I Z A Institute of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 16319

Air Pollution and Entrepreneurship

Liwen Guo
Zhiming Cheng
Massimiliano Tani
Sarah Cook
Jiaqi Zhao
Xi Chen

JULY 2023

IZA Institute of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 16319

Air Pollution and Entrepreneurship

Liwen Guo
University of New South Wales

Zhiming Cheng
Macquarie University and University of New South Wales

Massimiliano Tani
University of New South Wales and IZA

Sarah Cook
University of Nottingham Ningbo China, University of New South Wales and University of the Witwatersrand

Jiaqi Zhao
Peking University

Xi Chen
Yale University and IZA

JULY 2023

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ISSN: 2365-9793

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Air Pollution and Entrepreneurship*

We investigate the effect of exposure to air pollution on an individual's likelihood towards entrepreneurship using panel data in China. To address omitted variable bias and endogeneity arising from self-selection into entrepreneurship and location choice, we employ an individual fixed effects model with an instrumental variable approach. Our findings show that individuals exposed to higher levels of air pollution are less likely to become entrepreneurs or diversify their entrepreneurial activities. Specifically, a one standard deviation increase in air pollution leads to a 21 percentage points decrease in the propensity for entrepreneurship and a 34 percentage points decrease in the likelihood of entrepreneurial diversification. Our study identifies potential channels through which air pollution impacts entrepreneurship. In addition, our findings reveal that air pollution has a more significant negative impact for older individuals, people residing in less populated areas, and those with lower education levels compared to their counterparts.

JEL Classification: J24, L26, Q53
Keywords: air pollution, entrepreneurship, China

Corresponding author:
Massimiliano Tani
UNSW Canberra
Campbell ACT 2612
Australia
E-mail: m.tani@adfa.edu.au

* We are very grateful for insights and suggestions from seminar participants at the Australasian Development Economics Workshop, wISE Conference, Jinan International Economic Youth Forum, Global Labor Organization (GLO) VirtYS seminar, the UNSW Canberra School of Business research seminar and 2021 Australian Social Policy Conference. Liwen Guo thanks for the support and guidance from GLO and GLO-VirtYS program. Liwen Guo thanks for the financial support from UNSW and UNSW Canberra (Tuition Fee Scholarship (TFS) - fee component (RSRE7059), Tuition Fee Scholarship - stipend component (RSRE7080) and Development and Research Training Grant (RSTR9001)). Any remaining errors are ours.

1. Introduction

Entrepreneurship – the choice to work for oneself in non-agricultural sectors (Steinmetz & Wright, 1989) – plays a pivotal role in economic growth, especially in middle-income nations such as China. In recent years, China witnessed a significant increase in entrepreneurial activity, which has been integral to its transition from low to middle-income status (Banerjee & Newman, 1993; İlhan Ertuna & Gurel, 2011; Soto, 2003). This high entrepreneurship rate (e.g., average increasing rate of the number of new established firms is around 12.4% after 1990[1]) coincides with severe environmental issues, especially in terms of air pollution. While the consequences of air pollution on physical, cognitive ability and decision-making are well-documented (Chen, 2018; Chen & Schwartz, 2009; Zhang et al., 2017), our understanding of how it might influence entrepreneurial choices remains largely unexplored. This study aims to fill this gap by exploring how air pollution might impact entrepreneurs' psychology and performance, business environment, startup costs and feasibility of business initiation.

The entrepreneurial process theory puts forth entrepreneurship as an enduring interaction among individuals, organizations and the environment, emphasizing the strategic use of resources, such as capital, labor and technology, for estimates of costs and risks as well as opportunity exploitation (Wickham, 2001). Through this lens, we can analyze the potential impacts of air pollution on entrepreneurial activities, such as the alteration in preferences or a shrinking labor force, which may escalate the (assumed) costs of initiating a business and disrupt the dynamic balance between entrepreneurial elements (i.e., opportunity identification, facilitation, desire and motivation) and organizational development (i.e., overall growth in a company). In the case of China it is found that air pollution reduces new business entry at the city-level (Wei et al., 2023; Zhao et al., 2022). City-level costs of air pollution, such as talent outflow, social capital and cost constraints, might exacerbate the adverse effects of air pollution on new entrepreneurial activities

[1] The average rate is calculated based on data from China's administrative business enterprise registration database from 1990 to 2020.

at the city-level. However, the personal decision to engage in entrepreneurship is highly individual and influenced by myriad factors. Our study, therefore, scrutinizes the same individuals who establish and sustain entrepreneurial activities (or choose to become an employee) over time, considering the variations in their exposure to air pollution. We also assess the quality of entrepreneurial initiatives by exploring the diversity of entrepreneurial endeavors (i.e., numbers of types of businesses) within households, which allows us to examine the potential benefits of entrepreneurial diversity in income generation, collaboration and fostering an entrepreneurial culture.[2]

We conduct our empirical investigation by utilizing panel data from a nationally representative longitudinal survey of China's middle-aged and elderly populace (i.e., China Health and Retirement Longitudinal Study, CHARLS). The CHARLS dataset, a widely respected source of comprehensive data regarding the physical and psychological health, economic conditions and demographics of China's middle-aged and elderly population, is particularly crucial in the context of China's rapidly ageing populace and the common trend of entrepreneurs launching their ventures during their middle age. Influenced by their extensive work history and personal experiences amidst China's considerable economic and societal evolutions, these entrepreneurs provide a unique study group. Thus, the use of CHARLS data not only enables the critical investigation of how air pollution impacts various facets of the ageing population, including entrepreneurship, but also offers a more nuanced understanding of the shifts in China's entrepreneurial landscape. We apply an instrumental variable estimation method to eliminate the bias from various endogenous factors and identify the causal effect. The approach incorporates individual fixed effects to control for time-invariant unobserved heterogeneity (e.g., work experiences, capabilities and preferences) and potential bias from shocks that could correlate with air pollution and entrepreneurship. This study aims to answer key research questions such as: Does

[2] The significance of family members' involvement in entrepreneurship should not be overlooked. 90% of private enterprises in China are family businesses (Bennedsen et al., 2022). Families with entrepreneurship may operate a family business together or establish multiple enterprises.

exposure to air pollution influence entrepreneurship? Our research illuminates the detrimental impact of air pollution on individual entrepreneurial choices, thereby highlighting the associated costs and losses. By intertwining environmental science and entrepreneurship, two traditionally isolated fields, this study significantly enriches the environmental economics and entrepreneurship literature. Our findings further illuminate how air pollution might influence individual-level characteristics such as risk propensity, networking consumption and self-efficacy, and city-level attributes like educated migration and crime rates. These factors could potentially serve as channels through which air pollution impacts entrepreneurship. We also investigate whether air pollution's effects might vary across different demographic groups characterized by age, education levels and city characteristics such as population density. This analysis will be instrumental in guiding policy decisions related to setting air quality standards, fostering entrepreneurial growth and addressing inequality.

The subsequent section (Section 2) provides a theoretical framework, setting the groundwork for the framework of our study and hypothesizing potential relationships between air pollution and entrepreneurial activity. Section 3 describes the methodology adopted for this research, while Section 4 presents the empirical findings. Finally, Section 5 concludes the paper by discussing our findings, their implications and future research directions.

2. Theoretical Framework

In this paper, we adopt the framework depicted in Figure 1 and define air pollution as a hindrance to entrepreneurial activity.

2.1 Air Pollution and Entrepreneurship

Air pollution can have severe socioeconomic consequences, as it poses a significant risk to health and longevity, which can accumulate over time. The adverse effects of air pollution on health may lead to higher health costs, such as the need for additional health insurance, for entrepreneurs and their employees in areas with high air pollution (Chang et al., 2018). Moreover, long-term exposure to air pollution can worsen health conditions and affect cognitive abilities, which can impact the decision-making and choices of potential entrepreneurs (Chang et al., 2019; Fu et al., 2021). Air pollution can also reduce employee performance, leading to lower productivity and making it challenging for entrepreneurs to hire suitable staff. These factors can create uncertainties in the minds of potential entrepreneurs, discouraging them from starting a business. Thus, we propose our first hypothesis that:

H1. Areas with higher air pollution levels will have lower entrepreneurial activities and the diversity of business activities.

2.2 Air Pollution and Entrepreneurship: The Mediating Role of Acquired Capital

Furthermore, we argue that the relationship between air pollution and entrepreneurship is mediated by various factors that affect the entrepreneurial process, such as personal behaviors and city characteristics. The detrimental effect on individual entrepreneurial behaviors can be attributed to the negative consequences of air pollution, including its impact on personal behaviors and city characteristics. These consequences result in increased risks, as well as decreased opportunities and resources. However, factors such as better physical health, higher levels of education and living in larger cities can increase resilience for people to mitigate the negative effects of air pollution on entrepreneurial activities. For the sake of brevity, we use entrepreneurial tendencies to refer to the behavior and quality of entrepreneurial activity.

Numerous studies have shown that air pollution may affect people's risk preferences, although the impact is not entirely clear. While some studies suggest that air pollution may increase aggression and high-risk behaviors such as criminal activity (Bondy et al., 2020), our research supports the view that air pollution makes people more conservative. For example, research on investment analysts indicates that air pollution leads people to make more pessimistic forecasts about future earnings of companies, indicating a preference for low-risk options (Dong et al., 2021). This may discourage potential entrepreneurs from starting businesses, as entrepreneurial activities face various potential risks.

Air pollution can also discourage outdoor social and consumption behavior, as people tend to avoid the dangers associated with polluted air. Research on movie-watching in Beijing shows that air pollution reduces the frequency of outdoor activities and social interactions (He et al., 2022). Entrepreneurs, regardless of their age and geographical location, generally need a broad array of connections to foster a diverse range of contacts and pinpoint potential business opportunities. In Chinese culture, the concept of "guanxi" or interpersonal relationships frequently serves as a linchpin in business dealings. However, behaviors geared towards avoiding air pollution, which can limit networking opportunities, may potentially act as a deterrent for entrepreneurs. According to research on air pollution, it has been suggested that it can negatively impact learning ability (Chen, 2018). With increasing levels of air pollution, personal performance may decrease, resulting in a reduction of self-efficacy, hindering the learning behavior of potential entrepreneurs who could create business opportunities. Self-efficacy refers to people's belief in their ability to achieve goals, which is developed through personal performance and influences their estimation of capabilities and subsequent performance outcomes. High levels of self-efficacy are linked to intrinsic interest in tasks, increased effort and persistence when facing obstacles. In entrepreneurship research on young firms founded in the United States, entrepreneurial ability is crucial, and in the learning process, entrepreneurs require confidence to solve problems and the courage to face the unknown (Hmieleski & Baron, 2008). Measures of entrepreneurial self-efficacy is often used to evaluate their perseverance in the face of obstacles. Recent studies have shown that high self-efficacy leads to higher self-motivation, positive expectations, lower perceived differences and increased effort allocation, all of which are beneficial for developing entrepreneurial intention (Gielnik et al., 2020)

The detrimental effects of air pollution might surpass the impact it has on individuals alone, as it could potentially contribute to a surge in city-level criminal activities and pose a threat to the economy of populated areas in polluted periods. Recent studies examining wind-driven air pollution, specifically comparing differences between upwind and downwind areas within the same day, have suggested a causal link between severe air pollution and increased crime rates. The possible explanation for this connection is the negative influence of air pollution on mental well-being, potentially inciting increased levels of aggression, impulsivity and anxiety. The spectrum of criminal behaviors linked to this occurrence could span from violent crimes to more spontaneous transgressions (Herrnstadt et al., 2021). The rise in crime rates will escalate the direct and indirect costs of conducting business, such as security expenses, the migration of skilled individuals, reduced consumer demand and diminished trust, invoking harmful norms of reciprocity (Awaworyi Churchill et al., 2023). As a result, the rise in crime rates caused by air pollution may damage the social capital of the community, obstruct local economic growth, and make it challenging to cultivate a supportive business environment.

Air pollution could also have a substantial effect on the business setting. It could prompt a well-educated and highly competent workforce to consider migration due to the physical health concerns related to subpar air quality. Such a situation might result in a reduced pool of skilled labor, which, in turn, could stifle entrepreneurship (Chen et al., 2022; Qin & Zhu, 2018). When considering starting a business, entrepreneurs typically scrutinize the local labor market to ensure it can cater to their production demands. The presence of a substantial number of skilled workers can lower the effort and costs associated with finding specialized talent, a phenomenon often referred to as "labor market pooling". This can help cultivate a more vibrant business ecosystem (Doms et al., 2010). Moreover, the sharing and proliferation of ideas, both within specific industries (industry localization) and across various sectors, are instrumental. As underscored by Jacobs (1969), the cross-pollination of existing ideas from a range of sources can catalyze the birth of innovative concepts, thereby fostering the inception and sustainability of businesses.

We propose that the relationship between air pollution and entrepreneurship is mediated by the accumulation of individual and city capital in the entrepreneurial process.

H2. *Higher levels of air pollution lead to a reduction in the accumulation of acquired capital in terms of risk, opportunity, continuous learning and resources, ultimately resulting in a decrease in entrepreneurship. This reduction* *in capital accumulation acts as an intermediary between air pollution and entrepreneurship, such that individuals living in areas with high levels of air pollution accumulate less capital during the entrepreneurial process, leading to a lower likelihood of becoming an entrepreneur.*

2.3 Air Pollution and Entrepreneurship: The Moderating Role of Initial Capital

The initial advantages of individuals, such as physical health, education and living in a large city, may help mitigate the negative effects of air pollution on entrepreneurship. Younger individuals may have better physical fitness and immunity to withstand the harmful effects of air pollution on health. They may also have better access to entrepreneurship-related information and networking opportunities through advanced information networks, as well as higher learning ability and adaptability to face challenges (Yu et al., 2016).

Education is a critical component in the production function of human capital and a fundamental element for accumulating comprehensive skills necessary for management, decision-making and new professional knowledge. People with higher levels of education tend to develop skills more efficiently and demonstrate superior problem-solving abilities compared to those with lower levels of education (Gustafsson, 2006). Additionally, higher levels of education can increase an individual's perception of opportunities and their ability to assess their potential for business success in a specific field. Finally, higher education can also indicate higher comprehensive abilities, which may lead to a greater likelihood of becoming an entrepreneur for more capable individuals.

Living in a large city can provide entrepreneurs with advantages such as access to raw materials, a larger labor supply and greater consumer demand, all of which can reduce production costs (Ma et al., 2021). Potential entrepreneurs living in large cities may also benefit from comprehensive entrepreneurial policy support and access to fresh air with strict air pollution controls, which can help them resist the negative effects of air pollution on their entrepreneurship. Conversely, individuals living in small cities may be more vulnerable to the impact of air pollution on their entrepreneurial activities.

We also propose the following hypothesis, which posits that initial individual and city capital factors such as age, education and living conditions act as moderators between air pollution, acquired capital and entrepreneurship.

H3. *The accumulation of initial individual and city capital during the entrepreneurial process serves as a moderator between air pollution, acquired capital and entrepreneurship. Individuals with higher initial capital are less affected by air pollution in terms of acquired capital, leading to a lower likelihood of becoming an entrepreneur.*

3. Method

3.1 Data Analysis

We adopt the linear probability model to test the impact of air pollution on entrepreneurial choices. We use a causal mediation analysis framework in instrumental-variable regressions to assess the effects of air pollution on entrepreneurship, mediated by personal and city characteristics. We group respondents by education level to test for heterogeneity. Our mediation approach is based on estimations of three regressions of the same sample (Baron & Kenny, 1986). First, we regress the entrepreneurship on air pollution. Second, we regress the mediator on air pollution. Finally, we regress the entrepreneurship on both mediator and air pollution. There is an indirect effect of air pollution on entrepreneurship if the results of the first and second regressions are significant, and the result of the mediator is significant in the third regression. Furthermore, there is a partial mediation (i.e., complementary mediation) if the coefficient of air pollution in the third regression is less than the first regression and significant. A full mediation (i.e., indirect-only mediation) occurs when the air pollution variable in the third regression is not statistically significant. A suppressor effect (i.e., competitive mediation) is observed when the coefficient of air pollution in the third regression is equal to or larger than that in the first regression, and it is statistically significant.

In the regressions, we include individual fixed effect, household fixed effect, community fixed effect, city fixed effects and year fixed effects to control for the time-invariant factors of individual, household, community, city and year, respectively. Robust standard errors are clustered at the household-level to adjust for heteroskedasticity and accommodate within-household autocorrelation over time.

In this study, we use an instrumental variable to tackle the endogeneity issue in the model. The endogeneity mainly arises due to the difficulty of fully controlling the factors related to entrepreneurship and pollution. For instance, when compared to other areas, large cities may exhibit lower levels of entrepreneurship because of severe air pollution, or higher levels because of greater development, higher population density, a greater number of entrepreneurial talents, and more measures taken to mitigate air pollution, such as the promotion of electric vehicles and the installation of air purifiers in public places.

We follow the recent studies on air pollution to construct an instrumental variable using thermal inversions (He et al., 2019; Liu & Salvo, 2018; Qin et al., 2019). Thermal inversions can only affect air pollution when the pollutants exist, and thermal-inversion-induced air pollution will affect entrepreneurship through the original air pollution. Thus, we use values for temperature inversions in the atmosphere, wind speed, wind direction and the number of stagnation days (i.e., days with positive thermal inversion values) in the regression predicting PM2.5. Moreover, we adopt the fitted value of PM2.5 in the first-stage regression in our analysis. Considering that the relationship between thermal inversions and air pollution might be non-linear, we use their squared terms in robustness checks. The instrumental variable is exogenous as the temperature inversions, wind speed and wind direction in the atmosphere are natural phenomena and may exacerbate the level of air pollution.

3.2 Sample

Participants in the study were urban Chinese included in the CHARLS. The CHARLS dataset we utilize was initiated by Peking University in China in 2011. The CHARLS was conducted in 2011, 2013, 2015 and 2018 and included 28 provinces in the sample. Moreover, the researchers of the CHARLS utilized systematic probability proportional to size sampling with implicit stratification by administrative boundary and socioeconomic status. Then, they obtained a multistage probability sample. Finally, the CHARLS's baseline survey contains 10257 households in 150 counties and consists of information on adults, families and communities. The CHARLS datasets also provide city-level geographical information.

In comparison to other surveys, the CHARLS survey encompasses more comprehensive geographic information, a more extended duration of follow-up, a larger sample size, and an increased number of variables that encompass the characteristics of middle-aged and elderly individuals. We use CHARLS data from 2011, 2013, 2015 and 2018 to create a panel dataset. To investigate the influence of air pollution on general entrepreneurship, we define the non-entrepreneurial population as individuals without employees in their firm, no household members in the family, and potentially retired. Additionally, we categorize individuals living in cities with a high number of industrial firms and reporting overall life dissatisfaction as having a migrant tendency. To mitigate potential downward bias in the results, we exclude these populations from the main analysis. Furthermore, we exclude individuals who start firms in other cities or participate in unpaid family businesses to focus on the impact of air pollution in the local area on potential entrepreneurs. Our sample contains 990 adults, with a total of 3777 data points.

We obtained air pollution data from the NASA Socioeconomic Data and Applications Center at Columbia University.[3] This satellite-derived data are used to measure the annual global surface concentrations of ground-level PM2.5 ($\mu g/m^3$). The dataset has a high grid cell resolution of 0.01 degrees (latitude) × 0.01 degrees (longitude) (Van Donkelaar et al., 2016, 2018). The data confirm the significant variations of PM2.5 concentrations across cities in our dataset: the mean and standard deviation of the PM2.5 concentrations in the sample are 53.264 $\mu g/m^3$ and 21.233 $\mu g/m^3$, respectively.

3.3 Measures

[3] The data can be found at: https://beta.sedac.ciesin.columbia.edu/data/set/sdei-global-annual-gwr-pm2-5-modis-misr-seawifs-aod-v4-gl-03.

The survey measures were initially created in Chinese, but CHARLS data has made the questionnaires and datasets available in official English versions on its website. The Yearbooks also provide the data in both the original Chinese and official English versions. To ensure the precision and consistency of the air pollution and weather data, we used only data from NASA, which is in English. The survey questions varied somewhat from year to year, and we matched the variables based on their original meaning or response options. When the answer options had different ranges or scales, we included this information in the item descriptions provided below.

The survey questions changed slightly from year to year. We match the variables according to their original meaning or response options. If the answer options have different ranges or scales, we indicate this in the descriptions below.

Entrepreneurship. We focus on people who are employed or self-employed. They have different skills and experiences and work in various sectors and industries. They might be, for example, physical laborers, salespersons, equipment or machinery operators, doctors, or leaders of enterprises. Although these people have divergent skills and experiences, most of them could invest in businesses if they had entrepreneurial intention. This is because individuals with enough financial or social capital can make decisions to enter or exit the market in many industries under the permission of relevant regulations. We attempt to reduce the bias in the estimations by excluding people who worked in agriculture (i.e., casual agricultural workers and those who do agricultural work for their families or other families). Although agrarian workers might also be affected by air pollution, the reasons for and conditions of their entrepreneurial decisions might differ from those in the non-agricultural labor force. Thus, our study focuses on non-agricultural individuals.

We measured individuals' entrepreneurial actions using the adults' primary job type reported in the surveys.[4] After excluding agricultural workers, we created a dichotomous variable

[4] Job types include entrepreneurship, waged jobs and agriculture work.

representing an individual's entrepreneurial behavior; the variable is coded as one if the individual started a new venture and as zero if the individual worked at a company owned by someone else. We have created a variable to represent the quality of entrepreneurship. This variable is categorical and based on the level of diversification in self-employed activities. It ranges from non-entrepreneur to entrepreneurs with one type, two types and three types of self-employed activities within the household (George & Kabir, 2012).

Air pollution. We used PM2.5 to measure air quality and matched it at the city-level with the CHARLS data. This measure of air pollutants is deemed appropriate as it focuses on fine particulate matter with a diameter of 2.5 micrometers or smaller, which poses greater risks to individuals' physical health compared to larger particulate matter.

Thermal-inversion-induced air pollution. Following previous studies on air pollution, we use atmospheric thermal inversions to adjust the measurement error and solve the endogenous problem of air pollution arising from sorting, avoidance behaviors and the relationship between air pollution and economic activities. Specifically, air pollutants are not randomly assigned. Individuals may try to avoid exposure to air pollution. Areas with high economic growth tend to have high levels of air pollution. Yet, they will provide a favorable living environment, mitigating the negative impact of air pollution on human beings (Chen et al., 2018; Deschenes et al., 2020; Jans et al., 2014).[5]

We calculate the temperature differences from 1,000 to 850 hPa and adopt the predicted PM2.5 based on temperature differences as an instrumental variable for air pollution in the analysis. The first-stage specifications are as follows:

$$PM_{2.5_{t,j}} = PM\_fit_{2.5_{t,j}} + X_{t,j} + \varepsilon_{t,j}, \tag{1}$$

[5] Thermal inversions occur in three ways. They are generated on clear nights when the ground and the air touching the ground are cooled faster than the higher air layers. This is because the Earth's infrared emissions warm the higher layers of the atmosphere (radiation inversions). Vertical air movement causes a cold air layer to descend through a hot air layer (subsidence inversions). Moreover, when layers of air at different temperatures move horizontally, a layer of cold air develops below a layer of hot air (advection inversions; Hicks et al., 2016; Jacobson, 2002).

$$PM\_fit_{2.5_{t,j}} = \sum_0^{t,j} \gamma_{1_{t,j}} InverValue_{t,j} + \sum_0^{t,j,l} \gamma_{2_{t,j,l}} WS_{t,j,l} + \sum_0^{t,j,l} \gamma_{3_{t,j,l}} WD_{t,j,l} + \sum_0^{t,j,l} \gamma_{4_{t,j,l}} InverDay_{t,j,l} + \varepsilon_{t,j} \quad (2)$$

In Equation (1) and Equation (2), where $PM\_fit_{2.5t,j}$ represents the fitted value of PM2.5 at time t in city j. In Equation (1), $PM_{2.5t,j}$ is PM2.5 at time t in city j, and $X_{t,j}$ is the set of control variables. As for Equation (2), $InverValue_{t,j}$ is the value of thermal inversions at time t in city j; $WS_{t,j,l}$, $WD_{t,j,l}$ and $InverDay_{t,j,l}$ denote wind speed, wind direction and the number of occurrences of temperature inversions at time t in city j at layer l, respectively. The data source is the Modern-Era Retrospective Analysis for Research and Applications version 2 project, which provides historical atmospheric climate records.[6] We aggregate the 6-hourly data to yearly mean data.[7]

Channels. Risk propensity is determined by principal component analysis, using the interviewee's sense of hopefulness for the future and the logarithmic value of the total cash held at home by the interviewee and their spouse, as well as the current market value of any stocks, bonds, or mutual funds they are holding. Networking consumption is determined by taking the logarithmic value of the total household expenditure on clothing and bedding, travel, beauty and entertainment in the previous year. Self-efficacy is determined by principal component analysis, based on how often the interviewee felt bothered by things that don't usually bother them during the past week (ranging from most/all of the time=1 to rarely/none of the time=4), and how they rated their living standard compared to their schoolmates, relatives, neighbors, county and colleagues (worse=0, better=1)[8]. The city's crime rate is calculated as the number of people

[6] The data can be accessed at https://disc.sci.gsfc.nasa.gov/datasets/M2I6NPANA_5.12.4/summary?keywords=M2I6NPANA.
Also, some researchers use thermal inversions data from National Oceanic and Atmospheric Administration (NOAA) (He et al., 2019; Liu & Salvo, 2018; Qin et al., 2019), which are slightly different from the data we use. The NOAA atmospheric temperature at standard pressure points (e.g., 1,000 hPa) or other detailed pressure points (e.g., 999 hPa) is easily accessed. However, the NASA data we obtained only directly show the average temperature in standard pressure points, while the data at other pressure points need to be further calculated. Considering that the previous literature mainly focuses on the differences between layers of standard pressure points, we do not pay attention to other pressure points in this study.

[7] Wind can transport air pollution. Researchers have found that the variation of meteorological parameters, such as wind speed and direction, can cause pollutant dispersion (Verma & Desai, 2008). Studies have also confirmed that PM2.5 and other pollutants can traverse considerable distances (Deryugina et al., 2019).

[8] Note that it has data in 2011 and 2013.

arrested for violent crimes by the procuratorate per ten thousand people calculated from the data in People's Procuratorate work reports[9]. Finally, the city's educated migration is determined by principal component analysis, based on the growth rates of educated migrants (calculated from the China Migrants Dynamic Survey), the standardized percentage of employees per ten thousand people and the standardized percentage of university students per ten thousand people.

Controls. The survey includes many questions on individuals' characteristics that could be covariates. Including these variables could eliminate bias in the estimation because they may impact ambient air pollution and entrepreneurial decisions, but they cannot be influenced by air pollution and entrepreneurship. The control variables at the individual-level are age, age squared, marital status (never married = 1, separated, divorced, widowed = 2, married with spouse present, or married but not living with spouse temporarily for reasons such as work = 3), number of people living in this household. City attributes include the real gross domestic product (GDP) per capita (1978 = 100), transportation infrastructure (road areas per capita)., green infrastructure (park areas per capita) and demographic structure (numbers of primary school students per capita), as reported in the *China City Statistical Yearbook*.[10] Considering that weather could significantly affect individual performance, we collected weather information from NASA.[11] The weather control variable is surface-level temperature, precipitation, wind speed, relative humidity and water vapor pressure.[12] We also control for a dummy variable to measure if there are large variations among the counties within the same city (no = 0, yes = 1).

4. Results

Insert Table 1 about here

[9] Many cities in our sample does not provide criminal activities data in official websites.

[10] The GDP deflator was calculated by nominal and real GDP, which are sourced from the *China Statistical Yearbook*.

[11] For surface-level temperature, the spatial grid is 0.25 degrees (latitude) × 0.25 degrees (longitude), and the data frequency is every three hours. The data were gathered from the NASA Global Land Data Assimilation System: https://disc.sci.gsfc.nasa.gov/datasets/GLDAS_NOAH025_3H_2.1/summary?keywords=GLDAS_NOAH025_3H.2.1.

[12] Weather data were gathered via http://daac.gsfc.nasa.gov/. Note that precipitation might reduce the occurrences of thermal inversions and closely correlates with relative humidity.

The descriptive statistics for the variables of all samples, educated individuals and less-educated individuals are presented in Table 1.[13] To compare the impact of air pollution on entrepreneurial actions by education level, we report the summary statistics after grouping respondents by their level of education. We also conducted a univariate test, again segregating interviewees by education level, to identify any differences between the two groups. In the data from all samples, about 20.9% of participants are entrepreneurs, and most of them are less educated. Higher educated individuals tend to exhibit higher levels of risk propensity and networking consumption compared to their less educated counterparts, but may have lower levels of self-efficacy. The average number of people arrested for violent crimes by the procuratorate per ten thousand people is 6.465. Educated individuals tend to reside in areas with higher crime rates and a higher density of educated migrants compared to less educated individuals. Of the interviewees, 80.0% are male and 33.7% attended high school or above. Moreover, the data indicate that the levels of air pollution vary greatly across cities, and the average annual mean PM2.5, 57.767 μg/m^3, is largely higher than the primary annual mean National Ambient Air Quality Standard of 12 μg/m^3 set by the United States Environmental Protection Agency.[14] Considering that descriptive statistics do not fully capture the relationship between air pollution and entrepreneurial behaviors, we explore our research questions through further empirical analysis.

Insert Table 2 about here

Table 2 reveals the results of the estimation using a linear probability model and a two-stage least squares regression. Column (1) and column (3) in Table 2 presents the results of the linear

[13] The analysis was conducted using STATA (version 16.0 MP).
[14] We could find the air quality standard on the website: https://www.epa.gov/criteria-air-pollutants/naaqs-table.

probability model. The findings indicate that the impact of air pollution on entrepreneurship is not significant. However, based on the above discussion, we suspect that the estimation of the linear probability model is biased, so we use an instrumental variable to construct a two-stage least squares regression. As reported in column (2), the results indicate that an increase in the growth rate of PM2.5 corresponds to a decrease in entrepreneurial likelihood and entrepreneurial diversification. Specifically, a one unit increase in PM2.5 concentrations will reduce the propensity for entrepreneurship by 0.010 units and entrepreneurship diversity by 0.016 units, equivalent to -21.2% and -34.0% of one standard deviation increase in air pollution. Furthermore, the instrument's *t*-statistic is larger than the threshold of 3.43 (Lee et al., 2020), indicating that there are no weak instrument variable problems and our usage of the two-stage least squares regression is reasonable. Thus, the results fully support H1 that air pollution hinders the emergence of entrepreneurship.

Insert Table 3 about here

As we assume that there are channels through which air pollution affects entrepreneurship, we regress entrepreneurship on PM2.5 with acquired capital and present the results of the mediated models in Table 3. We report only the results for the critical variables due to space limitations. All columns include the controls for the individual and city attributes and include individual, household, community, city and year fixed effects. The results of Table 3 show that air pollution is significantly negatively related to risk propensity, networking consumption, self-efficacy and city's educated migration, and air pollution might increase crime rates. After accounting for the impact of air pollution, we find that the mediating effects of risk propensity, networking consumption, self-efficacy and the city's educated migration on entrepreneurial propensity are statistically significant. Moreover, we find that the mediating effects of networking consumption and self-efficacy are significant.[15] The Kleibergen-Paap *F*-statistic[16] for the excluded instruments in the first-stage regression of air pollution on entrepreneurship as well as for air pollution and the self-efficacy is above 10, which proves there are no weak instrument issues. The results suggest that air pollution affects entrepreneurship through the channel of acquired capital such as risk propensity, networking consumption, self-efficacy and the city's educated migration, which partially support H2.

Insert Table 4 about here

Air pollution may have different effects on entrepreneurs with different initial capital. Considering that initial capital may impact acquired capital, we conducted a moderated mediation analysis. We focus on self-efficacy rather than self-rated social status since it significantly impacts the relationship between air pollution and entrepreneurship. In column (1)-column (4) of Panel D of Table 4, our analysis reveals that older individuals and those residing in less populated areas are more vulnerable to the harmful and significant impact of air pollution on networking consumption than their counterparts. According to the results in column (1), column (5) and column (6), the adverse effect of air pollution on self-efficacy could be more pronounced among older adults and less educated individuals than among their younger and higher educated counterparts. Hence, the heterogeneity effects provide partial support for H3 that there is evidence that age, living in big cities and education play a moderate mediator role in the relationship between air pollution and entrepreneurship.

[15] The insignificant effect of air pollution in the third step of the mediation analysis may be due to the limited number of observations for the self-efficacy variable.

[16] We present Kleibergen-Paap *F*-statistic to test for the weak-instruments problem. The null hypothesis is that the independent variable is weakly identified because it is subject to unacceptably large bias. The rule of thumb is that if it exceeds 10, we could say that the instruments are not weak, and the correlations between the independent variable and instruments are not small. In addition, it is valid in non-independent and identically distributed (non-i.i.d.) cases (we could use robust standard errors to address non-i.i.d errors).

In Table A1 of robustness checks, we report the results of the long-term impact of air pollution on entrepreneurship. We found that the average air pollution in previous years is not significantly correlated with entrepreneurship. One possible explanation for the insignificant results could be the phenomenon of adaptation among individuals to long-term exposure to air pollution. It is possible that individuals living in areas with high air pollution have adapted to the environment and developed coping mechanisms to mitigate the negative effects on their entrepreneurial behavior. Another possible explanation could be the government's efforts to encourage entrepreneurship, which may have offset the negative impact of air pollution on entrepreneurial behavior.

To account for the possibility that entrepreneurial activities may not be limited to a particular city and individuals may have businesses in other locations, we conducted robustness checks using an alternative measure of entrepreneurship. The results, presented in Table A2, suggest that air pollution has a negative effect on city-level entrepreneurial activities and increases the likelihood of individuals having businesses in other locations, thus supporting the findings from Table 2.

We conduct analysis in Table A3 to measure the impact of alternative channels in the relationship between air pollution and entrepreneurship. Table A3 shows the results of the analysis of the mediator effects of additional individual, community-level and city-level characteristics on the relationship between air pollution and entrepreneurial activity. The results indicate that none of the variables, including air quality satisfaction (not at all satisfied=1, not very satisfied=2, somewhat satisfied=3, very satisfied=4, completely satisfied=5), working hours, life satisfaction (not at all satisfied=1, not very satisfied=2, somewhat satisfied=3, very satisfied=4, completely satisfied=5), personal medical insurance purchase, community support and collaboration (whether the interviewee took part in a community-related organization, done voluntary or charity work or cared for a sick or disabled adult who does not live with the interviewee in the last month), adjusted city's innovation performance (number of the newly added quantity of the granted patent for invention adjusted by number of university students), city's population density, public transport (logarithmic value of the numbers of city's taxi cabs), presence of financial institutions (whether city has average financial intermediation employees or above), presence of venture capital (whether city has average adjusted private equity and venture capital investment scores or above) and cultural diversity (inverse Herfindahl index of migration status concentration), significantly mediate the relationship between air pollution and entrepreneurial activity. These findings suggest that the negative impact of air pollution on entrepreneurial activity is not influenced by these characteristics.

Table A4 displays the results of exploring additional moderators in the relationship between air pollution and entrepreneurship. The variables examined include spouses' educational levels, gender, spillover effects of first-tier cities, high-speed railway establishment, city's carbon emissions offset, and city's carbon emissions reduction initiative. The results indicate that none of these variables have a significant moderator effect. Specifically, having a spouse with a high school education or above, being male, having proximity to first-tier cities, having high-speed rail, having average green coverage rates, and having average rates of industrial solid wastes utilized do not change the impact of air pollution on entrepreneurship.

We use alternative samples, by adding those with migration intention and have unpaid family business, to estimate the impact of air pollution on entrepreneurship in Table A5. The results are negative and significant, which confirms the robustness of our results.[17]

To investigate the role of city population density in the relationship between air pollution and entrepreneurship, we conducted an analysis presented in Table A6. The results in Panel A and B show that the negative impact of air pollution on entrepreneurship is significant for individuals living in areas with similar high population density. And the results in Panel C indicate that there is no significant relationship between city population density and either air pollution or entrepreneurship. When we used city population density as a predictor of air pollution, the impact on entrepreneurship also remained non-significant. Moreover, as depicted in Fig. A1, we note that

[17] The results from our analysis using a sample of the same age group from China Family Panel Studies (CFPS) were not significant. This may be due to the fact that the survey target population is not limited to middle-aged and elderly people in China, and therefore the lack of observations for this group of people may have resulted in biased results.

there are significant fluctuations in the levels of air pollution among areas with comparable city population density, and similarly, there are considerable variations in city population density among areas with similar air pollution levels. Moreover, it is important to note that the degree of air pollution can be substantial in cities with varying population densities. For instance, cities that belong to the lowest population density category may still exhibit high levels of air pollution, such as 93.079 $\mu g/m^3$, and be part of the highest air pollution group. Therefore, our findings suggest that the negative effect of air pollution on entrepreneurship still exists regardless of city population density.

We further check the personal income of people pre- and post-choice of becoming an entrepreneur. We present the summary statistics on income after excluding people with the same job status in the survey and zero income. We also exclude people who are entrepreneurs before they are workers to eliminate the effect of business failures and the possibility of side work. Table A7 displays that individuals who are entrepreneurs tend to have higher income compared to those who are workers. This finding indicates that being an entrepreneur may have a positive impact on an individual's economic well-being.

Table A8 displays the changes in the industry composition of household entrepreneurial activities between survey years for both entrepreneurs and workers. Our findings indicate that a large proportion of individuals are engaged in service, processing production and transportation industries. These results suggest that the impact of air pollution on entrepreneurship might be more significant in the third industry.

We attempt to plot the trends in entrepreneurship and air pollution and see if they are negatively correlated without the control of other confounders. As shown in Fig. A2, the yearly average entrepreneurial probability increases after 2011 but decreased after 2013. The trend in air pollution decreases steadily between 2011 and 2018, with a reduction of nearly 21.494 $\mu g/m^3$. After 2013, there is a positive correlation between entrepreneurial probability and air pollution trends, as shown in the figure. These results mitigate the potential bias that air pollution may not have a causal impact on entrepreneurship.

5. Conclusion and Discussion

5.1 Conclusion

This research highlights the deleterious effects of air pollution on entrepreneurial choices and entrepreneurial diversification. In delivering detailed evidence at the individual-level and unveiling potential mechanisms and heterogeneity, our work builds upon and expands earlier research which has primarily scrutinized the city-level impact of air pollution on new business entry. Importantly, our findings indicate that factors such as risk inclination, networking consumption, self-efficacy and educated migration might be channels via which air pollution influences entrepreneurial engagements. Moreover, our research divulges that individual characterized by lower initial capital, as evidenced by factors such as age, city population density and education levels, exhibit a greater vulnerability to the negative consequences of air pollution on entrepreneurial activities.

5.2 Theoretical Implications

Our study contributes significantly to the literature on the impact of air pollution on human decision-making in several ways. Firstly, we extend the existing knowledge on the negative impact of air pollution on workers' performance or productivity to entrepreneurship, which has received little attention in previous studies. Secondly, we highlight the critical roles played by initial and acquired capital in mediating the relationship between air pollution and entrepreneurial activities, which adds to the understanding of the mechanisms behind this relationship. Finally, our findings underscore the need for policymakers to be mindful of the role of education in mitigating the adverse effects of air pollution on self-efficacy and entrepreneurship. Specifically, our findings indicate that the negative impacts of air pollution on acquired capital may be more pronounced for individuals who are older, reside in areas with low population density, and have lower levels of education. This vulnerability could be due to their limited levels of health capital, cognition and social support, which may hinder their ability to acquire capital. In this regard, government interventions such as health and education programs, training and support schemes could help to mitigate the adverse impact of air pollution on these groups.[18]

5.3 Practical Implications

Our study has several policy implications. First, governments should consider the significant negative impact of air pollution on individuals' entrepreneurial decisions when encouraging entrepreneurship and providing support to people living in highly polluted areas. To mitigate the large health costs and productivity loss caused by air pollution, governments should control air pollutant emissions, especially in cities with high air pollution levels. Installing air quality monitors and using mobile technologies to increase environmental awareness could be helpful. Policy makers should also consider weather factors such as thermal inversions, wind speed and wind direction. Additionally, the results on the mediating role of acquired capital suggest that air pollution may have a heavier toll on individuals and cities' development. Along with addressing air pollution issues, policy makers should focus on enhancing people's acquired capital. To mitigate the negative impact of psychological factors such as risk propensity and self-efficacy, feasible measures include developing mental health care services in clinics and hospitals and establishing community psychological consultation rooms nationwide (Chen et al., 2018). These practices could be helpful in improving and building self-confidence.

Second, although the Chinese government has already been focusing on environmental protection and sustainability for decades, there may be differences in enforcement across prosperous urbanized areas and impoverished inland areas (van Rooij et al., 2015). Therefore, some cities in China might need to address air pollution issues in an efficient manner, as our findings highlight the potential continuous impact of air pollution.

[18] Every occupation has equal significance in society, and we are concerned with ensuring that people can access clean air without facing any additional costs. Implementing these measures can assist individuals in developing their skills, strengthening social ties, boosting their self-confidence, and ultimately enabling them to achieve their full potential in their chosen career paths.

Finally, our moderation analysis further emphasizes the importance of education. According to our findings, the nine-year compulsory education policy benefits the Chinese urban population. Although the negative impact of air pollution on self-efficacy might decrease for the new generations of China, we cannot ignore the broad negative outcomes of air pollution.

5.4 Limitations and Suggestions for Future Analysis

First, while PM2.5 is the independent variable in our study, it is important to acknowledge that other environmental factors could also influence entrepreneurship in ways that are not yet fully understood. We recognize that these factors may have varying effects on productivity and may also impact entrepreneurship differently. For instance, studies have shown that temperature has an inverted U-shaped relationship with productivity, indicating that extreme temperatures can have a significant adverse effect on human capital accumulation (Zivin & Neidell, 2014). This may be due to the adaptation effects of humans.

Second, future studies could explore the long-term effects of air pollution on entrepreneurship. By distinguishing between the cumulative effects of air pollution and the human body's ability to adapt to air pollutants over time, researchers can examine the impacts of early-stage exposure on different phases of life. This could provide insights into how to mitigate the harmful effects of air pollution in the long run.

References

Awaworyi Churchill, S., Hayward, M., Smyth, R., & Trinh, T.-A. (2023). Crime, community social capital and entrepreneurship: Evidence from Australian communities. *Journal of Business Venturing*, *38*(2), 106291. https://doi.org/10.1016/j.jbusvent.2023.106291

Banerjee, A. V., & Newman, A. F. (1993). Occupational choice and the process of development. *Journal of Political Economy*, *101*(2), 274–298.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173

Bennedsen, M., Lu, Y.-C., & Mehrotra, V. (2022). A Survey of Asian Family Business Research*. *Asia-Pacific Journal of Financial Studies*, *51*(1), 7–43. https://doi.org/10.1111/ajfs.12363

Bondy, M., Roth, S., & Sager, L. (2020). Crime Is in the Air: The Contemporaneous Relationship between Air Pollution and Crime. *Journal of the Association of Environmental and Resource Economists*, *7*(3), 555–585. https://doi.org/10.1086/707127

Chang, T. Y., Huang, W., & Wang, Y. (2018). Something in the air: Pollution and the demand for health insurance. *The Review of Economic Studies*, *85*(3 (304)), 1609–1634.

Chang, T. Y., Zivin, J. G., Gross, T., & Neidell, M. (2019). The effect of pollution on worker productivity: Evidence from call center workers in China. *American Economic Journal: Applied Economics*, *11*(1), 151–172. https://doi.org/10.1257/app.20160436

Chen, J.-C., & Schwartz, J. (2009). Neurobehavioral effects of ambient air pollution on cognitive performance in US adults. *NeuroToxicology*, *30*(2), 231–239. Scopus. https://doi.org/10.1016/j.neuro.2008.12.011

Chen, S., Oliva, P., & Zhang, P. (2018). *Air Pollution and Mental Health: Evidence from China* (No. w24686; p. w24686). National Bureau of Economic Research. https://doi.org/10.3386/w24686

Chen, S., Oliva, P., & Zhang, P. (2022). The effect of air pollution on migration: Evidence from China. *Journal of Development Economics*, *156*, 102833. https://doi.org/10.1016/j.jdeveco.2022.102833

Chen, S., Paulina, O., & Zhang, P. (2018). *Air pollution and mental health: Evidence from China*. NBER working paper no. 24686, Cambridge.

Chen, X. (2018). Smog, cognition and real-world decision-making. *International Journal of Health Policy and Management*, *8*(2), 76–80. https://doi.org/10.15171/ijhpm.2018.105

Deryugina, T., Heutel, G., Miller, N. H., Molitor, D., & Reif, J. (2019). The mortality and medical costs of air pollution: Evidence from changes in wind direction. *American Economic Review*, *109*(12), 4178–4219. https://doi.org/10.1257/aer.20180279

Deschenes, O., Wang, H., Wang, S., & Zhang, P. (2020). *The effect of air pollution on body weight and obesity: Evidence from China*. IZA discussion paper series no. 12296, Bonn.

Doms, M., Lewis, E., & Robb, A. (2010). Local labor force education, new business characteristics, and firm performance. *Journal of Urban Economics*, *67*(1), 61–77. https://doi.org/10.1016/j.jue.2009.10.002

Dong, R., Fisman, R., Wang, Y., & Xu, N. (2021). Air pollution, affect, and forecasting bias: Evidence from Chinese financial analysts. *Journal of Financial Economics*, *139*(3), 971–984. https://doi.org/10.1016/j.jfineco.2019.12.004

Fu, S., Viard, V. B., & Zhang, P. (2021). Air pollution and manufacturing firm productivity: Nationwide estimates for China. *Econ. J.*, *131*(640), 3241–3273. Scopus.

George, R., & Kabir, R. (2012). Heterogeneity in business groups and the corporate diversification–firm performance relationship. *Journal of Business Research*, *65*(3), 412–420. https://doi.org/10.1016/j.jbusres.2011.07.005

Gielnik, M. M., Bledow, R., & Stark, M. S. (2020). A dynamic account of self-efficacy in entrepreneurship. *Journal of Applied Psychology*, *105*(5), 487–505. https://doi.org/10.1037/apl0000451

Gustafsson, V. (2006). *Entrepreneurial decision-making: Individuals, tasks and cognitions*. Edward Elgar Pub.

He, J., Liu, H., & Salvo, A. (2019). Severe air pollution and labor productivity: Evidence from industrial towns in China. *American Economic Journal: Applied Economics*, *11*(1), 173–201. https://doi.org/10.1257/app.20170286

He, X., Luo, Z., & Zhang, J. (2022). The impact of air pollution on movie theater admissions. *Journal of Environmental Economics and Management*, *112*, 102626. https://doi.org/10.1016/j.jeem.2022.102626

Hmieleski, K. M., & Baron, R. A. (2008). When does entrepreneurial self-efficacy enhance versus reduce firm performance? *Strategic Entrepreneurship Journal*, *2*(1), 57–72. https://doi.org/10.1002/sej.42Herrnstadt, E., Heyes, A., Muehlegger, E., & Saberian, S. (2021). Air pollution and criminal activity: Microgeographic evidence from Chicago. *American Economic Journal: Applied Economics*, *13*(4), 70–100. https://doi.org/10.1257/app.20190091

Hicks, D., Marsh, P., & Oliva, P. (2016). *Air pollution and procyclical mortality: Causal evidence from thermal inversions*. Paper presented at the 2017 ASSA Annual Meeting,Chicago.

İlhan Ertuna, Z., & Gurel, E. (2011). The moderating role of higher education on entrepreneurship. *Education + Training*, *53*(5), 387–402. https://doi.org/10.1108/00400911111147703

Jacobs, J. (1969). *The Economy of Cities*. Random House.

Jacobson, M. Z. (2002). *Atmospheric pollution: History, science, and regulation*. Cambridge University Press.

Jans, J., Johansson, P., & P., N. (2014). *Economic status, air quality, and child health: Evidence from inversion episodes*. IZA discussion paper series no. 7929, Bonn.

Lee, D. S., Moreira, M. J., McCrary, J., & Porter, J. (2020). *Valid t-ratio inference for IV*. Working paper.

Liu, H., & Salvo, A. (2018). Severe air pollution and child absences when schools and parents respond. *Journal of Environmental Economics and Management*, *92*, 300–330. https://doi.org/10.1016/j.jeem.2018.10.003

Ma, L., Niu, D., & Sun, W. (2021). Transportation infrastructure and entrepreneurship: Evidence from high-speed railway in China. *China Economic Review*, *65*, 101577. https://doi.org/10.1016/j.chieco.2020.101577

Qin, Y., Wu, J., & Yan, J. (2019). Negotiating housing deal on a polluted day: Consequences and possible explanations. *Journal of Environmental Economics and Management*, *94*, 161–187. https://doi.org/10.1016/j.jeem.2019.02.002

Qin, Y., & Zhu, H. (2018). Run away? Air pollution and emigration interests in China. *Journal of Population Economics*, *31*(1), 235–266. https://doi.org/10.1007/s00148-017-0653-0

Soto, H. D. (2003). *The mystery of capital: Why capitalism triumphs in the west and fails everywhere else* (Reprint edition). Basic Books.

Steinmetz, G., & Wright, E. O. (1989). The fall and rise of the petty bourgeoisie: Changing patterns of self-employment in the postwar United States. *American Journal of Sociology*, *94*(5), 973–1018.

Van Donkelaar, A., Martin, R. V., Brauer, M., Hsu, N. C., Kahn, R. A., Levy, R. C., Lyapustin, A., Sayer, A. M., & Winker, D. M. (2016). Global estimates of fine particulate matter using a combined geophysical-statistical method with information from satellites, models, and monitors. *Environmental Science and Technology*, *50*(7), 3762–3772. https://doi.org/10.1021/acs.est.5b05833

Van Donkelaar, A., Martin, R. V., Brauer, M., Hsu, N. C., Kahn, R. A., Levy, R. C., Lyapustin, A., Sayer, A. M., & Winker, D. M. (2018). Global annual PM2.5 grids from MODIS, MISR and SeaWiFS Aerosol Optical Depth (AOD) with GWR, 1998-2016. In *Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC)* (p.).

van Rooij, B., Zhu, Q., Na, L., Qiliang, W., & Xuehua, Z. (2015). *Pollution Enforcement in China: Understanding National and Regional Variation* (SSRN Scholarly Paper No. 2646289). https://papers.ssrn.com/abstract=2646289

Verma, S. S., & Desai, B. (2008). Effect of meteorological conditions on air pollution of Surat city. *J. Int. Environmental Application & Science*, *3*(5), 358–367.

Wei, X., Jiang, Y., & Gan, T. (2023). Air pollution and entrepreneurship: Evidence from China. *Applied Economics*, *0*(0), 1–15. https://doi.org/10.1080/00036846.2023.2203454

Wickham, P. A. (2001). *Strategic Entrepreneurship: A Decision-Making Approach to New Venture Creation and Management* (2nd edition). Ft Pr.

Yu, R. P., Ellison, N. B., McCammon, R. J., & Langa, K. M. (2016). Mapping the two levels of digital divide: Internet access and social network site adoption among older adults in the USA. *Information, Communication & Society*, *19*(10), 1445–1464. https://doi.org/10.1080/1369118X.2015.1109695

Zhang, X., Zhang, X., & Chen, X. (2017). Happiness in the air: How does a dirty sky affect mental health and subjective well-being? *Journal of Environmental Economics and Management*, *85*, 81–94. https://doi.org/10.1016/j.jeem.2017.04.001

Zhao, K., Yu, B., Du, H., & Zhang, Y. (2022). Will air pollution affect entrepreneurial activity? Evidence from China. *Applied Economics Letters*, *0*(0), 1–5. https://doi.org/10.1080/13504851.2022.2097177

Zivin, J. G., & Neidell, M. (2014). Temperature and the allocation of time: Implications for climate change. *Journal of Labor Economics*, *32*(1), 1–26. https://doi.org/10.1086/671766

Table 1. Descriptive Statistics

	All adults		Less educated		More Educated		Welch's t-statistic
	Mean	SD	Mean	SD	Mean	SD	
Entrepreneurial likelihood (yes = 1)	0.209	0.407	0.245	0.430	0.139	0.346	6.616***
Entrepreneurial diversification	0.218	0.437	0.255	0.462	0.146	0.373	6.330***
Entrepreneurship in another city (yes=1)	0.052	0.222	0.056	0.229	0.044	0.205	1.174
Adjusted city's business and innovation performance	0.002	0.002	0.002	0.002	0.002	0.002	1.289
PM2.5 ($\mu g/m^3$)	57.767	21.240	58.410	21.119	56.504	21.432	2.104**
Thermal inversion induced fitted PM2.5 ($\mu g/m^3$)	53.958	8.506	53.797	8.100	54.273	9.250	-1.262
Risk propensity	0.03	1.048	-0.033	1.04	0.152	1.052	-4.161***
Networking consumption (thousand yuan)	2.989	6.845	2.213	6.280	4.427	7.583	-6.057***
Self-efficacy	0.056	1.030	0.093	1.030	-0.017	1.025	2.391**
City's crime rates	6.465	3.934	6.445	3.850	6.501	4.084	-0.211
City's educated migration	-0.253	1.269	-0.344	1.191	-0.075	1.393	-4.681***
Urban density conditions (city has average population density or above=1)	0.509	0.500	0.550	0.498	0.428	0.495	5.803***
Air quality satisfaction	3.131	0.783	3.203	0.803	3.025	0.741	2.269**
Working hours	8.678	2.443	8.939	2.564	8.242	2.160	6.259***
Life satisfaction	3.260	0.640	3.260	0.658	3.259	0.604	0.066
Insurance purchase	0.041	0.199	0.024	0.152	0.075	0.264	-5.228***
Community support and collaboration (yes=1)	0.069	0.254	0.044	0.206	0.118	0.323	-6.026***
Adjusted city's innovation performance	0.017	0.020	0.018	0.020	0.017	0.019	1.527
City's population density (per km^2)	503.994	283.297	527.514	278.381	457.741	287.326	5.777***
City's numbers of city's taxi cabs	3.213	3.858	2.918	3.648	3.793	4.182	-5.135***
Presence of financial institutions (city has average financial intermediation employees or above=1)	0.423	0.494	0.423	0.494	0.424	0.494	-0.045
Presence of venture capital (city has average adjusted private equity and venture capital investment scores or above =1)	0.246	0.431	0.246	0.431	0.245	0.430	0.062
City's cultural diversity	0.002	0.007	0.002	0.009	0.002	0.005	0.187
Education level (high school or above=1)	0.337	0.473	0.000	0.000	1.000	0.000	n.a.
Spouse's education level (high school or above=1)	0.200	0.400	0.103	0.305	0.387	0.487	-15.122***
Gender (males=1)	0.800	0.400	0.808	0.394	0.783	0.412	1.444
Spillover effects of the first-tier cities (city has average distances to first-tier cities or above=1)	0.278	0.448	0.229	0.420	0.376	0.485	-7.455***
High-speed railway establishment (yes=1)	0.500	0.500	0.478	0.500	0.544	0.498	-3.122***
Greenness (city has average green coverage rates or above =1)	0.465	0.499	0.472	0.499	0.451	0.498	0.995

City initiatives (city has average rates of industrial solid wastes utilized or above=1)	0.488	0.500	0.502	0.500	0.460	0.499	1.902*
Age	52.189	3.973	52.339	4.105	51.894	3.683	2.740***
Marital status	2.980	0.139	2.973	0.163	2.995	0.069	-4.826***
Household size	3.497	1.444	3.623	1.508	3.249	1.272	6.494***
Real gross domestic product per capita (thousand yuan)	7.465	3.802	7.263	3.639	7.861	4.077	-3.572***
Transportation infrastructure (m^2)	12.802	5.613	12.710	5.502	12.984	5.823	-1.130
Green infrastructure (ha)	3.055	3.190	2.820	2.740	3.519	3.888	-4.645***
Demographic structure	0.078	0.169	0.078	0.147	0.078	0.205	0.004
Ground-level temperature (°C)	15.310	4.608	15.773	3.952	14.400	5.572	6.358***
Ground-level rainfall (10^6 kg/m^2*s)	32.566	15.546	33.671	15.384	30.393	15.643	4.961***
Ground-level wind speed (m/s)	3.602	2.189	3.601	2.207	3.602	2.154	-0.008
Ground-level relative humidity (%)	62.230	11.282	62.908	11.292	60.897	11.150	4.226***
Ground-level water vapor pressure (hPa)	13.163	4.188	13.508	4.011	12.484	4.441	5.607***
High variance of PM2.5 within city (yes=1)	0.262	0.440	0.248	0.432	0.289	0.454	-2.210**

Notes: SD = standard deviation. The sample only includes entrepreneurs and workers. We assume that our unpaired data do not have equal variances, and we present Welch's *t*-statistic (less educated−educated).

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 2. The Impact of Air Pollution on Entrepreneurship

Dependent variable	(1) Entrepreneurial likelihood		(2) Entrepreneurial likelihood		(3) Entrepreneurial diversification		(4) Entrepreneurial diversification	
PM2.5 ($\mu g/m^3$)	0.001	(0.001)	-0.010*	(0.006)	0.002	(0.001)	-0.016*	(0.009)
Age	0.074	(0.053)	0.070	(0.056)	0.096	(0.059)	0.093	(0.064)
Age squared	-0.001	(0.000)	-0.000	(0.000)	-0.001*	(0.000)	-0.001	(0.001)
Marital status	-0.007	(0.027)	0.014	(0.045)	-0.014	(0.035)	0.035	(0.074)
Household size	0.002	(0.005)	0.003	(0.006)	0.005	(0.006)	0.006	(0.007)
Real gross domestic product per capita (thousand yuan)	-0.000	(0.006)	-0.004	(0.006)	-0.001	(0.007)	-0.005	(0.008)
Transportation infrastructure (m^2)	-0.000	(0.003)	0.001	(0.003)	0.001	(0.003)	0.004	(0.003)
Green infrastructure (ha)	0.004	(0.005)	0.008	(0.006)	0.008	(0.007)	0.029**	(0.014)
Demographic structure	0.028	(0.022)	0.000	(0.026)	0.027	(0.023)	-0.012	(0.031)
Weather controls	YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Number of individuals	738		738		700		700	
Observations	2392		2392		2258		2258	
Methodology	OLS		2SLS		OLS		2SLS	
t-statistic (instrument)	n.a.		5.27		n.a.		5.46	
Kleibergen-Paap rk Wald F-statistic (instrument)	n.a.		27.766		n.a.		29.781	

Notes: Robust standard errors are clustered at the household levels and reported in parentheses. For entrepreneurial diversification regressions in this study, we drop cities with 5th percentile or above of population density among the sample cities.

* p <.10, ** p <.05, *** p <.01.

Table 3. The Impact of Air Pollution on Entrepreneurship: Channels

Panel A. Risk propensity

Dependent variable	(1) Entrepreneurial likelihood		(2) Risk propensity		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) Risk propensity		(6) Entrepreneurial diversification	
PM2.5 ($\mu g/m^3$)	-0.017*	(0.009)	-0.071*	(0.043)	-0.016*	(0.008)	-0.021*	(0.011)	-0.065	(0.040)	-0.020*	(0.011)
Risk propensity					0.013*	(0.008)					0.012	(0.009)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	663		663		663		644		644		644	
Observations	2117		2117		2117		2049		2049		2049	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	4.83		4.83		4.88		5.14		5.14		5.19	
Kleibergen-Paap rk Wald F-statistic (instrument)	23.350		23.350		23.800		26.439		26.439		26.951	

Panel B. Networking consumption

Dependent variable	(1) Entrepreneurial likelihood		(2) Networking consumption		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) Networking consumption		(6) Entrepreneurial diversification	
PM2.5 ($\mu g/m^3$)	-0.010*	(0.005)	-0.110**	(0.055)	-0.009*	(0.005)	-0.016*	(0.009)	-0.141**	(0.063)	-0.014*	(0.008)
Networking consumption					0.009*	(0.005)					0.011*	(0.006)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	566		566		566		531		531		531	
Observations	1447		1447		1447		1356		1356		1356	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	6.26		6.26		6.50		5.76		5.76		6.01	
Kleibergen-Paap rk Wald F-statistic (instrument)	39.156		39.156		42.238		33.157		33.157		36.114	

Panel C. Self-efficacy

Dependent variable	(1) Entrepreneurial likelihood		(2) Self-efficacy		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) Self-efficacy		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.013*	(0.006)	-0.047**	(0.023)	-0.011*	(0.006)	-0.026*	(0.015)	-0.059*	(0.036)	-0.024	(0.015)
Self-efficacy					0.024***	(0.009)					0.026**	(0.010)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	655		655		655		622		622		622	
Observations	1910		1910		1910		1829		1829		1829	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.27		5.27		5.26		5.08		5.08		5.06	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.724		27.724		27.682		25.769		25.769		25.604	

Panel D. City's crime rates

Dependent variable	(1) Entrepreneurial likelihood		(2) City's crime rates		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) City's crime rates		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	0.010	(0.022)	0.403*	(0.212)	0.005	(0.018)	0.005	(0.024)	0.453*	(0.249)	0.001	(0.020)
City's crime rates					0.011	(0.015)					0.008	(0.015)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	302		302		302		283		283		283	
Observations	751		751		751		710		710		710	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	-2.04		-2.04		-2.42		-1.88		-1.88		-2.25	
Kleibergen-Paap rk Wald F-statistic (instrument)	4.143		4.143		5.846		3.551		3.551		5.082	

Panel E. City's educated migration

Dependent variable	(1) Entrepreneurial likelihood		(2) City's educated migration		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) City's educated migration		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.013**	(0.007)	-0.018**	(0.009)	-0.012*	(0.007)	-0.017*	(0.009)	-0.018**	(0.009)	-0.016*	(0.009)
City's educated migration					0.061**	(0.026)					0.039	(0.032)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	679		679		679		679		679		679	
Observations	2175		2175		2175		2175		2175		2175	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.42		5.42		5.39		5.42		5.42		5.39	
Kleibergen-Paap rk Wald F-statistic (instrument)	29.420		29.420		29.074		29.420		29.420		29.074	

Notes: Robust standard errors are clustered at the household levels and reported in parentheses. In Panel A, Panel C, and Panel E, we excluded cities with extreme values of financial workers, population density, and air pollution levels from our sample.
* *p* <.10, ** *p* <.05, *** *p* <.01.

Table 4. The Impact of Air Pollution on Entrepreneurship: Heterogeneity

Panel A. Entrepreneurial likelihood

Dependent variable	(1) Entrepreneurial likelihood		(2) Entrepreneurial likelihood		(3) Entrepreneurial likelihood		(4) Entrepreneurial likelihood		(5) Entrepreneurial likelihood		(6) Entrepreneurial likelihood	
PM2.5 (μg/m^3)	0.033	(0.024)	-0.001	(0.008)	-0.010	(0.007)	-0.016*	(0.008)	-0.009	(0.009)	-0.017*	(0.010)
PM2.5 * Age	-0.001	(0.001)										
PM2.5 * City's population density dummy (above average=1)			-0.021	(0.021)								
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	738		738		362		376		504		234	
Observations	2392		2392		1177		1195		1578		814	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	6.10, -3.58		6.58, 0.98		5.84		4.09		3.71		3.77	
Kleibergen-Paap rk Wald F-statistic (instrument)	6.814		1.614		34.082		16.689		13.790		14.248	
p-value of seemingly unrelated estimation					0.885				0.185			
Sample	Full sample		Full sample		Lower population density		Higher population density		Less educated		More educated	

Panel B. Entrepreneurial diversification

Dependent variable	(1) Entrepreneurial diversification		(2) Entrepreneurial diversification		(3) Entrepreneurial diversification		(4) Entrepreneurial diversification		(5) Entrepreneurial diversification		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	0.029	(0.026)	0.000	(0.014)	-0.015	(0.010)	-0.007	(0.010)	-0.019	(0.017)	-0.020*	(0.011)
PM2.5 * Age	-0.001	(0.001)										
PM2.5 * City's population density dummy (above average=1)			-0.045	(0.047)								
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	700		700		362		376		480		220	
Observations	2258		2258		1177		1061		1495		763	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.51, -3.28		6.68, 0.51		5.84		3.68		3.72		3.84	
Kleibergen-Paap rk Wald F-statistic (instrument)	6.814		0.933		34.082		13.561		13.860		14.755	
p-value of seemingly unrelated estimation					0.433				0.672			
Sample	Full sample		Full sample		Lower population density		Higher population density		Less educated		More educated	

Panel C. Risk propensity

Dependent variable	(1) Risk propensity		(2) Risk propensity		(3) Risk propensity		(4) Risk propensity		(5) Risk propensity		(6) Risk propensity	
PM2.5 (μg/m^3)	0.145	(0.177)	-0.062	(0.045)	-0.056	(0.035)	-0.049	(0.063)	-0.123	(0.078)	-0.030	(0.060)
PM2.5 * Age	-0.005	(0.005)										
PM2.5 * City's population density dummy (above average=1)			0.241	(0.302)								
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	663		663		356		307		504		206	
Observations	2117		2117		1151		946		1409		708	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	4.48, -2.77		6.27, -1.05		6.26		2.92		3.71		3.37	
Kleibergen-Paap rk Wald F-statistic (instrument)	5.773		0.413		39.160		8.518		10.470		11.374	
p-value of seemingly unrelated estimation					0.815				0.192			
Sample	Full sample		Full sample		Lower population density		Higher population density		Less educated		More educated	

Panel D. Networking consumption

Dependent variable	(1) Networking consumption		(2) Networking consumption		(3) Networking consumption		(4) Networking consumption		(5) Networking consumption		(6) Networking consumption	
PM2.5 (μg/m^3)	0.311*	(0.170)	-0.174**	(0.071)	-0.168*	(0.095)	0.066	(0.068)	-0.145**	(0.068)	-0.115	(0.111)
PM2.5 * Age	-0.009**	(0.004)										
PM2.5 * City's population density dummy (above average=1)			0.118*	(0.069)								
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	566		566		276		285		361		205	
Observations	1447		1447		690		737		900		547	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.38, -2.35		5.85, 4.58		4.38		6.38		6.48		3.32	
Kleibergen-Paap rk Wald F-statistic (instrument)	17.129		21.080		19.160		40.664		42.025		11.002	
p-value of seemingly unrelated estimation					0.044				0.667			
Sample	Full sample		Full sample		Lower population density		Higher population density		Less educated		More educated	

Panel E. Self-efficacy

Dependent variable	(1) Self-efficacy		(2) Self-efficacy		(3) Self-efficacy		(4) Self-efficacy		(5) Self-efficacy		(6) Self-efficacy	
PM2.5 (μg/m^3)	0.159	(0.106)	-0.056*	(0.033)	-0.061	(0.040)	-0.037*	(0.022)	-0.098***	(0.036)	0.011	(0.030)
PM2.5 * Age	-0.004*	(0.003)										
PM2.5 * City's population density dummy (above average=1)			0.017	(0.036)								
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	655		655		336		314		439		216	
Observations	1910		1910		1006		880		1246		664	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.36, -2.99		5.98, 3.29		4.95		8.92		4.28		3.54	
Kleibergen-Paap rk Wald F-statistic (instrument)	10.186		13.229		24.526		79.566		18.323		12.544	
p-value of seemingly unrelated estimation					0.249				0.008			
Sample	Full sample		Full sample		Lower population density		Higher population density		Less educated		More educated	

Notes: Robust standard errors are clustered at the household levels and reported in parentheses.
* p <.10, ** p <.05, *** p <.01.

Appendix

Table A1. Robustness Checks: The Long-term Impact of Air Pollution on Entrepreneurship

Panel A. Entrepreneurial likelihood

Dependent variable	(1) Entrepreneurial likelihood		(2) Entrepreneurial likelihood		(3) Entrepreneurial likelihood		(4) Entrepreneurial likelihood		(5) Entrepreneurial likelihood	
Average PM2.5 ($\mu g/m^3$) in previous years	-0.000	(0.001)	0.000	(0.002)	0.000	(0.002)	0.003	(0.003)	0.001	(0.003)
Weather controls	YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES	
Number of individuals	738		738		738		738		738	
Observations	2392		2392		2392		2392		2392	
Methodology	OLS		OLS		OLS		OLS		OLS	
Previous years	2016-2017		2015-2017		2014-2017		2013-2017		2008-2017	

Panel B. Entrepreneurial diversification

Dependent variable	(1) Entrepreneurial diversification		(2) Entrepreneurial diversification		(3) Entrepreneurial diversification		(4) Entrepreneurial diversification		(5) Entrepreneurial diversification	
Average PM2.5 ($\mu g/m^3$) in previous years	0.001	(0.002)	0.001	(0.002)	0.001	(0.002)	0.005	(0.003)	0.003	(0.003)
Weather controls	YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES	
Number of individuals	700		700		700		700		700	
Observations	2258		2258		2258		2258		2258	
Methodology	OLS		OLS		OLS		OLS		OLS	
Previous years	2016-2017		2015-2017		2014-2017		2013-2017		2008-2017	

Notes: Robust standard errors are clustered at the household levels and reported in parentheses.

* p <.10, ** p <.05, *** p <.01.

Table A2. Robustness Checks: Alternative Dependent Variables

Dependent variable	(1) Entrepreneurship in another city		(2) log(Adjusted business and innovation performance)	
PM2.5 (μg/m^3)	0.009*	(0.005)	-0.030*	(0.017)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	643		699	
Observations	2148		2239	
Methodology	2SLS		2SLS	
t-statistic (instrument)	5.89		5.38	
Kleibergen-Paap rk Wald F-statistic (instrument)	34.677		28.949	

Notes: Robust standard errors are clustered at the household levels and reported in parentheses.
* p <.10, ** p <.05, *** p <.01.

Table A3. Robustness Checks: Alternative Channels

Panel A. Air quality satisfaction

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	**Entrepreneurial likelihood**	**Air quality satisfaction**	**Entrepreneurial likelihood**	**Entrepreneurial diversification**	**Air quality satisfaction**	**Entrepreneurial likelihood**
PM2.5 ($\mu g/m^3$)	-0.000 (0.000)	0.008 (0.017)	-0.000 (0.000)	-0.000 (0.000)	0.012 (0.018)	-0.000 (0.000)
Air quality satisfaction			-0.006 (0.006)			-0.014 (0.013)
Weather controls	YES	YES	YES	YES	YES	YES
Number of individuals	398	398	398	373	373	373
Observations	398	398	398	373	373	373
Methodology	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
t-statistic (instrument)	6.55	6.55	6.57	6.39	6.39	6.42
Kleibergen-Paap rk Wald F-statistic (instrument)	42.967	42.967	43.176	40.802	40.802	41.216

Panel B. Working hours

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	**Entrepreneurial likelihood**	**Working hours**	**Entrepreneurial likelihood**	**Entrepreneurial diversification**	**Working hours**	**Entrepreneurial diversification**
PM2.5 ($\mu g/m^3$)	n.a.	0.035 (0.070)	n.a.	n.a.	0.034 (0.081)	n.a.
Working hours			n.a.			n.a.
Weather controls	YES	YES	YES	YES	YES	YES
Individual fixed effects	YES	YES	YES	YES	YES	YES
Household fixed effects	YES	YES	YES	YES	YES	YES
Community fixed effects	YES	YES	YES	YES	YES	YES
City fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
Number of individuals		541			506	
Observations		1720			1608	
Methodology	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
t-statistic (instrument)		4.25			4.51	
Kleibergen-Paap rk Wald F-statistic (instrument)		18.095			20.347	

Panel C. Life satisfaction

Dependent variable	(1) Entrepreneurial likelihood		(2) Life satisfaction		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) Life satisfaction		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.010*	(0.006)	-0.021	(0.017)	-0.013*	(0.007)	-0.016*	(0.009)	-0.027	(0.021)	-0.020	(0.012)
Life satisfaction					-0.007	(0.014)					-0.001	(0.016)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	738		694		694		700		658		658	
Observations	2392		2106		2106		2258		1990		1990	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.27		4.34		4.39		5.46		4.39		4.44	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.766		18.820		19.278		29.781		19.266		19.695	

Panel D. Insurance purchase

Dependent variable	(1) Entrepreneurial likelihood		(2) Insurance purchase		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) Insurance purchase		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.010*	(0.006)	-0.009	(0.006)	-0.010*	(0.006)	-0.016*	(0.009)	-0.014**	(0.006)	-0.016*	(0.009)
Insurance purchase					0.012	(0.044)					-0.005	(0.052)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	738		738		738		700		700		700	
Observations	2392		2392		2392		2258		2258		2258	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.27		5.27		5.22		5.46		5.46		5.44	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.766		27.766		27.252		29.781		29.781		29.541	

Panel E. Community support and collaboration

Dependent variable	(1) Entrepreneurial likelihood		(2) Community support and collaboration		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) Community support and collaboration		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.010*	(0.006)	-0.009	(0.006)	-0.010*	(0.006)	-0.016*	(0.009)	-0.011*	(0.007)	-0.016*	(0.009)
Community support and collaboration					-0.010	(0.026)					-0.017	(0.032)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	738		738		738		700		700		700	
Observations	2392		2392		2392		2258		2258		2258	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.27		5.27		5.29		5.46		5.46		5.48	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.766		27.766		27.958		29.781		29.781		29.996	

Panel F. Adjusted city's innovation performance

Dependent variable	(1) Entrepreneurial likelihood		(2) log(Adjusted city's innovation performance)		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) log(Adjusted city's innovation performance)		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.013*	(0.007)	-0.031*	(0.016)	-0.013*	(0.007)	-0.017*	(0.009)	-0.031*	(0.016)	-0.016*	(0.009)
log(Adjusted city's innovation performance)					0.007	(0.014)					0.015	(0.017)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	699		699		699		699		699		699	
Observations	2239		2239		2239		2239		2239		2239	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.38		5.38		5.51		5.38		5.38		5.51	
Kleibergen-Paap rk Wald F-statistic (instrument)	28.949		28.949		30.325		28.949		28.949		30.325	

Panel G. City's population density

Dependent variable	(1) Entrepreneurial likelihood		(2) log(City's population density)		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) log(City's population density)		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.012*	(0.007)	-0.002***	(0.001)	-0.013*	(0.007)	-0.016*	(0.009)	-0.002***	(0.001)	-0.017*	(0.010)
log(City's population density)					-0.396	(0.329)					-0.455	(0.414)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	700		700		700		700		700		700	
Observations	2258		2258		2258		2258		2258		2258	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.46		5.46		5.00		5.46		5.46		5.00	
Kleibergen-Paap rk Wald F-statistic (instrument)	29.781		29.781		24.968		29.781		29.781		24.968	

Panel H. City's public transport

Dependent variable	(1) Entrepreneurial likelihood		(2) City's public transport		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) City's public transport		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.010*	(0.006)	-0.011**	(0.005)	-0.010*	(0.006)	-0.016*	(0.009)	-0.011*	(0.006)	-0.016*	(0.009)
City's public transport					0.001	(0.034)					0.004	(0.041)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	738		738		738		700		700		700	
Observations	2391		2391		2391		2257		2257		2257	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.23		5.23		5.27		5.41		5.41		5.46	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.336		27.336		27.745		29.315		29.315		29.768	

Panel I. City's presence of financial institutions

Dependent variable	(1) Entrepreneurial likelihood		(2) City's presence of financial institutions		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) City's presence of financial institutions		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.010*	(0.006)	-0.014**	(0.007)	-0.011*	(0.006)	-0.016*	(0.009)	-0.013*	(0.007)	-0.017*	(0.009)
City's presence of financial institutions					-0.027	(0.024)					-0.029	(0.029)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	738		738		738		700		700		700	
Observations	2392		2392		2392		2258		2258		2258	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.27		5.27		5.34		5.46		5.46		5.51	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.766		27.766		28.511		29.781		29.781		30.324	

Panel J. City's presence of venture capital

Dependent variable	(1) Entrepreneurial likelihood		(2) City's presence of venture capital		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) City's presence of venture capital		(6) Entrepreneurial diversification	
PM2.5 ($\mu g/m^3$)	-0.010*	(0.006)	-0.041***	(0.014)	-0.009	(0.006)	-0.016*	(0.009)	-0.049***	(0.017)	-0.015	(0.009)
City's presence of venture capital					0.021	(0.020)					0.024	(0.024)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	738		738		738		700		700		700	
Observations	2392		2392		2392		2258		2258		2258	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.27		5.27		5.24		5.46		5.46		5.29	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.766		27.766		27.482		29.781		29.781		27.951	

Panel K. City's cultural diversity

Dependent variable	(1) Entrepreneurial likelihood		(2) City's cultural diversity		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) City's cultural diversity		(6) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.010*	(0.006)	0.001***	(0.000)	-0.009	(0.006)	-0.016*	(0.009)	0.001***	(0.000)	-0.015	(0.009)
City's cultural diversity					-1.117	(0.886)					-1.385	(0.922)
Weather controls	YES		YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES		YES	
Number of individuals	738		738		738		700		700		700	
Observations	2392		2392		2392		2258		2258		2258	
Methodology	2SLS		2SLS		2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.27		5.27		5.21		5.46		5.46		5.42	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.766		27.766		27.149		29.781		29.781		29.381	

Notes: Robust standard errors are clustered at the household levels and reported in parentheses. Panels F and G exclude individuals residing in cities where the population density is within the top five percentile.
* p <.10, ** p <.05, *** p <.01.

Table A4. Robustness Checks: Alternative Heterogeneity

Panel A. Entrepreneurial likelihood

	(1)		(2)	
Dependent variable	**Entrepreneurial likelihood**		**Entrepreneurial likelihood**	
PM2.5 (μg/m^3)	-0.014*	(0.007)	-0.004	(0.010)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	574		139	
Observations	1823		465	
Methodology	2SLS		2SLS	
t-statistic (instrument)	4.95		1.76	
Kleibergen-Paap rk Wald F-statistic (instrument)	24.551		3.099	
p-value of seemingly unrelated estimation	0.258			
Sample	Less educated spouse		More educated spouse	

Panel B. Entrepreneurial diversification

	(1)		(2)	
Dependent variable	**Entrepreneurial diversification**		**Entrepreneurial diversification**	
PM2.5 (μg/m^3)	-0.021*	(0.011)	-0.003	(0.010)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	542		136	
Observations	1712		453	
Methodology	2SLS		2SLS	
t-statistic (instrument)	5.09		1.71	
Kleibergen-Paap rk Wald F-statistic (instrument)	25.873		2.928	
p-value of seemingly unrelated estimation	0.157			
Sample	Less educated spouse		More educated spouse	

Panel C. Risk propensity

Dependent variable	(1) Risk propensity		(2) Risk propensity	
PM2.5 (μg/m^3)	-0.103*	(0.054)	0.115	(0.082)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	517		121	
Observations	1620		397	
Methodology	2SLS		2SLS	
t-statistic (instrument)	4.30		1.92	
Kleibergen-Paap rk Wald F-statistic (instrument)	18.529		3.686	
p-value of seemingly unrelated estimation	0.089			
Sample	Less educated spouse		More educated spouse	

Panel D. Networking consumption

Dependent variable	(1) Networking consumption		(2) Networking consumption	
PM2.5 (μg/m^3)	-0.147**	(0.067)	-0.067	(0.121)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	424		110	
Observations	1064		283	
Methodology	2SLS		2SLS	
t-statistic (instrument)	5.39		2.52	
Kleibergen-Paap rk Wald F-statistic (instrument)	29.065		6.337	
p-value of seemingly unrelated estimation	0.289			
Sample	Less educated spouse		More educated spouse	

Panel E. Self-efficacy

	(1)		(2)	
Dependent variable	**Networking consumption**		**Networking consumption**	
PM2.5 (μg/m^3)	-0.045	(0.034)	-0.027	(0.053)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	500		131	
Observations	1438		385	
Methodology	2SLS		2SLS	
t-statistic (instrument)	4.79		2.19	
Kleibergen-Paap rk Wald F-statistic (instrument)	22.919		4.799	
p-value of seemingly unrelated estimation	0.973			
Sample	Less educated spouse		More educated spouse	

Panel F. Entrepreneurial likelihood

	(1)		(2)	
Dependent variable	**Entrepreneurial likelihood**		**Entrepreneurial likelihood**	
PM2.5 (μg/m^3)	-0.013	(0.020)	-0.009	(0.006)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	151		587	
Observations	477		1915	
Methodology	2SLS		2SLS	
t-statistic (instrument)	1.97		5.47	
Kleibergen-Paap rk Wald F-statistic (instrument)	3.872		29.933	
p-value of seemingly unrelated estimation	0.991			
Sample	Female		Male	

Panel G. Entrepreneurial diversification

Dependent variable	(1) Entrepreneurial diversification		(2) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.073	(0.077)	-0.009	(0.007)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	148		552	
Observations	463		1795	
Methodology	2SLS		2SLS	
t-statistic (instrument)	1.52		5.62	
Kleibergen-Paap rk Wald F-statistic (instrument)	2.315		31.597	
p-value of seemingly unrelated estimation	0.281			
Sample	Female		Male	

Panel H. Risk propensity

Dependent variable	(1) Risk propensity		(2) Risk propensity	
PM2.5 (μg/m^3)	0.069	(0.231)	-0.085*	(0.046)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	142		521	
Observations	438		1679	
Methodology	2SLS		2SLS	
t-statistic (instrument)	0.68		4.97	
Kleibergen-Paap rk Wald F-statistic (instrument)	0.463		24.655	
p-value of seemingly unrelated estimation	0.814			
Sample	Female		Male	

Panel I. Networking consumption

Dependent variable	(1) Networking consumption		(2) Networking consumption	
PM2.5 (μg/m^3)	-0.049	(0.083)	-0.112*	(0.060)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	116		450	
Observations	316		1131	
Methodology	2SLS		2SLS	
t-statistic (instrument)	3.13		5.72	
Kleibergen-Paap rk Wald F-statistic (instrument)	9.787		32.775	
p-value of seemingly unrelated estimation	0.709			
Sample	Female		Male	

Panel J. Self-efficacy

Dependent variable	(1) Self-efficacy		(2) Self-efficacy	
PM2.5 (μg/m^3)	-0.087*	(0.052)	-0.039	(0.028)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	140		515	
Observations	411		1499	
Methodology	2SLS		2SLS	
t-statistic (instrument)	2.09		5.49	
Kleibergen-Paap rk Wald F-statistic (instrument)	4.377		30.106	
p-value of seemingly unrelated estimation	0.298			
Sample	Female		Male	

Panel K. Entrepreneurial likelihood

Dependent variable	(1) Entrepreneurial likelihood		(2) Entrepreneurial likelihood	
PM2.5 (μg/m^3)	-0.077	(0.174)	-0.007	(0.006)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	530		208	
Observations	1719		673	
Methodology	2SLS		2SLS	
t-statistic (instrument)	0.53		4.00	
Kleibergen-Paap rk Wald F-statistic (instrument)	0.282		16.032	
p-value of seemingly unrelated estimation	0.250			
Sample	Fewer distances		More distances	

Panel L. Entrepreneurial diversification

Dependent variable	(1) Entrepreneurial diversification		(2) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.015	(0.078)	-0.021	(0.012)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	492		208	
Observations	1590		668	
Methodology	2SLS		2SLS	
t-statistic (instrument)	0.73		4.17	
Kleibergen-Paap rk Wald F-statistic (instrument)	0.532		17.396	
p-value of seemingly unrelated estimation	0.729			
Sample	Fewer distances		More distances	

Panel M. Risk propensity

	(1)		(2)	
Dependent variable	**Risk propensity**		**Risk propensity**	
PM2.5 (μg/m^3)	-0.312	(0.699)	-0.084	(0.072)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	469		194	
Observations	1489		628	
Methodology	2SLS		2SLS	
t-statistic (instrument)	0.59		3.59	
Kleibergen-Paap rk Wald F-statistic (instrument)	0.344		12.898	
p-value of seemingly unrelated estimation	0.546			
Sample	Fewer distances		More distances	

Panel N. Networking consumption

	(1)		(2)	
Dependent variable	**Networking consumption**		**Networking consumption**	
PM2.5 (μg/m^3)	-0.213	(0.129)	-0.087	(0.068)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	406		160	
Observations	1045		402	
Methodology	2SLS		2SLS	
t-statistic (instrument)	3.25		3.83	
Kleibergen-Paap rk Wald F-statistic (instrument)	10.593		14.685	
p-value of seemingly unrelated estimation	0.075			
Sample	Fewer distances		More distances	

Panel O. Self-efficacy

Dependent variable	(1) Self-efficacy		(2) Self-efficacy	
PM2.5 ($\mu g/m^3$)	-0.041	(0.056)	-0.058*	(0.032)
Weather controls	YES		YES	
Individual fixed effects	YES		YES	
Household fixed effects	YES		YES	
Community fixed effects	YES		YES	
City fixed effects	YES		YES	
Year fixed effects	YES		YES	
Number of individuals	462		193	
Observations	1347		563	
Methodology	2SLS		2SLS	
t-statistic (instrument)	3.31		3.48	
Kleibergen-Paap rk Wald F-statistic (instrument)	10.929		12.101	
p-value of seemingly unrelated estimation	0.970			
Sample	Fewer distances		More distances	

Panel P. Entrepreneurial likelihood

Dependent variable	(1) Entrepreneurial likelihood		(2) Entrepreneurial likelihood		(3) Entrepreneurial likelihood	
PM2.5 ($\mu g/m^3$)	-0.010*	(0.005)	-0.026*	(0.015)	-0.033	(0.054)
PM2.5 * City has high speed rail (yes=1)	0.002	(0.004)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	738		405		368	
Observations	2392		1107		1088	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	3.93, 7.02		2.97		0.70	
Kleibergen-Paap rk Wald F-statistic (instrument)	16.525		8.846		0.485	
p-value of seemingly unrelated estimation			0.661			
Sample	Full sample		No high speed rail		Has high speed rail	

Panel Q. Entrepreneurial diversification

Dependent variable	(1) Entrepreneurial diversification		(2) Entrepreneurial diversification		(3) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.014*	(0.008)	-0.034*	(0.020)	0.029	(0.065)
PM2.5 * City has high speed rail (yes=1)	0.005	(0.005)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	700		386		349	
Observations	2258		1039		1022	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	4.24, 6.69		3.40		-0.63	
Kleibergen-Paap rk Wald F-statistic (instrument)	13.567		11.538		0.401	
p-value of seemingly unrelated estimation			0.462			
Sample	Full sample		No high speed rail		Has high speed rail	

Panel R. Risk propensity

Dependent variable	(1) Risk propensity		(2) Risk propensity		(3) Risk propensity	
PM2.5 (μg/m^3)	-0.068*	(0.038)	-0.045	(0.064)	0.180*	(0.103)
PM2.5 * City has high speed rail (yes=1)	0.002	(0.017)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	663		404		293	
Observations	2117		1099		827	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	3.70, 6.10		3.05		-2.24	
Kleibergen-Paap rk Wald F-statistic (instrument)	11.341		9.311		5.014	
p-value of seemingly unrelated estimation			0.008			
Sample	Full sample		No high speed rail		Has high speed rail	

Panel S. Networking consumption

Dependent variable	(1) Networking consumption		(2) Networking consumption		(3) Networking consumption	
PM2.5 (μg/m^3)	-0.117**	(0.051)	-0.344*	(0.204)	-0.113	(0.172)
PM2.5 * City has high speed rail (yes=1)	0.052	(0.044)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	566		243		248	
Observations	1447		582		605	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	4.48, 6.24		2.78		1.68	
Kleibergen-Paap rk Wald F-statistic (instrument)	22.591		7.731		2.825	
p-value of seemingly unrelated estimation			0.157			
Sample	Full sample		No high speed rail		Has high speed rail	

Panel T. Self-efficacy

Dependent variable	(1) Self-efficacy		(2) Self-efficacy		(3) Self-efficacy	
PM2.5 (μg/m^3)	-0.043**	(0.022)	-0.111	(0.070)	-0.008	(0.030)
PM2.5 * City has high speed rail (yes=1)	0.036*	(0.020)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	655		320		328	
Observations	1910		832		886	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	4.08, 6.55		3.68		2.58	
Kleibergen-Paap rk Wald F-statistic (instrument)	26.430		13.564		6.675	
p-value of seemingly unrelated estimation			0.069			
Sample	Full sample		No high speed rail		Has high speed rail	

Panel U. Entrepreneurial likelihood

Dependent variable	(1) Entrepreneurial likelihood		(2) Entrepreneurial likelihood		(3) Entrepreneurial likelihood	
PM2.5 (μg/m^3)	-0.010*	(0.006)	-0.008	(0.005)	-0.044	(0.122)
PM2.5 * City's greenness	-0.003	(0.002)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	738		399		354	
Observations	2392		1133		979	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	6.75, 13.01		5.57		0.60	
Kleibergen-Paap rk Wald F-statistic (instrument)	15.945		30.972		0.359	
p-value of seemingly unrelated estimation			0.760			
Sample	Full sample		Lower greenness		Higher greenness	

Panel V. Entrepreneurial diversification

Dependent variable	(1) Entrepreneurial diversification		(2) Entrepreneurial diversification		(3) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.016*	(0.009)	-0.019*	(0.010)	0.024	(0.062)
PM2.5 * City's greenness	-0.001	(0.002)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	700		370		341	
Observations	2258		1046		953	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	6.44, 11.98		4.54		1.16	
Kleibergen-Paap rk Wald F-statistic (instrument)	17.066		20.603		1.344	
p-value of seemingly unrelated estimation			0.429			
Sample	Full sample		Lower greenness		Higher greenness	

Panel W. Risk propensity

Dependent variable	(1) Risk propensity		(2) Risk propensity		(3) Risk propensity	
PM2.5 (μg/m^3)	-0.070*	(0.042)	-0.038	(0.037)	-0.016	(1.320)
PM2.5 * City's greenness	-0.023**	(0.009)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	663		347		334	
Observations	2117		970		893	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	5.74, 11.94		3.88		0.23	
Kleibergen-Paap rk Wald F-statistic (instrument)	13.268		15.086		0.053	
p-value of seemingly unrelated estimation			0.217			
Sample	Full sample		Lower greenness		Higher greenness	

Panel X. Networking consumption

Dependent variable	(1) Networking consumption		(2) Networking consumption		(3) Networking consumption	
PM2.5 (μg/m^3)	-0.101**	(0.049)	-0.052	(0.045)	-2.011	(5.737)
PM2.5 * City's greenness	-0.098***	(0.025)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	566		266		219	
Observations	1447		632		543	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	7.80, 11.97		6.08		0.38	
Kleibergen-Paap rk Wald F-statistic (instrument)	23.670		36.980		0.147	
p-value of seemingly unrelated estimation			0.062			
Sample	Full sample		Lower greenness		Higher greenness	

Panel Y. Self-efficacy

Dependent variable	(1) Self-efficacy		(2) Self-efficacy		(3) Self-efficacy	
PM2.5 (μg/m^3)	-0.049**	(0.022)	-0.029	(0.026)	-0.035	(0.209)
PM2.5 * City's greenness	0.002	(0.011)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	655		310		304	
Observations	1910		816		820	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	6.04, 8.82		4.96		1.23	
Kleibergen-Paap rk Wald F-statistic (instrument)	16.957		24.597		1.517	
p-value of seemingly unrelated estimation			0.743			
Sample	Full sample		Lower greenness		Higher greenness	

Panel Z. Entrepreneurial likelihood

Dependent variable	(1) Entrepreneurial likelihood		(2) Entrepreneurial likelihood		(3) Entrepreneurial likelihood	
PM2.5 (μg/m^3)	-0.011	(0.007)	-0.004	(0.006)	-0.286	(2.449)
PM2.5 * City's initiatives	-0.002	(0.002)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	728		334		342	
Observations	2190		934		895	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	4.36, 19.99		6.98		0.12	
Kleibergen-Paap rk Wald F-statistic (instrument)	10.819		48.658		0.013	
p-value of seemingly unrelated estimation			0.167			
Sample	Full sample		Less initiatives		More initiatives	

Panel AA. Entrepreneurial diversification

Dependent variable	(1) Entrepreneurial diversification		(2) Entrepreneurial diversification		(3) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.019*	(0.011)	-0.003	(0.006)	0.021	(0.035)
PM2.5 * City's initiatives	-0.002	(0.002)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	690		321		316	
Observations	2061		890		815	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	4.56, 19.41		6.86		-1.60	
Kleibergen-Paap rk Wald F-statistic (instrument)	11.569		46.992		2.566	
p-value of seemingly unrelated estimation			0.080			
Sample	Full sample		Less initiatives		More initiatives	

Panel AB. Risk propensity

Dependent variable	(1) Risk propensity		(2) Risk propensity		(3) Risk propensity	
PM2.5 (μg/m^3)	-0.086	(0.055)	-0.047	(0.036)	0.082	(0.062)
PM2.5 * City's initiatives	-0.003	(0.008)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	654		310		281	
Observations	1950		866		739	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	4.31, 17.38		6.39		-5.37	
Kleibergen-Paap rk Wald F-statistic (instrument)	7.779		40.881		28.835	
p-value of seemingly unrelated estimation			0.004			
Sample	Full sample		Less initiatives		More initiatives	

Panel AC. Networking consumption

Dependent variable	(1) Networking consumption		(2) Networking consumption		(3) Networking consumption	
PM2.5 (μg/m^3)	-0.132**	(0.066)	-0.072	(0.071)	-0.002	(0.284)
PM2.5 * City's initiatives	0.002	(0.017)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	484		198		187	
Observations	1210		469		444	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	4.92, 15.37		5.09		0.71	
Kleibergen-Paap rk Wald F-statistic (instrument)	16.672		25.952		0.510	
p-value of seemingly unrelated estimation			0.408			
Sample	Full sample		Less initiatives		More initiatives	

Panel AD. Self-efficacy

Dependent variable	(1) Self-efficacy		(2) Self-efficacy		(3) Self-efficacy	
PM2.5 (μg/m^3)	-0.052	(0.032)	-0.041	(0.043)	-0.010	(0.053)
PM2.5 * City's initiatives	0.006	(0.008)				
Weather controls	YES		YES		YES	
Individual fixed effects	YES		YES		YES	
Household fixed effects	YES		YES		YES	
Community fixed effects	YES		YES		YES	
City fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
Number of individuals	643		274		279	
Observations	1755		708		702	
Methodology	2SLS		2SLS		2SLS	
t-statistic (instrument)	3.83, 16.29		4.73		1.77	
Kleibergen-Paap rk Wald F-statistic (instrument)	9.794		22.391		3.146	
p-value of seemingly unrelated estimation			0.753			
Sample	Full sample		Less initiatives		More initiatives	

Notes: Robust standard errors are clustered at the household levels and reported in parentheses. We do not use marital status as a control when considering heterogeneity across spouse education levels.
* p <.10, ** p <.05, *** p <.01.

Table A5. Robustness Checks: Alternative Samples

Dependent variable	**(1) Entrepreneurial likelihood**		**(2) Entrepreneurial likelihood**		**(3) Entrepreneurial diversification**		**(4) Entrepreneurial diversification**	
PM2.5 ($\mu g/m^3$)	-0.010*	(0.006)	-0.010*	(0.006)	-0.016*	(0.009)	-0.016*	(0.009)
Weather controls	YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Number of individuals	748		748		710		710	
Observations	2456		2461		2313		2317	
Methodology	2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.26		5.20		5.51		5.48	
Kleibergen-Paap rk Wald F-statistic (instrument)	27.700		27.063		30.403		29.986	
Sample	Key+migration intention		Key+migration family business	intention+unpaid	Key+migration intention		Key+migration family business	intention+unpaid

Notes: Robust standard errors are clustered at the household levels and reported in parentheses.
* p <.10, ** p <.05, *** p <.01.

Table A6. Robustness Checks: City Population Density Effects

Panel A. City population density distributions

Dependent variable	**(1) Entrepreneurial likelihood**		**(2) Entrepreneurial likelihood**		**(3) Entrepreneurial likelihood**		**(4) Entrepreneurial likelihood**	
PM2.5 ($\mu g/m^3$)	-0.005	(0.009)	0.041	(0.042)	-0.009	(0.012)	-0.033*	(0.017)
Weather controls	YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Number of individuals	179		183		186		189	
Observations	581		569		566		574	
Methodology	2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.60		-1.99		2.83		3.30	
Kleibergen-Paap rk Wald F-statistic (instrument)	31.357		3.971		8.008		10.890	
Sample	Lowest		Lower		Higher		Highest	

Dependent variable	(5) Entrepreneurial diversification		(6) Entrepreneurial diversification		(7) Entrepreneurial diversification		(8) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.011	(0.011)	0.051	(0.044)	-0.006	(0.012)	-0.020*	(0.011)
Weather controls	YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Number of individuals	179		183		186		151	
Observations	581		569		566		440	
Methodology	2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.60		-1.99		2.83		5.15	
Kleibergen-Paap rk Wald F-statistic (instrument)	31.357		3.971		8.008		26.570	
Sample	Lowest		Lower		Higher		Highest	

Panel B. Air pollution distributions

Dependent variable	(1) Entrepreneurial likelihood		(2) Entrepreneurial likelihood		(3) Entrepreneurial likelihood		(4) Entrepreneurial likelihood	
PM2.5 (μg/m^3)	-0.011	(0.018)	0.007	(0.023)	0.124	(0.115)	0.005	(0.084)
Weather controls	YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Number of individuals	179		183		186		189	
Observations	558		495		519		508	
Methodology	2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	5.60		-1.99		2.83		3.30	
Kleibergen-Paap rk Wald F-statistic (instrument)	17.814		13.746		1.894		0.180	
Sample	Lowest		Lower		Higher		Highest	

Dependent variable	(5) Entrepreneurial diversification		(6) Entrepreneurial diversification		(7) Entrepreneurial diversification		(8) Entrepreneurial diversification	
PM2.5 (μg/m^3)	-0.024	(0.024)	0.017	(0.025)	0.078	(0.072)	0.071	(0.299)
Weather controls	YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Number of individuals	185		172		196		144	
Observations	548		495		500		419	
Methodology	2SLS		2SLS		2SLS		2SLS	
t-statistic (instrument)	1.30		3.71		-2.05		-0.31	
Kleibergen-Paap rk Wald F-statistic (instrument)	18.466		13.746		4.217		0.093	
Sample	Lowest		Lower		Higher		Highest	

Panel C. City population density induced Entrepreneurship

Dependent variable	(1) Air pollution		(2) Entrepreneurial likelihood		(3) Entrepreneurial likelihood		(4) Entrepreneurial diversification		(5) Entrepreneurial diversification	
City population density	-0.009	(0.010)			0.000	(0.000)			0.000	(0.000)
City population density induced PM2.5 (μg/m^3)			-0.033	(0.027)			-0.013	(0.038)		
Weather controls	YES		YES		YES		YES		YES	
Individual fixed effects	YES		YES		YES		YES		YES	
Household fixed effects	YES		YES		YES		YES		YES	
Community fixed effects	YES		YES		YES		YES		YES	
City fixed effects	YES		YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES		YES	
Number of individuals	738		738		738		700		700	
Observations	2392		2392		2392		2258		2258	
Methodology	OLS		OLS		OLS		OLS		OLS	

Notes: Robust standard errors are clustered at the household levels and reported in parentheses. Marital status in column (3) of Panel A is omitted due to its collinearity with fixed effects.

* p <.10, ** p <.05, *** p <.01.

Table A7. Robustness Checks: Summary Statistics on Income Pre- and Post-choice of being an Entrepreneur

	All adults		Workers		Entrepreneurs		Welch's t-statistic
	Mean	SD	Mean	SD	Mean	SD	
Personal income (thousand yuan)	25.185	42.588	25.047	22.711	25.341	57.345	-0.087

Notes: SD = standard deviation. We assume that our unpaired data do not have equal variances, and we present Welch's t-statistic (workers−entrepreneurs).
* p <.10, ** p <.05, *** p <.01.

Table A8. Robustness Checks: Summary Statistics on Industry Types

Panel A. Key sample

	First survey		Second survey		Third survey	
	Employee	Employer	Employee	Employer	Employee	Employer
Second survey, employee	1(5),2(7), 5(2), 6(14)	1(3), 5(1), 6(4)				
Second survey, employer	2(1), 6(3)	1(22), 2(5), 3(2), 5(10), 6(50)				
Third survey, employee	1(7), 2(7), 5(2), 6(12)	1(5), 2(1), 3(2), 5(2), 6(8)	1(7), 2(6), 5(2), 6(11)	1(3), 2(1), 3(2), 5(2), 6(8)		
Third survey, employer	2(1), 6(3)	1(14), 2(1), 5(8), 6(41)	1(1), 5(1), 6(2)	1(13), 2(2), 5(7), 6(38)		
Fourth survey, employee	1(6), 2(6), 5(2), 6(13)	1(5), 2(3), 3(1), 5(4), 6(5)	1(5), 2(5), 5(2), 6(13)	1(4), 2(3), 3(1), 5(4), 6(3)	1(9), 2(7), 3(1), 5(3), 6(14)	1(2), 2(1), 5(3), 6(1)
Fourth survey, employer	0	5(1)	0	5(1)	0	5(1)
Later surveys, employee	1(4), 2(5), 5(2), 6(10)	1(1), 6(1)	1(5), 2(5), 5(2), 6(11)	1(2), 2(1), 5(1), 6(3)	1(9), 2(7), 3(1), 5(3), 6(14)	1(2), 2(1), 5(3), 6(1)
Later surveys, employer	0	5(1)	0	5(1)	0	5(1)

Panel B. Full sample

	First survey		Second survey		Third survey	
	Employee	Employer	Employee	Employer	Employee	Employer
Second survey, employee	1(12), 2(9), 3(1), 5(5), 6(18)	1(5), 2(4), 5(3), 6(5)				
Second survey, employer	1(2), 2(1), 6(5)	1(39), 2(10), 3(5), 5(19), 6(87)				
Third survey, employee	1(10), 2(9), 3(1), 5(5), 6(19)	1(8), 2(6), 3(2), 5(6), 6(15)	1(14), 2(10), 3(1), 5(7), 6(20)	1(4), 2(5), 3(2), 5(4), 6(14)		
Third survey, employer	1(4), 2(1), 6(4)	1(36), 2(8), 3(3), 5(16), 6(77)	1(3), 2(3), 5(1), 6(3)	1(37), 2(6), 3(3), 5(15), 6(78)		
Fourth survey, employee	1(10), 2(8), 5(5), 6(19)	1(11), 2(5), 3(2), 5(8), 6(14)	1(14), 2(10), 5(7), 6(22)	1(7), 2(3), 3(2), 5(6), 6(11)	1(17), 2(11), 3(1), 5(9), 6(29)	1(4), 2(2), 3(1), 5(4), 6(4)
Fourth survey, employer	1(4), 2(2), 3(1), 6(4)	1(33), 2(9), 3(3), 5(14), 6(78)	1(3), 2(3), 3(1), 5(1), 6(1)	1(34), 2(8), 3(3), 5(13), 6(81)	1(1), 2(4), 3(2), 5(2), 6(5)	1(36), 2(7), 3(2), 5(12), 6(77)
Later surveys, employee	1(10), 2(8), 5(5), 6(17)	1(4), 2(1), 5(2), 6(3)	1(14), 2(9), 5(7), 6(20)	1(3), 2(2), 3(1), 5(2), 6(9)	1(17), 2(11), 3(1), 5(9), 6(29)	1(4), 2(2), 3(1), 5(4), 6(4)
Later surveys, employer	1(2), 2(1), 6(3)	1(31), 2(4), 3(2), 5(11), 6(73)	1(3), 2(3), 5(1), 6(1)	1(33), 2(5), 3(2), 5(11), 6(76)	1(1), 2(4), 3(2), 5(2), 6(5)	1(36), 2(7), 3(2), 5(12), 6(77)

Notes: The key sample is the sample used for the main analysis. The full sample is the original sample before excluding the non-entrepreneurial individuals and individuals with conflicting job class information. We present industry type codes. Services (cooking, sewing, private clinic and so on)=1, transportation=2, construction=3, mining=4, processing production=5, other businesses=6. And the numbers of people in each industry type are indicated in parentheses.

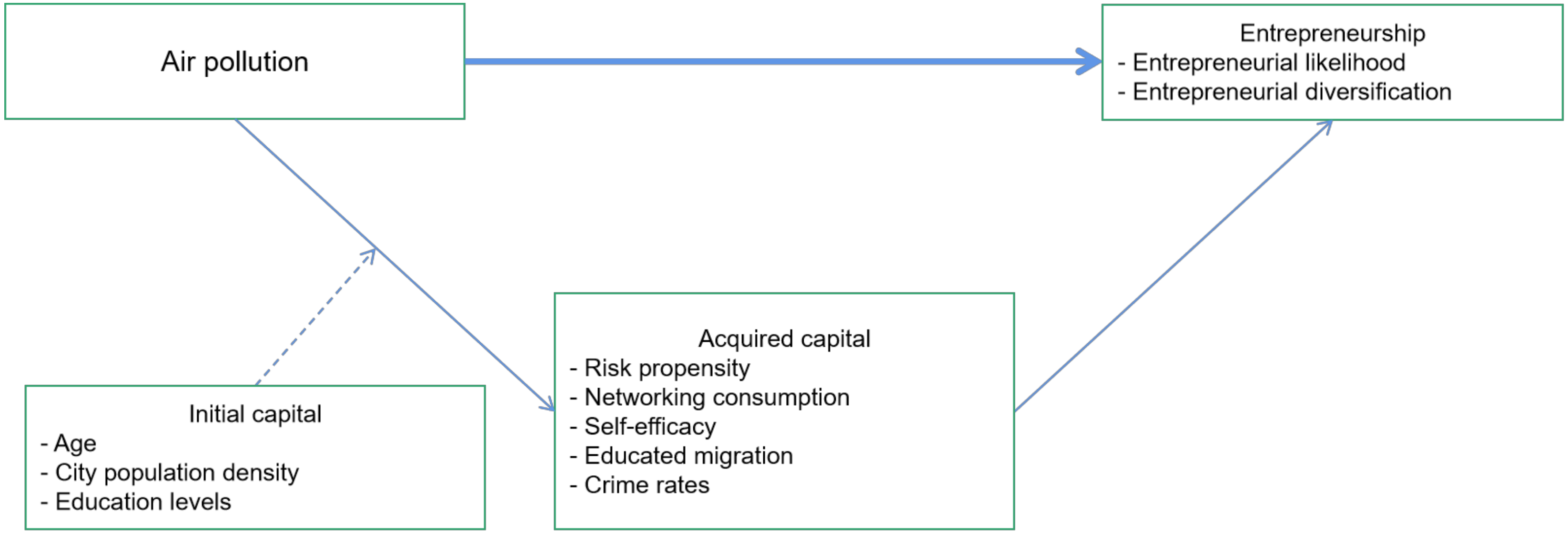

Fig. 1 Air Pollution and Entrepreneurship

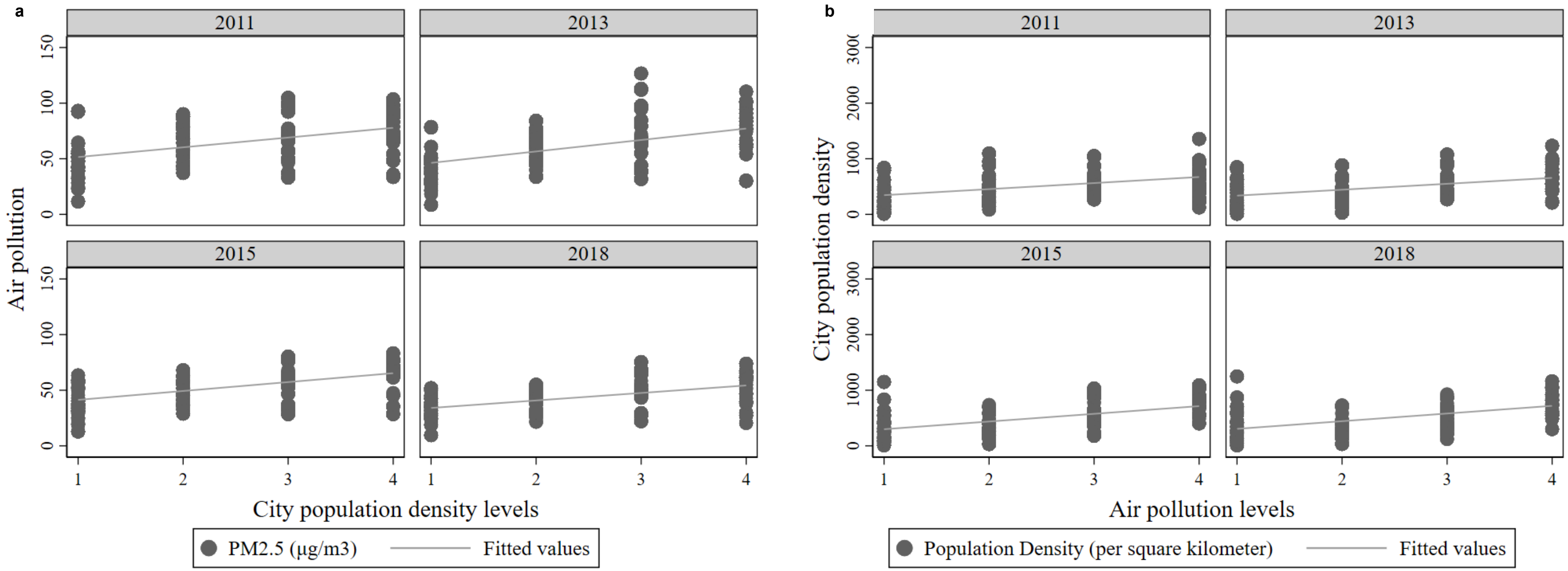

Fig. A1 Variations in Annual Mean Air Pollution and City Population Density Levels

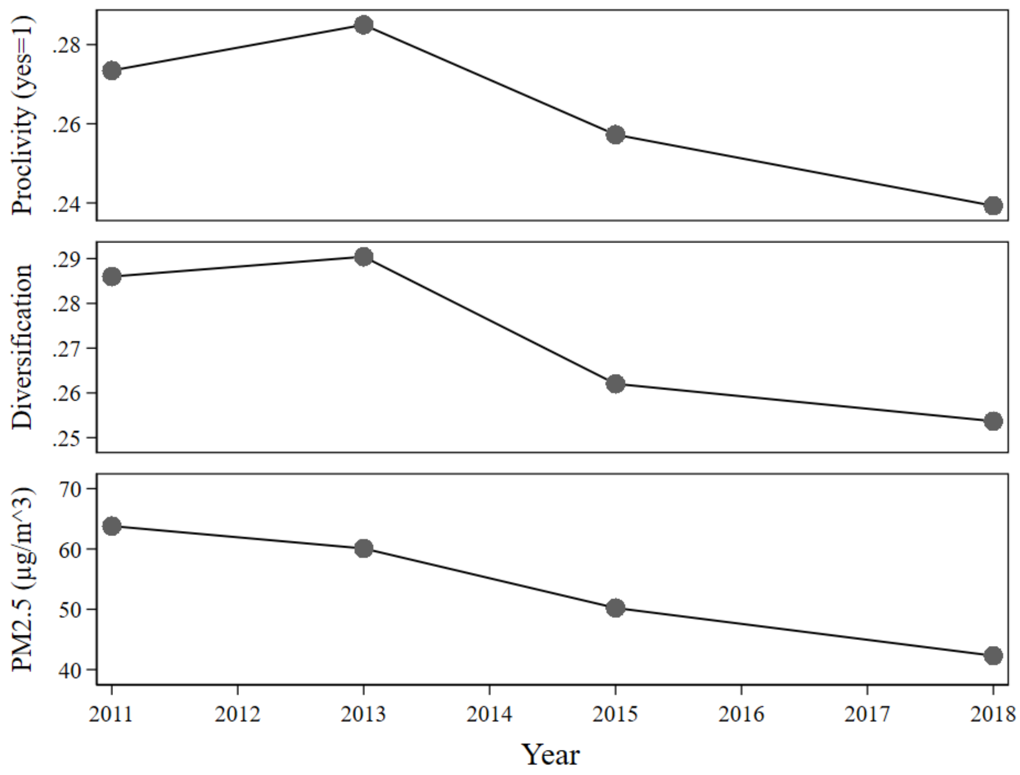

Fig. A2 Trends in Annual Mean Air Pollution and Entrepreneurship