

## Full length article

# Could smog pollution lead to the migration of local skilled workers? Evidence from the Jing-Jin-Ji region in China

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## ABSTRACT

The study explored the characteristics of skilled workers' migration intention in the Jing–Jin–Ji region of China from a new perspective of smog risk perception in response to the question “does smog lead to brain drain”. Quantitative research and exploratory and confirmatory factor analysis were used to contribute to the literature on risk perception by developing dimensions of smog risk perception, namely, physical health risk perception, mental health risk perception, living cost perception and government control perception. The applied boundary of social exchange theory was extended to the macro-social level from the original micro-organizational level. Based on this, the paper theoretically analyzed the hypothesis that there is a social exchange relationship between skilled workers and their city of residence. We theorized that this relationship could be upset by local smog pollution, ultimately resulting in the departure of skilled workers. The relationship between smog risk perception and migration intention was examined through correlation analysis and multiple regression analysis. The results showed that physical health risk perception, mental health risk perception and government control perception have significant explanatory power for skilled workers' migration intention, which corroborates that the degree to which skilled workers perceive smog risk surely affects their migration intention. However, living cost perception is not currently a significant driver of migration intention. This study suggested that an important role is played by policy makers and organizations in the smog risk perception of skilled workers.

## 1. Introduction

The air quality index of 2016 published by the Ministry of Environment Protection of the People's Republic of China indicated that seven cities in the Beijing–Tianjin–Hebei (Jing–Jin–Ji) region<sup>1</sup> (Fig. 1) of China were in the bottom 10 of the air quality rankings. Meanwhile, China Environmental Status Bulletin in 2016 showed that throughout a year, 10 cities at the prefecture level and above in the Jing-Jin-Ji region of China experienced more than 140 days that air quality didn't meet national air quality standards (Fig. 2). Therefore, smog has become a prominent environmental problem throughout the whole country, especially in the Jing-Jin-Ji region (Huang et al., 2017; Yang and Teng, 2016; Qin et al., 2015; Zheng et al., 2015; Shi et al., 2016). Smog is a form of air pollution and is closely related to human health, mortality, life span, and emotion perception variables (Sun et al., 2016; Laden et al., 2006; Correia et al., 2013); it is a risk to the quality of people's working and living environments, as well as their physical and mental health (Hunter, 2005; Kilani et al., 2013). A legitimate question is “will people under high smog risk in the long term migrate away from

severely polluted areas by smog to avoid smog risk (in addition to wearing masks, buying air purifiers or taking other defensive measures)?”

In theory, beliefs, attitudes, judgments and feelings form when people face possible loss resulting from external objective risks; this is theoretically known as risk perception (Slovic, 1993), and it affects individuals' self-protective behaviors (Van der Pligt, 1996), health-related behaviors (Brewer et al., 2007), and other behaviors (Hu et al., 2017). Smog risk perception—a person's ability to subjectively evaluate the risks of smog pollution—can contribute to the adoption of responsive behavior, such as averting behavior (Bresnahan et al., 1997), short-term or long-term deliberate ‘escape’ behavior (Bickerstaff and Walker, 2001), travel behaviors (Christine Bae, 1993), and health protective behaviors (reducing or rescheduling outdoor activity) (Radisic and Newbold, 2016). Thus, we speculate that, considering the severity of smog pollution, smog risk perception of skilled workers in this region may also prompt them to generate thoughts of leaving the Jing-Jin-Ji region, named as “skilled workers' migration intention” in this study. As the primary environmental problem and special air

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<sup>1</sup> The concept of the Beijing-Tianjin-Hebei Region evolved from the concept of the Beijing-Tianjin-Hebei industrial base, and includes two municipalities (i.e., Beijing and Tianjing) and 11 cities of Hebei Province (i.e., Baoding, Langfang, Tangshan, Shijiazhuang, Zhangjiakou, Chengde, Qinhuangdao, Cangzhou, Hengshui, Xingtai and Handan).

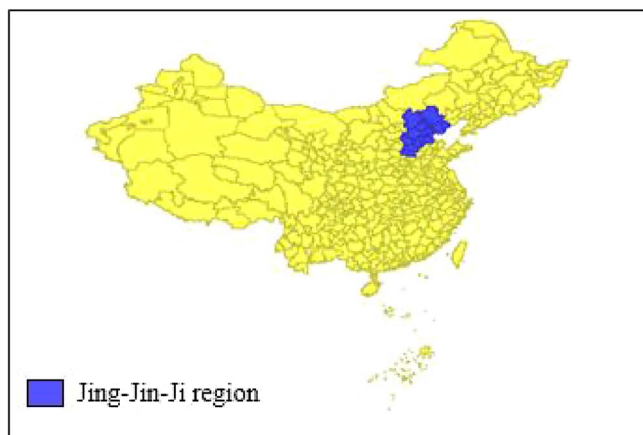


Fig. 1. The geographical position of Beijing-Tianjin-Hebei Region in China.

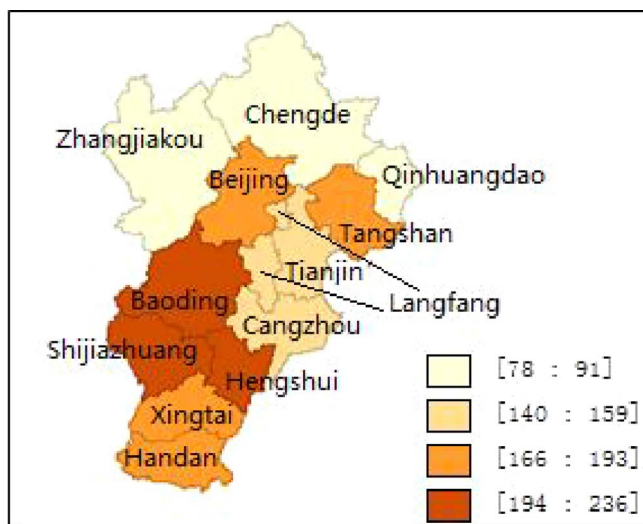


Fig. 2. The number of days that didn't meet the national air quality standards in Jing-Jin-Ji region of China, 2016.

pollution phenomenon that confronts China, smog has the characteristics of wide-ranging effects, long duration, potential to cause great damage and it is difficult to treat (Sun et al., 2016; Zhou et al., 2015; Wang et al., 2017). Thus, smog risk perception is not identical to air pollution risk perception. Current research pays more attention on risk perception of air quality and environmental risk perception, for example, Becken et al. (2017) found that feelings towards the risk of air quality had a significant negative effect on destination images as well as intention to visit China by investigating US and Australian residents. Chen et al. (2017) examined the relationship between environmental risk (focused on air and water quality) perception and public responses in China. Only a small amount of research exists that explores the links among smog concern, risk perception, trip satisfaction and destination loyalty (Li et al., 2016; Zhang et al., 2015).

In response to the general question “does smog lead to brain drain”, this paper examines qualitative and quantitative data of smog risk perception and migration intention of skilled workers in the Jing-Jin-Ji region of China. Based on a review of the theoretical background, this paper analyses the social exchange relationship between skilled workers and city, combining it with social exchange theory, and then develops an initial structure for smog risk perception through qualitative research. The formal structure of smog risk perception and a questionnaire to confirm the structure are formed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), followed by research hypotheses and methods. By surveying 720 skilled workers

in the Jing-Jin-Ji region and using correlation analysis and multiple regression analysis, we examine how dimensions of smog risk perception affect their intention to migrate from severely polluted areas by smog. To conclude, an in-depth discussion of our findings is presented, and suggestions for policy makers and organizations are proposed.

## 2. Theoretical background

Migration of Skilled workers becomes increasingly common and attracts considerable attention of scholars, whereas skilled workers do not form a specifically defined category as the definition of skills varies in different countries and time. Skilled workers are frequently regarded as having some level of tertiary education, such as a university degree. People with vocational skills are sometimes considered as skilled workers too. In this paper, Raghuram's (2000) definition of skilled workers as those with some tertiary education (including doctor degree, master degree, bachelor degree, three-year or two-year college education, secondary vocational school education and so forth) and in possession of skills valued in the labor markets was adopted.

On the theoretical principle of reciprocity, all human behaviors are dominated by exchange activities that can bring repayments according to social exchange theory (Blau, 1964; Emerson, 1976). In the exchange process, when one party helps or benefits another party, there is an expectation of a future repayment that meets the supplier's requirements (Konovsky and Pugh, 1994; Cropanzano and Mitchell, 2005). If exchange partners obey reciprocity rules, the needs and expectations of all parties will be met, and the exchange activities between parties will be in a reciprocally balanced state, which motivates parties to “choose to remain involved in the relationship”. That is, an open-ended and long-term social exchange relationship will be formed (Blau, 1964; Colquitt et al., 2014). One party will gradually be trusting in and committed to another party (Molm et al., 2000) over time, which promotes the sustainable development of the social exchange relationship. Although existing research has mainly applied social exchange theory to explaining the interaction between employees, or between employees and organizations in work settings (Herman et al., 2013; Banks et al., 2014) such as leader-member exchange (Graen and Uhl-Bien, 1995) and organization-member exchange (Karriker and Williams, 2009), the applied boundary of social exchange theory is not only confined to organizations but also can be extended to the macro level of social structure in line with Blau's research (1964). Similar social exchange activities and stable and balanced social exchange relationships exist between groups, organizations and communities in the macro level of social structure; these are based on salary expectation, the principle of reciprocity, repayment value and fair rules accepted by exchange partners, and emphasize the mutual needs satisfaction and expectations (Blau, 1964).

A city is defined as a form of social organization that has definite characteristics and is geographically bounded (Bardo and Hartman, 1982), and within which different organizational units (e.g., groups and organizations) operate in a systematic way. From the perspective of social division of labor, the formation and development of a city is bound up with the process of social exchange and the formation of a social exchange relationship between the internal units. Blau (1964) applied the generalized concept of “community” (noting that a community is a specific geographical area that can be a country, a city or village, or parts thereof) to explain the exchange between groups, organizations and communities. That is, when groups or organizations directly or indirectly supply valuable contributions to the community, the community will supply (directly or indirectly) rewards, powers, permissions and other benefits to the groups (or to group members). As a result, there is a social exchange relationship between a city in which skilled workers live (with “city” fitting Blau's (1964) generalized concept of “community”) and the skilled workers as groups inside the city or the main body of an organization.

In line with the social exchange theory and the principle of

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