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Jobs or Amenities? Location Choices of Interprovincial Skilled Migrants in China, 2000–2005

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ABSTRACT

On the basis of the data derived from China's 2005 1% population sample survey, this paper examines regional and personal factors that shape locations chosen by China's interprovincial skilled migrants. It aims to evaluate the relative weight of employment opportunities, and amenities, and the ownership structure of economy in determining skilled migrants' destination choices, and the extent to which such place-based factors work differently among different types of skilled individuals. The results indicate that China's skilled migration is driven mainly by interregional income differentials and that regional variations in amenities and ownership structure play a less important role in this regard. Furthermore, compared with college diploma holders, bachelor's degree holders are more responsive to wage levels and are less sensitive to the risk of unemployment, whereas those with managerial and professional occupations and those without *hukou* at the destinations are more sensitive to wages and employment possibilities. In addition, there is little evidence that the effects of amenities differ greatly across life-course groups, but those holding *hukou* at the destinations are more attracted to places with ample government-provided amenities. The findings suggest that at least in the first half of 2000s, China's skilled people prioritise career prospects over amenity-related issues in their migration decisions and that institutional arrangements continue to affect interregional movements of skilled labour in China.

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Keywords: skilled migration; interprovincial migration; destination choices; amenities; institutional arrangements; China

INTRODUCTION

In today's knowledge-based world, the accumulation of human capital is of paramount importance for promoting economic development and enhancing regional competitiveness (Lucas, 1988; Romer, 1990). Hence, understanding the factors underlying movements of skilled labour has triggered a heated scholarly and policy debate in advanced capitalist countries. As the world's second biggest economy, China has been undergoing a new wave of economic restructuring over the last few years (Lin *et al*., 2011; Wei and Liefner, 2012). On the demand side, its coastal region has enjoyed the proliferation of technology-based and knowledge-intensive industries, spawning great demand for people with managerial and professional expertise. On the supply side, rapid expansion of higher education across the whole country since 1999 has brought about an increasing number of university graduates. Under such circumstances, migration of skilled labour will play an important role in China's internal migration in the foreseeable future.

In the case of this study, interprovincial skilled migrants are defined as those who have a tertiary education qualification and whose current province of residence is different from 5 years ago. Although competing for human capital has received

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extensive attention from policy makers and the media in contemporary China, very few scholarly efforts have so far been made to investigate the migration behaviours and the decision-making process of China's skilled people (Fan, 2009; Fu and Gabriel, 2012). On the basis of the disaggregated census data, this paper attempts to identify factors underlying their destination choices by using microdata analysis. In particular, it focuses on the roles of economic opportunities, location-specific amenities, and ownership structure of economy in shaping migration decisions and the extent to which these place-based factors work differently among different socioeconomic and life-course cohorts.

Whether amenities such as the natural environment (e.g. warm winters), social and cultural amenities (e.g. medical facilities and museums), and the quality of social life (e.g. tolerance or openness) play a fundamental role in attracting mobile human capital to particular locations has triggered a heated debate in Western-developed countries (Glaeser *et al*., 2001; Florida, 2002b; Scott, 2010; Faggian *et al*., 2012). Most existing studies on China's internal migration have merely focused on the economic rationality of migration, devoting insufficient attention to the role of amenities in the migration process. This paper contributes to existing literature on China's migration by exploring the extent to which amenities influence destination choices of skilled migrants.

Previous studies have highlighted the role of institutional factors such as household registration (*hukou*) system and ownership structure of economy in shaping China's migration process (Li, 1997; Fan, 2002; Zhou, 2006; Fan, 2008; Shen, 2013). Although the relaxation of the *hukou* system has lead to the boom of labour migration, migrants without local *hukou* status at the destinations do not have full urban citizenship and therefore have rather low settlement intentions (Zhu, 2007; Chan and Buckingham, 2008). Given that different types of enterprises are concentrated on different economic sectors (for example, state-owned enterprises and foreign-invested enterprises are more intensive in capital and technology than domestic private enterprises) and recruit workers from different segments of the labour force, it can be assumed that ownership structure may play a certain role in driving skilled migration in China (Li, 1997; Zhou, 2006; Lin and Hu, 2011). Therefore, this paper tries to incorporate China's particular institutional factors into the analytical framework, going beyond previous studies based on the premise of free flows of skilled labour in advanced market economies.

The remainder of this paper is organised as follows. It begins with a review of literature on individual migration decisions in Western-developed countries and in China, followed by a clarification of the methods and data used in this research. The next sections provide a descriptive account of the spatial patterns of China's interprovincial skilled migration and then examine factors underlying skilled migrants' destination choices by using the conditional logit model. The paper concludes with a summary of key findings and a discussion of implications concerned.

UNDERSTANDING THE DETERMINANTS OF MIGRATION DECISIONS

A large body of literature has examined factors underlying migration behaviours by using macro and micro approaches (Cadwallader, 1989). The neoclassical migration model conceptualises migration as a form of investment in human capital and as a result of rational cost-benefit calculations (Sjaastad, 1962). Earlier studies treated interregional migration entirely as an economic phenomenon and as a response to regional income and employment opportunity differentials (Greenwood, 1975). To be specific, people move to areas with higher expected wages to maximise their utility, and this process will not stop until regional differences in expected wages eventually equilibrate (Greenwood, 1975).

As the aforementioned neoclassical approach regarded economic opportunities as the sole driver of interregional migration, the equilibrium approach, initially proposed by Graves (1976, 1979, 1980), gave an alternative view of migration mechanism. In this view, interregional differentials in wage levels and property values are assumed to reflect compensation for spatial variations in amenities, and as a corollary, real utility is expected to be the same everywhere for identical individuals (Knapp and Graves, 1989; Mueser and Graves, 1995). For these reasons, migration is a result of the change in demand for location-specific amenities rather than wage differentials (Knapp and Graves, 1989; Mueser and Graves, 1995).

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The role of amenities in driving migration and urban growth has gained growing academic attention in recent decades. Although favourable climate such as warm winters has been found to be a key driver of population growth in the Sunbelt after World War II (Rappaport, 2007; Partridge, 2010), it is only quite recently that man-made amenities are regarded pivotal factors in encouraging or deterring migration (Glaeser *et al*., 2001; Clark *et al*., 2002; Florida, 2002b; Ferguson *et al*., 2007). For example, in the 'consumer city' hypothesis, Glaser and his colleagues (2001) claimed that contemporary urban growth increasingly hinged on whether the cities were capable of providing services and consumer goods and thus were attractive to high human capital residents. In his seminal works, Florida (2002a, 2002b) pointed out that keeping low barriers to entry was of paramount importance in attracting and retaining the 'creative class'.

Nevertheless, up to now, there has been no consensus on the relative weight of employment-related and amenities-related factors. Although some scholars claimed that amenities were virtually secondary considerations in the migration decision-making (Greenwood and Hunt, 1989; Arntz, 2010; Niedomysl and Hansen, 2010), others directly called into question the logical basis of the amenities-migration hypothesis (Storper and Scott, 2009; Scott, 2010). For instance, Storper and Scott (2009) doubted the casual relationship between favourable climate and high in-migration rates in the Sunbelt and claimed that it is agglomeration effects and cumulative causation forces that exerted a dominant influence on destination choices of skilled workers. On the basis of empirical results, some scholars indicated that people of working age tilted toward places with abundant job opportunities rather than amenity-rich places (Arntz, 2010; Niedomysl and Hansen, 2010; Scott, 2010). In addition, empirical studies conducted under the European context showed that amenities did not affect migration and urban growth to the extent found in the USA (Cheshire and Magrini, 2006; Arntz, 2010; Biagi *et al*., 2011; Faggian *et al*., 2012).

Previous studies have found that individual and household preferences for amenity-rich locations are heterogeneous across the life course (Graves, 1979; Clark and Hunter, 1992; Chen and Rosenthal, 2008; Whisler *et al*., 2008). Some scholars argued that the equilibrium model was more applicable to retired or about-to-retire people than working-age people, in that the former group is more attracted to amenity-rich locations than the latter group (Graves, 1979; Clark and Hunter, 1992; Ferguson *et al*., 2007; Scott, 2010). Chen and Rosenthal (2008) examined how age, marital status, and education jointly affected migration decisions. Whisler *et al*. (2008) divided college-educated population into six life-course groups and found that their valuations of quality of life indicators varied greatly across the life course.

China's interprovincial migrants are predominantly constituted by poorly educated and unskilled rural migrant workers (Shen, 1996; Liang and Ma, 2004). Rooted in the neoclassical approach, previous studies have attributed the initiation and perpetuation of China's internal migration mainly to increasing rural labour surplus fueled by rural industrialisation (Shen, 1995; Liang and White, 1997) and to a widening development gap between the coastal and the inland region as well as between rural and urban areas (Ma, 1999; Shen, 1999; Fan, 2005; Shen, 2013). Studies based on the gravity approach indicated that China's internal migration was predominantly in response to pull rather than push forces (Fan, 2005; Shen, 2012).

As China's managerial and professional elites have crossed a certain income threshold, they may pay more attention to their living standards and quality of life, and their migration decisions may be increasingly affected by spatial variations in amenities. The most recent studies began to gauge the extent to which amenities influence internal migration and the redistribution of skilled people in China. For instance, Qian (2010) and Florida *et al*. (2012) illustrated that the milieu of openness played a significant role in shaping regional talent stock and that service amenities had little effect in this regard. Fu and Gabriel (2012) found some effects of climatic amenities and the cost of living on migration. Nevertheless, the role of location-specific amenities in driving China's population movement remains poorly understood.

Institutional arrangements and market mechanisms jointly determined the spatial patterns and processes of China's internal migration, which distinguishes migration in China from its counterparts in Western-developed countries (Fan,

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2008). The *hukou* system acts as a major impediment to the free flow of labour over space, because local *hukou* status is strictly tied to opportunity structure and differential access to public goods and services in the destination cities (Chan and Zhang, 1999; Fan, 2002; Fan *et al*., 2009).[1] For this reason, *hukou* migration and non-*hukou* migration differed in terms of the spatial patterns and migration mechanisms (Chan *et al*., 1999; Sun and Fan, 2011). Although the state has implemented a series of *hukou* reform and has lowered the *hukou* threshold for wealthy and highly educated migrants in recent years, the *hukou* system remained a powerful gatekeeper that divides local *hukou* holders and non-local *hukou* holders (Chan and Buckingham, 2008). In fact, China's large cities remain restrictive by controlling non-*hukou* migrants' access to government-provided goods and welfare nowadays (Zhang and Tao, 2012).

China's economy has undergone a rapid ownership transformation since the early 1990s (Wei, 2004). State-owned enterprises (SOEs)[2] used to be the dominant ownership type in pre-reform China, but they have become less important to China's economy since the economic reform (Wei, 2004; Oi and Han, 2011). Meanwhile, non-state economy including private enterprises and foreign-invested enterprises (FIEs)[3] has grown rapidly and has absorbed the lion's share of China's labour force (Wei, 2004; Lin and Hu, 2011). For instance, the second economic census reported that the public sector accounted for 6% of the number of firms and 14% of employment in 2008, whereas the private sector accounted for over 70% in the number of firms and 40% of employment (Lin and Hu, 2011). However, SOEs have enjoyed a marked resurgence and have continued to dominate strategic sectors considered to be the pillars of the national economy in recent years (Gabriele, 2010; Oi and Han, 2011).

The progress of ownership transformation has varied greatly by region (Wei, 2004; Lin and Hu, 2011). As the coastal region has benefited more from the reform and has experienced more rapid transformation, the central and western regions have lagged behind (Wei, 2004; Lin and Hu, 2011). Monopolistic SOEs and FIEs are more capable of attracting and retaining skilled labour than other types of enterprises. On one hand, they are more represented in capital-intensive sectors and large-sized enterprises, thus usually absorbing skilled labour through their nationwide recruitment networks (Zhou, 2006; Gabriele, 2010; Lin and Hu, 2011). On the other hand, they can provide high salary and a wide range of benefits to their managerial and professional staff (Zhao, 2002; Chen *et al*., 2005). In this sense, it can be predicted that spatial variations in ownership structure may have some effect on interprovincial skilled migration in China.

METHODOLOGY

Some studies have taken migration decision-making as a sequential decision process: a decision maker first decides whether to move, and given a decision to move, then decides where to move (Liang and White, 1997; Fotheringham *et al*., 2004; Rees *et al*., 2004). Nevertheless, as the decision regarding whether to move is generally based on a rational consideration of the possible migration destination, this paper models jointly the decision to move and the choice of destination and treats staying at the origin province as one among the many possible destination choices (Davies *et al*., 2001; Cushing and Poot, 2004).

This paper examines migration destination choices based on the individual utility maximisation framework. Each individual is assumed to have preferences for over 30 provinces, including his or her original province. The probability of choosing one specific province hinges on attributes of possible destinations and characteristics of migrants themselves. The utility of choosing province j for individual i can be specified as follows:

$$U_{ij} = x'_{ij}\beta + z'_{i}\alpha + \epsilon_{ij}, j = 1, \ldots, 30 \qquad (1)$$

where x_{ij} contains the attributes of the possible destinations, z_i contains the characteristics of the individual, β and α represent the coefficients for destination-specific variables and individual-specific variables, respectively, and ϵ_{ij} represents a set of random variables. Individual i will choose destination j on the condition that the utility of destination j (U_{ij}) exceeds that of any other destination (U_{ik}):

$$P_{ij} = \Pr\left[U_{ij} > U_{ik}\right] \forall k, \quad \text{where} \quad k = 1, \ldots 30 \;\; k \neq j \qquad (2)$$

This study applies the conditional logit model to estimate individuals' destination

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choices (McFadden, 1974; Powers and Xie, 2008). Assuming the disturbance ϵ_{ij}s are independently and identically distributed with identical extreme value distribution, the probability of individual i choosing destination province j (P_{ij}) is given by

$$P_{ij} = \exp\left(x'_{ij}\beta + z'_i\alpha\right) / \sum_{j=1}^{30} \exp\left(x'_{ij}\beta + z'_i\alpha\right) \quad (3)$$

The goodness of fit of the conditional logit model is measure by McFadden's R^2 (or ρ^2) (McFadden, 1974):

$$\text{McFadden's } R^2 = 1 - \ln(L)/\ln(L_0) \quad (4)$$

where $\ln(L)$ is the maximum log likelihood for the model estimated and $\ln(L_0)$ is the maximum log likelihood for the same model with only a constant term. To evaluate the relative importance of one subset of independent variables (say, variables related to job opportunities) against another subset (say, variables related to amenities), we remove each subset from the full model containing all variables and then compare the resulting decreases in ρ^2 (Liaw and Frey, 1998; Ishikawa and Liaw, 2009). The greater the decrease in ρ^2, the more important the removed subset is.

DATA

The empirical analysis is primarily based on 15.22% sample of China's 2005 1% population sample survey (hereafter, 2005 microdata). The 2005 microdata provide geographic, demographic, and socioeconomic information of every single individual. In addition, province-level data come mainly from China's statistical yearbook, 2000 population census, and the second basic unit census.

In the analysis, skilled people are an economically active population aged 24–64 years with a professional college diploma or above, ruling out housewives/househusbands, retirees, students, recent graduates waiting for employment, and the disabled. A skilled migrant is defined as a skilled individual, who, on the date of enumeration (1 Nov 2005), resided in a province different from 5 years ago (1 Nov 2000), and a skilled non-migrant is defined as a skilled individual who stayed in the same province on the survey day. We only consider interprovincial migration because information on intraprovincial migration is not available in the dataset. Finally, the dataset contains 99,937 potential skilled migrants, including 4,567 migrants and 95,370 non-migrants.

Estimating the conditional logit model requires that the data be arranged in the form of person-province records (Powers and Xie, 2008). Specifically, we have data on 99,937 potential migrants, choosing among 30 provinces including the province of current residence. For each potential migrant, there are 30 observations corresponding to the 30 destination choices, yielding a total of $99{,}937 \times 30 = 2{,}998{,}110$ observations. For example, the first observation is for an individual's option of moving to Beijing, the second for moving to Tianjin, and the third for moving to Hebei. Each observation carries information about possible migration distance, place-based attributes of potential destinations, individual characteristics, and interaction terms between them. Note that individual characteristics must be interacted with attributes of potential destinations in the model, because individual characteristics do not differ across potential destinations.

The dependent variable is coded one if the province is selected by a potential migrant as the final destination and zero otherwise. The independent variables related to regional attributes and personal characteristics are listed in Table 1. Diagnostic factors such as the variance inflation factor show no evidence of multicollinearity in the set of independent variables. The gravity variables include skilled population (POP) and migration distance between the origin and the destination (DIST) (Schwartz, 1973; Greenwood, 1975). Two classic economic indicators, average annual wages (WAGE) and urban unemployment rates (UNEMP), are used to capture the effect of labour-market opportunities (Rees *et al.*, 2004; Arntz, 2010; Scott, 2010). It is expected that China's skilled migrants tend to tilt toward regions with higher wage levels and lower unemployment rates (Fu and Gabriel, 2012; Shen, 2012).

Following previous studies, natural (TEMPSEV, PRECIP, and JULYHUM) and man-made amenities (DOCTOR, UNIVSTUD, GREEN, and MUSEUM) are taken into consideration in the analysis (Graves, 1976; Knapp and Graves, 1989; Clark and Hunter, 1992; Glaeser *et al.*, 2001; Florida, 2002a, 2002b). In the case of China, places with more favourable weather (e.g. lower temperature severity and less-humid summer), better urban environment, and a relative abundance of educational, medical, and cultural facilities are assumed to be more attractive

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Table 1. Description of independent variables in the conditional logit model.

Variable	Description	Source
Regional attributes		
DIST	Railway distance between each pairs of possible origins and destinations (km, in log)	Du, 2008
POP	Population aged 24–64 that have attained tertiary education in 2000 (in log)	China's 2000 census
WAGE	Average annual wage in 2000 (CNY, in log)	China statistical yearbook, 2001
UNEMP	Urban unemployment rate in 2000 (%)	China's 2000 census
TEMPSEV	Temperature severity index: difference in temperature between July and June from 2000 to 2005 of the capital (°C)	China statistical yearbook, 2001–2006
PRECIP	Average annual precipitation from 2000 to 2005 of the capital (mm, in log)	China statistical yearbook, 2001–2006
JULYHUM	Average relative humidity in July from 2000 to 2005 of the capital (%)	China statistical yearbook, 2001–2006
UNIVSTUD	Number of university/college students per 1000 inhabitants with local *hukou* status in 2000	China statistical yearbook, 2001
DOCTOR	Number of qualified doctors per 10,000 inhabitants in 2000	China statistical yearbook, 2001
MUSEUM	Number of museums, public libraries, cultural centres, and performance venues per million inhabitants in 2000	China statistical yearbook, 2001
GREEN	Areas of public green lands per capita in 2000 (m^2 per capita)	China statistical yearbook, 2001
SOEEMP	Share of state-owned and state-controlled enterprises in total enterprise employment in 2001 (%)	China Second National Census of Basic Units
FDIPER	Foreign direct investment per capita in 2000 (US$, in log)	China statistical yearbook, 2001
COST	Share of living expenditure in disposable income of urban household in 2000 (%)	China statistical yearbook, 2001
SAME	= 1 if the destination province is the same as the origin province	2005 microdata
Personal attributes		2005 microdata
Age50	= 1 if aged 50-64	
Male	= 1 if male	
Child16	= 1 if have at least one child under 16 in the household	
Elderly70	= 1 if have at least one senior citizen over 70 in the household	
Bachelor	= 1 if have at least one bachelor degree	
Manager	= 1 if work in a managerial job	
Professional	= 1 if work in a professional job	
Local*hukou*	= 1 if have a local *hukou* of current residence	

to highly educated people (Qian, 2010; Florida *et al*., 2012; Fu and Gabriel, 2012).

As proxies for ownership structure, the share of employment in state-owned enterprises and state-controlled listed enterprises (SOEEMP) and foreign direct investment per capita (FDIPER) are included in the models. As mentioned before, compared with other ownership types, SOEs and FIEs are more concentrated in skill-demanding economic sectors and are more attractive to skilled workforce (Li, 1997; Zhou, 2006; Lin and Hu, 2011). Therefore, the variables of SOEEMP and FDIPER are expected to be associated positively with the dependent variable.

In addition, the cost of living (COST) and a dummy variable representing an individual's stay in the original province (SAME) are added to the models. High cost of living, especially high housing price, has been considered a deterrent against inflows of educated migrants (Gottlieb and Joseph, 2006; Venhorst *et al*., 2011). People may be reluctant to leave their original places of residence because of uncertainty, transportation costs, and psychic costs (Schwartz, 1973; Greenwood, 1975). Thus, as the variable of COST is expected to display a negative sign, the variable of SAME is expected to have a positive sign.

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EMPIRICAL RESULTS

Spatial Patterns of Skilled Interprovincial Migration

Table 2 exhibits the spatial patterns of skilled interprovincial migration in China. At the regional level, the figures show that China's eastern coastal region benefited from the influx of skilled labour, whereas the rest of China suffered from brain drain. Specifically, the eastern region had a large in-migration rate (5.98%) and a positive net migration rate (3.23%), with a net gain of 711,000 skilled people in the period 2000–2005; the central region experienced a net loss of 560,000 skilled people, a high out-migration rate (5.04%), and a low in-migration rate (0.86%); the western region exhibited a lower out-migration rate (3.02%) and a higher in-migration rate (1.66%) than the central region, but it still had a net loss of 151,000 skilled people in the period 2000–2005. Evidently, China's skilled people tended to migrate from economically less-developed inland areas to more prosperous coastal areas.

Table 2. Size and rate of skilled interprovincial migration by province, 2000–2005.

	Migration size ('000)			Migration rate (%)		
	In	Out	Net	In	Out	Net
Eastern	**1,316**	**605**	**711**	**5.98**	**2.75**	**3.23**
Beijing	235	67	168	10.43	2.97	7.46
Tianjin	30	32	−2	3.60	3.79	−0.19
Hebei	31	64	−33	1.49	3.12	−1.63
Shandong	67	66	1	2.35	2.30	0.05
Liaoning	34	68	−34	1.48	2.97	−1.49
Shanghai	243	38	205	13.57	2.09	11.48
Jiangsu	117	116	1	3.66	3.63	0.03
Zhejiang	114	41	73	7.00	2.53	4.46
Fujian	40	34	6	3.48	2.90	0.58
Guangdong	392	68	324	10.73	1.85	8.88
Hainan	13	11	2	4.56	3.87	0.69
Central	**116**	**676**	**−560**	**0.86**	**5.04**	**−4.17**
Shanxi	8	32	−24	0.62	2.51	−1.89
Jilin	4	64	−60	0.39	5.63	−5.25
Heilongjiang	10	78	−68	0.61	4.60	−3.99
Anhui	19	80	−61	1.18	5.12	−3.94
Henan	16	91	−75	0.60	3.36	−2.75
Hubei	17	143	−126	0.92	7.51	−6.59
Hunan	20	117	−97	1.05	6.15	−5.10
Jiangxi	22	71	−49	1.83	5.89	−4.06
Western	**185**	**336**	**−151**	**1.66**	**3.02**	**−1.36**
Inner Mongolia	16	24	−8	1.25	1.88	−0.63
Guangxi	29	39	−10	2.16	2.88	−0.72
Chongqing	25	36	−11	2.83	4.08	−1.26
Sichuan	39	73	−34	1.94	3.66	−1.72
Guizhou	19	15	4	2.33	1.82	0.51
Yunnan	12	15	−3	1.34	1.78	−0.44
Shaanxi	14	67	−53	1.02	4.99	−3.97
Gansu	8	28	−20	1.01	3.66	−2.66
Qinghai	7	5	2	2.24	1.72	0.52
Ningxia	6	10	−4	1.75	3.23	−1.48
Xinjiang	10	24	−14	0.79	1.96	−1.18

Tibet was omitted from this table. In-migration, out-migration, and net migration rates are computed as sizes of skilled in-migration, out-migration, and net migration divided by per 1,000 skilled people aged 24–64 years. Figures based on the 2005 1% sample survey have been multiplied by 10,000/(1.325*98.28) because this sample accounts for 1.325% of the total population, with a rate of missing report of 1.72%.
Source: 2005 microdata.

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The data further identify specifically gainers and losers of skilled labour at the provincial level. Most eastern-region provinces received considerable inflows of skilled labour, among which Guangdong, Beijing, Shanghai, Zhejiang, and Jiangsu took the lead in absorbing skilled people. Eight central-region provinces received only a small number of skilled people from elsewhere but experienced massive outflows of skilled labour. Hubei, Hunan, and Henan were the biggest losers in the competition for human capital, with a net loss of more than 75,000 skilled people. By contrast, western-region provinces suffered less than their central-region counterparts from the skilled out-migration, and the central region rather than the western region bears the brunt of the brain drain.

We then gauge the extent to which movements of skilled people affected the regional skilled labour pool by using indicators of in-migration, out-migration, and net migration rates. The results show that eight eastern-region provinces, including Shanghai, Guangdong, Beijing, Zhejiang, Hainan, Jiangsu, Tianjin, and Fujian, had in-migration rates over 3.00%, and that eight provinces in the central and western regions, including Hubei, Hunan, Jiangxi, Jilin, Anhui, Shaanxi, Heilongjiang, and Chongqing, presented out-migration rates over 4.00%. With regard to net migration rates, net migration rates more than 4.00% are found in Shanghai, Guangdong, Beijing, and Zhejiang. In addition, the four eastern-region provinces of Shandong, Fujian, Hainan, and Jiangsu, and the two western-region provinces of Qinghai and Guizhou had positive net migration rates. The rest of China uniformly experienced negative migration rates, among which Hubei, Jilin, Hunan, and Jiangxi were the most prominent donors.

Analysis of Migration Destination Choices

Table 3 exhibits the results from the conditional logit models predicting potential migrants' destination choices. Model I, which includes only attributes of potential destinations, aims to examine the extent to which employment opportunities, amenities, and ownership structure of economy influence destination choices of skilled migrants. The model has a large ρ^2 (0.9171), indicating that it has accounted for the major features of skilled migrants' destination choice behaviours. Two gravity variables are significant and have expected signs. Specifically, the variable of DIST has a negative sign, which is consistent with the conventional wisdom that direct economic costs and indirect psychic costs act as important deterrents to migration (Zipf, 1946; Greenwood, 1975). The variable of POP has a positive sign, which indicates that populous regions are more attractive to skilled people in China.

As expected, the coefficient for WAGE is positive and highly significant, which shows that skilled people tend to move to provinces with higher wage levels. However, the coefficient for UNEMP has an unanticipated positive sign, indicating that places with high unemployment rates are more likely to be migration destinations. This unexpected sign may be partial because skilled migrants are more competitive and have greater flexibility than their less-educated counterparts in seeking new employment, thus being more risk-taking in their location decisions (Venhorst *et al*., 2011). Another explanation is that the influx of university/college graduates without a job in hand may swell the unemployment rate at the destination (Gottlieb and Joseph, 2006).

Both climatic amenities and human-produced amenities have significant impact on destinations chosen by potential migrants. For climatic amenities, the variables of TEMSEV, PRECIP, and JULYHUM have negative signs, suggesting that large temperature severity, excessive precipitation, and high relative humidity in July exert a strong inhibiting impact on in-migration of skilled people. Coefficients of variables related to social and cultural amenities (DOCTOR, MUSEUM, and GREEN) show that regions with a wealth of medical and cultural resources and an abundance of public green space are more attractive to skilled people. Surprisingly, the variable of UNIVSTUD displays a negative sign. This reflects the fact that the opportunities of university education for children are actually a secondary consideration for skilled people in their destination choices.

For regional variations in ownership structure, skilled migrants tilt toward provinces with a larger share of SOE employment and a higher foreign direct investment per capita, which verifies our assumption that SOEs and FIEs are more attractive than other types of enterprise ownership to skilled labour from elsewhere. The variable of COST is significant and negative, indicating that

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Table 3. Coefficients of conditional logit models predicting migration destination choices.

	Model I		Model II		
	Standardised coefficient	Standard error	Standardised coefficient	Standard error	Decrease in ρ^2
Gravity variables					0.0020
DIST	−7.775***	(0.022)	−8.264***	(0.029)	
POP	3.223***	(0.038)	2.647***	(0.046)	
Employment opportunities					0.0082
WAGE	6.741***	(0.106)	13.118***	(0.139)	
UNEMP	0.766***	(0.009)	−0.019	(0.013)	
Amenities					0.0036
TEMPSEV	−4.592***	(0.005)	−4.627***	(0.005)	
PRECIP	−2.546***	(0.049)	−2.469***	(0.058)	
JULYHUM	−0.415***	(0.003)	−0.840***	(0.004)	
UNIVSTUD	−3.681***	(0.007)	−4.817***	(0.008)	
DOCTOR	1.314***	(0.004)	0.975***	(0.005)	
MUSEUM	0.644***	(0.011)	0.862***	(0.013)	
GREEN	0.700***	(0.018)	1.486***	(0.020)	
Ownership structure of economy					0.0001
SOEEMP	1.662***	(0.002)	0.551**	(0.003)	
FDIPER	0.702***	(0.024)	0.824***	(0.028)	
Controlled variables					0.0001
COST	−0.413***	(0.004)	0.206**	(0.005)	
SAME	0.289*	(0.154)	0.170	(0.106)	
Interactions: SAME with personal characteristics					0.0018
SAME * Male			−0.171***	(0.039)	
SAME * Age50			0.408***	(0.115)	
SAME * Child16			0.918***	(0.051)	
SAME * Elderly70			0.237***	(0.161)	
SAME * Bachelor			−0.354***	(0.066)	
Interactions: employment opportunities with personal characteristics					0.0097
WAGE * Bachelor			18.971***	(0.085)	
WAGE * Manager			6.281***	(0.143)	
WAGE * Professional			6.407***	(0.075)	
WAGE * Local*hukou*			−108.600***	(0.111)	
UNEMP * Bachelor			0.722***	(0.008)	
UNEMP * Manager			−0.320*	(0.016)	
UNEMP * Professional			−0.847***	(0.009)	
UNEMP * Local*hukou*			1.532***	(0.009)	
Interactions: amenities with personal characteristics					0.0004
TEMPSEV * Age50			0.200	(0.012)	
UNIVSTUD * Child16			0.190	(0.006)	
DOCTOR * Age50			0.646***	(0.009)	
DOCTOR * Elderly70			0.108	(0.014)	
UNIVSTUD * Local*hukou*			2.175***	(0.005)	
Interactions: other variables with personal attributes					0.0001
COST * Age50			−5.394**	(0.018)	
COST * Child16			−6.596***	(0.009)	
DIST * Bachelor			−0.023	(0.001)	
Log likelihood	−28179.5730		−21190.9220		
ρ^2	0.9171		0.9377		
N	99937 × 30		99937 × 30		

***, **, *denote statistical significance at 1%, 5%, and 10% level, respectively.

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high costs of living at the destinations deter inflows of human capital. The dummy variable of SAME has a positive but weak effect on the probability of choosing one specific province as the final destination, which suggests that China's skilled people are only slightly more likely to stay in the same province when distance-decay effect is controlled.

Model II includes not only variables of place attributes but also four sets of interaction terms between regional attributes and individual characteristics. Adding interaction terms results in a slight increase in ρ^2 from 0.9171 to 0.9377. With a few exceptions, regional variables in model I and model II are largely the same in terms of signs and significant levels. The variable of UNEMP becomes insignificant in model II, probably because, as mentioned previously, skilled migrants are not sensitive to the risk of unemployment. The variable of COST turns out to be significantly and positively correlated with the dependent variable, which indicates that skilled people tend to migrate to high-wage regions regardless of the cost of living. The variable of SAME becomes insignificant, which means that when the variable of distance is held constant, China's skilled people have no preference toward the original province in general.

The first set of interaction terms represents the effect of demographic characteristics on the likelihood of staying in the same province. The results indicate that male skilled people are less likely than female counterparts to stay in the original provinces in China (SAME * Male), and that bachelor's degree holders vis-a-vis college diploma holders have a lower propensity to stay in the original province (SAME * Bachelor). This may be because men and bachelor's degree holders have an advantage over women and college diploma holders in applying for jobs at a remote location. By contrast, those who are close to retirement (SAME * Age50) and who have children under 16 years (SAME * Child16) and elderly people aged over 70 years in the household (SAME * Elderly70) are more inclined to stay in the same province. This bolsters the conventional view that becoming old, child-bearing, and taking care of elderly parents increase an individual's likelihood of settling down in the place of current residence (Whisler *et al*., 2008).

The effect of job opportunities works differently for skilled individuals with different educational and occupational attainment. Specifically, bachelor's degree holders are more likely than college diploma holders to move to places with higher wage levels (WAGE * Bachelor) and higher unemployment rates (UNEMP * Bachelor), which verifies Arntz's (2010) observation that highly skilled individuals are more responsive to interregional wage differentials and the assumption of Venhorst *et al*. (2011) that university graduates have a broader range of possibilities than college graduates to mitigate the adverse effect of unemployment. By contrast, those working in managerial and professional jobs are more inclined to choose places with high-wage levels (WAGE * Manager and WAGE * Professional) and low unemployment rates as migration destinations (UNEMP * Manager and UNEMP * Professional).

Interestingly, local *hukou* status can partially offset the impact of regional differences in job opportunities. Compared with those without *hukou* at the potential destinations, those who are granted local *hukou* are less likely to move to regions with higher wage levels (WAGE * Local*hukou*) and lower unemployment rates (UNEMP * Local*hukou*). Given that holding a local *hukou* still brings a wide range of nonmonetary benefits to the *hukou* holder (e.g. getting access to social security and public school system), local *hukou* status plays a key role in preventing brain drain of economically less-developed regions on the one hand and compensating low expected incomes at the potential destination on the other hand (Fan *et al*., 2009; Zhang and Tao, 2012).

Previous studies have shown that the effect of amenities varies significantly among different life-course groups in the US (Clark and Hunter, 1992; Chen and Rosenthal, 2008; Whisler *et al*., 2008), but our findings indicate that the life-cycle approach is applicable to only a few amenity-related factors. In particular, when considering climatic and social amenities at the destination, no significant difference can be found between working-age and about-to-retire individuals and between households with and without children under 16 years and elderly people over 70 years. The only exception is the interaction term of DOCTOR * Age50, which represents that those who are close to retirement are more inclined to provinces with better medical services.

In addition, regions with more advanced education opportunities are more attractive to skilled

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individuals with local *hukou* at the destinations (UNIVSTUD * Local*hukou*). This may be due to regional discrimination in the process of university admission. Specifically, China's universities usually provide more admission quotas to their home provinces, and a student candidate is admitted on the basis of his or her *hukou* location. Therefore, local *hukou* holders' children will have a much greater chance than non-local *hukou* holders' children to enter local universities.[4]

Places with low costs of living are more attractive to about-to-retire people (COST * Age50) and those who have at least one child under 16 years in the household (COST * Child16), probably because these two social groups care more about their household financial health. DIST * Bachelor displays an insignificant coefficient, which refutes the assumption that the migration distance increases substantially with education (Schwartz, 1973).

The relative importance of the nine subsets of independent variables can be assessed by comparing the decreases in ρ^2 (Liaw and Frey, 1998; Ishikawa and Liaw, 2009). Removing variables related to job opportunities (both interaction terms and place-based variables) from the full model leads to the greatest decrease in ρ^2 (0.0097 and 0.0082, respectively), suggesting that job opportunities have a dominant impact on the destinations choices of skilled individuals. Amenity-related variables (0.0036) and gravity variables (0.0020) turn out to be the third and fourth most important sets of explanatory variables, respectively. By contrast, variables related to ownership structure of economy (0.0001), controlled variables (0.0001), and interactions between other variables and individual characteristics (0.0001) turn out to be the least important in affecting the destination choices. Therefore, the results indicate that Chinese skilled people tend to prioritise job-related factors over amenity-related factors when choosing preferred destinations.

CONCLUSION

On the basis of the data derived from China's 2005 1% population sample survey, this study has examined regional and personal factors that shape destination choices of skilled migrants in the Chinese context. It has particularly focused on the relative importance of employment opportunities, natural and man-made amenities, and the ownership structure of economy in determining skilled migrants' destination choices, and how such place-based factors work differently across different demographic and socioeconomic groups. The results have indicated that their destination choices are shaped primarily by job-related factors, especially interregional income differentials, and that regional variations in amenities and ownership structure play a less important role in this regard. Furthermore, as bachelor's degree holders are more responsive to wage levels and are less sensitive to the risk of unemployment, those working in managerial and professional jobs and those without *hukou* at the destinations are more responsive to wages and employment possibilities. In addition, there is little evidence to support the notion that the effect of amenities differs greatly across life-course groups, but some government-provided amenities such as advanced educational opportunities are more attractive to those who are awarded *hukou* at the destinations.

This paper has advanced our knowledge of the relative weight of employment opportunities and amenities in attracting human capital in the Chinese context. A large body of Western literature has confirmed the importance of amenities in shaping the migration patterns and promoting urban growth over the past few decades (Graves, 1976; Graves, 1980; Cheshire and Magrini, 2006; Ferguson *et al*., 2007; Partridge, 2010). Our findings have suggested that at least in the first half of 2000s, China's skilled people tended to prioritise career prospects over amenity-related issues in their migration decision-making. However, China's skilled migrants may place more importance on amenity-related issues in the future, partly because professional and managerial staff is becoming increasingly wealthy and partly because people's values about work-life balance gradually change over time. Thus, further studies are needed to examine whether amenities play an increasing role in shaping skilled migrants' destination choices by using the upcoming 2010 census data.

In recent years, a vast number of educated and skilled people have flooded China's so-called first-tier cities such as Beijing, Shanghai, and Guangzhou (Bei-Shang-Guang). Although these cities are unlivable to a certain degree because of a series of disamenities such as high housing price, air pollution, and traffic jam, they prevail

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in the war for talent by providing plenty of job opportunities and high quality educational, medical, and cultural facilities. Therefore, more research is needed to systematically assess the relative importance of different amenity-related factors in driving China's skilled migration.

Although marketisation has swept across the country since the inception of economic reform, our findings have inferred that institutions inherited from the socialist period such as the *hukou* system still have some impact upon interregional movements of skilled people. Without local *hukou* status, an individual has less access to public goods and services in the city of residence (e.g. universities and public housing). In this sense, granting local *hukou* can bring considerable benefits to the awardees, thus compensating low expected income at the potential destinations. In recent years, China's local governments have used urban *hukou* as a means to compete for skilled workforce, thereby fulfilling the task of economic growth (Zhang, 2010; Zhang and Tao, 2012). Therefore, although China's skilled people have gained increased impetus and autonomy to vote with their feet, institutional factors continue to affect the migration decision-making process indirectly.

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ENDNOTES

1. To know more about household registration system in China, please see Chan and Zhang (1999); Chan and Buckingham (2008).
2. In a narrow sense, state-owned enterprises (*guo you qi ye*) only include enterprises/companies solely funded by the state (*guo you du zi qi ye/guo you du zi gong si*) and joint state ownership enterprises (*guo you lian ying qi ye*). Since the mid-1990s, many state-owned enterprises have experienced shareholding restructuring and have been transformed into listed enterprises whose controlling stake was owned by the state (*guo you kong gu qi ye*) (Oi and Han, 2011). For the sake of simplicity, in this paper, SOEs refer to both state-owned enterprises and listed enterprises controlled by the state.
3. In this paper, FIEs include not only foreign enterprises but also enterprises with investment from Hong Kong, Macro, and Taiwan.
4. University educational resources are distributed unevenly across China. For example, in 2010, acceptance rates (computed as the ratio of enrollment of students from a province to the total number of candidate students of the province) for students from Beijing, Shanghai, Shandong, and Henan who applied for universities of the first-ranking category were 20.1%, 18%, 7.1%, and 3.5%, respectively.

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