma_\lambda^2 \end{pmatrix}\right) \tag{3.5}$$

in which $\rho_{\epsilon\lambda}$ is the correlation between the unobserved heterogeneity terms of the pro-

cesses. The model estimation was performed using full-information maximum likelihood, as implemented in the package aML (Lillard and Panis, 2000).

Table 3.1 shows the descriptive statistics for all the independent variables in the analysis. Time constant variables, except for education level, were counted in persons, while time-varying variables, i.e., the one-child policy, U.S. migration policy, and Chinese emigration policy, were counted in person-years. Age is operationalized as a time-varying variable in the model but shown as "age at survey time" in the descriptive analysis. The first three columns show the variables involved in the equations of first birth and migration because the whole sample is at risk of a first birth and migration at 15. The other six columns show the descriptive statistics for variables of the sample at risk of second and third birth. The reference group is marked as "ref" in the table. Women's education levels are calculated from the time-varying age and the standard Chinese and American educational framework, which shows the individual's grade at a certain age. The variable "first (two) birth(s) female" presents the sex of the previous birth(s), which implies the degree of son preference. Moreover, the migration policies at the country of origin and destination changed across time. This period effect is presented in the variables of "U.S. migration policy towards Chinese" and "Chinese emigration policy".

The primary variables explaining fertility differences are migration status controlling for age, cohort and women's educational attainment. "Fertility policy and migration status" stands for whether a) a particular birth parity is allowed when the individual's place of residence at a given point in time was China, b) at the year of migration to isolate the simultaneity of the two events, i.e., migration and fertility, c) she is living in the U.S. and belongs to the first-generation of migrants and d) the woman belongs to the 1.5-generation of migrants, i.e., migrated to the U.S. before age 15, and lives in the U.S.. We separate the likelihood of having birth by parity since each birth parity is treated differently by policy. The reference group reflects the strictest family policy for that particular birth parity.

Given the large differences between regions in China, the regional differences in family policies should not be ignored. These are covered in the point (a). Normally, administrative fertility policies vary by province of residence and across time. We introduce province-specific fertility regulations (See Appendix A.1) in 22 provinces, 3 municipalities (except Chongqing which is integrated into Sichuan Province) and the 5 autonomous regions that in total cover almost all areas of mainland China. This analysis draws on the 287 documents on "population and planned birth regulation" available at the *pkulaw.cn*, which are reliable in covering heterogeneous fertility policies across provinces. These documents state the conditions under which a second birth is allowed in a specific

Table 3.1: Descriptive Statistics for Variables in the Analysis

Variables for first birth and migration	Freq.	Prop.	Variables for second birth	Freq.	Prop.	Variables for third birth	Freq.	Prop.
Age at survey time			Age at survey time			Age at survey time		
18-24	992	3.12%	18-24	573		18-24	61	0.45%
25-34	12195	38.41%	25-34	9677		25-34	3550	26.44%
35-44	13132	41.36%	35-44	11974		35-44	7163	53.35%
45-55	5434	17.11%	45-55	4567		45-55	2652	19.75%
Birth cohorts			Birth cohorts			Birth cohorts		
born 1950-1954 (ref)	3500	11.02%	born 1950-1954 (ref)	2906	10.85%	born 1950-1954 (ref)	1708	12.72%
born 1955-1959	5089	16.03%	born 1955-1959	4576	17.08%	born 1955-1959	2770	20.63%
born 1960-1964	7034	22.15%	born 1960-1964	6447	24.06%	born 1960-1964	3899	29.04%
born 1965-1969	7933	24.98%	born 1965-1969	7003	26.14%	born 1965-1969	3541	26.37%
born 1970-1974	6021	18.96%	born 1970-1974	4605	17.19%	born 1970-1974	1333	9.93%
born 1975-1990	2176	6.85%	born 1975-1990	1254	4.68%	born 1975-1990	175	1.30%
Women's highest education			Women's highest education			Women's highest education		
less than primary (ref)	1629	5.13%	less than primary (ref)	1499	5.60%	less than primary (ref)	1223	9.11%
primary education	7601	23.94%	primary education	7144	26.67%	primary education	4740	35.30%
secondary education	16203	51.03%	secondary education	14112	52.67%	secondary education	5885	43.83%
university	6320	19.90%	university	4036	15.06%	university	1578	11.75%
Total	31753	100.00%	First birth female			First two births female		
			yes	12858	47.99%	yes	2939	21.89%
			no	13933	52.01%	no	10487	78.11%
			Total	26791	100.00%	Total	13426	100.00%
One-child policy	178352	52.95%	One-child policy			One-child policy		
only one child allowed (ref)	91805	27.26%	less than two allowed (ref)	59027	34.21%	less than three allowed (ref)	74346	71.72%
more than one child allowed	7839	2.33%	two children allowed	70990	41.15%	at least three allowed	546	0.53%
year of migration	45851	13.61%	more than two children allowed	2791	1.62%	year of migration	660	0.64%
first generation after migration	12956	3.85%	year of migration	2470	1.43%	first generation after migration	25503	24.60%
1.5 generation	336803	100.00%	first generation after migration	34102	19.77%	1.5 generation	2610	2.52%
Total person years, first birth			1.5 generation	3150	1.83%	Total person years, third birth	103665	100.00%
			Total person years, second birth	172530	100.00%			
U.S. migration policy towards Chinese								
Chinese immigration act 1923 (ref)				438922	82.32%			
illegal immigration reform act 1996				94272	17.68%			
Chinese emmigration policy								
before open economy (ref)				68616	12.87%			
open up economy 1978				116647	21.88%			
first set of migration law 1985				162514	30.48%			
official document on tightening controls 1992				112581	21.11%			
law amendment on penalties for smuggling 1996				41078	7.70%			
passport policy normalization 1999				31758	5.96%			
Total person years, migration				533194	100.00%			

province during a certain period of time. These conditions are summarized in Appendix A.1. These conditions are further mapped with an individual's province of residence in a given year to see if a certain birth order is allowed for her or not. This variable is named as "one-child policy" which also include one's migration status (the above-mentioned points (b), (c), (d)), i.e., year of migration, first-generation migrants and 1.5-generation migrants (see Table 3.2 for example). This data enabled us to shed light on the different effects of the one-child policy and migration status on fertility by birth parity.

To capture the impact of national-level economic development and immigration and emigration policy after 1960 on migration, we included economic indicators like China GDP real value, GDP growth rate, GDP ratio of China and U.S., U.S. unemployment rate, immigration/emigration policy on origin and destination, proportion of population living in urban areas, and land policy in China. Chinese emigration policy evolves towards increasing restrictions towards emigration and more formalized border control and passport management to reduce human smuggling. From 1978 to 2005, there are roughly five turning points in this policy: (1) the open-door policy in 1978 ended restrictions imposed on international migration; (2) the first set of migration law regarding border control and application to passports in November 1985; (3) an official document that ordered coastal provinces to tighten up authorities in April 1992; (4) a modified criminal law by adding harsh penalties for human smuggling in 1997; (5) a passport policy that formalized the process of applying a passport in 1999, see Chin (2003) for details.

3.6 Results

In Table 3.1, we examined the "emancipation" hypothesis by looking into the effect of fertility policy and migration status on fertility outcomes, controlling for cohort and education. Then we introduce the duration effect proxied by time since migration as shown in Model 3 and 4 (see Annex A.2) to identify the disruption and the adaptation effect of migration on fertility. The fertility equations are jointly estimated with a migration equation that controls for demographic indicators, economic development, migration and land policy at the origin and destination. Results including and excluding the correlation between unobserved heterogeneity (Model 2 and 1, respectively) are presented. The standard deviation of unobserved heterogeneity in the migration process is identified by the introduction of reasonably exogenous variable, for example, time-varying GDP growth rate in China, urban rate, unemployment rate in the U.S., U.S. immigration policy towards Chinese, Chinese emigration policy and Chinese land policy.

3.6.1 Selection effect - Interrelationship between Migration and Fertility

The remaining fertility differences are attributed to some unobservable factors captured by the correlation term between people living in China and those in the U.S. They are associated with motivation, fertility intention and family orientation following the assumption discussed by Chattopadhyay et al. (2006). It is likely that many of the female migrants moved to the U.S. for family reunion reasons, though this does not exclude a socio-economic motivation. The result shows that migration and fertility are negatively correlated (correlation = -0.61), meaning those who are more likely to migrate are also those who are more likely to bear fewer births. Migrants are negatively selected concerning fertility, which is consistent with the positive selection of educational level, see Figure 3.3. These higher educated migrants might share some unobserved characteristics that predict lower fertility levels, e.g., individualism, consumerism or high social mobility aspirations (Lindstrom and Giorguli Saucedo, 2007).

Figure 3.3 shows the fertility of a simulated person who migrated 3 years after the previous birth (for second and third births) and was 30 years old, compared with others who never migrated. Lower educated migrants have a higher probability of having births than highly educated migrants. After controlling for demographic factors and the selection effects, the likelihood of having the second birth for a highly educated migrated woman was almost comparable to that of a non-migrant with less than primary education. However, it is still well below the fertility of a migrated woman with lower education. The predicted probability of having a second child for women with a university degree living in China (non-migrants) is near zero because women with a university degree form a selective group[8]. They are likely to have "hukou" registered in urban rather than rural areas. The one-child policy is much stricter in the cities than in the countryside. Also, it is likely that many of them work in the public sector, for example, the government, schools, hospitals, etc. For these positions, a second birth might risk women losing their jobs, according to the one-child policy. In Table A.6 in the Appendix, we show the predicted probability of having a first, second and third birth for women with secondary education

[8]Our model estimated that the annual predicted probability of having a second child for women with university degree living in China (non-migrants) ranges from 0.0001 to 0.0093. The sum of the annual predicted probability of having a second child estimated from the model is around 0.0718 for women born between 1950 and 1990 with university degree during 1965-2005. This is similar to the annual birth rate of the year 1999 for women between age 15 and 49 with a university degree, provided by China's national census 2000. In 1999, only around 0.49% of women with a university degree have a second child.

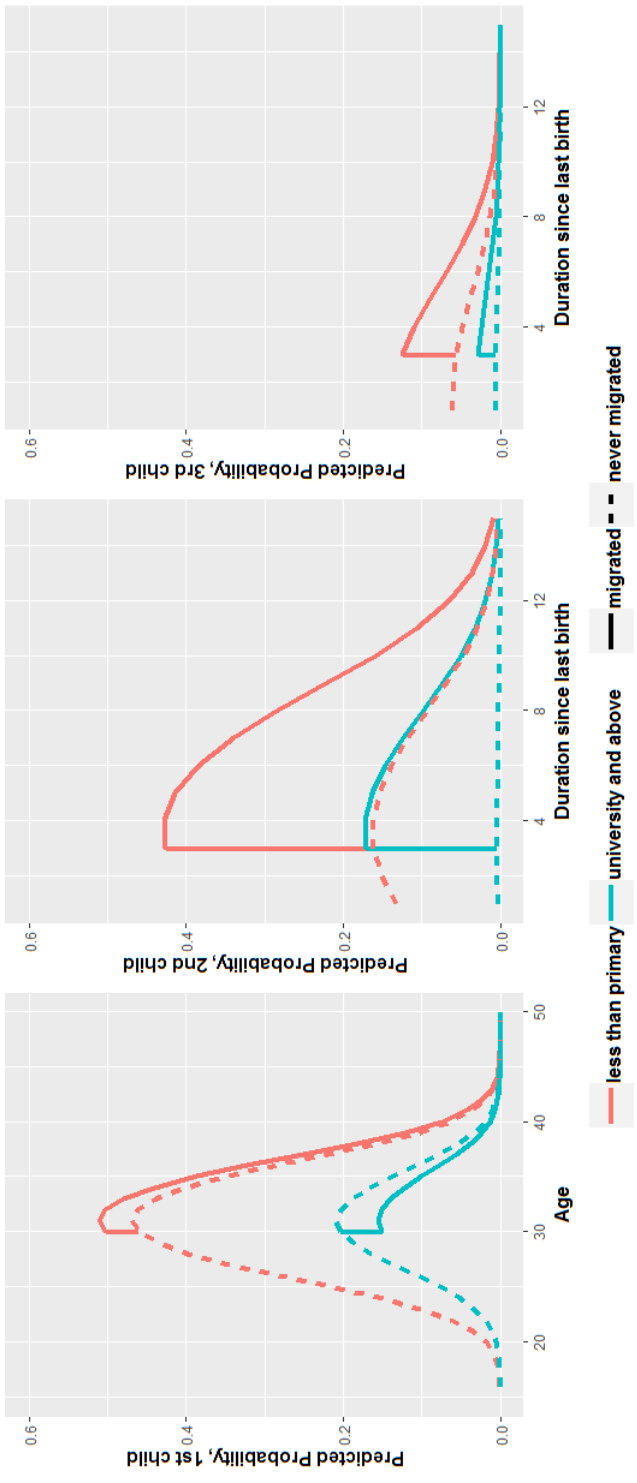


Figure 3.3: Simulated conditional annual probabilities of first, second and third birth for a hypothetical migrant who migrated at age 30, which was 3 years after the birth of the first (or second) child by education (university degree vs less than primary school).

Note: Specification as Model 2.

compared with others with less than primary school education.

On the other hand, female migrants with at least a university degree showed a lower likelihood of having the first birth after migration. This implies higher proportion of childlessness among the highly educated who were living in the U.S.[9]. In the migration equation of Table 3.1, after controlling for the correlation between migration and fertility, the relationship between educational level and migration is no longer significant. This means that the negative correlation (partly) represents the selection effect of socio-economic status indicators other than education, for instance, income and occupation. Migrants are selective of higher socio-economic status and thus present lower fertility.

3.6.2 Migration Status and Fertility Policy

Model 2 in Table 3.1 shows that migration has a positive effect (odds ratio 17.89 and 5.48, respectively) on higher-order births but less so on the first birth (odds ratio 1.22), which is a piece of strong evidence supporting the "emancipation" hypothesis. The odds of having the first birth for 1.5-generation migrants were 57% less than their counterparts living under the condition that only one child was allowed. The odds of having the second birth were 17 and 8 times higher for first-generation migrants after migration and for 1.5-generation migrants than women living in China under the condition that less than 2 children were allowed. Migration increases the odds of having a third child by around 5 and 4 times for first- and 1.5-generation migrants, respectively.

Living in the U.S. means a higher likelihood of having a second or third birth than others living in China, whose fertility behaviour is subject to China's family policies. The intervals between the first and second birth for non-migrants and first-generation migrants were 3.8 and 3 years, and it was only 2.6 years for 1.5-generation migrants. This suggests that international migration increases the likelihood of a second birth because international migrants are no longer subject to China's family policies. Without considering the negative correlation between migration and fertility, separate estimation of the three births and migration severely underestimates the odds of having the three births for migrants, in another word, the "emancipation" effect of migration on fertility.

Furthermore, it is likely that besides being emancipated from the one-child policy, international migration resulted in a large range of positive effects for the fertility Chinese migrants. The fertility of those living in China does not strictly follow the modifications

[9]In our sample, about 35% of the highly educated migrants were childless, while only 15% were childless by the survey time for the whole sample.

of the one-child policy. This is perhaps due to the increasing age at marriage and prolonged birth interval suggested by the "later-longer-fewer" policy. It also means that there are migration-related factors, e.g., birthright citizenship at the destination, that lead to hastened higher-order births after migration. In Model 2, after including common unobserved factors for all the three birth orders, some family policy factors "lose" its significance, implying that some explaining power of the fertility policy could be due to selection. This unobserved factor, shared by all three birth orders could be the tendency to have more children after the birth of the previous one.

3.6.3 Duration since Migration and Fertility

As shown in Figure 3.4, migration means delayed second births before migration but hastening to do it afterwards. The probability of having the second birth increased dramatically on the year of migration. Migrants delayed the first birth before migration, which may result from marriage migration to the extent that women delay migration and marriage simultaneously. However, the sharp increase in second birth probabilities on the year of migration and the maintenance of high levels afterwards is unlikely to be due to marriage since marriage usually precedes first birth in the Chinese setting. Therefore, this can be taken as substantial evidence of the "emancipation" effect of migration. For those who already had a first birth, migrants are less likely to have the second birth before migration but more likely to have the second birth after arriving in the U.S..

We did not see a noticeable difference between the probability of having the first, second and third birth by duration since migration between 1965 and 2005 (Figure 3.4) and the probability between 1965 and 1995 (See Appendix A.4). This implies that there is no firm evidence showing adaptation of the fertility pattern at the destination regarding the number of children. Using U.S. 2000 census, Almond and Edlund (2008) showed that son preference is evident on the third birth for Chinese migrants compared with Whites. In our result, having the first one or two female births predicts a lower probability of having the next child for migrants living in the U.S. than others living in China. This implies a detachment from the son preference in the original culture and adaptation to the norm at the destination. However, this adaptation only works in the way to lower the fertility level due to the reluctance to continue giving births, rather than to stimulate a rebound of the fertility level at the destination where higher TFR applies.

Table 3.2: Simultaneous Equation Model, Migration Status and Family Policy

	Model 1			Model 2		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 1 - Fertility: First Birth						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	5.60	5.37-5.83	***	7.71	7.32-8.11	***
Age squared	0.97	0.97-0.97	***	0.97	0.97-0.97	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	1.37	1.32-1.43	***	1.56	1.46-1.66	***
born 1960-1964	1.88	1.80-1.96	***	2.49	2.33-2.67	***
born 1965-1969	1.81	1.72-1.89	***	2.41	2.23-2.61	***
born 1970-1974	1.25	1.18-1.32	***	1.40	1.27-1.55	***
born 1975-1990	1.03	0.92-1.15		1.14	0.96-1.36	
Women's education (Ref. less than primary)						
primary education	0.81	0.72-0.91	***	0.70	0.59-0.83	***
secondary education	0.60	0.54-0.66	***	0.38	0.32-0.45	***
college education	0.49	0.44-0.54	***	0.26	0.22-0.30	***
One-child policy (Ref. only one child allowed)						
more than one child allowed, living in China	0.95	0.92-0.98	***	1.01	0.97-1.05	
year of migration	0.40	0.36-0.44	***	0.66	0.57-0.77	***
first generation after migration	0.66	0.64-0.69	***	1.22	1.03-1.45	**
1.5 generation	0.51	0.47-0.56	***	0.43	0.37-0.49	***

Taula 3.1: Simultaneous Equation Model, Migration Status and Family Policy (continued)

	Model 1			Model 2		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 2 - Fertility: Second Birth						
Constant	0.26	0.13-0.53	***	0.00	0.00-0.00	***
Age	1.04	0.99-1.09		1.36	1.28-1.44	***
Age squared	1.00	1.00-1.00	***	0.99	0.99-1.00	***
Duration since last birth	1.22	1.18-1.25	***	1.20	1.16-1.24	***
Duration since last birth squared	0.98	0.97-0.98	***	0.97	0.97-0.97	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	1.12	1.04-1.20	***	1.15	1.05-1.27	***
born 1960-1964	1.11	1.03-1.20	***	1.22	1.10-1.35	***
born 1965-1969	0.82	0.76-0.90	***	0.80	0.71-0.89	***
born 1970-1974	0.48	0.43-0.54	***	0.35	0.30-0.41	***
born 1975-1990	0.29	0.21-0.38	***	0.20	0.14-0.28	***
Women's education (Ref. less than primary)						
primary education	0.75	0.67-0.84	***	0.64	0.54-0.75	***
secondary education	0.40	0.36-0.44	***	0.23	0.20-0.26	***
college education	0.12	0.11-0.13	***	0.05	0.04-0.06	***
One child policy (Ref. less than two children allowed)						
two children allowed, living in China	0.94	0.89-1.00	**	1.05	0.98-1.12	
more than two children allowed, living in China	1.47	1.29-1.66	***	1.07	0.92-1.25	
year of migration	1.68	1.37-2.06	***	3.87	3.10-4.82	***
first generation after migration	5.28	4.86-5.74	***	17.89	15.45-20.71	***
1.5 generation	5.41	4.39-6.66	***	8.55	6.71-10.90	***
first child female	1.31	1.24-1.38	***	1.41	1.33-1.50	***
first child female * living in China, first generation	0.84	0.76-0.93	***	0.81	0.72-0.91	***
first child female * living in China, 1.5 generation	0.82	0.61-1.09		0.77	0.55-1.08	

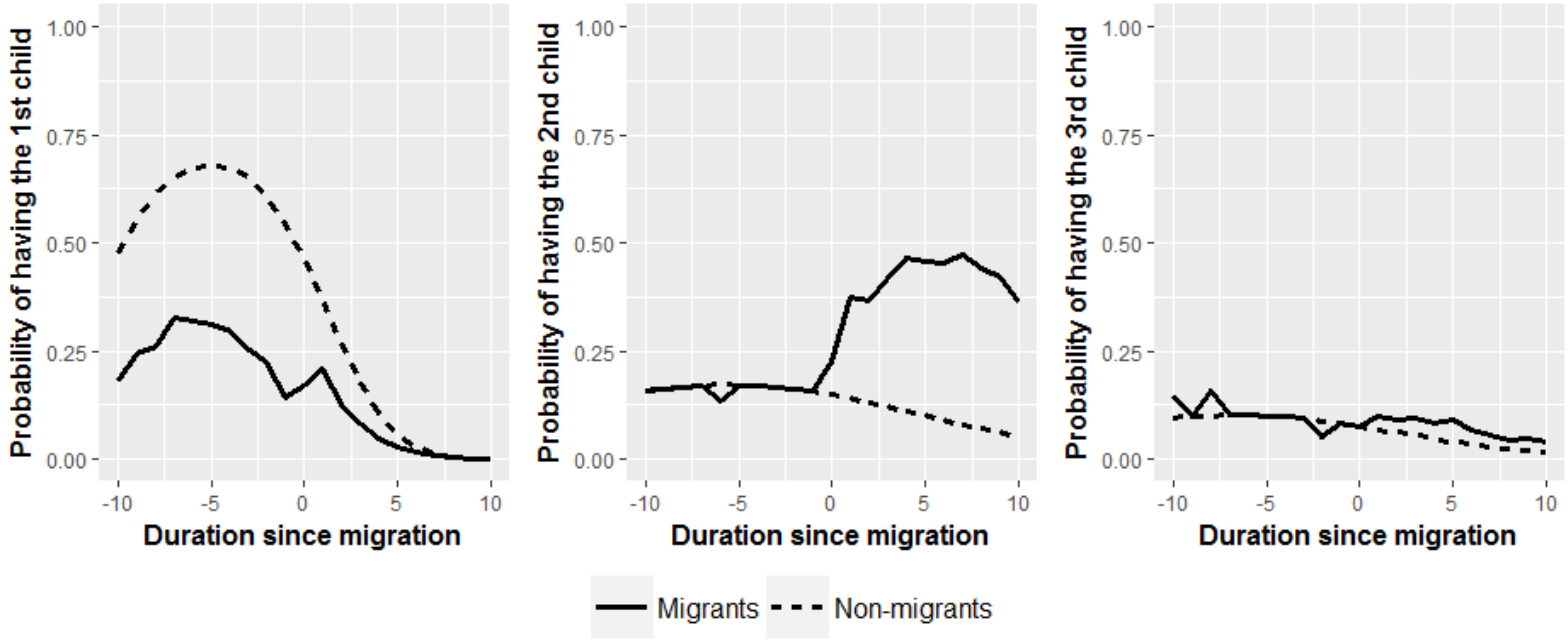
Taula 3.1: Simultaneous Equation Model, Migration Status and Family Policy (continued)

	Model 1			Model 2		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 3 - Fertility: Third Birth						
Constant	0.24	0.05-1.17	*	0.00	0.00-0.00	***
Age	1.06	0.96-1.18		1.39	1.24-1.57	***
Age squared	1.00	1.00-1.00	***	0.99	0.99-1.00	***
Duration since last birth	1.15	1.08-1.24	***	1.09	1.02-1.18	**
Duration since last birth squared	0.97	0.96-0.98	***	0.97	0.96-0.98	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	0.88	0.78-0.98	**	0.90	0.79-1.03	
born 1960-1964	0.69	0.61-0.78	***	0.75	0.65-0.86	***
born 1965-1969	0.39	0.33-0.45	***	0.34	0.28-0.40	***
born 1970-1974	0.29	0.22-0.38	***	0.18	0.13-0.24	***
born 1975-1990	0.25	0.10-0.61	***	0.14	0.05-0.40	***
Women's education (Ref. less than primary)						
primary education	0.73	0.63-0.84	***	0.57	0.47-0.69	***
secondary education	0.50	0.44-0.57	***	0.26	0.22-0.31	***
college education	0.24	0.19-0.29	***	0.09	0.07-0.12	***
One child policy (Ref. less than three child allowed)						
at least three children allowed, living in China	0.80	0.61-1.07		0.58	0.43-0.80	***
year of migration	0.93	0.55-1.60		1.81	1.05-3.11	**
first generation after migration	1.50	1.32-1.71	***	5.48	4.64-6.47	***
1.5 generation	2.62	2.01-3.42	***	4.56	3.34-6.23	***
first two births female	2.58	2.32-2.88	***	3.04	2.67-3.46	***
first two births female * living in the US, first generation	0.94	0.76-1.15		0.88	0.71-1.10	
first two births female * living in the US, 1.5 generation	0.62	0.38-1.00	**	0.57	0.33-0.97	**

Taula 3.1: Simultaneous Equation Model, Migration Status and Family Policy (continued)

	Model 1			Model 2		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 4 - Migration						
Constant	0.00	0.00-0.01	***	0.00	0.00-0.00	***
age	1.37	1.33-1.41	***	2.02	1.68-2.42	***
age squared	0.99	0.99-1.00	***	0.99	0.99-0.99	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	0.87	0.81-0.95	***	1.13	0.93-1.37	
born 1960-1964	0.88	0.77-1.00	**	1.76	1.22-2.53	***
born 1965-1969	0.95	0.80-1.13		2.44	1.42-4.18	***
born 1970-1974	1.26	1.01-1.57	**	4.39	2.36-8.16	***
born 1975-1990	1.84	1.38-2.44	***	7.94	3.93-16.04	***
Women's education (Ref. less than primary)						
primary education	0.82	0.73-0.92	***	0.88	0.48-1.61	
secondary education	0.94	0.85-1.04		1.04	0.62-1.74	
college education	1.10	0.99-1.22	*	1.25	0.74-2.12	
gdp growth rate, China	0.18	0.08-0.37	***	0.15	0.07-0.35	***
urban rate, China	3.47	1.85-6.49	***	3.21	1.37-7.55	***
unemployment rate, US	0.76	0.65-0.90	***	0.72	0.60-0.87	***
US migration policy towards Chinese (Ref. Chinese immigration act 1923)						
Illegal Immigration Reform Act 1996	0.86	0.77-0.96	***	0.90	0.79-1.01	*
Chinese emigration policy (Ref. before open economy)						
open up economy 1978	1.29	1.13-1.47	***	1.08	0.91-1.29	
first set of migration law 1985	1.37	1.13-1.66	***	1.16	0.91-1.46	
official document on tightening controls 1992	1.33	1.05-1.69	**	1.20	0.90-1.60	
law amendment on penalties for smuggling	1.36	1.02-1.80	**	1.32	0.94-1.86	
passport policy normalization	0.62	0.45-0.87	***	0.60	0.41-0.87	***
Family contract Management policy	1.11	0.96-1.27		1.05	0.90-1.22	
Standard deviation of unobserved factor, fertility (Sigma ϵ)				1.16		***
Standard deviation of unobserved factor, migration (Sigma λ)				2.94		***
Correlation between unobserved heterogeneity factors (ρ)				-0.61		***
Log-likelihood	-176777			-174310		

Figure 3.4: Annual Probability of having the first, second and third birth for a female migrant born in 1965 who migrated at age 36 and with secondary education (both median statistics) from 10 years before migration until 10 years after migration (solid line) and a female non-migrants living in China born in 1965 with secondary education (dash line) during 1965-2005.



Note: Specification as Model 2. Only significantly different statistics at least on 90% significance level are drawn on the solid line. Otherwise it is fitted as the same as that of non-migrant (dash line).

3.7 Discussion

China's one-child policy ceased to exist on the 1st of January 2016, signifying the end of an era which never experienced by any other countries with high fertility level back in history. It is important to note that this paper does not attempt to discuss a hypothetical fertility level of China without the one-child policy. Instead, we focus on how Chinese citizens would have behaved under the following conditions: they were freed from any birth restrictions, they had the incentive of birthright citizenship in the U.S., they faced the difficulties of migration, and they were exposed to different fertility values in the destination country (lower fertility before 1995 and higher after than country of origin). To our knowledge, this paper is the first attempt to explicitly test the "emancipation" hypothesis proposed by Hwang and Saenz (1997). It does so by comparing the fertility level of Chinese international migrants and non-migrants with micro data and considering selection effects.

Internal migration could only test part of the "emancipation" effect of migration because the third birth is not allowed for both rural dwellers and urbanites under the one-child policy. The "emancipation" effect is confirmed because we found that Chinese living in the U.S. are more likely to have a second and third birth than non-migrants. Migrants postponed their second birth before migration but hastened it right afterwards, see Figure 3.4. This indicates that the probability of having the second birth is lower for migrants before migration but higher after migration compared with non-migrants. This could be seen as a sign of the "emancipation" effect of migration on the second birth that is mostly affected by the one-child policy. Scholars suggested that the higher fertility after migration is partly due to the postponement of childbearing, see e.g., Toulemon (2004) on French context and Goldstein and Goldstein (1983).

The one-child policy and its changes are not as compelling in discouraging or encouraging the progress into the next birth after controlling for the selectivity of fertility and correlation between migration and fertility. Previous literature suggested that the one-child policy is dominant in explaining the low fertility level in China. For example, Bongaarts and Greenhalgh (1985) attributed the low fertility during the 1990s to "later-longer-fewer" and the one-child policy. Goodkind (2017) estimated that these fertility policies by 2015 might have averted 400 million births. Chen et al. (2010) found that provincial fertility trend expectedly responded to population policy and that the difference between it and the national one is correlated with a different implementation of fertility policy. Feeney and Feng (1993) reported that the one-child policy played a significant

role in lowering the parity progression ratio to the second birth from 87 percent in 1978 to a mere 11 percent in 1983. However, Cai (2010) found that socio-economic development plays a crucial role in driving down the fertility level in terms of changing one's fertility preference. It is not promising to expect the fertility level strongly rebound after the end of the one-child policy. China's birth rate declined from 1.295 percent to 1.243 percent from 2016 to 2017 (National Bureau of Statistics[10]). In this paper, we show that the effect of looser fertility policy is not as powerful as migration in bringing up the probability of or hastening the second birth. However, the third birth is less likely to rebound than the second birth even without fertility control, see Table 3.1 and Figure 3.4.

Literature worked at adaptation hypothesis found a negative relationship between the length of stay in the U.S. and fertility, see Dubuc (2012), based on the case where migrants are coming from origin countries of higher fertility level than the destination country. We find mixed evidence of adapting to the destination fertility values. Because the U.S. TFR has been stabled at around two since the 1970s for almost 50 years, the significantly increased probability of having the second birth as years in the U.S. grow may be due to adaptation to the two-children-family trend at the destination. Plus, for those already having one or two female births, Chinese first- and 1.5-generation migrants are less likely to progress to a third birth compared with their Chinese counterparts living in China, implying adapting to the gender-blind preference of births at the destination. However, if adaptation hypothesis holds, we should see converging fertility behaviour of migrants along years staying in the U.S., which is, decreasing fertility before 1995 and increasing fertility after 1995. We did not observe this pattern, which implies no significant adaptation effect of migration on fertility for Chinese migrants on the number of children they gave birth. This is perhaps because migrants' fertility level might not converge towards that of the destination country unless their status gets more secure (Bledsoe, 2004). Given that China TFR dropped well below that of U.S. during the 1990s, the significant tendency they presented towards higher birth order means that the "emancipation" power is not ignorable.

It is reasonable that people curtail their fertility behaviours shortly before and after migration since both giving birth and migrating is costly. Taking Mexican migrants in the U.S. as an example, Lindstrom and Giorguli Saucedo (2007) found that the probability of having the first birth increased soon after migration, implying that migration and family events are connected (Milewski, 2007). It could be that part of the aim of migration is to

[10]Mu Guangzong, China's worrying decline in birth rate: China Daily columnist. The Straits Times. Jan 24th, 2018.

start a new family and increase family size. It might also signify difficulties entering the labour market for women, which results in family-oriented life after migration. Our result does show evidence of the disruptive effect of the year of migration on the first birth but not on the higher-order births, see Table 3.1. The disruption effect may be particular to migrants whose origin country is far from the destination and who are irregular. In the case of Fujianese in the U.S., the migration process required extensive preparation and significant economic resources.

Chinese migrants are selective of lower fertility because they prefer to delay higher-order births until after migration since they are no longer restricted by China's family planning policies. This negative selection of fertility for Chinese migrants was observed in other contexts. For example, Abbasi-Shavazi and Mcdonald (2000) found lower fertility of Chinese international migrants in Australia than Chinese non-migrants. Coleman and Dubuc (2010) found TFR of Chinese origin in the UK at 1.5, well below the national average and was always the lowest among all ethnic groups and native British from 1977 to 2005. The Chinese migrants in the U.S. are selective of higher educational attainment from 1965 to 2005. These highly educated migrants are selective of lower fertility perhaps due to delayed marriage, economic motivation or career ambition. Future research may be interested in linking the "emancipated" fertility of Chinese migrants in the U.S. with marriage migration when the information such as age at marriage is available. It is possible that there is a lag effect in adapting to the fertility norm at the destination, which can be tested only when more recent data is available at the origin and destination country. Migrants and non-migrants may differ in some perspectives other than the observables in the data. This calls for information on income, occupation, etc., as well as an in-depth qualitative study of personal elements, such as career motivation. It remains interesting to explore cross-sectionally which age group during a period or longitudinally which birth cohort drives the result when more data is available for decomposition.

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Appendix

A.1 Conditions under which a Second Birth is Allowed by Province

Province Name	Couple both the only child	Rural dwellers first birth female
AnHui	After 1988, both	After 2002
BeiJing	After 1991, both	Not Applicable
FuJian	After 1988, rural After 2002, urban	After 2000
GanSu	After 2002, both	After 1997
GuangDong	After 1986, both	After 1986
GuangXi	After 1988, both	After 1988
GuiZhou	After 1998, both	After 1998
HaiNan	After 1989, both	After 1989
HeBei	After 1989, both	After 1994
HeiLongJiang	After 1989, both	after 1989
HeNan	after 2011, both	After 1990
HuBei	after 2002, urban	After 1988
HuNan	After 1989, both	After 1989
Inner Mongolia	After 2002, rural	After 1990
JiangSu	After 1990, both	After 1990

A.1 Conditions under which a Second Birth is Allowed by Province (continued)

Province Name	Couple both the only child	Rural dwellers first birth female
JiangXi	After 1990, both	After 1990
JiLin	After 1993, both	After 2002
LiaoNing	After 1988, both	After 1988
NingXia	Always, rural After 1987, urban	Always
QingHai	Always, rural After 1986, urban	Always
ShaanXi	After 1986, both	After 1997
ShanDong	After 1988, both	After 1988
ShangHai	After 1990, both	Not Applicable
ShanXi	After 1999, both	after 1999
SiChuan	After 1987, both	Not Applicable
TianJin	After 1988, both	after 1994
Tibet	Always, rural After 1992, urban	Always
XinJiang	Always, rural After 2002, urban	Always
YunNan	Always, rural After 1990, urban	Always
ZheJiang	After 1985, both	After 2002

A.2 Simultaneous Equation Model, Duration Since Migration for First-generation Migrants

	Model 3			Model 4		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
First Birth						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	6.11	5.86-6.38	***	7.02	7.02-7.79	***
Age squared	0.97	0.97-0.97	***	0.97	0.97-0.97	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	1.47	1.40-1.53	***	1.55	1.55-1.76	***
born 1960-1964	2.15	2.05-2.25	***	2.61	2.61-2.98	***
born 1965-1969	1.96	1.87-2.06	***	2.49	2.49-2.87	***
born 1970-1974	1.22	1.15-1.30	***	1.39	1.39-1.63	***
born 1975-1990	0.97	0.87-1.08		1.02	1.02-1.36	**
Women's education (Ref. less than primary)						
primary education	0.84	0.74-0.95	***	0.58	0.58-0.80	***
secondary education	0.56	0.50-0.64	***	0.32	0.32-0.44	***
college education	0.42	0.37-0.47	***	0.22	0.22-0.30	***
Duration since migration (Ref. never migrated)						
more than 3 years before migration	0.33	0.32-0.34	***	0.15	0.15-0.20	***
less than 3 years before migration	0.20	0.18-0.21	***	0.08	0.08-0.11	***
year of migration	0.28	0.25-0.31	***	0.11	0.11-0.14	***
less than 3 years after migration	0.47	0.44-0.50	***	0.18	0.18-0.24	***
more than 3 years after migration	0.43	0.41-0.45	***	0.16	0.16-0.21	***

A.2 Simultaneous Equation Model, Duration Since Migration for First-generation Migrants (continued)

	Model 3			Model 4		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Second Birth						
Constant	2.67	2.12-3.37	***	0.20	0.20-0.43	***
Age at first birth	0.89	0.88-0.90	***	0.96	0.96-0.99	***
duration since last birth	1.10	1.06-1.13	***	1.18	1.18-1.26	***
duration since last birth squared	0.97	0.97-0.98	***	0.97	0.97-0.97	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	1.09	1.01-1.17	**	1.12	1.12-1.32	***
born 1960-1964	1.06	0.98-1.14		1.22	1.22-1.46	***
born 1965-1969	0.78	0.71-0.84	***	0.82	0.82-1.00	**
born 1970-1974	0.44	0.39-0.50	***	0.36	0.36-0.47	***
born 1975-1990	0.24	0.18-0.33	***	0.16	0.16-0.31	***
Women's education (Ref. less than primary)						
primary education	0.75	0.67-0.85	***	0.53	0.53-0.70	***
secondary education	0.41	0.36-0.45	***	0.22	0.22-0.29	***
college education	0.11	0.10-0.12	***	0.05	0.05-0.07	***
Duration since migration (Ref. never migrated)						
more than 3 years before migration	1.13	1.04-1.23	***	0.48	0.48-0.68	***
less than 3 years before migration	1.11	0.95-1.28		0.47	0.47-0.70	***
year of migration	1.84	1.50-2.26	***	0.76	0.76-1.23	
less than 3 years after migration	3.95	3.62-4.32	***	1.93	1.93-2.58	***
more than 3 years after migration	5.88	5.49-6.31	***	3.28	3.28-4.25	***
first birth female	1.22	1.16-1.28	***	1.22	1.22-1.36	***

A.2 Simultaneous Equation Model, Duration Since Migration for First-generation Migrants (continued)

	Model 3			Model 4		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Third Birth						
Constant	5.42	3.81-7.71	***	0.28	0.28-0.73	***
Age at first birth	0.87	0.86-0.88	***	0.93	0.93-0.96	***
duration since last birth	1.03	0.96-1.10		1.01	1.01-1.16	**
duration since last birth squared	0.97	0.96-0.98	***	0.96	0.96-0.97	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	0.86	0.77-0.97	**	0.84	0.84-1.09	
born 1960-1964	0.67	0.60-0.75	***	0.71	0.71-0.93	***
born 1965-1969	0.37	0.32-0.43	***	0.33	0.33-0.47	***
born 1970-1974	0.27	0.21-0.36	***	0.17	0.17-0.31	***
born 1975-1990	0.23	0.09-0.56	***	0.07	0.07-0.50	***
Women's education (Ref. less than primary)						
primary education	0.72	0.63-0.83	***	0.49	0.49-0.68	***
secondary education	0.50	0.44-0.57	***	0.25	0.25-0.35	***
college education	0.25	0.20-0.30	***	0.08	0.08-0.14	***
Duration since migration (Ref. never migrated)						
more than 3 years before migration	0.74	0.63-0.87	***	0.29	0.29-0.46	***
less than 3 years before migration	0.80	0.58-1.10		0.29	0.29-0.60	***
year of migration	0.90	0.52-1.55		0.28	0.28-0.85	**
less than 3 years after migration	1.49	1.20-1.86	***	0.63	0.63-1.06	
more than 3 years after migration	1.49	1.33-1.67	***	0.85	0.85-1.17	
first two births female	2.51	2.29-2.74	***	2.55	2.55-3.14	***

A.2 Simultaneous Equation Model, Duration Since Migration for First-generation Migrants (continued)

	Model 3			Model 4		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Migration						
Constant	0.00	0.00-0.01	***	0.00	0.00-0.00	***
Age	1.36	1.32-1.39	***	1.74	1.74-2.01	***
Age squared	0.99	0.99-1.00	***	0.99	0.99-0.99	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	0.88	0.81-0.95	***	0.83	0.83-1.16	
born 1960-1964	0.89	0.79-1.01	*	1.00	1.00-1.57	*
born 1965-1969	0.96	0.81-1.14		1.24	1.24-2.25	***
born 1970-1974	1.25	1.01-1.56	**	1.94	1.94-4.20	***
born 1975-1990	1.82	1.38-2.42	***	3.06	3.06-8.30	***
Women's education (Ref. less than primary)						
primary education	0.82	0.73-0.92	***	0.57	0.57-0.87	***
secondary education	0.95	0.86-1.05		0.68	0.68-1.00	*
college education	1.15	1.03-1.28	**	1.16	1.16-1.75	***
GDP growth rate, China	0.18	0.08-0.36	***	0.06	0.06-0.32	***
urban rate, China	3.42	1.84-6.35	***	1.06	1.06-5.58	**
unemployment rate, US	0.77	0.65-0.91	***	0.60	0.60-0.88	***
US migration policy towards Chinese (Ref. Chinese immigration act 1923)						
Illegal Immigration Reform Act 1996	0.86	0.77-0.96	***	0.81	0.81-1.03	
Chinese emigration policy (Ref. before open economy)						
open up economy 1978	1.27	1.12-1.45	***	0.84	0.84-1.14	
first set of migration law 1985	1.34	1.10-1.62	***	0.83	0.83-1.28	
official document on tightening controls 1992	1.30	1.03-1.65	**	0.84	0.84-1.43	
law amendment on penalties for smuggling	1.33	1.00-1.75	**	0.87	0.87-1.62	
passport policy normalization	0.61	0.44-0.85	***	0.38	0.38-0.78	***
Family contract Management policy	1.11	0.97-1.27		0.91	0.91-1.23	
Standard deviation of unobserved factor, fertility				0.92		***
Standard deviation of unobserved factor, migration				2.61		***
Correlation between migration and fertility				0.3		***
Log-Likelihood	-173647			-173296		

A.3 Robustness Check of Introducing Age at First/Second Birth (Model 5) and Interaction between Birth Cohort and Migration Status (Model 6)

	Model 5			Model 6		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 1 - First Birth						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	7.35	6.81-7.01	***	6.85	6.53-7.18	***
Age squared	0.97	0.97-0.97	***	0.97	0.97-0.97	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	1.54	1.44-1.54	***			
born 1960-1964	2.41	2.16-2.41	***			
born 1965-1969	2.33	2.01-2.33	***			
born 1970-1974	1.38	1.13-1.38	***			
born 1975-1990	1.12	0.83-1.12				
Women's education (Ref. less than primary)						
primary education	0.71	0.59-0.61	***	0.71	0.61-0.82	***
secondary education	0.40	0.35-0.35	***	0.44	0.39-0.51	***
college education	0.28	0.24-0.24	***	0.34	0.29-0.39	***
One-child policy						
(Ref. only one child allowed)						
more than one child allowed, living in China	1.00	0.96-0.96		0.94	0.91-0.98	***
year of migration	0.66	0.48-0.56	**	0.72	0.62-0.85	***
first generation after migration	1.22	0.75-1.10		1.58	1.43-1.74	***
1.5 generation	0.44	0.35-0.37	***	0.40	0.34-0.46	***
born after 1965 * year of migration				0.96	0.77-1.19	
born after 1965 * first-gen after migration				0.67	0.61-0.73	***
born after 1965 * 1.5-gen after migration				1.17	0.93-1.47	

A.3 Robustness Check of Introducing Age at First/Second Birth (Model 5) and Interaction between Birth Cohort and Migration Status (Model 6) (continued)

	Model 5			Model 6		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 2 - Second Birth						
Constant	0.17	0.02-0.11	*	0.11	0.07-0.17	***
Age at first birth	0.97	0.91-0.96		0.99	0.98-1.01	
Duration since last birth	1.23	1.16-1.20	***	1.24	1.20-1.28	***
Duration since last birth squared	0.97	0.96-0.96	***	0.97	0.96-0.97	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	1.14	1.03-1.14	**			
born 1960-1964	1.18	0.99-1.18	*			
born 1965-1969	0.77	0.65-0.77	***			
born 1970-1974	0.34	0.29-0.34	***			
born 1975-1990	0.18	0.13-0.18	***			
Women's education (Ref. less than primary)						
primary education	0.65	0.55-0.56	***	0.66	0.57-0.77	***
secondary education	0.26	0.22-0.22	***	0.25	0.22-0.29	***
college education	0.06	0.05-0.05	***	0.06	0.05-0.06	***
One-child policy						
(Ref. less than two children allowed)						
two children allowed, living in China	1.05	0.97-0.99		0.87	0.82-0.93	***
more than two allowed, living in China	1.01	0.87-0.88		1.13	0.98-1.30	*
year of migration	3.89	2.98-3.04	***	3.44	2.69-4.41	***
first generation after migration	17.34	12.48-15.77	***	13.93	12.67-15.32	***
1.5 generation	8.32	6.49-6.62	***	5.53	4.40-6.94	***
first child female	1.40	1.31-1.33	***	1.27	1.21-1.34	***
first child female * living in China, first-gen	0.81	0.72-0.81	***			
first child female * living in China, 1.5-gen	0.76	0.54-0.76				
born after 1965 * year of migration				0.92	0.58-1.44	
born after 1965 * first-gen after migration				0.74	0.66-0.82	***
born after 1965 * 1.5-gen after migration				0.99	0.71-1.37	

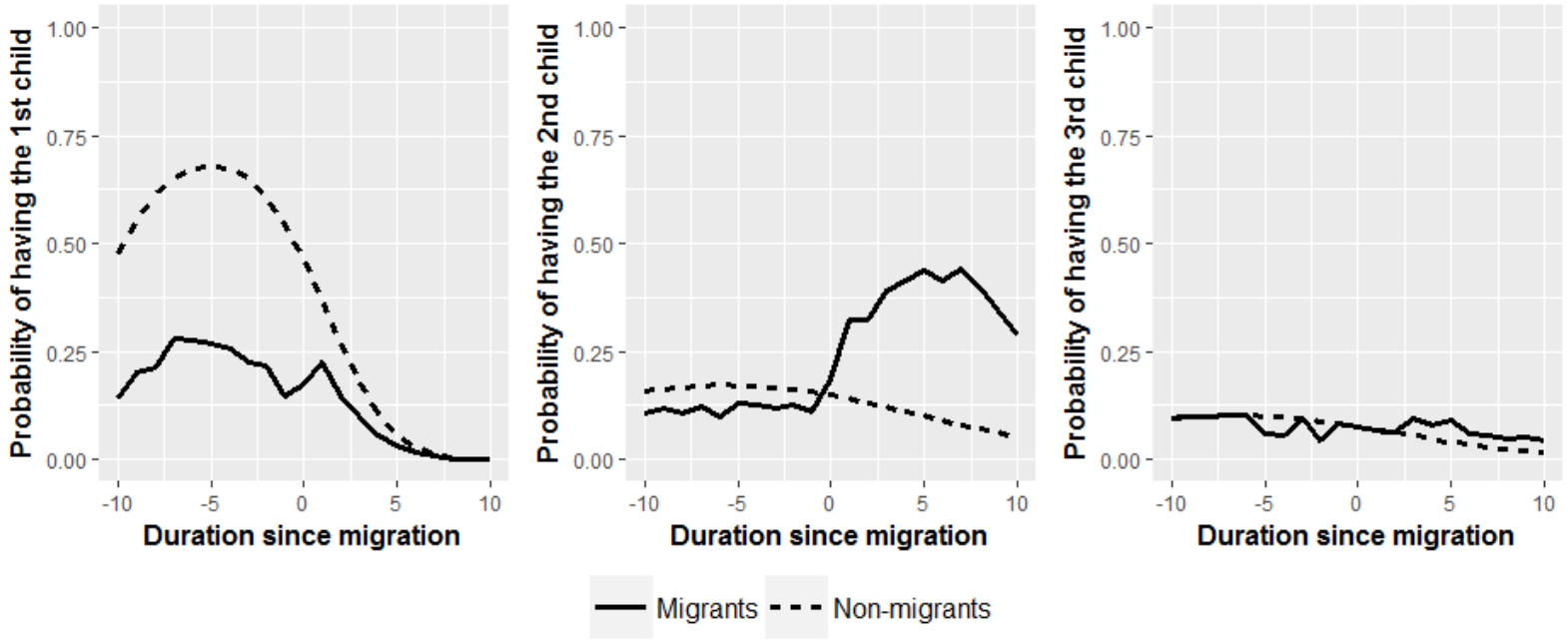
A.3 Robustness Check of Introducing Age at First/Second Birth (Model 5) and Interaction between Birth Cohort and Migration Status (Model 6) (continued)

	Model 5			Model 6		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 3 - Third Birth						
Constant	0.39	0.07-0.24		0.11	0.07-0.19	***
Age at second birth	0.93	0.89-0.92	***	0.96	0.95-0.98	***
Duration since last birth	1.08	1.01-1.01	**	1.09	1.02-1.17	**
Duration since last birth squared	0.97	0.96-0.96	***	0.97	0.96-0.97	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	0.88	0.77-0.88	*			
born 1960-1964	0.72	0.59-0.72	***			
born 1965-1969	0.33	0.27-0.33	***			
born 1970-1974	0.17	0.13-0.17	***			
born 1975-1990	0.12	0.04-0.12	***			
Women's education (Ref. less than primary)						
primary education	0.59	0.49-0.50	***	0.64	0.53-0.76	***
secondary education	0.29	0.24-0.25	***	0.29	0.25-0.34	***
college education	0.10	0.08-0.08	***	0.09	0.07-0.12	***
One-child policy						
(Ref. less than three children allowed)						
more than three allowed, living in China	0.54	0.39-0.40	***	0.87	0.64-1.18	
year of migration	1.85	1.05-1.05	**	2.10	1.19-3.71	**
first generation after migration	5.22	4.08-4.52	***	4.61	3.98-5.33	***
1.5 generation	4.34	3.16-3.17	***	3.68	2.69-5.04	***
second birth female	2.98	2.61-2.69	***	2.71	2.45-3.01	***
first two births female * first-gen in the U.S.	0.89	0.71-0.89				
first two births female * 1.5-gen in the U.S.	0.56	0.33-0.56	**			
born after 1965 * year of migration				0.25	0.03-1.90	
born after 1965 * first-gen after migration				0.56	0.45-0.69	***
born after 1965 * 1.5-gen after migration				0.39	0.23-0.64	***

A.3 Robustness Check of Introducing Age at First/Second Birth (Model 5) and Interaction between Birth Cohort and Migration Status (Model 6) (continued)

	Model 5			Model 6		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 4 - Migration						
Constant	0.00	0.00-0.00	**	0.00	0.00-0.00	***
Age	2.00	1.22-1.84	***	2.03	1.87-2.21	***
Age squared	0.99	0.99-0.99	***	0.99	0.99-0.99	***
Cohorts (Ref. born 1950-1954)						
born 1955-1959	1.13	0.83-0.93		1.44	1.18-1.75	***
born 1960-1964	1.74	0.70-1.34		2.66	2.05-3.45	***
born 1965-1969	2.42	0.62-1.70		3.53	2.48-5.02	***
born 1970-1974	4.36	0.97-2.73	*	4.58	2.87-7.32	***
born 1975-1990	7.81	1.56-4.53	**	7.89	4.58-13.58	***
Women's education (Ref. less than primary)						
primary education	0.89	0.28-0.52		0.78	0.46-1.34	
secondary education	1.05	0.46-0.65		0.92	0.57-1.50	
college education	1.27	0.54-0.78		1.10	0.67-1.79	
gdp growth rate, China	0.15	0.06-0.07	***	0.15	0.07-0.34	***
urban rate, China	3.37	1.34-1.38	***	4.60	1.88-11.25	***
unemployment rate, US	0.73	0.60-0.60	***	0.73	0.60-0.88	***
US migration policy towards Chinese (Ref. Chinese immigration act 1923)						
Illegal Immigration Reform Act 1996	0.90	0.78-0.79		0.91	0.81-1.03	
Chinese emigration policy (Ref. before open economy)						
open up economy 1978	1.09	0.83-0.92		1.11	0.94-1.30	
first set of migration law 1985	1.16	0.86-0.93		1.15	0.92-1.44	
official document on tightening controls 1992	1.20	0.82-0.92		1.21	0.92-1.58	
law amendment on penalties for smuggling	1.33	0.83-0.97		1.34	0.97-1.84	*
passport policy normalization	0.61	0.40-0.42	**	0.59	0.41-0.86	***
Family contract Management policy	1.04	0.89-0.89		1.06	0.91-1.23	
Standard deviation of unobserved factor, fertility	1.07		***	1.04		***
Standard deviation of unobserved factor, migration	2.94		*	3.02		***
Correlation between migration and fertility	-0.63		***	-0.64		***
Log-Likelihood	-174395			-175382		

A.4 Annual Probability of having the first, second and third birth for a female migrant born in 1965 who migrated at age 36 and with secondary education (all median statistics) from 10 years before migration until 10 years after migration (solid line) and a female non-migrant living in China born in 1965 from age 26 to 46 and with secondary education (dash line) during 1965-1995.



Note: Only significantly different statistics at least on 90% significance level are drawn on the solid line, otherwise it is fitted as the same as that of non-migrant (dash line).

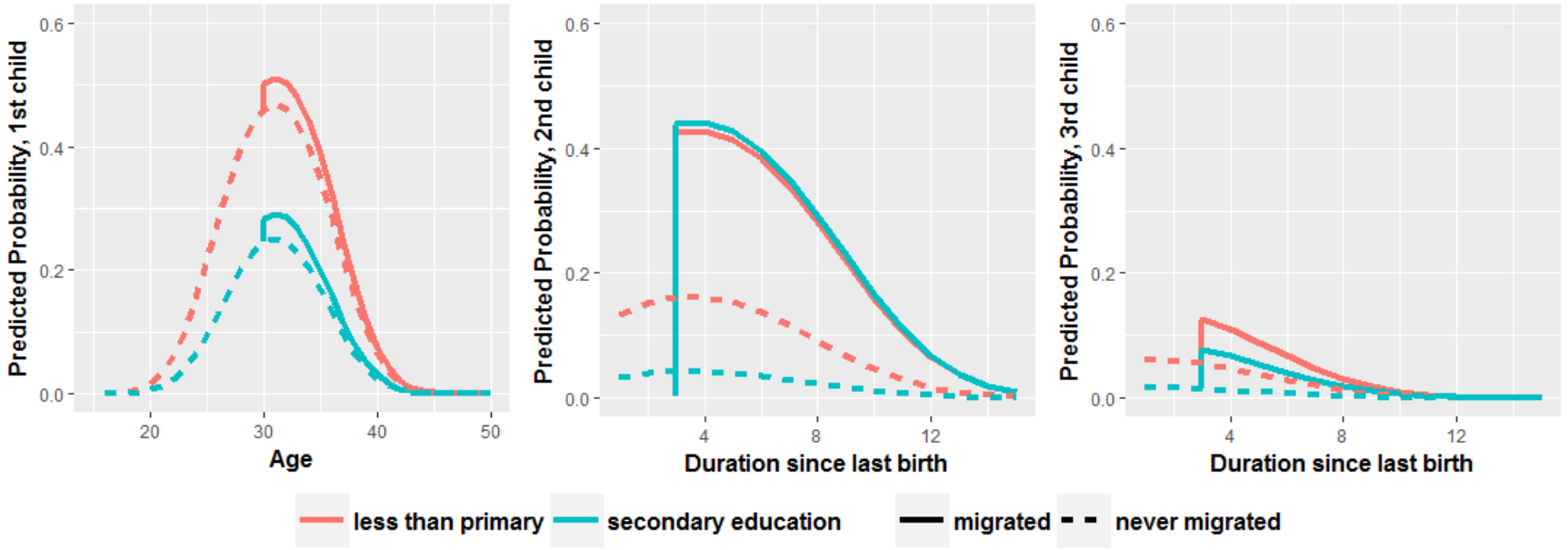
A.5 About the Matching Technique

One needs to bear in mind that the treatment and control groups, i.e., migrants and non-migrants, come from different data source thus different sampling strategies. The two countries, China and U.S., where migrants and non-migrants data were obtained, differ in various aspects, among them, are age structure, historical period TFR, education level, etc. To make the comparison exact, exact matching is preferred when non-trivial differences exist between treatment and control group so that a substantial portion of observations in either group would be dropped because of noncomparativity, see Riosmena et al. (2017). For this reason, we applied exact matching given that the sample size ratio for non-migrants and migrants is approximately 100:1, i.e., around 1.92 million non-migrants and 12,544 migrants, and limited variables on which matching was implemented. In this procedure, we obtained pairs of migrant and non-migrant extracted from the U.S. and Chinese samples, respectively, who share similar cohort, age, and educational characteristics, but differ in migration experience.

After applying weights using R package "Matchit", we had each matched control (non-migrant) unit with a weight proportional to the number of treatment units (migrants) to which it was matched, and the sum of control weights equal to the number of uniquely matched control units (Ho et al., 2011). After propensity score matching, compositional structure of age, we balance the age, cohort and education structure of the non-migrants sample from the Chinese data and migrants sample from the U.S. data.

Why weights are important? If we ignore the weights generated from matching process but assign equal weights to all observations, we would end up with zero standard deviation for the error term in the migration equation. This implies no unobserved variables which are relevant to one's migration likelihood,which is not plausible. However, there are reasons to believe that unobserved heterogeneity, for instance, individual income, occupation, risk preference, contribute to different intention to migrate and giving birth in the population. The necessity of applying weights comes from the little power in identifying migration behaviour with the data at hand. In a word, not applying matching process before weighted likelihood estimation results in failure to identify the migration equation with unobserved heterogeneity involved in one's migration decision-making.

A.6 Simulated conditional annual probabilities of first, second and third birth for a hypothetical migrant who migrated at age 30, which was 3 years after the birth of the first (or second) child by education (secondary education vs less than primary school).



Note: Specification as Model 2.

Chapter 4

SPOUSAL SEPARATION AND MARITAL FERTILITY

Chinese Internal and International Migration

Abstract

This paper investigates the effect of spousal separation due to internal and external migration on marital fertility for Chinese internal migrants and international migrants to the U.S.. Using data from the Chinese International Migration Project, I jointly model the first, second and third births, and spousal separation applying event-history techniques and controlling for unobserved heterogeneity. This chapter sheds light on the effects of couples' living arrangements on fertility by birth order, considering a time-varying occupational status of both partners. The results show that the first two births are disrupted by spousal separation. Reunification does not lead to higher fertility but rather implies lower fertility. There is clear evidence on the selection of spousal separation and fertility at couple level: couples who tend to be separated due to the migration of one partner also have a higher fertility level. It is possible that the selection effect mainly comes from a stronger family orientation, the time of the survey and higher household income.

***Keywords*—** Spousal Separation; Marital Fertility; China-U.S. Migration

4.1 Introduction

One's labour migration, especially when it involves crossing international borders, often requires the migrant to leave his or her spouse and children for a long time, which leads to a series of family changes (Yabiku et al., 2010). This paper investigates the effect of spousal separation due to short-distance or long-distance migration on marital fertility of Chinese internal and international migrants, taking into account the selectivity of separated couples. The aims are, first, to isolate the long-term negative fertility effect caused by spousal separation from the short-term disruptive effect of migration on fertility. Second, to shed light on the fertility behaviour after return migration or migration of the left-behind spouse, or spousal reunification in this case. Lastly, to extend the framework of "men's migration and women's fertility (Agadjanian et al., 2011)" to a more general one, i.e., "couples' living arrangement and fertility" where couples' living arrangement includes living together, living separately due to migration and living together again due to reunification.

In a closed population with neither migration nor contraception methods, the complete fertility of a woman depends on several intermediate variables, including fecundability or probability of conception, length of post-partum and other non-susceptible periods associated with fetal loss (Menken, 1979). However, as urbanisation and globalisation expands, migration adds complexity to the task of estimating and forecasting a population's fertility level. In a modern society with massive long-distance migration due to the rapid development of transportation infrastructure (migration also exists in traditional societies), spousal separation has a substantial and cumulative effect on marital fertility, even when the absence is very short term (Menken, 1979). This is not only because the migration of one partner predicts at least temporary spousal separation and thus lower intercourse frequency, but also because factors affecting fertility in both the destination and origin locations shape family dynamics. A migrant's fertility would either adapt to the norms and circumstances at destination (adaptation hypothesis) or persist as the cultural norm of the origin country (di Belgiojoso and Terzera, 2018).

Studies on spousal separation and fertility would add to our understanding of the selection of separated and reunified couples' fertility norms, which would be different from other couples who opted to experience no spousal separation. Furthermore, an exploration of the interrelationships between spousal separation and marital fertility might shed light on the unobserved dynamics of the couple regarding fertility decisions. Lastly, in some more developed countries with extremely low total fertility rates and increasing immi-

gration flows, understanding the fertility of migrants would be important for near-future population projection. China stands out as a unique country of origin where the fertility level is lower than that of the countries of destination, like the U.S.. Migration is often from high-fertility regions to low-fertility regions.

Though the literature on "migration and fertility" shows a keen awareness of the substantial impact of couples' living arrangement on marital fertility, previous studies generally dealt with this topic in the context of seasonal or temporary migration (Bongaarts, 1977; Bongaarts and Potter, 1979; Menken, 1979; Millman, 1984). The prevalence of seasonal and temporary migration was well justified in contexts like rural-to-urban migration, due to seasonal labour (Menken, 1979), and international migration to a neighbouring destination country, for example, Mexico-U.S. (Lindstrom and Saucedo, 2002), Central Asia-Russian Federation (Clifford, 2009; Nedoluzhko and Andersson, 2007), Africa-Europe (Baizán et al., 2014). For seasonal migration with very short-term absences of one partner, the overall annual fertility is reduced to a new constant level (Menken, 1979). This means that the monthly spousal separation has a cumulative effect on annual birth rates.

To the best of my knowledge, this paper is among the first attempts to quantify the effect of spousal separation caused by both Chinese internal and international migration and reunification on marital fertility, controlling for the complete occupational history of both partners and selectivity of couples from the perspective of the sending villages. This differentiation between spousal separation caused by internal and international migration is important because separations that are short (internal migration) and long (international migration) in distance are substantially different in terms of how they affect fertility, due to geographical distance, visiting frequency, length of stay at the destination, etc. However, data on both internal and international migration from the same origin area has not been commonly available until recently, making it impossible to draw the comparison.

Furthermore, the paper contributes to the previous understanding of the disruptive effect of migration on fertility by explicitly modelling couples' living arrangement, thus isolating the effect of couples' living arrangement from temporary economic uncertainty, which is proxied by couples' occupational status. It incorporates the employment status of the husband and wife into a modelling of marital fertility, shedding light on the importance of a couple's socio-economic status in reproduction decision-making. Moreover, the interrelationship between migration and fertility is worth exploring at the couple level, since marital fertility is a couple's joint decision and is, therefore, closely related to a couple's living arrangement.

Results show that once couples have experienced separation due to migration, they are

selected for certain personality traits and values, which contribute to a tendency towards a higher fertility level, albeit strongly discouraged by spousal separation itself. Not surprisingly, the negative effect of spousal separation due to international migration is higher than other separations due to internal migration for the first two births but not the third birth. The third birth, however, depends on China's time-varying family policy, which did not allow for a third birth for most households after 1980. Though a couple's employment status does not have a significant impact on fertility behaviour, spousal separation is correlated with a more traditional share of labour, meaning that the wife is more likely to be out of the labour force and assumed to be taking care of other family members. Moreover, spousal separation seems to be a long-term strategy and spousal reunification is not the norm.

4.2 Literature Review

There are a number of relevant studies on migration in the Chinese context undertaken in recent years. For example, "Environment and Planning A: Economy and Space" published several papers related to the topic. There are huge difference regarding the number of migrants sent and received within and across key regions and provinces in China (Qi et al., 2017; Shi and Liu, 2019). Fujian province, the focus for this paper, sent around 1 million migrants to other regions in East China and received 4 million migrants from the other provinces during the period 2010-2015 (Qi et al., 2017). The floating population was concentrated predominantly in three key regions, the Yangtze River Delta, Pearl River Delta, and Jing-Jin-Ji region, and moderately in the inland provincial capitals (Shi and Liu, 2019). Hu (2019) confirmed the concentrated floating population in these three regions plus Chengdu. Life-course theory could be applied to China's internal migration context because skilled migrants' migration is closely related to households and labour careers (Cui et al., 2015). There is a substantial gender difference in the first outward move. Women's moving outward is much more sensitive to caring needs than for men. In this sense, women are more likely to return and less likely to migrate out (Chen and Fan, 2018).

The book "Internal and International migration: Chinese perspectives" by Frank N. Pieke and Hein Mallee argues that it is worth the effort to compare Chinese internal migration to Chinese international migration to Europe because China's internal passport system (*hukou*) is as variable as the individual immigration policies in Europe. The organization of household migration could be that married men move to urban areas or abroad

to send income back to the family, or that the household head sends one or more dependents as insurance (Pieke and Mallee, 2013). On the other hand, Pieke and Mallee (2013) showed that the fast-growing communities at the destination mean that pioneer migrants survive for long periods without frequent contact with their home communities.

Studies on couples "living apart together across borders" have provided two basic branches of scholarship: family reunification at the origin and destination (Baizán et al., 2014; González-Ferrer, 2011) and the effects of seasonal/long-distance migration on family changes, for example, marital fertility (Clifford, 2009) and female autonomy (Yabiku et al., 2010). Family unification has become the key to explaining immigration into some European countries after a decline in work-related migration (di Belgiojoso and Terzera, 2018; González-Ferrer, 2007). It had commonly been perceived as producing extra burden for taxpayers and a leading cause for integration failure (González-Ferrer, 2007). In challenging this common understanding, empirical evidence has suggested persistent patterns of living apart together across borders (Baizán et al., 2014; Caarls and Mazzucato, 2016) even with a stable economic situation and regular migration status (Fresnoza-Flot, 2018). Qualitative evidence showed that migrant families cope with their transnational life and take this living arrangement as part of normal life (Gupta, 2002).

A couple's separation affects the likelihood and timing of family events. For example, Caarls and Mazzucato (2015) found that migrant couples have higher divorce rates than non-migrant couples when it is the woman that has migrated. Both spousal separation and reunification have a significant effect on migrants' fertility performance. Macro-simulation and mathematical proof have demonstrated the substantial effect of seasonal spousal separation on marital fertility (Bongaarts and Potter, 1979; Menken, 1979), however, empirical studies are still scarce due to data limitation. Among later empirical works, though several solid hypotheses on the migration and fertility relationship have been tested in various contexts, including disruption, adaptation and migrant selectivity, fewer have been developed on the interrelationship between spousal separation, reunification, and fertility, except for the example given by Clifford (2009). Exceptions also include some literature that sheds light on the disruptive effect of migration on fertility due to spousal separation, for example, the effect of the migration experience for both men and women on marital fertility (Lindstrom and Saucedo, 2002).

The literature has found that men's migration has a negative effect on woman's fertility, either through increased female autonomy (Yabiku et al., 2010), reduced intercourse frequency (Massey and Mullan, 1984) or temporary economic hardship. Lindstrom and Saucedo (2002) suggested that returnee Mexican women showed only slightly lower com-

plete fertility, despite being exposed to the use of contraceptives in the U.S.. This may be connected with the power structure between partners. Fujian province is famous for the many temples for worship along patriarchal lines. Anecdotal evidence suggests that Fujianese rural dwellers have a strong attachment to traditional values and might practice traditional labour divisions.

4.3 Theoretical Perspectives and Hypotheses

4.3.1 The disruptive Effect of Spousal Separation on Fertility

The disruptive hypothesis states that fertility might be temporarily depressed by migration due to spousal separation, mental issues and improvements in economic situations and employment status, but would recover after difficulties are overcome or when couples are reunified. A mathematical model in Menken (1979) has proved that the birth rate, with a seasonally varied conception rate, is similar to a reduced constant level of the annual birth rate. This means that the effect of spousal separation on fertility can be cumulative: longer separation reduces birth probabilities to a greater extent (Massey and Mullan, 1984). The disruption of fertility by spousal separation can be due to one partner's seasonal or temporary labour migration or long-term family strategy, such as living apart together across borders.

Empirically, Agadjanian et al. (2011) highlighted the negative effect of migration on fertility and a catch-up effect after men's migration at the macro level in rural Mozambique. Clifford (2009) found a negative effect of spousal separation and positive selectivity at the community level in post-Soviet Tajikistan. Hampshire and Randall (2000) showed that groups that are more involved in seasonal rural-to-urban migration present lower fertility than non-migrants due to higher risks of sexually transmitted diseases for migrants. Davis (2011) found that, though there is no significant effect of the duration of men's migration on fertility, if a female migrant spends an accumulation of months abroad, this has a negative effect on annual fertility[1].

Hypothesis 1 (Disruption hypothesis): Spousal separation due to migration leads to lower fertility.

However, little attention has been given to the fertility outcome from spousal separation due to long-distance migration, e.g., from China to the U.S. and Europe. Chinese

[1]Unfortunately, it is not possible to explore the duration effect of couple separation on fertility in a given year. This is because there are many missing values on the departure and return months.

internal and international migration share similarities but also differ in many ways. In terms of the similarities, both internal and international migrants might encounter certain regulations on migration, for example, the *hukou* policy for internal migrants and visa policy in the case of international migration. On the other hand, internal and international migration differs not only in terms of the distance of migrants from their place of origin, but also many other aspects, e.g., need to learn a new language or adapt to new culture and labour market, etc. In terms of visit frequency, it seems that Chinese international migrants to the U.S. rarely pay visits to their family members in China and stay for an indefinite period of time at the destination due to geographic distance and visa issue (Liang and Zhang, 2004). By contrast, Chinese internal migrants normally move within the same province, so visits home for them are not as difficult as they are for international migrants (see Table 4.2). It is more difficult for international migrants to visit home than internal migrants, so the disruption effect of spousal separation due to international migration on marital fertility should be larger than if it is due to internal migration.

If the disruptive effect accumulates over time (Menken, 1979), separation due to international migration should have a stronger effect on fertility than separation due to internal migration with a similar duration of separation. This should hold even for very long periods of separation due to both internal and international migration (see Table 4.2). In this analysis, visits home for less than three months is not included due to a lack of data. Short stays should be more possible for internal migrants than international migrants.

Hypothesis 2 (Types of migration): Spousal separation due to international migration leads to lower fertility than if spousal separation is due to internal migration. This holds even when the two kinds of separation last for similar periods of time.

The effect of migration on fertility is gendered: Spousal separation due to migration temporarily affects fertility, while women's migration lowers both birth probability and the total number of births (Lindstrom and Saucedo, 2002). The effect of spousal separation on fertility might differ when the spousal separation is due to the independent migration of the men or women. Lindstrom and Saucedo (2002) argued that the openness to family norms at the destination differs according to many factors, e.g., gender, so it matters who is exposed to these norms. Women's migration might have a more negative effect on fertility because of their exposure to contraceptive methods (Lindstrom and Saucedo, 2002) or certain personal traits, for example, career ambition.

Hypothesis 3 (First migrant): The disruption effect of spousal separation on fertility is stronger when the wife is the first migrant, i.e., the spousal separation is initiated by the wife's migration.

4.3.2 Unemployment, Spousal Separation, and Fertility

Regarding the effect of unemployment on fertility, some of the literature shows that in certain contexts, both a substitution effect and an income effect exist and the net effect of economic uncertainty on fertility might be marginal. For example, men's unemployment would delay the transition to fatherhood, but women's unemployment would not affect fertility timing in West Germany (Özcan et al., 2010). The effect of unemployment is negligible on individual-level fertility in Norway (Kravdal, 2002). This has to do with the strong welfare state and short periods of unemployment in Norway. Kreyenfeld (2010) also found little evidence to support the postponement of births caused by objective and subjective economic uncertainty in Germany during 1984-2006. In China, both the substitution and income effect may have been at play during 1965-2005. On the one hand, the opportunity cost of unemployment is still low in China, as it is in East Germany (Özcan et al., 2010). On the other hand, given the relatively high female labour force participation rate[2] in China, it is possible that women's unemployment could mean a negative income effect on fertility in a context of weak social welfare, but solid informal childcare provided by grandparents.

Hypothesis 4 (Unemployment and fertility hypothesis): Couples' employment status does not significantly affect fertility outcomes.

There is hardly any consensus on how men's migration affects women's employment. Some argue that men's labour migration promotes women's employment outside the home, especially for the wives of unsuccessful male migrants, due to the extra burden of raising the family in Mozambique (Yabiku et al., 2010). While Menjívar and Agadjanian (2007) found that men's labour migration strengthens inequal labour divisions in rural Armenia and Guatemala. Gupta (2002) found that more highly educated women are more likely to migrate with their husbands, rather than being "left behind" because education improves gender equality at home. Socio-economics status is important in explaining the various likelihoods of couples' living arrangement: higher occupational status for men normally means higher chances of reunification in both Senegal and Europe. In addition, if the woman is a skilled worker at the origin, this doubles the chance of reunifying or accelerates the reunification process in Europe (Baizán et al., 2014; González-Ferrer, 2007). This is because higher socio-economic status for both men and women foresees an increased capability to feed more family members in Europe. On the other hand, couples

[2]Female labour force participation rate was 73% in 1990 and 61% in 2017. Though decreasing rapidly, it was still higher than the world's average, i.e., 51% in 1990 and 48% in 2017.

who can not reunify, and continue to be separated, usually face difficulties in terms of affording the high living costs at the destination. In this patriarchal society, where the husband moves out to work in a more profitable industry, the wife lives with the husband's extended family and has to shoulder the domestic chores. In this situation, one could imagine that the husband migrates for labour reasons and the wife stays at home to take care of the other family members at the origin. Or perhaps the wife does not need to work because remittances given by the migrated husband allow her not to (Clifford, 2009). It is likely that separated couples function with a more traditional labour division, i.e., the husband as the breadwinner and the wife as the caregiver.

Hypothesis 5 (Unemployment and spousal separation hypothesis): Spousal separation is positively related to the traditional husband-breadwinner-wife-caregiver family type.

4.3.3 Catch-up on Fertility during Spousal Reunification

The catch-up effect during spousal reunification means that the fertility level might increase after the return of the migrant or migration of the left-behind partner. It is partly derived from the "migration disruptive effect on fertility" theory which argues that couples postpone fertility until returning to a more familiar context (Davis, 2011), in most cases, their origin villages and towns. Bean et al. (2018) found that women aged 20-24 are the most susceptible to the disruption of fertility caused by migration, however, women aged 30 and above presented some catch-up effect to compensate for the earlier disruption.

Spousal reunification can take place either at the village of origin after the return of the migrated partner or at the destination country after the migration of the partner left behind. Returning to the origin village normally means a more familiar environment, lower living costs, and an improved economic situation, thereby increasing fertility. Even in the case of reunifying at the destination, the reunification should still raise fertility due to adaptation to the new environment and an improvement in the economic situation for the migrants' families. Possible mechanisms through which reunification elevates fertility include increased intercourse (Millman, 1984) and changed traditional values related to post-partum abstinence (Omondi and Ayiemba, 2003).

Hypothesis 6 (Catch-up after reunification hypothesis): Couples temporarily increase fertility or hasten it during the reunification period.

4.3.4 Interrelationship between Spousal Separation and Fertility

Spousal separation, marriage, and fertility are closely related events since the likelihood of a couple's residential separation is highest during the early years of marriage when family formation activities are most intense (Gupta, 2002). Lindstrom and Saucedo (2002) found that temporary migrants from Mexico to the U.S. tend to reject family values in the U.S., such as smaller family size, in favour of traditional and patriarchal values. Clifford (2009) also documented that there is a significant positive component between temporary migration and fertility at the community level since more economically disadvantaged communities with higher fertility levels are motivated to participate in labour migration. Unobserved heterogeneity variables like household income might determine both higher chances of migration with its related spousal separation, and a higher fertility level.

Household income might affect decision-making in women's migration and spousal separation in opposite directions. The wife's migration to join the husband normally signifies an improved or higher household income, since the husband is usually the migrant and only considers bringing the wife over when his economic situation improves or allows for family-level consumption at the destination. Families in poorer economic situations would send only the more efficient labour units, usually the husbands, and the women and children would stay at home. The sustenance of poor households often relies heavily on agriculture, in which child labour is a resource, thus leading to a higher ideal number of children. Declined fertility emerged when society saw a transition from the farming mode to labour-market mode (Caldwell, 2006). If this mechanism works, the significant covariance between spousal separation and fertility may decline significantly or even become trivial after controlling for household income and the ideal number of children.

Hypothesis 7 (Selectivity hypothesis): Couples who are more likely to separate also tend to have more births or an accelerated fertility process. This is because separated couples are selective of lower household income.

4.4 Spousal Separation and Reunification within and across Borders

Both internal and international migrants from China are dominated by young male workers. Male migrants consistently accounted for around 77 percent of the total international

migrant population from 1990 to 1995 (Liang and Morooka, 2004). Meanwhile, women accounted for more than half of the "left-behind" population in rural areas[3]. International migration from Fujian province clustered in the service industry, although it became less selective in terms of educational attainment and household socio-economic status in 1995 as compared with 1990. According to the China 1990 Census, the proportion of migrant workers from Fujian province in the service industry increased from 22.90% in 1990 to 38.11% in 1995 (Liang and Zhang, 2004). Most within-border spousal separation is caused by a partner's rural-to-urban migration or worker movement from China's middle and western regions to the eastern coastal area. This mass migration flow was called "migrant workers" or "floating population". The duration of spousal separation can last for years or even decades. The few chances migrants have to visit home include the spring festival[4], among others, so couples who separate for a long time are also called "commune couples".

Until now, little is known about how spousal separation affects the total fertility level in China, including depressed marital fertility and, perhaps, an increase in out-of-wedlock births. The out-of-wedlock births scenario might bring about an extra "social pension fee"[5] in order to get the residential registration (*hukou*) and access to social benefits. Moreover, the *hukou* policy plays an important role in shaping the dynamics of spousal separation. On 22 July 1998, the newly enacted *hukou* policy stated that "a citizen who has been a resident in the city where his/her spouse has lived for some years, should also be granted the *hukou* registration in the same city to avoid spousal separation". However, the high living cost, lack of accessibility for children's education and need for one of the partners to look after the "left-behind" family still prevent spousal reunification. For example, in some circumstances, a child of a migrant worker does not have the local *hukou* and, therefore, cannot go the public school in the destination city, so the couple decides that the wife and child return to the city of origin and the husband remain in the destination city. Moreover, spousal reunification is not necessarily due to an improvement in the economic situation, but rather increasing household expenses, such as the children's education and elderly family members' healthcare, meaning both partners need to work

[3]It is estimated that of the 87 million left-behind population, 47 million of them are married women.

[4]Some argued that transportation infrastructure is responsible for taking around 3 billion passengers to and from home during the spring festival.

[5]"Social pension fee" was once named "penalty fee for extra-quota births" in the 1980s and renamed as it is in the "Law of Population and Planned Fertility (2001)". It is commonly understood as the compensation fee to government investment in the public fairs paid by citizens who gave more births than the fertility policy allowed.

to be able to pay for them.

The data used in this chapter shows that, among the couples who live separately across borders, the majority of migrants go to North America and Europe. Take the migrant flow into the U.S. as an example. There were many undocumented migrants from Fujian villages to New York City, who later brought their family members for family reunification during 1965-2005 (Liang and Miao, 2013). Visits to China are very infrequent since they would not be able to go back to the destination country if they returned without a green card (Liang and Zhang, 2004). Normally, it would be easier for the "left-behinds" to join their partners who already have a green card. Otherwise, migrating without a paper might be subject to high migration costs, by way of smuggling fees, for example (Liang and Miao, 2013).

The differences between internal and international migration include that the latter implies greater difficulty adapting to the destination, in terms, for example, of language, cultural differences and support network (Liang and Miao, 2013). As a result, the length of spousal separation is normally longer and visiting frequency lower for couples involved in international migration than others involved in internal migration. The data in this analysis suggests that internal migrants on average move within China for 1.219 times, while international migrants averagely migrate for 1.059 times. The two distributions are significantly different (p-value=0.0001, two-sample Kolmogorov-Smirnov test). Moreover, the selectivity of education for Chinese internal and international migrants from the same area differs as internal migrants are mainly small businessmen (Song and Liang, 2016) who are positively selected for education, while the occupations of international migrants (e.g., restaurant-related work) is not significantly related to education (Liang and Miao, 2013).

4.5 Data and Methods

The data is merged from the household head file, migrants file, household file and person file from the Chinese International Migration Project (CIMP)[6]. An ethno-survey followed the research design of the Mexico Migration Project, which provided detailed information on the history of migration, family formation, reproduction and socio-economic mobility for Fujianese international migrants and internal migrants to other counties in China. Interviews took place during October 2002 - March 2003. The survey included information on household heads, households, migrants and all persons interviewed in separate files. The survey was conducted in eight towns situated in northeast Fujian Province in China and New York City. The selection of these eight towns was based on a pre-survey investigation of common villages of origin among Fujianese in New York City. Among the eight towns found to commonly send migrants to New York City, four villages and 50 households in each were systematically sampled, with a total, therefore, of 200 households per town. At the destination, 25-40 Fujianese migrants from each of the eight towns were interviewed. There are 1,806 households and 10,447 individuals in the sample, 4,646 of whom have migrated at least once, either internally or internationally. A detailed description of the survey can be found in (Liang et al., 2008).

This paper covers couples born between 1950 and 1980 who married no earlier than age 15, experienced, or not, spousal separation after getting married and gave birth after marriage[7]. The analysis is conducted at the couple level. Kinships like spouses and children are established through the spouse identifier, resulting in 931 couples with a complete history of couple separation. The birth year of the child is lagged one year to account for the 9 months of pregnancy. It is normal that many couples conceive a child the same year as they start a partnership: this fertility must be considered as marital since the child is born when the couple is married. Applying the own-children method (Goldstein and Goldstein, 1981), I only use the couples for whom the number of children reported by the household head and number of children within marriage is identical. This only excludes 30 couples, 3% of the couples for whom the first birth was before age 15.

[6]Data collection for this project was supported by grants from The National Science Foundation (SES-0138016), The National Institute of Child Health and Human Development (1 R01 HD39720-01), and The Ford Foundation (1025-1056). Zai Liang is the Principal Investigator of the project.

[7]The 1950 Marriage Law suggests register of marriage no earlier than when the man is 20 years old and the woman is 18 years old. However, anecdotal evidence suggests that in some rural areas where this study is based on, the de facto relationship starts earlier than the marriage and the births are widely treated as marital fertility.

Couples who have more than one birth in the same year or have the first birth before 15 or before marriage (not marital fertility), or who got married before age 15 are not included in the analysis resulting in 632 couples[8].

Data on fertility history is of good quality and that the act of exclusion would not significantly bias the results since the year of birth of these excluded couples seems quite random, and not systematic. Results including births of unmarried woman are shown in Appendix A.2. Not surprisingly, the inclusion of births before marriage shows a weaker effect of spousal separation due to migration on the total fertility level of the first birth: only the negative effect of spousal separation due to international migration on the first birth is statistically significant. This signifies the substantially disruptive effect of spousal separation due to international migration on the timing and likelihood of the first birth. However, on the second and third birth order, the effect of spousal separation on women's total fertility rate does not qualitatively differ from that on marital fertility. This is because couples normally get married soon after the first birth if not married before it.

To obtain a finer estimation of spousal separation, both internal and international migration is defined as moving to a different county or another country for at least three months. This study benefits from the detailed research design of the China International Migration Project in that its household head file provides rich information on the complete history of migration, reproduction, time-varying household income, and occupational mobility for the couple: up to 6 occupational changes are recorded for both the household head and the spouse. There is detailed information on household income in the year 1990, 1995 and 2001. The time-varying household income is assumed to be constant during the period between the year intervals: assume that household income before 1990 stayed the same as that of 1990, that between 1990 and 1995 as the same of 1995, etc.

Observation of fertility starts from the year of marriage and ends at the last birth happened, or 15 years after the previous birth[9], or at age 50 or age at the time of the survey, if there were no further births. I selected one of these conditions for censoring the observations based on its chronological order. The fertility history of the wife is merged with the spousal separation history and the couple's occupational history in a longitudinal setting.

[8]Among the 925 couples matched with complete history of couples' living arrangement, i.e., living together, spousal separation and reunification due to internal or international migration, 2 couples had the first birth before age 15, 4 couples had the first two children as twins, 6 couples had the second and third births as twins, 30 couples were excluded by the "own-children method", and 251 couples conceived the first birth more than one year before marriage. These couples are excluded from the analysis which ended up with 632 couples with complete fertility history.

[9]Data suggests that almost zero more births happen if the birth does not happen 15 years after the last birth.

Couples are exposed to risks of separation only when married and never separated or had reunified either at the origin or destination and lasts until the occurrence of the event of separation, or 30 years after getting married if not separated or at age 50. Spousal separation started the year when one partner migrated and the other stayed in the origin village and ended when the migrant return to the origin village or the left- behind migrated, from when the spousal reunification began.

Basic data cleaning yields 632 couples and 907 couple-years for the process of the first birth, 2,455 couple-years for the observation of the second birth and 2,966 couple-years for the third birth (see Footnote 9 for the reasons of excluding some couples). There are so few couple-years included in the observation of the first birth because the first one normally took place quite rapidly after marriage and presents a high prevalence in the population. Moreover, there are 555 couples and 9,148 couple-years for the separation process. There were 207 couples who once experienced separation due to internal migration, among which 90% are within the same province, and another 221 couples who once experienced separation due to international migration, a large share of which separated across Europe and the U.S. (see Table 4.2). Up to three spousal separations and two reunifications (both at the origin and destination) are observed given the data. Spousal reunification at the destination and origin is not treated separately since there are not enough cases to run a model that places spousal reunification at the destination and origin in separated categories.[10].

The joint modelling of the first, second, third birth and couples' living arrangement, i.e., separated or not, is shown in equation (1) and (2). It is assumed that there is some shared covariance among all the three births in ϵ. $F_j(t)$ is a vector of time-varying variables like age, duration since marriage, husband's and wife's educational attainment, couple's living arrangement, employment status of the husband and wife, etc. All the variables included in the model (except for the ideal number of children) are time-varying. The equations of the three births and spousal separation were first estimated separately and then incorporated a factor ϵ in all three births and λ in spousal separation. The four equations were estimated simultaneously. Hypotheses 1, 2, 4 could be tested using the specification of equation (4.1), (4.2) and (4.3) where fertility is the dependent variable, while Hypothesis 3 could be tested using the specification of equation (4.4) where spousal separation, coded as 0 or 1, is the dependent variable. These models are estimated by aML (Lillard and Panis, 2000; Kravdal, 2001).

[10]Of all the 275 couples who ever reunified, 70 reunified at the destination and 205 reunified at the origin, with 182 of them being the husband returning to the village of origin.

$$ln\left\{\frac{Pr(y_i^{1B}=1|X_i)}{1-Pr(y_i^{1B}=1|X_i)}\right\}=\beta_1 x_{it}+\beta_2 w_{it}+\epsilon_i \tag{4.1}$$

$$ln\left\{\frac{Pr(y_i^{2B}=1|X_i)}{1-Pr(y_i^{2B}=1|X_i)}\right\}=\beta_1 x_{it}+\beta_2 w_{it}+\epsilon_i \tag{4.2}$$

$$ln\left\{\frac{Pr(y_i^{3B}=1|X_i)}{1-Pr(y_i^{3B}=1|X_i)}\right\}=\beta_1 x_{it}+\beta_2 w_{it}+\epsilon_i \tag{4.3}$$

$$ln\left\{\frac{Pr(y_i^{S}=1|X_i)}{1-Pr(y_i^{S}=1|X_i)}\right\}=\beta_1 w_{it}+\lambda_i \tag{4.4}$$

where the subscript i refers to the couple, and t to each time unit, i.e., year. The X_i denotes a vector of covariates, x_{it} denotes the couple's living arrangement variable, and w_{it} is a set of control variables. The left side of the equations are the logarithms of the odds of the first, second or third birth or separation conditional on a set of covariates and the error term. The ϵ and λ capture the couple-level unobserved heterogeneity, and are assumed to have a joint bivariate normal distribution:

$$\begin{pmatrix}\epsilon\\ \lambda\end{pmatrix}\sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix},\begin{pmatrix}\sigma_\epsilon^2 & \rho_{\epsilon\lambda}\\ \rho_{\epsilon\lambda} & \sigma_\lambda^2\end{pmatrix}\right) \tag{4.5}$$

Family migration models are heterogeneous and dynamic which would be well described with the help of sequence analysis to illustrate the different timing, order of events and sequencing of couple's migration and return (di Belgiojoso and Terzera, 2018). The evolution of spousal separation and fertility is visualised with the help of the sequence analysis package TraMineR in R[11].

4.6 Results

4.6.1 Descriptive

Table 4.1 shows the transition rate from childless to the first, second and third birth for couples that have always been living together, couples who once separated but never reunified and couples who separated and reunified either at the origin or destination. In

[11] Gabadinho, A., G. Ritschard, M. Studer and N. S. Muller Mining sequence data in R with the TraMineR package: A user's guide, University of Geneva, 2010. (http://mephisto.unige.ch/traminer)

rural Fujian, the first birth is almost universal, and the transition rate from the second to the third birth is around 20% during the period of 1965-2005 for cohorts born between 1950 and 1980. However, the transition rate of progressing to the second birth varies by couples' living arrangement: couples who never separated show 10% higher transition rate than couples who experienced at least one-time separation, including separation due to both internal and international migration. The Kruskal-Wallis Test showed that the parity progression ratios from childless to the first birth and from the second to the third birth by couples' living arrangement are not statistically significant (p-value=0.84 and 0.76, respectively), while those between first birth to the second birth by couples' living arrangement are statistically significant (p-value=0.001).

For the parity progression ratio from the first to the second birth, the Mann-Whitney-Wilcoxon Test (pairwise test) showed that both the difference between couples once separated but never reunified and couples who never separated, and the difference between couples once separated and reunified and couples who never separated are statistically significant (p-value=0.004 and p-value=0.0007, respectively). However, the difference in parity progression ratio between couples once separated but never reunified and couples once separated and reunified is not significant (p-value=0.66). This means that couples who have separated have significantly lower progression ratios from the first to the second birth compared with others who never separated.

Table 4.1: Parity Progression Ratios to the First, Second and Third Birth by Couples' Living Arrangement

	Childless - First Birth	First Birth - Second Birth	Second Birth - Third Birth
couples who never separated	98%	84%	22%
couples once separated but never reunified	99%	75% ***	19%
couples once separated and reunified	98%	73% ***	19%

Table 4.2 shows the mean age at spousal separation for both the husband and the wife, average years spent outside of one's own county or abroad, the proportion of reunification at the time of the survey, and distance between the partners while separated. Spousal separation due to international migration comes at a later age than other separations due to internal migration. Surprisingly, the average years spent out of the county and abroad is very similar for both groups, around 8.4 years for both[12]. Though these statistics need

[12]This means the duration of migration does not take into account returning and staying for less

to be interpreted with caution, it seems that even internal migrants spend quite a long time away from their village. Not including returns to origin villages for less than 3 months, the duration Chinese international migrants stay abroad lies in the same range of stay durations of some Central American migrants in the U.S.. Guatemalan return migrants spent, on average, 4.9 years in the U.S. while Nicaraguans spent 10.57, on average (Davis, 2011).

Table 4.2: Spousal separation due to internal and international migration

	separation due to internal migration	separation due to international migration
Mean age at separation of the husband	20.03	28.87
Mean age at separation of the wife	23.59	31.53
Mean separated duration	8.42	8.45
Proportion of reunification	78%	18%
living distance while separated		
same province	90%	
Asia		7%
U.S.		47%
Europe or others		46%

At the time of the survey, only 18% of couples separated due to international migration once reunified, while around 78% of internal migrants reunified. Regarding the distance between couples who are separated, 90% of the separated couples due to internal migration live apart across counties but remain in the same province. For couples involved in internal migration, only 7% of them separated within Asia. There is a similar share of couples, around 46% each, separated between the U.S., Europe and their origin villages in Fujian.

Table 4.3: Spousal Separation initiated by Husband and Wife

	Internally Separated	Internationally Separated
Husband was the main migrant	819 (94%)	48 (94%)
Wife was the main migrant	55 (6%)	3 (6%)
Total	874 (100%)	51 (100%)

There has been a trend of feminizing of migration in recent years, meaning that there are a lot more women who migrate independently and become the primary economic provider. In 2015, women comprised around 48 percent of international migrants in the

than 3 months, which is very likely for internal migrants and less so for international migrants.

world (International Migration Report 2015[13]). However, it was not the case during the period studied, i.e., 1965 to 2003. Table 4.3 shows that for around 94% of those couples who separated either within China or across borders, the separations are initiated by the husbands, while only 6% of the separations was due to the migration of the wife. It seems that both internal and international migration from Fujian province during that period is gendered: normally the men migrated first.

Figure 4.1 shows the couple's status, i.e., separated because of one's internal or international migration, during the transition from childless to first, second and third birth. Spousal separation is normally shorter, if there is any, between getting married and the arrival of the first birth, compared with the time waiting for higher-order births, i.e., second and third births. For the transition into higher-order births, separation could happen after a while of living together and lasts longer than the separation period before having the first birth. For all the three birth transitions, there are signs that spousal separation brings down the likelihood of fertility since the censored states (births failed to happen) seem to follow spousal separation states more than when the couple is not separated due to migration.

4.6.2 Spousal Separation, Reunification, and Fertility

Table 4.4 shows that the first two births are disrupted by spousal separation due to both internal and international migration and do not recover even during a couple's reunification. The annual likelihood of the first birth decreased by 36% for couples separated due to internal migration, i.e., moving to another county. The annual likelihood of the first birth after spousal separation due to international migration decreased to merely 9% of that of other couples who are not separated after marriage. The first birth of international migrants is more severely depressed by spousal separation than that of internal migrants. The second birth is only strongly disrupted by long-distance international migration but not internal migration. The annual likelihood of the second birth for couples who were living across borders is only 12% of other couples who are not separated. The conditional annual likelihood of having the third birth is slightly reduced after migration and does not significantly recover after spousal reunification.

As shown in Table 4.4, the disruption effect exists: spousal separation due to both internal and international migration significantly decreases marital fertility (Hypothesis 1).

[13] https://www.un.org/en/development/desa/population/migration/publications/migrationreport/docs/MigrationReport2015_Highlights.pdf

Figure 4.1: Sequence of yearly couple status (separated due to migration or not separated) by the time of first, second and third birth if these occurred.

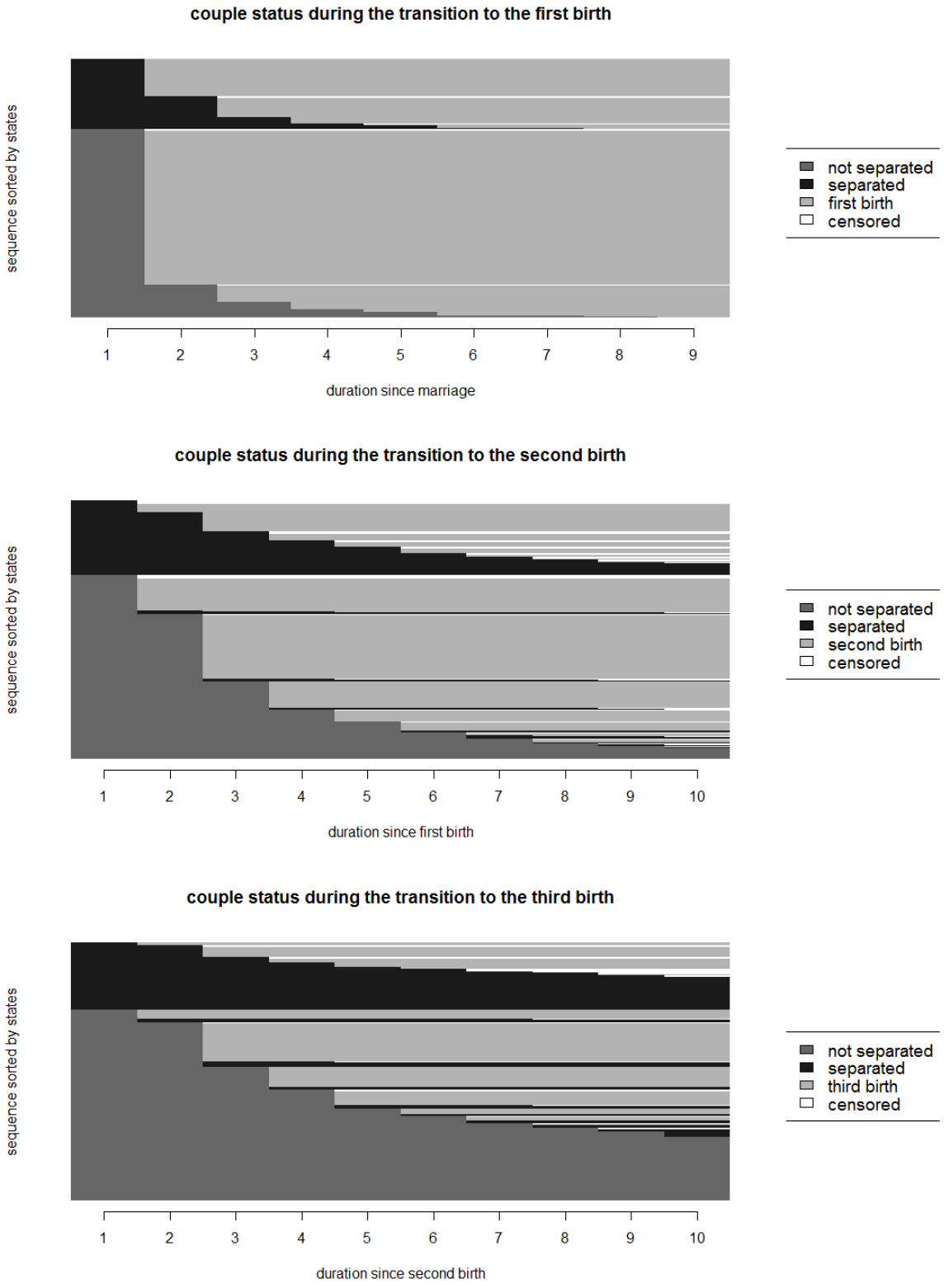


Table 4.4: Estimation of Fertility and Spousal Separation

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 1 - First Birth						
Constant	0.00	0.00-0.01	***	0.00	0.00-0.01	***
Age	3.12	1.86-5.22	***	3.11	1.86-5.19	***
Age squared	0.98	0.96-0.99	***	0.98	0.96-0.99	***
Duration since marriage	0.44	0.36-0.53	***	0.44	0.36-0.54	***
Duration since marriage squared	1.07	1.04-1.10	***	1.07	1.04-1.10	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.71	0.52-0.97	**	0.70	0.51-0.95	**
senior high school and above	0.53	0.29-0.96	**	0.52	0.28-0.95	**
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.84	0.62-1.13		0.83	0.61-1.12	
senior high school and above	0.86	0.52-1.41		0.85	0.51-1.41	
Couple living arrangement (Ref. couple living together)						
couple separated due to internal migration	0.37	0.28-0.50	***	0.36	0.27-0.49	***
couple separated due to international migration	0.10	0.04-0.22	***	0.09	0.04-0.21	***
couple reunified after separation	0.41	0.29-0.60	***	0.42	0.29-0.60	***
Husband employed (Ref. unemployed or temporary job)	2.05	0.85-4.96		2.11	0.87-5.14	
Wife employed (Ref. unemployed or temporary job)	0.94	0.71-1.25		0.91	0.68-1.20	

Taula 4.4: Estimation of Fertility and Spousal Separation (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 2 - Second Birth						
Constant	0.60	0.20-1.75		0.61	0.21-1.81	
Age at first birth	0.95	0.90-1.00	**	0.95	0.90-1.00	**
Duration since first birth	2.97	2.16-4.08	***	3.04	2.20-4.20	***
Duration since first birth squared	0.87	0.83-0.91	***	0.86	0.83-0.91	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.02	0.76-1.35		1.00	0.75-1.34	
senior high school and above	0.37	0.20-0.69	***	0.35	0.19-0.66	***
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.66	0.49-0.87	***	0.65	0.49-0.87	***
senior high school and above	0.64	0.43-0.96	**	0.64	0.42-0.96	**
Couple living arrangement (Ref. couple living together)						
couple separated due to internal migration	0.82	0.62-1.07		0.79	0.60-1.05	
couple separated due to international migration	0.14	0.03-0.73	**	0.12	0.02-0.64	**
couple reunified after separation	0.64	0.43-0.96	**	0.65	0.43-0.96	**
Husband employed (Ref. unemployed or temporary job)	0.67	0.46-0.98	**	0.66	0.44-0.97	**
Wife employed (Ref. unemployed or temporary job)	1.01	0.80-1.27		0.94	0.74-1.19	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.97	0.73-1.27		0.95	0.72-1.25	
loosened one child policy (after 1988)	0.25	0.17-0.35	***	0.23	0.16-0.33	***

Taula 4.4: Estimation of Fertility and Spousal Separation (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 3 - Third Birth						
Constant	0.82	0.15-4.45		0.79	0.14-4.39	
Age at second birth	0.92	0.86-0.99	**	0.93	0.87-0.99	**
Duration since second birth	1.75	0.97-3.19	*	1.75	0.96-3.18	*
Duration since second birth squared	0.93	0.86-1.00	*	0.93	0.86-1.00	*
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.79	0.50-1.23		0.80	0.51-1.25	
senior high school and above	0.67	0.16-2.92		0.67	0.15-2.92	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.88	0.58-1.32		0.87	0.57-1.31	
senior high school and above	1.14	0.58-2.24		1.16	0.59-2.28	
Couple living arrangement (Ref. couple living together)						
couple separated due to migration	0.88	0.57-1.36		0.83	0.53-1.29	
couple reunified after separation	0.95	0.43-2.09		0.95	0.43-2.11	
Husband employed (Ref. unemployed or temporary job)	1.13	0.64-1.99		1.14	0.65-2.02	
Wife employed (Ref. unemployed or temporary job)	1.00	0.71-1.43		0.94	0.65-1.34	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.50	0.32-0.78	***	0.50	0.32-0.77	***
loosened one child policy (after 1988)	0.14	0.08-0.25	***	0.13	0.07-0.23	***

Taula 4.4: Estimation of Fertility and Spousal Separation (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 4 - Couple separation						
Constant	0.00	0.00-0.03	***	0.00	0.00-0.03	***
Age	1.32	0.97-1.78	*	1.35	0.93-1.96	
Age squared	1.00	0.99-1.00		1.00	0.99-1.00	
Duration since marriage	1.01	0.91-1.12		1.11	0.95-1.31	
Duration since marriage squared	1.00	0.99-1.00	*	0.99	0.98-1.00	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.13	0.80-1.60		0.95	0.53-1.70	
senior high school and above	0.73	0.36-1.49		0.41	0.15-1.11	*
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	1.01	0.72-1.41		0.81	0.49-1.36	
senior high school and above	1.40	0.86-2.28		1.93	0.98-3.80	*
Husband employed (Ref. unemployed or temporary job)	1.32	0.79-2.21		1.53	0.68-3.42	
Wife employed (Ref. unemployed or temporary job)	0.29	0.20-0.41	***	0.06	0.03-0.14	***
Standard deviation of unobserved heterogeneity, fertility				0.19		***
Standard deviation of unobserved heterogeneity, couple separation				2.34		***
Correlation between fertility and couple separation (Rho)				0.71		***
Log-likelihood	-2966			-2912		

Table 4.5: Estimation of Fertility and Spousal Separation, Similar Duration

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 1 - First Birth						
Constant	0.00	0.00-0.02	***	0.00	0.00-0.02	***
Age	2.91	1.74-4.87	***	2.91	1.74-4.85	***
Age squared	0.98	0.97-0.99	***	0.98	0.97-0.99	***
Duration since marriage	0.41	0.33-0.50	***	0.42	0.34-0.51	***
Duration since marriage squared	1.07	1.04-1.10	***	1.07	1.04-1.10	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.72	0.53-0.99	**	0.70	0.51-0.96	**
senior high school and above	0.46	0.25-0.82	**	0.44	0.25-0.80	**
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.82	0.61-1.12		0.81	0.60-1.11	
senior high school and above	0.80	0.49-1.29		0.79	0.49-1.30	
Couple living arrangement (Ref. couple living together)						
separated due to internal migration, 0-3 years	0.26	0.18-0.37	***	0.26	0.18-0.37	***
separated due to internal migration, more than 3 years	0.67	0.39-1.13	***	0.65	0.38-1.11	***
separated due to international migration, 0-3 years	0.03	0.00-0.28	***	0.03	0.00-0.25	***
separated due to international migration, more than 3 years	0.19	0.08-0.45		0.18	0.08-0.42	
reunified	0.41	0.29-0.60		0.42	0.29-0.61	
Husband employed (Ref. unemployed or temporary job)	2.00	0.83-4.83		2.07	0.85-5.03	
Wife employed (Ref. unemployed or temporary job)	0.91	0.68-1.21	**	0.87	0.66-1.16	**

Taula 4.5: Estimation of Fertility and Spousal Separation, Similar Duration (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 2 - Second Birth						
Constant	0.68	0.23-2.03	***	0.71	0.24-2.12	***
Age at first birth	0.94	0.90-0.99	***	0.95	0.90-1.00	***
Duration since first birth	2.83	2.06-3.89		2.89	2.09-3.99	
Duration since first birth squared	0.87	0.83-0.91	***	0.87	0.83-0.91	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.03	0.77-1.37	***	1.01	0.76-1.35	***
senior high school and above	0.37	0.20-0.69	**	0.35	0.19-0.66	**
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.66	0.49-0.87		0.65	0.49-0.87	
senior high school and above	0.65	0.44-0.98	**	0.65	0.43-0.98	**
Couple living arrangement (Ref. couple living together)						
separated due to internal migration, 0-3 years	0.33	0.15-0.75	**	0.30	0.14-0.68	**
separated due to internal migration, more than 3 years	0.93	0.69-1.26	**	0.92	0.68-1.25	**
separated due to international migration	0.14	0.03-0.75		0.12	0.02-0.65	
reunified	0.65	0.44-0.96		0.65	0.44-0.97	
Husband employed (Ref. unemployed or temporary job)	0.67	0.46-0.99	***	0.66	0.45-0.98	***
Wife employed (Ref. unemployed or temporary job)	1.00	0.79-1.26		0.92	0.72-1.17	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.96	0.73-1.26	**	0.94	0.71-1.24	**
loosened one child policy (after 1988)	0.25	0.18-0.35	*	0.23	0.16-0.33	*

Taula 4.5: Estimation of Fertility and Spousal Separation, Similar Duration (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 3 - Third Birth						
Constant	0.82	0.15-4.46	*	0.79	0.14-4.40	*
Age at second birth	0.92	0.86-0.99		0.93	0.87-0.99	
Duration since second birth	1.75	0.97-3.18		1.75	0.96-3.18	
Duration since second birth squared	0.93	0.86-1.00		0.93	0.86-1.00	
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.79	0.50-1.23		0.80	0.51-1.25	
senior high school and above	0.67	0.16-2.92		0.67	0.15-2.90	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.88	0.58-1.32		0.86	0.57-1.30	
senior high school and above	1.14	0.58-2.24		1.16	0.59-2.29	
Couple living arrangement (Ref. couple living together)						
couple separated due to migration	0.88	0.57-1.36		0.83	0.53-1.29	
couple reunified after separation	0.95	0.43-2.09	***	0.95	0.43-2.12	***
Husband employed (Ref. unemployed or temporary job)	1.13	0.64-1.99	***	1.14	0.65-2.02	***
Wife employed (Ref. unemployed or temporary job)	1.00	0.71-1.43	***	0.93	0.65-1.33	***
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.50	0.32-0.78	*	0.49	0.32-0.77	
loosened one child policy (after 1988)	0.14	0.08-0.25		0.12	0.07-0.23	

Taula 4.5: Estimation of Fertility and Spousal Separation, Similar Duration (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 4 - Couple separation						
Constant	0.00	0.00-0.03		0.00	0.00-0.03	
Age	1.32	0.97-1.78	*	1.35	0.93-1.96	***
Age squared	1.00	0.99-1.00		1.00	0.99-1.00	
Duration since marriage	1.01	0.91-1.12		1.11	0.95-1.31	*
Duration since marriage squared	1.00	0.99-1.00		0.99	0.98-1.00	
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.13	0.80-1.60		0.95	0.53-1.71	*
senior high school and above	0.73	0.36-1.49		0.41	0.15-1.12	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	1.01	0.72-1.41	***	0.81	0.49-1.36	***
senior high school and above	1.40	0.86-2.28		1.92	0.97-3.81	***
Husband employed (Ref. unemployed or temporary job)	1.32	0.79-2.21		1.53	0.68-3.41	***
Wife employed (Ref. unemployed or temporary job)	0.29	0.20-0.41		0.06	0.03-0.14	***
Standard deviation of unobserved heterogeneity, fertility				0.20		***
Standard deviation of unobserved heterogeneity, couple separation				2.34		***
Correlation between fertility and couple separation (Rho)				0.71		***
Log-likelihood	-2957			-2903		

This disruption effect differs by migration type causing spousal separation (Hypothesis 2) and by birth parity. Disruption is more severe for spousal separation caused by international migration than internal migration. The first birth is 36% as likely to happen when the couple is separated geographically within China. Furthermore, the odds of having a first birth when separated across borders decline to a mere 9% of the odds of having a first birth when the couple is not separated. The second birth is not substantially affected by internal migration but still severely depressed by international migration. On the other hand, the third birth is not affected significantly by a couple's living arrangement.

Table 4.5 shows how the effect of spousal separation differs according to migration type, given similar durations of separation, i.e., 0-3 years and more than 3 years. Due to limited sample size and the low occurrence of the second and third birth, it is not possible to differentiate the effect of spousal separation on marital fertility according to both types of migration and durations of separation for these two birth orders. However, based on the result of the first birth, we can see that even for similar durations of separation, separation due to international migration has a stronger effect on fertility than if it is due to internal migration. For separations that last for 0 to 3 years, the odds of having the first birth when separated within China are around 74% lower than the odds when the couple is not separated. While the odds of the first birth, if couples are separated across borders, are only 3% of the odds of the first birth if they are not separated, the odds ratio of having the first birth for those separated internally for more than 3 years compared to others not separated is 0.67. While the odds ratio of first birth is only 0.19 for couples separated internationally compared to others that are not separated.

Using the same data source, Liang and Miao (2013) argues that Fujianese internal and international migrants are selective of different education levels: educational attainment seems to be more important for internal migrants than for international migrants. This is because Fujianese international migrants to the U.S. usually run small businesses, e.g., restaurants, which do not require high education levels. While Fujianese internal migrants could be businessmen, whose migration would benefit from higher levels of education. The next question is, are couples who have separated internally the same group of people in terms of socio-economic status as those who separated across borders? Panel 4 of Table A.3 in the Appendix shows the model when only spousal separation due to internal migration is included. This result is compared with Table 4.4 to identify the different selectivity of socio-economic status of spousal separation due to the two types of migration[14].

[14]Results that only include spousal separation due to international migration is not presented.

Table 4.6: Estimation of Fertility and Spousal Separation, First Migrant

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 1 - First Birth						
Constant	0.00	0.00-0.01	***	0.00	0.00-0.01	***
Age	3.02	1.79-5.08	***	3.01	1.79-5.03	***
Age squared	0.98	0.97-0.99	***	0.98	0.97-0.99	***
Duration since marriage	0.43	0.35-0.52	***	0.43	0.35-0.53	***
Duration since marriage squared	1.07	1.04-1.10	***	1.07	1.04-1.10	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.67	0.48-0.93	**	0.65	0.47-0.91	**
senior high school and above	0.47	0.26-0.84	**	0.46	0.25-0.83	**
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.84	0.62-1.13		0.83	0.62-1.12	
senior high school and above	0.87	0.52-1.44		0.86	0.52-1.42	
Couple living arrangement (Ref. couple living together)						
separated due to husband's move	0.39	0.27-0.57	***	0.38	0.26-0.56	***
separated due to wife's move	0.29	0.20-0.41	***	0.29	0.20-0.41	***
reunified	0.42	0.29-0.61	***	0.43	0.29-0.62	***
Husband employed (Ref. unemployed or temporary job)	2.21	0.89-5.48	*	2.23	0.90-5.54	*
Wife employed (Ref. unemployed or temporary job)	1.03	0.78-1.36		1.00	0.76-1.31	

Taula 4.6: Estimation of Fertility and Spousal Separation, First Migrant (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 2 - Second Birth						
Constant	0.62	0.21-1.84		0.64	0.21-1.90	
Age at first birth	0.94	0.90-0.99	**	0.95	0.90-0.99	**
Duration since first birth	2.96	2.16-4.07	***	3.03	2.19-4.19	***
Duration since first birth squared	0.87	0.83-0.91	***	0.86	0.82-0.90	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.04	0.78-1.40		1.04	0.77-1.40	
senior high school and above	0.40	0.21-0.74	***	0.39	0.21-0.73	***
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.66	0.49-0.88	***	0.66	0.49-0.88	***
senior high school and above	0.65	0.43-0.97	**	0.65	0.43-0.98	**
Couple living arrangement (Ref. couple living together)						
separated due to husband's move	0.72	0.49-1.06	*	0.68	0.46-1.01	*
separated due to wife's move	0.76	0.54-1.07		0.75	0.53-1.05	*
reunified	0.64	0.43-0.96	**	0.65	0.43-0.96	**
Husband employed (Ref. unemployed or temporary job)	0.68	0.46-0.99	**	0.67	0.45-0.98	**
Wife employed (Ref. unemployed or temporary job)	1.04	0.83-1.31		0.98	0.77-1.23	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.98	0.75-1.29		0.96	0.73-1.27	
loosened one child policy (after 1988)	0.24	0.17-0.34	***	0.23	0.16-0.33	***

Taula 4.6: Estimation of Fertility and Spousal Separation,, First Migrant(continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 3 - Third Birth						
Constant	0.91	0.17-5.00		0.89	0.16-4.94	
Age at second birth	0.92	0.86-0.98	**	0.92	0.86-0.99	**
Duration since second birth	1.76	0.97-3.19	*	1.78	0.97-3.24	*
Duration since second birth squared	0.93	0.86-1.00	*	0.93	0.86-1.00	*
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.74	0.47-1.17		0.75	0.47-1.18	
senior high school and above	0.60	0.14-2.65		0.60	0.13-2.66	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.83	0.56-1.24		0.82	0.55-1.23	
senior high school and above	1.15	0.58-2.27		1.17	0.59-2.31	
Couple living arrangement (Ref. couple living together)						
separated due to husband's move	1.51	0.90-2.56		1.46	0.86-2.47	
separated due to wife's move	0.62	0.35-1.11		0.58	0.32-1.06	*
reunified	0.98	0.44-2.16		0.98	0.44-2.18	
Husband employed (Ref. unemployed or temporary job)	1.17	0.66-2.07		1.19	0.67-2.10	
Wife employed (Ref. unemployed or temporary job)	0.99	0.70-1.42		0.93	0.65-1.33	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.52	0.33-0.80	***	0.51	0.33-0.79	***
loosened one child policy (after 1988)	0.14	0.08-0.25	***	0.13	0.07-0.23	***

Taula 4.6: Estimation of Fertility and Spousal Separation, First Migrant(continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 4 - Couple separation						
Constant	0.00	0.00-0.03	***	0.00	0.00-0.03	***
Age	1.32	0.97-1.78	*	1.35	0.93-1.96	
Age squared	1.00	0.99-1.00		1.00	0.99-1.00	
Duration since marriage	1.01	0.91-1.12		1.11	0.95-1.31	
Duration since marriage squared	1.00	0.99-1.00	*	0.99	0.98-1.00	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.13	0.80-1.61		0.94	0.52-1.69	
senior high school and above	0.73	0.36-1.49		0.41	0.15-1.11	*
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	1.01	0.72-1.41		0.81	0.48-1.35	
senior high school and above	1.40	0.86-2.28		1.92	0.98-3.79	*
Husband employed (Ref. unemployed or temporary job)	1.32	0.79-2.21		1.53	0.68-3.42	
Wife employed (Ref. unemployed or temporary job)	0.29	0.20-0.41	***	0.06	0.03-0.14	***
Standard deviation of unobserved heterogeneity, fertility				0.17		**
Standard deviation of unobserved heterogeneity, couple separation				2.34		***
Correlation between fertility and couple separation (Rho)				0.71		***
Log-likelihood		-2971		-2918		

We can see that in the original model (see Table 4.4), women with higher education levels are less likely to be separated from their husbands, either internally or internationally. This odds ratio is no longer significant when only spousal separation due to internal migration is considered (see Panel 4, Table A.3). This means that highly educated women, i.e., those with high school education or above, do not have lower risks of spousal separation due to internal migration. In other words, wives who are internationally separated from their husbands normally have lower education levels, i.e., below high school. While wives who are separated from their husbands within China are not selective of education. This finding is consistent with Gupta (2002), who found that highly educated women are more likely to join the husband at the destination country than being left behind.

The effect of a spousal separation initiated by the husband and/or wife on fertility differs by birth order. Spousal separation due to both husband and wife moving predicts a lower likelihood of having a first birth and that spousal separation initiated by the wife means lower fertility (odds ratio = 0.29 compared with not separated) than spousal separation initiated by the husband (odds ratio = 0.38). However, for the second birth, spousal separation due to the husband moving means even lower fertility levels than those due to the wife's migration. Spousal separation initiated by the husband does not affect the likelihood of the third birth, but the effect of spousal separation on fertility due to the wife's migration is still statistically significant. Hypothesis 3 is partially confirmed, which suggests that the negative effect of spousal separation on fertility is stronger when the wife is the first migrant for the first and third birth, but not the second birth. It is not clear why this is the case. One possibility is that couples for whom the wife is the first migrant might be selective of some characteristics that allow them to have a second birth in accordance with China's family policy, for example, lower income.

There is no sign of a fertility catch-up during spousal reunification (Hypothesis 6). The first two births are significantly disrupted by spousal separation. For these two birth parities, even after spousal reunification, the likelihood of having the first birth is still 42% of those that were not separated, and that of the second birth fell to 66% of others that were not separated.

Couples' socio-economic status and women's educational attainment is crucial in explaining the second birth and spousal separation. In general, couples' time-varying em-

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The model is not likely to converge due to the relatively low occurrence of separation across borders during the period when couples are at risk of the second and third birth. However, the comparison of Table A.3 (spousal separation due to only internal migration) and Table 4.4 (spousal separation due to both internal and international migration) could shed light on the different selectivity of the two types of separation

ployment status does not have a strong influence on fertility outcome, except that couples in which the husband is unemployed or doing temporary work are more likely to have a second child than other couples in which the men are employed in the manufacturing, agricultural or service industry or as an administrator, manager or professional. This implies a negative correlation between the second birth and the husband's socio-economic status. Similarly, wives who are unemployed or have temporary contracts are more likely to experience spousal separation. After accounting for the unobserved heterogeneity, the likelihood of employed wives with at least agricultural or manufacturing employment being separated from their husbands drops from 29% to only 6% of others who are unemployed or doing temporary work, which is most likely, as unpaid housewives.

Hypothesis 4 is supported in that a couple's unemployment would not substantially affect fertility, although a husband's employment does depress the chances of a second birth. This is perhaps linked to the somehow negative selection of socio-economic status on the second birth (or protection of those with "real difficulties") stated by the family policy: couples facing difficulties[15], once these are evidenced, are allowed to have a second birth.

Spousal separation is positively related to traditional labour division (Hypothesis 5), i.e., husband's employment (see Table 4.5) and wife's unemployment (see Table 4.4). Table 4.4 shows that wives with jobs are only 6% as likely to be separated from their husbands as those without jobs. The correlation between a husband's employment status and the couple's living arrangements is not statistically significant. But in a model specification considering the period effect and types of migration, the husband's employment status is positively associated with spousal separation: employed husbands are 53% more likely to be separated from their wives than unemployed ones.

Regarding the relationship between socio-economic status and fertility, both wives and husbands with higher educational attainments present a lower fertility level. While the wife's educational attainment affects both the first and second births, the husband's education level only has a significant impact on the second birth. There is an opposite selection of education for spousal separation for the two genders: wives with higher education levels are less likely to be separated from their husbands, while husbands with higher educational attainments are more likely to be in a separated couple due to migration. This is consistent with the substantial pattern of left-behind wives being unemployed or only doing some form of unstable work while the husbands migrated. The occupational

[15]These difficulties included, but were not limited to, disabilities due to public service and living in less populous areas with more land or forests, mining workers and long-term fishermen.

choices of these wives are likely to be constrained not only by educational attainment but also by traditional values of being responsible for taking care of the children and elderly family members.

From 1965 to 2003, rural-to-urban migrants in Fujian province experienced the strictest nationwide one-child policy during the early 1980s and a reformed fertility policy in 1988, under which a second child is allowed, for example, for couples who are both themselves the only child from the original family[16]. A family policy at the origin village might have an effect on the fertility behaviour of both non-migrants and migrants through the persistence of gender and cultural norms (di Belgiojoso and Terzera, 2018). On the other hand, migration means no longer being subject to the fertility policies in the place of origin, although they might continue to be subject to the one-child policy in the case of internal migration. However, results show a declined period of fertility or delayed higher-order births, i.e., the second and third birth, rather than recovered fertility after 1988 when conditions allowing a second birth were applicable. The declined fertility might be related to changing fertility norms (Zheng et al., 2009). For example, rural migrants might prefer smaller families after migration due to an increased cost in the cities.

4.6.3 Selectivity of Spousal Separation and Fertility

After controlling for age, women's educational attainment and employment status, there is still some significant unobserved component that shows a positive correlation between spousal separation and fertility (Hypothesis 7). This means that separated couples are selective of a higher likelihood of progressing to the next birth through some unobserved mechanisms. This is consistent with Clifford (2009) who illustrated the existence of positive covariance between fertility and spousal separation at the community level. Some unobserved heterogeneity, e.g., the ideal number of children and household income, might influence decision-making regarding both a couple's living arrangement and fertility. In post-Soviet Tajikistan, poorer households show a tendency to both send migrants abroad and have more children. A model that does not account for this unobserved component results in a downward biased estimation of the effect of spousal separation and an upward biased estimation of the effect of spousal reunification on the first and second births,

[16]The "Fujian Province planned fertility policy" was passed by the Fujian Province 7th People Representative Standing Committee at its second meeting on 29th April 1988. It states that each couple living in rural Fujian area have one child. However, there are 11 conditions under any of which rural Fujian dwellers could have a second child, for example, when both the couples themselves are the only child in their original family.

although the differences are small.

Table 4.7: Random effects parameters by different sets of controls in all equations

	original set of controls	(...) + ideal number of children	(...) + ideal number of children + household income
σ^2_ϵ	0.20 ***	0.18 **	0.03
σ^2_λ	2.34 ***	2.09 ***	1.98 ***
$cov(\sigma^2_\epsilon, \sigma^2_\lambda)$	0.71 ***	0.75 ***	-0.04

Note: The original set of controls includes the wife's age, age at the last birth, duration since the last birth, duration since marriage, wife's educational attainment, couple's employment status and China's family policy. The results are shown in Appendix A.2.

Table 4.7 presents the variance of the unobserved heterogeneity component for fertility, i.e., first, second and third births (σ^2_u), and spousal separation (σ^2_v), and covariance between these unobserved heterogeneity components, $cov(\sigma^2_u, \sigma^2_u)$ with the same set of control variables as in Appendix A.1). Though couples who ever separated at some stage are somehow selective of higher fertility intentions preferring a "two-children" family, adding the ideal number of children reported by the household head at the time of the survey[17] does not substantially change the random effects of the model. Rather, as in Clifford (2009), household income might account for a substantial share of the unobserved heterogeneity component that leads to both higher levels of spousal separation and fertility. Controlling for both the ideal number of children and household income results in almost zero and non-significant covariance between the unobserved components of fertility and spousal separation. Meanwhile, higher household income means delayed births or a lower likelihood of having a first or second birth and delayed or a lower likelihood of experiencing spousal separation (see Annex A.1).

4.7 Conclusion

Spousal separation can last for many years leading to delayed first two births or fewer children. These two births are still somehow allowed by the family policy during 1965-2005, though the couple needs to meet certain requirements to have a second child. The population under study is mostly rural Fujianese[18], for whom there are at least 11 conditions

[17] One needs to bear in mind that the ideal number of children at the time of the survey does not reflect causation, but is rather the rationalised result of past behaviour.

[18] 64% of the husbands and 69% of the wives were of rural residence at the time of the survey. City residents were underrepresented in the data, only 2.6% of the couples registered as city residents in the year of the survey.

under which a second child is allowed. These 11 conditions are not applicable to urban dwellers. For these first two births, couples with different living arrangements present different likelihood of having these births, meaning that spousal separation does have a significant effect in depressing overall marital fertility. Hypothesis 1 to 3 are supported that spousal separation leads to lower fertility; spousal separation due to international migration has a more severe negative impact on fertility due to longer distances between partners, more difficulties at the destination and perhaps less frequent visits home (see section 4.4). The negative effect on fertility of spousal separation due to international migration is stronger than if it is due to internal migration even when the duration of these two types of separation is similar (see Table 4.5). The disruption effect is stronger when the woman is the main/first migrant.

Possible reasons explaining this greater negative effect of international migration than internal migration include the difference in geographical distance, transportation cost, duration of separation and return rate for these two types of migration. Proximity to the partner for internal migrants allows for more frequent return visits and shorter stays away from home, compared with international migrants who rarely visit from abroad. Moreover, international migrants normally need longer to adapt to the environment at the destination than internal migrants. The former face more challenges in terms of language, job market, and cultural values, which, in general, lowers the likelihood of having births or, at least, delays this event.

Though couples who have separated at some stage present significantly lower parity progression ratios from the first birth to the second one, it seems that while living in different counties, internal migrants found a way to keep pursuing their family goals. Perhaps this has to do with Fujian's family policy which gave people with rural *hukou* more chances of having the second birth, and the individuals included in the analysis are mainly rural dwellers who, although they floated to other places, still keep their rural *hukou*. It seems that even though couples were once separated due to migration, they still somehow achieved the highest birth parity allowed by the family policy.

A couples' employment status does not significantly affect the fertility outcome, although if the husband has a job, this will delay the second birth. Hypothesis 4 is partially supported. This means that the effect of employment status on fertility is largely accounted by couple's living arrangements, e.g., spousal separation. The reason why men's employment has a negative effect on the second birth could (partly) be that the fertility policy in Fujian province stated that households with economic difficulties are entitled to have a second birth. Women's employment does not have a substantial impact on fertility

outcomes, which might be due to the availability of informal childcare provided by other household members, in most cases, the grandparents.

The negative effect of spousal separation on fertility does not even bounce back after spousal reunification either at the origin or destination. Hypothesis 6 is not supported. There is no clear reason provided so far for the lack of catch-up fertility after couple reunification. In the case of Chinese international migration to the U.S., women's fertility level of higher-order births increased dramatically after migration, implying the "emancipation" effect of international migration on fertility. In a "men migrate, women follow" migration framework, we should observe catch-up fertility after spousal reunification. However, we do not observe this catch-up fertility after spousal separation because spousal reunification in this context can be at the county of origin, at the destination county/city in China, or abroad. The reasons for the absence of catch-up fertility after spousal reunification include economic difficulties still persisting after reunification, adapted fertility norms at the destination which favour smaller families, or higher costs of raising children preventing the fertility rebound.

The effect of temporary migration on marital fertility not only comes from the reduced intercourse frequency due to spousal separation but also from the possible adoption of fertility norms prevalent at the destination society (Lindstrom and Saucedo, 2002). New fertility norms adopted from urban citizens, destination natives, or formed by the migrants themselves might prevent the rebound of fertility even after spousal reunification. These fertility norms are affected by the perception of a higher cost of raising a child in urban areas and abroad, quality-quantity tradeoff, calculation of returns to education, erosion of traditional fertility norms related to agricultural production and preference for a smaller family, etc.

Another mechanism through which fertility does not recover is the couple's socioeconomic status. As discussed in Section 4.3.2, if couples follow a traditional division of labour during spousal separation, this husband-breadwinner-wife-caregiver pattern is hard to reverse or transform into a dual-earner household after spousal reunification, especially when the wife joins the husband at the destination. Employment instability might have a strong negative effect on fertility resulting in postponed births and lower fertility rate (Baizán, 2006). In a migrant family, household income would be easier to accumulate in the "dual-earner" scenario than in that of the traditional division of labour. In other words, migrant households, where there is only one breadwinner, are more vulnerable to temporary economic shock or crisis, which drives down the intention of having more children.

A couple's socio-economic status is closely related to their living arrangement. Couples who live separately due to internal or international migration are more likely to divide labour in a traditional way than others that live together. Hypothesis 5 is confirmed. Women, especially, are more likely to be unemployed or have only temporary employment at the origin. Perhaps this has to do with the selection of education on spousal separation: for the separated couples, the husband is more likely to be highly educated while the wife is less likely to be highly educated. In the same way that women's higher skill levels predict higher chances of reunifying (Baizán et al., 2014; González-Ferrer, 2007), women with lower education levels are more vulnerable to spousal separation and often stayed at the village of origin without a formal job. It could also be that given the money sent by the husband, there is no need for them to take a formal job, or that higher living costs prevent spousal reunification, especially for couples where a significant education gap is observed between the partners. It is still not clear how this traditional division of labour affects fertility, but results show that, in general, the employment status of the couple does not have a significant effect on fertility (Hypothesis 4), except that unemployed husbands have slightly better chances of a second birth. There seems to be a mix of substitution and income effect regarding socio-economic resources on fertility.

There is a significant covariance between spousal separation and fertility: couples who have separated at some stage due to the migration of one partner are selective of higher fertility level. Hypothesis 7 is supported. This is perhaps because of unobserved heterogeneity, such as the ideal number of children and time-varying household incomes, after controlling for which the interrelationship between spousal separation and fertility becomes trivial. Rural households with lower total incomes are more attached to agricultural production and favour more children, but are more vulnerable to the migration of only one partner, either to big cities or abroad. This is perhaps because of higher living costs at the destination and the relatively lower socio-economic status of the couple from households with fewer economic resources, which predicts lower chances of getting employment for both partners at the destination so as to afford the living expenses of the whole family at the destination.

The empirical analysis of this chapter shows that migration has a major effect on marital fertility through spousal separation. It also shows the different educational selectivity of spousal separation due to internal or international migration (see Table A.3). However, many factors might have different impacts on spousal separation due to internal and international migration. This would warrant further analyses in order to differentiate between the two and draw firm conclusions. Moreover, it is possible that the "men migrate, women

follow" pattern might no longer reflect the reality anymore. This calls for future research to investigate new patterns using more recent data.

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Appendix

A.1 Multi-Process Model for Fertility and Spousal Separation Controlling for Ideal Number of Children and Household Income

	(...) + ideal number of children			(...) + ideal number of children + household income		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 1 - First Birth						
Constant	0.00	0.00-0.00	***	0.00	0.00-0.00	***
Age	3.27	1.94-5.50	***	3.21	1.91-5.39	***
Age squared	0.97	0.96-0.99	***	0.98	0.96-0.99	***
Duration since marriage	0.38	0.29-0.49	***	0.36	0.28-0.47	***
Duration since marriage squared	1.13	1.07-1.20	***	1.13	1.07-1.19	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.68	0.48-0.96	**	0.71	0.51-0.98	**
senior high school and above	0.55	0.29-1.02	*	0.58	0.32-1.08	*
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.83	0.61-1.13		0.84	0.62-1.13	
senior high school and above	0.84	0.46-1.51		0.79	0.45-1.37	
Couple living arrangement (Ref. couple living together)						
separated due to internal migration	0.43	0.32-0.57	***	0.45	0.34-0.59	***
separated due to international migration	0.11	0.05-0.25	***	0.12	0.05-0.27	***
reunified after separation	0.44	0.31-0.63	***	0.45	0.32-0.64	***
Husband employed (Ref. unemployed or temporary job)	2.15	0.87-5.32	*	1.77	0.81-3.90	
Wife employed (Ref. unemployed or temporary job)	1.00	0.75-1.33		1.05	0.80-1.39	
ideal number of children	1.20	0.95-1.53		1.20	0.95-1.51	
standardized household income	1.00	1.00-1.00		1.00	0.91-1.10	

A.1 Multi-Process Model for Fertility and Spousal Separation Controlling for Ideal Number of Children and Household Income (continued)

	(...) + ideal number of children			(...) + ideal number of children + household income		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 2 - Second Birth						
Constant	0.15	0.04-0.64	**	0.16	0.04-0.65	**
Age at first birth	0.95	0.90-1.00	*	0.94	0.89-1.00	**
Duration since first birth	3.12	2.26-4.32	***	3.02	2.20-4.14	***
Duration since first birth squared	0.86	0.82-0.90	***	0.87	0.83-0.91	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.08	0.79-1.47		1.11	0.81-1.51	
senior high school and above	0.40	0.22-0.76	***	0.44	0.23-0.82	***
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.65	0.48-0.89	***	0.66	0.49-0.89	***
senior high school and above	0.67	0.44-1.02	*	0.65	0.43-0.98	**
Couple living arrangement (Ref. couple living together)						
separated due to internal migration	0.85	0.65-1.11		0.88	0.67-1.14	
separated due to international migration	0.16	0.03-0.80	**	0.14	0.02-1.03	*
reunified after separation	0.66	0.44-0.98	**	0.65	0.44-0.97	**
Husband employed (Ref. unemployed or temporary job)	0.67	0.43-1.03	*	0.69	0.45-1.05	*
Wife employed (Ref. unemployed or temporary job)	0.94	0.73-1.20		1.02	0.80-1.30	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	1.03	0.76-1.41		1.05	0.78-1.42	
loosened one child policy (after 1988)	0.31	0.21-0.45	***	0.33	0.23-0.48	***
ideal number of children	1.74	1.35-2.23	***	1.76	1.37-2.25	***
standardized household income	1.00	1.00-1.00		0.98	0.86-1.11	

A.1 Multi-Process Model for Fertility and Spousal Separation Controlling for Ideal Number of Children and Household Income (continued)

	(...) + ideal number of children			(...) + ideal number of children + household income		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 3 - Third Birth						
Constant	0.07	0.01-0.59	**	0.08	0.01-0.63	**
Age at second birth	0.93	0.87-1.00	**	0.93	0.87-0.99	**
Duration since second birth	2.06	0.98-4.35	*	1.95	1.00-3.81	*
Duration since second birth squared	0.91	0.82-1.01	*	0.92	0.84-1.00	*
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.95	0.60-1.49		0.95	0.61-1.48	
senior high school and above	0.70	0.15-3.17		0.67	0.14-3.23	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.90	0.60-1.36		0.90	0.60-1.35	
senior high school and above	1.30	0.66-2.54		1.17	0.59-2.32	
Couple living arrangement (Ref. couple living together)						
separated due to migration	0.83	0.52-1.34		0.87	0.55-1.39	
reunified after separation				1.18	0.55-2.53	
Husband employed (Ref. unemployed or temporary job)	1.26	0.71-2.23		1.23	0.70-2.18	
Wife employed (Ref. unemployed or temporary job)	0.96	0.65-1.40		1.06	0.73-1.52	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.59	0.37-0.94	**	0.61	0.39-0.97	**
loosened one child policy (after 1988)	0.17	0.09-0.32	***	0.20	0.10-0.37	***
ideal number of children	2.22	1.54-3.19	***	2.16	1.52-3.07	***
standardized household income	1.00	1.00-1.00		1.08	0.99-1.18	*

A.1 Multi-Process Model for Fertility and Spousal Separation Controlling for Ideal Number of Children and Household Income (continued)

	(...) + ideal number of children			(...) + ideal number of children + household income		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 4 - Couple separation						
Constant	0.00	0.00-0.51	**	0.00	0.00-0.13	***
Age	1.29	0.89-1.86		1.31	0.92-1.85	
Age squared	1.00	0.99-1.00		1.00	0.99-1.00	
Duration since marriage	1.15	0.97-1.35		1.15	0.98-1.34	*
Duration since marriage squared	0.99	0.98-1.00	**	0.99	0.98-1.00	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.97	0.40-2.37		0.98	0.63-1.53	
senior high school and above	0.43	0.10-1.90		0.50	0.21-1.19	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.79	0.42-1.46		0.86	0.55-1.36	
senior high school and above	1.56	0.48-5.01		2.10	1.22-3.62	***
Husband employed (Ref. unemployed or temporary job)	1.56	0.66-3.66		1.55	0.71-3.36	
Wife employed (Ref. unemployed or temporary job)	0.07	0.03-0.20	***	0.07	0.03-0.16	***
ideal number of children	0.62	0.36-1.05	*	0.63	0.43-0.93	**
standardized household income				0.69	0.51-0.92	**
Standard deviation of unobserved heterogeneity, fertility	0.18		*	0.03		
Standard deviation of unobserved heterogeneity, couple separation	2.09		**	1.98		***
Correlation between fertility and couple separation (Rho)	0.75		**	-0.04		
Log-likelihood	-2882			-2877		

A.2 Single- and Multi- Process Model for All Births Including Births Before Marriage

	All births (single process model)			All births (multi process model)		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 1 - First Birth						
Constant	0.00	0.00-0.01	***	0.00	0.00-0.01	***
Age	2.56	1.66-3.96	***	2.53	1.64-3.91	***
Age squared	0.98	0.97-0.99	***	0.98	0.97-0.99	***
Duration since marriage	0.85	0.67-1.08		0.87	0.68-1.10	
Duration since marriage squared	1.01	0.97-1.05		1.01	0.97-1.05	
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.73	0.54-0.98	**	0.71	0.53-0.96	**
senior high school and above	0.87	0.50-1.52		0.85	0.48-1.50	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.80	0.61-1.06		0.80	0.60-1.06	
senior high school and above	0.83	0.53-1.29		0.83	0.53-1.29	
Couple living arrangement (Ref. couple living together)						
couple separated due to internal migration	1.17	0.88-1.57		1.16	0.87-1.55	
couple separated due to international migration	0.21	0.10-0.44	***	0.20	0.09-0.42	***
couple reunified after separation	1.05	0.73-1.52		1.06	0.73-1.54	
Husband employed (Ref. unemployed or temporary job)	1.18	0.70-2.00		1.20	0.71-2.02	
Wife employed (Ref. unemployed or temporary job)	1.09	0.85-1.39		1.04	0.81-1.33	

A.2 Single- and Multi- Process Model for All Births Including Births Before Marriage (continued)

	All births (single process model)			All births (multi process model)		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 2 - Second Birth						
Constant	0.60	0.20-1.76		0.61	0.21-1.78	
Age at first birth	0.95	0.90-1.00	**	0.95	0.90-1.00	**
Duration since first birth	2.99	2.18-4.10	***	3.04	2.21-4.19	***
Duration since first birth squared	0.87	0.83-0.91	***	0.86	0.83-0.90	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.02	0.77-1.36		1.01	0.76-1.34	
senior high school and above	0.37	0.20-0.69	***	0.36	0.19-0.67	***
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.66	0.49-0.87	***	0.65	0.49-0.87	***
senior high school and above	0.65	0.43-0.97	**	0.64	0.43-0.97	**
Couple living arrangement (Ref. couple living together)						
couple separated due to internal migration	0.80	0.61-1.05		0.78	0.60-1.03	*
couple separated due to international migration	0.14	0.03-0.73	**	0.12	0.02-0.65	**
couple reunified after separation	0.64	0.43-0.96	**	0.65	0.43-0.96	**
Husband employed (Ref. unemployed or temporary job)	0.67	0.46-0.99	**	0.66	0.45-0.98	**
Wife employed (Ref. unemployed or temporary job)	1.00	0.79-1.26		0.94	0.74-1.19	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.95	0.73-1.25		0.94	0.71-1.24	
loosened one child policy (after 1988)	0.24	0.17-0.34	***	0.23	0.16-0.33	***

A.2 Single- and Multi- Process Model for All Births Including Births Before Marriage (continued)

	All births (single process model)			All births (multi process model)		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 3 - Third Birth						
Constant	0.83	0.15-4.56		0.80	0.14-4.43	
Age at second birth	0.92	0.86-0.99	**	0.93	0.86-0.99	**
Duration since second birth	1.77	0.97-3.26	*	1.77	0.96-3.24	*
Duration since second birth squared	0.93	0.85-1.00	*	0.93	0.85-1.00	*
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.78	0.50-1.23		0.79	0.50-1.24	
senior high school and above	0.66	0.15-2.93		0.66	0.15-2.93	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.87	0.58-1.31		0.86	0.57-1.30	
senior high school and above	1.14	0.58-2.23		1.15	0.59-2.27	
Couple living arrangement (Ref. couple living together)						
couple separated due to migration	0.85	0.55-1.31		0.81	0.52-1.26	
couple reunified after separation	1.04	0.46-2.35		1.04	0.46-2.35	
Husband employed (Ref. unemployed or temporary job)	1.12	0.63-1.99		1.14	0.64-2.01	
Wife employed (Ref. unemployed or temporary job)	1.00	0.70-1.42		0.94	0.66-1.34	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.51	0.32-0.79	***	0.50	0.32-0.78	***
loosened one child policy (after 1988)	0.14	0.08-0.25	***	0.13	0.07-0.23	***

A.2 Single- and Multi- Process Model for All Births Including Births Before Marriage (continued)

	All births (single process model)			All births (multi process model)		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 4 - Couple separation						
Constant	0.00	0.00-0.04	***	0.00	0.00-0.03	***
Age	1.3	0.96-1.76	*	1.35	0.93-1.96	
Age squared	1.00	0.99-1.00		1.00	0.99-1.00	
Duration since marriage	1.01	0.91-1.12		1.11	0.95-1.31	
Duration since marriage squared	1.00	0.99-1.00	**	0.99	0.98-1.00	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.13	0.80-1.61		0.95	0.53-1.70	
senior high school and above	0.74	0.36-1.50		0.41	0.15-1.12	*
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	1.01	0.72-1.41		0.82	0.49-1.37	
senior high school and above	1.41	0.86-2.29		1.95	0.99-3.84	*
Husband employed (Ref. unemployed or temporary job)	1.33	0.79-2.22		1.53	0.68-3.42	
Wife employed (Ref. unemployed or temporary job)	0.29	0.20-0.41	***	0.06	0.03-0.14	***
Standard deviation of unobserved heterogeneity, fertility				0.17		***
Standard deviation of unobserved heterogeneity, couple separation				2.34		***
Correlation between fertility and couple separation				0.71		***
Log-likelihood	-3158			-3104		

A.3 Estimation of Fertility and Spousal Separation due to Internal Migration

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 1 - First Birth						
Constant	0.00	0.00-0.01	***	0.00	0.00-0.01	***
Age	2.97	1.78-4.96	***	2.96	1.78-4.94	***
Age squared	0.98	0.97-0.99	***	0.98	0.97-0.99	***
Duration since marriage	0.42	0.34-0.52	***	0.43	0.35-0.52	***
Duration since marriage squared	1.07	1.04-1.10	***	1.07	1.04-1.10	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.76	0.56-1.04	*	0.74	0.54-1.01	*
senior high school and above	0.53	0.29-0.95	**	0.51	0.28-0.93	**
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.79	0.59-1.06		0.79	0.59-1.06	
senior high school and above	0.87	0.52-1.43		0.85	0.51-1.41	
Couple living arrangement (Ref. couple living together)						
separated due to internal migration	0.36	0.27-0.49	***	0.36	0.27-0.48	***
reunified	0.41	0.28-0.59	***	0.41	0.29-0.60	***
Husband employed (Ref. unemployed or temporary job)	2.06	0.85-4.97		2.10	0.87-5.11	
Wife employed (Ref. unemployed or temporary job)	0.94	0.71-1.25		0.90	0.68-1.19	

A.3 Estimation of Fertility and Spousal Separation due to Internal Migration (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 2 - Second Birth						
Constant	0.60	0.20-1.77		0.61	0.20-1.82	
Age at first birth	0.95	0.90-1.00	**	0.95	0.90-1.00	**
Duration since first birth	2.99	2.17-4.12	***	3.07	2.22-4.24	***
Duration since first birth squared	0.87	0.83-0.91	***	0.86	0.83-0.91	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.03	0.77-1.38		1.02	0.76-1.36	
senior high school and above	0.38	0.20-0.70	***	0.36	0.19-0.67	***
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.63	0.48-0.85	***	0.63	0.47-0.84	***
senior high school and above	0.63	0.42-0.95	**	0.63	0.42-0.95	**
Couple living arrangement (Ref. couple living together)						
separated due to internal migration	0.81	0.62-1.07		0.79	0.60-1.04	*
reunified	0.64	0.43-0.95	**	0.65	0.43-0.96	**
Husband employed (Ref. unemployed or temporary job)	0.67	0.45-0.99	**	0.66	0.44-0.98	**
Wife employed (Ref. unemployed or temporary job)	1.01	0.80-1.28		0.94	0.74-1.19	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.96	0.73-1.27		0.94	0.71-1.25	
loosened one child policy (after 1988)	0.24	0.17-0.34	***	0.23	0.16-0.32	***

A.3 Estimation of Fertility and Spousal Separation due to Internal Migration (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 3 - Third Birth						
Constant	0.82	0.15-4.46		0.80	0.14-4.42	
Age at second birth	0.92	0.86-0.99	**	0.93	0.86-0.99	**
Duration since second birth	1.75	0.97-3.18	*	1.76	0.96-3.19	*
Duration since second birth squared	0.93	0.86-1.00	*	0.93	0.86-1.00	*
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	0.78	0.50-1.23		0.80	0.51-1.25	
senior high school and above	0.74	0.17-3.31		0.74	0.17-3.28	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.88	0.59-1.33		0.87	0.57-1.31	
senior high school and above	1.13	0.58-2.23		1.15	0.59-2.27	
Couple living arrangement (Ref. couple living together)						
couple separated due to migration	0.89	0.58-1.37		0.83	0.53-1.30	
couple reunified after separation	0.94	0.42-2.08		0.94	0.42-2.11	
Husband employed (Ref. unemployed or temporary job)	1.12	0.63-1.99		1.14	0.65-2.02	
Wife employed (Ref. unemployed or temporary job)	1.00	0.71-1.43		0.93	0.65-1.33	
Chinese family policy (Ref. without One Child Policy)						
strictest one child policy (1980-1988)	0.50	0.32-0.78	***	0.49	0.32-0.77	***
loosened one child policy (after 1988)	0.14	0.08-0.25	***	0.13	0.07-0.23	***

A.3 Estimation of Fertility and Spousal Separation due to Internal Migration (continued)

	Single Process Model			Multi-Process Model		
	Odds Ratio	C.I.		Odds Ratio	C.I.	
Panel 4 - Couple separation due to internal migration						
Constant	0.00	0.00-0.04	***	0.00	0.00-0.04	***
Age	1.30	0.96-1.76	*	1.34	0.92-1.95	
Age squared	1.00	0.99-1.00		1.00	0.99-1.00	
Duration since marriage	1.01	0.91-1.13		1.12	0.95-1.32	
Duration since marriage squared	0.99	0.99-1.00	**	0.99	0.98-1.00	***
Wife's Educational Attainment (Ref. at most primary school)						
junior high school	1.14	0.80-1.63		0.96	0.53-1.73	
senior high school and above	0.80	0.38-1.68		0.48	0.17-1.39	
Husband's Educational Attainment (Ref. at most primary school)						
junior high school	0.99	0.70-1.40		0.80	0.48-1.33	
senior high school and above	1.37	0.83-2.24		1.85	0.92-3.74	*
Husband employed (Ref. unemployed or temporary job)	1.33	0.79-2.22		1.53	0.68-3.42	
Wife employed (Ref. unemployed or temporary job)	0.29	0.21-0.42	***	0.06	0.03-0.14	***
Standard deviation of unobserved heterogeneity, fertility				0.20		***
Standard deviation of unobserved heterogeneity, couple separation				2.37		***
Correlation between fertility and couple separation (Rho)				0.71		***
Log-likelihood	-2925			-2871		

Chapter 5

CONCLUSION

The aim of this dissertation is to understand how both internal and international migration affects family-building activities like marriage and fertility in the Chinese context. Intuitively, migration and family events are highly related since the decision is normally made at an early stage in life. This means that these events could be part of the same process. Moreover, migration and marriage are gendered phenomena and fertility decision-making involves both partners. Research, therefore, must explore the effect of human mobility separately for men and women, and, regarding fertility, at couple level, and consider the interrelationship between events.

The studies on living arrangement, separation and migration in other contexts, e.g., Africa-Europe migration, would be very relevant for reflecting on how findings are similar or differ by contexts. By comparing those who migrate from Africa to Europe, Mazzucato et al. (2015) argue that there are significant differences in the frequency of transnational families and their determinants across countries of origin and destination. Senegalese migrants with lower education levels and socio-economic status are more likely to be in a transnational family. Moreover, gender norms play an important role in shaping living arrangements: men are more likely to be in a transnational family than women. Migration is, in general, a male activity, while women's migration is usually related to family reunification. The findings in this thesis confirmed those in the Senegalese context that spousal separation is associated with lower household income and that the motivation for migration is gendered.

Studies focused on the interrelationship between migration and family events have illustrated the importance of socio-economic status, e.g., education and employment status, in explaining the timing and likelihood of the events. Some studies have also pointed out the longitudinal nature of the life course and the existence of unobserved heterogeneity between events, suggested using multilevel event history techniques. This dissertation contributes to the previous literature by adding an under-researched, yet interesting, country case where migration increased dramatically and traditional family values eroded due to socio-economic development and individuals' self-adjustment to institutional shocks, such as the one-child policy (Greenhalgh, 1988).

To understand the interrelationship between the three events, I first explored the effect of international migration on marriage by gender from the theoretical framework of educational assortative mating (Chapter 2). Next, we investigated the effect of international migration on fertility by comparing the fertility of first- and 1.5-generation female migrants to the U.S. with that of non-migrants who were subject to different family policies in China (Chapter 3). Lastly, I studied the effect of spousal separation as a result of migration on marital fertility at the couple level, accounting for couples' employment statuses (Chapter 4). The covariance between these events was controlled for in all these empirical articles.

This dissertation highlights the substantial interrelationship between migration, marriage, and fertility: migration and marriage are positively correlated after controlling for demographic factors, education levels, positional power of household members and migration policies. International migration and fertility are negatively correlated events after accounting for demographic characteristics, education and family policies in China. Spousal separation due to migration and marital fertility are positively correlated events, as seen in the post-Soviet Tajikistan context (Clifford, 2009). However, this interrelationship becomes trivial after accounting for household income. It seems that socio-economic status is central to explaining the interaction between migration, marriage and fertility in the Chinese context.

The conclusion section provides a summary of the main findings of this dissertation, highlights contributions to previous literature from theoretical and methodological perspectives, acknowledges limitations and proposes some interesting topics for future research.

5.1 Summary of the Main Findings

The three empirical chapters examine the interrelationship between migration with its consequential couple living arrangement and family behaviours, i.e., marriage and fertility, in the Chinese context. Chapter 2 investigates the effect of international migration from Fujian province to the U.S. on marriage timing and probability by gender. Chapter 3 explores the effect of international migration from China to the U.S. on fertility in the context of China's unique family policies. Chapter 4 introduces couple living arrangements due to migration, i.e., spousal separation and reunification, and returns to the subject of marriage in order to study the effect of couples' living arrangements on marital fertility for Fujian's international migrants.

Chapter 2 '"Effects of Migration on Marriage: Chinese International Migration to the U.S." found that Fujianese men and women are different in terms of migration and marriage timing and likelihood. This makes it necessary to analyse the interrelationship between migration and marriage by gender. On the one hand, men migrate at an earlier age and are more attracted by migration opportunities than women. On the other hand, women enter into marriage earlier than men and are more likely to get married. Male migrants have fewer chances of getting married as compared with male non-migrants. This means that migration has a negative effect on men's marriage chances. While female migrants delay marriage, the overall likelihood does not significantly differ from that of female non-migrants. International migration does not seem to have a substantial effect on women's marriage opportunities.

In general, the "migration for better marriage chances" theory is not supported because migration does not promise better marriage chances for either gender. Hypothesis 1 is confirmed that marriage chances for men even decline after migration, especially for male migrants with lower education levels, who are perhaps disadvantaged in the marriage market. Migration does not have a significant effect on women. Hypothesis 2 is not supported. Males migrants are selective of lower education while it is the opposite for female migrants who are more likely to have at least junior high school education. This different selectivity of male and female migrants, together with a traditional "women marrying up" logic, makes male migrants with lower education levels less attractive in the marriage market in the destination country. It is not true that Chinese only marry co-ethnics rather than non-Chinese, but the intermarriage rate was not the same among men and women. Intermarriages with Whites increased from 0.7% to 2.2% among minorities from 1970 to 1992 (Qian and Lichter, 2001). However, this increase in intermarriage is

not gender blind: Asian women are more likely to marry Whites than Asian men in the 1990s (Qian and Lichter, 2001). Though the results of this thesis do not directly show that Asian women intermarry more than Asian men, it illustrates that the probability of Chinese men getting married significantly decreased after migration. This would shed light on the gendered intermarriage at the destination, given that the sex ratio of Chinese ethnics at the destination was less unbalanced than that at the country of origin. The phenomena that Chinese women seem to be more likely to intermarry than Chinese men could be part of the reason why Chinese men did not have increased marriage likelihood after migration. On the other hand, the declined likelihood of getting married for men could also be due to their lower chances of intermarriage at the destination.

Both migration and marriage are high-cost events in the Chinese culture, especially for male households. Migration seems to have a disruptive effect on marriage for men (Hypothesis 3). Male migrants with higher education levels are more likely to get married in the same year they migrate, or after, than others with lower education levels. For women whose marriage was motivated by migration, i.e., they migrated with a spouse visa, the probability of marriage increased dramatically during the same year they migrated (Hypothesis 4). The simultaneity between marriage and migration explains the urgency in processing documents (spouse visa) for international migration, which is also found to be valid in the case of female marriage migration within China for *hukou* status. There is a positive correlation between migration and marriage, not accounting for which would underestimate the negative effect of migration on marriage (Hypothesis 5).

Chapter 3 "Does Migration Matter for Higher Fertility? Fertility of Chinese International Migrants to the U.S. and Non-Migrants During China's One-Child Policy Period" compares the fertility of Chinese migrants to the U.S. with non-migrants in China to shed light on the effectiveness of the one-child policy (or "emancipation" hypothesis) and the disruption and adaptation effects of migration on fertility and migrants' selectivity. Migration and fertility are negatively correlated events due to some observed and unobserved heterogeneity. This means that Chinese international migrants to the U.S. are more selective of certain constant characteristics related to lower fertility than non-migrants, for example, individualism, consumerism and a desire to achieve upward social mobility (Lindstrom and Giorguli Saucedo, 2007). The hypothesis on policy effectiveness (Hypothesis 1) is only partly confirmed: the fertility level of a particular birth order is not always higher when this birth is allowed by the family policy than when it is discouraged. In other words, fertility does not bounce back even after the one-child policy was revised with additional conditions that allowed for a second child. This finding has some

important implications for the period of the "two-child policy" starting from 2016. The birth rate dropped from 1.295 percent in 2016 to 1.243 percent in 2017 (National Bureau of Statistics). It seems that a relaxed birth control policy following a much more strict one does not promise increased fertility and that the downturn of fertility seems to be a long-term trend.

The "emancipation" hypothesis (Hypothesis 2a) is supported, which considers that international migration has a positive effect on fertility on higher-order births but less so on the first birth. The higher-order births were allowed by the family policies only under certain circumstances. The effectiveness of family policy and "emancipation" diminishes over time (Hypothesis 2b) since first-generation migrants from younger cohorts have lower fertility at all birth parities after migration than first-generation migrants from older cohorts after migration. This means that fertility values might have changed because of rapid socio-economic development.

The adaptation hypothesis (Hypothesis 3) is partly proved since first-generation migrants are significantly less likely to have a second child as compared with non-migrants when the first child is a female. This suggests migrants' detachment from the preference for having a son, typical in the origin country, once they are in the destination country. However, adaptation is incomplete. The fertility gap between migrants and non-migrants before 1995 shows no change after 1995, as their time at the destination increases. In the mid-1990s, the TFR of the U.S. surpassed that of China. If the adaptation hypothesis holds, the reversed relative fertility level of the countries of origin and destination after 1995 should have resulted in a different adaptation pattern as the years migrants stayed in the U.S. increased, i.e., converging to a lower fertility level before 1995 and a higher one after 1995.

The disruption effect of migration on fertility (Hypothesis 4) holds only for the first birth but not for subsequent births. Female migrants are selective of some (unobserved) heterogeneity related to lower fertility level (Hypothesis 5), including education, occupation, income, age at marriage and household income, etc. This finding is consistent with findings in other contexts (Baizán, 2017; Chattopadhyay et al., 2006; Goldstein and Goldstein, 1983; Lindstrom and Saucedo, 2002).

Chapter 4 "Effects of Spousal Separation and Reunification on Fertility: Chinese Internal and International Migration" shows how couples' living arrangement, i.e., spousal separation and reunification, affects marital fertility for both Chinese internal and international migrants from Fujian province by birth order. Results show that only the first and second births are disrupted by spousal separation, while the third birth is not sub-

stantially affected. This implies that perhaps spousal separation that happens immediately after marriage has a greater influence on marital fertility than later spousal separation. The disruption effect is greater for spousal separation due to international migration than internal migration (Hypothesis 1).

International migration differs from internal migration in terms of the length of stay at the destination, frequency of visits home, the similarity of culture at origin and destination, travel documents related to migration policy, e.g., *hukou* for internal migration and U.S. visa for international migration, travelling costs and efforts for reunification, etc. The difference in the disruption effect for spousal separation due to the two migration types sheds light on the cumulative effect of spousal separation on marital fertility (Menken, 1979). Except for the difference mentioned above, internal and international migrants may be selective in different ways. For example, Fujianese internal migrants are selective of higher education levels, while it is the opposite for Fujianese international migrants to the U.S. (Liang and Miao, 2013). This different selection of education level is related to the different occupations of internal and international migrants: most of the available jobs for international migrants from Fujian to the U.S. are in restaurants or garment factories which do not reward high education levels, while internal migrants from Fujian to other parts of China may be running (small) businesses and, therefore, education is a reward for them (Liang and Miao, 2013).

The couple's employment status does not significantly affect marital fertility, except that unemployment of the husband depresses the second birth (Hypothesis 2). It is likely that a man's unemployment means a significant loss of household income. While women earn less than men on average, and their unemployment would, therefore, not have a substantial effect on marital fertility. The income ratio (male/female) was 1:0.65 in China in 2011. However, spousal separation is closely related to a couple's division of labour: couples who are experiencing spousal separation due to migration are more likely to practice traditional labour divisions, i.e., husband-breadwinner and wife-caregiver (Hypothesis 3). This reflects a shift to a more traditional division of labour because of the (frequent) absence of one partner. The need to accumulate economic resources drives either a husband or wife to migrate, normally the man leaves, and the woman stays at home and remains unemployed.

There is no evidence of a fertility catch-up after couple reunification, either at the origin or destination. This is perhaps because of the adopted fertility norms at the destination or limited economic resources (Hypothesis 4). There is a clearly positive interrelationship between spousal separation and marital fertility (Hypothesis 5). After controlling

for household income, meaning household income was treated as a source of unobserved heterogeneity, the significant positive correlation between the two events come close to zero and are not significant. This implies that couples who are more vulnerable to couple separation are from lower-income households who prefer higher fertility levels related to agricultural production.

Chapter 4 adopts a couple perspective to study family behaviour. In China, the couple functions like a pair of chopsticks. This couple perspective contributes to shedding light on how a couple's joint decision regarding living arrangement and migration would affect marital fertility. As the life course approach argues, the decision-making of married men and women regarding migration and fertility is interdependent, i.e., they have "linked lives" (Elder et al., 2004). The living arrangement on the couple level, i.e., spousal separation, would be more relevant to fertility outcomes than the migration of one partner, because the decisions regarding both living arrangement and fertility are made by couples jointly.

There are gendered differences in both migration and family behaviour. Chinese internal migration is gendered in that men's migration is normally due to a job change and women's migration is normally due to marriage (Fan, 1999). Findings in this thesis suggest that Chinese international male migrants and female migrants are selective of different educational levels: male migrants are selective of lower education levels than male non-migrants, while it is the opposite for female migrants. This different selection of education has implications on marriage likelihood for both genders. Qian and Lichter (2001) showed that intermarriage in the U.S. is a gendered behaviour and that Asian women are more likely to intermarry than Asian men. Findings in this thesis show that the likelihood of getting married declined after migration for men, which implies the difficulties of finding a partner due to the gendered intermarriage pattern and male migrants' selectivity of lower education. On the other hand, the results show that women's marriage chances are not significantly affected by migration. Moreover, spousal separation, or the migration of one partner, is related to the gendered division of housework. Results show that couples who are more likely to experience spousal separation are also those that divide housework more traditionally, i.e., the husband-breadwinner-wife-caregiver family type.

5.2 Contributions

In the "Theoretical Framework" section in the introduction (Chapter 1), I argued that there are some existing gaps in the previous literature, which this dissertation was committed to

filling. In this part, I will explain how these gaps could be (partly) filled from a theoretical perspective.

This dissertation explores the interrelationship between international migration, marriage, and fertility in the Chinese context, and, to the best of my knowledge, this is the first attempt of this nature. Apart from the justified empirical importance of studying Chinese migrants, exploring the selectivity of migrants in the Chinese context would generate various theoretical implications. Though the move is clearly economically driven, it does have a consequence on family dynamics; delayed marriage and "emancipation" of fertility after migration, for example. China's particular traditional values related to migration, marriage and fertility and the country's interaction with modernism and family policies makes exploring the Chinese context an interesting endeavour.

This dissertation extends the theoretical framework on the effect of migration on family events to a more holistic examination of life events, including sequence, timing, and likelihood by gender, during a period of strong policy intervention or at couple level. It concludes with a series of effects of migration on family events. These include but are not limited to, male international migrants' lower chance of getting married after migration, delayed marriage for female migrants, and positive selectivity of marriage for migrants (Chapter 2). Regarding fertility, it confirms that migrants' fertility is emancipated from China's family policies after migration. There is an incomplete adaptation to the fertility norms at the destination, a disruption effect of migration on the first birth, and a selectivity of some unobserved characteristics related to lower fertility level for international migrants (Chapter 3). It also illustrates that marital fertility is disrupted by spousal separation due to internal and international migration, couples fail to catch-up on fertility after spousal reunification, and that there is a positive correlation between spousal separation and marital fertility.

This dissertation highlights the importance of socio-economic status, either as an unobserved or observed characteristic, in driving the interrelationship between migration and family events. Migrants are selective of some socio-economic statuses, in turn leading to a delayed or lower likelihood of marriage and fertility. Let's take household income as an example. Accounting for this removes the significant positive correlation between spousal separation and marital fertility. This is because lower household income is related to a higher fertility level due to agricultural production model in the rural area. Also, life events are costly and are sensitive to the budget constraints of the individual or household.

5.3 Limitations and Future Research directions

As no data set and modelling strategy is perfect, this dissertation suffers from several weaknesses which might limit the possibility of providing answers to some relevant research questions, generalising results in a broader context, or incorporating the newest demographic trend. In this section, I acknowledge the various limitations of this dissertation and present a few research directions which would fill the gaps when the data is available.

The first limitation concerns the generalisability of the Chinese International Migration Project. Though being a unique data source of ethno-survey design, the data collection was implemented only in Fujian province, a famous migrant-sending region in Southeast China, and the selection of Fujianese villages was based on villages of origin that many Fujianese migrants in New York City come from. This is a fairly standard method of conducting ethno-surveys on migrants who are clustered in certain regions at the origin and destination countries. However, it is hardly a nationally representative survey of Chinese international migrants to the U.S.. Migrants from other regions of China to other cities in the U.S. might have different cultural preferences regarding migration and family decision-making and different selectivity of socio-economic status. This thesis would have provided more general conclusions if data on other migrant sources were available, such as for the traditional regions of origin like Guangdong province and new migrant sources, e.g., Wenzhou city in Zhejiang Province, northeast China, etc.

The second limitation relates to the available data on the complete history of socio-economic indicators. This information is not commonly available in other censuses and surveys due to the high cost of collecting more detailed data. One strategy to obtain a time-varying socio-economic status indicator is to impute dynamic educational attainment according to the common stages of a country's education system. This imputation would help to understand decision-making at early life stages but not throughout all the marriageable and reproductive ages. Other socio-economic statuses like occupation and income are too complex and diverse to be imputed under a standard framework. In our case, introducing a time-varying employment status helps to understand a couple's labour division during spousal separation (Chapter 4). Unfortunately, this complete history of occupational changes is not available for all household members. So it is treated as an unobserved heterogeneity in the study of migration and marriage (Chapter 2), and migration and fertility (Chapter 3). The datasets applied in this thesis only provide information on occupation and income at the survey time, which limits the potential of this thesis to

cover more aspects of certain important socio-economic indicators. Future research could better address the importance of socio-economic status in the decision-making regarding migration and family events by collecting complete histories of occupations or incomes.

The third limitation involves the sample size of the Chinese International Migration Project and the low migration rate. This project covered around 1,800 households and more than 10,000 people. However, it is still not enough to identify heterogeneous migration and family trajectories, especially when a finer migration status is defined, a larger set of controls are added, and correlations between events are considered. For example, it is not possible to analyse spousal reunification due to internal and international migration or spousal reunification at the origin and destination separately, simply because of the small sample size and relatively low migration rate. It is true that, even in villages well known for emigration, international migration is still a low-rate event when villagers are systematically sampled to represent the whole population in the region. It seems that this problem is not unique to the Chinese International Migration Project. Even for the Chinese and U.S. census provided by IPUMS, because of the low international migration rate, exact matching was needed so that non-migrants are assigned a lesser weight to help identify the migration equation. The low number of migrants due to the low migration rate limits the potential of this thesis to analyse different migration behaviours separately. The design of future survey could improve on this by oversampling migrants compared with non-migrants at the region of origin.

The fourth limitation regards some data sources' lack of marriage and migration timing. To be specific, the variable "year married" is not available for the U.S. 2000 Census and 2005 American Community Survey. Marriage could be an intermediary event between migration and fertility. The missing information on marriage timing made it infeasible to incorporate marriage migration in Chapter 3. Moreover, the purpose of Chapter 3 was to understand the "emancipation" effect triggered by family policies from the 1970s. It would be helpful to introduce earlier census data like the U.S. 1970-1990 Census. However, this census only reported the range of years that included migrants' year of arrival, which rendered the analysis based on these data impossible. The omission of marriage timing in Chapter 3 would somehow result in an overestimation of the effect of international migration on fertility. For example, the increased fertility level after migration (e.g., the "emancipation" effect) could partly be driven by marriage if migration itself is motivated by marriage. Future research should take into account the role of marriage timing in shaping the relationship between international migration and fertility when marriage timing is available.

The final limitation is that the most recent demographic trends might not be covered due to a lack of the most recent data. Although aimed at exploring the most recent data available, this dissertation employed mostly data collected during the period 2000-2005. This means that the findings only apply to the period before 2005, since when many trends have changed. These changing socio-demographic trends include, but are not limited to, rising anti-immigrant sentiment around the globe, the abolishment of China's one-child policy and implementation of its two-child policy, as well as the country's economic slowdown. Unfortunately, to the best of my knowledge, there is no newly available data on migration and family events in the Chinese context at the time of writing this thesis. A lack of the most recent data means some findings in this thesis could not reflect reality during the last decade when many changes have taken place. Future research could rely on new data to look into the effect of anti-immigrant sentiment, China's new fertility policies, the economic crisis in Europe and China's economic slowdown on migration flows and family dynamics.

There is a lot of work to be done on the interrelationship between migration and family events in the future. First, the ordering of events, i.e., migration, fertility, and marriage, has an impact on family outcomes. For example, a higher-order birth after international migration helps to expand the family size at lower costs which are restricted or penalized at the country of origin. The sequence of migration and marriage is also shaped by economic resources and marriage market condition. It seems that delayed family events until after migration could be related to some specific family-building strategies that are different from that of non-migrants. This form an interesting topic for future research.

Second, the selectivity of socio-economic status is worthy of greater attention because it is an important factor that affects the timing and likelihood of migration and family events. It seems that economic considerations are still at the centre of decision-making: migrants form a budget-constrained group whose migration and family behaviours are aimed towards achieving upward social mobility. Migration may initially be aimed at gathering the economic resources needed to make some family events possible. However, the amassing of wealth is not always successful or does not always happen in time for family events to take place earlier. The likelihood of family events also changes (very likely diminishes) with age. It may be that the motivation to earn money in order for family events to happen has diminished over time and that migrants have slowly adjusted their family-building strategies to favour smaller families. Future research would benefit from longitudinal information of one's socio-economic status and histories of family events to investigate if this is the case.

Third, there is a greater need than ever for qualitative scholarship in understanding the dynamics between migration and family events. Transnational Chinese migrants have moved to diversified environments, and some have achieved significant upward mobility while others have not. This migrant population has become more heterogeneous in terms of preferences, life-time goals and family building strategies. Moreover, some traditional values including "migration is only a secondary option after staying", "people (should) marry within the same social status", "women (should) marry up", preference for sons, "more children happier life" have changed to "modern values". These modern values include that one should not rush into marriage until meeting a true match, single life means more freedom and satisfaction (delayed marriage), having fewer children means a greater likelihood of achieving upward social mobility, while having more children predicts downgraded household consumption (less children or delayed childbearing), etc. It is also interesting to see how these values have changed or persisted after migration, and across time and birth cohorts. These values and preferences and strategies could best be understood through in-depth observations and interviews.

Fourth, when a certain migrant group has grown to be proportional to the total population at the destination, it would be interesting to analyse this migrant group from the population census at the destination, and compare the migrant population with non-migrants, with the aid of the matching technique. This methodology could be explored in other migrant contexts in the future. By linking the census data of both the country of origin and destination, future research would benefit from large-scale national representative samples and the origin-destination information which has featured in ethno-surveys like the Mexican Migration Project (MMP), MAFE project, and the Chinese International Migration Project, etc.

Fifth, findings in this thesis could be interesting for other contexts where migration is a gendered behaviour and patriarchy exists in the region of origin, for example, migration from Asian and African countries. Some unique features of China - U.S. migration would also contribute to understanding how differences in migration characteristics result in different or similar family dynamics. For example, the countries of origin and destination are not in close proximity to each other in the China - U.S. migration context. This is different from many other contexts like Mexico - U.S. and Africa - Europe migration. The consequential family dynamics like spousal separation might be different in these contexts because of different geographic settings, which could form an interesting avenue for future research.

Lastly, as Chinese international migrants move to many places in the world, it would

be interesting to study migration from other regions in China to other destinations as well. In the two empirical chapters of this thesis, I studied international migration from Fujian province to the U.S., mainly New York City. The surging international migration flow from northeast China (Xiang, 2007) and from Wenzhou city to Europe (Liang and Miao, 2013) could be motivated by different events, such as the institutional reform in northeast China (Xiang, 2007). For future research, studying Chinese migration from regions other than Fujian to other destination countries would help to understand why regions sharing similar cultures may find different continents attractive for migration.

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