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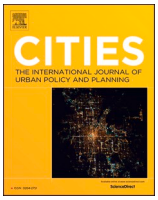

What attracts young talents? Understanding the migration intention of university students to first-tier cities in China

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ABSTRACT

In recent years, China has witnessed fierce competition for talents among cities. There is evidence that China's first-tier cities are losing their appeal for young talents due to the soaring housing prices and high living costs in first-tier cities, as well as the catch-up of next-tier cities. Therefore, uncovering what factors drive young talents to develop in first-tier cities is important for policymakers to maintain and enhance the attractiveness of first-tier cities. Most previous research on talent migration has focused on demographic and socioeconomic factors, while little research has examined the influence of psychological factors. By adopting the Theory of Planned Behavior (TPB), this paper aims to explore what beliefs and background factors influence university students' intention to develop in first-tier cities after graduation. Using the data we collected from 1242 university students across China, we found that two-thirds of university students have the intention to develop in a first-tier city after graduation. The Structural Equation Modeling (SEM) results show that students' migration intentions were most influenced by their attitudes, followed by subjective norms and perceived behavioral control (PBC). Specifically, beliefs such as realizing future dreams, better job opportunities, and higher wages shape students' positive attitudes towards developing in first-tier cities. The supports from family, friends, teachers, and classmates contribute to positive subjective norms of developing in first-tier cities. In contrast, perceptions of high housing prices, high living costs, and family ties discourage students from developing in first-tier cities. Furthermore, being male, being a non-only child, studying in first-tier cities, and attending higher-ranking universities have positive influences on migration intention through the mediating effects of the TPB constructs. Policy implications were discussed to help first-tier cities attract graduates.

1. Introduction

With the advent of the knowledge economy, how to attract and retain talents has become one of the most significant discussions in the development of regions and cities worldwide (Arntz, 2010; Darchen & Tremblay, 2010; Esmaeilpoorarabi et al., 2016). The view that human capital is of great importance to regional growth and development has been widely agreed upon by scholars and policymakers (Corcoran et al., 2010; Florida, 2005). A number of studies have provided empirical evidence that supports the talent-regional growth relationship. For example, Rauch (1993) revealed that both salary and housing rents were higher in cities with higher average educational levels in the United States. In their study of English cities from 1861 to 1961, Simon and Nardinelli (1996) found that cities with higher proportions of talents grew more rapidly. Similarly, Simon (1998) identified a positive, large, and persistent relationship between the average level of human capital and regional employment growth over a considerable time frame in the United States. Universities are important sources for human capital cultivation and play crucial roles in importing human capital into regions (Haapanen & Tervo, 2012). Therefore, the migration of university students - graduating from university and entering the workforce somewhere - has received considerable academic interest (Faggian & McCann, 2009; Greenwood, 1973; Venhorst & Corvers, 2018). Policymakers in various regions and cities have taken initiatives to retain local university students and attract university students from outside the region (Gottlieb & Joseph, 2006; Raco, 2008). In line with China's economic transformation and development in recent years, the thirst for talent has become ever more intense. To attract and retain talents, various cities in China launched a heated “competition for talents”. A series of policies have been introduced to attract and retain university students in the form of settlement subsidies, housing subsidies, and living subsidies. For example, in 2017, the city of Zhengzhou launched

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the "Smart Zhengzhou" talent program which provided a three-year living allowance of 1500, 1000, and 500 RMB per month for graduates with a doctoral, master's, and bachelor's degree respectively, if they settle in Zhengzhou after graduation.

Previous studies found that university students tend to develop in first-tier cities[1] after graduation because they offer access to higher salaries and better urban services (He et al., 2016; Liu & Shen, 2014a). However, some recent studies suggest that high housing prices, fierce employment competition, and low residential satisfaction are leading to a gradual decline in the proportion of graduates going to first-tier cities, while enthusiasm towards going to second-tier and other cities is on the rise (Chen et al., 2019; Lin et al., 2021). For example, the net talents inflow ratio[2] in the first-tier cities decreased with 0.8%, −0.5%, −0.9% and −2.7% from 2016 to 2019. In contrast, the net talent inflow ratio in the second-tier and third-tier cities showed a continuous increase in the same period, with (0.60%, 3.20%, 3.60%, 1.10%) and (0.40%, −0.30%, −0.30%, 1.80%) respectively (TPN, 2021). Furthermore, according to the report released by the McKinsey Institute (2021), the proportion of university students opting to work in first-tier cities after graduation decreased from 26% in 2015 to 17% in 2020. This shows that the demand for talents remains acute in first-tier cities. For example, among the top ten cities with the most high-tech companies in China, the number of high-tech companies located in first-tier cities accounted for 64% of the total number (Yicai, 2021). Researchers believe that as the number of talents in first-tier cities decreases, the labor cost of enterprises will increase, and innovation vitality will inevitably be constrained (Daily, 2021). The brain drain may become a serious deterrent to the sustainable development of cities (Zhou et al., 2018), necessitating a more in-depth and evidence-based understanding and analysis of the drivers of talents' migration intention to first-tier cities. Instead of encompassing all kinds of talents, this paper focuses on only one specific group: university students. It is because university students constitute the majority of future talents and are the main targets of 'talent competition' among China's cities.

Numerous international studies have attempted to examine the factors influencing the university-to-work migration of university graduates. An earlier study by Greenwood (1973) argued that factors influencing the migration behavior of US graduates were: the size of the regional labor market, (un)employment rates, and specific regional characteristics such as regional livability. For instance, Greenwood (1973) argued that the larger the size of the labor market, the greater the number of jobs it would provide and, therefore, the higher the expected in-migrants of the region. Kodrzycki (2001) later added that house prices, quality of life, and prior migration experience also affected the US graduates' migration behavior. For example, high house prices at the destination discourage the migration behavior of university students. Several aspects have been identified as crucial factors influencing the migration behavior of UK graduates. A series of studies by Faggian and his colleagues found that regional innovation and differences in job opportunities and wages drive graduates' migration behavior (Faggian et al., 2007b; Faggian & McCann, 2009). Besides, they argued that migration is associated with personal characteristics such as gender and ethnicity (Faggian et al., 2006, 2007c). The research by Marinelli (2013) and Dotti et al. (2013) on the mobility of Italian graduates from south to north yielded similar results. Their findings suggested that regional economic base, labor market dynamics (regional job vacancies), graduates' academic background and employability skills influence graduates' migration choices.

While these studies provide important insights, significant gaps remain in this field. To begin with, most existing research agreed that university students' migration behavior after graduation was related to the information that they obtain about the origin and the intended destination (Greenwood, 1973; Herzog et al., 1985). The predominant "push-pull theory", for example, suggested that 'push' factors of origin and 'pull' factors of destination together influenced graduates' migration decisions (Dorigo and Tobler, 1983). They stressed the importance of variations in 'push' and 'pull' factors across regions and the impact of differences in information about the 'push' and 'pull' factors that different people accessed (Farivar et al., 2019; Van Hear et al., 2018). However, they overlooked the fact that most people do not have perfect information and different people react to the information differently, thus resulting in variations in people's subjective perceptions towards the migration behavior. In the decision-making process, subjective perceptions are considered to be the ultimate component that leads directly to people's migration intention (Lee, 1966; Lu, 1998). Therefore, further research is needed on how subjective perceptions, such as attitudes and subjective norms, shape migration choices. Furthermore, many studies have focused on graduates of a specific profession or degree (Dotti et al., 2014; Gesing and Glass, 2019; Gottlieb & Joseph, 2006) or graduates from a specific city (Cui et al., 2016). However, research about determinants of graduates' migration intention across different majors and degrees at a national level is insufficient. Furthermore, most current studies on Chinese talent migration are not based on theoretical frameworks and hence only provide scattered evidence and cannot ensure generalizability in the research field (Liu et al., 2017; Shi, 2015; Wang et al., 2020).

The current paper aims to better understand the intention and its driving factors of Chinese university students to develop in first-tier cities after graduation. Based on the Theory of Planned Behavior (TPB) (Ajzen, 1991), an online survey was conducted to collect data on the intention to develop in first-tier cities from 1242 university students from all over China. The TPB provides the opportunity to analyze the students' attitude, subjective norms, and perceived behavioral control (PBC) as well as the underlying beliefs (perceptions about consequences and possibilities) towards developing in a first-tier city.

Specifically, the following questions are addressed:

1) What is the proportion of university students who intend to develop in a first-tier city after graduation from 2021 onwards?
2) To what extent is the intention of university students to develop in a first-tier city after graduation explained by attitudes, subjective norms, and PBC?
3) What beliefs about first-tier cities do university students hold that influence their attitudes, subjective norms, and PBC to develop in a first-tier city after graduation?
4) Do differences in personal background factors contribute to variations in beliefs, attitude, subjective norm, and PBC and the intention to develop in a first-tier city?

The remainder of the paper is structured as follows. The next section provides an overview of the theories of migration and introduces the TPB and the rationale for using it. The third section describes the data collection process and statistical methods. The fourth section presents the findings, followed by a discussion of the results in section five. The paper concludes with the main findings and policy implications.

2. Theoretical framework

2.1. Theories of migration

Researchers have developed a variety of theoretical frameworks to explain and predict human migration behavior. The oldest theory of

[1] It is recognized and a common practice to classify China's mainland cities into "tiers". According to the National Bureau of Statistics, four first-tier cities are Beijing, Shanghai, Guangzhou, and Shenzhen. There are 31 s-tier cities, which are mostly provincial capital cities (e.g., Wuhan) or sub-provincial cities (e.g., Qingdao).

[2] The net talent inflow ratio is equal to (number of talents flowing into a city - number of talents flowing out of a city) /total number of migrant talents across the country.

migration dates back to Ravenstein's Laws of Migration (Ravenstein, 1885), which claimed that the call for labor in the canters of industry and commerce is the prime cause of the flow of migration in the UK. This theory also argued that most migrants in the UK only migrate short distances. When people choose to migrate long distances, they choose the great centers of commerce and industry which offer better facilities (Ravenstein, 1885,p.198). In the early twentieth century, geographers developed the 'gravity model' inspired by Newton's law of gravity to predict the volume of migration between cities, regions, and countries (Castles, 1998, p. 28; Karemera et al., 2000; Vanderkamp, 1977). Despite the existence of some variants (Haynes & Fotheringham, 2020), the gravity model basically claims that the volume of migration is proportional to the product of the population size between two regions and inversely proportional to the square of the distance separating them. In his widely cited paper "A Theory of Migration", Lee (1966) argued that migration behavior was influenced by 'plus' and 'minus' factors in four dimensions: factors related to the place of origin, factors related to the destination, disturbance factors, and personal characteristics. These types of theoretical frameworks are frequently referred to as 'push-pull' models (Passaris, 1989). Despite its practicality, the 'push-pull' models have received much criticism for failing to unravel the interactions between the influencing factors of migration (Skeldon, 1990).

The neoclassical theory views migration as a part of the overall national development process through which surplus labor from the rural sector becomes labor for the urban industrial economy (Castles, 1998; Lewis, 1954). Due to wage gaps, workers migrate from low-wage, labor-surplus regions to high-wage, labor-scarce areas, which will finally result in the convergence between wages in the two areas (Castles, 1998; Harris & Todaro, 1970). However, neoclassical theory is based on the premise that people are rational actors—that is, their decisions about migration are governed by the goal of maximizing their income or 'utility', and they are completely aware of the salary levels and job opportunities in the intended destination area, which is unrealistic in real-life migration (Coolen et al., 2002; Boelhouwer, 2011; Hu et al., 2020; Lee, 1966).

In a nutshell, both 'push and pull' and neoclassical theories have overlooked the role of 'human agency' in migration behavior. As Castles (1998) put it:

('Push and pull' and neoclassical theories) portray human beings as socially isolated individuals who passively and uniformly react to external factors, while people's aspiration and capability to migrate actually depends on factors such as age, gender, knowledge, social contacts, preferences, and perceptions of the outside world. These theories generally do not consider how migrants perceive their world and relate to their kin, friends, and community members. (Castles, 1998, p. 31).

Personal characteristics, such as sensitivity and intelligence, can influence the evaluation of information (Fishbein & Ajzen, 2011), while access to migration information also depends on personal accessibility or sources of information that are not generally available (Greenwood, 1973). Therefore, the decision to migrate is never entirely rational and for some people, the rational component is much lower than the irrational component. Therefore, in addition to objective factors, it is important to identify what subjective beliefs people hold about migration and how these beliefs influence their intention to migrate.

2.2. Theory of planned behavior

Different from the above theories, the theory of planned behavior (TPB) does not presume that people are rational (Ajzen, 2015). The TPB, depicted in Fig. 1, was proposed by Ajzen (1991) based on the Theory of Reasoned Action (Fishbein & Ajzen, 1977). According to the TPB, the intention to perform a behavior is shaped by people's attitudes, subjective norms, and perceived behavioral control (PBC) regarding that behavior (Ajzen, 1991). Whereas the underlying determinants of their attitudes, subjective norms, and PBC are the behavioral, normative, and control beliefs that people hold about the behavior, respectively (Ajzen, 2011). Attitude towards the behavior is determined by the behavioral beliefs, which consist of the individual subjective probability that the behavior will produce a given outcome or experience, weighted by the evaluation of that outcome or experience (Ajzen, 1991). Normative beliefs are the perceived behavioral expectations of important referring individuals or groups (e.g., family, or friends). The strength of normative beliefs - combined with the motivation to comply with different referents - determine prevailing subjective norms (Fishbein & Ajzen, 2011). Control beliefs are perceptions of factors that may facilitate or hinder behavioral performance. Specifically, the strength of control beliefs (how strong is the control belief) - in combination with the power of each control factor that influences the behavior (how strong is its influence) - determine the general PBC (Fishbein & Ajzen, 2011). The TPB makes no assumptions about the veracity or objectivity of the beliefs, which may be based on invalid or selective information. The beliefs may be irrational, reflecting unconscious bias, paranoid tendencies, wishful thinking, or other personal motivations (Ajzen, 2020).

The TPB points out that background factors can influence the beliefs that people hold. Examples are demographic variables (such as age, gender, and income), individual personality factors, and past experiences (Ajzen, 2011; Ajzen, 2019). These factors vary depending on the population and behavior studied (Fishbein & Ajzen, 2011). It is expected that background factors will indirectly influence the intention to perform the behavior through their impact on the beliefs that people

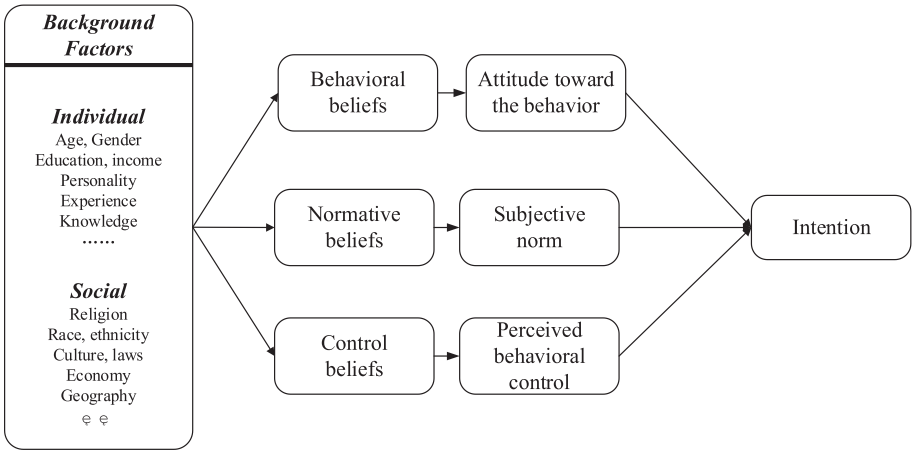

Fig. 1. Theoretical model
Source:(Ajzen, 2019; Ajzen et al., 2011).

hold.

The past literature suggested that gender was associated with university students' intention and behavior to migrate (Cui et al., 2016; Faggian et al., 2007c; Orosová et al., 2018). For example, Orosová et al. (2018) found that the opinions of families and friends have a greater impact on female students' intention to migrate than male students because emotional ties inhibit female migration. The present study, therefore, examines how gender, as a background variable, affects the beliefs of university students and thus their intention to migrate. China enacted the "one-child policy" in 1980 (Feng et al., 2013), and a considerable proportion of university students are the "only child" in their families. It has been shown that being the only child in the family influenced their decision to migrate (Giles & Mu, 2007; Liu & Shen, 2014b). The "only child" is more likely to develop in the hometown to take care of his or her parents (Deutsch, 2004). Therefore, we incorporated the factor of "being the only child" as a background factor in our study. Several studies found that previous migration experience had a significant influence on university-to-employment migration (DaVanzo, 1976, 1983; Faggian et al., 2007b; Kodrzycki, 2001). In China, university students are very likely to migrate from their hometowns to universities, which can be considered as past experience of migration. Thus, previous migration experience is also included as a background factor in our study.

Additionally, since our research population is university students, some student-related variables should also be taken into consideration. For example, by analyzing a large dataset of Scottish and Welsh students, Faggian et al. (2007a) found that students who had higher educational attainment and who studied in higher-ranked universities were more mobile. He also found that students graduating in different majors had different migration propensities. His findings showed that students studying medicine and science generally had a higher propensity to migrate than students studying social sciences. Similarly, Ciriaci (2014) found that both the research and teaching quality of the university influenced the migration choices of Italian students. Furthermore, several studies have revealed that the migration choice of university students is path-dependent (Cui et al., 2015; Liu et al., 2017). For example, Liu et al. (2017) found that students who study at a regular university have a strong tendency to stay in the university's province after graduation. In our case, students who study in first-tier cities may well have a higher intention to develop in a first-tier city. Therefore, university ranking, major, the year of education, university location (city level), and educational level are also included in our study.

The TPB has been successfully adopted in various domains to predict and explain behavior such as environmental behavior (De Leeuw, et al., 2015; Harland, et al., 1999), health-related behavior (Godin & Kok, 1996; Grønhøj et al., 2013), shopping behavior (George, 2004; Yadav & Pathak, 2016), and travel behavior (Han et al., 2017; Quintal et al., 2010). A few studies have used TPB to explain and predict the migration intention of university students, for example, Cui et al. (2016) and Novotný et al. (2020). Both authors have examined the effects of beliefs and attitudes, subjective norms, and PBC on migration intention. However, they did not specifically examine how beliefs influence attitudes, subjective norms, and PBC, which in turn influence migration intention. The present paper argues that the relationship between beliefs and attitude/subjective norm/PBC is one of the core parts of TPB. Understanding what beliefs determine the attitude/subjective norm/PBC may not only unravels the mechanism of the decision-making process of migration behavior but also provides us with directions for policy implications.

3. Research methodology

3.1. Data collection

The target population of our study is university students at school (until 2021) around China, including bachelors, masters, and Ph.D. students. The universities in this research refer to "Higher Education Institutions (HEIs) Offering Degree Programs" and exclude "Higher Vocational Colleges", "Adult HEIs", and "Other Non-government HEIs". Due to limited financial and human resources as well as the difficulty of implementation during the covid-19 pandemic, we could only include a subsection of the population and could not conduct offline investigations. Instead, we adopted the online questionnaire survey and used the snowball sampling method to select our study sample. Details about the sampling strategy will be presented in Section 3.1.2.

As recommended by Ajzen (2006), a two-stage TPB survey was conducted. In the first stage, an elicitation study was conducted which aimed to elicit salient beliefs of university students regarding developing in a first-tier city after graduation. The results of the elicitation study were used to further design the TPB questionnaire in the second stage, which aimed to explore the determinants of university students' intention to develop in a first-tier city.

3.1.1. Elicitation study

The aim of an elicitation study is to identify what important behavioral, normative, and control beliefs are shared by the target population. Following Ajzen's instructions (Ajzen, 2006), an open questionnaire survey was conducted to elicit university students' salient beliefs towards developing in a first-tier city after graduation. The survey contains nine open questions, such as "What do you believe are the (dis)advantages of developing in a first-tier city?", "Are there any individuals or groups who would (dis)approve of your developing in a first-tier city?", and "What factors or circumstances facilitate/impede you to develop in a first-tier city?". Different questions aim to elicit different beliefs. The abovementioned three sets of questions were aimed to elicit behavioral beliefs influencing attitude, normative beliefs influencing subjective norms, and control beliefs influencing PBC, respectively. Respondents were encouraged to share their thoughts and stories freely in response to these questions. The most frequently mentioned answers to these questions are considered to be salient beliefs.

A total of 28 university students from 16 universities in different regions were investigated through an online survey in October 2020. These respondents were recruited through referrals from acquaintances and online social apps like WeChat and QQ. Their average age was 21 years old; 15 were female and 13 were male. In addition, 22 respondents were bachelor's students, while four and two were master's students and doctoral students, respectively.[3]

Finally, seven behavioral beliefs, five normative beliefs, and four control beliefs were collected (see Appendix A for the details of these beliefs). Notably, one of the behavioral beliefs 'fulfill my dreams for the future' was also mentioned by five respondents as a control belief, implying this belief might be both a behavioral belief and a control belief. The information obtained in this elicitation study was used to develop the complete TPB survey.

3.1.2. Development of the questionnaire

Following Francis et al. (2004), we used three different semantic items to measure intention, attitude, subjective norm, and PBC. For example, to measure intention, we used the three items "I expect to develop myself in a first-tier city after graduation", "I want to ……", "I intend to ……", and the measurement scale of each item ranged from "Strongly disagree (1)" to "Strongly agree (7)". The mean value of the three items was used as the respondent's generalized intention. This was done to ensure the accuracy and reliability of the measurement. The questions that are used to measure attitude, subjective norm, and PBC are also coined by Ajzen (2020) as "reflective indicators". Appendix B contains detailed information on the reflective indicators.

[3] As a rule of thumb, the pilot study should include a sample of 25 to 30 participants representative of the general research population (Ajzen, 2021).

3.1.2.1. Measuring behavioral/normative/control beliefs. As explained in Section 2, the strength of each behavioral belief, combined with the outcome evaluation, influences the attitude. The same applies to the subjective norm (strength of normative belief and motivation to comply) and the PBC (strength of control belief and perceived power of control factor). The beliefs that influence the attitude, subjective norm, and PBC are called 'formative indicators(Ajzen, 2021). Following Ajzen (1991), strength was measured using a seven-point unipolar adjective scale (1–7) and power with a seven-point bipolar adjective scale (−3–+3). For example, the perceived likelihood (strength) of the control belief "The house prices in first-tier cities are high", was measured on a scale from Extremely unlikely (1) to Extremely likely (7). To measure its power, we used the statement "High house prices would make it _ for me to develop myself in a first-tier city after graduation", for which respondents could choose an answer between "Much more difficult (-3)" and "Much easier (3)". See Appendix A for an overview of the beliefs.

3.1.2.2. Background factors. In this study, eight background variables were included, namely "gender", "only child", "previous migration experience", "educational level", "university ranking", "university location (city level)", "major", and "the year of education". For "gender", the male is used as the reference. The "only child" is defined as being the only child in the family with no other siblings, and the "non-only child" is used as the reference. "Previous migration experience" refers to whether university students had the experience of inter-provincial migration, i.e., whether their university location and hometown were in the same province. Those who did not have cross-province college experience were used as the reference. To simplify the research, we converted the variable "educational level" into a dichotomous variable containing "bachelor" (reference) and "master & PhD". To indicate "university ranking", we asked students whether they attend a university from the 985/211 project.[4] Students who attend a regular university are used as the reference. The indicator "university location (city level)" indicates whether the student's university is located in a first-tier city. In this study, a non-first-tier city location is the reference. For "major", we divided the students into four categories: Arts & Humanities, Engineering & Technology, Life & Natural Sciences & Medicine, and Social Sciences & Management. Finally, the year of educational enrollment was collected.

3.1.3. Questionnaire survey

The data were collected with the use of an online survey, in January and February 2021. An online survey is easy to implement, fast to deliver, inexpensive, widely available, and convenient for respondents to answer (Hamzah & Zyed, 2020; Sekaran & Bougie, 2016).

3.1.3.1. Pilot questionnaire. Before the distribution of the formal online questionnaire, we conducted a small pilot survey in November 2020 with 18 university students from all over the country. These students were referred by the previous elicitation respondents. The main purpose of the pilot survey was to test whether the length of the questionnaire was appropriate, whether the terminology and questions were easy to understand and answer, and whether important factors had been omitted. Based on the feedback of the respondents in the pilot survey, we adjusted the order of the questions and rephrased some questions that were not entirely clear.

3.1.3.2. Formal questionnaire. The participants of the formal questionnaire were selected using the virtual snowball sampling method. The main merit of this approach is its effectiveness to extend the geographic range and easily reach individuals with visiting barriers (Baltar & Brunet, 2012). Baltar and Brunet (2012) argue that the virtual snowball sampling method can increase the number of cases in the sample and improve representativeness as well since the number and type of responses can be controlled during the process. Following the steps of snowball sampling proposed by Biernacki and Waldorf (1981), we first identified initial respondents/referrers, including classmates and friends known to the researchers, respondents known through the pilot study described above, and college teachers (teachers do not serve as direct respondents to the study but serve as key referrers to the snowball sampling method). We then verified the eligibility of these respondents/referrers and selected 66 of them who were willing to collaborate as our research assistants to help spread the questionnaire. The distribution of the 66 assistants covers the spread of major universities all over China. The assistants are either teachers or students and have access to a wide range of students. We began distributing the questionnaire to the initial respondents/referrers via email, WeChat, QQ, and other virtual social apps in January 2021. These initial respondents/referrers further distributed the questionnaire to new respondents through virtual social media. To achieve statistical precision, Kline (2015) recommended that the sample size should be at least 10 times, or preferably 20 times the number of parameters to be estimated. There are 41 parameters at most to be estimated in our theoretical model (mainly including path coefficients). Therefore, the minimum sample size required is 410, and the suggested sample size is 820. To ensure the representativeness of the sample, we also controlled for the spread direction of the referral chain in terms of educational level, geographic location of the university, and level (ranking) of the university as much as possible. By February 26, 2021, we had received a total of 1330 responses, which met our sample size requirement and that showed relatively good representativeness with regard to the level of education and the quality of universities. Therefore, the online survey was closed. We dropped 82 responses with low response quality (e.g., responses that selected the first option for all questions) and too short a response time (<6 min) and 6 responses whose hometowns are first-tier cities, ultimately yielding 1242 valid responses.

3.1.3.3. Sample characteristics and data representativeness. The average age of the respondents is 20.9, of which 40.5% are male and 59.5% are female. Although the male to female ratio seems to be imbalanced, it is close to the national university population level. According to the OECD report, the overrepresentation of women in the college population has become a global trend (Vincent-Lancrin, 2008). In terms of the educational level, our data is representative. 84.9% of our respondents are bachelor students, while 12.4% and 2.7% are master and Ph.D. students respectively. Concerning university ranking, 12.5% of our respondents were from 985/211 project universities while 87.5% are from regular universities. Students from 985/211 Project universities were slightly overrepresented. The National Bureau of Statistics (2011) divides China into four economic regions: East, Central, West, and Northeast. According to this classification, respondents from universities in eastern China are overrepresented while students from universities located in western and northeast China are underrepresented. See Table 1 for the detailed characteristics of the respondents.

3.2. Analytical process

Under the framework of the Theory of Planned Behavior (TPB), our analytical process to address the proposed research questions consists of the following four steps:

Step 1: By counting the proportion of respondents with varied intentions (1–7) to develop in a first-tier city after graduation, we will answer research question 1: After graduating, what percentage of university students intend to develop their career in a first-tier city?

Step 2: To answer research question 2, we constructed a basic model

[4] Universities included in Project 985 and Project 211 can be seen as the top universities in China. See website: https://www.chinaeducenter.com/en/cedu/ceduproject211.php for more information.

Table 1
Characteristics of the respondents.

	Mean/percentage of our sample	National university population level
Age (S.D.)	20.9	–
Gender		
Male	40.5%	42.3%
Female	59.5%	57.7%
Only child		
Yes	38.5	–
No	61.5%	–
Previous migration experience		
Yes	44.7%	–
No	55.3%	–
Educational level		
Bachelor	84.9%	86%
Master	12.4%	11.9%
PhD	2.7%	2.1%
Major		–
Arts & Humanities	*8.7%*	–
Engineering & Technology	*35.7%*	–
Life & Natural Sciences & Medicine	*7.5%*	–
Social Sciences & Management	*48.1%*	–
The year of Education		
First-year bachelor	*28.7%*	
Second and third-year bachelor	*36.9%*	
Final year bachelor	*19.2%*	–
Master & PhD	*15.1%*	–
University ranking		
985/211 project	12.5%	8.9%
regular universities	87.5%	91.1%
University location		
East China	61.4%	40.2%
Central China	24.6%	25.2%
West China	11.8%	24.6%
Northeast China	2.3%	10%
University location (city level)		
First-tier cities	8.2%	–
Other cities	91.8%	–

Note:
The data on gender ratio came from https://www.163.com/dy/article/FK7JPJF70524WU43.html (accessed on 26 August 2021).
The national data of educational level, university ranking, and university location are calculated based on the latest official data published by the Ministry of Education of the People's Republic of China (MEPRC, 2020).

(model 1) containing only attitude, subjective norm, PBC, intention, and their corresponding reflective indicators. The objective of Model 1 was to primarily test the explanatory power of the TPB model. Model 1 also allowed us to measure the relative importance of attitude, subjective norm, and PBC in the prediction of the intention.

Step 3:To understand what beliefs shape university students' attitude, subjective norm, and PBC (research question 3), we introduced behavioral beliefs, normative beliefs, and control beliefs to the basic model (Model 2). In particular, the beliefs we have introduced refer to the product of the strength of a belief and the importance of that belief, that is, behavioral belief strength × outcome evaluation, normative belief strength × motivation to comply, and control belief strength × power of control factor. As Fishbein and Ajzen argue, the product is better at predicting the corresponding attitude, subjective norm, and PBC than the strength of the belief alone (Ajzen, 2011; Fishbein & Ajzen, 2011). Meanwhile, behavioral beliefs, normative beliefs, and control beliefs, as formative indicators of attitude, subjective norm, and PBC, respectively, together with the reflective indicators, form a multiple indicators and multiple causes (MIMIC) model (Diamantopoulos & Winklhofer, 2001; Hauser & Goldberger, 1971). Compared to the reflective model (model 1), the MIMIC model (model 2) cannot only identify which beliefs predict attitude, subjective norm, and PBC but can also reveal which beliefs are more important judging from the estimates of the standardized regression or path coefficients.

Step 4: Finally, we added background factors in Model 3. The purpose of model 3 was to test whether and how background factors affect intention. To avoid an overly complex model, we first conducted a series of one-way ANOVA or independent samples *t*-test (where applicable) to examine the relationship between each of the background factors and the intention. This procedure was repeated for all salient beliefs. Relationships between background factors and beliefs were only included in model 3 when significant results had been found using these tests ($p < 0.05$). See Appendix C for the results of the ANOVA and *t*-tests.

3.3. Statistical method

The Structural Equation Modeling (SEM) method was adopted in our study to test the proposed TPB model due to its distinct advantages. To begin with, it allows for the estimation of models with multiple independent variables and multiple dependent variables simultaneously. Furthermore, it allows for the estimation of latent (unobserved) variables from observed variables and considers measurement error of variables. More importantly, SEM supports the examination of mediating effects (Jin et al., 2021; Chin, 1998; Kline, 2015; Ullman & Bentler, 2003). These features of SEM are well suited to our data analysis requirements.

Following Collier (2020, p. 62), before the construction of the structural model (Model 1, 2, and 3), a Confirmatory Factor Analysis (CFA) was conducted to analyze how well the reflective indicators measure the unobserved constructs and whether the unobserved constructs are uniquely different from one another, in other words, the reliability and validity of the model (Jöreskog, 1969). Composite reliability (CR)[5] is a commonly used way to measure the internal reliability of the measurement model. When CR $\geq$ 0.6, it can be considered that the internal reliability of each latent variable is high and meets the requirements (Bacon et al., 1995). Convergent validity and discriminate validity are two main indicators of validity (Fornell & Larcker, 1981). In general, when Average Variance Extracted (AVE)[5] $\geq$ 0.5, convergent validity is of the required standard (Fornell & Larcker, 1981). If the positive square root of AVE > The biggest correlation between latent variables, it implies the discrimination validity is acceptable (Fornell & Larcker, 1981). The CFA results show that the measurement model has adequate reliability and validity, suggesting that latent variables can be well measured by the observed variables and that the latent variables are clearly distinct from each other. The results of the CFA can be found in Appendix E.

In our analysis, the maximum likelihood (ML) method was adopted because it provides more accurate and robust parameter results when data are normally distributed (Hair, 2009). However, it is unable to report the significance of indirect and total effects because indirect effects are often non-normally distributed. Therefore, we also employed the bootstrap technique[6] to test the significance of indirect and total effects. The analysis was performed through AMOS 21 in SPSS.

4. Empirical results

4.1. University students' intention to develop in first-tier cities

Three items were used to measure students' migration intention: "I

[5] See Hair (2009) for the detailed calculation method and formula of CR value and AVE value.

[6] The Bootstrap technique is a resampling method that uses random sampling methods to estimate the sampling distribution of almost any statistic. Bootstrap allocates accuracy (bias, variance, confidence interval, prediction error, etc.) to the sample estimates (Efron & Tibshirani, 1994)

expect to develop myself in a first-tier city after graduation", "I want to ……", and "I intend to…". Before averaging the value of the three items, an internal reliability test was performed using Cronbach's Alpha. Generally, an alpha value above 0.70 is considered to reflect a reliable scale (Nunnally, 1994). According to this criterion, the three items showed high internal consistency, so they can be averaged ($\alpha = 0.955$). Table 2 shows that only 14% of respondents explicitly stated that they do not want to develop in a first-tier city. 22% were neutral, while over 64% of university students expressed their willingness to develop in a first-tier city. This result clearly answers our first research question: almost two-thirds (64%) of university students have the intention to develop in a first-tier city after graduation.

4.2. SEM results

4.2.1. Basic TPB model (model 1)

Fig. 2 shows the results of the basic TPB model (model 1). The results provide an answer to the second research question. The fit indices[7] of model 1 indicate that our data fit the theoretical model well. As shown in Fig. 2, attitude, subjective norm, and PBC together explain 53% of the variance in university students' intention to develop in a first-tier city after graduation. The intention was influenced most by the attitude, followed by the subjective norm and then the PBC. Students with a more positive attitude, a more supportive subjective norm, and more perceived control, generally have a stronger intention to develop in a first-tier city.

4.2.2. Influences of salient beliefs (model 2)

In model 2, we examined the influence of salient beliefs on university students' attitude, subjective norm, and PBC towards developing in a first-tier city after graduation. This model provides the answer to the third research question. Fig. 3 shows the estimation results of Model 2. The R^2 of attitude and the subjective norm were 0.498 and 0.571 respectively, showing strong explanatory power. The initial R^2 of PBC was 0.153, which did not meet the structural validity criteria of the MIMIC model ($R^2 \geq 0.3$) (Heiny et al., 2019). The previous elicitation study showed that the belief "fulfill my dreams for the future" was also mentioned as a control belief. Therefore, we assumed that this belief would not only influence attitude but also PBC and added a relationship between "fulfill my dreams for the future" and PBC. As a result, the R^2 of PBC increased to 0.296, and the overall fit of the model also improved slightly (see Fig. 3).

Five out of the eight beliefs had significant positive effects on attitude. "Fulfill my dreams of the future" was shown to have the largest influence, followed by "excellent job opportunities", "fast-paced lifestyle", "generous income", and "high work pressure". In contrast, "accumulate a high-quality social network", "excellent medical services at my disposal", and "ascertain elite education for my children" were shown to be insignificant.

Regarding normative beliefs, "families' support" had the greatest impact on the desire of university students to develop in a first-tier city, followed by the support from friends and the practices of classmates (cohort). The support from teachers also had a significant positive influence. The influence of seniors' (older students') failed to reach significance.

Among the five control beliefs, four were found to have a significant effect on PBC. "Fulfill my dreams for the future" was shown to have the largest influence, it significantly and positively influenced PBC. Surprisingly, "high living costs (apart from housing expenditure)" had a significant positive effect on PBC, which means that respondents who expected high living costs also expected to have high PBC. To check the robustness of this result, a Pearson correlation test was performed between "high living costs" and PBC (using the mean value of the three reflective indicators). It turns out that the two factors were negatively correlated ($r = -0.075$, $p < 0.01$, $n = 1242$), which was in accordance with our expectations. Furthermore, the correlations between "high living costs" and "high house prices"/ "high rent prices" turned out to be rather high ($r = 0.825$ and 0.908 respectively). An additional linear regression analysis of all control beliefs regressed on PBC indicated the existence of multicollinearity of "high living costs" (Tolerance = 0.163, VIF = 6.141). Therefore, we believe that multicollinearity might explain the positive effect of "high living cost" on PBC. In addition, "high house prices" and "family ties (not being able to take good care of my family)" were shown to have significant negative effects on PBC, while "high rent prices" was found to be insignificant.

4.2.3. Influences of background variables (model 3)

In Model 3, six background variables were included (see Fig. 4). The results of the bivariate analyses showed that "major" and "the year of enrollment" did not have a significant relationship with students' migration intention and beliefs (see Appendix C). Therefore, these variables were not included in model 3. Model fit indices indicate that the data fit the model well. The direct effects of the background factors on various beliefs are shown in Fig. 4, while the indirect (total) effects of the background factors on attitude, subjective norm, PBC, and intention are shown in Table 3. The results answer the fourth research question.

Among the six background factors, university location has the largest influence on students' intention. Students who study in first-tier cities have a statistically significantly more positive attitude, a more favorable subjective norm, and a higher intention to develop in a first-tier city than those who study in second and lower tier cities. The second most influential factor is university ranking. Students from 985/211 universities showed higher perceived behavioral control and a higher intention than students from regular universities to develop in a first-tier city. "Only child" was found to be a statistically significant predictor of intention, attitude, and PBC. Those who are non-only-child have a more positive attitude and a higher intention towards developing in a first-tier city, but lower perceived control. Female respondents were found to have a statistically significantly lower intention than male respondents to develop in a first-tier city after graduation. Meanwhile, female students were less supported by their social norm than male students. Previous migration experience and educational level were not statistically significantly related to intention.

Note: Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Model fit indices: CFI =0.961, TLI = 0.939, RMSEA = 0.054; "……" Dashed lines = non-significant. To avoid overloading the figure, error items of beliefs and arrows between them are not shown.

5. Discussion

The migration behavior of university students has attracted increasing interest from scholars and practitioners worldwide (Faggian & McCann, 2009; Haussen & Uebelmesser, 2018). The current paper investigated the intention, as well as its underlying determinants, of university students to develop in a first-tier city after graduation in China. Specifically, four research questions were proposed: 1) the proportion of university students who intend to develop in a first-tier city after graduation, 2) the explanatory power of attitude, subjective norm, and PBC on intention, 3) the influence of various beliefs on attitude, subjective norm, and PBC, and 4) the influence of background factors on the intention to develop in a first-tier city. Using the TPB as the theoretical framework, we designed a questionnaire and collected online data from 1242 university students across China to address the above questions.

[7] Model fit indices provide the most fundamental indication of how well the proposed theory fits the data. The comparative fit index (CFI), root mean square error of approximation (RMSEA), and Tuckere Lewis Index (TLI) are most recommended indices to be reported by researchers (Hu & Bentler, 1999). Generally, TLI > 0.95, CFI > 0.95, and RMSEA<0.08, reflect a good model fit (Kline, 2015).

Table 2
University students' intention to develop in first-tier cities ($N = 1242$).

	Average intention score							
Interval	1–1.99	2–2.99	3–3.99	4	4–4.99	5–5.99	6–7	Mean (S.D.)
N	34	37	107	268	111	303	382	4.92 (1.39)
Percent	2.74%	2.98%	8.62%	21.58%	8.94%	24.40%	30.76%	

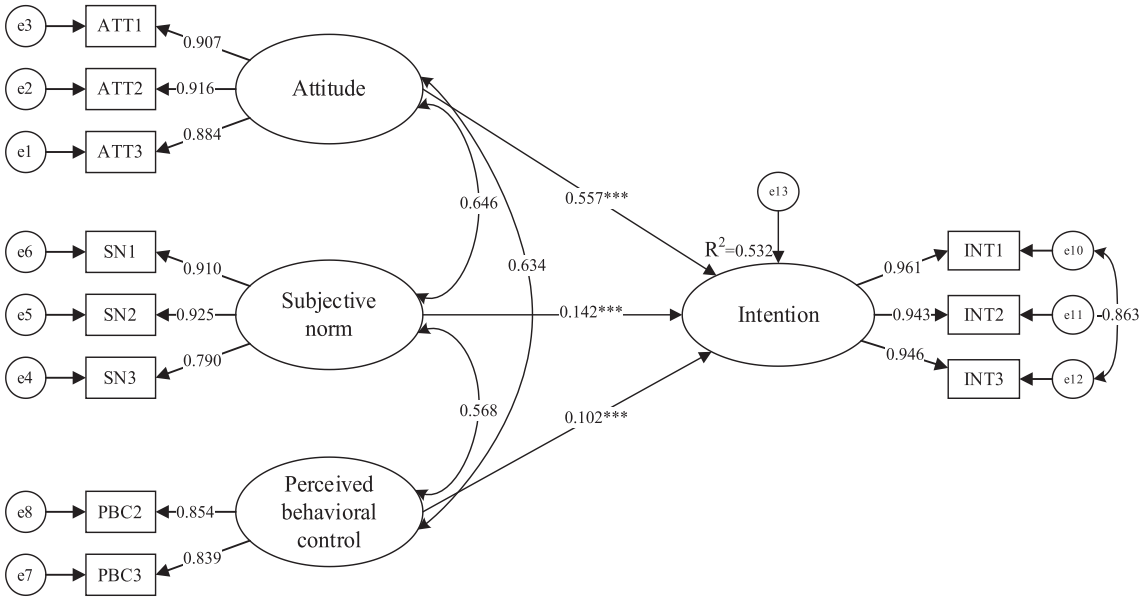

Fig. 2. Model 1: Basic TPB Model (standardized estimates)
Note: Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Model fit indices: CFI = 0.99, TLI = 0.98, RMSEA = 0.06.

With regard to the first research question, 64% of the university students we surveyed expressed an intention to develop in a first-tier city after graduation. This is consistent with the findings of some studies in Western countries, where university students and graduates are willing to relocate to thriving metropolitan areas (Berck et al., 2016; Faggian & McCann, 2009). This result seems to contradict a recent report stating that in 2020 only 17% of graduates with bachelor's degrees in China actually worked in first-tier cities, while the percentage of graduates with master's degrees is 33% (McKinsey Institute, 2021). It might imply that a large proportion of graduates who intend to go to a first-tier city after graduation finally fail to do so. This is understandable as the intention-behavior relationship is moderated by PBC and "actual behavioral control" (Ajzen, 2011). The actual behavioral control concerns the actual opportunities and limitations that a student encounters when trying to develop in a first-tier city. These factors were not included in the current study.

Concerning the second research question, attitude, subjective norm, and PBC together explained 53% of the variance in intention in model 1, 49% in Model 2, and 49% in Model 3. According to the meta-analysis of Armitage and Conner (2001), the TPB accounts for 39% of the variance in intention on average, suggesting that the TPB can be well adopted in students' migration intention. Furthermore, we found that attitude had the greatest effect on university students' intention to develop in a first-tier city, followed by the subjective norm and PBC. The attitude that students have is more important than the barriers that they expect regarding their development in a first-tier city. The subjective norm is also important, but still less important than attitude. According to our study, attitude should be given the highest priority by policymakers. This finding is slightly different from the findings of Cui et al. (2016), who found that the intention of university students to stay in Nanjing after graduation was most influenced by the subjective norm, followed by attitude, while the PBC had no significant effect on the intention. The differences between the two studies could be explained by the differences in the behaviors that were studied. The current study explores the intention of university students to develop in a first-tier city after graduation, while Cui et al. (2016) studied the intention of university students to stay in Nanjing after graduation. It has been demonstrated that the factors influencing the behavior of staying in a place and going to a place are different (Haapanen & Tervo, 2012; Marinelli, 2013; Novotný et al., 2020). This result is also in line with the view of Ajzen (1991) that the relative importance of attitude, subjective norm, and PBC in predicting intention varies according to behavior and situation.

As for the third research question, it was found that the most important behavioral belief was "fulfill my dreams for the future", which has rarely been studied in past research. As one of our respondents mentioned, "My boyfriend and I are determined to go to a first-tier city, because only in these cities can we have a greater probability of success. This possibility is fascinating because it can ignite people's spirit of struggle... We may meet some people or come across some opportunities, and start a business or something like that, to fulfill our dreams." It is clear that ambition has played an important role in driving students to develop in a first-tier city. This finding supports Hagen-Zanker and Hennessey (2021)'s appeal for an emphasis on the influence of subjective and intangible factors on migration decisions. In accordance with most existing studies (Darchen & Tremblay, 2010; Haussen & Uebelmesser, 2018; Venhorst et al., 2011), we found that regional economic factors such as job opportunities and income are also important drivers of university students' intention to develop in a first-tier city after graduation.

One interesting finding was that the more the students believed they will have high work pressure and a fast-paced lifestyle in the first-tier city, the more positive their attitude towards developing in such a city. Some respondents expressed that they indeed appreciated the pressure and the fast pace of life in the first-tier cities because it helped

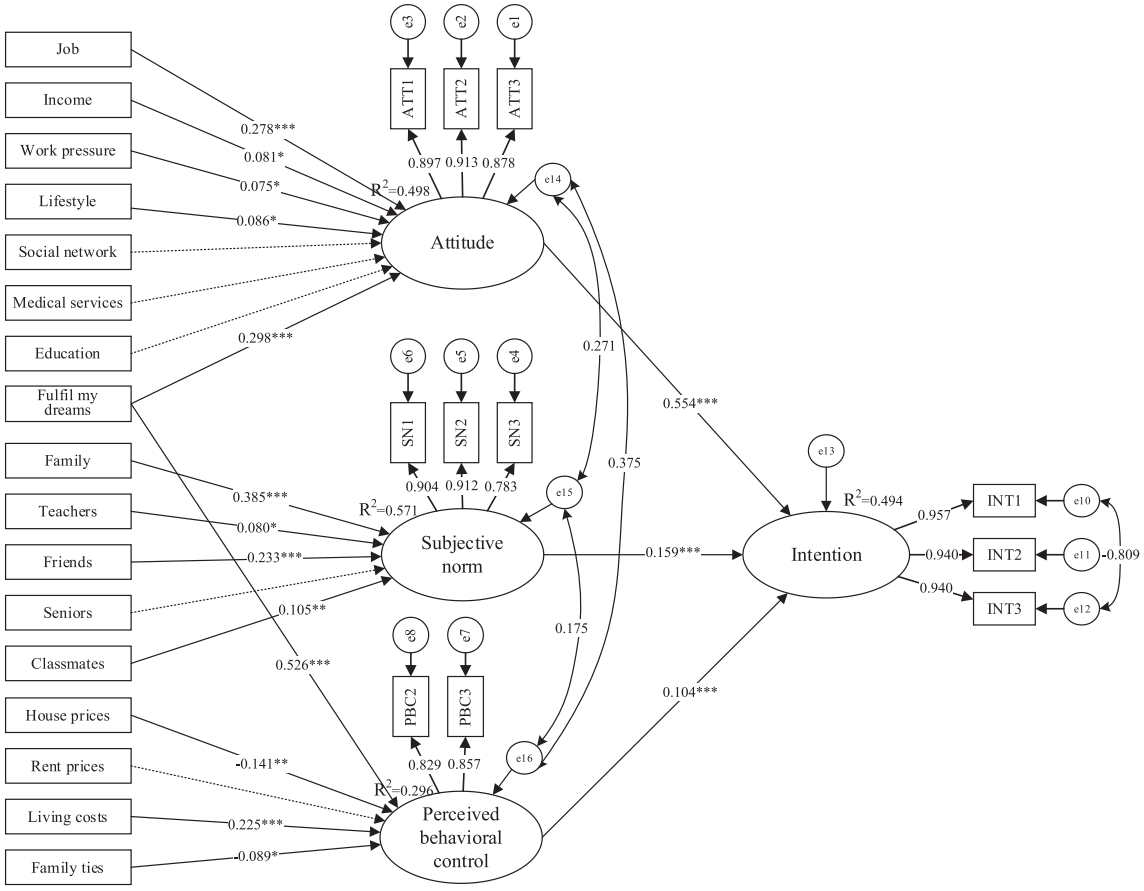

Fig. 3. Model 2: Consolidation of Salient Beliefs (standardized estimates)
Note: Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Model fit indices: CFI = 0.96, TLI = 0.95, RMSEA = 0.06; "……" Dashed lines = non-significant; To avoid overloading the figure, arrows between beliefs are not shown.

them to make career progress more quickly. This result is especially interesting when compared with Cui et al. (2016), in which university students who enjoyed a moderate pace of life had a higher intention to stay in Nanjing. A possible explanation is that those who intend to develop in a first-tier city have greater ambition than those who want to develop in a lower-tier city. In contrast to previous studies that have emphasized the role of urban amenities (Florida, 2005; Whisler et al., 2008), "accumulate a high-quality social network", "excellent medical services at my disposal", and "ascertain elite education for my children" did not have a significant influence on students' intention to develop in a first-tier city in this study. Considering that this research was conducted among university students who are young and healthy, these factors might be not very important to them.

Regarding the normative beliefs, we found that opinions from family, friends, and teachers, as well as the behavior of classmates, shaped the subjective norm of university students' decisions to develop in a first-tier city after graduation. This finding echoes with previous studies that suggested migration decision making is not a purely personal process but is influenced by social networks and pressures from family, friends, and colleagues (Cui et al., 2016; Kaplan et al., 2016; Orosová et al., 2018; Van Dalen & Henkens, 2013). The importance of Chinese parents' opinions on their children's behavior can be explained by the Chinese Confucian familism that considers following parents' instructions as a "filial piety" (Yao & Yao, 2000). Dolfin and Genicot (2010) found that social networks can influence migration decisions by providing different types of services, such as information on jobs and help at the destination. In our study, friends and classmates are the main social network of university students, thus they also influencing university students' migration decisions. As one of the respondents said, "After graduation, I want to develop in the same city as my friends or classmates so that we can take care of each other". Perceived teacher support was found to be statistically significantly associated with students' intention to develop in a first-tier city. This is consistent with Metheny et al. (2008), who found that perceived teacher support influenced adolescents' career decision-making and vocational outcome expectations.

In terms of the control beliefs, the results showed that "fulfill my dream for the future" had the largest influence on perceived behavior control. What our respondents said is: "My dream motivates me to move forward and help to build my confidence, so I am confident that I can go to a first-tier city for a brighter future". In contrast, university students' perceived high cost of living and high housing prices discouraged their intention to develop in a first-tier city. This is coherent with previous research findings that the high cost of living/housing deter the migration to the destination (Kodrzycki, 2001; Whisler et al., 2008). Probably, recent graduates are in the early stages of their independent lives/careers and do not yet have enough savings. They therefore tend to choose cities where they can afford to live. Besides, China is a nation of homeowners, and housing is often a prerequisite for marriage (Huang et al., 2021b; Li & Wu, 2014). This also explains why there is no effect of high rent prices. Chinese urban house prices have been on a strong upward trend since the beginning of the century, with house prices in first-tier cities rising at a much higher rate than the national average (Chen et al., 2021). The deteriorating housing affordability of the younger generation and new immigrants has become a serious social problem (Huang et al., 2021a; Li et al., 2021). Family ties are another important deterrent, which has been highlighted in the literature by Mincer (1978) as an important factor influencing migration. In China, especially in rural areas, many parents do not have national social

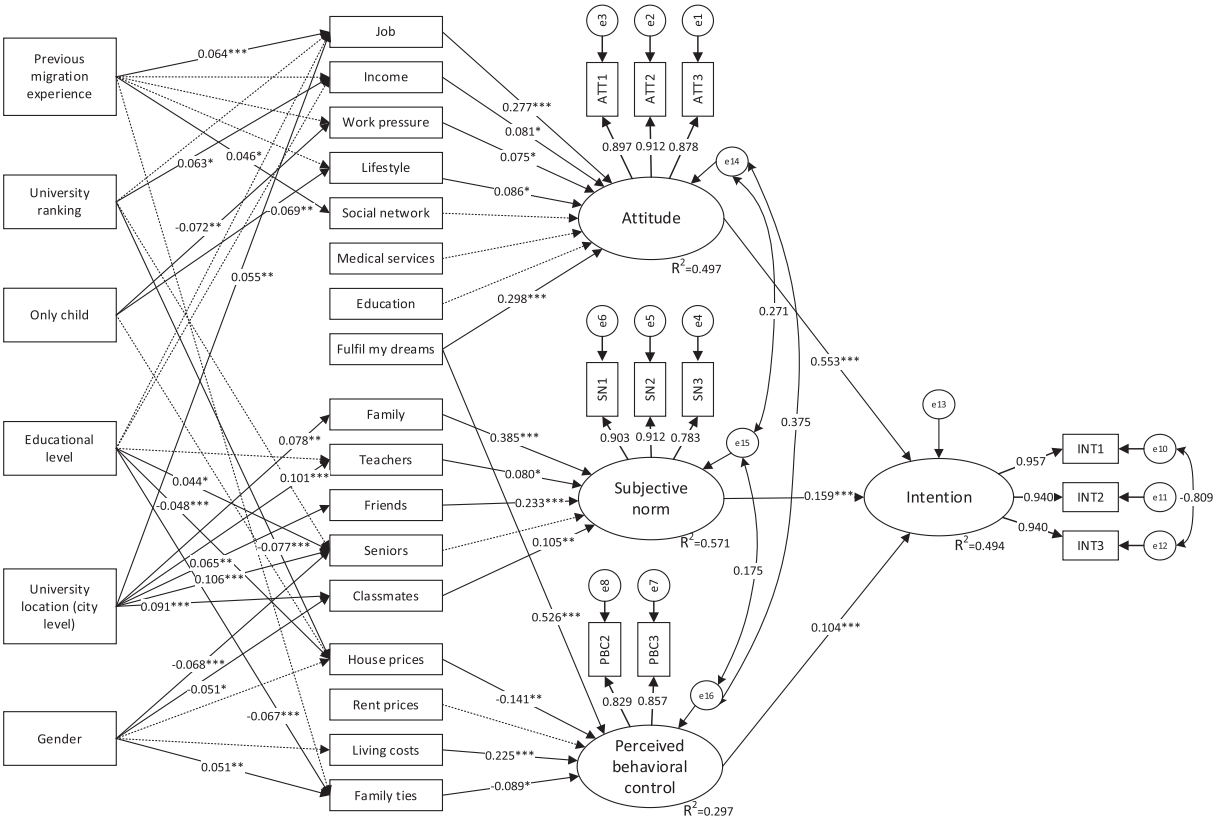

Fig. 4. Model 3: Incorporation of Background Factors (standardized estimates).

Table 3
Standardized indirect (total) effects of background factors.

Background factors	Attitude	Subjective norm	PBC	Intention
Gender (male as reference)	–	−0.01**	−0.004	−0.002*
Only child (non-only child as reference)	−0.011**	–	0.002	−0.006**
Previous migration experience (who have no across- provinces migration experience as reference)	0.013	–	0.002	0.007
Educational level (bachelor as reference)	0.007	0.006*	0.013**	0.006
University ranking (regular university as reference)	0.017	0.001	0.011*	0.01**
University location (city level) (other cities as reference)	0.015***	0.069***	...	0.02***

Note: Significance levels:
*** $p < 0.001$.
** $p < 0.01$.
* $p < 0.05$.

insurance and are dependent on the care of their children as they grow older. One of the respondents said: "If I go to a first-tier city after graduation, I may not be able to take good care of my elderly parents".

For the fourth research question, we found that four out of eight background factors had significant effects on intention. Judging from the standardized coefficients, university location had the largest influence on students' intention among the eight factors. Students who studied in a first-tier city had significantly higher intention than their counterparts to develop in a first-tier city, echoing with previous studies (Cui et al., 2015; Liu et al., 2017). Interestingly, Model 3 provides some new insights beyond path dependence unraveling the mechanism linking university location and intention. Students who studied in first-tier cities were more likely to be supported by their referring individuals towards developing in a first-tier city, resulting in more favorable subjective norms and stronger intention. In addition, students from 985/211 universities have a higher intention to develop in a first-tier city than those from regular universities because they have higher perceived behavioral control. More specifically, 985/211 students were less concerned about the high housing prices in first-tier cities. Furthermore, students who were the only child had lower intention to develop in a first-tier city than their counterparts. According to our model, students who were the only-child in the family were less likely to enjoy the high work pressure and fast-paced lifestyle in the first-tier cities than their counterparts, leading to lower attitude and intention. This finding adds new insights because previous studies maintained that the only-child is less likely to migrate because they face the obligation of parent care without siblings (Giles & Mu, 2007; Gui & Koropeckyj-Cox, 2016). Next, male students had a stronger intention than female students to develop in a first-tier city after graduation, in line with Guohua et al. (2021). According to Model 3, it is because male students were more likely to be influenced by their classmates (cohorts) than female students. Although Ph.D. students and Masters are perceived to have more control over their development in a first-tier city and receive more support from seniors than bachelors, there are no significant differences between their attitudes. That could explain why the total effect of educational level on intention was not statistically significant. This result is also consistent with Cui et al. (2016).

This research has some limitations. A limitation of the study concerns the data representativeness. Due to time and funding constraints, our data cannot fully represent university students around China because students from universities located in western and north-eastern China were underrepresented. In addition, this study only examined university

students' intention to develop in a first-tier city after graduation without investigating the actual migration behavior of university students after graduation. However, established research has shown that intention is a strong predictor of future migration behavior (Orosova & Gajdošova, 2017; Van Dalen & Henkens, 2013). Future studies could conduct longitudinal surveys to further study the actual migration behavior of university students. Moreover, since the first-tier cities were used as case studies, the results of this paper cannot be generalized to non-first-tier cities. However, the theoretical framework and methodology employed in the paper can be adopted by other researchers studying other cities. Future studies can focus on graduates' intention to develop in second or lower tier cities to help them attract talents and thus promote more balanced regional development. Another limitation of the current study concerns the multicollinearity posed by the variable "living costs". In line with Bacon (2001), we believe that the existence of multicollinearity may be the consequence of asking the same respondent multiple similar questions in the same context. Such multicollinearity cannot be completely avoided in general. However, several scholars argue that the deleterious effects of multicollinearity can be largely offset when the sample size is large and the independent variables explain a high proportion of the variance in the dependent variable (Grewal et al., 2004; Mason & Perreault, 1991). In addition, the robustness of SEM estimates might alleviate the problems generated by multicollinearity (Westlund et al., 2008). Finally, only eight background variables were included in this paper for model parsimony because we were limited in the number of questions that we could include in the survey. However, other background factors such as parents' educational level and wealth might also influence students' migration intention (Abramitzky et al., 2013). Follow-up studies could include more background factors, in conjunction with the use of the TPB framework, to examine how other background factors influence the intention.

6. Policy implications

The findings of this study have some important implications for policymakers. In this paper, it is found that students' intention to develop in a first-tier city is most influenced by the students' attitude, followed by the subjective norm and perceived behavioral control. Furthermore, our third model has clearly shown what beliefs determine students' attitude, subjective norm, and perceived behavioral control. For example, to improve students' attitude towards developing in a first-tier city, the belief that 'first-tier cities can help realize my future dreams' could be promoted as a city branding image. In doing so, the local municipality could advertise the idea that first-tier cities are at the forefront of economic and social development, providing them with a greater stage to exploit their abilities so as to help them realize their dreams. Since 'job' and 'income' were also found to be significantly correlated to attitudes, creating more jobs and promoting higher wages are also possible means of attracting talents. Next, the role of family, teachers, and social networks - important referents for university students - could also be highlighted when developing relevant talent policies. For example, when publicizing and advertising the first-tier cities, targeting parents and teachers might have a good effect. In terms of perceived behavioral control, we found that university students were concerned about the "high cost of living" in the city. The provision of living allowance to new graduates or the introduction of minimum wage might reassure their concerns. In addition, to address the concern of high housing prices, the local government could consider encouraging the construction of talented housing and providing housing subsidies to improve the perceived control of university students. Finally, talent policies could be individualized depending on the background of the talents. For example, for graduates who are the only child of their parents, providing elder care or cash benefit for their parents at home could be considered.

CRediT authorship contribution statement

Chi Jin: Conceptualization, Methodology, Investigation, Data curation, Writing – original draft. **Bo Li:** Conceptualization, Investigation, Writing – review & editing. **Sylvia J.T. Jansen:** Methodology, Writing – review & editing, Supervision. **Harry J.F.M. Boumeester:** Writing – review & editing, Supervision. **Peter J. Boelhouwer:** Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Descriptive statistics of behavioral/normative/control beliefs.

Behavioral beliefs: strength of behavioral beliefs (formative indicators)		
Item Wording	Item value: scale	Mean (S.D.)
If I would develop myself in a first-tier city after graduation, I would:		
Have excellent job opportunities	Extremely unlikely →Extremely likely: 1 → 7	5.31 (1.28)
Have a generous income		5.39 (1.21)
Have high work pressure		5.94 (1.15)
Have a fast-paced lifestyle		5.88 (1.18)
Accumulate a high-quality social network		5.44 (1.19)
Have excellent medical services at my disposal		5.53 (1.17)
Ascertain elite education for my children (if any)		5.58 (1.23)
Fulfill my dreams of the future		5.39 (1.22)

Outcome evaluation (formative indicators)		
Item wording	Item value: scale	Mean (S.D.)
For me to have excellent job opportunities is	Extremely bad → Extremely good: −3 → +3	1.53 (1.13)
For me to have a generous income is		1.75 (1.12)
For me to have high work pressure is		0.36 (1.76)

(*continued on next page*)

(*continued*)

Outcome evaluation (formative indicators)		
Item wording	Item value: scale	Mean (S.D.)
For me to have a fast-paced lifestyle is		0.52 (1.57)
For me to accumulate a high-quality social network is		1.42 (1.17)
For me to have excellent medical services at my disposal is		1.54 (1.12)
For me to ascertain elite education for my children (if any) is		1.65 (1.23)
For me to fulfill my dreams of the future is		1.51 (1.18)

Normative beliefs: strength of normative beliefs (formative indicators)		
Item wording	Item value: scale	Mean (S.D.)
My family will approve of my development in a first-tier city	Strongly disagree → Strongly agree: −3 → +3	0.93 (1.23)
My teachers will approve of my development in a first-tier city		1.19 (1.09)
My friends will approve of my development in a first-tier city		1.12 (1.11)
Most of my seniors (older students) developed themselves in first-tier cities after graduation		0.77 (1.18)
Most of my classmates (cohort) that I knew will develop themselves in first-tier cities after graduation		0.83 (1.19)

Motivation to comply (formative indicators)		
Item wording	Item value: scale	Mean (S.D.)
How much do you value the following groups' opinions or behavior when it comes to developing yourself in a first-tier city?		
Family	Extremely unimportant → Extremely important: 1 → 7	5.18 (1.1)
Teachers		4.72 (1.11)
Friends		4.72 (1.03)
Seniors		4.48 (1.14)
Classmates		4.42 (1.17)

Control beliefs: strength of control beliefs (formative indicators)		
Item wording	Item value: scale	Mean (S.D.)
The house prices in first-tier cities are high	Extremely unlikely →Extremely likely: 1 → 7	6.01 (1.13)
The rent prices in first-tier cities are high		5.96 (1.15)
The living costs (apart from housing expenditure) in first-tier cities are high		5.94 (1.13)
I cannot take good care of my family when I develop myself in a first-tier city		5.57 (1.26)

Power of control (formative indicators)		
Item wording	Item value: scale	Mean (S.D.)
High house prices would make it _ for me to develop myself in a first-tier city after graduation	Much more difficult →Much easier: −3 → +3	−1.3 (1.25)
High rent prices would make it _ for me to develop myself in a first-tier city after graduation		−1.26 (1.24)
High living costs would make it _ for me to develop myself in a first-tier city after graduation		−1.25 (1.23)
Not being able to take good care of my family would make it _ for me to develop myself in a first-tier city after graduation		−1.17 (1.28)

Appendix B. Measurement of intention, attitude, subjective norm, and PBC

Item wording	Item name	Item value: scale	Mean (S.D.)
Intention measurement			
I expect to develop myself in a first-tier city after graduation	INT1	Strongly disagree → Strongly agree: 1 → 7	5.05 (1.41)
I want to develop myself in a first-tier city after graduation	INT2		4.95 (1.44)
I intend to develop myself in a first-tier city after graduation	INT3		4.76 (1.50)
Attitude measurement (reflective indicators)			
I think developing myself in a first-tier city after graduation is	ATT1	Bad → Good: 1 → 7	5.05 (1.23)
	ATT2	Worthless → Useful: 1 → 7	5.13 (1.26)
	ATT3	The wrong thing to do → The right thing to do: 1 → 7	4.97 (1.22)
Subjective norm measurement (reflective indicators)			
	SN1		4.74 (1.23)

(*continued on next page*)

(*continued*)

Item wording	Item name	Item value: scale	Mean (S. D.)
Most people who are important to me think that I should develop in a first-tier city after graduation			
Most people whose opinions I value would approve of me developing in a first-tier city after graduation	SN2	Strongly disagree → Strongly agree: 1 → 7	4.77 (1.24)
Most of the students in the university like me will develop themselves in a first-tier city after graduation	SN3		4.84 (1.81)
Perceived behavioral control (PBC) measurement (reflective indicators)			
Whether or not I develop myself in a first-tier city after graduation is completely up to me	PBC1	Strongly disagree → Strongly agree: 1 → 7	5.31 (1.27)
For me, to develop myself in a first-tier city after graduation is easy	PBC2		4.48 (1.35)
I am confident that if I want to, I could develop myself in a first-tier city after graduation	PBC3		4.73 (1.41)

Appendix C. 1. Results of the t-tests.

Independent samples test	Gender	Only child	Previous migration experience	Educational level	University ranking	University location (city level)
Variable	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
Job	0.491	0.176	**0.001**	**0.001**	**0.001**	**0.000**
Income	0.382	0.271	**0.008**	**0.001**	**0.001**	0.106
Work pressure	0.247	**0.015**	**0.018**	0.069	0.268	0.249
Lifestyle	0.571	**0.02**	**0.020**	0.079	0.928	0.365
Social network	0.209	0.693	**0.024**	0.114	0.241	0.054
Medical service	0.929	0.724	0.212	0.058	0.409	0.152
Education	0.813	0.287	0.363	0.501	0.892	0.844
Fulfill my dreams	0.860	0.393	0.948	0.761	0.580	0.348
Family	0.084	0.728	0.861	0.333	0.600	**0.004**
Teachers	0.368	0.458	0.416	**0.039**	0.220	**0.000**
Friends	0.622	0.409	0.636	0.911	0.165	**0.012**
Seniors	**0.003**	0.184	0.930	**0.004**	**0.007**	**0.000**
Classmates	**0.016**	0.699	0.503	0.415	0.133	**0.001**
House prices	**0.007**	**0.017**	0.062	**0.000**	**0.000**	0.953
Rent prices	0.057	0.113	0.095	0.322	0.804	0.309
Living costs	**0.024**	0.242	0.258	0.988	0.594	0.056
Family ties	**0.002**	0.101	**0.025**	**0.004**	**0.026**	0.052
Intention	0.942	0.274	0.756	0.119	0.447	**0.001**

Note: significant at $p < 0.05$. Significant result presented in bold.

Appendix D. 2. Results of the one-way ANOVA

ANOVA	Major (N = 1242)		Year of education (Only bachelors, $N = 1054$)	
Variable	One-way ANOVA/ Welch's F	Sig.	One-way ANOVA/ Welch's F	Sig.
Job	$F(3, 1238) = 1.353$	0.256	$F(3, 1050) = 1.194$	0.311
Income	$F(3, 1238) = 1.664$	0.173	$F(3, 1050) = 0.486$	0.692
Work pressure	$F(3, 1238) = 0.152$	0.929	$F(3, 1050) = 0.389$	0.761
Lifestyle	$F(3, 1238) = 0.153$	0.928	$F(3, 1050) = 0.692$	0.557
Social network	$F(3, 1238) = 2.116$	0.096	$F(3, 1050) = 1.272$	0.283
Medical service	$F(3, 1238) = 0.724$	0.538	$F(3, 1050) = 0.564$	0.639
Education	$F(3, 1238) = 2.000$	0.112	$F(3, 1050) = 0.534$	0.659
Fulfill my dreams	$F(3, 1238) = 0.990$	0.396	$F(3, 1050) = 1.960$	0.118
Family	$F(3, 1238) = 1.004$	0.372	$F(3, 1050) = 1.551$	0.200
Teachers	$F(3, 1238) = 2.117$	0.095	$F(3, 1050) = 1.014$	0.385
Friends	$F(3, 1238) = 0.180$	0.910	$F(3, 1050) = 0.525$	0.665
Seniors	$F(3, 1238) = 2.549$	0.056	$F(3, 1050) = 2.196$	0.087
Classmates	$F(3, 1238) = 1.374$	0.251	$F(3, 1050) = 1.381$	0.247
House prices	$F(3, 1238) = 1.808$	0.146	$F(3, 1050) = 2.547$	0.058
Rent prices	$F(3, 1238) = 0.816$	0.486	$F(3, 1050) =2. 278$	0.103
Living costs	$F(3, 1238) = 0.914$	0.434	$F(3, 1050) = 1.586$	0.192
Family ties	$F(3, 1238) = 0.961$	0.412	$F(3, 1050) =0.702$	0.551
Intention	$F(3, 1238) = 0.350$	0.789	$F(3, 1050) = 2.211$	0.085

Note: significant at $p < 0.05$. The results of Post Hoc Tests are not presented since none of the bivariate tests for the relationship between "major" and intention or beliefs were significant in the table. The same applies to variable "the year of education".

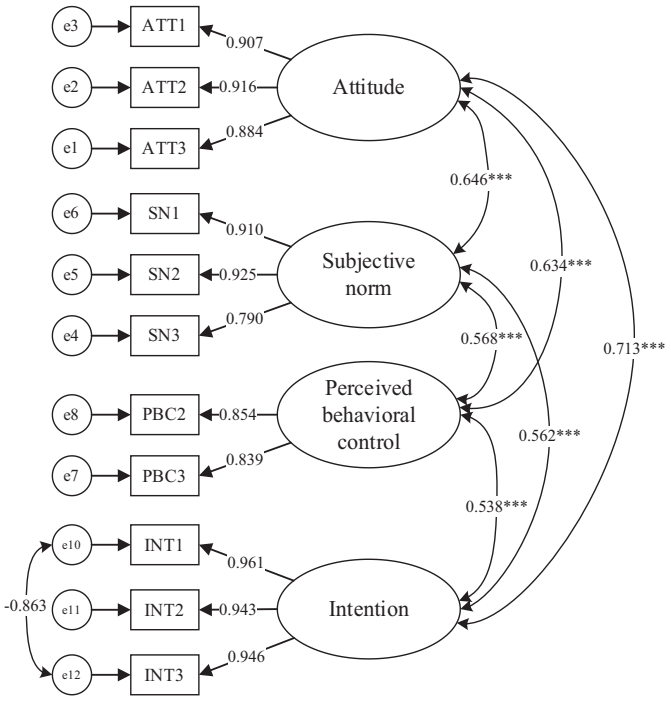

Fig. D. Model of Confirmatory factor analysis (standardized estimates).

Note: Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Since we can and can only adjust the model fit based on the covariance between error terms in the same construct when performing CFA (Collier, 2020), we added the covariance between the error terms e10 and e12 based on the output of the modified indices prompted in AMOS. We finally obtained acceptable model fit; Model fit indices: CFI = 0.99, TLI = 0.98, RMSEA = 0.08.

Appendix E. Results of the Confirmatory factor analysis (CFA).

Latent variables	Measurable variables	Factor loading	CR	AVE	Square root of AVE	Correlation		
						ATT	SN	PBC
ATT	ATT1	0.907***	0.929	0.814	0.902			
	ATT2	0.916***						
	ATT3	0.884***						
SN	SN1	0.910***	0.908	0.769	0.877	0.646***		
	SN2	0.924***						
	SN3	0.790***						
PBC	PBC2	0.854***	0.835	0.717	0.762	0.634***	0.568***	
	PBC3	0.839***						
INT	INT1	0.961***	0.965	0.903	0.950	0.713***	0.562***	0.538***
	INT2	0.943***						
	INT3	0.946***						

Note:
1. Significance levels: *** $p < 0.001$, **$p < 0.01$, *$p < 0.05$.
2. Reliability indicators and qualification criteria: CR $\geq$ 0.6
3. Validity indicators and qualification criteria: AVE $\geq$ 0.5; Square root of AVE > The biggest intercorrelation between latent variables.

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