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WHO HAD TO LEAVE THEIR CHILDREN BEHIND? EVIDENCE FROM A MIGRANT SURVEY IN SHANGHAI*

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Abstract

Many studies have confirmed that the separation of parents and children has a negative impact on children's growth. Although compulsory-education barriers for migrants' children have gradually disappeared in China, many families who migrate to cities have to leave their school-age children in their hometown. In this paper, using a logit model, we investigate which factors influence school-residential choice for migrants' children. The latest migration survey, Shanghai's 2011 Floating Population Dynamic Monitoring Survey, which contains data on 23, 517 migrant families, is used. We obtain two major findings. First, higher levels of household income and parents' education increase the probability of migrants' children receiving their education in the city. Our second finding, which has more policy implications, is that noncompulsory-education barriers still prevent many migrants' children from moving to the city.

Keywords: migrants' children, school-residential choice, college entrance examination
JEL Classification Codes: C25, I24, I28

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I. *Introduction*

According to China's sixth population census, the country has 260 million internal migrants (Peng, 2011). Initially, migration to cities mainly involved young adult men. However, as migrants secure employment and settle down, they are more likely to bring other family members to the city, including their spouses and children (Liang and Chen, 2007). Approximately 55 million migrant children live in the cities, including 40 million school-age children (Dai and Li, 2011). The education of migrants' children has become a prominent problem.

Scholars agree that internal migration has made an important contribution to China's economic growth. Internal migrants certainly play an important role in the cities. For example, in 2009, internal migrants made up more than 50% of the employed population in Shanghai. However, migrants do not enjoy full access to public services; in particular, the education services available to migrants' children are extremely poor. Despite the large proportion of migrants living in the cities, education expenditures are allocated according to the proportion of registered children only. Migrants' children, who do not have urban registration, suffer from many restrictions related to receiving education in the cities. Consequently, these children receive benefits from neither their departure locations nor their destination locations.

The Compulsory Education Law, last revised in 2006,[1] requires cities to provide equal compulsory-education opportunities to migrants' children; since then, compulsory-education barriers for migrants' children have gradually disappeared. However, noncompulsory-education barriers still exist. In particular, the college entrance examination and household registration (*hukou*) systems prevent children from migrating across provinces.

It is argued that students are being discriminated against during the admission process based on their geographic region of origin. A university usually sets a fixed admission quota for each province, with a higher number of students coming from its home province. Most high-quality public universities are concentrated in economically developed provinces such as Beijing or Shanghai, and candidates with *hukou* registration in these provinces have a much greater opportunity to be admitted into these high-quality universities. For example, in 2012, Beijing University planned to admit 246 students from Beijing (with 73,000 candidates in total), but only 80 from Henan[2] province (with 950,000 candidates in total). This is different to the practices of regional universities in other countries, which receive subsidies from regional governments in addition to or in place of those received from central governments. Beijing University depends primarily on the state budget rather than the local budget. Furthermore, most private universities are also concentrated in urban areas and most prefer students who live in economically developed provinces.

To ensure the university admittance rate of economically developed provinces, current policy requires that migrants' children take the college entrance examination at the location where they are registered. At present, this policy has caused widespread controversy in China. Furthermore, examination papers differ across provinces. Among China's 31 provinces, 16 provinces, including Beijing and Shanghai, are able to develop the senior high school

[1] China's compulsory education includes primary school education and junior high school education.
[2] Henan is a densely populated province, but has fewer advanced educational resources.

curriculum and design their own examination papers subject to the requirements of the Ministry of Education. The other 15 provinces use curriculum and examination papers designed by the Ministry of Education. Consequently, migrants' children must receive their senior high school education at their registered location, if they want a better chance of entering university.

The city of Shanghai is currently making every effort to provide registered children and migrants' children with the same education. The vast majority of public primary schools and junior high schools are fully open to migrants' children and, recently, its public nursery schools have made efforts to accept babies from migrant families. However, similar efforts are lacking for noncompulsory education. Senior high schools in Shanghai maintain high barriers against migrants' children, and even though some can enter these schools, they are not allowed to take the college entrance examination in Shanghai.

In this paper, using a logit model, we investigate which factors influence school−residential choices for migrants' children, with a specific focus on how noncompulsory-education barriers prevent migrants' children from joining their parents in the city. The latest migration survey, Shanghai's floating population dynamic monitoring survey (2011), is used in this study. The rest of the paper is organized as follows. Section II reviews the existing literature. Section III introduces the survey data. In Section IV, we present our model and discuss the results. Section V concludes the paper. In the appendix, we describe the method used to calculate the average partial effect (APE) of the interaction terms.

II. *Literature Review*

Despite having made an important contribution to China's economic growth, internal migrants encounter a range of difficulties and hurdles in their destination cities. In this regard, Sicular et al. (2007) emphasize the income gap between migrants and urban residents, and Fu and Ren (2010) focus on the gap in returns to education among people with different *hukou* statuses. However, few studies have examined the education of migrants' children in cities.

Early field research indicates that the separation of parents and children because of migration has a negative impact on the performance of the children left behind. In theory, however, the relationship between migration and schooling remains ambiguous. Migration provides financial benefits that allow children to continue schooling and perform well, but it may also disrupt family life in a manner that hinders children's scholastic progress. Booth (1996) analyzes survey data from Swaziland and emphasizes the negative effects of parents' migration. In contrast, Kandel and Kao (2001), using Mexican survey data, detect a positive relationship between migration and grades. In addition to schooling, McKenzie and Hildebrandt (2007) find that parental migration made children of migrants less likely to receive certain forms of health care.

In China, most left-behind children are cared for by their grandparents, while the rest are looked after by relatives. Grandparents do not have enough energy and knowledge to take care of their grandchildren because of their age. Care from extended family usually focuses on material satisfaction and lacks learning and spiritual guidance. Lee (2010), drawing on the 2006 China Health and Nutrition Survey, concludes that parental absence because of labor migration affects children's mental and, to a lesser extent, physical well-being. They indicate that parents' migration has a weakly negative effect on the schooling of children aged 6−11 and 12−14 years

(compulsory period). The negative impact becomes extremely significant for older children aged 15−18 years (noncompulsory period), namely the older children with migrant parents are more likely to discontinue their education after junior high school. Meyerhoefer and Chen (2011), using data from two provinces in northeastern China, also find that parental labor migration is associated with a 0.7 grade level in educational attainment among girls. For boys, however, this negative impact becomes insignificant. Apart from schooling, Lee also finds that the children with migrant parents are less likely to receive immunization and more likely to smoke. The lack of role models and moral guidance creates obstacles to children's development, especially in the formation of their personality. Furthermore, life safety is also worrying. Accidental deaths of left-behind children, such as drowning incidents, are frequently reported in China. We should be more concerned about the current circumstances of migrants' children. Even in the same city, Liang and Chen (2007) find that migrants' children are much less likely to be enrolled in school than urban-based household-registered children.

To the best of our knowledge, almost all of the previous studies compared children whose parents have migrated with those whose parents have not or compared accompanied children with household-registered children in cities. Up to now, no study has compared accompanied migrant children with left-behind children. Our survey indicates that for children aged 6−14 years, the enrollment rate is 89% for accompanied migrant children and 88% for left-behind children, respectively. There is no difference between the two proportions. In contrast, for children aged 15−18 years, the enrollment rate decreases to 45% for accompanied migrant children and 64% for left-behind children. Surprisingly, for older migrants' children, the enrollment rate is higher in rural than in urban areas.

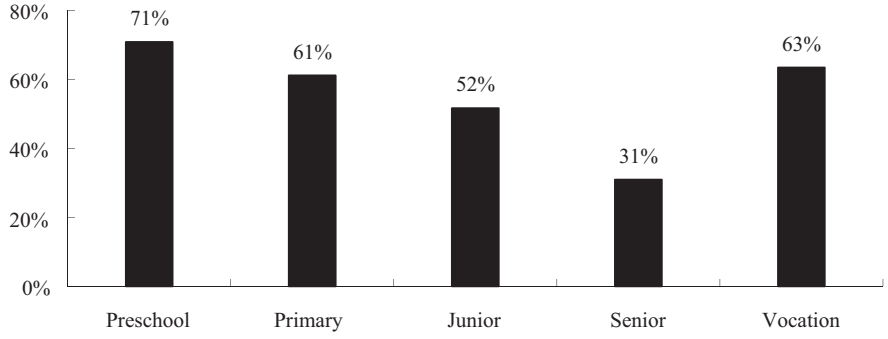
This paper investigates the factors that prevent left-behind children from migrating with their parents and receiving an education in the destination city. Goodburn (2009) shows those migrants' children face financial and administrative barriers; this latter type of barrier is our main interest in this study. Hannum et al. (2011) stress that the college entrance examination can shape opportunities for children in poor rural areas and enhance China's social mobility. We consider college entrance examination policy to be a key factor influencing the school−residential choice for migrants' children; this comprises our contribution to the literature.

III. *Data Description*

The data used in this paper come from Shanghai's floating population dynamic monitoring survey (2011). This survey was conducted jointly by the Shanghai Population and Family Planning Commission and the 985 Platform of the School of Economics of Fudan University. According to the Shanghai Statistical Year Book 2011, there are 5439 villages or neighborhood committees in Shanghai, out of which 592 areas are covered in the survey. Using the method of probability proportional to size sampling, the sample contains data on 23,517 migrant families and 63,500 individuals in Shanghai. In addition, this survey includes 42,247 family members living outside of Shanghai. We checked the logical relationships within the sample as carefully as possible and winsorized the household income data at the 1% significance level, resulting in the removal of 762 outliers.

This study only investigates the factors that influence the school−residential choices for migrants' children. Therefore, children who drop out are excluded (otherwise, the problem

FIG. 1. PROPORTION OF MIGRANTS' CHILDREN ENROLLED IN EACH SCHOOLING LEVEL IN SHANGHAI



would have required a nested logit framework). Where detailed information on parents is missing, the interviewee is a grandparent of the child; such samples are also omitted from our regression model. First, we only retain one-child families in the sample, otherwise in multiple-child families the explanatory variables of some siblings would have been the same, even if their school–residential choices were different. In the end, 7123 families remained in the sample, with 64% of the children taken to Shanghai and the remainder left behind in the family's hometown. We conduct a robustness check by including multiple-child families.

The sample is classified into five categories: preschool,[3] primary school (primary), junior high school (junior), senior high school (senior), and secondary vocational school (vocation). The percentage of migrants' children at each schooling level in Shanghai is presented in Figure 1. As shown in the figure, the higher the level of schooling, the lower the probability of migrants' children receiving an education in Shanghai. More than two-thirds of senior high school students cannot live with their parents. By contrast, the percentage of migrants' children attending secondary vocational schools in Shanghai is more than double that of senior high schools, even though students in these two categories are of similar age. Furthermore, nearly half of junior school students have to study at their registered locations.

Next, we turn our attention to the economic backgrounds of migrant families. The relationship between monthly household income and school–residential choice is presented in Figure 2. Living costs vary greatly across provinces in China. As calculated by Brandt and Holz (2006), the cost of a basket of consumer goods in Shanghai is around 1.4 times higher than in the urban areas of Henan province and 3.6 times higher than in the rural areas of Henan province. Educational expenditure varies more across provinces. According to the China Statistical Year Book 2010, school sundry fees are 2548 yuan in Shanghai and 526 yuan in Henan, respectively. It is clear that higher household income increases the probability of a migrant's child receiving an education in Shanghai.

The sample is also divided into high- and low-income groups in order to avoid heterogeneities in income. There are broadly similar trends in the two groups (see Figure 3). Most senior high school students remain in their hometown, regardless of whether their family

[3] Preschool also includes nursery school.

FIG. 2. PERCENTAGE OF MIGRANTS' CHILDREN ENROLLED IN SCHOOL IN SHANGHAI BY MONTHLY HOUSEHOLD INCOME (CHINESE YUAN, ONE-CHILD FAMILIES)

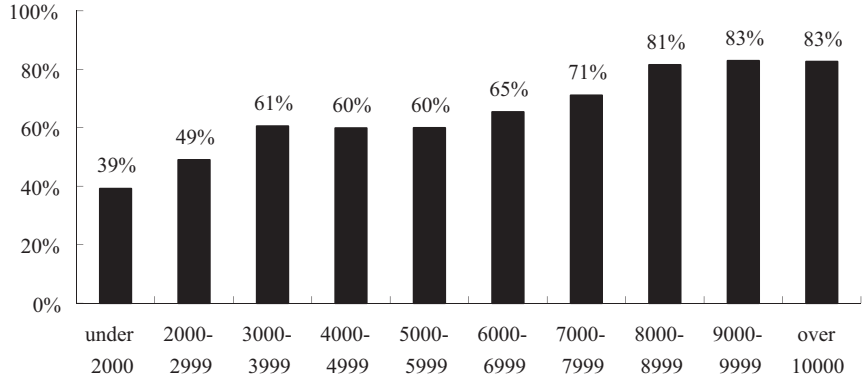
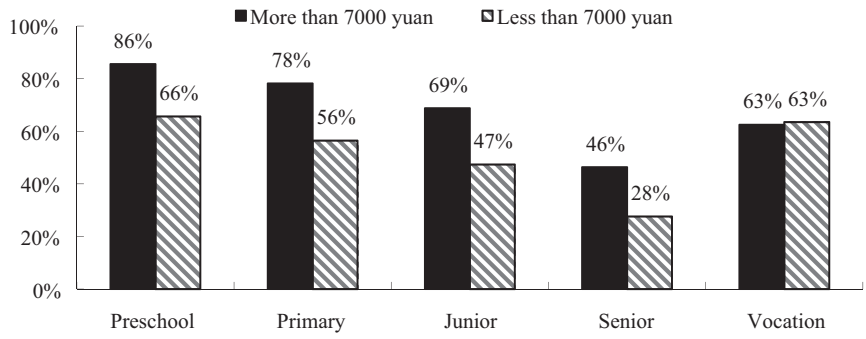


FIG. 3. PROPORTION OF MIGRANTS' CHILDREN ENROLLED IN SHANGHAI BY LEVEL OF SCHOOLING AND MONTHLY HOUSEHOLD INCOME[4] (ONE-CHILD FAMILIES)



is wealthy or poor.

Furthermore, we investigate the relationship between the school–residential choice of migrants' children and their parents' educational backgrounds. A relationship similar to that with economic backgrounds is detected; we have omitted the details here.

IV. *The Model*

In this section, a logit model is applied to investigate which factors influence school–residential choices for migrants' children. The explained variable is binary with $y=1$ or $y=0$, where the value 1 denotes that the children received their education in Shanghai, and the

[4] Monthly disposable income in Shanghai in 2011 was about 3100 yuan. Therefore, we divide the two groups roughly at 7000 yuan (household income).

value 0 denotes that they have to study in their hometown.

First, multiple-child families are excluded for the simplicity. Both financial and administrative barriers are considered in our regression model. The logarithms of monthly household income (*lnincome*), mother's education (*motheduc*), and father's education (*fatheduc*) are included to capture each family's financial background. The duration of the parents' stay in Shanghai (*stayyear*) is included to capture the social integration of the migrant family. The dummy variable *spouse*[5] is defined as 1 if both parents are in Shanghai and 0 otherwise. In view of the general preference for sons in rural China, the dummy variable *gender* (male = 0, female = 1) is included to capture the gender preference of the migrant family. The dummy variable *hukou* denotes the registration type of the children (rural=0, urban=1). Although many previous papers indicate that hukou acts as a strong constraint on individual migration, we do not consider *hukou* to be a key factor in this study. It is worth noting that none of the children in our sample has *hukou* status for Shanghai. They face identical barriers regardless of whether they are registered in an urban or rural area. In general, a child has the same *hukou* status as his/her mother. Therefore, the explanatory variable *hukou* in our regression only captures the discrimination of lifestyle before their parents migrated to Shanghai. We use the dummy variable *hukou* to identify the migrants who come from an urban area outside of Shanghai. There are huge differences with respect to lifestyle and consciousness between urban and rural China. The urban residents pay more attention to the future prospects of their children. They are more willing to settle in Shanghai and hope that their children can integrate into Shanghai's sociological and economic culture as soon as possible. Therefore, we estimate that urban parents are more likely to bring their children to Shanghai, even though their children are also discriminated against in terms of college entrance examinations.

Children's levels of schooling are defined by a group of dummy variables (*primary*, *junior*, *senior*, *vocation*) and the reference category is *preschool*. Using these variables, we indirectly identify the administrative barriers. As discussed in the Introduction, senior high school students have to take college entrance examinations at their registered locations. The results of the base model are presented in Table 1.

Higher household incomes and parents' education levels increase the probability of migrants' children receiving their education in Shanghai. Furthermore, the income and the education levels of parents are included simultaneously. Regardless of possible multicollinearity problems, ceteris paribus, we find that the income and education levels of parents have significantly positive effects on the migration of children simultaneously (see the results of models 4, 5, 9, and 10). This indicates that highly educated parents are more willing to bring their children to Shanghai than lowly educated parents, even when their incomes are equal. The duration of parents' stay in Shanghai has no significant effect on school−residential choice. Families are more likely to take their children with them to the city when both parents are in Shanghai. Contrary to our intuition, migrant families are more likely to leave their sons in their hometown, even though Chinese rural parents attach more importance to the education and development of sons than of daughters. Boys receive their education in their hometown so that

[5] Taking into account China's migration patterns, we consider *spouse* as an exogenous variable. Our data indicate that 25.3% of young adult men give priority to their spouses to the cities. In contrast, only 3.8% of young adult men give priority to their children. Some 61.2% of children live in Shanghai with their mothers, and about 70% of these children migrate to Shanghai soon after their mothers.

TABLE 1. RESULTS OF THE BASE MODEL (ONE-CHILD FAMILIES)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coefficient	APE	Coefficient	APE	Coefficient	APE	Coefficient	APE	Coefficient	APE
lnincome	0.489***	0.112					0.380***	0.087	0.392***	0.090
	(9.227)						(6.818)		(7.004)	
motheduc			0.105***	0.024			0.080***	0.018		
			(8.254)				(6.004)			
fatheduc					0.098***	0.023			0.073***	0.017
					(7.461)				(5.256)	
stayyear	0.004	0.001	0.008	0.002	0.013	0.003	0.003	0.001	0.007	0.002
	(0.375)		(0.720)		(1.077)		(0.284)		(0.619)	
spouse	2.046***	0.468	2.383***	0.524	2.525***	0.544	2.244***	0.502	2.385***	0.524
	(21.88)		(23.38)		(23.71)		(21.61)		(22.04)	
gender	0.105*	0.024	0.096*	0.022	0.097*	0.022	0.098*	0.022	0.099*	0.023
	(1.855)		(1.668)		(1.676)		(1.705)		(1.709)	
hukou	0.454***	0.099	0.366***	0.080	0.327***	0.073	0.303***	0.067	0.268***	0.060
	(5.880)		(4.375)		(3.827)		(3.594)		(3.114)	
primary	−0.393***	−0.092	−0.316***	−0.074	−0.359***	−0.084	−0.343***	−0.080	−0.381***	−0.089
	(−5.952)		(−4.704)		(−5.334)		(−5.082)		(−5.643)	
junior	−0.770***	−0.186	−0.662***	−0.159	−0.714***	−0.172	−0.691***	−0.166	−0.783***	−0.178
	(−9.406)		(−7.888)		(−8.521)		(−8.196)		(−8.755)	
senior	−1.672***	−0.394	−1.548***	−0.368	−1.676***	−0.395	−1.577***	−0.375	−1.699***	−0.399
	(−14.87)		(−13.68)		(−14.62)		(−13.86)		(−14.74)	
vocation	−0.106	−0.025	0.055	0.012	−0.102	−0.024	0.060	0.014	−0.109	−0.025
	(−0.388)		(0.194)		(−0.371)		(0.212)		(−0.396)	
No. of observations	7123		7022		7002		7002		7002	

Notes: (a) All the constant terms are significantly negative, but not reported here. (b) The *t* values are reported in parentheses. (c) The size of the sample is different in each model because of the lack of information on some parents' education level. (d) ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

they can achieve better results in the college entrance examination. This result also indirectly supports our main findings, as discussed below.

The key factor in this study is the level of schooling. Unlike in the linear model, the partial effect differs with the value of the explanatory variable. The APEs of the dummy variables indicate that the level of schooling significantly decreases the probability of migrants' children receiving their education in Shanghai, with the exception of secondary vocational schools. There is no significant difference between preschool and secondary vocational school, even though the coefficient of *vocational* is negative. It is noteworthy that, although secondary vocational school students are of similar ages to senior high school students, they are much more likely to migrate to Shanghai because they do not need to take the college entrance examination.

After that, we add interaction terms between children's level of schooling and their family backgrounds to detect whether the effect of schooling level on the probability of migration is similar across families. The results of the model including interaction terms are presented in Table 2. The APEs for the explanatory variables included in the interaction terms are calculated using the method described in the Appendix. Although the significance of a small number of coefficients changes, the APEs indicate that there is no fundamental change.

TABLE 2. RESULTS OF THE MODEL INCLUDING ITERACTION TERMS (ONE-CHILD FAMILIES)

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11	
	Coefficient	APE	Coefficient	APE	Coefficient	APE	Coefficient	APE	Coefficient	APE	Coefficient	APE
lnincome	0.459***	0.094					0.319***	0.072	0.383***	0.073	0.390***	0.073
	(6.450)						(4.298)		(6.861)		(6.946)	
motheduc			0.094***	0.020			0.080***	0.015	0.063***	0.150		
			(5.593)				(6.020)		(3.593)			
fatheduc					0.086***	0.019					0.057***	0.014
					(5.207)						(3.332)	
stayyear	0.005	0.001	0.009	0.002	0.013	0.002	0.004	0.001	0.004	0.001	0.007	0.001
	(0.416)		(0.746)		(1.082)		(0.336)		(0.312)		(0.629)	
spouse	2.053***	0.393	2.397***	0.457	2.530***	0.479	2.254***	0.427	2.259***	0.427	2.393***	0.450
	(21.89)		(23.46)		(23.74)		(21.63)		(21.70)		(22.10)	
gender	0.102*	0.020	0.096*	0.018	0.097*	0.018	0.095*	0.018	0.098*	0.018	0.099*	0.019
	(1.803)		(1.675)		(1.680)		(1.653)		(1.694)		(1.702)	
hukou	0.459***	0.088	0.367***	0.070	0.326***	0.062	0.309***	0.058	0.307***	0.058	0.268***	0.050
	(5.930)		(4.383)		(3.804)		(3.659)		(3.536)		(3.108)	
primary	−2.028*	−0.076	−0.657**	−0.059	−0.835***	−0.067	−2.434**	−0.065	−0.768***	−0.064	−0.896***	−0.071
	(−1.888)		(−2.403)		(−2.748)		(−2.229)		(−2.786)		(−2.927)	
junior	−0.208	−0.147	−0.557*	−0.131	−0.834**	−0.136	−0.788	−0.131	−0.724**	−0.134	−0.931***	−0.139
	(−0.159)		(−1.765)		(−2.392)		(−0.590)		(−2.274)		(−2.661)	
senior	−0.918	−0.319	−2.443***	−0.291	−2.362***	−0.316	−1.469	−0.298	−2.581***	−0.294	−2.432***	−0.319
	(−0.534)		(−5.001)		(−4.479)		(−0.848)		(−5.293)		(−4.628)	
vocation	−1.602	−0.027	2.156*	−0.045	4.907**	−0.138	1.143	0.006	2.060*	−0.041	4.493*	−0.127
	(−0.399)		(1.947)		(2.120)		(0.272)		(1.829)		(1.943)	
primary × *lnincome*	0.194						0.248*					
	(1.524)						(1.917)					
junior × *lnincome*	−0.067						0.012					
	(−0.432)						(0.074)					
senior × *lnincome*	−0.089						−0.012					
	(−0.439)						(−0.060)					
vocational × *lnincome*	−0.207						−0.131					
	(−0.428)						(−0.261)					
primary × *motheduc*			0.037						0.046			
			(1.290)						(1.585)			
junior × *motheduc*			−0.0136						0.002			
			(−0.399)						(0.045)			
senior × *motheduc*			0.098*						0.109**			
			(1.893)						(2.123)			
vocation × *motheduc*			−0.254**						−0.242*			
			(−2.021)						(−1.898)			
primary × *fatheduc*					0.049						0.053*	
					(1.604)						(1.718)	
junior × *fatheduc*					0.012						0.019	
					(0.320)						(0.534)	
senior × *fatheduc*					0.070						0.075	
					(1.329)						(1.424)	
vocation × *fatheduc*					−0.572**						−0.525**	
					(−2.251)						(−2.068)	
No. of observations	7123		7022		7002		7002		7002		7002	

TABLE 3. RESULTS OF THE MODEL WITHOUT INTERACTION TERMS (ONE-CHILD AND MULTIPLE-CHILD FAMILIES)

	Model 1'		Model 2'		Model 3'		Model 4'		Model 5'	
	Coefficient	APE	Coefficient	APE	Coefficient	APE	Coefficient	APE	Coefficient	APE
lnincome	0.489***	0.116					0.439***	0.104	0.429***	0.102
	(13.77)						(11.91)		(11.54)	
motheduc			0.062***	0.015			0.038***	0.009		
			(7.748)				(4.610)			
fatheduc					0.071***	0.017			0.044***	0.010
					(7.767)				(4.599)	
stayyear	0.019**	0.004	0.022***	0.005	0.025***	0.006	0.017**	0.004	0.021***	0.005
	(2.359)		(2.763)		(3.158)		(2.179)		(2.596)	
spouse	2.024***	0.457	2.416***	0.515	2.499***	0.525	2.256***	0.492	2.342***	0.504
	(28.91)		(31.05)		(31.34)		(28.55)		(28.95)	
gender	−0.066*	−0.016	−0.063*	−0.015	−0.071*	−0.017	−0.063	−0.015	−0.070*	−0.017
	(−1.753)		(−1.657)		(−1.857)		(−1.641)		(−1.827)	
multiple-child	−0.089*	−0.021	−0.046	−0.011	−0.047	−0.011	−0.064	−0.015	−0.058	−0.014
	(−1.852)		(−0.955)		(−0.965)		(−1.315)		(−1.193)	
second-son	0.098*	0.023	0.130**	0.031	0.112**	0.026	0.120**	0.028	0.105**	0.025
	(1.887)		(2.493)		(2.153)		(2.298)		(2.011)	
hukou	0.197***	0.046	0.220***	0.051	0.168***	0.039	0.132**	0.031	0.094	0.022
	(3.379)		(3.629)		(2.722)		(2.141)		(1.504)	
primary	−0.538***	−0.130	−0.495***	−0.120	−0.519***	−0.125	−0.515***	−0.124	−0.536***	−0.130
	(−12.05)		(−10.92)		(−11.44)		(−11.30)		(−11.77)	
junior	−1.085***	−0.264	−1.015***	−0.248	−1.039***	−0.253	−1.052***	−0.256	−1.069***	−0.260
	(−20.73)		(−19.00)		(−19.51)		(−19.53)		(−19.94)	
senior	−2.149***	−0.472	−2.049***	−0.456	−2.103***	−0.464	−2.103***	−0.465	−2.149***	−0.472
	(−27.33)		(−25.97)		(−26.56)		(−26.41)		(−26.91)	
vocation	−0.814***	−0.200	−0.724***	−0.179	−0.821***	−0.202	−0.747***	−0.184	−0.841***	−0.207
	(−4.944)		(−4.373)		(−4.965)		(−4.492)		(−5.068)	
No. of observations	15,254		15,059		15,041		15,059		15,041	

Furthermore, multiple-child families are included to check the robustness of the results (with 15,254 children in total). We use the dummy variable *multiple-child* to identify children who live in one-child families (*multiple-child*=0) or a multiple-child family (*multiple-child*=1). Among the multiple-child families, we use the dummy variable *second-son* to identify the eldest son/daughter and the others. The dummy variable *second-son* equals 0 if the child is the only son/daughter or the eldest son/daughter, and 1 otherwise. The results are presented in Table 3. Our two major findings are still valid. Financial and administrative barriers prevent many migrants' children from moving to the city. Compared with multiple-child families, one-child families are more likely to bring their children to Shanghai. Among of multiple-child families, the eldest son/daughter will be left behind. The coefficient of *gender* in Table 3 has changed from Table 1 and Table 2 to be weakly negative. This change is because of the sample selection problem. Among the one-child families (with 7123 children in total), only 39% of children are girls. However, among the multiple-child families (with 8131 children in total), the proportion of girls is higher at 49% and a large number of girls are left behind.

V. *Conclusions*

In this paper, using a logit model, we investigated which factors influence school–residential choices for migrants' children, using the latest migration survey, Shanghai's floating population dynamic monitoring survey (2011). We presented two major findings. First, higher levels of household income and parents' education increase the probability of migrants' children receiving their education in the destination city. Second, noncompulsory-education barriers continue to restrict the movement of migrants' children to the city.

The second finding has more significant policy implications. It is noted that China has started losing its advantage in sectors using labor-intensive technologies because of increasing labor costs. Discrimination against migrants' children in schooling increases social cost. Démurger and Xu (2011) indicate that recent migrants are concerned about their children growing up in rural China. For example, children who are left behind are found to attract their parents back to the village. Our data also support this idea. For those parents and their children living together, 49% of interviewees are willing to reside in Shanghai for a long period. In contrast, for those parents living apart from their children, only 33% of interviewees have the same desires. Internal migrants play an important role in cities, and should therefore have equal access to public services. In the field of education, governments should eliminate administrative barriers to migrants' children joining their parents. The Ministry of Education should adjust the related policies in a timely manner to allow migrants' children to take the college entrance examination at their current residential locations such as Shanghai or Beijing, rather than only at their registered locations.

Appendix

In this appendix, we explain the method used to calculate the APE for an explanatory variable that is included in the interaction term.

According to Chapter 14 of Cameron and Trivedi (2005), the probability density function can be modified as follows, when an interaction term is included:

$$p = \Pr[y=1] = \frac{e^{\alpha+\beta x+\gamma z+\lambda xz}}{1+e^{\alpha+\beta x+\gamma z+\lambda xz}} \qquad \text{eq. (A.1)}$$

where x, z are explanatory variables and xz is an interaction term. Partial differentiation yields the following expression for the partial effect of z, when z is a continuous variable:

$$\frac{\partial p}{\partial z} = (\gamma+\lambda x)\frac{e^{\alpha+\beta x+\gamma z+\lambda xz}}{(1+e^{\alpha+\beta x+\gamma z+\lambda xz})^2} \qquad \text{eq. (A.2)}$$

If z is a binary explanatory variable, then the partial effect from changing z from zero to one, holding all other variables fixed, is simply

$$\frac{e^{\alpha+\beta x+\lambda+\lambda x}}{1+e^{\alpha+\beta x+\gamma+\lambda x}} - \frac{e^{\alpha+\beta x}}{1+e^{\alpha+\beta x}} \qquad \text{eq. (A.3)}$$

Using the above expressions, the APE can be straightforwardly obtained.

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