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HUMAN CAPITAL, PERCEIVED DOMESTIC INSTITUTIONAL QUALITY AND ENTREPRENEURSHIP AMONG HIGHLY SKILLED CHINESE RETURNEES

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Over the past two decades, returnee entrepreneurs have emerged as major promoters of business startups and entrepreneurship in China. Recognizing their positive impact in promoting new and innovative companies, Chinese national and local governments have instituted a raft of preferential policies aimed at assisting returnee entrepreneurs. Based on a survey of Chinese returnees and returnee entrepreneurship from 2011 to 2012, this paper examines how human capital and perceptions of domestic institutional quality affect entrepreneurial activity among highly skilled returnees. We find their educational levels, overseas work experience, the degree to which they bring back new business models and their perception of domestic economic opportunities affects the likelihood of such individuals becoming entrepreneurs. Our work suggests regulatory transparency discourages returnees from entering entrepreneurship, suggesting the relationship between regulatory transparency and entrepreneurial behavior is more complex than is portrayed in previous research done on this matter. The results of our analysis are robust against a number of rigorous statistical specification checks.

Keywords: High skilled Chinese returnees, entrepreneurship, human capital, technology resources, perceived institutional environment.

1. Introduction

In recent years, increasingly large numbers of Chinese have returned to the People's Republic after obtaining their higher education abroad, mainly in developed countries, to

grasp improved career opportunities, with many choosing to become entrepreneurs (Xinhua News Net, 2013). To gain a better understanding of the emerging phenomenon of Chinese returnee students, research in both migration and return immigration studies has begun addressing the post-return activities of these individuals and their contributions to China's social and economic development. This research draws from a number of theoretical frameworks. Work based on the "brain circulation" perspective examined the role of entrepreneurial returnee ventures by linking them to regional economic development and technological advancement (Liu *et al.*, 2009, 2011, 2012; Saxenian, 2002a,b, 2006). Research based on human capital theory and social capital theory generally focuses on the key characteristics differentiating Chinese returnees and returnee entrepreneurs from local non-returnees—those who do not have foreign education or work experience. Some studies note that returnee entrepreneurs have a competitive advantage over non-returnee entrepreneurs in terms of firm innovation. Thanks to their time overseas, returnee entrepreneurs have specific commercial and technical knowledge and social capital, including both relational and structural resources, which non-returnee entrepreneurs emerging economies may have difficulty accessing (Dai, 2010; Dai and Liu, 2009; Filatotchev *et al.*, 2009; Liu *et al.*, 2010; Wright *et al.*, 2008). However, very little systematic work exists on the decision-making calculus of returnees who choose to become entrepreneurs.

China has paid considerable attention to creating entrepreneurial opportunities for returnees from overseas. In addition to assembling a cluster of private entrepreneurial firms pursuing technological opportunities, the Chinese government offers tax incentives and subsidies for returnee firms. However, we know little about the factors influencing the returnees' decisions to become entrepreneurs. Therefore, it is useful to rigorously investigate and determine how returnees make decisions regarding their economic activities after returning to China, especially the factors determining the career choices they make. Furthermore, investigating how returnee entrepreneurs' perceptions of domestic institutional quality and economic development affect their decisions to "become entrepreneurial" will shed light on the effectiveness of public policy initiatives seeking to promote such activity. Existing entrepreneurship studies have examined the influence of education levels, professional experience, prior entrepreneurial experience and social embeddedness on the proclivity of individuals to become entrepreneurs (Dahl and Sorenson, 2010; Davidsson and Honig, 2003; Kwon *et al.*, 2013; Lerner and Malmendier, 2012). A study by McCormick and Wahba (2001) has shown that overseas savings, the duration of overseas stays and overseas work experience increased the likelihood of becoming an entrepreneur among the educated Egyptian returnees. A number of studies demonstrate a relationship exists between entrepreneurial activity, economic development and institutional environment. (Aidis *et al.*, 2008; Carree *et al.*, 2002; Wennekers *et al.*, 2005). However, at this point, we know little about the specific factors influencing entrepreneurial inclinations among Chinese returnees.

Therefore, this paper examines the relationship between human capital and returnee perceptions of domestic institutional quality on the one hand and entrepreneurial activity among highly skilled and educated Chinese returnees on the other. In so doing, it seeks to determine if human capital and perceptions of domestic institutional quality positively

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affect the decisions of these individuals' to become entrepreneurs. We use data from a survey on Chinese returnees and returnee entrepreneurship conducted by the Center for China and Globalization (CCG) and the Guanghua School of Management, Peking University, from 2011 to 2012. We find strong evidence supporting the hypotheses that education levels, overseas work experience, whether bringing back new business models, administrative transparency and the perception of domestic economic opportunities significantly affect the likelihood of becoming an entrepreneur among highly skilled Chinese returnees. The results of our analysis are robust against a number of specification checks.

With these results, the paper is an important addition to the rapidly growing literature dealing with the potentially substantial contributions of Chinese returnees to the economic development of the People's Republic. Previous literature on Chinese returnee entrepreneurs simply focused on the contrast between returnees and non-returnees (Filatotchev *et al.*, 2011; Li *et al.*, 2012). We take this analysis one step further by examining the factors affecting whether or not returnees become entrepreneurs. This study contributes to the career choice and entrepreneurship literature by exploring the extent to which individual perceptions of institutional quality, human capital and technological resources have affected the propensity to become entrepreneurs in the context of present-day China.

The remaining sections of this paper are as follows. Section 2 develops the hypotheses regarding the effect of economic and institutional factors on the likelihood of entrepreneurial entry. Section 3 describes the research methodology. Section 4 presents our findings, while section 5 lays out the conclusions that follow from these results.

2. Theoretical Background and Hypotheses

The existing literature on entrepreneurs presents a differentiated picture of these individuals and entrepreneurship. According to Sternberg and Wennekers (2005), entrepreneurship can be occupational or behavioral notions of entrepreneurship. In the case of the former concept, "entrepreneurs" are individual who own and manage their own businesses and take on all of the risks involved in doing so. In the behavioral concept of entrepreneurship, entrepreneurial activity involves seizing economic opportunities, and entrepreneurs do not need to be business owners or self-employed to do that. The Global Entrepreneurship Monitor (GEM) sets forth a two-fold division of entrepreneurial activity between "nascent entrepreneurs" and "baby business managers." The first category refers to individuals "who are actively trying to start a new firm, but who have not done so as yet," while the second refers to the "owner-managers of a new, entrepreneurial firm that is younger than 42 months" (Autio, 2005).

Based on these theoretical concepts of entrepreneurship, this paper distinguishes between two types of economic activities among returnees: entrepreneurs and salaried employees. According to the behavioral notion of entrepreneurship and GEM definition of entrepreneurial activity, we classify returnees as "returnee entrepreneurs" or "salaried employees." The former individuals are those willing to become entrepreneurs or have already started their business as "returnee entrepreneurs," while the latter chose to be an employer or are currently employed by organizations.

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The resource-based theory stresses the importance of human, social, technological and financial resources (Rumelt, 1987; Aldrich, 1999). In light of resource-based theory, a few studies have examined the correlation between human capital, social capital, career choices of returnees (Chen *et al.*, 2012) and their entrepreneurial entry (Nanda and Khanna, 2010; Obukhova, 2012). The study examines the degree to which human capital, technical resources and returnee perceptions of the institutional and economic environment correlate with entrepreneurial activity among returnees. The following section reviews the existing literature for three groups of factors.

2.1. *Human capital and entrepreneurship*

Human capital refers to the stock of individual knowledge and skills possessed by workers that enables them to productive and efficient (Becker, 1964; Mincer, 1974). Individuals obtain knowledge and skills from formal education, especially secondary and post-secondary education, or through work experience and non-formal training, such as job-training programs. Previous studies show a positive relationship exists between human capital and entrepreneurial activity. Davidsson and Honig (2003) state that higher levels of human capital help promote the successful identification and exploitation of business opportunities. Here, we examine four different aspects of human capital—education level, field of academic study, years of overseas work experience and whether or not an individual has previous start-up experience—and their respective impacts on the decisions of returnees to become entrepreneurs.

Some researchers treat the years of education as a proxy for human capital, and plenty of studies tend to support the view that higher education levels increase the probability of new firm formation (Arenius and Minniti, 2005; Blanchflower, 2000; Davidsson and Honig, 2003; Evans and Leighton, 1989). However, the relationship between education and entrepreneurship appears rather uncertain (Arenius and Minniti, 2005), with other work casting doubt on the connection between education levels and entrepreneurship. For example, a study by Blanchflower *et al.* (2001) indicates a negative relationship exists between higher education levels and entrepreneurial activities. Using survey data from the United States and fifteen EU Member States, Grilo and Irigoyen (2006) investigate two aspects of entrepreneurial capacity: latent and actual entrepreneurship. They find the relationship between education and self-employment seems to be U-shaped, meaning both higher and lower education levels have a positive impact on being self-employed. However, they find no connection between the education factor and the probability of becoming self-employed (Grilo and Irigoyen, 2006).

Based on micro-surveys in 70 countries drawn from both rich and poor economies, Blanchflower (2004) finds increases in post-graduate training raises high-tech start-up rates in wealthier countries. The survey results of Chinese returnees and returnee entrepreneurship from 2011 to 2012 conducted by the CCG and Guanghua School of Management, Peking University, find that 90 percent of the returnee entrepreneurs starting their own businesses focus on high-tech or other knowledge-intensive industries (Wang and Bao, 2015). In this study, we examine the explanatory power of higher education levels on

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education levels in promoting entrepreneurship in China. Academic research indicates people gain a specific skill set and knowledge through formal education (Conway *et al.*, 1991). We assume the returnees who have studied economics or commerce possess greater knowledge and skills regarding starting a new business than do those who studied other subjects. We use having a degree in economics or commerce as an independent human capital variable for testing its predictive power with respect to a returnee's intentions to start a new business. We predict that:

H1a: Returnees with a higher education lever are more likely to become entrepreneurs.
H1b: A degree in economics or commerce has a significant impact on the likelihood of returnees becoming entrepreneurs.

While being abroad, returnees absorb not only the technical expertise, managerial and entrepreneurial skills seen in the scholarly literature as being key entrepreneurial inputs (Kenney *et al.*, 2013). During this time, they may also accumulate savings that can provide much-needed capital for successful entrepreneurship. McCormick and Wahba (2001) argue the length of time spent overseas influences the proclivity of individuals to become entrepreneurs. This is because the longer an individual spends overseas, the greater the relevant work experience and opportunity for skill acquisition. Zanakis *et al.*'s findings (2012) support McCormick and Wahba's claim. A study by Davidsson and Honig (2003) shows previous start-up and work experiences both significantly affect nascent entrepreneurs. Based on this existing work, we set forth the following hypotheses:

H1c: Years of overseas work experience positively influence the likelihood of returnees becoming entrepreneurs.
H1d: Returnees who have experience in creating new business ventures overseas are more likely to become entrepreneurs.

2.2. *Technological resources*

Technological resources include both formal technology (such as patents) and informal technology-related skills of the entrepreneurs (Wright, 2012). Zweig *et al.* (2006) argue technology is now generating reverse migration. In their view, returnees who bring back technology can grasp lucrative opportunities and reap substantial rewards. Some researchers also note returnee entrepreneurs who bring back new technology not yet introduced to China have a substantial comparative advantage over the local entrepreneurs who have never gone overseas (Dai and Liu, 2009; Filatotchev *et al.*, 2009; Liu *et al.*, 2010a). Moreover, China proactively works to attract the high-end Chinese overseas talent with a strong background in the natural sciences, engineering, or technology. Local governments especially target talent that is able to bring back new technology that can help these metropolises improve their scientific and technical base to grow the local economy. Therefore, we expect the returnees who bring back new technology from abroad or own patents are more likely to become entrepreneurs. Some returnees also see themselves as taking the business models they learned overseas with them to China. In this study, we use

three variables—bringing back new technology, having own patent, and bringing back new business models—as proxies for the returnees' technological resources and we expect:

H2a: Returnees who bring new technology back to China are more likely to become entrepreneurs.
H2b: Returnees who have their own patent(s) are more likely to become entrepreneurs.
H2c: Returnees who bring new business models back are more likely to become entrepreneurs.

2.3. *Institutional and economic factors determining entrepreneurial entry*

Institutions are defined as the laws, norms, or beliefs that form the "rules of the game" (North, 1990; Scott, 2008; Williamson, 2000), acting as the political, social and legal (both formal and informal) constraints on individuals and organizations (North, 1990; Scott, 2008). It has been widely argued that a country's institutional environment—governmental policies and capabilities, particularly in the fiscal realm, and social values systems—can significantly affect the quality of its entrepreneurship (Kostova, 1997; Sine *et al.*, 2005). A few studies examined the impact of institutions on the choices of individuals to become entrepreneurs (Aidis *et al.*, 2009).

Institutional features can facilitate or constrain entrepreneurial activities by influencing entrepreneurial attitudes and motives, access to resources, costs and opportunities related to starting and expanding a business and overall cultural climate around business creation (Martinelli, 2005). Levie and Autio (2008) argue that government policy is one of the most important determining factors in the perception of entrepreneurial opportunity because government plays a role "from setting up rules and regulations to facilitate economic transactions through meddling more than necessary to blatantly corrupt politicians and bureaucrats treating the economy as prey" (Fogel *et al.*, 2006). The Chinese government implemented a series of preferential policies for returnee entrepreneurs. The incentives include simplified procedures for investment and trade settlement, reduced tariffs on imported educational and R&D equipment, better access to medical care, improved entry-exit services and direct subsidies to high-quality professionals returning from overseas, such as low-cost housing. Yet many factors, especially transparent regulation and information transparency, may affect the extent to which these policies actually help motivate returnee entrepreneurship. Fogel *et al.* (2006) found an effective, transparent and clean government is what really matters in encouraging entrepreneurship. They also found institutional deficiencies, particularly heavy regulatory burdens on business, are positively associated with corruption and raise the cost of information while impeding its flow and retarding the efficient development of capital markets, all of which dampens entrepreneurial activity. Wong (2008) shows how regulatory business costs deter opportunity driven entrepreneurship. We therefore expect that:

Hypothesis 3a: The perception of transparent regulation promotes entrepreneurial entry among returnees.

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Hypothesis 3b: The perception of complex administrative procedures has a negative impact on entrepreneurial entry among returnees.

Schumpeter (1914) observed that "a well-developed financial system is a prerequisite for widespread entrepreneurship," because most potential entrepreneurs lack great personal or family wealth (Fogel *et al.*, 2006). A study by Grilo and Irigoyen (2006) shows perception of complex administrative procedures negatively affects the preference for self-employment. However, their findings also indicate the perception of the availability of financial support has a significant impact only on actual entrepreneurship, but not on latent entrepreneurship. This finding conflicts with other studies on the linkage between financial development and entrepreneurial entry, which indicate an underdeveloped financial system may be a particularly damaging barrier for the entry of new entrepreneurial firms (e.g., Cabral and Mata, 2003; Perotti and Volpin, 2004). We therefore predict that:

Hypothesis 4a: The perception of the difficulty in accessing financial support has a negative impact on the likelihood of entrepreneurial entry among returnees.
Hypothesis 4b: There is a significant negative relationship between higher financial entry costs and the likelihood of entrepreneurial entry among returnees.

To support returnee entrepreneurs, Chinese local and national governments developed more than 150 national returnee entrepreneurial parks throughout the country. By 2011, over 8,000 start-up businesses established in these parks involved more than 20,000 Chinese returnees (Xinhua News Net, 2011). As part of China's policy of promoting a market economy, these parks create a protected environment for entrepreneurial firms competing against well-established businesses, while also providing returnee entrepreneurs with links to scientists, other kinds of social and human capital and access to government subsidies, customers and suppliers. As these new business venture parks and other science parks make it easier for these individuals to accumulate and mobilize the resources needed for business start-ups, we expect such facilities will significantly promote returnee entrepreneurial entry (Goddard and Chouk, 2006; Van de Ven, 1993).

Hypothesis 5: A well-established business support infrastructure increases the likelihood of entrepreneurial entry among the returnees.

Gerlach and Wagner (1994) have argued the availability of skilled labor increases the number of entrepreneurs because such labor is a key input new firms require. Studies have documented the strong linkage between the concentration of skilled human resources, innovation and entrepreneurship (Australian Bureau of Statistics, 2006; Potter and Miranda, 2009). This paper argues that the availability of skilled, qualified personnel are crucial ingredients for Chinese returnee entrepreneurship because such labor reduces the costs and uncertainties associated with the innovation activities of start-up firms, thereby contributing to their successful operation (Breschi and Malerba, 2001).

Hypothesis 6a: A lack of skilled workers decreases the likelihood of entrepreneurial entry among returnees.

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Hypothesis 6b: A lack of technicians decreases the likelihood of entrepreneurial entry among returnees.

2.4. *Other factors*

Wadhwa (2008) has shown the most important factors drawing both Chinese and Indians home are career opportunities, family ties and quality of life. The 2011–12 survey on Chinese returnees and returnee entrepreneurship also indicates the top two reasons given by members of the Chinese diaspora for returning to China are "more economic opportunities" and "having a comparative advantage in a professional field." However, at the same time, a high percentage of correspondents chose the options "reunion with family or friends," and/or "life is more comfortable and steady in China" as their main reasons for returning to China (Wang and Bao, 2015). In this study, we investigate whether these motivations for returning to China affect returnee entrepreneurial activity. In particular, returnees returning to take advantage of economic opportunities probably also perceive lucrative business opportunities, causing them to start—or consider starting—new business initiatives. Therefore, we therefore set out the following hypothesis:

Hypothesis 7: There is a positive linkage between an individual's motivation to return to China to take advantage of business start-up opportunities and the likelihood of becoming an entrepreneur.

A study by De Wit and Van Winden (1989) shows individuals in the agriculture, trade, hotels and repair sectors are more likely to become entrepreneurs. Using survey data for Turkish immigrants to Germany who returned to Turkey, Dustmann and Kirchkamp (2002) find the highest percentage of returnee entrepreneurs is active in the agricultural, trade, service and craft sectors. This paper investigates if the economic sectors a returnee works in or plans to work in after they return to China affect the likelihood of becoming an entrepreneur. We expect that:

Hypothesis 8: There is a positive link between the economic sectors that returnees (plan to) work in and the likelihood of becoming an entrepreneur.

3. Methodology

3.1. *Sampling procedure*

To explore the relationship between prior academic experience and the choice to engage in entrepreneurial activity, we use a dataset from online and offline surveys on returnees and returnee entrepreneurship conducted by the Guanghua School of Management, Peking University, and CCG from late 2011 to early 2012. CCG is a non-profit think tank founded by the China Western Returned Scholars Association (WRSA), an association of scholars originally from China who returned from overseas.

We sent an online survey questionnaire by email to 2,642 persons based on WRSA membership data. This was not a random, but rather a selected sample. The respondents participating in the survey had to meet the following criteria: be of Chinese origins and,

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prior to their return to China, studied abroad as a full-time undergraduate or graduate student and/or worked in the receiving countries for at least one year. The survey questions include the motivation for studying abroad and returning, their feelings for and experiences regarding studying abroad, and trends in their new undertakings and career development; participants returned the anonymous responses online. After collecting the first round of data, we sent two reminder emails to those who had yet to respond. We received approximately 356 valid questionnaires, representing a 13.5 percent response rate.

We also conducted an offline survey during the 2011 Convention of Overseas Chinese Scholars in Science and Technology in Guangzhou, receiving 143 valid questionnaires. Between the two surveys, we received 499 valid questionnaires. Of those returned, 288 participants completed the entire questionnaire. Although the survey results may not generalize to all contemporary Chinese returnees, we expect they are representative of highly educated Chinese returnees.

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3.2. *Variables*

3.2.1. *Dependent variable*

In our statistical models, the dependent variable, *likelihood of choosing whether to become an entrepreneur or not*, is operationalized as adichotomous variable with a value of 1 if the survey respondents were involved in nascent entrepreneurial or actually carried out full-scale entrepreneurial activities.

3.2.2. *Independent variables*

We use indicators to gauge an individual returnee's *human capital: master dummy, overseas work experience, field of academic study* and *overseas entrepreneurial experience.* We use the highest degree of education reported by the subjects to measure their education levels. Subjects chose from a dropdown menu with five categories: (1) Bachelor's degree from an overseas institution, (2) Master's degree from an overseas institution, (3) PhD degree from an overseas institution, (4) Post-doctoral work, (5) No degree. We aggregated the reported data from choices indicating 2 through 4 into a category, "highest completed education is a master's degree or more," which is given the value of 1. We then aggregate the reported data from choices 1 and 5 into a category, "highest completed education is a bachelor's degree or less," which takes on the value of 0. We use the subjects' self-reported overseas work experience, measured in years, as the overseas work experience variable. Similar to the master dummy, we create a dummy variable, which is given the value of 1 in the category if the subject had over five years of overseas work experience, and 0 otherwise. Subjects indicated their fields of academic study when they were pursuing their highest degree program overseas. We create a dummy variable, *field of academic study*, which is given the value of 1 for those studying the natural sciences or engineering, and 0 otherwise. The variable of *overseas entrepreneurial experience* dummy is given the value of 1 for those who reported having previous overseas entrepreneurial experience and 0 otherwise.

We measured an individual returnee's technological resources using his/her responses to three questions on the questionnaires, namely did you *bring back new technology to China*, *bring back new business models to China,* or do you *own a patent(s)*. They responded with the binary choices "yes" and "no." We create three dummy variables, given the value of 1 for the subjects answering "yes," 0 otherwise.

Kostova (1997) suggests the measurement of the institutional profile for entrepreneurship for a country should be limited to a particular cognitive domain because the environmental context affects the actions of individuals through cognitive processes (Bandura, 1986). In contrast to the traditional analyses of institutions, which have relied on "hard" data concerning the existing nature of these bodies (Scott, 1995), this study tests the extent to which an individual returnee's perceptions of the Chinese intuitional environment affect their decision to become an entrepreneur.

Drawing on the theoretical work of Bowen and De Clercq (2008), we develop 7-point Likert-type measurement scales for the variables related to the domestic institutional environment perceived by returnees, with 7 representing "absolutely agree" and 1 "entirely disagree." Bowen and De Clercq (2008) argue that the allocation of entrepreneurial effort within a country is likely significantly influenced by the following institutional factors: "(1) availability of financial capital targeted at entrepreneurship; (2) extent of educational capital targeted at entrepreneurship; (3) regulatory framework (i.e., extent of regulatory protection and regulatory complexity); and (4) level of corruption." The 2011-12 survey on Chinese returnees and returnee entrepreneurs also includes the factor of the extent of existing higher quality human resources to measure the institutional influence on entrepreneurial activities. Some studies show that the degree to which this resource is available to entrepreneurs can affect their ability to be successful in setting up new business ventures (Ács *et al.*, 2013). Thus, we measure an individual returnee's perception of the domestic institutional environment by using seven indicators: the availability of credit; financial costs; business support infrastructure; access to skilled labor; access to skilled technicians; the complexity of administrative procedures; and regulatory transparency. Reporting Cronbach's alpha is 0.749, indicating a high degree of internal consistency of the instrument.

3.2.3. *Other variables*

As in the questions used by Welter *et al.* (2008), we put the reasons why returnees have come back to China into three categories: *optimistic about the domestic economic outlook, individual development problems* and *better life in China.* We then measure each category using the five questions related to its facets (Table 1). The scores on each facet range from 1–7; therefore, scores for each factor range from 5-35. We calculate the weighted mean of each factor and use the highest scores for the three factors as the subject's major reason for moving back to China. We then construct two dummy variables, *optimistic on domestic economic outlook* and *individual development problems*, given the value 1 for the major reason motivating the subject to return China, 0 otherwise.

We asked all of the subjects to state the industries to which their companies or employers belonged after they returned to China. We create a dummy variable, *primary*

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Table 1. The motivations for returning to China.

Factors	Optimistic on Domestic Economic Outlook	Individual Development Problems	Better Life in China
Facet 1	Have comparative advantage in a professional field	To be united with family and friends	Difficult to integrate well into foreign society
Facet 2	Optimistic domestic economic outlook	Life is more comfortable and steady in China	Lack proper career opportunities
Facet 3	Existing opportunities in domestic market	Tired of boring eventless overseas life	Failing to renew the visa
Facet 4	Attractive preferential policies	Show patriotism and China's political pattern presents stable	Career bottleneck
Facet 5	Having strong domestic social network	Feel more comfortable under Chinese cultural environment	Feel sense of discrimination

sector, given value 1 for the respondents who (will) work in primary industry, such as agriculture and fishing, 0 otherwise. We create a dummy variable, *secondary sector*, given value 1 for the respondents who (will) work in secondary industry, such as manufacturing and innovative energy, 0 otherwise.

Table 2 includes all of the variables from the survey used in the nonparametric and regression analyses.

Table 2. Related variables used.

Variables			Description	Mean
Human capital	Education levels	X_1	1: Highest completed education is master's degree and higher than that; 0: others	0.913
	Academic major	X_2	1: Science and engineering; 0: others	0.634
	Overseas work experience	X_3	1: Reported overseas work experience over 5 years; 0: others	.460
	experience	X_4	1: Had it before; 0: others	0.348
Domestic institutional environment	Difficulty of access loan	X5	The extent to which it is difficult to get loan	4.679
	Financial costs	X6	The scales of financial cost	4.561
	Well established business support infrastructure	X7	How well the business support infrastructure is	4.798
	Lack of skilled workers	X8	The extent to which it is difficult to get skilled workers	4.125
	Lack of skilled technicians	X9	The extent to which it is difficult to get skilled technicians	4.146
	Transparency in regulations	X10	The extent to which regulations are transparent	4.321
	Straightforward administrative procedures	X11	The extent to which administrative procedures are simple and easy	4.575

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Table 2. (*Continued*)

Variables			Description	Mean
Technological resources	New technology	X12	1: Bring back new tech to China; 0: others	0.634
	New business model	X13	1: Bring back new business model; 0: others	0.505
	Patent	X14	1: Own patent(s); 0: others	0.247
Motivation of return China	Domestic economic outlook	X15	1: Return because optimistic about domestic economic outlook; 0: others	0.690
	Individual development issues	X16	1: Face individual development issues at overseas; 0: others	0.062
Economic sectors	Primary industry	X17	1: Had experience in primary industry; 0: others	0.017
	Secondary industry	X18	1: Had experience in secondary industry; 0: others	0.652

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4. Results

4.1. *Descriptive overview of returnee's career choice*

Table 3 shows the distribution of the survey respondents' career choices. Nearly 60 percent of the respondents are involved in entrepreneurial activities, with 38.9 percent planning to start a new venture and 20.83 percent having started their own ventures. Using Pearson's *p*-values, we find that the master dummy, field of academic study, length of overseas work experience, overseas entrepreneurial experience, whether bringing back new technology to China, whether bringing back new business models to China, and whether owning a patent(s) all have a significant positive effect on the possibility of these returnees becoming an entrepreneur.

4.1.1. *Human capital, technology resources, other variables and the returnee's career choice*

Table 4 includes the distribution of human capital, technical resources and other variables for the returnee's career choice. Using a Chi-square test, we test the location of the distributions of variables for the likelihood that being entrepreneurs and being salaried employees is the same.

Table 3. The distribution of survey respondents' career choice.

Career Choice	Population	Percentage
Business owner	71	24.65%
Currently employed	60	20.83%
Plan to start a new business	112	38.89%
Plan to become a salaried employee	45	15.63%
To sum up	288	100.00%

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Table 4. The distribution of human capital, technology resources, and other variables

	Percent of Total Population	Percent of Population of Entrepreneurs	Percent of Population of Salaried Employee	Chi Square P Value
Education levels				0.008
Bachelor's degree	3.47% (N=10)	1.09% (N=2)	7.62% (N=8)	
Master's degree	37.85% (N=109)	33.88% (N=62)	44.76% (N=47)	
Doctor's degree	32.99% (N=95)	36.61% (N=67)	26.67% (N=28)	
Post doctor	23.61% (N=68)	25.68% (N=47)	20.00% (N=21)	
No degree	1.74% (N=5)	2.19% (N=4)	0.95% (N=1)	
Academic major				0.000
Science and engineering	66.67% (N=192)	74.32% (N=136)	53.33% (N=56)	
Others	32.29% (N=93)	4.04% (N=44)	6.67% (N=49)	
Overseas work experience				0.000
No more than 5 years	60.76% (N=175)	49.18% (N=90)	80.95% (N=85)	
More than 5 years	39.24% (N=113)	50.82% (N=93)	19.05% (N=20)	
Overseas entrepreneurial experience				0.000
Yes	34.72% (N=100)	48.63% (N=89)	10.48% (N=11)	
No	64.93% (N=187)	50.82% (N=93)	89.52% (N=94)	
Bring back new technology to China				0.000
Yes	65.28% (N=188)	78.14% (N=143)	42.86% (N=109)	
No	34.72% (N=100)	21.86% (N=40)	57.14% (N=60)	
Own a patent				0.000
Yes	24.65% (N=71)	32.79% (N=60)	10.48% (N=11)	
No	75.35% (N=217)	67.21% (N=123)	89.52% (N=94)	
Bring back new business model				0.000
Yes	50.35% (N=145)	63.39% (N=116)	27.62% (N=29)	
No	49.31% (N=142)	36.07% (N=66)	72.38% (N=76)	
Motivation of return China				0.002
Optimistic economic outlook	69.10% (N=199)	76.50% (N=140)	56.19% (N=59)	
Facing difficulties of staying abroad	6.25% (N=18)	4.37% (N=8)	9.52% (N=10)	
Life is more enjoyable in China	24.31% (N=70)	19.13% (N=35)	33.33% (N=35)	
The economic sector returnees worked in				0.000
Primary industry	1.74% (N=5)	1.64% (N=3)	1.90% (N=2)	
Secondary industry	64.93% (N=187)	79.23% (N=145)	40.00% (N=42)	
Tertiary industry	32.99% (N=95)	18.58% (N=34)	58.10% (N=61)	

Note: Some observation contains missing values.

The largest number of survey respondents have a master's degree from abroad, representing 37.9 percent, followed by 33 percent with a PhD and 23.6 percent studied overseas. Using a Chi-square test, we strongly reject the notion that the distributions of the master dummy for returnees' career choices for being an entrepreneur or a salaried

employee are the same (Pr = 0.000). A higher percentage of returnee entrepreneurs (74.3%) studied science and engineering compared to the survey respondents choosing to be salaried employees (53.3%). The majority of survey respondents have overseas work experience and 39.2 percent of the respondents have over 5 years of overseas work experience. Of these, over half chose to become entrepreneurs, while less than 20 percent opted to become salaried employees. Over one-third of the respondents and nearly half of the returnee entrepreneurs accumulated entrepreneurial experience during their time abroad. The results of Chi-square tests strongly suggest the distributions of fields of academic study (Pr = 0.000), overseas work experience (Pr = 0.000) and overseas entrepreneurial experience (Pr = 0.000) for returnees' career choices are not the same.

Most of the survey respondents brought both new technology and business models back to China. Some of these individuals also own patent(s). Moreover, compared to salaried employees, a higher percentage of returnee entrepreneurs brought new technology and business models back from abroad and have their own patent(s). Some 78.1 and 63.4 percent of the returnee entrepreneurs come back to China with new technology and business models, respectively; the corresponding figures for returnees choosing salaried employment is 42.9 and 32.8 percent, respectively. The results of Chi-square tests suggest the distributions of introducing new technology (Pr = 0.000) and business models (Pr = 0.000), along with owning a patent(s) (Pr = 0.000) for returnees' choosing entrepreneurship vs. salaried employment are not the same.

A high percentage of respondents (69.1%) stated they moved back to China because of an optimistic domestic economic outlook, with less than ten percent citing individual development problems overseas. Most returnees already work in or plan to work in both secondary and tertiary industries, with only 1.7 percent seeking employment in primary industry. The results of Chi-square tests suggest the distributions of reasons for returning to China (Pr = 0.000) and distributions of economic sectors (Pr = 0.002) for returnees' career choices are not the same.

4.1.2. *Perception of institutional environment and returnee's career choices*

Table 5 reports the mean scores of the perception of institutional environment for the likelihood of being returnees or salaried employees at facet levels, respectively, as well as Kolmogorov-Smirnov test *p*-values for the differences between the underlying distributions.

Table 5 illustrates how the nonparametric findings clearly show there is no significant relationship between returnees choosing to be entrepreneurs or salaried employees and their perception of the institutional environment. The next section includes personality on the facet level in the regressions to confirm or reject the nonparametric findings.

4.2. *Regression analysis*

This subsection undertakes econometric analysis to see if and how individual career choices vary with human capital variables, technology resources, returnee perceptions of the institutional environment, their motivations for returning to China and the economic sector they now work or plan to work in.

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Table 5. The mean scores of perceived institutional environment variables in the distribution of returnees' career choices

Variables	Mean Scores		Kolmogorov-Smirnov p-Value
	Entrepreneurs	Salaried-Employees	
Difficulty of access loan	4.70	4.35	0.19
High financial cost	4.80	4.79	1.0
Well established business support infrastructure	4.73	4.59	0.55
Lack of skilled worker	4.58	4.53	1.0
Lack of skilled technicians	4.10	4.16	0.945
Straightforward administrative procedures	4.23	4	0.602
Transparency in regulations	4.26	4.04	0.622

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Table 6 presents the estimated results from different specifications of the Logit model testing for the possibility of being a returnee entrepreneur—including goodness-of-fit measures and LR test statistics. Model A tests for the likelihood of subjects being entrepreneurs, controlling for all relevant variables. Only *overseas entrepreneurial experience* has a strongly significant effect on being an entrepreneur, with a positive sign among our four measures of human capital, thereby supporting H1d. *Bringing back new business models* and *owning a patent* have a significantly positive impact on the likelihood of being an entrepreneur, supporting H2b and H2c. The reason bringing back new technology to China is insignificant probably results from multicollinearity because the variable of bringing back new technology to China is highly correlated to other variables, including the length of overseas work experience, overseas entrepreneurial experience, bringing back new business models, patent(s), and employment the secondary industry (see Table 6).

Significant correlations exist between *transparent regulations* and being an entrepreneur. The same holds true for *high financial costs;* furthermore, *straightforward administrative procedures* show a significant effect on the possibility of becoming an entrepreneur. All of these independent variables have negative signs. The finding that straightforward administrative procedures negatively affects the possibility of being an entrepreneur is puzzling and difficult to explain. It likely results from the high multicollinearity because a significant correlation exists between the straightforward administrative procedures variable and the variables of limited access to loans and high financial costs, well-established business support infrastructure, lack of skilled workers, lack of technicians, transparent regulations and optimistic economic outlook, which supports hypotheses 3a and 4b. The regression results show there is no significant relation between *access to financial support* and the likelihood of becoming an entrepreneur, which is probably because most returnee entrepreneurial start-up ventures are bootstrap businesses or firms established without external help or outside capital. Therefore, the most important capital resources for these entrepreneurs are their own personal savings or help from family members and friends. In our case, of the 72 survey respondents who established their own businesses, only three state they acquired part of their start-up capital from a bank loan. Therefore, no significant impact exists from accessibility of bank loans on the possibility of becoming an entrepreneur among the Chinese returnees. Hence, there is no

Table 6. Logit model of marginal effects report on returnee's career choice.

	Model A dy/dx	Model B dy/dx	Model C dy/dx
Human capital			
Education level	−.0883 (0.58)		−.0751 (0.62)
Academic major	.131 (0.11)	.142(0.07)*	.115 (0.14)
Length of overseas work experience	.220 (0.13)	.151(0.04)**	.214 (0.13)
Entrepreneurial experience	.242 (0.00)***	.237(0.00)***	.232 (0.00)***
Perception of institutional environment			
Difficulty of access loan	.004 (0.89)		
Financial costs	−.068 (0.10)*	−.015(0.47)	
Business support infrastructure	.0164 (0.51)		
Lack of skilled workers	.0404 (0.52)		
Lack of skilled technicians	.0141 (0.83)		
Transparency in regulations	.085(0.01)***	−.015(0.02)**	
Straightforward administrative procedures	−.0631 (0.07)*	−.044(0.15)	
Technology resources			
New technology	.1641 (0.29)		.171(0.26)
New business model	.268(0.00)***	.274 (0.00)***	.273(0.00)***
Patent	.128 (0.10)*	.149(0.04)**	.157(0.03)**
Motivation of return China			
Domestic economic outlook	.163(0.07)*	.151(0.05)**	.156(0.07)*
Individual development issues	.112 (0.32)		.0401(0.77)
Economic sectors			
Primary industry	.121 (0.53)		.138(0.46)
Secondary industry	.384(0.00)***	.380(0.00)***	.368(0.00)***
Observations	287	287	287
AIC	272.4091	262.8478	268.2537
BIC	341.9393	303.1021	312.1675
Pseudo R2	0.3781	0.3611	0.352
LR test		Model B vs Model A Prob > chi2 = 0.5982	Model C vs Model A Prob > chi2 = 0.1976

Note: *p*-values in parentheses. Significance levels are indicated by asterisks: ***> 0.001 **> 0.05 *> 0.10.

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significant impact on becoming an entrepreneur from variables regarding the existence of human capital and a well-established infrastructure.

Compared to the respondents who return because of opportunities for a better life in China, those who return because of an *optimistic domestic economic outlook* are highly likely to become entrepreneurs, thereby supporting hypothesis 7. Compared to the subjects who (plan to) work in tertiary industry, the respondents who (plan to) work in secondary industry are more likely to start a new venture, which demonstrates support for hypothesis 8.

Model B is a restricted version of Model A, which includes variables from Model A that are significant at the 15 percent level. We use Model B to test the robustness of results. Except *the financial costs* and *straightforward administrative procedures* variables, all other significant variables remain significant in the more restricted Model B, which confirms the significant findings of Model B are robust. We find the sign of *transparency in*

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regulations changes in model B to indicate regulatory transparency significantly discourages entrepreneurial entry. This result is at odds with the findings of previous research. Previous studies indicate regulatory transparency is a key factor in creating a conducive environment for a flourishing private sector, while high levels of corruption negatively affect the confidence and willingness of individuals to set up new businesses (Aidis *et al.*, 2009; Estrin and Mickiewicz, 2010). A possible explanation for our anomalous finding is the way in which the perception of regulatory non-transparency affects the expectations of returnees. In particular, these expectations could lead to poor institutional practices on the part of business people, such as rent seeking entrepreneurial activities, especially when the government controls most of the resources. In this respect, regulatory transparency not only shapes entrepreneurial behavior, but influences it as well, creating a complex interaction between the two. Another thing worth noting is that *field of academic study* and the *length of overseas work experience* are more significant, moving from the 15 percent significance level to ten and five percent, respectively, in Model B. *Patent ownership* and *optimistic on domestic outlook* both shift from the ten percent significance level to five percent. Other significant variables remain at the same level and with the same signs. Comparing Models A and B, Model B provides a better data–lower BIC criterion fit. Using the LR test, we cannot reject the null hypothesis that the reduced Model B is the preferred model.

Model C corresponds to the unrestricted Model A, but we exclude the perceived institutional environment to test the extent to which the results depend on the presence of institutional environment variables. The first thing to notice from the table is that only *patent* changes from the ten to five percent significance level without controlling for institutional environment variables. Other variables remain at the same significance levels and have the same signs. Using the LR test, we cannot reject the null hypothesis that the reduced Model C is preferred to Model A. However, comparing Models C and B, the R-squared of Model C is lower but BIC criterion is higher, corroborating that some perceived institutional environment variables can affect the likelihood of being entrepreneurs. Therefore, Model B is our preferred model.

5. Conclusion and Discussion

Using secondary data for a sample of highly skilled Chinese returnees obtained from surveys conducted from the end of 2011 to early 2012, we employed a logistic regression analysis to examine the impact of human capital, perceived intuitional environment, technical resources, motivation for returning home, and economic sector on the likelihood of such individuals becoming entrepreneurs. We found returnees who *studied natural sciences and engineering, have over 5 years work experience, have overseas entrepreneurial experience, bring back new business models to China, own their own patents, work in the secondary industry,* and who are *optimistic regarding China's economic outlook* are more likely to become entrepreneurs. In addition, the perception of *transparent regulations* decrease the possibility of entrepreneurship among the returnees.

The paper contributes to the literature on returnees' career choices regarding entrepreneurship in several ways. First, the existing literature on returnee entrepreneurs has

simply focused on key characteristics of returnees, emphasizing the differences between returnees and non-returnees (Filatotchev *et al.*, 2011; Li *et al.*, 2012). We have taken this orientation one step further by examining the role of human capital variables and technological resources on the likelihood of returnees becoming entrepreneurs. Second, we examined the role of perceived institutional environment quality with respect to the possibility of becoming an entrepreneur among the returnees. In addition, the study contributes to the literature on the career choices made by reverse migrants by showing how the motivation to return to the sending country may affect their economic activities after returning home.

Our work suggests regulatory transparency discourages returnees to enter entrepreneurship. As was noted earlier, this may suggest the relationship between regulatory transparency and entrepreneurial behavior is more complex than is portrayed in previous research conducted on this matter. Government control over resources matters considerably in influencing the interaction between these variables in the Chinese context. In recent years, China's national, provincial and local level governments, as well regional returnee parks, developed numerous schemes, including various innovation funds and providing generous education and welfare benefits to the children and families of returnee entrepreneurs to promote returnee entrepreneurship. In terms of future research, we suggest further testing of our anomalous results regarding regulatory transparency and new business formation to determine if they are sensitive to these subsidies and China's overall development level.

One limit to this study is the lack of demographic information regarding the respondents' gender and age range; therefore, these relevant variables could not be included in the models. In future research, we intend to investigate the extent to which the bi-cultural identities of returnees affect their entrepreneurial propensity.

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