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Body shape and stable employment opportunity analysis of China's nonagricultural labor market

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ABSTRACT

Based on the integrated data of the China General Social Survey (CGSS) from 2010 to 2017, this study observes that body shape – being overweight or underweight – is important for labor market outcomes. Body shape significantly affects the employment opportunities of Chinese individuals, and this effect differs by gender and across the occupational hierarchy. Women face both slim premium and obesity penalty effects. Slim women, those with normal and lower but not excessively lower body weight, are more likely to gain long-term employment contracts in the labor market, while the opposite is observed for overweight individuals. The relationship between women's body shape and employment opportunities also varies by occupation. The obesity penalty is more pronounced in occupations with a higher International Socio-Economic Index (ISEI), while the slim premium is more evident in occupations with a low ISEI. The results suggest that the Chinese labor market is highly demanding regarding women's figures, while it is relatively tolerant of men's figures. By mechanism analysis, health capital is found to be the leading cause of the body shape effect. In addition, socialization is also a possible pathway of action. This paper has extended implications for the study of stature and employment stability, enriching the empirical research on labor market discrimination.

1. Introduction and literature review

According to China's seventh national census (2020),[1] the working-age population is 880 million, making it the country with the world's largest population and labor force. Coupled with the impact of global economic fluctuations, domestic industrial restructuring, and the extension of the legal retirement age, it has become increasingly difficult for unemployed and new laborers to get jobs. Chinese employers have an absolute advantage in the process of personnel selection. In addition to education, experience, and cognitive ability, employers' focus on candidates has expanded to external factors, such as their appearance, height, and body shape. From 1992 to 2020, China's population experienced a continuous increase in body weight, with a notable rise in overweight individuals in urban areas. More than half of China's adult residents are overweight or obese,[2] indicating a significant increase in the country's overall obesity rate. In addition to damaging health, obesity affects workers' appearance or body shape, in turn affecting their employment prospects and income. Outcomes-based on body shape can be seen as a potential form of discrimination that has long existed but is easy to ignore and difficult to measure accurately. The impact of body shape on the Chinese labor market has become increasingly evident in recent years. Compared to outcomes based on gender, education, background, and other apparent characteristics, those based on body shape have more covert effects on workers' employment and income as they operate via people's perceptions. Currently, with the spread of what may be termed "lookism" and the widely held view of a specific beauty standard, people are becoming more inclined to seek out good looks and a slim figure to maintain a better image of themselves. In addition, with the competition in the labor market, employers have an absolute advantage, which often

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[2] The State Council Information Office of the People's Republic of China. Press Briefing for the *Report on Chinese Residents'* Chronic Diseases and Nutrition 2020.

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enables them to add more requirements when recruiting, including restrictions on the appearance and figures of employees. Therefore, research on body shape has gradually expanded from the medical field to economics.

The majority of the existing literature on labor market premiums related to employees' physical appearance or body shape is based on wage premiums. The study of the wage or labor income gap caused by different appearances or figures is regarded as the appearance premium or penalty, it is the primary analytical framework of the economics of beauty. When a person with a good appearance or slim figure earns a higher income than an ordinary person, this can be considered a premium provided by the labor market in his or her favor. When unattractive or obesity employees are underpaid, it can be considered an income punishment from the labor market. Whether the result is a market premium or punishment, wage or income is often used as the core variable with which to measure market feedback. Wages and income follow once employment has been achieved. Shifting the focus of the study forward to employment opportunities reflects the role of market choice more comprehensively. Adopting differences in employment opportunities to measure labor market discrimination in this paper is an important supplement. Employment discrimination is multifaceted, particularly in terms of the income gap and employment opportunities. Again, the employment opportunities used in this paper go beyond simply being able to obtain a job. A considerable amount of the literature using employment opportunities to measure discrimination has focused on the differences in the interview opportunities or being hired and rejected experienced by people of different statures. This paper adopts long- and short-term employment contracts, which is very much in line with the characteristics of the Chinese labor market. Long-term employment contracts imply a more stable employment status, higher pay, and more generous benefits. Short-term employment contracts indicate unstable employment, low income, and poor benefits. The worst situation, however, is not having an employment contract but being employed. Examining the effect of body shape on access to employment opportunities with employment contracts of different lengths after controlling for variables such as demographic, economic, and social status, and regional controls is an essential expansion of the investigation of employment opportunity discrimination.

1.1. Body shape and labor market results

Economists have focused on the feedback mechanism of body shape in the labor market, mainly through the themes of the body shape premium, slim premium, obesity punishment, and body shape discrimination, to study the physical characteristics of employees. The primary streams of the literature on labor market feedback regarding body shape concern its the effect on employment opportunities and its influence on wage rates or income.

1.1.1. Body shape affects employment opportunities

Scholars have found that the hazard ratios for unemployment are 1.18 for individuals with obesity (30≤body mass index (BMI) < 35) and 1.27 for individuals with severe obesity (BMI≥35) compared of individuals with normal weight (Bramming et al., 2019). Obesity increases the risk of unemployment, increases informal employment, reduces the possibility of obtaining employment opportunities or even looking for work, and raises the possibility of unstable employment. Obese people are likely to experience various forms of discrimination in their daily lives and in the labor market. Therefore, they have a lower job search success rate, and some positions are not even open to obese job seekers (Barbieri, 2018; R. L.; Pearl et al., 2018).

1.1.2. Body shape affects interview opportunities and success rate and influences salary and job stability after employment

Obese individuals obtain a lower income and welfare from work (Slade, 2017). They are less likely to be employed in professional, technical and management positions than are individuals who are not overweight, showing an obesity punishment effect(Pagán & Dávila, 1997). Compared with obese people, nonobese or thin people are more sought after in the labor market, thus enjoying a slim premium effect. For example, models using the narrower genetic risk score as an instrument imply that a one-unit increase in BMI is associated with 6.9% lower wages, 1.8% fewer years employed, and a 3% higher probability of receiving any social income transfers(Böckerman et al., 2019).

1.2. Explanation of the gap in body shape results

When employers face information asymmetry, the most efficient method in line with the profit-maximization goal is to use inference based on group characteristics as the selection criterion (Cain, 1987). Employers tend to hire slim people, even those who are underweight. The outcome gap in the labor market based on physical characteristics impacts the following four aspects.

1.2.1. Employers avoid the loss of production efficiency caused by the poor health of obese people

Physical characteristics partly reflect the differences in health capital. Health is a core component of human capital(Grossman, 1972). The state of health directly determines employee output. Obesity is often associated with poor health and an increased risk of illness (Bozoyan & Wolbring, 2018; Huq et al., 2020). The primary manifestation is lower work capability, which reduces production efficiency (Clna et al., 2019). Obese people may reduce their work quality and productivity in the case of illness. The situation of asking for a leave of absence from production reduces the working time and ultimately lowers work productivity, thus reducing workers' prospects for employment, working ability, working hours, work efficiency, and quality of work and significantly increases their intention to retire early (Ramadani et al., 2019). The hiring of slim individuals can reduce the risk of productivity loss. Employers tend to provide slim individuals with more work opportunities (John Cawley, 2004).

1.2.2. Employers avoid the increase in labor costs arising from sickness and missed work

Regarding the relationship between BMI and health in the Chinese population it has been found that the prevalence of slim men and women is 3.2 and 5.3%, respectively, while the that of overweight or obese men and women is 35.7 and 34.6%, which is almost seven times that of the former (Zhang et al., 2019). Obese people are much more likely to get sick than are normal weight or even underweight employees. Therefore, employers have to consider excluding obese people from the candidate pool when hiring employees. It is safer to choose people of normal weight to be employees, as doing so reduces the likelihood of high medical costs due to illness among obese employees (Cawley & Meyerhoefer, 2012; John Cawley, 2015; John.; Tonnon et al., 2019).

1.2.3. Tcater to customers' preferences, employers are more likely to offer employment to candidates who look slim, especially those jobs involving direct contact with customers

The aesthetic expectations of most customers is a preference for slim people or nonobese people compared to obese or overweight individuals. To obtain more customer support and have a greater probability of customer satisfaction, employers tend to hire slim candidates(E. Han et al., 2009).

1.2.4. Body obesity is a negative signal of self-control

It has been found that weight control behavior and social influence are related to being overweight, and that poor weight control is related to having a high BMI, which verifies the poor self-control of obese people (Robinson et al., 2020). Employers often discriminate against obese people based on the subjective perceptions formed by their first impressions, such as a lack of willpower, overeating, and a lack of

exercise (Vallejo-Torres et al., 2018). Stereotypes about obese people influence the judgments and decisions of human resource managers and the attitudes of their colleagues. These stereotypical attributes include a lack of self-control, laziness, competence, emotional loss, decreased health, absence, and a lower possibility of being accepted by others (K. E. Giel et al., 2010). Stigmatization was most pronounced in obese females. It is need to intervene targeting stigmatization for obese individuals(Katrin E. Giel et al., 2012). There are many factors that contribute to obesity, and stigma tends to treat obesity as a consequence of the individual's self-induced condition, sometimes exaggerating the effect of stigma(Rebecca L. Pearl, 2018; PUHL et al., 2015). Obesity is not necessarily a consequence of self-control, but it can increase anxiety and unhappiness in individuals(Courtemanche et al., 2014; Daly et al., 2019; Oswald & Powdthavee, 2007). An important reason why we are against body shape discrimination is that obesity is sometimes difficult to control.

1.3. Occupational differences

From the perspective of labor discrimination (Hamermesh & Biddle, 1994), proposed for the first time a third possible effect of appearance on employment and income in addition to productivity and employer discrimination: occupation. In occupations in which body shape is relatively essential, especially jobs in customer service, the preference caused by body aesthetics and prejudice is more concentrated and thus impacts individual employment (DeBeaumont, 2009; Pagán & Dávila, 1997; Vallejo-Torres et al., 2018).

The gender difference in the effect of body shape on employment is mainly due to the different occupational structures of genders. Increased BMI negatively affects female labor force participation and employment but, positively affects that of men (Sari & Osman, 2018). Being overweight seems to be a disadvantage for women, whereas the market is more tolerant of obesity among men. The adverse effects of obesity on income and employment are greater for women than for men (Campos-Vazquez & Gonzalez, 2020). In China, the workplace is far more tolerant of male body shapes than of female body shape. (Clément, 2017; Huang et al., 2016; Li et al., 2021; Tafreschi, 2015). A considerable amount of research has been published exploring the gender gap in the relationship between BMI and income. (Au et al., 2013; Dang et al., 2019; Feigl et al., 2019; Johar & Katayama, 2012; Kim & Han, 2017).

The main contributions of this article are twofold. (1) Using Chinese labor market data and taking the contract duration as the core independent variables, this paper explores the differences in employment opportunities based on body shape, filling the gaps in the existing literature. The labor outcome gap is based on body shape, including production efficiency, labor cost, and customer and employer body shape preferences, leading to differences in employment opportunities and wages. The previous literature usually modeled the impact of body shape on employment status as a binary choice (employed, yes/no) (Barbieri, 2018). Some works categorized employment status into four parts: working, looking for paid work, permanently not working due to disability, and looking after the home or family (Kinge, 2016). We take the term employment contract as the proxy variable of employment opportunities and discuss body shape's impact on employment opportunities. We focus on the stability of employment opportunities, not just on being hired or rejected. Further exploration has excellent merit in terms of enriching the discrimination literature. (2) This work analyzes the influence of body shape on employment according to occupational class. A critical problem with previous studies is that they ignore the precondition that the requirement of human capital varies across occupations and fail to realize the occupational differences in the influence of body shape on employment opportunities. (See Parts 4.2 and 4.3)

2. Theoretical explanations

2.1. Probability of long-term and short-term contracts

Suppose that there are three types of candidates: normal, overweight, and underweight, represented by subscripts $j = 1, 2, 3$, in the labor market. Moreover, suppose that there is no preference based on body shape in the labor market. In that case, employers judge whether to hire candidates and provide long-term offers and high salaries based on only their human capital. Because employees of normal body shape account for the majority of employees, their production efficiency and labor costs are relatively stable. Therefore, employers often compare overweight, underweight, and normal weight individuals when making employment decisions. HC_j is the comprehensive performance of candidate j , which is used to judge the human capital that substantially affects production efficiency.

Suppose there are three employment situations faced by job seekers: ①Rejection by the employer and no employment opportunities; ② Short-term contracts (SCs), which is an unstable or poor-quality job opportunity; and ③ Long-term contracts (LCs), which is a stable and high-paying job opportunity.

The probabilities of the above three situations are P_{NC} P_{SC}, and P_{LC}. The expectation of obtaining an employment contract is $E(C) = LC^* P_{LC} + SC^* P_{SC}$. Employers making employment decisions are often affected by prejudice: they are concerned about the loss of production efficiency, increased medical costs, and personal preferences.

The employer decides which contract to offer based on the human capital and physical characteristics, i.e., *BMI* of the candidates. The probabilities of obtaining LC and SC are as follows:

$$P_{LC,i,j} = \alpha_{LC} BMI_{i,j}^{\beta_{LC}} HC_{i,j}^{\delta_{LC}}$$

$$P_{SC,i,j} = \alpha_{SC} BMI_{i,j}^{\beta_{SC}} HC_{i,j}^{\delta_{SC}}$$

That is:

$$\ln P_{LC,i,j} = \ln \alpha_{LC} + \beta_{LC} \ln BMI_{i,j} + \delta_{LC} \ln HC_{i,j} \quad (1)$$

$$\ln P_{SC,i,j} = \ln \alpha_{SC} + \beta_{SC} \ln BMI_{i,j} + \delta_{SC} \ln HC_{i,j} \quad (2)$$

Subscript i is the occupation type. $BMI_{i,j}$ is the BMI of candidate j in occupation i, indicating his or her body shape. According to our framework, we consider only LCs and SCs. As an employment opportunity, a LC is better than a SC.[3] β represents the influence of body shape on employment contract. The value of which depends on the occupation matches individual's body characteristics. When the two match, β is positive; otherwise, β is negative. For example, a factory production worker needs a more muscular physique for high-intensity shift work. Employers are inclined to hire candidates with athletic bodies. As a result, for an candidate with a muscular physique, β_{LC} is positive and β_{SC} is negative. In other words, a robust physique helps individuals obtain a long-term employment contract and avoid a short-term employment contract. An candidate with a less strong physique does not have an advantage in terms of body shape. Therefore, in such a case, β_{LC} is negative, and the β_{SC} is positive. Candidates who lack the physical requirements for the job is likely to obtain a SC instead of a LC. In addition, the greater the absolute value of β is, the greater the influence of BMI.

[3] The rising 'gig' economy of short duration employer contracts is a separate topic. Many of freelance collaborators have sprung up in China who rely on the connectivity opportunities created by the internet. This topic is not considered here. We exclude the self-employed sample from the empirical analysis later in the paper.

2.2. Market value of candidates

The importance of human capital in occupation i is I_i. For example, education is not important for the career of a truck driver but is very important for the profession of a scientific researcher. In contrast, experience and physical health are more important to the work performance of truck drivers. The value of candidate j in occupation i is $V_{i,j} = (I_i \times HC_{i,j})^{\rho}$. By taking the logarithm of both sides of the equation, we obtain the following:

$$\ln V_{i,j} = \rho\left(\ln I_{i,j} + \ln HC_{i,j}\right) \tag{3}$$

The marginal value is as follows:

$$\ln\left(Margin\ V_{i,j}\right) = \ln\left(\rho I_i^{\rho}\right) + (\rho - 1)\ln HC_{i,j} \tag{4}$$

Assuming the marginal value of a candidate is related to obtaining an employment contract. The higher the marginal value is, the greater the probability of getting a long-term contract $\gamma_{LC} > 0$,

$$\ln P_{LC,i,j} = \gamma_{LC}\ln\left(Margin\ V_{i,j}\right) \tag{5}$$

Similarly, we can assume $\gamma_{SC} < 0$ and then obtain the relationship between the short-term contract and the marginal value. The higher the marginal value is, the lower the probability of getting a short-term contract:

$$\ln P_{SC,i,j} = \gamma_{SC}\ln\left(Margin\ V_{i,j}\right) \tag{6}$$

Then, we substitute equation (1) (4) into equation (5):

$$\ln \alpha_{LC} + \beta_{LC}\ln BMI_{i,j} + \delta_{LC}\ln HC_{i,j} = \gamma_{LC}\ln\rho + \gamma_{LC}\rho\ln I_i + \gamma_{LC}(\rho - 1)\ln HC_{i,j}$$

$$\ln I_i = \frac{(\ln \alpha_{LC} - \gamma\ln\rho)}{\gamma_{LC}\rho} + \frac{\beta_{LC}}{\gamma_{LC}\rho}\ln BMI_{i,j} + \frac{(\delta_{LC} - \gamma_{LC}\rho + \gamma_{LC})}{\gamma_{LC}\rho}\ln HC_{i,j} \tag{7}$$

The above equation expresses the importance of human capital and BMI. Employers consider both the body shape and human capital when hiring. Moreover, employers can directly know the body shape by observing a candidate's physique and measuring human capital by education. Then, by substituting equation (7) into equation (3),

$$\ln V_{i,j} = \frac{\ln \alpha_{LC} - \gamma_{LC}\ln\rho}{\gamma_{LC}} + \frac{\beta_{LC}}{\gamma_{LC}}\ln BMI_{i,j} + \frac{\delta_{LC} + \gamma_{LC}}{\gamma_{LC}}\ln HC_{i,j} \tag{8}$$

The value of candidate is a complete result of body shape and human capital. Here, it is necessary to analyze the sign of β_{LC}/γ_{LC} according to the value setting of β. In the same way, we obtain the logarithm of candidate's value in a short-term employment contract.

$$\ln V_{i,j} = \frac{(\ln \alpha_{SC} - \gamma_{SC}\ln\rho)}{\gamma_{SC}} + \frac{\beta_{SC}}{\gamma_{SC}}\ln BMI_{i,j} + \frac{\delta_{SC} + \gamma_{SC}}{\gamma_{SC}}\ln HC_{i,j} \tag{9}$$

2.3. Employer utility maximization

For employers, the aim is to maximize utility. An employer of occupation i, has short-term and long-term employment SL_i and LL_i, respectively. The pay for LCs and SCs are W_s and W_L, respectively. LC holders have better employment opportunities compared to SC holders, $W_L > W_s$.

$$LL_{i,j} = \sum_{1}^{n} 1\left(P_{LC,i,j} \geq P_{SC,i,j}\right),$$

When candidate have a greater probability of obtaining a LC, they are considered permanent employees. $1(\cdot)$ is the indicator function.

$$SL_{i,j} = \sum_{1}^{n} 1\left(P_{LC,i,j} < P_{SC,i,j}\right),$$

When candidate are more likely to obtain SCs, they are considered short-term employees.

The utility function of the employer is

$$U = price \cdot f\left(LL_{i,j}, SL_j\right) - W_L\sum_{j=1}^{3} LL_{i,j} - W_s\sum_{j=1}^{3} SL_{i,j} - \sum_{j=2}^{3} D_{i,j}\left(LL_{i,j} + SL_{i,j}\right) \tag{10}$$

where $price{\cdot}f(LL_{i,j}, SL_{i,j})$ is the return obtained by multiplying the commodity's price by the output from the production function. Assuming a Cobb Douglas production function,

$$f\left(LL_{i,j}, SL_{i,j}\right) = A \cdot {LL_{i,1}}^{\theta_1}{SL_{i,1}}^{\varphi_1} \cdot {LL_{i,2}}^{\theta_2}{SL_{i,2}}^{\varphi_2}{\cdot}{LL_{i,3}}^{\theta_3}{SL_{i,3}}^{\varphi_3} \tag{11}$$

where $W_L\sum_{j=1}^{3} LL_{i,j}$ and $W_s\sum_{j=1}^{3} SL_{i,j}$ on the right side of equation (10) are the labor costs that need to be paid. $D_{i,j}$ is the loss of utility from hiring an obese or weak employee.

Indexes θ_1, φ_1, θ_2, φ_2, θ_3, and φ_3 are the production efficiencies of various types of employees. The numbers of long and short-term employees with normal body weight in occupation i are $LL_{i,1}$ and $SL_{i,1}$, respectively. The numbers of overweight employees are $LL_{i,2}$ and $SL_{i,2}$, and the numbers of underweight employees are $LL_{i,3}$ and $SL_{i,3}$, respectively. According to equations (10) and (11),

$$\begin{aligned} U = {} & price{\cdot}A{\cdot}LL_{1,j}^{\theta_1}SL_{ij}^{\varphi_1}{\cdot}LL_{i,2}^{\varphi_2}SL_{i,2}^{\varphi_2}{\cdot}LL_{i,3}^{\varphi_3}SL_{i,3}^{\varphi_3} \\ & - W_L\left(LL_{i,1} + LL_{i,2} + LL_{i,3}\right) - W_s\left(SL_{i,1} + SL_{i,2} + SL_{i,3}\right) \\ & - D_2\left(LL_{i,2} + SL_{i,2}\right) - D_3\left(LL_{i,3} + SL_{i,3}\right) \end{aligned} \tag{12}$$

2.4. Employer's employment preferences

Candidates seek stable and well-paid long-term employment. The number of long-term employees can explain whether or not the discrimination exists. ① If $\frac{LL_{i,2}}{LL_{i,1}} < 1$, then there is employment discrimination against overweight people. Occupation i offers fewer overweight people LCs. ② If $\frac{LL_{i,3}}{LL_{i,1}} < 1$, then fewer underweight people are hired as long-term employees.

For long-term employees, the first derivative for maximizing utility is as follows:

$$\frac{\partial U}{\partial LL_{i,1}} = P{\cdot}A{\cdot}{SL_{i,1}}^{\varphi_1}{\cdot}{LL_{i,2}}^{\theta_2}{SL_{i,2}}^{\varphi_2}{\cdot}{LL_{i,3}}^{\theta_3}{SL_{i,3}}^{\varphi_3}{\cdot}\theta_1{LL_{i,1}}^{\theta_1 - 1} - W_L = 0,$$

$$\frac{\partial U}{\partial LL_{i,2}} = P{\cdot}A{\cdot}{LL_{i,1}}^{\theta_1}{SL_{i,1}}^{\varphi_1}{\cdot}{SL_{i,2}}^{\varphi_2}{\cdot}{LL_{i,3}}^{\theta_3}{SL_{i,3}}^{\varphi_3}{\cdot}\theta_2{LL_{i,2}}^{\theta_2 - 1} - W_L - D_2 = 0,$$

$$\frac{\partial U}{\partial LL_{i,3}} = P{\cdot}A{\cdot}{LL_{i,1}}^{\theta_1}{SL_{i,1}}^{\varphi_1}{\cdot}{LL_{i,2}}^{\theta_2}{SL_{i,2}}^{\varphi_2}{\cdot}{SL_{i,3}}^{\varphi_3}{\cdot}\theta_3{LL_{i,3}}^{\theta_3 - 1} - W_L - D_3 = 0,$$

Then, we can obtain

$$\frac{LL_{i,2}}{LL_{i,1}} = \frac{W_L}{W_L + D_2}\frac{\theta_2}{\theta_1} \tag{13}$$

$$\frac{LL_{i,3}}{LL_{i,1}} = \frac{W_L}{W_L + D_3}\frac{\theta_3}{\theta_1} \tag{14}$$

If an employer discriminates against an overweight person, then

$$\frac{LL_{i,2}}{LL_{i,1}} < 1 \quad \Rightarrow \quad \frac{W_L}{W_L + D_2}\frac{\theta_2}{\theta_1} < 1 \quad \Rightarrow \quad D_2 > \left(\frac{\theta_2}{\theta_1} - 1\right)W_L \tag{15}$$

When the employer's utility loss caused by overweight people reaches a certain level, he or she discriminates against overweight people, hiring fewer overweight people as long-term employees. Employers cannot accurately know the relative value of workers' production efficiency $\frac{\theta_2}{\theta_1}$ at the time of recruitment. They can judge $\frac{\theta_2}{\theta_1} = \frac{\ln V_{i,2}}{\ln V_{i,1}}$ only according to the relative value. Substitute equation (8) into equation (15).

$$D_2 > \left(\frac{\ln V_{i,2}}{\ln V_{i,1}} - 1\right)$$
$$W_L = \left(\frac{(\ln \alpha_{LC} - \gamma_{LC} \ln \rho) + \beta_{LC} \ln BMI_{i,2} + (\delta_{LC} + \gamma_{LC}) \ln HC_{i,2}}{(\ln \alpha_{LC} - \gamma_{LC} \ln \rho) + \beta_{LC} \ln BMI_{i,1} + (\delta_{LC} + \gamma_{LC}) \ln HC_{i,1}} - 1\right) W_L \quad (16)$$

When the utility loss caused by overweight people is too significant, discrimination eventually manifests in a way that reduces the long-term employment of overweight individuals, yielding a punitive effect on such individuals.

When the utility loss brought about by hiring underweight individuals is small enough, $\frac{LL_{i,3}}{LL_{i,1}} > 1$, the employer shows a preference for them, producing a premium effect for underweight people's employment.

$$D_3 < \left(\frac{\ln V_{i,3}}{\ln V_{i,1}} - 1\right)$$
$$W_L = \left(\frac{(\ln \alpha_{LC} - \gamma_{LC} \ln \rho) + \beta_{LC} \ln BMI_{i,3} + (\delta_{LC} + \gamma_{LC}) \ln HC_{i,3}}{(\ln \alpha_{LC} - \gamma_{LC} \ln \rho) + \beta_{LC} \ln BMI_{i,1} + (\delta_{LC} + \gamma_{LC}) \ln HC_{i,1}} - 1\right) W_L \quad (17)$$

Body shape can lead to long- or short-term employment opportunities because employers assume that health capital affects utility. The increase in the prevalence of overweight, especially obesity, leads to increased medical costs, low production efficiency, and high absenteeism, which leads to a loss of utility for employers. These are more "objective" than the aesthetics of body shape. The utility of underweight people to employers is twofold: being close to slim positively affects, while being too thin negatively affects employment. Those who are close to slim may also gain more benefits and support from customers, aligning with the mainstream social requirements for a slim body figure and increasing their effectiveness. We test the effect of body shape on employment opportunities in Parts 4.1 and 4.6, and examine the transmission mechanism between body shape and employment opportunities for health capital in Part 4.5.

Moreover, the mismatch between occupational requirements and the body shape can inevitably cause utility loss. The utility loss is too high, and employers tend to reduce the number of overweight long-term employees, as shown in equation (16). With a small utility loss, employers tend to increase the number of underweight long-term employees, as shown in equation (17).

It is evident in the case of manufacturing, as it requires employees to be strong and competent for the job. The employer hires a thin employee who is unable to complete the job's tasks, resulting in the loss of utility. An opposite example of people preferring those who are thin are models, as they are more critical of their weight. Thus, employment preferences vary across occupations, depending on how each occupation favors body shape. We verify the occupational variations in Parts 4.2 and 4.3.

3. Data

3.1. Data

This paper employs survey data from the Chinese General Social Survey (CGSS[4]) in 2010, 2011, 2012, 2013, 2015, and 2017, and the combined data are used for empirical analysis. The CGSS data include the height and weight, occupational information, employment and unemployment in a specific period, education, and other individual variables of respondents, which provides good data support for the analysis of workers' employment opportunities. When processing the data, (1) we limit the sample to workers aged 18–60 years because the retirement age in China is 60 years. (2) We omit subjects with missing BMI values and retain subjects with BMI values between 10 and 40 to ensure that excessively obese or fragile samples are not included. (4) The military and farmer samples are excluded, allowing us to obtain China's civilian, nonagricultural labor market sample. (5) We merge the mixed multiperiod survey data with macro data to further obtain the economic development and health care conditions in the individual province, facilitating the use of instrumental variables and controls for regional effects. The sample size after data processing is 18,645, with 9,595 women and 9,050 men, and the gender composition is balanced. Of these, 13,013 were employed, and 5,632 were unemployed, (see Table S1 **Panel A)**. We report the year composition and gender composition of these employees in Table S1 Panel B. A selective list of the variables used in the regression analysis can be found in Table 1.

3.2. Independent and instrumental variables

Body shape can be defined by height and weight. The most commonly used index to measure a person's figure is BMI, which is weight/height,[2] with weight in kilograms, and height in meters. Most existing studies measure body shape in term of BMI and other indicators simultaneously (Burkhauser & Cawley, 2008; Caliendo & Lee, 2013). A few scholars choose the height, weight, waist circumference, appearance, or a comprehensive subjective and objective score based on appearance (Biddle & Hamermesh, 1998; Gu & Ji, 2019; Kinge, 2017; Mavisakalyan, 2017). The classification of absolute BMI by the World Health Organization and countries differs by race and physique. Generally, in economics and sociological studies, people in the 30%–70% quantile group are often defined as having normal BMI values. People with BMI values in the top 30% quantile are considered overweight. People with BMI values in the lowest 30% quantile are deemed to be in the underweight range. This paper adopts this approach. To ensure the sample validity, we remove the extreme values of BMI on both sides. People with BMI greater than 40 are considered excessively obese, and those with BMI less than 10 are considered excessively thin and possibly have a health problem. Therefore, these 2 groups of people are not included in the sample. Male and female samples are ranked according to their BMI values to define three ranges: underweight, normal, and overweight.

We do not consider appearance factors because interviewers and interviewees have an intensely subjective judgment of appearance, which is greatly influenced by personal aesthetic preference. The second reason is that appearance is affected by factors such as income and occupation. Men's hair trimming and women's makeup change the intuitive sense of their appearance, which is closely related to personal income level and work, and it is difficult to find the appropriate instrumental variables. We use BMI as a proxy variable for body shape. We also consider endogeneity and use the IV regression. Some studies (Bargain & Zeidan, 2019; Böckerman et al., 2019; Kinge, 2016; Tyrrell et al., 2016; Willage, 2018) have used genetic information for BMI, which is a well-suited instrument. In addition, variables used as instrumental variables for body shape include the lagged component of the respondents' own BMI(Gilleskie et al., 2017), the mean adult BMI at the regional level (Morris, 2006), the body status of biological relatives (Lindeboom et al., 2010), and the oldest child's BMI(Kinge, 2017). Instrumental variables must be related to the BMI (independent variable) but not the individual's employment contract (dependent variable). We use instrumental variables for BMI: age and the mean BMI by gender, occupation, and region(Morris, 2006, 2007). The samples are separated by gender in the first stage, province in the second stage, and occupation (according to the first subcategory of the International Standard Classification of Occupation 2008 (ISCO08)) in the third stage. The mean BMI values are calculated after the classification. We use the

[4] The CGSS is a nationwide, comprehensive, and continuous academic survey project in China. Thus far, two phases have been carried out. The first phase was during 2003–2008, in which 5 annual surveys were completed, and the second phase was during 2010–2019, in which 6 annual surveys were completed in 2010, 2011, 2012, 2013, 2015 and 2017. The data used in this article are the survey data from the second phase, including those from 2010 to 2017.

Table 1
Key variable description.

Variable type	Variable	Variable description
Employment opportunity	Employment contract	1 = No contract(0 months) 2 = Short-term(0<months≤12) 3 = Mid-term(12<months≤36) 4 = Long-term(months>36)
	Months of employment contract	Months
Body shape	Body weight	Kilograms
	Height	Meters
	BMI	Body weight/height ^{2}
	Overweight	BMI quartile in the top 30%
	Normal	BMI quartile between 31 and 70%
	Underweight/Slim	BMI quartile in the bottom 30%
Occupation	Occupation	1 = Managers 2 = Professionals 3 = Technicians and associate professionals 4 = Clerical support workers 5 = Services and sales workers 7 = Craft and related trades workers 8 = Plant and machine operators 9 = Elementary occupations
	ISEI	International Socio-Economic Index
Demographics	Education	1 = No education 2 = Primary school or below 3 = Junior high school 4 = High school and technical secondary school 5 = Junior college and undergraduate and above
	Migration	0 = Local Hukou 1 = Migrant Hukou
	Race	0 = Others 1 = Han
	Marital Status	0 = Single (unmarried, divorced or widowed) 1 = Married
	Children	Number of children under 18 years old
	Age	–
	Political status	0 = Non-Chinese Communist 1 = Chinese Communist
Socioeconomic status	Union	0 = Not union member 1 = Union member
	Family income	Logarithm of family income last year
	Medical insurance	0 = No 1 = Yes
	Social status	Social status of self-assessment 1-10
Regional controls	PGDP	Logarithm of per capita gross regional product
	Population	Logarithm of resident population
	Number of unemployed	Logarithm of number of urban registered unemployed
	Number of benefits	Logarithm of number of people on unemployment benefits
	Consumption	Logarithm of consumption per capita
	Health institutions	Logarithm of number of medical and health institutions
	Hospitals	Logarithm of number of hospitals
	Health Technicians	Logarithm of number of medical and health technicians
Fixed effects	Province	i.province (Shanghai, Yunnan, Neimenggu, Beijing, Jilin, Sichuan, Tianjin, Ningxia, Anhui, Shandong, Shanxi, Guangdong, Guangxi, Xinjiang, Jiangsu, Jiangxi, Hebei, Henan, Zhejiang, Hainan, Hubei, Hunan, Gansu, Fujian, Xizang, Guizhou, Liaoning, Chongqing, Shannxi, Qinghai, and Heilongjiang)
	Year	i.year (2010, 2011, 2012, 2013, 2015, and 2017)
Other variables	Health status	1 = Very unhealthy 2 = Relatively unhealthy 3 = Normal 4 = Relatively healthy 5 = Very healthy
	Health impact	1 = Always 2 = Often 3 = Sometimes 4 = Rarely 5 = Never
	Socialization	1 = Never 2 = Once a year or less 3 = A few times a year 4 = About once a month 5 = A few times a month 6 = 1 or 2 times a week 7 = Almost every day

mean BMI of the occupation and province as the individual BMI instrumental variable, satisfying the correlation condition with the independent variables but not directly affecting the individual's employment outcome.

3.3. Dependent variables and descriptive statistics

The proxy variable to measure employment opportunities is the duration of the employment contract. Compared with short-term employment contracts, long-term employment contracts represent good employment opportunities and stable employment. The mean values of the key variables used in this analysis are shown in Table S2.

Male and female physical characteristics are significantly different, so we analyze male and female samples separately to avoid the influence of gender discrimination. The average male heights of overweight, normal, and underweight respondents are 1.717 m, 1.716 m, and 1.720 m, respectively, while their average weights are 80 kg, 68 kg, and 54 kg. The average female heights of overweight, normal and underweight respondents are 1.601 m, 1.606 m, and 1.613 m, respectively, while the average weights are 67 kg, 56 kg, and 46 kg. For both men and women, the average heights of respondents with different body characteristics do not differ significantly, with men close to 1.7 m and women close to 1.6 m in height. Therefore, what primarily affects body shape is weight rather than height. Weight is affected by both genetic inheritance and acquired factors.

The distribution of employment contracts and unemployment duration under different body shapes can be seen in Table 2. Overall, in Panel A, underweight individuals are shown to be most favored by the labor market. The employment stability of the underweight group is better than that of the normal and overweight groups, and the employment stability of men is better than that of women.

- For both men and women, the proportion of underweight persons who have not signed an employment contract is minor, compared to those of overweight and normal weight.

Table 2
Comparison of employees' employment contracts (%).

		No contract	Short-term	Medium term	Long-term	Total
Female	ALL	56.8	15.6	21.4	6.2	100
	Overweight	66.4	13.6	15.9	4.2	100
	Normal	56.9	16.2	20.8	6.2	100
	Underweight	48.6	16.4	27.1	7.9	100
Male	ALL	60.5	12.8	19.0	7.7	100
	Overweight	61.8	12.0	18.5	7.8	100
	Normal	62.6	11.8	18.3	7.3	100
	Underweight	56.3	15.1	20.4	8.3	100

- For women, the proportion of the sample with medium- and long-term employment contract terms gradually increases as BMI decreases, while no such trend is found in the male sample.
- The percentages of men with different body shapes signing long-term employment contracts are not much different, and they are all larger than the proportion of women signing LCs.

We obtain the following approximate assessment: BMI measures body shape and has a more significant impact on employment opportunities for women than for men.

4. Results

4.1. Effect of body shape on employment

For workers in the employment state, the employment contract term indicates the quality of employment opportunities. The independent variable of employment contracts is divided into J categories, and $J = 1, 2, 3, 4$ stands for no employment contract and short, medium, and long-term employment contracts, respectively. According to the *Labour Law of the People's Republic of China*, employment contracts can be divided into two types: fixed-term contracts of generally 1 year, 3 years or more and employment contracts with no fixed term, which generally apply to employees who have worked in a particular company for more than 5–10 years. Temporary employees are not required to sign an employment contract. Therefore, various employment contracts in China represent different degrees of employment stability and employment opportunities. The longer the contract term is, the greater the possibility of an employee continuing to work in the company, and the more likely the work unit is to make human capital investments in employees. In addition, Chinese employers implement principles of distribution according to work. An employee with a long-term employment contract has worked for a long time in the company and may hold a higher position, thus enjoying a higher salary. Therefore, the employment quality of a long-term employment contract is highest because it may be accompanied by a higher salary and a more comfortable working environment.

To accurately obtain the variance in the perturbation term, most regression estimations in this paper use age for clustering analysis. Table 3 Column (1) shows the ordered logit regression results. The dependent variable is the employment contract category. The dependent variable in Models (2)–(4) is the months of the employment contract. In addition, the weight of each age group has obvious clustering properties.

- The baseline ordered logit estimate results are shown in Columns 1–2 of Table 3. BMI is the core variable with which to explore the effect of body shape on obtaining short-, medium- and long-term contracts or no contracts. With the increase in BMI, the possibility of obtaining long-term employment contracts decreases for women, while this result is not found in the male sample. The coefficient for the females is −0.045, which is significant as shown in Column 1, while the coefficient for males is not significant, as shown in Column 2. The influence of BMI on the employment contract is robustly significant in the female sample but not in the male sample. The results of ordered logit estimates with and without control variables can be seen in Table S3.
- Columns 3–4 of Table 3 show the ordinary least squares (OLS) estimators. The marginal effect of the BMI increase is a reduction in contract duration of more than 0.3 months for females. To weaken the impact of sample selection bias, we regress again using Heckman's two-step LS and obtain estimators in Columns 5–6, which are not different from the OLS estimators. More OLS models varying the control variables are presented in Columns 1–3 of Table S4, and instrumental variable models can be found in Columns 4–6 of Table S4.
- Columns 7–8 of Table 3 present the coefficients from the instrumental variable models. BMI robustly and significantly influences employment contracts in the female sample, but not in the male sample.

Table 4 reports the regression results of overweight and underweight employees. We convert the ISCO to the International Socio-Economic Index (ISEI) (Ganzeboom et al., 1992; Jann, 2020) and use it as a proxy variable for occupation.

- Among men and women, underweight individuals are more likely to obtain long-term employment contracts and achieve more stable employment than are normal and overweight individuals, confirming the underweight premium effect.

Table 3
Regression results of BMI: Pros and cons of employment opportunities.

D.V.	Employment contract category		Months of employment contract					
	Ordered logit		OLS		HECKMAN		IV GMM	
	Female	Male	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BMI	−0.045***	−0.010	−0.369***	−0.067	−0.366***	−0.069	−1.705***	−0.085
	(0.012)	(0.006)	(0.087)	(0.074)	(0.086)	(0.074)	(0.341)	(0.269)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socioeconomic status	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes		
Observations	5421	7074	5421	7074	9168	8679	5421	7074
Pseudo R^2	0.113	0.097						
Adjusted R^2			0.147	0.125			0.080	0.107

Notes: 1. Demographic variables include migration, race, marital status, children, and education. We used age for the cluster analysis. Socioeconomic status variables include political status, union, family income, medical insurance, social status. Regional control variables include PGDP, population, number of unemployed individuals, number of benefits, consumption per capita, number of health institutions, number of hospitals, and number of health technicians. We also consider the regional fixed effects of different provinces and survey years. Fixed effects include i.province and i.year. To avoid overidentification due to too many instrumental variables, we do not have fixed effects in Columns 7–8.
2. Robust standard errors clustered by age are in parentheses. ***p < 0.01, **p < 0.05, and * p < 0.10.
3. We remove the sample of people with no desire to work, who were not searching for a job in the labor market. We do not delve into the sample of those not working who have left the labor market and have no desire to work. We retain those not discouraged and with the will to work in the sample, and we remove the long-term unemployed, who have lost their jobs more than 120 months prior to ensure that the observers are effectively activated labor in the market. Observations of unemployment are retained for subsequent Heckman regression and for calculating the mean BMI.

Table 4
Ordered logit regression results of the effect of being overweight and underweight on receiving employment contracts.

D.V.	Employment contract category			
	Female	Male	Female	Male
	(1)	(2)	(3)	(4)
Overweight	−0.340***	0.011	−0.307***	0.017
	(0.086)	(0.057)	(0.085)	(0.061)
Underweight	0.294**	0.229***	0.147*	0.125**
	(0.092)	(0.046)	(0.080)	(0.053)
ISEI	0.024***	0.020***	0.014***	0.011***
	(0.002)	(0.002)	(0.002)	(0.002)
Demographics			Yes	Yes
Socioeconomic status			Yes	Yes
Regional control			Yes	Yes
Fixed effects			Yes	Yes
Observations	5670	7343	5426	7082
Pseudo R^2	0.026	0.013	0.104	0.090

Notes: 1. Demographics variables do not include education. We add the ISEI to the model, so education is no longer used in the control variables. The indicators used to construct the ISEI are usually education and income. The higher the education is, the higher the ISEI value, and education is one of the core components that make up the ISEI. To avoid overlapping the meaning of the two factors, we take only one of them. The same is true in Table 5.
2. Robust standard errors clustered by age are in parentheses. ***p < 0.01, **p < 0.05, and * p < 0.1.

- Being overweight is detrimental to obtaining stable employment, and there is a negative relationship between being overweight and receiving long-term employment contract. The coefficient of overweight of females is −0.307, which is significant, as shown in Column 3, but this finding does not hold for the male sample. Women face an overweight penalty in employment.

4.2. Influence of body shape varies by occupation

It is essential to consider the specific occupation regarding the effect of body shape, as a certain occupation may have a particular inhibiting or strengthening effect on body shape. To explore whether the premium or penalty effect of body shape varies by occupation, we add the interaction term of body shape and the ISEI to the ordered logit equation to investigate whether the same body shape premium or penalty exists in all jobs. Using within-group dispersion can reduce the influence of the ISEI value itself. The interaction terms added to the equation are all decentralized(Balli & Sorensen, 2013). That is, the ISEI variable is subtracted from the corresponding mean value. The ordered logit model used is as follows:$P(y = J) = 1 - \Phi[r_{J-1} - (x'\beta)]$, where

$$x'\beta = \beta_1 overweight + \beta_2 underweight + \beta_3 \Delta ISEI + \beta_4 overweight^{*}\Delta ISEI + \beta_5 underweight^{*}\Delta ISEI + \lambda \cdot control$$

Here, $\Delta ISEI_i = ISEI_i - \overline{ISEI}_{female}$ if the responder is a woman, and $\Delta ISEI_i = ISEI_i - \overline{ISEI}_{male}$ if the responder is a man. The use of intragroup deviations to estimate coefficients does not have an impact on causality. Therefore, the impact coefficients of overweight and underweight individuals are $(\beta_1 + \beta_4 \Delta ISEI)$ and $(\beta_2 + \beta_5 \Delta ISEI)$ respectively.

The regression results are shown in Table 5. There are gender and occupational differences in the influence of body shape on employment contracts. The labor market seems to be more critical of women's body shape than of a man's body shape. In occupations with a high ISEI, people are less likely to receive slim premiums.

- In the female sample, the negative effect of being overweight on employment opportunities and the positive impact of being underweight on employment opportunities remain significant and unchanged after the inclusion of the interaction term in Columns 1 and 3 of Table 5.
- The interaction variables for overweight and occupation and for underweight and occupation, show negative values in Columns 1 and 3 of Table 5, which indicates that the negative effect of being overweight is strengthened and that the positive impact of being underweight is weakened as the occupational class increases. In other words, the influence of body shape among women changes with the advancement of occupations. These results suggest that the overweight penalty for female employees is more severe in occupations with a higher ISEI and moderated somewhat in those with a lower ISEI. The slim premium for female employees is weakened in occupations with a higher ISEI and has a great impact in those with a lower ISEI.
- However, this phenomenon is not found in the male sample. The interaction between male occupation and body shape does not significantly impact employment opportunities, as shown in Columns 2 and 4 of Table 5. A higher BMI for men may be related partly to muscle mass and not excess fat.

4.3. Occupational heterogeneity

The ordered logit results show that the interaction items of women's body shape and the ISEI are significant, meaning that the importance of body shape varies across occupations for women. We further regress the subsamples of various occupations to explore the differences in the female sample across occupations. We reclassify all nonagricultural occupations into three categories (see Table S5 for occupational structure).

Occupation (1) *Managers, Professionals, Technicians and associate professionals.*
Occupation (2) *Clerical support workers, Services and sales workers.*
Occupation (3) *Craft, Plant and machine operators and assemblers, Elementary occupations.*

The estimated results for women are shown in Fig. 1. The overweight penalty effect and the slim premium effect exist simultaneously in the female group but focus on different impact objects.

- Significant overweight penalty effects are found for occupations (1) and occupations (2). The regression coefficients of these occupations are significantly less than 0, meaning obesity has a significant negative effect on obtaining long-term employment opportunities. At the same time, the overweight penalty is not significant in the relatively low social status occupations (3).
- The slim premium effect is found in occupations (3). After controlling for demographic and other characteristics, the coefficient of underweight is significant in occupations (3) and no longer significant in the two different occupational categories.

4.4. Mechanisms: Body shape – health capital - employment

Obesity increases the risk of poor physical health, negatively affects health, reduces working time, and reduces production efficiency and work quality, thus also reducing workers' productivity and affecting their employment performance. The effect of body shape on health status, further on employment, is shown in Table 6.

- In Panel A of Table 6, being overweight is shown to not be suitable for health for both women and men. The coefficients of overweight are −0.421 in Column 1 and -0.233 in Column 2. However being underweight has a significant positive effect for women, with a coefficient of 0.087 in Column 1.
- Panel B of Table 6 shows that health status positively affects employment contracts for both women and men, with coefficients of 0.096 and 0.102, respectively.

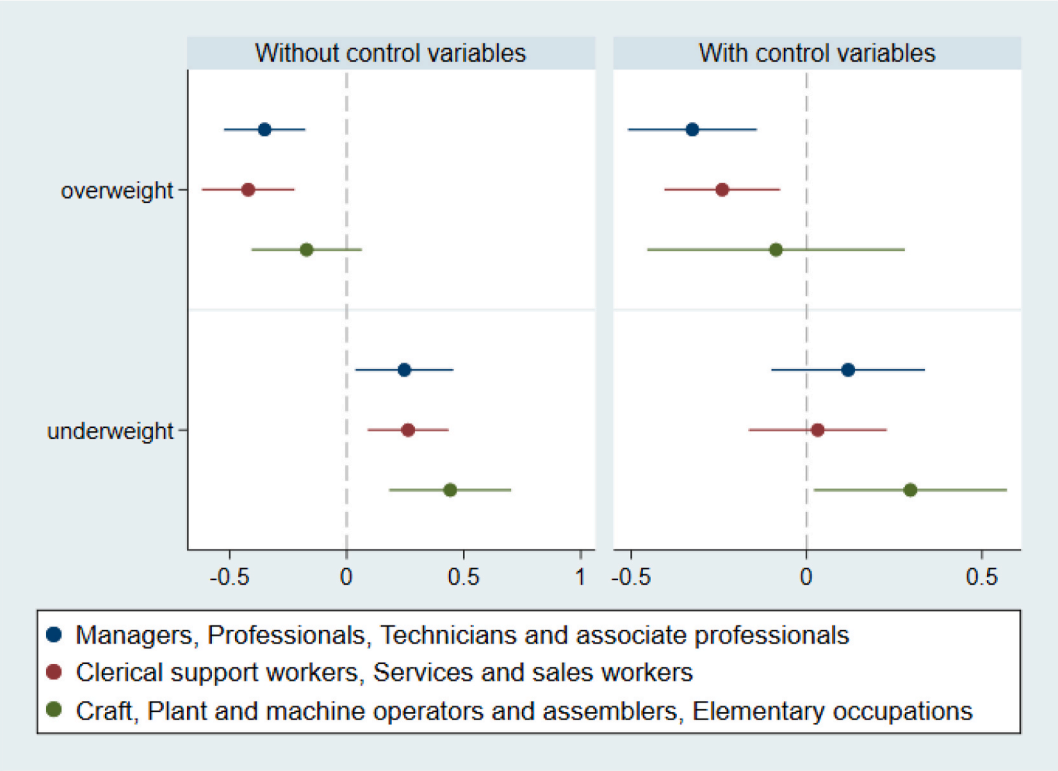

Fig. 1. Regression results for the female subsample - employment contract by occupation.
Note: 1. The coefficient plots on the left are the results of subsample regressions for three types of occupations that do not include control variables. The coefficient plots on the right add demographics, socioeconomic status, regional controls, and fixed effects. In the ordered logit model, the explained variable is the type of employment contract.

Table 5
Ordered logit regression results of the interaction effect between body shape and occupation.

D.V.	Employment contract category			
	Female	Male	Female	Male
	(1)	(2)	(3)	(4)
Overweight	−0.309***	0.011	−0.282***	0.019
	(0.087)	(0.057)	(0.085)	(0.060)
Underweight	0.244***	0.191***	0.177**	0.120**
	(0.086)	(0.050)	(0.076)	(0.055)
Overweight*ISEI	−0.008*	−0.002	−0.009**	−0.001
	(0.004)	(0.004)	(0.004)	(0.004)
Underweight*ISEI	−0.006*	0.001	−0.006*	0.002
	(0.004)	(0.003)	(0.004)	(0.004)
ISEI	0.022***	0.015***	0.018***	0.010***
	(0.003)	(0.003)	(0.002)	(0.003)
Demographics			Yes	Yes
Socioeconomic status			Yes	Yes
Regional control			Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
Observations	5670	7343	5426	7082
Pseudo R^2	0.092	0.070	0.104	0.090

Notes: 1. The values of the ISEI variables in the regressions are intragroup deviations. 2. Robust standard errors clustered by age are in parentheses. ***p < 0.01, **p < 0.05, and * p < 0.1.

4.5. Alternative interpretations: Body shape – social capital-employment

Usually, increased social frequency improves one's social capital and results in increasingly better employment opportunities. The results of the regression between body shape and socialization are shown in Table 7. Friends' social frequency is used as a proxy socialization variable (1–7 frequency is increasing).

- In Column 1 of Table 7 Panel A, the coefficient for being overweight is harmful, while the that for being underweight is positive. Coefficients indicate that overweight women are more likely to carry out low-frequency socialization with friends, while slim individuals are more likely to carry out high-frequency socialization. Body shape has no significant effect on men's socialization with friends.
- Table 7 Panel B shows that socialization has a positive effect on long-term employment contracts. Being overweight negatively affects socialization for females. There is ultimately a negative effect on employment, which is the overweight penalty. The overweight penalty for social pathways could not be validated in the male sample.

4.6. Robustness tests

The employment status of workers is likely to affect their body shape, adversely resulting in selective bias. Thus, to alleviate the systematic difference in variables, Propensity Score Matching (PSM) is used to explore employment opportunities among employees of different body shapes. We compare overweight (underweight) women with those with a normal build. Columns 1–2 of Table 8 report the average treatment effect on the treated (ATT). The ATT difference is significantly negative in matching overweight and normal-weight women, with the mean ATT difference being −2.04. Overweight women have a 2-month shorter duration of employment contracts than do normal-weight women.

In contrast, underweight women versus normal-weight women yield an ATT difference value of 1.44, with underweight women receiving more stable employment opportunities. ATT differences also indicate the existence of overweight penalties and slim premiums for female employees, which are not confirmed in the male sample.

Table 6
Effect of body shape on health capital and employment.

Panel A: The effect of body shape on health capital		
D.V.	Health status	
	Female	Male
	(1)	(2)
Overweight	−0.421***	−0.233***
	(0.038)	(0.049)
Underweight	0.087**	−0.007
	(0.043)	(0.048)
Demographics	Yes	Yes
Socioeconomic status	Yes	Yes
Regional control	Yes	Yes
Fixed effects	Yes	Yes
Observations	9181	8689
Pseudo R^2	0.040	0.045
Panel B: The effect of health capital on employment		
D.V.	Employment contract category	
	Female	Male
	(1)	(2)
Health status	0.096**	0.102***
	(0.040)	(0.029)
Demographics	Yes	Yes
Socioeconomic status	Yes	Yes
Regional control	Yes	Yes
Fixed effects	Yes	Yes
Observations	5423	7080
Pseudo R^2	0.102	0.091

Note: 1. All models use ordered logit regression. The demographic variables include the ISEI, migration, race, marital status, and children. The socioeconomic status variables include political status, union, family income, medical insurance, social status. The regional control variables include PGDP, population, number of unemployed individuals, number of benefits, consumption per capita, number of health institutions, number of hospitals, and number of health technicians. Fixed effects include i.province and i.year.
2. Health status 1–5 from very unhealthy to very healthy.
3. Robust standard errors clustered by age are in parentheses. ***p < 0.01, **p < 0.05, and * p < 0.1.

Table 7
Effect of body shape on social capital and employment.

Panel A: The effect of body shape on socialization		
D.V.	Frequency of socializing with friends	
	Female	Male
	(1)	(2)
Overweight	−0.095*	0.065
	(0.053)	(0.052)
Underweight	0.156***	−0.036
	(0.047)	(0.058)
Demographics	Yes	Yes
Socioeconomic status	Yes	Yes
Regional control	Yes	Yes
Fixed effects	Yes	Yes
Observations	7633	7350
Pseudo R^2	0.021	0.021
Panel B: The effect of social capital on employment		
D.V.	Employment contract category	
	Female	Male
	(1)	(2)
Socialization	0.044***	0.024
	(0.017)	(0.021)
Demographics	Yes	Yes
Socioeconomic status	Yes	Yes
Regional control	Yes	Yes
Fixed effects	Yes	Yes
Observations	4651	6095
Pseudo R^2	0.107	0.096

Note: 1. All models use ordered logit regression. The demographic variables include the ISEI, migration, race, marital status, and children. The socioeconomic status variables include political status, union, family income, medical insurance, and social status. The regional control variables include PGDP, population, number of unemployed individuals, number of benefits, consumption per capita, number of health institutions, number of hospitals, and number of health technicians. Fixed effects include i.province and i.year.2. Robust standard errors clustered by age are in parentheses. ***p < 0.01, **p < 0.05, and * p < 0.1.

5. Discussion

5.1. Gender heterogeneity

In the main results section, there is found to be gender heterogeneity in the effect of body shape on long- or short-term employment opportunities (Tables 3 and 4). The overweight penalty and the slim premium are robustly present in the female sample, while the overweight penalty is not observed in the male sample. Occupational structure is a critical factor of the gender heterogeneity of the overweight penalty. In occupations (1) *Managers, Professionals, Technicians and associate professionals*, the share of women and men is approximately the same, at 28% and 31%, respectively. However, there is a noticeable difference in occupations (2) *Clerical* support *workers, Services and sales workers*, and occupations (3) *Craft, Plant, and machine operators and assemblers, Elementary occupations.* The percentage of women in occupations (2) is 43%, while the percentage of men is 28%.

Conversely, the share of women in occupations (3) is 29%, compared to 41% for men (Table S4). Employees in occupations (2) are required to have more exposure to people. They are directly in front of customers or provide services. Employer and customer preferences are superimposed. Consequently, the adverse effects of being overweight are pronounced. The female sample with a larger share of occupations (2) exhibit an overweight penalty, while the smaller male sample has no such effect. Occupation (3) has more blue-collar jobs with an emphasis on muscle and physical labor. Being overweight tends to be associated with muscle and sustainable physical work. A male sample with a larger share of occupations (3) would not reflect the penalty effect due to being overweight.

Table 8
PSM analysis of body shape and months of employment contract.

	Female		Male	
Matching	Overweight V.S. Normal	Underweight V.S. Normal	Overweight V.S. Normal	Underweight V.S. Normal
	(1)	(2)	(3)	(4)
k-Nearest neighbors	−2.329***	1.808**	−0.060	0.305
Radius	−1.872***	1.495**	0.235	0.365
Kernel	−1.964***	1.471**	0.437	0.404
Mahalanobis	−1.996**	0.985**	−0.280	1.150
Mean	−2.040	1.440		

Note: 1. The outcome is the months of the employment contract.
2. The standard deviation and significance results are obtained by the bootstrap method (200 repetitions). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.
3. Nearest neighbor matching is set to 1:4, and the radius matching method caliper is set at 0.01.
4. The covariates variables include the ISEI, demographics, socioeconomic status, and regional controls.

5.2. Occupational heterogeneity

It has been demonstrated that the effect of body shape on employment is occupationally heterogeneous, and it changes with the ISEI (Table 5). The overweight penalty is enhanced in the female sample, and the slim premium is weakened as ISEI rises (Columns 1 and 3 in Table 5). This variation is not substantiated in the male sample (Columns 2 and 4 in Table 5). The occupational heterogeneity of body shape influence

reveals that heterogeneity concentrated in the female group (Fig. 1). The occupational heterogeneity of body impact in females stems from many factors.

First, human capital is the main factor leading to variations. People believe that highly educated women and those engaged in high-income occupations (involving social and business contacts) tend to care about health, which means a longer career and return on educational time and money investments. Therefore, there is a higher expectation that employees in high-income occupations maintain their weight and are not too overweight. Obesity penalties enhance in high-income occupations. However, the slim premium is diminished in high-income occupations because human capital plays a more significant role than body shape. Human capital is far more critical to managers, professionals, and technicians than to clerks and salespeople. In middle and lower-income occupations, the slim premium can have a more significant impact. The change of body shape impact is similar to the logic of (Ahn et al., 2019): the relationship between BMI and health-related quality of life vary significantly by income level, with a stronger association among those with the lowest income level.

Second, occupational requirements are another factor. Women in occupations (3) are likely to engage in long term and shift work that requires high physical energy. These occupations have high physical requirements for employees. Slim or underweight women find it challenging to carry out such work, and busy schedules prevent them from keeping their weight under control, so they may voluntarily or involuntarily gain weight to perform the job. In addition, they may engage in more customer-oriented service work. Slim figures and a better appearance conform to the general aesthetic, which is conducive to improving customer service satisfaction. Therefore, employers put forward occupational requirements favoring employees with a healthy appearance. Both the overweight penalty and the underweight premium are reflected in occupations (2).

5.3. Mechanism discussion

This study has revealed health capital and social capital are two main mechanisms involved in the influence of body shape. Both impact mechanisms could be verified only in the female sample. Body shape is associated with health capital, and an overweight employee *i*, may suffer from both subjective and objective factors, such as higher medical costs and lower productivity due to physical and mental health problems, which leads to the loss of employers' utility. Underweight people look slimmer. Slim individuals are unlikely to face health problems due to being obese. They conform to the mainstream aesthetics of society and thus gain more recognition from colleagues and the appreciation of customers, which in turn brings about more utility for employers. In addition, if employers are sensitive to or demanding about body shape and appearance, then they may give this aspect important consideration when selecting employees. Based on the stereotype of overweight employees, being underweight is a positive sign for employers. Underweight people can maintain their weight at a low level, which leads employers to believe that they have desirable characteristics, such as diligence, health, strong willpower, and self-control, providing underweight and slim individuals with strong bargaining power (S. Y. Han et al., 2018). Therefore, employers' probability and degree of utility loss of hiring an underweight person are lower than those of hiring an overweight person. Coupled with the influence of statistical bias, employers are more inclined to offer job opportunities to underweight people, which is the slim premium.

5.4. Limitations

Respondents' height and weight are relying on self-reported, which causes measurement bias. Although we applied instrumental variable regression to mitigate the bias in order to check the robustness of the results. It did not completely resolve the measurement bias. It may be helpful for future studies if height and weight data measured by medical institutions or others can be used. On the other hand, this paper uses only BMI as a proxy variable for body shape, which is a limitation. Alternative measures such as body fat (Bozoyan & Wolbring, 2018; Burkhauser & Cawley, 2008; Wada & Tekin, 2010) and A Body Shape Index (ABSI) have yet to be tried. ABSI is replacing over the spectrum of different medical fields (Duncan et al., 2013; He & Chen, 2013; Krakauer & Krakauer, 2012; Soltanifar et al., 2019). Follow-up work will use a more scientific index to verify these conclusions.

The outcome of body shape discrimination in the labor market is not only differences in employment opportunities, but also in earnings. We also expect to continue to examine other outcomes of body shape discrimination.

6. Concluding remarks

This article explores whether there is an overweight penalty and a slim premium in the Chinese nonagricultural labor market and whether these two labor market feedback mechanisms behave equally across all occupations. Conclusions of gender heterogeneity and occupational heterogeneity are drawn. First, underweight or slim individuals are more likely to obtain a long-term employment contract and maintain a more stable job situation, while the opposite is true for overweight individuals. Both the slim premium and the overweight penalty exist for female employees. However, the overweight penalty does not exist for male employees. Second, there are differences in the impact of body shape on women across occupations. The overweight penalty is more pronounced in high-income occupations. The slim premium strengthens as the ISEI is lowered. For men, however, the impact of the occupational heterogeneity of body shape on employment is not significant. Third, the effect of body shape on stable employment opportunities is mainly through health capital and social capital generation mechanisms.

The research findings of this article have a specific enlightening value, putting forward suggestions for the government. Gender and occupational heterogeneity indicate that the labor market requires more standards for women's bodies and more BMI-related inequality in women's employment. The labor market must advocate fair competition and establish a fair and credible personnel selection and promotion mechanism. Job seekers of different sizes have more opportunities in the labor market and a more tolerant social environment. The government must strengthen policy guidance and improve labor laws to reduce body discrimination as much as possible and promote employment equity. Such efforts can promote the employment stability of overweight women.

We realize that the interpretation of the overweight penalty and slim premium results relies heavily on classifying body shape and occupation categories. Although we have conducted robustness tests using PSM, the heterogeneity and mechanism of the impact of body shape on employment depend mainly on the above arguments. We hope that our discussions are convincing.

Author statement

Ping Li: Conceptualization, Methodology, Investigation, Formal Analysis, Writing Original Draft.

Xiaozhou Chen: Software, Data curation, Writing- Original draft.

Jinyun Ou: Investigation.

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Data availability

The datasets analyzed in this document are available upon request in the repository of the CGSS data available at http://cgss.ruc.edu.cn/

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Appendix A. Supplementary data

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