Uncovering Children in Marginalization: Explaining Unregistered Children in China

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I. Introduction

As China successfully cut its fertility and entered the low fertility regime with the implementation of the country's one-child policy, evaluation of the impact of the policy also led to growing attention to some costs of the strict one-child policy. One issue surfaced with the implementation of the policy, as seen by most people, is the growing number of unregistered population in China. Particularly, an increasing number of children, --- often times are believed to be born in excess of birth plan or born out of wedlock, do not have a hukou, that is, are not officially registered in the national household registration system. These children, referred to as "black children" in China, usually lack legitimacy and basic rights, and are not entitled to state benefits. Having no legal identities, they are hidden from the state system, and only exist in the marginalized corners of society.

This issue of "out-of-plan" children's registration status has been noted since the late 1980s when reports on unregistered children surfaced in the national media, such as The People's Daily, and Xin Guancha [New Observance]. These reports suggested that there were more than a million such unregistered children as of the end of 1980s. Chinese census reports do show a considerable number of people with household registration status recorded as "unsettled". The 1982 census showed 4,754,602 persons not registered (see table 1.1). As pointed out by Zhou (1987), the "rectification[1]" of household registry done prior to the census yielded 4,702,000 children without registration (born in excess of birth plan or born out of wedlock), and 1,810,000 adults not holding registration. The rectification solved 4,483,000 cases, but at the census reference time, an increment to the un-registration was seen, due to addition of newborn babies. Then, the 1990 census turned out an increase in un-registration with 8,535,536 persons unregistered, accounting for 0.76% of the total population. It is estimated that the increase has much to do with the increasing floating population as the economic reform progressed in the country, and the spill-over of the family planning policy practice around the nation (Chen and Wang 1997, Sun 1997). In 2000 census, the number decreased a bit, but still 8,052,484 persons have registration unsettled, amounting to 0.65% of the total population.

Household registration is connected to birth planning because local officials tend to block the registration of unplanned births. The census, in principle, counts all persons regardless of registration status, and thus should contain a more complete count of population than the household registers. Nonetheless, Chinese census counts are closely linked to the household registration system (Lavely 2001). And both parents and officials may have reasons to hide unregistered children from census enumerators. The census is thus likely to undercount unregistered children. Then the actual number of unregistered children could only be larger. Note the adverse fortune that these children are facing: they

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[1] The well-established household registration system in China provides source of regular population statistics and was made full use during Chinese censuses. For more satisfactory utilization in the census, the household registraters were updated before the census reference time, during which time census organs at various levels help the household registration agencies to solve major problems in household registration, so as to clarify the real number of residents. The rectification starts at different times in local areas, and may take about one year to finish.

lack legitimate identity, and are generally blocked from access to a series of basic social welfare benefits and state support, including health care, education and employment. They tend to suffer from adverse social well being. This marginalized situation, in which these unregistered children fall, generates a serious human problem.

Table 1.1 Number un-registered and total enumerated in three censuses: China 1982, 1990, and 2000

Year	Number unregistered	Total enumerated population	% Unregistered
1982	4,754,602	1,002,044,685	0.47
1990	8,535,536	1,130,510,638	0.76
2000	8,052,484	1,242,612,226	0.65

Source: 1982 figure is from Zhou, Guangsheng "On the Role Played by Household Registers in China's 1982 Population Census", in Li Chengrui Ed. A census of One Billion People: Papers for International seminar on China's 1982 Census, Hong Kong, 1987. 1990 figure is from the State Bureau of Statistics, "1990 Census Tabulation", Beijing, 1992. 2000 figure is from the State Bureau of Statistics, "2000 Census Tabulation", Beijing, 2002.

However, given the significance of the problem of unregistered children, there are not many studies addressing this issue of children's registration status, looking into parents' registration behavior for their newborn children. There are only remained, in the limited literatures attempting to address the issue, some untested estimations, mostly based on some anecdotal reports or scattered qualitative data, that many of these unregistered children may be out-of plan births, female children, or children of migrants (Greenhalgh 2003, Chen and Wang 1997). But there exist few academic studies based on data analysis examining the issue of un-registration. Therefore, little is known about whom these unregistered children are, and what determined their unregistered status. It is the task of this paper to contribute to a better understanding of this special group of unregistered children.

In this paper, my focus is on infants' hukou registration situation, trying to find out the possible determinants of children being registered. The research attempts to answer: who are these unregistered children? What are the characteristics of their parents? And what are the broader-level social forces that shape their un-registration status? Namely, the analysis will be focused on three dimensions: the community level policy influences, parental characteristic factors, and the child's own characteristics, with respects to the child's sex and his or her birth positions. This study would contribute to a general understanding of the problem of un-registration of children, and would present a story telling how these forces at all levels play together to shape the infants registration status. The study has important policy implications, both for the implementation of family planning policy and for strengthening the household registration system itself, in terms of strengthening its function of state control and its importance for improving people's well being.

II. Background: the Household Registration (Hukou) System in China

The household registration system was a pivotal institution of political and social control in Maoist China. It was formed during the collectivist era when it was linked to the national ration system. Due to scarce supplies of grain and some other daily essentials, the state needed to exert strict control of markets as well as people. In January, 1958, right at the juncture of the 1957 anti-rightist campaign and the ensuing Great Leap Forward collectivization, the standing committee of the First National People's Congress passed Regulations of Household Registration in the People's Republic of China, and formally initiated the nationwide hukou system, which continues in force to this day (Zhang, 2001). Household booklets or passports were only issued to urban residents at that time, and became the principal basis for the allocation of grain and other amenities.

Throughout the planned economy period, hukou registration not only served the function of establishing identity, citizenship, and proof of official status, but was also essential for every aspect of one's daily life. Without registration, one even could hardly obtain food, clothing, shelter, or employment, receive education, marry or enlist in the army (Cheng and Selden, 1994). However, as alluded to above, in serving as the basis for the operation of the national rationing system, the hukou system also created a bifurcated social order, dividing the Chinese population into two groups: the urban residents, holding the non-agricultural hukou, and being the direct responsibility of the state, are supplied by the state with all the essentials and amenities of life; and the rural residents, known as the agricultural hukou holders, who are not supplied by the state, and are supposed to stay in rural villages to produce grains and rely only on the highly differentiated resources allocated by self-reliant rural communities or collective sub-units (Cheng and Selden 1994, Banister 1987). The hukou system remains today the central institutional mechanism shaping the urban-rural relationship and important elements of the state-society relations in the country.

For the purpose of state control, the hukou system carried with it strict restrictions on population movement, especially in the collectivist era, by requiring that all household members reside in the township where they are registered. Then with the implementation of the one-child policy, the hukou system also serves as an instrument of family planning regulation and management. Through the system, the number of infants born to each household is recorded, which facilitates the implementation of birth control programs.

The Regulations require eight items for household registrations in the urban area — birth, death, emigration, immigration, permanent residence, temporary residence, change of residence, and amendment of registration; while registrations in rural area only contain the first five items (Zhang 2001). Among them, birth registration, whereby citizens proceed to institute residence registrations for newborn infants, is an important component of the registration system. Article 7 of the Regulations states that "within one month after the birth of an infant, the head of household, relatives, foster parents, or neighbors shall apply for birth registration at the residence registration organ at the infant's place of permanent residence" (Zhang 2001). If the infant is born at the parents' temporary place of residence, the father or mother may apply for birth registration after

he or she returns to the household's permanent residence registration. In case father and mother vary in their places of permanent residence, the child inherits the residence status of their mothers (Mallee 1995). And on application for birth registration, the newborn infant's "medical birth certificate" or a certificate produced by the residence/village committee testifying to the circumstances of the infant's birth, plus the certificate of permission to give birth, and the residence registration booklet should be presented. The residence registration organ also permits the registration of an infant should he or she fails to be registered within one month of birth, or should the newborn be in excess of family planning. But the application in the latter case should be in accordance with the relevant regulations (Zhang 2001). In this way, the practice of birth registration while discouraging out-of-plan births by requiring the certificate of permission to give birth at the registration, also tracks births should they exceed family planning regulations.

The household registration system also serves the role of state control through authorizing basic rights to each person registered, entitling them to social welfare and benefits, including access to health care, education, or even employment and so forth. Thus, while avoidance of registration becomes somewhat a way to circumvent the family planning regulations and migration controls, it also represents a surrender of basic rights.

At the macro social level, the birth registration serves as legal proof of a citizen's identity, and functions to protect the rights of a citizen, as well as to ensure that the citizen fulfills his or her duties. Another part of facilitating social control involves providing the state with population information for formulating correct population policies and implementing Planned Parenthood. Therefore, existence of a large number of un-registered people would weaken the national population statistics management, and suggests loopholes in the system itself, as well as in state control.

III. Previous Estimations and Analytical Framework

Among the rare literature systematically studying determinants of registration status, there is one interesting article by Chen and Wang (1997) examining the registration status of residents covered in the 1992 National Fertility and Family Planning Survey. In their sample of all the persons counted, 6.6% were unregistered residents. Urban areas had a much higher percentage of un-registration — 18.5% were unregistered, compared with only 3.8% unregistered in rural areas. And they found that in rural areas, the farther away the community is from the capital of the county, the lower the percentage unregistered. Apart from the rural-urban and distance differences, at the aggregate level, regional differences were not substantial. The general pattern though, was that the remote areas usually had higher rates of registration, namely, higher percentage of registration in the southwest than in the northeast, and in the west than in the east. And among the provinces and municipalities, Beijing had the lowest proportion of registered residents (85.7%), and Tibet the highest (99%). At the individual level, sex, age, and marital status had hardly any substantial effects on registration. Education, though, displayed an interesting effect: residents with no schooling or only primary education were more likely to be registered than those with senior high or even higher education. And if urban-rural residence was not considered, women with the most

education were the least likely to be registered; the pattern was reversed when in urban areas, though. This study showed some interesting findings on factors associated with residential status, but it simply displayed the findings, without explaining them. And the study addressed the entire population and did not specifically consider infants.

Analyses specifically focusing on "black children", or in another word, unregistered children, as introduced above, attribute un-registration mainly to out-of-plan births (Zhang 1988, Fan and Huang 1989). It is argued that, in order to avoid punishment for non-sanctioned births, some parents try to hide the illegitimately born infants by circumventing the birth registration. According to a report in the People's Daily (Zhang 1988), Hebei, Shandong, Jiangxi, and Guizhou province, each had more than 70 thousands kids with their registration unsettled due to out-of-plan births, as far back as in the late 1980s. Another report in Xin Guancha [New Observance] estimated that the "black population" in China totaled almost 20 million (Fan and Huang 1989). Both the two articles relate the large unregistered population to births given in excess of the family planning regulations. Apart from individual intentional concealment of out-of-plan births, it was reported in the articles that some local governments, in order to "achieve" their family planning objectives, refuse to register children born in excess of birth planning regulations. Even though such measures were criticized by the Central Disciplinary Commission of the Party, refusing household registration for unauthorized children continued to be practiced in many regions as unwritten laws (Scharping 2003).

According to these reports in national media, three situations mainly shape un-registration. Firstly, in order to avoid punishment, parents of higher-order births intentionally refuse to apply for registration for their out-of-plan children. Secondly, surging rural-urban migration results in a large number of floating population left unattended by the state system of both family planning and household registration. They usually have multiple births, and have difficulty accessing the registration sites, thus may unintentionally fail to report their births. Thirdly, given the autonomy of local governments in terms of family planning implementation, many officials reject applications of registration for out-of-plan births, either as a punishment or as a means of improving their record of family planning work.

These reports, however, base their findings on incomplete estimation, qualitative data, or anecdotal reports, while lack systematic data. The focus of these reports is on out-of-plan births and importance of family planning work, and other factors of un-registration tend to be neglected. The present study attempts to provide a systematic analysis on the determinants of infants' un-registration with a comprehensive model.

I categorize two types of factors that might deter the hukou registration of infants: one has to do with the subjective choice of parents — parents intentionally want to avoid the registration of their children, which may suggest that the child is of unwanted birth; the other has to do with the objective, mostly the institutional barriers that make registration inaccessible. Then community, parent, and child characteristics exert various effects that can be classified into the two types. Drawing on findings from previous research, we estimate that:

For most of the community characteristics, they tend to play the role of objective factors. Urban features of a community may suggest easier access to registration as compared with rural features. Stricter birth control program at the community tends to make implementation of residence registration more effective, whereas more relaxed birth planning policy might decrease incidence of registration due to lack of regulation. However, poor implementation of family planning and birth registration can also be translated into higher rates of registration because of underreport of un-registration that is usually associated with out-of-plan births.

For parental characteristics, they can be both motivational and objective factors. Migration status of parents tends to show negative effects on accessibility of registration for the child. Education is supposed to have positive effects on the motivation of registration, since better-educated parents are more likely to see the importance of recognizing the identity of the newborn regardless of the sex. Yet, there might be rural-urban differentials, and interaction effects with migration status, child's sib set position, and so forth, that might result in different signs of the effects.

As for child characteristics, they are more likely to influence the parental motivation for registering the infants. But age, while tends to increase the parental motivation for registration, can be a variable that also shows variation in the institutional factors, since it takes time for the parents to get familiar with the regulations regarding household registration of the newborns. In this sense, first-born child, while being more likely to gain attention from parents to get registered, also has less chance of registration due to accessibility problem, but this can also simply be a time issue. Important child characteristics can be gender, which, due to gender preference discussed previously, tends to increase the intentional avoidance of registration for girl infants. Sex composition of previous children also affects the parental motivation for registering the child. As shown above, newborn infants with more surviving male siblings have better chance of getting registered, while the chance tends to decrease for those with less male, yet more female siblings.

All in all, the basic theory underlying the research is that the act of registration of children is a parental choice, shaped by the macro-level administration force. The micro level decision on registration is made in consideration of the costs versus benefits associated with registration. The benefits refer to the government support for securing the social well being of registered children, while the costs are usually associated with the efforts taken in registration process, — including accessing the registration sites, providing required documents, and so forth, — and the side effects of registration, usually related to restrictions of family planning policies. The individual process of weighing between costs and benefits is assumed to be affected by all the three dimensions mentioned above. Meanwhile, the macro-level force, either the state force or local administration force, always challenges the individual level choice making.

With the general analytical framework and preliminary estimations shown above, this study examines the relative importance of individual motivation versus objective

accessibility effects, as well as the comparative effects of various community, parental, and child characteristics and their interactions.

IV. Data and Method

The present study is primarily based on the China 1990 census 1% sample of administrative villages, — also referred to as the 1% clustered sample data, which is one of two micro-samples of the 1990 Chinese census (Mason and Lavely, 2001). The data set has national coverage, contains data in all the 30 provinces and autonomous regions, excluding only Taiwan, Hong Kong and Macao, and thus is nationally representative. It contains rich demographic information on individuals, and records each person's registration status as well. Given that the 2000 census micro data are not yet available; this 1990 census 1% data is the best census data set available for a comprehensive, nation-wide study of household registration.

One concern for using census data to study infant registration status, however, lies in the possible underreport of unregistered children in the census. But being a large-scale scientific social investigation with less administrative purpose, population census is less connected to the implementation of local birth planning programs. Thus, people might be more willing to report during the census than for household registration. In this way, census data is able to enumerate people left out of the household registration system. In addition, other than passively depending on individual volition in reporting as so in the household registration, the census takes the initiative to go to individuals to ask about needed information, and is usually able to count more people than those captured under the registration system. But also note that there is surely large amount of unregistered population still not covered in the census.

According to the estimation of Mason and Lavely (2001), the 1990 census 1% sample was created by a systematic selection of all the persons (including deaths that occurred within 18 months prior to July 1, 1990, the date of the census) — but civilians only, in every hundredth administrative villages (or urban street committees) within each province. After some correction, the sample consists of 8,518 administrative villages or street committees, covering approximately 2,600 out of 2,845 of China's county-level units. The sample enumerated 11,475,104 living persons, out of which, 88,822, namely, 0.77% living civilians have unsettled registration status, which is very close to the result from the 100% census enumeration — 0.76% unregistered, as table 1.1 in the introduction shows. Their distribution by province is shown in table 4.1. As we can see, there are marked differences in registration rates across provinces, but a regional pattern is not very clear. It seems that there are higher rates of un-registration in northeast than in southeast or central-east provinces, but there are also variations. And distribution of un-registration for children under 5 generally accords with the pattern shown for the population of all ages.

The bulk of the unregistered are actually concentrated in those who are below age of 10. Though accounting for only 18.97% of the total population in the sample of the living, those below 10 years of age actually account for 87.72% of the whole unregistered

population in the sample, with 77,919 persons unregistered. If we take a closer look at those less than 10 years old, 67,797 children under 5 years old are not registered, and for those under 18 months old, 38,232 children have never obtained a registration. As shown in table 4.2, the cases of un-registration are concentrated in the younger age groups, especially in those who are less than 1 year old. They account for 42.69% of the under-10-year-old unregistered children, and 37.45% of the total unregistered. It is interesting to examine the determinants of registration status for these young infants, not only because of the high concentration of un-registration in this age group, but also because the registration status of these children is a result of parental choice that reflects parental care and preference shown to the child, adjusted in the structural context of the household registration regulations and the family planning policies.

Table 4.1 Registration status by province

Province	No. of people	% Unregistered	Children 1-5yrs old	% Unregistered
Beijing	113,449	0.72	6,981	3.90
Tianjin	114,906	0.70	7,000	3.86
Hebei	596,255	0.42	55,897	1.88
Shanxi	301,152	0.99	25,748	4.72
Inner Mongolia	221,673	1.47	16,613	6.95
Liaoning	402,804	0.82	27,370	4.67
Jilin	266,677	1.37	20,700	6.86
Heilongjiang	358,990	1.67	26,092	8.97
Shanghai	154,360	0.46	7,130	2.62
Jiangsu	672,945	0.86	48,671	4.75
Zhejiang	418,244	0.89	26,098	6.01
Anhui	540,723	0.63	43,461	2.90
Fujian	338,519	2.05	29,120	10.48
Jiangxi	396,770	0.86	33,877	3.68
Shandong	827,392	0.93	68,237	5.28
Henan	840,092	0.79	76,628	3.08
Hubei	562,235	0.33	49,917	1.25
Hunan	625,306	0.38	53,084	1.82
Guangdong	628,310	0.88	56,139	4.23
Guangxi	441,025	0.56	41,301	2.49
Hainan	72,708	1.72	6,252	8.49
Sichuan	1,048,750	0.41	77,210	1.77
Guizhou	311,574	0.53	27,844	2.49
Yunnan	370,752	0.16	31,412	0.51
Tibet	24,175	0.10	2,346	0.21
Shaanxi	337,434	0.77	31,583	2.36
Gansu	240,539	0.48	21,647	1.55
Qinghai	57,385	1.47	4,902	6.63
Ningxia	38,667	0.57	3,649	1.89
Xinjiang	151,293	1.53	14,722	4.92
Total	11,475,104	0.77	941,631	3.67

Source: China 1990 census 1% cluster data file.

Table 4.2 Un-registration by age group

Age Group	Population	Number unregistered	Percent unregistered
0	234,849	33,267	14.17
1	235,630	13,985	5.94
2	244,118	9,119	3.74
3	245,088	6,733	2.75
4	216,795	4,693	2.16
5-9	1,006,962	10,122	1.01
10-14	986,463	1,895	0.19
15-19	1,214,644	1,263	0.10
20-24	1,284,574	2,999	0.23
25-29	1,063,829	1,722	0.16
30-64	4,104,869	2,757	0.07
65+	637,283	267	0.04
Total	11,475,104	88,822	0.77

Source: China 1990 census 1% clustered sample.

Manipulation of the data enables us to link each child under 18 months old to his or her mother as well. A new data set of 332,724 live 0–18 months old infants was therefore created, that provides child information, mother's and household's information, as well as certain community features. A preliminary look at this under-18-month-old 1990 1% clustered sample data shows 38,232 infants with registration status unsettled, accounting for about 11.49% of the total population of living infants in the data set, which provides enough cases for analysis that examines all the variations. However, for children over 18 months old, we are not able to track their mother's information. Thus, the focus is on the younger group.

Several community level variables have 10 common missing cases. Since the number is really small, it is considered safe to simply delete them for the part of logistic regression analysis, in order to keep a consistent number of cases. So for logistic regression analysis, the number of cases in the data set is actually 332,714, among which 38,226 infants are not registered.

The census data classifies the registration status of each individual into five categories, which identify permanent residents, migrants, and unregistered people respectively. They are made into a dummy variable that identifies un-registration as 1, and the rest as 0. This becomes the dependent variable of the study. Explanatory variables are the sets of child, maternal and community characteristics. A summary of all the explanatory variables examined in the present study is presented in the table 4.3 as shown below. Logistic regression is applied for analysis. Since overwhelming effects of residential type and migration are identified in cross-tabulations, separate group logistic regression analysis by rural and urban, migrants and non-migrants is also conducted, to further examine the interactions by residential type and migration status.

Table 4.3 Summary of explanatory variables

(N = 332,714)

Variable	Category	Mean or % distribution
Child characteristics		
Child age:	<1month*	4.16%
	1-6 months old	25.73%
	6-12 months old	38.10%
	12-18 months old	32.01%
Child sex:	Male*	53.41%
	Female	46.59%
Sib set:	0 male & 0 female siblings*	50.94%
	0 male & 1+ female siblings	22.35%
	1+ male & 0 female siblings	18.14%
	1+ male & 1+ female siblings	8.57%
Child ethnicity:	Han*	90.28%
	Northern minority	2.71%
	Southern minority	7.00%
Maternal characteristics		
Mother's age		26.068
Marital status:	Currently married*	99.74%
	Currently not married	0.26%
Migration status:	Permanent residents*	96.55%
	Migrants**	3.45%
Hukou type:	Agricultural hukou*	88.08%
	Non-agricultural hukou	11.68%
	No-hukou	0.24%
Education level:	<6 yrs*	55.28%
	Middle school (6-12 years)	43.70%
	Above middle school (>12 years)	1.03%
Working status:	Not working*	10.85%
	Working mother	89.15%
Community characteristics		
Residential type:	Rural*	79.82%
	Urban	20.18%
Proportion male 2 to 9		.520
Parity progression		-1.593
Progression at one son		-.701
% female illiterate		11.391
% Han		90.971

*: The reference category, **: residents registered in places other than current residence

V. Findings and Discussions

To paint a general picture to show how each of the explanatory variable plays a role in un-registration, I begin with series of bivariate logistic regressions to explore the effects of all the potential factors on infant registration.

Table 5.1 Bivariate logistic regression results on infant un-registration determinants (0=registered, 1=unregistered)

Variable	Logit	Odds	Z score
Child age (reference: <1month)			
1-6 months old	-.891**	.410	-44.30
6-12 months old	-1.621**	.198	-79.30
12-18 months old	-1.952**	.142	-89.81
Child sex (reference: male)			
Female	.088**	1.091	8.05
Sib set (reference: 1st child)			
0 male, 1+ female	.011	1.011	0.81
1+ male, 0 female	-.116**	.890	-7.63
1+ male, 1+ female	-.140**	.870	-6.71
Child ethnicity (reference: Han)			
Northern minority	.239**	1.270	7.88
Southern minority	-.807**	.446	-27.91
Mother's age	-.011**	.989	-8.62
Marital status (reference: married)			
Not married	.200	1.222	2.04
Migration status (reference: permanent residents)			
Migrant mother	2.314**	10.118	118.06
Hukou type (reference: agricultural hukou)			
Non-agricultural hukou	.140**	1.150	8.56
No-hukou	3.329**	27.899	39.40
Mother's education (reference: <6 yrs)			
Middle school (6-12 years)	.305**	1.357	27.93
Middle school & over (>12 years)	-.370**	.691	-5.55
Working status (reference: not working)			
Working mother	-1.180**	.307	-87.37
Proportion male 2 to 9	.693**	2.000	4.88
Residential type (reference: rural)			
Urban	.801**	2.228	67.70
Parity progression	.157**	1.170	26.75
Progression at one son	-.080**	.923	-10.37
% female illiterate	-.013**	.987	-35.45
% Han	.006**	1.006	23.26

**: Significant at the .001 level, *: significant at .01 level.
N = 332,714 for all the models.

Table 5.2 Coefficients for multivariate logistic regressions on infant un-registration

Variable	Model 1	Model 2	Model 3
Child characteristics:			
Child age (reference: <1month)			
1-6 months old	-.897**		
6-12 months old	-1.635**		
12-18 months old	-1.961**		
Child sex (reference: male)			
Female	.104**		
Sib set (reference: 1st child)			
0 male, 1+ female	.037*		
1+ male, 0 female	-.094**		
1+ male, 1+ female	-.042		
Child ethnicity (reference: Han)			
Northern minority	.232**		
Southern minority	-.846**		
Maternal characteristics:			
Mother's age		-.003	
Marital status (reference: married)			
Not married		.249	
Migration status (reference: permanent residents)			
Migrant mother		1.997**	
Hukou type (reference: agricultural hukou)			
Non-agricultural hukou		.013	
No-hukou		1.280**	
Mother's education (reference: <6 yrs)			
Middle school (6-12 years)		.273**	
Middle school & over (>12 years)		-.219*	
Working status (reference: not working)			
Working mother		-.953**	
Community characteristics:			
Residential type (reference: rural)			
Urban			.601**
Parity progression			.123**
Progression at one son			-.084**
Intercept			-.094**
% female illiterate			-.006**
% Han			.004**
Constant	-.667**	-1.433**	-2.392**
LR Chi-square	11959.9	17300.2	6007.0
d.f.	9	8	6
Log likelihood	-112673	-110002.8	-115649.5

*: Significant at the 0.01 level, **: Significant at the 0.001 level.
N = 332,714

Table 5.2 (continued)
Coefficients for multivariate logistic regressions on infant un-registration

Variable	Model 4	Model 5
Child characteristics:		
Child age (reference: <1month)		
1-6 months old	-.975**	-.977**
6-12 months old	-1.741**	-1.755**
12-18 months old	-2.108**	-2.133**
Child sex (reference: male)		
Female	.110**	.115**
Sib set (reference: 1st child)		
0 male, 1+ female	.133**	.250**
1+ male, 0 female	.010	.158**
1+ male, 1+ female	.102**	.322**
Child ethnicity (reference: Han)		
Northern minority	.078	.202**
Southern minority	-.720**	-.451**
Maternal characteristics:		
Mother's age	.006*	-.006**
Marital status (reference: married)		
Not married	.494**	.489**
Migration status (reference: permanent residents)		
Migrant mother	2.089**	1.877**
Hukou type (reference: agricultural hukou)		
Non-agricultural hukou	.030	-.513**
No-hukou	1.380**	1.437**
Mother's education (reference: <6 yrs)		
Middle school (6-12 years)	.261**	.127**
Middle school & over (>12 years)	-.310**	-.498**
Working status (reference: not working)		
Working mother	-.969**	-.839**
Community characteristics:		
Residential type (reference: rural)		
Urban		.621**
Parity progression		.104**
Progression at one son		-.075**
Intercept		-.124**
% female illiterate		-.005**
% Han		.002**
Constant	-.221**	-.183*
LR Chi-square	29211.0	32314.9
d.f.	17	23
Log likelihood	-104047.5	-102495.5

*: Significant at the 0.01 level,   **: Significant at the 0.001 level.
N = 332,714

As table 5.1 shows above, most of the considered factors have statistically significant effects on infants' registration status, which might be due to the large sample size dealt with here. The coefficients indicate that what makes big difference on infants' registration status are infants' age, mother's migration status, working status (whether working or not), and the residential type (whether urban or rural). Infants of older age groups (by month) are obviously more likely to be registered than those younger ones. Whether mother is a permanent resident in the registration place or is a migrant has the most significant effect on the baby child's registration status. Namely, mothers who have unstable or transitional registration or residential status are far less likely to register their children (β=2.314) than those non-migrants. The effect of mother's work status generally goes along the same line: mothers, who are currently not working, for various reasons though, are much less likely to register their children than those who are working (β=-1.18). So, it seems that a stable status of the mother plays a really import role in children's registration. The effect of the residential type is somewhat out of the expectation, that it is in rural areas that infants are more likely to be registered, comparing with in urban places (β= .801). Such results can very likely be explained by migration. It is usually cities that attract more in-migrants, and thus, have more people in transient status or unsettled registration. In brief, bivariate regression gives us a sketch of the factors at play, for further explanation, we need to put in certain controls and to build multivariate regression models.

Multivariate logistic regression analysis allows us to compare different models of the three dimensions, showing the effects of child, versus maternal and, versus community characteristics in determining the registration status of infants (their results are shown in table 5.2 above).

Child characteristics

Model 1 includes all the child characteristic variables of interests. The result largely replicates the story shown in the bivariate analysis. This suggests that each of the child characteristics tends to exert their effects independently from one another. Only the effect of the sib set seems to show some interaction with child sex. While the strength of the latter is enhanced a little bit, the former is reduced. And having both male and female siblings is no longer significantly different from those with no siblings in terms of increasing the chance of child's registration.

As expected, age has a strong effect. It is the strongest among all child characteristics. All the three age categories that are over one month old are less likely to be unregistered than the group under one month old, and the older the age group the child is in, the bigger the difference in hazards of un-registration, as compared with the one-month old age group. This age effect is especially distinct for children over 6 months old. The coefficient almost doubles from -.897 for 1-6 months old to -1.635 for 6-12 months old. Note that this age effect is only relative to the time of the census. It can simply be a longer-exposure effect: the older the child, the longer the duration captured in the census, which leads to the higher chance of being registered. It is also possibly a period effect especially in consideration of the rectification of household registry before census: those

infants in older age groups are very likely to be rectified during this period, while those really young ones might be born after the rectification, and therefore are not captured during that process. Or possibly there is simply an age effect: as the child grows older, more attention he or she draws from the parents, or it becomes harder to hide the child any more, both of which lead to registration. Also note that it takes time for parents to get familiar with all the procedures, such as the documents required for registration, and where to reach the registration organs, which may be especially true if it is a first child. However, since the dataset does not provide the time of registration, we are not really able to judge between the period versus the age effects. Given that we have no evidence about the period effect of registration rectification, it is only safer to assume the role played by the age effect.

Sex of the child matters, but is not particularly strong. As expected, girls have slightly higher risk of being unregistered ($\beta= .104$), as compared with boys, which is due to sex preference to sons in the Chinese culture.

It is the same for the sib set effect. Taking the first-borns as the reference group, the group has female siblings only is slightly more likely to be unregistered ($\beta= .037$), while those with male siblings only ($\beta=-.094$) and those with both male and female siblings ($\beta=-.042$) are less likely to be unregistered, but the effect of the latter is not significant. So here it seems that the expectation that children born with siblings, or of higher parity are at higher risks being unregistered is not well met. The story seems to be the opposite: the first-born children are more likely to be unregistered, which may be due to the fact that their parents are not that familiar with the registration procedures, and are inexperienced in taking care of them. Sex composition of the surviving siblings does play a role though, showing a preference for sons. It is with the presence of surviving male siblings that the higher order births are more likely to be registered than the first-borns. Also to be noted is that due to the variation in family planning policies across local communities, the second child is not necessarily an out-of-plan birth (defined as a birth in excess of the local family planning regulations). Therefore, the assumption that parents avoid registration for children of higher parity to circumvent the policy punishment may not really apply here. Some community level factors need to be controlled for further exploration of this sibset effect. It is also highly likely as many suspected (Greenhalgh, 2003), that many of the out-of-plan births that are unregistered, are simply not captured by the census, since their parents want to hide them to escape from the punishment, or the local cadres also want to conceal them in order to improve the record of their family planning enforcement.

The effect of the child's ethnicity is also consistent with the result of bivariate regressions. The chance of being unregistered for northern minority infants ($\beta= .232$) are significantly higher than for the majority Han infants, while the chance for southern-western minority babies are distinctively lower ($\beta= -.846$). While credit can be given to the lenient birth control policy for minorities, especially remote (usually the south-western) minority groups, and the greater assimilation into Han culture for the northern minorities, there remains the possibility that for many remote southwest minority groups, unregistered infants are simply not well represented in the census enumeration.

In model 4 where child and maternal characteristics are grouped together, we can see that the effects of most of the child characteristics are strengthened a little bit (may not be significantly enhanced, though). Only the effect of child ethnicity is reduced a little bit as compared with in model 1, which may be due to the controlling effect of mother's working status or hukou type. When maternal characteristics are controlled, infants with male siblings only are no longer significantly different from those first children in terms of chance of un-registration, while the effect of having both male and female siblings becomes significant (β= .102). We cannot specifically tell which maternal characteristic has the interaction with child sib set. The estimation is that mother's hukou type plays a role here, which in fact, reflects rural-urban differentials in the one-child limitation. Another notable change among child characteristics is that when maternal features are added, the effect of northern minority is reduced and is no longer significant. This can be a result of control of mother's migration status. Since what makes northern minorities more likely to have unregistered children than Hans tend to be their nomadic life styles. Once the migration status is controlled, we see a more similar pattern in registration with Hans.

In model 5, the full model, we see all the effects are further strengthened (may not be significantly enhanced, though) as compared with model 4, with the exception of child ethnicity though. Specifically, the effects of sibset are saliently enhanced. All the three categories with siblings become to have significantly higher chance of un-registration than infants without siblings. This is very possibly due to the controlling effects of residential type and local birth control policy. It is estimated that there are variations in birth planning policy regulations across communities, and between rural and urban areas, which influences the way that sibset plays its role on infant registration. As for child ethnicity, the effect of southern minority is obviously reduced as compared with model 1 (β= -.846 in model 1, = -.451 in model 5). This can be explained by the controlling effect of residential type and birth control policy. Most southern minorities tend to be residing in remote countryside and experiencing different registration practices and more relaxed birth control policies than the majority Han. So it seems that their higher chance of registration is partially explained by these community factors.

Mother's characteristics

Model 2 examines all maternal characteristics. Mother's age is included as a control, and it is not significant. Also insignificant is mother's marital status. The various unmarried states (can be never married, divorced, or widowed) may be what blur the picture of its effect. Never-married mothers are very likely to avoid registration, since they give illegitimate births; or they are blocked from registration due to the lack of a marriage certificate. But they tend to be in small number, and thus, this effect tends to be mitigated by other unmarried states. Also note that we are only looking at mother's marital status at the time of the census, and cannot tell mother's marital status at the birth of the child, or at the time the child was registered, which makes it harder to interpret the story. But given that we are only looking at infants under 18 months old, we can expect the effect to be similar to what is shown here, since there would not be many cases of shifts in marital status within 18 months.

Whether mother is a permanent resident in the registration place or is a migrant has the most significant effect on the infant's registration status. Namely, mothers who have unstable or transitional registration or residential status are far less likely to register their children ($\beta=1.997$) than those non-migrants. The fact that migrant mothers are very likely to fail in registering their children may be due to the administrative barriers involved in registration: mothers are required to go back to their own registration places to register their children, instead of registering at their places of residence. This regulation, with all the troubles involved in getting back to one's hometown and migrating out again, increases the cost of registration for migrant mothers. This increased risk of un-registration for mothers in transient or unsettled residential status is further demonstrated by the effect of mother's hukou type, in that those with no hukou are far less likely to register their children ($\beta= 1.28$), compared with mothers with an agricultural hukou,. But those with non-agricultural hukou, usually the urban residents, unlike in bivariate regression, are no longer significantly different from agricultural hukou holders ($\beta= .13$). The assumption is that hukou type has common variance with mother's working status, since most non-working mothers (including doing housework) tend to be agricultural hukou holders. Once working status is controlled, the effect of non-agricultural hukou on un-registration is washed off.

The effect of mother's work status generally goes along the same line: mothers who are currently working are much less likely to have unregistered children than those who are not ($\beta=-.953$). The explanation is that mothers' working status is usually also tied to their registration or residential type. Those who are not working tend to be in a transient state. With their own unstable state to tend to, they usually tend to show less attention to their children's registration status. So, it seems that a stable status of the mother does play an import role in children's registration.

Unexpectedly, mothers with middle school education are more likely to have unregistered children than those who are illiterate or have only primary school or less education. Only those who have above middle school education are more likely to register their children as compared with the reference group. This seems to suggest a threshold effect of education, in that the positive effect of education on compliance with registration only takes effect for mothers who have achieved some college or beyond. But since mother's education level tends to vary between urban and rural residents, it is better to examine these two effects in the presence of controls. Also, many migration studies in China point out that, migrant women usually concentrate in the group of people who have reached junior middle school education (Davin 1999, Ma and Day 1994, Fan and Huang 1998). Thus, migration status might be an explanation for the high infant un-registration rate for mothers with junior middle school level of education.

While in model 4 the effect of mother's education does not change greatly, the effect of middle school education does reduce a bit in model 5, where both child and community factors are controlled. This supports the estimation on the variance in education between rural and urban. The fact that education effects reduce a bit when other maternal characteristics are controlled, as compared with bivariate regression result, may support the argument on the association between education and migration. The

effect of above-middle school education is even enhanced a bit, which suggests a positive effect of high education on compliance with registration, regardless of rural-urban or migration differentials.

What does have an obvious change in model 4, when child characteristics are added in, is the effect of mother's marital status. It is enhanced and becomes significant, which is possibly related to the control of child sibset. Its significant effect in model 5, with all the other controls, also suggests the possible association between marital status and community birth control policy or rate of female illiteracy.

Comparing models 2 and 4 with model 5, we also see that mothers who are non-agricultural hukou holders turn to be significantly less likely to have unregistered infants than agricultural hukou holders, when all the community factors are controlled. This is possibly due to the controlling effect of residential type and local birth planning policy. Since it is believed that rural and urban regimes have different administrative practices of registration and birth planning, once these community factors are controlled, the negative effect of non-agricultural hukou on un-registration appears. Another noticeable change in mother's characteristics is the slightly reduced effects of migration status, mostly can be attributed to the control of residential type.

Community characteristics

Model 3 focuses on community level features. Generally, the factors maintain their effects as shown in bivariate analysis. We only observe slightly reduced strength of certain effects — such as residential type and female illiteracy rate, — which can be due to some correlations among these community features.

The effect of the residential type is the strongest here. Its effect is unexpected, but corresponds with the bivariate regression results: it is in rural areas infants are more likely to be registered, compared with those in urban places (β= 0.601). This rural-urban differential is substantial. Again, this result may be explained by migration as mentioned before, since cities attract more in-migrants, who are less likely to register their infants.

A higher percentage of Han population is associated with a higher likelihood of un-registration (β= .004), which might be related to the harsher birth control policy or more thorough census coverage in the Han communities as compared with minority communities. Interestingly, the larger the percentage illiterate females in the community, the less likely for the infant to be unregistered (β= -.006), which suggest that mother's decision-making may not play a significant role here for their children's registration status. It is possibly the administrative practice that determines the child's registration.

The set of three variables meant to measure the strength of birth planning enforcement in the local community present different signs in their effects on infant registration status. The measure of probability of parity progression after second birth is positively associated with infant un-registration (β= .123), suggesting the more lenient the birth planning policy in the local community, the more likely for infants in the

community to be unregistered; whereas the measure of probability of parity progression after giving birth to one son has a negative effect on infant un-registration (β=-.084), telling a different story than the previous one. The logic behind can be that progression to higher parity and progression after having one son suggest different degrees of enforcement of birth control policies. When controlling for the former, places that permit another child after the birth of a son tend to have lower rates of un-registration. The variable called intercept is the constant obtained in the equation producing the two coefficients of probability progression for measuring birth planning policies. It is simply put in as a control and its effect will not be discussed here.

When comparing with the full model (model 5), no substantial changes in effects are observed for most of these community factors. Such a result seems to suggest a consistent shaping force of community features on infant registration status. Also, the fact that positive effect of urban residency on un-registration still persists, netting off mother's migration status, suggests that migration does not explain away the higher rates of un-registration in urban areas or in communities with lower female illiteracy rates. It is very likely that the rural-urban differential in practices of registration does play a role here.

Generally, in model 5, where all the child, maternal and community factors are grouped together, most variables keep the same patterns of effects as in the partial models, but all the variables turn out to be significant. As discussed above, while most of the child characteristic effects are already slightly strengthened in model 4, with controls of the set of maternal characteristics, they are further enhanced in model 5, when community features are added in. This indicates variance of child characteristics by certain community level features. Just by eyeballing, we can see that child sibset in particular, is possibly very much shaped by the rural-urban regime and local birth planning policies. For all the maternal characteristics, adding community features make the performance of non-agricultural hukou type more interpretable. As discussed above, it begins to exert a significant negative effect on un-registration, rather than an insignificant positive effect. Yet, the full model does not bring substantial changes to most of the community characteristics. All these patterns presented seem to suggest a possible more overwhelming force of community features, the rural-urban differentials in particular, in shaping infant registration status.

Then, does the full model significantly improve the model's fit by adding the set of community features as compared with model 4? And similarly, does model 4 improve the goodness of fit compared with the two models for child and maternal characteristics respectively? Using BIC and AIC tests, it is found that model 4 does dominate the models simply specifying child or maternal characteristics only ($BIC_{4,1}$ = -17149.4, $AIC_{4,1}$ = -17235.1; and $BIC_{4,2}$ = -11796.3, $AIC_{4,2}$ = -11892.8), and so does the full model versus model 4 ($BIC_{5,4}$ = -3027.6, $AIC_{5,4}$ = -3091.92), suggesting the community features do help to explain infants' registration status.

For comparing the goodness-of-fit and predictive power of the three separate models with child, maternal, and community characteristics respectively, Pearson chi-square test, BIC and ROC curve are used. And their values are listed in the table below:

Table 5.3 Goodness of fit tests across models

Tests	Model 1	Model 2	Model 3
Pearson Chi2	319.88	7596.96	126094.98
Prob>chi2	.0000	.0000	.0000
Area under ROC curve	.6547	.6378	.6216
BIC	225460.4	220107.4	231375.2

So here we see that actually all the models do not fit well. It can well be that there are many unobserved variables explaining the infant registration status that are not specified in our models; or simply that there is too much uncertainty in predicting the probability of un-registration given the data --- can be that the data do not capture un-registration well. Comparatively, given that model 2 has the smallest BIC value, it seems the model with all the maternal characteristics offer a relatively better fit than the two models specifying either child or community features only. Though the models do not fit well, they do have some predictive power. And it is the model with all the child characteristics that has the greatest predictive power among the three. However, we shall be cautious at simply interpreting this as child characteristics play a larger role in predicting the chance of un-registration, since the greater power can simply be the more variables included in the model. And note that actually, the BIC value offers a different story. It is very likely that it is the mother's migration status in model 2 that explains much of the variance in probability of un-registration.

Given the expected and observed strong effect of migration status and rural-urban differentials, separate models are built and tested to examine if the model fits better when certain migration status or residential type is specified.

1. Child characteristics.

For all the four groups, child age consistently presents strong significant negative effects on un-registration. The effects are stronger in urban than in rural areas for both the migrant and non-migrant groups respectively, and across rural-urban regimes, the effects are stronger for non-migrant than for migrant mothers. This suggests that there is an interaction between age effects and both residential type and migration status effects. Also, in both rural and urban regions we see a sudden drop of un-registration rate around 6 months old or older for those with non-migrant mothers, and at about 1 year old for those with migrant mothers. If this age effect suggests time needed by parents to get familiar with registration procedures and to tend to the issue of registration, such amount

of time needed is certainly longer for migrants than for permanent residents, which makes sense, since it takes a lot more trouble for migrant mothers to register their children.

It is interesting to note that child sex has no significant effect on un-registration for the rural migrant group. The result seems to show that these people have no strong sex preference for children. But it can also be either that the un-registration rate is equally high for both male and female infants in this category, or that lots of unregistered baby girls in this category are not captured by the census, since this is a group of people unlikely to be captured by the local registration enforcement practice. For the other three groups, girls have significantly higher chance of un-registration than boys.

The sib set effect presents some variations among different groups. Generally, those with siblings are more likely to be unregistered than the only child, other factors being equal. This can be a result of the force of family planning policies: people with higher order births intentionally avoid registration to escape from punishment. However, for infants with migrant mothers in urban areas, only those with both male and female siblings are more likely to be unregistered than those with no siblings (β= .683), whereas the other two categories have no significant effects. While sib set effects are tied to birth control policies, it seems that migrants in urban areas are hardly under stringent policy control, which can be due to their transient situation that they can hardly be captured by either their origin or destination places. Possibly for them, the physical barriers to registration are more overwhelming that the first-borns are just equally unlikely to be registered compared with those with siblings. Yet migrants in rural areas seem to be somehow different. It can be that these migrant mothers do not travel that far from their origins, thus are more easily to be captured. There are also studies showing that some rural people with out-of-plan births tend to migrate in order to get away with the family planning punishment, and their destinations are usually rural (Fan and Huang 1989, Liu and Goldstein 1996). Also shown in the table is that sib set has the strongest effect for urban residents, since urban areas are where the family planning policy is most stringent.

The effect of child's ethnicity is no longer significant for those born to migrant mothers. In the first place, there is relatively smaller size of minority people in migration, comparing with Hans. And among those who do migrate, they usually move into Han-concentrated places. This fosters their adoption of Han practices. Thus, we find these migrant minorities not very much different from Hans, especially when other factors are controlled. Yet, for urban migrants, southwest minorities present higher chance of un-registration than Hans, which is possibly due to less assimilation into the local Han cultural, and the overwhelming barriers to registration brought by migration. Then for urban residents, no significant difference in infant registration rate is seen between northern minorities and Hans. The northern minorities are themselves more similar to Hans, comparing with the southwest minorities, who usually live in remote countryside. Residing in urban areas can only help with the assimilation with Hans, and further sweep off any remaining differences. Also, the small size of northern minorities in urban areas may be another explanation. Only the rural permanent residents display a pattern consistent with that of the full model (see table 5.2 model 5).

Table 5.4 Coefficients for multivariate logistic regression on infant un-registration — by rural-urban and mother's migration status

Variable	Rural non-migrants	Urban non-migrants	Rural migrants	Urban migrants
Child age (<1month omitted):				
1-6 month	-.866**	-1.418**	-.474**	-.833**
6-12 month	-1.675**	-2.282**	-.786**	-1.211**
12-18 month	-1.977**	-2.627**	-1.294**	-2.406**
Female child (reference: male)	.110**	.146**	.045	.195**
Sib set (reference: no siblings)				
0 male, 1+ female	.175**	.572**	.345**	.120
0 female, 1+ male	.073**	.514**	.248*	-.084
1+ male, 1+ female	.222**	.618**	.669**	.683**
Child ethnicity (reference: Han)				
Northern minority	.313**	-.064	.146	.206
Southern minority	-.509**	-.375**	-.020	.726*
Mother's age	.002	-.037**	.011	-.036**
Currently unmarried (married omitted)	.497**	.472	-.679	1.309
Mother's education (reference: <6yrs)				
Middle school (6-12yrs)	.150**	-.109**	.290**	.025
Middle school & over (>12yrs)	.570*	-.841**	-.897	-.735*
Working mothers (non-working omitted)	-.751**	-1.041**	-.918**	-.431**
Proportion of boys 2 to 9	.297	2.293**	-.289	-.610
Parity progression	.113**	.159**	-.033	-.080
Progression at one son	-.083**	-.068*	-.201**	.086
% female illiterate	-.005**	-.000	.003	.001
% Han	.003**	.001	-.010**	-.003
Constant	-.781**	.786	1.250*	3.413**
N	259756	61480	5812	5666
Pearson Chi2	258194.4	58614.01	5827.99	5639.55
Prob>chi2	.0007	.999	.2805	.3385
Area under ROC curve	.6958	.7475	.69	.7096

*: Significant at the 0.01 level,   **: Significant at the 0.001 level.

2. Maternal characteristics.

Mother's working status is the only variable remaining consistently significant for all the four groups here. The negative effect of working on un-registration is particularly strong for urban non-migrant mothers, yet much weaker for the migrants in urban areas, suggesting an interaction between the effects of mother's working status and migration status or residential type. It is possible that whether working or not makes more difference for mothers who are permanent urban residents than for those who are rural residents or urban migrants in terms of socioeconomic status. And high socioeconomic

status tends to attach higher cost and lower benefits to un-registration, making mothers more likely to comply with registration.

Rural-urban discrepancies are observed in the effects of mother's education. The expectation for enhanced chances of registration by education is only met for permanent urban residents. Among non-migrants, mother's education consistently increases infant's chance of un-registration in rural areas, whereas suppresses it in urban areas. This distinctive rural-urban differential speaks to our estimation of the administrative uniform registration practice in certain rural areas, especially in the remote countryside where women are poorly educated. Individual volition is not reflected in those areas. Therefore, we see an even higher rate of registration for lower-educated women. In urban areas, registration is largely based on individual choice, and the positive effect of education on compliance with regulation is in practice. The rural migrants group bears certain similarity with the rural non-migrants. But for the former, above middle school education is not significant, which can be due to the small number of highly educated rural migrants. For migrants in urban areas, middle school education does not have significant effect. It can be that the barriers brought by migration are so overwhelming that the force brought by middle school education on complying with registration is suppressed. Or possibly some poorly educated migrant mothers who do not register their children are simply not included in the census. However, education above middle school still makes significant effect in enhancing chances of registration for urban in-migrants. A threshold effect of college education on registration is possibly at play.

As for the effect of mother's marital status, it shows no substantial difference in terms of magnitude of the effects between rural and urban for non-migrants. But the effect is only significant for rural non-migrants. The homogeneity in terms of socioeconomic status for both married and unmarried mothers may explain their insignificant difference in compliance with registration. Another explanation can be the smaller number of currently unmarried mother in urban areas, which may also explain the insignificant effects for both the two migrant groups.

Mother's age is just a control variable, and is not of key attention for the discussion.

3. Community features.

No single variable examined here exerts consistently significant effect across all the four groups. The two birth planning policy measures display very different effects on infant registration. The variable "progression at one son" (a measure using the probability of progressing to higher parity when already having had one son) shows no significant effect for migrants in urban areas. This is largely because there are not that many cases within this group to show enough variations in parity progression at the presence of one son. For the rest groups, the measure displays generally similar effects: lenient birth planning policy, reflected by the higher probability of progression at one son, is associated with lower chance of un-registration, since lenient policy means less

punishment on out-of-plan births, which tends to encourage couples to register their children of higher order births.

The parity progression measure, however, seems to show a variation by migration status rather than by rural-urban. For both rural (β= .113) and urban (β= .159) non-migrants, it is positively associated with un-registration, meaning communities with lenient family planning policies are more likely to have unregistered infants. It can be interpreted as: lenient policy denotes for poor practice of birth control by individual couples, shown as the higher probability of progress to higher parity, but it does not necessarily suggest that such higher order births are legitimate. Particularly in urban areas, punishment on out-of-plan births is still strictly enforced. Thus, in such places, couples are still trying to circumvent from family planning punishment by avoiding registration. Yet, for migrants in either rural or urban areas, the measure shows insignificant negative effects. It is possibly since the local birth planning policy is not practiced on migrants, thus, not really influencing their fertility, and in turn, registration behaviors.

We use proportion of 2 to 9 year old males in the community as an indicator of the local son preference. But among the four groups, the measure only has significant effect for infants born to mothers who are permanent urban residents. Communities with higher percentage of boys are more likely to have unregistered infants. It might because strong son preference tends to lead to delay of registration for infant girls. And greater variations in proportion of boys are more likely to be seen among permanent residents, who have easier access to the technology to achieve their gender selection in giving births (Wu et al. 1996). In rural areas, the practice of local government uniform registration may wash off the influence of personal son preference. For migrants, the proportion of boys in their destination communities may not be a good capture of the migrants' own son preferences, thus the effect is not significant.

The effect of the percentage of illiterate female in local communities is only significant for the rural non-migrants (β=-.005). Communities with higher percentage of illiterate women see higher rates of registration for infants, which corresponds with the estimation on the local uniform practice of registration, which is more likely to be performed in remote and backward areas, usually with more illiterate women, resulting in larger chance of under-reporting of unregistered infants. For other groups, especially for urban non-migrants, there are not many variations in percent female illiterate, so that no significant effect is seen for this variable.

Different patterns between rural and urban are seen in the effect of percentage of Han population in the local community, in that it is not significant for either of the two urban groups. This is because in urban areas, being mostly Han-dominated, there are hardly any variations in the percent Han. In rural areas, for infants born to non-migrant mothers, their chances of un-registration increase if they are born in communities with higher percentage Han (β= .003). As introduced before, ethnic minorities usually face much looser regulation on family planning, and the chances of avoiding registration due to out-of-plan births or say, for evading family planning punishment are slighter for them.

On the other hand, minority-concentrated communities are usually the remote and backward areas, thus, are more likely to see the under-reporting of unregistered infants in census enumeration. Both the two factors tend to result in superficially higher infant registration rates. But for rural migrants, a different mechanism is at work — concentration of Han population has negative effect on un-registration, since rural communities that attract migrants are usually more urbanized or developed, and less likely to have such uniform registration practices. Therefore, among these higher-Han-concentration communities, with better-maintained family planning enforcement and registration system, people — including migrants into such local communities, are less likely to have higher order births and see more clearly the importance of registration.

To sum up, there are significant differences by separate rural-urban and migrant/non-migrant groups. The division between rural-urban is overwhelming if we examine non-migrants only. Assessing models' goodness of fit and predictive power, it turns out that the model provides a bad fit for rural non-migrants, while has the least predictive power for migrants in rural areas. Clearly, the model fits very well for urban non-migrants, and has the greatest predictive power for them. All these further support that there are different stories going on between rural and urban in terms of infants' registration. The estimated practice of uniform registration by local administration and underreporting of unregistered children seem to be proved in existence in rural areas, which makes it hard to predict probability of un-registration and explain the registration status for infants in rural areas. The cost-benefit analysis in parental decision-making to rationally explain child registration status can only be applied for permanent urban residents, who also offer better reporting of registration status.

VI. Conclusion

Studying the "black children" hidden between the cracks of the household registration system is no easy task, given the lack of data on this special group of infants. Examination of the 1990 census 1% cluster sample data does offer a portrait of the unregistered infants though, if not a complete one, and shed light on the possible determinants of infants' registration status.

We find that infants' chance of registration increases substantially and steadily with age. This suggests that registration is very likely to be a time issue, that given a longer span of time, with the child growing up, many of the unregistered infants will eventually win enough attention from their parents to obtain a stable hukou status. For the delay of registration, it is more likely to happen to girl infants, those have siblings — usually a female dominated sibset, and infants of the Han majority or Northern minorities. These characteristics of unregistered infants demonstrate the presence of son preference and its conflict with the birth control policies, particularly strict for the Han majority. This has implications for policy interventions to promote educational campaigns to further popularize the importance of registration and the notion of equal value of boys and girls.

The present study also shows that mothers of the unregistered infants tend to be less educated, and tend to have an unstable status — being temporary migrants, having no hukou, not working, and having no intact families. While this also has implications for promoting educational programs, which need to be targeted at mothers with lower socioeconomic status or unstable status particularly; such a finding indicates defects in the registration system as well, especially in terms of the accessibility problem. Since migrant status of the mother severely increases chance of un-registration, and such a strong migration effect is independent of other factors like child sex or mother's education, it can be concluded that the objective barriers to registration set by migration are substantial and tend to overshadow parental volition. Therefore, system level adjustment on the household registration needs to be made to enable easier access of infant registration, regardless of mother's unstable status, — migration status in particular. One possible change is to simplify registration procedures, and to relax the requirement of on-site registration at mother's permanent registration place.

Findings suggest that the effects of all these child and maternal features are also shaped by community level forces — local family planning policies, administrative registration and census reporting practices. Our analysis shows that communities that are rural, and with higher percentage of illiterate females achieve even higher registration rates. However, this does not necessarily mean that un-registration problem is less severe in those communities. Rather, the estimation is that the uniform registration by local administration and the reliance on local government for census enumeration might have covered up the unregistered infants in those places, since it is in the poorly developed, remote rural areas that the uniform registration by local government is more likely to be in practice, so as to achieve good family planning and census records.

Our comparisons of the separate models by rural-urban and migration status prove the interaction effects of these two overwhelming factors on infant registration status: the effects of child, maternal and community features play differently across rural and urban areas, and between migrants and non-migrants. There are basically different regimes of registration in rural and urban places, and for migrants and non-migrants. In rural areas, the effect of administrative practices is so overwhelming that individual volition in complying with registration is submerged. Only in urban areas, for permanent residents, that the role of individual cost-benefit decision-making in registration emerges, and we see the predicted individual selection indicative of parental sex preference and socioeconomic conditions. In a broader sense, residential type and local socioeconomic development conditions largely shape the determinants of individual infants' registration status.

Given that the rural-urban differentials are institutionalized, to legitimize the unregistered children and secure their social well being, it is imperative to take institutional level reform. Evaluation of local family planning work should not be tied up to household registration. Local administration should ensure that all children have equal rights to registration regardless if they are "out-of-plan births". On the other hand, a better monitoring system needs to be set up to check the administrative registration practices, as well as the census enumeration process.

The present account of the determinants of un-registration may only shed some light on the real world situation, and is likely to be incomplete due to limitations of the data. As discussed above, this 1990 census 1% sample data set probably does not capture all unregistered infants, and it lacks a good measure of the local birth planning and administrative registration practices. In this sense, the effects of "out-of-plan births" on un-registration may not be adequately captured in the current analysis. Also, in consideration of the small percentage of variations on infant registration status explained by the model, many other factors may not be considered. While it is possible that a large part of variation in registration is at random, lack of measurements of other possible determinants in the current data set limits the amount of captured variations. Despite these limitations, this data set is the only available source we have to quantify the estimation on unregistered infants nationwide. It provides at least a preliminary account of the myths of these "black children" and implies some policy recommendations.

Not covered in this study is also the registration status of children over 18 months old — are determinants of their registration status anything different than the infants studied here? And what happens to the unregistered infants — are they eventually get registered, as the pattern by age seems to show? Then if they are, how is their future social well being influenced by the delay in registration? Or if they are not, do they really suffer severely from their unregistered status due to impossibility of access to health care, education, and other state benefits? Greenhalgh (2003) speculates that the "black children" tend to feel being overlooked, and tend to be discriminated against. They experience will severe mental pressure, if less material disadvantage. And even some may eventually obtain a hukou; most will become unplanned persons, and always live in the shadow of the childhood lack of self-identity. These unplanned persons pose potential social problems. No matter what the consequences might be, current conditions of the unregistered children certainly deserve more public concern. At present, so little known is known about these "black children", since they can hardly be tracked. We can only expect future studies to address the unanswered questions posed above in this study.

The light side of the picture, however, is that the rigid rural-urban division set by the hukou system is already under criticism, and with the growing flow of internal migration, the restriction on mobility set by the registration system is already relaxed. With such relaxation, also at the edge of reform is the attachment of state benefits with household registration. There are have been arguments advocating reducing the importance of hukou in accessing to social welfare. It is expected that the importance of the hukou system in China is diminishing, which may eventually solve the problem of "black children".

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