

# When City Boy Falls in Love with Country Girl: Baby's Hukou, Hukou Reform, and Inter-hukou Marriage

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**Abstract:** Under the permanent registration (Hukou) system, all Chinese citizens have either rural hukou or urban hukou, which is determined by birth and is inherited from one generation to the next. Before 1998, baby's hukou status must follow its mother's according to the *1958 Hukou regulation*. This rule changed in 1998 that the baby could choose to follow either its mother or its father. In this paper, we examine the effect of this policy change on the probability of inter-hukou marriage. Using a random sample from the 2005 1% census, we find that intermarriage increased significantly because of the reform. We also find that the increase is not symmetric, with most of the increase coming from the probability of a rural woman marrying an urban man. In terms of migration, rural women's probability of marriage migration increased significantly.

## 1. Introduction

The current household registration (hereafter Hukou) system, which came into shape during the 1950s, is a unique feature of China. All Chinese citizens have either *rural* or *urban* hukou status (but not both). People with different hukou status not only differ in places of residence, but also in many other aspects including social status, education and employment opportunities, and social security coverage (Lu, 2003). Almost invariably, an urban hukou is associated with higher social status, more opportunities and broader social security coverage. Meanwhile, although the restrictions on labor mobility relaxed dramatically in the mid and late 1990s, changing hukou status is still extremely difficult. In most cases, one's hukou status is determined according to a matrilineal rule, which means the child's hukou status is after its mother and he/she carries that status afterwards.<sup>1</sup>

Now consider an urban boy who falls in love with a rural girl. The prospect that their child can only have rural hukou may discourage him from marrying her. As pointed out by Au, et al. (2007), the rule in terms of determination of child's hukou is discrimination against rural woman. Otherwise, they would have more opportunity moving upward by marrying a man with urban hukou. However, to what extent this matrilineal rule discourages inter-hukou marriage is seldom investigated empirically.

In this paper, we investigate this empirically utilizing the hukou reform in 1998. In 1998, the Ministry of Public Security suggested some measures (*yijian*) to cope with some outstanding issues in the management of hukou system, which was approved shortly by the State Council. The first measure was to change the determination rule of infant's hukou status. Specifically, for the inter-hukou married couples, their children's hukou status could follow either father or mother. Again, consider the boy with urban hukou who falls in love with a rural girl. This couple, if got married and had a child, can choose an urban hukou for their child under the new rule. In terms of child's hukou determination, the girl's rural hukou status won't be an intimidating factor for this prospective couple anymore. It's natural to hypothesize that this type of inter-hukou marriage should have increased. However, it's difficult to have a convincing estimate of the effect of hukou reform on inter-hukou

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<sup>1</sup> Hukou status can change however. Gustafsson and Deng (2005) and Xing (2009) document the institutional background and have some descriptive analysis.

marriage.

Notice that the late 1990s also witnessed a dramatic increase of rural migrants flowing into the urban labor market. In the marriage market, the probability of meeting a member of the opposite sex of different hukou status also increased. The estimate of the effect of hukou reform will be biased by this time trend if we just compare the number (ratio) of inter-hukou marriage before 1998 to that after 1998. The asymmetric feature of the effect of hukou reform gives us an opportunity to estimate the effect more appropriately. To see the asymmetry, we consider an alternative case where a rural boy meets an urban girl. If they got married and had a child, they could always choose urban hukou for their child whether it was before or after 1998. Therefore, we do not expect this type of inter-hukou marriage to have increased because of the hukou reform. If this is true, we can use this type of marriage in different years as a control group.

Using the data of the 2005 census, we investigate the effect of this hukou reform on the probability of inter-hukou marriage. The probability that an urban boy marrying a rural girl increased by over 5% after 1998; accordingly, the probability of marrying an urban man for rural girl increased by over 2%. Meanwhile, the probability of a rural man marrying an urban woman doesn't change much. We also find that, more rural women migrate to urban areas because of marriage after 1998. We don't find any evidence of increase in other types of migration because of the reform in 1998.

The effect of Hukou system on labor mobility has been discussed extensively by many scholars (Zhao 2002, 2003; Rozelle, et al., 1999; Liang and Ma, 2004; Cai et al., 2001 and He, 2004 for example). Researches using explicit policy relaxation on hukou as variation to identify how hukou system affects mobility are rare. There are two notable exceptions however. One is de Brauw and Giles (2006). They use exogenous variation across counties in the timing of national identity card distribution to identify the change in the cost of migration. The variation they utilize is happened in the 1980s, and their focus is on how migration opportunity affects education decision. Sun et al., (2009) is more closely related to our research. They study how the hukou reform in 1998 and thereafter affects migration. Our paper is different from theirs in the following aspects. Instead of investigating the 1998

reform as a whole package, we unbundle the reform and study only one piece of the reform. This makes our identification strategy more clear. Second, the focus of this paper is on how hukou affects the mobility of rural woman through marriage, instead of through employment.

The paper is also related to the discrimination literature. Discrimination against rural hukou in the urban labor market has long been regarded as a major factor that makes migrants worse off in terms of employment opportunity, wage levels, and social welfare (Gagnon, et al, 2009, Xing, 2008; Xing and Luo, 2009; Meng and Zhang, 2001; Maurer-Fazio and Dinh, 2004; Wang, 2005; Deng, 2007; Yue Ximing et al., ??). And the discrimination against rural migrants in the urban labor market is regarded as a factor that prevents more rural labor from migrating to urban labor market. However, discrimination against rural women in terms of child's hukou is seldom studied. The unique feature of the rule change allows us to look into this. In fact, this allows us to investigate the value differential of hukou for one at the very beginning of its life. Of course, the differential has been translated into the utility of parents.

Finally, the marriage market is of interest for economists for a long time. The sorting patterns are believed to have potentials to impact the social welfare and income distributions (Becker, 1991; Burdett and Coles, 1997, 1999; Fernandez and Guner, 2005 etc). More related to our research is Wong (2003). She looked into the fact that only 5.5% black male married with white female, and pointed out that mating taboo plays a major role that prevent inter-racial marriage. Another strand of literature similar to ours is those on India's marriage markets, who studied the marriage between different castes (Banerjee et al., 2009 and Anderson, 2003 for example). Our paper is different from theirs. First, the matching function is asymmetric for male and female in our paper as we'll see in the model. This means while rural woman are more willing to propose to urban man, the later are less willing to propose to the former. In both Wong's paper and Banerjee et al.'s paper, where the matching quality (Banerjee et al.) or the payoff of marriage (Wong) is symmetric, the taboo (or distaste) of marrying someone with different color or caste is the same for man and woman and for

different race or castes.<sup>2</sup> Second, to our knowledge at the moment, there's few research on inter-group marriage that take the social status of future child into consideration explicitly. Considering the importance of child in a household, this neglect is surprising.

The paper is structured as follows. In section 2, we lay out a simple model. We hope to use this model to capture some main features of inter-hukou marriage and its response to the hukou reform. The data description is in section 3, and the empirical analysis is in section 4. Section 5 concludes.

## 2. Model

### 2.1 Marriage matching quality

There are two types of hukou  $i \in \{1, 2\}$ , letting  $i=1$  refer to urban hukou and  $i=2$  refer to rural hukou. We use  $x$  and  $y$  to refer to individual characteristics of men and women with  $x \in \{H, L\}$  and  $y \in \{H, L\}$ . H refers to a higher level of education, beauty, ability or income, and L refers to a lower level. The payoff from marriage depends on matching quality, which is determined by individual characteristics and hukou status of the couple. The matching quality of personal characteristics is determined by  $f(x, y)$ , which is increasing in both arguments. We also assume that  $x$  and  $y$  are complements. In terms of hukou, the matching quality for a person with hukou  $i$  meeting with a member of the opposite sex with hukou  $j$  can be formulated as:

$$A_B^G(i, j) = 1 + \alpha(2 - j) + c \{1[G = M, j = 1] + 1[G = F, i = 1]\} \quad G = M, F \quad (1)$$

where  $G$  refers to sex of  $i$ , with  $M$  representing male and  $F$  representing female. Before 1998 (that's what  $B$  stands for), the matching quality for  $i$  in terms of hukou is determined by his/her partner's hukou in general and the hukou status of child. For  $i$ , marrying to one with urban hukou (2-1) is always better than marrying to one with rural hukou (2-2), holding others constant. This is reasonable because urban hukou is often a prerequisite for eligibility of better education and employment opportunities, social security, etc. Different people may evaluate this differently. Therefore, we let  $\alpha$  be a random variable uniformly distributed

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<sup>2</sup> Fernandez and Guner (2005) considered the discrimination against woman.

between zero and  $\alpha$ , representing person  $i$ 's sensitivity to hukou difference.

We use  $c$  to stand for the value of urban hukou for a child (value of rural hukou is normalized to zero). The third term in equation (1) is a formal way to describe the matrilineal rule before 1998.  $1[\cdot]$  is an indicator function.  $1[G = M, j = 1]$  means that if person  $i$  is a male ( $G = M$ ), and if his partner is with urban hukou ( $j = 1$ ), their kid will have urban hukou no matter what hukou status he has ( $1[G = M, j = 1] = 1$ ). Otherwise,  $1[G = M, j = 1] = 0$ . Similarly,  $1[G = F, i = 1]$  means that if person  $i$  is a female ( $G = F$ ), no matter what hukou status her partner has, their kid will have urban hukou if and only if she has an urban hukou herself ( $i = 1$ ). Notice that the matching quality is asymmetric for man and woman. This makes our matching quality function different from those in Banerjee et al, (2009). It's straightforward to show this asymmetry. According to (1), for an urban man ( $G=M$ , and  $i=1$ ), the hukou matching quality of marrying a rural woman is  $A_B^M(1, 2) = 1$ , while for an urban woman ( $G=F$ , and  $i=1$ ), the quality of marrying a rural man is  $A_B^F(1, 2) = 1 + c$ . Similarly, we have  $A_B^F(2, 1) = 1 + a$  and  $A_B^G(2, 1) = 1 + a + c$ . It's the matrilineal rule makes this matching function asymmetric.

Putting the above two pieces together, we have the overall matching quality:

$$u_B^G(i, j, x, y) = A_B^G(i, j) f(x, y) \quad \text{for } G = M, W$$

## 2.2 The price of hukou and the effect of hukou reform

Consider an urban man with characteristics  $x$ , and suppose that an urban woman with characteristics  $y$  matches him well (they both would like to propose). To make him indifferent to propose to a rural woman, the latter should be with higher quality to satisfy the following condition:

$$A_B^M(1, 1) f(x, y) \leq A_B^M(1, 2) f(x, y + \varepsilon_B) \Leftrightarrow (1 + \alpha + c) f(x, y) \leq f(x, y + \varepsilon_B)$$

With equality, we can solve out  $\varepsilon_B = \varepsilon_B(x, y, \alpha, c)$ , which can be interpreted as the urban man's supply price of urban hukou. It's increasing in  $(\alpha, c)$ .

What about a rural woman with characteristics of  $y'$ . Suppose a rural man with characteristics  $x'$  is one she is willing to propose (and the man is also willing to propose). To make this woman indifferent between the rural man with characteristics  $y'$  and an urban man, the following conditions should be satisfied:

$$A_B^F(2,2)f(x', y') = A_B^F(2,1)f(x' - \delta_B, y') \Leftrightarrow f(x', y') = (1 + \alpha)f(x' - \delta_B, y')$$

We can solve for  $\delta_B$ , which can be interpreted as the demand price for urban hukou.

Obviously, it's increasing in  $\alpha$ , but independent of  $c$ .

To see how the reform in 1998 will change the relative prices, we write down the new hukou matching function as follows (the A refers to after 1998):

$$A_A^G(i, j) = 1 + \alpha(2 - j) + c \cdot 1[\min\{i, j\} = 1] \quad (2)$$

$1[\cdot]$  is an indicator function. The last term in equation (2) means that as long as either husband or wife has urban hukou ( $i = 1$  or  $j = 1$ , and therefore  $\min\{i, j\} = 1$ ), their kid will have urban hukou ( $1[\min\{i, j\} = 1] = 1$ ). Only when both parents have rural hukou ( $i = j = 2$ ), the kid will not have urban hukou. After the reform, urban man's supply price and rural woman's demand price for urban hukou will change according to the following rules.

$$(1 + \alpha + c)f(x, y) = (1 + c)f(x, y + \varepsilon_A)$$

$$f(x', y') = (1 + \alpha + c)f(x' - \delta_A, y')$$

It's straightforward to show that  $\varepsilon_A \leq \varepsilon_B$  and  $\delta_A \geq \delta_B$ . The urban man's supply price of urban hukou declined, because their kid can have urban hukou now. The rural woman's demand price for urban hukou increases because an urban man can secure their kid an urban hukou.

Consider the potential of marriage between urban woman and rural man. Under this simple framework, both the demand and supply price of urban hukou will not change. The urban woman's supply price of urban hukou is determined as follows:

$$(1 + \alpha + c) f(x, y) = (1 + c) f(x + \varepsilon, y)$$

And the rural man's demand price for urban hukou is determined as follows:

$$f(x', y') = (1 + \alpha + c) f(x', y' - \delta)$$

### 2.3 Rural boy meets urban girl

To make the problem simple, we consider the case that both population and individual characteristics are balanced within rural and urban groups. We use  $m_k^i$  and  $w_k^i$  to represent the population of man and woman with hukou  $i$ . The population is balanced means that for all  $k = L, H$  and for all  $i \in \{1, 2\}$ , we have  $m_k^i = w_k^i$ . If all rural population are of low ability and all urban population of high ability, there won't be any inter-hukou marriage as no urban population are willing to marry rural ones. In the more general case, we assume that

$m_H^1 = w_H^1 > m_H^2 = w_H^2, m_L^1 = w_L^1 < m_L^2 = w_L^2$ . Now we consider inter-hukou marriage. Given the matching quality, to make a rural man of type H willing to marry a urban woman of type L, we have:

$$A_B^M(2,2) f(H, H) \leq A_B^M(2,1) f(H, L) \Leftrightarrow \alpha \geq \frac{f(H, H) - (1+c) f(H, L)}{f(H, L)}$$

This means that only those who are sensitive to the hukou difference are willing to marry with an urban woman of type L. And the higher the value of child's urban hukou, the more likely of this kind of inter-hukou marriage. From the perspective of an urban woman of type L, only when she is not very sensitive to the hukou difference will she consider marrying a rural man of type H, as is shown in the following equation:

$$A_B^F(1,1) f(L, L) \leq A_B^F(1,2) f(H, L) \Leftrightarrow \tilde{\alpha} \leq \frac{(1+c)(f(H, L) - f(L, L))}{f(L, L)}$$

It's important to notice that the hukou reform in 1998 will not change the conditions we got above.

### 2.4 Urban boy meets rural girl

The case is different when we consider urban man and rural woman. To make a rural



woman of type H willing to marry an urban man of type L, we should have:

$$A_B^F(2,2)f(H,H) \leq A_B^F(2,1)f(L,H) \Leftrightarrow \alpha \geq \frac{f(H,H)}{f(L,H)} - 1$$

To make an urban man of type L willing to marry a rural girl of type H, we have:

$$A_B^M(1,1)f(L,L) \leq A_B^M(1,2)f(L,H) \Leftrightarrow \tilde{\alpha} \leq \frac{f(L,H)}{f(L,L)} - (1+c)$$

The above conditions are for the environment before 1998. After 1998, however, the conditions become as follows:

$$A_A^F(2,2)f(H,H) \leq A_A^F(2,1)f(L,H) \Leftrightarrow \alpha \geq \frac{f(H,H)}{f(L,H)} - (1+c)$$

$$A_A^M(1,1)f(L,L) \leq A_A^M(1,2)f(L,H) \Leftrightarrow \tilde{\alpha} \leq \frac{(1+c)f(L,H)}{f(L,L)} - (1+c)$$

Obviously, more rural woman of type H are willing to marry urban man of type L; Meanwhile, more urban man of type L are willing to marry rural woman of type H. Notice that the above conclusion is based on the assumption that urban hukou is better than rural hukou for a child ( $c > 0$ ). Therefore, to see the response of inter-hukou marriage to the reform also is a way to test whether urban hukou is better than rural hukou.

### 3. Data and Descriptive Statistics

The data we use is a 1/5 random draw from the 1% census survey of 2005. Several pieces of information are used to construct married couples. The first is “the relationship to the household head”: household head himself (herself), spouse, son or daughter, father or mother, father-in-law or mother-in-law, grandfather or grandmother, son-in-law or daughter-in-law, grandchild, brother or sister, and others. The second is the time (year and month) of marriage. Additionally with the gender information, we can figure out who is whose wife or husband. Using the above information, we construct a dataset with every single observation containing information of husband and of wife. We keep those couples who married after 1980. There are 326 833 couples: 257 485 cases of household head with spouse, 18 897 cases of father with mother (or father-in-law and mother-in-law), and 50 451

cases of son and daughter-in-law (or daughter and son-in-law). At the current stage, we don't consider single person.

Within-hukou marriage is the most prominent feature of table 1. Among all the marriages between 1980 and 2005, only 5.1% of these marriages are inter-hukou, with 3.5% being urban man with rural woman and 1.7% urban woman with rural man. Using the number of observations in the last row of figure 1, we can also show that around 11% of urban men are married to rural women, and 5.6% of urban women are married with rural men. Taking into consideration that the rural population is larger than urban population, the percentage of inter-hukou marriage for rural men and rural women are 2.5% and 5% respectively.

In terms of individual characteristics, we consider the age at marriage first. Rural people tend to marry at younger ages, with the rural ones being 2 years younger than their urban counterparts on average. In cases of inter-hukou marriage, both men and women, either with urban hukou or rural hukou, were married at a later age than their rural counterparts but at an earlier age than urban counterparts who are in intramarriage.

The average level of education is significantly lower for population with rural hukou than those with urban hukou. Also, women have lower education level than men. For rural couples, the average years of schooling for husbands and wives are 8.3 and 7.2 respectively. In cases of urban couples, they are 11.9 and 11.3 respectively. The average years of schooling for urban men who are married with rural women is 10.6, lower than that for the total population of urban man. For intermarried rural women, their average year of schooling is 8.9, much higher than the average level of total population of rural women. In cases of rural men marrying to urban women, the former has higher education level (compared to all rural men) and the latter has lower education level (compared to all urban women). In terms of income level, the patterns are similar to those in terms of education.

These summary statistics indicate a basic fact that urban hukou is superior to rural hukou on average. It's associated with higher education levels and income levels. The consequence is that within-hukou marriages are dominant in the marriage market. Inter-hukou marriages are not absolutely impossible however, although rare. Those who find

it hard to get offers from within urban hukou may choose to search in the rural population. Rural population with better individual characteristics (or family background) are much more likely to get proposes from urban population. This is consistent with our simple model.<sup>3</sup>

#### **4. Hukou Reform and Inter-hukou Marriage**

##### **4.1 Hukou reform and child's hukou**

If the rule change of the determination of child's hukou status affected inter-hukou marriage, we should be able to observe that children of inter-hukou marriage born after 1998 are more likely to choose urban hukou (given  $c > 0$ ). Notice that the reform doesn't change the fact that child's hukou status is determined by its parents. In cases both parents are of the same hukou, the child can't choose hukou status other than that of its parents'. Next, we investigate how children born at different years choose their hukou status in intermarriages.

Using the census data of 2005, the left panel of figure 1 plot the fractions of children whose hukou follow their mothers' and whose hukou follow their fathers in intermarriage. In case of urban man marrying rural woman, child born after 1998 (aged 8 or younger) is more likely to follow its father's hukou status. In case of rural man marrying urban woman, child is after its mother in terms of hukou in most of the time, whether before or after 1998. Notice that there is no discontinuity regarding to the likelihood of being after father's hukou. According to the policy, children born before 1998 can also change hukou status given their parents hukou are not identical. But the hukou problem of children born after 1998 is the priority. The problem of those born before 1998 can be solved gradually.

Using the data of 2000, we can see more discontinuity (right panel of figure 1). For children born before 1998, their hukou mainly follow their mothers. The faction of following their mothers declined dramatically for those born after 1998. The difference between the left and right panel of figure 1 reflect the fact that the implementation of the policy has some inertia. The change of hukou status for those who are born before 1998 has some time lag. Figure 1 indicates that the choice of children's hukou status is responsive to the rule change in 1998.

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<sup>3</sup> To some extent, it's similar to the case of inter-caste marriage in India as described by Anderson (2003).

## 4.2 Difference-in-difference

In figure 2, we give the time trend of total inter-hukou marriage, and the trend by types. The solid line is the fraction of new inter-hukou marriages in one year for different years. The dash and dot lines are for the intermarriages of urban man with rural woman and urban woman with rural man, respectively. From the left panel, we can see a downward trend of inter marriage in the early 1980s, and from the late 1980s, inter marriages increase. The increase is more significant after 1998. When we consider the two types of inter-hukou marriage separately, they show some interesting dissimilarities. For the type of rural woman marrying urban man, there is a downward trend until the mid and late 1980s. In the early 1990s, this type of inter-hukou marriage began to increase gradually, and after 1998, the increasing trend accelerated. In comparison, the fraction of intermarriage with rural man marrying urban woman remained low, but kept increasing during the whole period, without significant change around year 1998. To make the comparison more relevant, the right panel of figure 2 keeps only observations of those married after 1990. From 1990 to 1998, the two types of inter-hukou marriage have a parallel time trend. But after 1998, there's divergence between these two types of marriage.

In the following, we consider a difference-in-difference model. Consider a random observation (with the information of a couple), there are four possibilities: marriage within rural hukou, marriage within urban hukou, rural woman marrying urban man, or rural man marrying urban woman. We use a dummy variable  $y$  to indicate whether the marriage is intra-hukou ( $y=0$ ) or inter-hukou ( $y=1$ ). Therefore, we can estimate a linear probability model.

$$y_i = X_i\beta + \text{Policy98}_i * \gamma + \text{HHukou}_i * \lambda + \text{Policy98}_i * \text{HHukou}_i * \delta + \varepsilon_i$$

$X$  is a vector of control variables including age, education, income, their differences (between wife and husband), regional characteristics (sex ratio, income inequality measured as standard deviation of monthly income, and urbanization rate), province dummies and time trend of every province. The variable  $\text{policy98}$  is used to indicate whether the couples get married after 1998.  $\text{HHukou}$  is a dummy to indicate whether the husband's hukou is urban or rural (urban=1/rural=0). Then the coefficient  $\delta$  is the effect of the reform on inter-hukou

marriage. Table 2 shows how the DID strategy works (ignoring  $X$  at the moment). When  $HHukou=1$ , the above model gives the probability of an urban man marrying a rural woman. To compare this type of inter-hukou marriage after 1998 and before 1998, we have  $\gamma + \delta$ . Obviously, there may be other factors that influence the probability of this type of inter-marriage  $\gamma$ . As the probability of rural man marrying urban woman does not change with the rule, the change after 1998 in this type of inter-hukou marriage can be used to control for  $\gamma$ .

The results are reported in table 3. Based on the estimate of  $\delta$ , we can see that after the rule changed, the probability of inter-hukou marriage for urban man increased by over 5%. In column 1 of table 3, we don't have other controls except *policy98*, *HHukou*, and their interaction. The interaction term is highly significant (5.8%). In column 2, we controlled provincial dummies and provincial specific time trend. In column 3, we add control variables of difference of characteristics between wife and husband and their interaction with variable *HHukou*. Column 4 controlled the age at marriage, education level, and income level of husband. Further in column 5, we only keep couples married after 1990 make couples married before the reform and those after the reform more comparable. In all the robustness checks, the estimates of  $\delta$  varies from 5% to 7%, around our baseline estimate in column 1.

The above estimations have potential problems, however. The first one is that rural man and urban man may have different time trend even without the intervention of hukou reform. To alleviate this concern, we do a placebo experiment, by choosing arbitrarily the year of 1990 as the year the policy commenced. After deleting the observations that married after 1998, we run regressions as before. The coefficient of the interaction term (*HHukou\*policy90*) is not significant any more. This makes us a little more confident that the significant estimates in column 1-5 are indeed the effect of the 1998 policy. The second problem is that the total population of rural man and urban man are different, with the former much larger than the latter. Further, the probability of rural man marrying to urban woman is much lower than urban man marrying to rural woman even before the reform. Therefore, we consider inter-hukou marriage from perspectives of different types of individuals. The

method is just before-after comparison.

### 4.3 Before-After

We consider rural women, urban women, rural men, and urban men respectively to see the effect of hukou reform on their probability of marrying the opposite sex with different hukou. As we only consider those who are married, every observation has two choices: intra-hukou marriage or inter-hukou marriage. In figure 3 we plot the fraction of population marrying the opposite sex with different hukou for each population. Panel A of figure 3 is for rural women. The probability of rural women marrying urban man declined slightly in the 1980s, and began to increase in the 1990s. After 1998, the increase becomes more significant. Panel D of figure 3 is for urban men. Similarly, their probability of marrying rural women changed gradually before 1998. After that the probability of inter-hukou marriage increases dramatically. Although from different perspectives, both panel A and panel D reflect the possibility of inter-hukou marriage between rural women and urban men. Correspondingly, both panel B and panel C reflect the possibility of inter-hukou marriage between rural men and urban women. Although not as many as the number of rural women marrying urban men, this type of marriage increase gradually ever since 1980s. But there are no discontinuities around 1998. We already mentioned this asymmetry in the last subsection between panel A-D and panel B-C. It is due to the fact that the new rule affects the potential output of former type of intermarriage, but not the latter type.

To investigate it more rigorously, we estimate a group of linear probability models:

$$y_i = X_i\beta_g + \text{policy98}_i * \gamma_g + \varepsilon_i$$

$g=1, 2, 3, 4$  represent rural women, urban women, rural men and urban men respectively. We estimate the LPM separately for these four types of populations. Dependent variable  $y$  is a dummy, with  $y=1$  representing intermarriage and  $y=0$  intramarriage. The vector  $X$  contains control variables as in the last subsection.

As for rural woman (column 1 of table 4), the probability of marrying an urban man first increases with age and then declines. The more educated and those earn more are more likely to be intermarried. If intermarried, the characteristics difference (age, education and

income) between wives and husbands tend to be larger. In terms of regional characteristics, both the rise in sex ratio (the fraction of female in total population) and inequality make rural women in a more competitive environment and therefore lower their probability of intermarriage. On the contrary, the probability of intermarriage increases with urbanization rate (the fraction of population with urban hukou). At last, we can see that the probability of intermarriage increases as time passes by. After controlling all the above factors, the coefficient on variable *policy98* is still 2.3% and highly significant.

Column 2 in figure 4 is for urban women. The more educated are less likely to marry rural men. Both the age difference and education difference are negatively associated with probability of intermarriage. Regional inequality is positively related to the probability of intermarriage. The urbanization rate, however, is negatively associated with urban women's intermarriage. After controlling provincial dummies and province specific time trend, the probability of intermarriage after 1998 is still significantly higher than before 1998. Column 3 and column 4 are for rural man and urban man respectively. For rural man, higher level of human capital and income are associated with higher probability of intermarriage. The opposite is true for urban man, however. Higher inequality is associated with lower (higher) probability of intermarriage for rural (urban) man. Higher urbanization rate is associated with higher probability of intermarriage for rural men, but associated with lower probability of intermarriage for urban men.

Summarize the results in table 4. For each type of population, the reform in 1998 is associated with more intermarriage in terms of hukou status, even after controlling a rich set of variables. However, the effects of the reform are different for different types of inter-marriage. From the perspective of rural population, the estimates of the coefficient of policy dummy (*policy98*) are 2.3% and 0.5% for women and men respectively. The policy has more impact on rural women than on rural men. Correspondingly, this policy has more impact on urban men than on urban women from the perspective of urban population, the estimates being 2.1% and 7.7% for women and men respectively. As emphasized many times, the fact that intermarriage between urban man and rural woman increase more than the opposite lies in the choice of child's hukou. Therefore we can use the estimates of coefficient

of policy<sup>98</sup> for urban women (column 2) and for rural men (column 3) to control for other effects of hukou reform in 1998 or just some discontinuous time trends. The effects of the change of rule in terms of child hukou can be differenced out. We can calculate that the probability of rural women marrying urban men increased by 1.8% (2.3%-0.5%), and that the probability of urban men marrying rural women increased by 5.6% (7.7%-2.1%).

## 5. Hukou Reform and Migration of Rural Woman

In the previous analysis, we don't consider geographic feature of China's marriage market in terms of hukou status. Historically, the hukou status, either rural or urban, is determined mainly based on where the resident lives or works.<sup>4</sup> In most of the cases of intermarriage, at least one person will migrate. Traditionally, it's the woman that moves to the man's place. And it's the rural one that moves to the urban area. This tradition and practice has two implications. First, this explains why the probability of urban women marrying rural men is significantly low: rural women seldom move to rural areas. Second, intermarriage for rural women means migration and upward mobility. But as pointed by Au et al. (2007), the matrilineal rule of hukou status is another hurdle that rural women face, as well as many others. A natural hypothesis is that the reform of 1998 will create more marriage migration.

To test this hypothesis, we run linear probability models as before. The dependent dummy variable  $y$  is an indicator with  $y=1$  indicating migration because of marriage. It is regressed on marriage year dummies as well as many other controls. The estimates of coefficients are plotted in figure 4. Clearly, the probability marriage migration for rural women increased significantly after 1998, which is not true for urban women. For the latter, however, there is a significant increase in 1997. We guess this may be due to the urban labor market reform in 1997. With the ownership restructuring and privatization, the mobility of labor in urban area increased. Workers are not tied up to one work unit. They have more freedom to choose where to work and whom to work for. Urban women are more likely to migrate because of marriage. In figure 4, we don't report the coefficient for men, as this type of cases is rare.

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<sup>4</sup> The vast amount of migration makes this claim less true. But in general, this claim is still true.



Of course, rural women may migrate to another rural area also for purpose of marriage. The reform in 1998 should have no effect on this type of marriage, because the child (children) will have rural hukou whatsoever. The value differential of hukou is much larger between urban and rural than within rural areas. Therefore, we hypothesize that the 1998 policy will have much larger effect on marriage migration to urban areas than marriage migration to other rural areas. To test this hypothesis, we consider three groups of rural women according to where they live in 2005: rural area, suburban area, and urban area. In figure 5, the probability of marriage migration kept increasing for all three groups of rural women. But only those in urban or suburban areas show a significant increase after 1998. Marriage migration to other rural areas resembles a linear trend around 1998.

This section justifies the conclusion that hukou system is a hurdle for rural-urban migration. In addition, we point out a specific way how hukou system discourages rural-urban migration: matrilineal rule of hukou status. Abolishment of this rule encourages migration.

## **6. Conclusion**

The hukou system that came into shape in the 1950 has a far reaching influence on China's society and economy. It makes more prominent of the dual feature of China. After several decades of development, hukou system has evolved from a tool of confining rural people within rural area and rural sector to a tool of discriminating rural residents in terms of education and employment opportunities, living condition, social security, and children's social status and their future prospect of life. In most of the cases, urban hukou is associated with better off conditions. Entering the 1990s, hukou system became less restrictive. The document "*On the settlement of several outstanding issues in the current Hukou management*" by the Ministry of Public Security in 1998 symbolized the commencement of a new round of Hukou reform. Till now, however, there are few systematic empirical studies to evaluate the effect of this reform.

In this paper, we focus on a particular aspect of the hukou reform, namely the abolishment of matrilineal rule. In particular, we investigate how the abolishment of the matrilineal rule affects the probability of inter-hukou marriage. According to the regulation,

the baby's hukou must follow its mother's before 1998. Therefore urban man was reluctant to marry a rural woman because their child would have a rural hukou. The abolishment of this rule eliminates this type of discrimination against rural women. We observe that intermarriage with urban man marrying rural woman increase significantly. And rural woman's probability of marriage migration to urban areas also increases.

There's one feature of hukou system we haven't looked into in this paper, namely the hukou difference among different areas within rural or urban areas. China's Hukou system is more than a tool to discriminate between urban and rural population. It is also a tool to discriminate among different areas (cities) within rural or urban areas. For example, the value of urban hukou in Beijing or Shanghai is much higher than the value of urban hukou in some other medium or small cities, let alone rural areas. Although no restrictions are set to keep migrant workers outside, getting Beijing or Shang hukou is extremely difficult. If the two falling in love are from different cities, and the two cities have different levels of infrastructure, public service, etc, they have the same type of problem as we've already seen. And we expect the abolishment of matrilineal rule will also encourage intercity marriage within urban areas, and therefore encourage intercity migration. But the feature of this problem will not be as simple as inter-hukou marriage. We leave it for future research.

Another caveat we should keep in mind is the inadequacy of our theoretical model. One important feature of the marriage market is lacked in the current one, namely the friction of the market. It takes time to find someone that one would like to propose. And they can only organize as a household when both propose to each other. The search and match process will have implications for how the market functions and how the reform will affect the marriage market. But moving that way makes the analysis more difficult.

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Table 1 Summary statistics

	Ag+Ag	NoAg+NoAg	NoAgHus +AgWife	AgHus +NoAgWife	Total
<b>Husband</b>					
Age	37.29	39.61	36.85	35.58	37.91
Age at marriage	23.51	25.74	25.10	24.67	24.22
Years of formal schooling	8.27	11.87	10.60	9.60	9.39
Monthly income	0.58	1.17	0.90	0.95	0.77
<b>Wife</b>					
Age	35.47	37.66	34.48	33.90	36.03
Age at marriage	21.69	23.79	22.73	22.99	22.34
Years of formal schooling	7.20	11.31	8.85	9.85	8.47
Monthly income	0.30	0.68	0.35	0.49	0.41
<b>Difference</b>					
Age at marriage	1.82	1.94	2.37	1.68	1.87
Years of formal schooling	1.06	0.56	1.75	-0.25	0.92
Monthly income	0.29	0.49	0.55	0.45	0.36
No. of couples	217086	92928	11338	5481	326833

Note: “Ag+Ag” refers to marriage of rural couples; “NoAg+NoAg” refers to marriage of urban couples; “NoAgHus+AgWife” refers to intermarriage between an urban man and a rural woman; and “AgHus+NoAgWife” refers to intermarriage between a rural man and an urban woman.

Table 2 DID strategy to identify the hukou reform effect

	<b>Before 98</b> i	<b>After 98</b> ii	ii - i
<b>Urban man</b> ①	$E[y_i = 1   X, Policy=0, HHukou=1]$ $= X_i\beta + \lambda$	$E[y_i = 1   X, Policy=1, HHukou=1]$ $= X_i\beta + \gamma + \lambda + \delta$	$\gamma + \delta$
<b>Rural man</b> ②	$E[y_i = 1   X, Policy=0, HHukou=0]$ $= X_i\beta$	$E[y_i = 1   X, Policy=1, HHukou=0]$ $= X_i\beta + \gamma$	$\gamma$
②-①	$-\lambda$	$-\lambda + \delta$	$\delta$

Table 3 Hukou reform and intermarriage (DID)

	Dependent variable: intermarriage (yes=1/no=0)					
	(1)	(2)	(3)	(4)	(5)	(6)
Non ag husband	0.070*** (0.001)	0.074*** (0.001)	0.389*** (0.028)	0.421*** (0.028)	0.511*** (0.040)	0.346*** (0.029)
Marriage after 98	0.022*** (0.001)	0.013*** (0.002)	0.012*** (0.002)	0.008*** (0.002)	-0.017*** (0.002)	0.003** (0.002)
(Marriage after 98)*(Non ag husband)	0.058*** (0.002)	0.050*** (0.002)	0.055*** (0.002)	0.069*** (0.002)	0.070*** (0.002)	-0.003 (0.002)
Year of marriage		0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.008*** (0.001)	0.002*** (0.001)
Age difference			-0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)
(Age difference)*(Non ag husband)			0.004*** (0.000)	0.003*** (0.000)	0.004*** (0.000)	0.001** (0.000)
Schooling yr difference			-0.004*** (0.000)	-0.003*** (0.000)	-0.005*** (0.000)	-0.002*** (0.000)
(Schooling yr difference)*(Non ag husband)			0.020*** (0.000)	0.026*** (0.000)	0.030*** (0.001)	0.022*** (0.000)
Rank difference			0.004*** (0.001)	0.010*** (0.001)	0.016*** (0.001)	0.006*** (0.001)
(Rank difference)*(Non ag husband)			-0.004*** (0.001)	-0.005*** (0.001)	-0.008*** (0.001)	-0.003*** (0.001)
Sex ratio			0.065* (0.035)	0.067* (0.035)	0.021 (0.051)	0.075** (0.036)
(Sex ratio)*(Non ag husband)			-0.501*** (0.055)	-0.510*** (0.055)	-0.737*** (0.078)	-0.337*** (0.057)
Inequality			-0.009*** (0.002)	-0.007*** (0.002)	-0.008*** (0.002)	-0.003* (0.002)
Inequality*(Non ag husband)			0.008*** (0.002)	0.018*** (0.002)	0.027*** (0.003)	0.010*** (0.003)
Urbanization			0.072*** (0.004)	0.078*** (0.004)	0.086*** (0.006)	0.063*** (0.005)
Urbanization*(Non ag husband)			-0.255*** (0.006)	-0.257*** (0.005)	-0.205*** (0.008)	-0.270*** (0.006)
Age at marriage				-0.005*** (0.001)	-0.003*** (0.001)	-0.006*** (0.001)
Age at marriage squared				0.007*** (0.001)	0.004** (0.002)	0.009*** (0.002)
Junior middle				0.010*** (0.001)	0.017*** (0.002)	0.007*** (0.001)
Senior high				-0.009*** (0.001)	-0.007*** (0.002)	-0.012*** (0.001)
College +				-0.106*** (0.002)	-0.115*** (0.003)	-0.090*** (0.002)
Rank				-0.006*** (0.001)	-0.010*** (0.001)	-0.003*** (0.001)
R-squared	0.040	0.044	0.068	0.085	0.087	0.069
N	326833	326833	326833	326833	181831	250018

Note: \*, \*\*, and \*\*\* refer to significance levels of 10%, 5%, and 1%. Standard errors are in parenthesis.

Table 4 Hukou reform and intermarriage (Before-After)

	Dependent variable: intermarriage (yes=1/no=0)			
	Rural	Urban	Rural men	Urban men
	women	women		
	(1)	(2)	(3)	(4)
Age at marriage	0.013*** (0.001)	-0.034*** (0.002)	0.004*** (0.001)	-0.038*** (0.002)
Age at marriage square	-0.015*** (0.002)	0.057*** (0.004)	-0.002 (0.001)	0.051*** (0.004)
junior middle	0.065*** (0.001)	-0.076*** (0.003)	0.017*** (0.001)	-0.081*** (0.005)
senior high	0.186*** (0.002)	-0.122*** (0.003)	0.060*** (0.001)	-0.170*** (0.005)
college+	0.387*** (0.008)	-0.164*** (0.004)	0.247*** (0.004)	-0.250*** (0.005)
Monthly income (1000yuan)	0.006*** (0.001)	0.000 (0.001)	0.027*** (0.001)	-0.012*** (0.001)
Age difference (husband minus wife)	0.006*** (0.000)	-0.005*** (0.000)	-0.002*** (0.000)	0.008*** (0.000)
Schooling yr difference (husband minus wife)	0.014*** (0.000)	-0.014*** (0.000)	-0.007*** (0.000)	0.028*** (0.000)
Income difference (husband minus wife)	0.015*** (0.001)	0.000 (0.001)	-0.022*** (0.001)	0.009*** (0.001)
Sex ratio (female/total)	-0.141*** (0.037)	0.024 (0.071)	-0.025 (0.027)	-0.248*** (0.091)
Inequality (standard deviation of income)	-0.014*** (0.002)	0.008*** (0.002)	-0.008*** (0.001)	0.013*** (0.003)
Urbanization (proportion of non ag hukou)	0.090*** (0.005)	-0.071*** (0.007)	0.053*** (0.003)	-0.136*** (0.009)
Year of marriage	0.002*** (0.001)	0.004*** (0.001)	0.002*** (0.000)	0.006*** (0.001)
Marriage after 1998	0.023*** (0.002)	0.021*** (0.003)	0.005*** (0.001)	0.077*** (0.003)
Constant	-3.780*** (1.148)	-7.468*** (1.041)	-4.113*** (0.871)	-10.224*** (1.323)
R-squared	0.075	0.062	0.047	0.119
N	228424	98409	222567	104266

Note: \*, \*\*, and \*\*\* refer to significance levels of 10%, 5%, and 1%. Standard errors are in parenthesis.

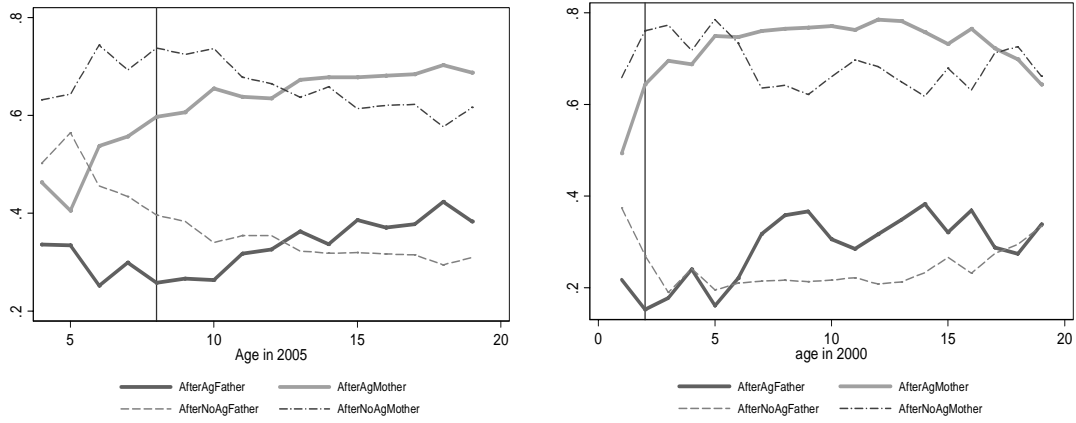


Figure 1 hukou reform and child hukou choice in intermarriage

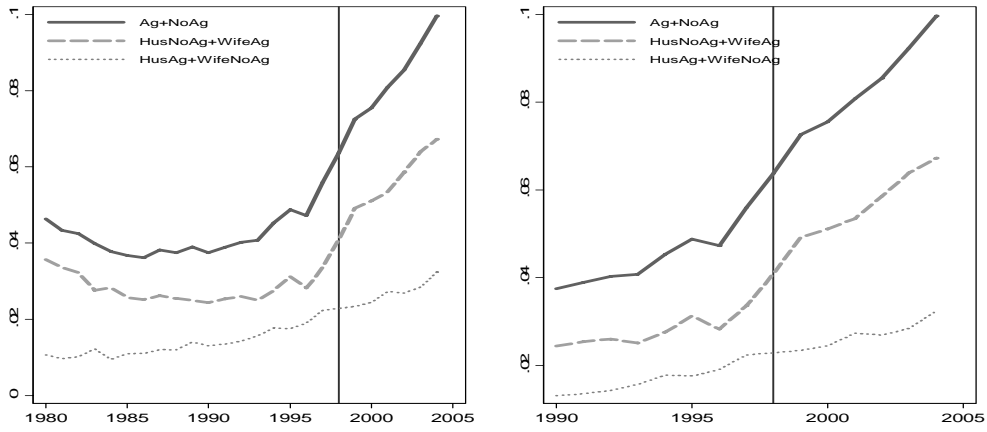


Figure 2 Hukou reform and intermarriage (I)



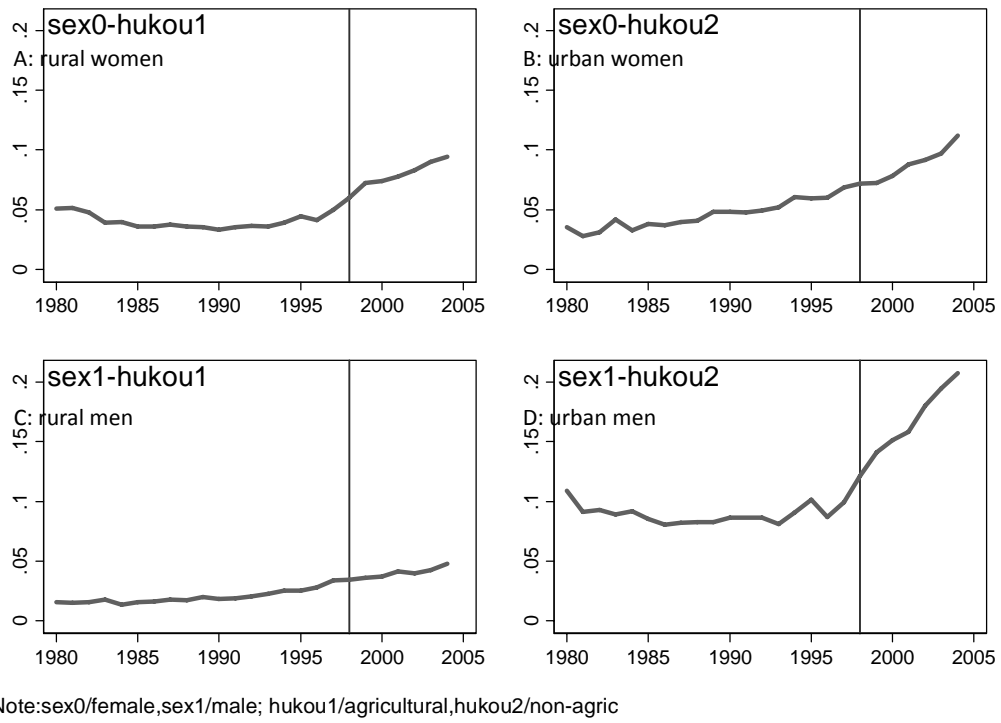


Figure 3 Hukou reform and intermarriage (II)



Figure 4 Hukou reform and marriage migration (I)

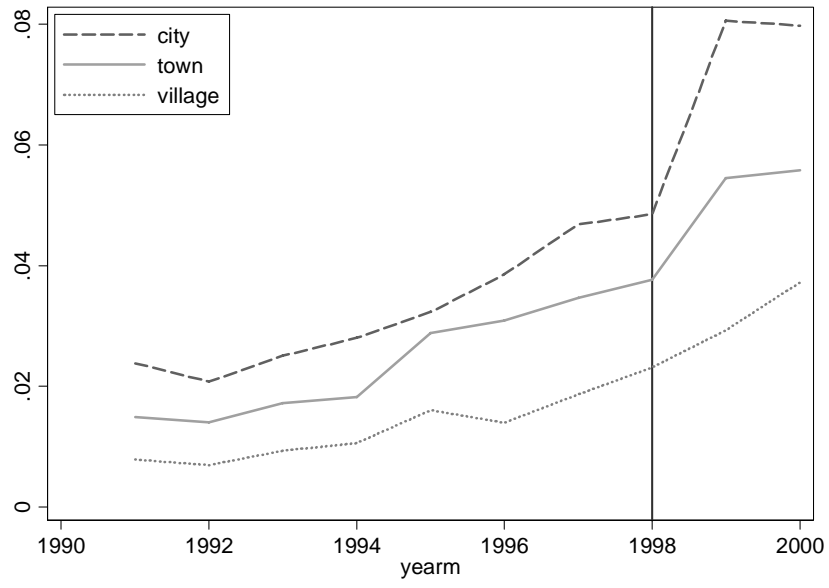


Figure 5 Hukou reform and marriage migration (II)