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Compensating Wage and Income Differentials for Occupational Risk: Evidence from Migrant Workers in China's Pearl River Delta

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Abstract: This study contributes to an important, but under-researched, topic on China by empirically examining the theory of compensating differentials in the context of China's migrant workers. Using survey data collected from the Pearl River Delta in Guangdong province in south China, this study applies the Firpo-Fortin-Lemieux quantile decomposition method to examine the compensating wage and income differentials for migrant workers undertaking risky and safe jobs. The results show that migrant workers undertaking risky jobs incur a wage penalty at medium- and low-wage levels and an income penalty at the low-income level. In contrast, migrant workers at the high wage level enjoy positive wage premiums, and those at the medium and high-income levels enjoy positive income premiums. Both the negative wage premiums and positive income premiums exhibit an inverted U-shape with the quantile increment. Overtime allowances, bonuses and other income are the major sources of compensation for job riskiness. In addition, at the medium-income level, workers in risky jobs are further compensated by employee benefits, while at the high-income level they are further compensated by medical reimbursement.

Keywords: China; Pearl River Delta economy; migrant workers; compensating wage/income differentials

JEL: C21; J31

1. Introduction

In China, the *hukou* (household registration) system assigns every Chinese either a rural or urban *hukou* status. The system restricted domestic migration in the pre-reform era. But this system was loosened following the market reforms, in order to meet the increasing demand for labour in the cities. The number of rural-urban migrants increased from 6.57 million in 1982 to 221.43 million in 2010 (NBSC 1982, NBSC 2011). Rural-urban migrants have provided the low-wage labour that has fuelled China's high growth rate.

After more than three decades of reform, however, China's urban labour market is still relatively informal and segmented due to the *hukou* system (Warner 2002). The segmented labour market has resulted in migrants incurring socio-economic disadvantage. For example, rural-to-urban migrant workers are not allowed access to most permanent positions in the state sector, which provides a better work environment and benefits. Migrant workers are disproportionately concentrated in the private and informal sectors and a majority of them are engaged in labour-intensive, low-skilled and even hazardous jobs that are shunned by urban locals. In addition, migrants have limited access to the urban social security system and they are socially and/or residentially segregated from, and considered to be 'inferior' to, local urban residents (Wang and Zuo 1999).

It is well known that many migrant workers face high work-related health risks and some of them suffer from severe occupational injuries and diseases. A survey of six cities in the Pearl River Delta in Guangdong province (also the geographical focus of this paper) in 1994 suggested that one-third of migrant workers believed that their health was adversely affected by working in noisy, dusty and poisonous working environments (Tan 2004). In Guangdong province, every year a significant number of migrant workers, who are not properly trained in operating machines, lose their fingers, hands or arms, and, thus, become physically disabled (Chan 2001, Lam 2000). Many suffer chronic diseases due to exposure to hazardous dusts and toxic chemicals. A large number of benzene poisoning and pneumoconiosis cases have been reported in the construction, mining and manufacturing sectors, in which migrants are concentrated, and a majority of these affected workers are no longer able to work (Xiang 2004). Every year approximately 10,000 workers die in mining accidents, many of whom are migrants, accounting for 60 per cent of the fatalities in the global mining sector (State Statistical Bureau 2004, Nielsen et al. 2005).

A number of studies on the compensating wage for occupational risk exist for developed economies (Viscusi and Aldy 2003). There is, however, little research for developing countries and, in particular, China. The only study, of which we are aware, for mainland China is Guo and Hammitt (2009) who estimate the economic value of mortality risk for urban residents with an urban *hukou*. These authors found a positive correlation between wages and occupational fatality risk, but acknowledge that a shortcoming of their study is

that they do not have data for migrant workers. Because migrant workers have fewer job alternatives than those with an urban household registration, they may be willing to accept less compensation for risk. This raises the following related questions. First, are migrant workers compensated for undertaking jobs which have significant occupational and health risks? Second, if so, to what extent, and in what form, are migrant workers in risky jobs compensated by monetary premiums or other benefits? Third, if so, is there any inequality in compensation for risk among migrant workers? This study aims to answer these questions by using compensating wage differentials to decompose the basic wage and total income differentials among migrant workers in risky and safe jobs.

The rest of the paper is structured as follows. The next section reviews the extant literature on the relationship between wage and occupational risk and existing critiques of the literature. Following this, we present the data, explain the econometric method and estimate the distributional risk premiums among migrant workers. The final section summarizes the main findings and offers some concluding comments.

2. Literature Review

Prior studies on occupational risks and employee compensation are mainly based on the theory of compensating wage differentials and the model of hedonic prices. The theory provides an analytical framework to answer the questions posed in the introduction through examining the labour market differentials derived from the interaction between workplace health and safety and workers' compensation. The theory assumes that wage premiums are paid to compensate employees working in undesirable conditions with higher health and safety risks than others (Rosen 1974). Compensating wage differentials act as individual rewards to workers who accept arduous or dangerous jobs. In other words, compensating wage differentials are the prices at which good working conditions are bought from, or bad working conditions are sold to, workers who take on less desirable jobs.

The theory explains the wage differentials between workers by considering non-wage components associated with different types of jobs. In a perfectly competitive labour market conceptualized by neoclassical economics, workers are compensated by wage premiums for undertaking undesirable working conditions with higher occupational risks, after controlling for factors affecting productivity and wages (Brown 1980).

Some studies have investigated the trade-off between occupational risks and personal economic returns, and estimated the value of statistical life in developed economies, such as the United States, the United Kingdom and Canada (Kniesner and Leeth 1991, Miller, Mulvey and Norris 1997, Marin and Psacharopoulos 1982). Earlier studies find a positive, and statistically significant, relationship between work-related (fatal or nonfatal) risks and wages (Thaler and Rosen 1976, Dorsey and Walzer 1983, Moore and Viscusi 1990). More

recent studies focusing on Asian economies, such as Hong Kong, South Korea and Taiwan, also confirm the existence of a similar positive relationship between risk and wages (Kim and Fishback 1999, Liu, Hammitt and Liu 1997, Siebert and Wei 1998).

According to some studies, however, the values of statistical life and injury have fallen significantly due to differences in the construction of the risk variable, sampling restrictions, and the failure to capture the effect of nonfatal risks (Viscusi 2004). Some studies have found that there is an insignificant, or even negative, relationship between occupational risk and wages (Moore and Viscusi 1988, Leigh 1991, Dorsey 1983). Other studies have examined how trade union membership affects the trade-off between occupational risk and wages. These studies have also generated conflicting results (Gegax, Shelby and Schulze 1991, Dorman and Hagstrom 1998, Meng and Smith 1990, Arabsheibani and Marin 2000).

Mixed empirical findings have led some to question the theoretical assumptions underpinning the theory of compensating wage differentials. The first assumption is that there is a perfectly competitive labour market, in which wages are determined by labour supply and demand and workers are mobile. In reality, however, workers—especially those with low human capital—may not have complete freedom to change jobs. For example, in periods of high unemployment workers will be less mobile even if their jobs are dangerous. Supporting this conjecture, one study found that there was no significant difference in labour turnover between risky and safe jobs in the United States during periods of economic recession (Robinson 1991). Moreover labour surplus during economic recession may even suppress the wage level, meaning that workers may be undercompensated, or not compensated at all, for engaging in risky jobs (Guo and Hammitt 2009).

Second, workers may not be able to obtain full information in relation to occupational risk. The original theory assumes that workers are fully informed about the nature of the job, or that they can find out about the hazards of a 'bad' job by word of mouth or soon after joining. If the hazard, however, is obscure and carries medium or long-term impacts on health, workers may not receive any wage compensation. In the absence of an effective mechanism which presses employers to fully reveal occupational health and safety information, employers have economic incentives to understate, or hide, such information, or even mislead employees in pursuit of profits (Hopkins 1995).

Third, people are not invariably rational decision-makers as assumed by the theory. They have a propensity to overestimate probability of positive events and underestimate the probability of negative, or low probability, events (Akerlof and Dickens 1982). Traumatic deaths from work-related causes are relatively rare. Hence, workers may believe that 'it cannot happen to me', meaning that cognitive dissonance results in the underestimation of work-related risks and a disinclination to seek safer alternative employment.

Three important methodological issues in studies of compensating wage differentials are

the appropriate construction of the risk variable, addressing endogeneity of occupational risk and addressing omitted variable bias. We begin with the appropriate construction of the risk variable. The ideal measure of fatal and non-fatal occupational risks should reflect the perceptions of both employees and employers (Viscusi and Aldy 2003). Nevertheless, only a few studies use workers' subjective assessments of job risks and little research is based on employers' perceptions of occupational risk (Hersch and Viscusi 1990, Gerking, de Haan and Schulze 1988). The most widely adopted alternative method is to use data on job-related accidents and mortality (such as that categorized by occupations or industries) or workers' compensation records as the proxy of occupational risk (Lanoie, Pedro and Latour 1995, Viscusi 2004, Viscusi and Aldy 2007). However, this method only provides an estimate of average risk and ignores heterogeneity in actual risk experienced by individual workers, resulting in potential bias (Purse 2004). To reduce this bias, some studies focus on specific groups, such as blue-collar workers (Siebert and Wei 1998), male workers (Berger and Gabriel 1991), and trade union members (Dillingham and Smith 1984).

The second issue is addressing endogeneity of occupational risk. In most studies, occupational risk is assumed to be exogenous. However, Viscusi (1980) argues that occupational risk may be correlated with workers' income through the wealth effect. In other words, workers with better human capital—and thus, higher earning potential—are more likely to choose jobs with lower risk, assuming that occupational safety is a normal good. To address the endogeneity problem, some studies have applied two-stage least squares or weighted least squares to estimate the compensating wage differentials. The estimated risk premiums with this approach are higher than those estimated using ordinary least squares in earlier studies (Garen 1988, Sandy and Elliott 1996).

The third issue is addressing omitted variables bias, arising from imperfect measures of workers' ability (Siebert and Wei 1998). The unobserved ability may bias results through two channels. First, workers with better ability are more likely to obtain higher earnings. Second, workers with better ability may have more active social communication and better social networks, which contribute to higher earnings. Garen (1988) (p. 9) argues that 'individuals may systematically differ in unobserved characteristics which affect their productivity and earnings in dangerous jobs and so these unobservables will affect their choice of job risk'. These unobserved characteristics, such as having a 'smart head and nimble hands' at work, could enhance workers' productivity and reduce risk incurred in dangerous jobs. Some studies attempt to minimize this bias by using the education of the worker's parent as a proxy for unobserved ability, based on the assumption that the children of better educated parents have relatively more ability (Rubinstein and Tsiddon 2004).

While critiques questioning the theoretical assumptions underpinning the theory of compensating wage differentials are well taken, one of the benefits of studying migrant workers in urban China is that the vast majority of them are concentrated in the informal

and private sectors which generally have many of the characteristics of a competitive labour market (Meng 2001). This provides a relatively good setting in which to examine the compensating wage differentials within the framework of neoclassical economics.

In this study we address the above methodological issues as follows. First, to measure the risk variable we use employees' perception of risk. This measure has the limitation that it does not measure hidden long-term risk, which is also a limitation of previous studies. However, it is a better measure of risk than official industry data on industry fatalities, especially given the well-known problems of reliability of such official data in China. Our measure of risk means that the analysis is based on current risks perceived by workers. While we do not have data on employers' perception of risk, it is reasonable to conclude that employers must know these risks as well. Second, the standard Heckman (1979) selectivity correction is used to control for the wealth effect and unobserved heterogeneity related to the selection of risky jobs. Third, dummy variables for cities are included to control for disparities in unemployment rates and socio-economic development across cities. Fourth, the education of the worker's father is used as a proxy to mitigate omitted variable bias due to unobserved individual ability. Finally, industry and occupation dummies allow the models to capture inter-industry and inter-occupation wage differentials.

3. Data and descriptive analysis

The data used in this study was collected in 2008 by the School of Sociology and Anthropology at Sun Yat-sen University, Guangzhou, China as part of a research project entitled Rural Migrant Workers in Cities of the Pearl River Delta. The data collection followed a proportional sampling framework that distributed the sample across nine cities, according to the actual gender, industrial and regional distributions of migrant workers obtained from the results of provincial population census' conducted by the Chinese Government. In order to maintain representativeness, no more than three responses were selected from each enterprise. Altogether, 2,505 valid responses were received which contained information related to occupational risk; of which, 1,832 workers (73.1 per cent) were engaged in safe jobs, while 673 workers (26.9 per cent) were engaged in risky jobs in poisonous and harmful work environments. The distribution of valid responses across cities is presented in Table 1. The other information collected in the survey pertained to earnings, employment status, employee benefits, and personal and family characteristics.

[Table 1 here]

We distinguish between the hourly wage and hourly income of the migrant worker. The hourly wage is the basic hourly wage. The hourly income includes overtime allowance, bonus and any other job-related income in addition to the hourly basic wage. Table 2 presents descriptive statistics on workers' wages and income, as well as other

characteristics, according to whether the individual works in a risky or safe job. The average hourly wage and hourly income for workers in risky jobs were 4.75 and 6.77 RMB respectively, which were lower than the corresponding amounts for workers in safe jobs.

This study categorizes wages (or income) into three levels according to the quantiles to which they belong. Low-wage refers to wages below the 0.3 quantile, medium-wage refers to wages between the 0.3 and 0.7 quantiles and high-wage refers to wages above the 0.7 quantile. Figure 1 graphically presents the distributional statistics, including the density and cumulative density functions of wages and income, among those in risky and safe jobs. The density function shows that, at the low-wage level, there is a higher proportion of workers in risky jobs than in safe jobs, but, at the high wage level, there are a lower proportion of workers in risky jobs than in safe jobs. The cumulative density function shows that wages in safe jobs are higher than in risky jobs at different wage levels. However, the wage differentials do not exhibit any clear patterns with the increment of quantiles. For income, the density and cumulative density functions of those in risky and safe jobs superpose each other. Only at the high-income level is the proportion of workers in safe jobs larger than that in risky jobs and the income of the former slightly higher than the latter. The results from a Wilcoxon rank-sum test, also reported in Table 2, suggest that a significant difference exists in the wage distribution among workers in risky and safe jobs; however, there is no significant difference in the distribution of income.

[Table 2 here]

[Figure 1 here]

4. Econometric method

The above descriptive statistics suggest that workers in risky jobs are not treated equally with their peers in safe jobs in terms of wages and income. Based on human capital theory, wage differentials between the two groups are assumed to be closely associated with heterogeneity in productivity-related characteristics (Schultz 1961). In Table 2, the descriptive statistics, and t-test results, for personal characteristics and employment status of migrant workers in risky and safe jobs show that, at the 95 per cent confidence level, there are significant differences in gender, age, education, job mobility, overtime work, labour contract, occupational and industrial attainment, and size of the enterprise. However, it is still unclear to what extent productivity differences versus risk premiums contribute to the distributional differentials in wages and income. To disentangle these components, we employ the re-centred influence function (RIF) regression and decomposition approaches.

The Oaxaca-Blinder decomposition method (Oaxaca 1973), which has been widely used to quantify the contributions of differences in productivity-related characteristics and

discrimination to wage differentials, can be applied to examine the compensating wage differentials. More recently, a novel two-stage decomposition technique, which is a generalisation of the Oaxaca-Blinder decomposition method was developed by Firpo, Fortin and Lemieux (2007) (hereafter, referred to as FFL decomposition) to untangle the *sources* of wage distribution differentials. The FFL decomposition method extends the Oaxaca-Blinder decomposition to any distributional statistics of interest and allows for a more flexible wage setting model than the Oaxaca-Blinder method.

The hedonic wage (or income) equation is expressed in the standard semi-logarithmic form:

$$\ln W_{i\theta} = a_\theta + \beta_{1\theta} X_{i\theta} + \beta_{2\theta} \lambda_{i\theta} + \mu_{i\theta} \qquad (1)$$

where subscripts i and θ represent the ith worker and θth quantile respectively (the same definitions apply to all other equations); $\ln W$ is the natural logarithm of the wage (or income); X is a vector of personal and employment characteristics (as defined in Table 2); λ is the inverse Mills ratio; β is a vector of coefficients; and μ is the error term.

The probit-type risk-selection function can be expressed as follows:

$$R^*_{i\theta} = a_\theta + \beta_{1\theta} X_{i\theta} + \beta_{2\theta} F_{i\theta} + \beta_{3\theta} N_{i\theta} + \varepsilon_{i\theta} \qquad (2)$$

and

$$R_{i\theta} = 0 \Rightarrow R^*_{i\theta} < 0$$

$$R_{i\theta} = 1 \Rightarrow R^*_{i\theta} \geq 0$$

where R^* is an unobserved or latent continuous variable; R is a dummy variable for choosing a risky job; X is a vector of personal characteristics and employment status. Besides other factors influencing wages, the decision whether or not to choose a risky job depends on non-wage income (N) and factors affecting the degree of risk aversion (F) (Garen 1988). The degree of risk aversion in this study is determined by multiple factors including whether or not the individual has a child, family size, the number of family members at university, and non-wage income from medical and industrial injury insurance. It is assumed that the first three factors are negatively related to the degree of risk aversion, while non-wage income is positively related to the degree of risk aversion. Family income is included to represent income, independent of the respondent's occupational risk.

The probit estimates generate the predicted value of the inverse Mills ratio (λ):

$$\lambda_{i\theta} = \frac{\phi(R^*_{i\theta})}{1 - \Phi(R^*_{i\theta})} \qquad (3)$$

where $\phi(.)$ and $\Phi(.)$ are the density and cumulative density functions of the standard normal distribution respectively. To estimate the risk premium, the FFL decomposition method, which can be expressed as follows, is employed:

$$\Delta_\theta \ln W_{rs} = Q_\theta(\ln W_r) - Q_\theta(\ln W_s) = \left[Q_\theta(\ln W_r) - Q_\theta(\ln W_{r-s})\right] + \left[Q_\theta(\ln W_{r-s}) - Q_\theta(\ln W_s)\right] \quad (4)$$

where $\Delta_\theta \ln W_{rs}$ represents wage (or income) differentials between workers in risky jobs *r* and safe jobs *s* at the θth quantile and $Q_\theta(\ln W_{i-j})$ is the counterfactual wage/income distribution; that is, the conditional wage distribution of workers in safe jobs if they have the same marginal return on various skills as those in risky jobs. The first term on the right-hand side is the explainable component of the wage (or income) gap attributable to the group difference in productivity characteristics, and the second term is the unexplainable component of the wage (or income) gap attributable to the group difference in the returns to productivity characteristics. The unexplainable component of the wage (or income) gap is attributed to the compensating wage differentials or risk premium.

Similar to other decomposition methods, a methodological issue with FFL decomposition relates to the path-dependence problem (see examples in Bourguignon and Ferreira 2005, Démurger et al. 2009, Meng and Zhang 2001). The risk premium in Equation (4) can be estimated based on the pattern of wage (or income) determination for workers in risky jobs. It can also be calculated based on the pattern of wage (or income) determination for workers in safe jobs. Results based on the two patterns will be different and will be sensitive to the chosen path of estimation. To ensure the robustness of the results, we report the means for both sets of decomposition results based on the different patterns.

5. Empirical results

Determinants of job choice

Table 3 presents the maximum likelihood estimation results of the probit model (Equation 2). The results suggest that male workers and workers with lower human capital are more likely to engage in risky jobs. This is consistent with most previous research that suggests females are more risk averse than males and that the better educated are more risk averse than their less well-educated counterparts (see review in Halek and Eisenhauer, 2001). Table 3 also suggests that married workers are more likely to choose risky jobs. Previous research on the relationship between marital status and job riskiness has yielded conflicting results. Our findings are consistent with those reported in Garen (1988). They are consistent with the hypothesis, set forth by Rees and Shah (1986), that those who are married are more likely to take risks because they can rely on their spouse's income and/or other forms of family support in the event of being injured at work.

Migrants with urban *hukou* are more likely to engage in risky jobs. Many migrants with urban *hukou* changed their hukou from rural to urban status after losing their land and

livelihood following urban expansion. This has forced them to enter the urban labour market. However, some of them have poorer human capital than migrants with rural *hukou* who may have better access to government-sponsored occupational training.

Migrants with higher job mobility are also more likely to engage in risky jobs. Many migrants with higher job mobility lack continuously accumulated work experience and thus they are usually perceived to be unstable and less favoured by employers who offer safe jobs. Those working overtime and having meals/accommodation provided by employers are less likely to work in risky jobs. This is consistent with the assumption that job safety is a normal good. Migrant workers in the manufacturing and construction industries are more likely to work in risky jobs, which reflects the nature of the work in these industries.

Among the proxies for the degree of risk aversion, only having children and the number of university students in the family were significant with the expected signs. The inverse Mills ratio was computed from the estimated coefficients on the probit model based on Equation (3), and incorporated into the wage/income regressions, in order to control for the wealth effect and unobserved heterogeneity related to the selection of risky jobs.

[Table 3 here]

Determinants of wage and income

We present estimates for the hedonic wage/income equations for workers engaged in risky and safe jobs. Tables 4 and 5 show the results from the RIF regressions of the wages and income of rural-urban migrants, working in risky jobs (Panel A) and safe jobs (Panel B). In the wage and income equations, the estimated coefficients of λ are significant at the medium-income level in risky jobs and in the total distribution in safe jobs. This implies that a selection bias exists in choosing risky jobs. Father's education has a positive and significant effect on workers' income only at the medium-income level in safe jobs. At most quantiles of wages and income for workers in both risky and safe jobs, female workers earn less than male workers. This result suggests that discrimination against female migrant workers is widespread and substantial. Generally, the degree of gender discrimination increases gradually as the quantile of wages or income increases.

[Tables 4 and 5 here]

The positive and significant coefficients for age and negative and significant coefficients for age squared at most quantiles show that wages or income increases at first and then decreases as age increases, demonstrating an inverted U-shaped trend. The inverted U-shaped trend is more significant among workers in risky jobs than among workers in safe jobs. This could be due to the fact that risky jobs, which are usually labour intensive and

low-skilled, have strict requirements in terms of workers' health and physical strength. Younger workers prefer to be employed in these jobs because of the higher return to age.

Several studies suggest that the return to education has increased in urban China (see eg. Zhang et al. 2005). The results from this study suggest that educational attainment only has a significant effect on wages in safe jobs at, and above, the 0.5 quantile, or income in safe jobs at, and above, the 0.4 quantile. An additional year of education contributes to 1.42 to 6.15 per cent higher wages or income. Having an occupational certificate has a significant effect on wages for workers in safe jobs at the high-wage level and incomes for workers in risky jobs at the medium-income level. At the high-income level, occupational training has a greater effect on the income of workers in risky jobs than those in safe jobs. To summarize, there are increasing returns to higher education at higher income levels.

Marriage has a significant negative effect on the wages and income of migrant workers in both types of jobs at several income levels. This is different from some previous research (Korenman and Neumark 1991). One potential explanation is that unmarried migrant workers could spend more time, and put in more effort, to improve their productivity through training, while married workers are more likely to be constrained by family duties.

Hukou status had a significant negative effect on income and wages at most levels among workers in safe jobs. This suggests that the *hukou* system, as a legacy of the planned economy, still contributes to segmentation in the urban labour market (Meng and Zhang 2001). The segmentation of the urban labour market has resulted in discrimination in earnings against rural-urban migrant workers when compared with their urban-urban counterparts. In this study, rural migrants earn less than urban migrants, possibly because the former face a higher degree of discrimination arising from dual segregation (that is, between locals and non-locals, and between holders of urban *hukou* and rural *hukou*) in the urban labour market, while urban migrants only face discrimination arising from the segregation between locals and non-locals (Zhang 2007). The degree of discrimination against rural migrant workers increases as the quantile of wages and income increases.

In China, trade unions have traditionally played a subordinate role in resolving labour disputes, and have typically acted as a mediator between employer and employee rather than as a representative of labour. One study argues that the All-China Federation of Trade Unions—the only legal trade union in China—has been ineffective in representing the grievances of migrant workers in foreign-owned enterprises, especially in Guangdong province (Zhu, Warner and Feng 2011). Our results show that, only at the low-wage level, does trade union membership have a significant effect on wages for workers in risky jobs. Being a union member reduces wages by 20.78 to 29.56 per cent. This implies that the function of the official trade union is indeed impaired due to its limited coverage and administrative power and that it acts as a mediator rather than as a representative for

labour. A further factor is that the ability of the All-China Federation of Trade Unions to represent migrants is likely to be hampered by the high mobility of migrant workers.

In 2008, the Labour Contract Law, which was designed to formalize the labour relationship, was introduced in China. The results show that the degree of familiarity with the Labour Contract Law has a positive and significant effect on wages and income of workers in risky and safe jobs at most quantiles. The increase in wages and income with the degree of familiarity with the Law is higher for workers in risky jobs than those in safe jobs. However, the effect does not show a consistent trend with the increment of quantile.

Work experience has a positive and significant effect on income for workers in risky jobs at the high-income level only. One additional month of work experience contributes to 0.23 to 0.49 per cent higher income. Job mobility has a negative and significant effect on wages of workers in risky jobs at the medium-wage level, but a positive effect on wages and income of workers in safe jobs at the high-income level. There are competing theories on the mechanism through which workers acquire economic status in the labour market. Human capital theory suggests that job mobility would interrupt the accumulation of work experience, and, in turn, reduce wages (Mincer 1974). In contrast, vacancy competition theory posits that the major method to improve one's labour market outcomes is to access well-paid occupations, meaning that job mobility may result in higher returns (Sørensen 1977). The results for wages for workers in risky jobs is consistent with the first theory, while wages and income for workers in safe jobs is consistent with the second theory.

Migration duration had a significant effect on the wages and income of workers in safe jobs at the medium-income level. One additional month of migration contributed to 0.07 to 0.1 per cent higher wages and 0.06 to 0.12 per cent higher income. Working overtime significantly increased wages for workers in risky jobs by 18.03 to 37.95 per cent, and that for workers in safe jobs by 8.95 to 14.97 per cent. The effect of working overtime on wages/income exhibits an inverted U-shape with the increment of quantile.

The existence of a labour contract has a significant effect on income for workers in safe jobs at most quantiles. However, the effect is negative on wages for workers in risky jobs at the medium-wage level. This may be due to employers' attempts to circumvent the Labour Contract Law, which requires a written labour contract to be signed within one month of recruitment. For instance, some employers have circumvented the Contract Law by increasing dormitory and meal fees as well as imposing higher penalties for breaching rules or making mistakes at work (Wang et al. 2009). As a result, workers' actual wages decline. At most quantiles, provision of meals and/or accommodation has a significant negative effect on wages for workers in safe jobs and income for workers in both risky and safe jobs. This indicates that employers provide workers with these benefits at the cost of lower wages or income. This effect is higher for workers in safe jobs than for those in risky jobs.

Occupational attainment has a significant effect on wages of workers in safe jobs and income of workers in risky and safe jobs at all quantiles. Compared with white collar workers, blue collar workers earned 19 to 49 per cent less wages and 12 to 66 per cent less income in safe jobs and 10 to 48 per cent less income in risky jobs. With the increment of quantile, the returns to occupational attainment show an upward trend, which increases the inequality within the group. Industry type has a significant effect on wages and income of workers in risky and safe jobs at all quantiles. In general, workers employed in business and service industries receive the lowest wages and income. The effect of the industry in which the person works on wages of workers in safe jobs is stronger than for those in risky jobs, while the effect on income of workers in safe jobs is lower than those in risky jobs.

The type of employer has a significant effect on wages for workers in risky jobs at the low wage level, indicating that workers working for private enterprises and individual entrepreneurs earn 37 to 45 per cent and 27 to 47 per cent higher wages than those working for state-owned and collective-owned enterprises. The size of the enterprise has a significant effect on income for workers in risky and safe jobs at several quantiles. For risky jobs, workers employed in small enterprises earn the lowest income; for safe jobs, however, no clear conclusions emerge due to the conflicting signs on the coefficients.

The city dummies have a significant effect on wages in risky and safe jobs below the medium-wage level and income in safe jobs over the total distribution. Workers engaging in risky jobs earn 7 to 15 per cent higher wages in more developed cities, while those engaging in safe jobs only earn 3 to 8 per cent higher wages, which is much lower than their counterparts in risky jobs. The city effect on wages exhibits a downward trend with the increment in the income level, while the opposite is true for the effect on income.

The results of F-tests suggest that there are significant differences in the determinants of hourly wages/income in risky and safe jobs at most quantiles.[1] The structural difference in returns to productivity characteristics between workers in risky and safe jobs indicate that they are treated differently in the urban labour market. As discussed above, the different treatment may be the outcome of wage premiums compensated for undertaking undesirable working conditions. Therefore, the next section reports the results from the FFL decomposition and evaluates the degree of compensating wage differentials.

Decomposition of wage and income differentials

Table 6 present the FFL decomposition results for wage and income differentials between risky and safe jobs. The results show that workers in safe jobs, rather than those in risky jobs, are compensated by wage premiums ranging from 0.0321 to 0.8109 between the 0.1 and 0.7 quantiles, accounting for 1.82 and to 58.82 per cent of workers' wage in safe jobs.

1 The results of these F-tests are available upon request from the authors.

The negative wage premiums, or negative compensating differentials, show an inverted U-shape with the increment in the wage level, reaching the maximum and minimum at the 0.4 and 0.7 quantiles respectively. A possible reason for this result is that workers engaged in low-wage jobs are usually new entrants to the urban labour market and/or have lower human capital. As such they might have low bargaining power to claim the wage premiums for undertaking risky jobs and/or are unable to obtain full information in relation to occupational risk. Thus, impeded by low human capital, these migrants may have no choice but to work in hazardous positions even if they knew the information on occupational risk and understand their rights. In contrast, workers at the higher quantiles are compensated for job riskiness by wage premiums of 0.2918 and 0.8108 at the 0.8 and 0.9 quantiles respectively, accounting for 14.71 and 35.97 per cent of their wage in safe jobs.

[Table 6 here]

The decomposition of income differentials shows that workers in risky jobs suffer discrimination in the form of negative income premiums at low-income levels, which is consistent with the results for the decomposition of wage differentials. The negative income premiums reach 0.0995 at the 0.1 quantile and 0.3665 at the 0.3 quantile, accounting for 8.00 and 23.91 per cent of the workers' income in safe jobs respectively. In contrast, workers above the low-income level receive positive income premiums ranging from 0.3775 to 1.0873, accounting for 15.13 to 59.41 per cent of their income in safe jobs. The income premium shows an inverted U-shape with the increment of quantile, reaching the maximum and the minimum at the 0.6 and 0.9 quantiles respectively.

The above results imply that workers in risky jobs could receive compensating wage differentials in the forms of overtime wages, bonuses and other income. As suggested by some studies, workers in risky jobs may also be compensated by other means, such as fringe benefits (Matthew, Robert and Joanne 2009). In the present study, we examine the differences in industrial injury insurance, medical insurance and the reimbursement for medical expenses in the total wage and income distributions. The t-test results, which are reported in Table 7, suggest that workers at the medium-wage/income level are further compensated by employee benefits, while those at the high-income level are further compensated by medical reimbursement. However, at the high-wage level, workers in safe jobs, rather than those in risky jobs, are further compensated by medical insurance since those in safe jobs have a higher insurance participation rate than those in risky jobs.

[Table 7 here]

6. Conclusion

While China's urban labour market has undergone considerable reform in the last three decades, particularly since the 1990s, the *hukou* system continues to play an important role in determining migrants' access to urban employment. Migrant workers are most likely to end up in the bottom rungs of the occupational structure and engage in the dirty and dangerous jobs. The compensating wage differentials theory posits that workers in a competitive labour market receive compensation for working in a hazardous environment. However, the compensating wage differentials for migrant workers undertaking risky jobs in China have not, to this point, been studied. The descriptive statistics suggest that, on average, migrant workers in risky jobs in the Pearl River Delta earn lower wages and income than those in safe jobs. A significant wage distribution difference exists between workers in risky and safe jobs, while the difference in income distribution is not significant.

In the regression analysis, we employed standard Heckman selectivity correction and incorporate additional variables to address the problem of endogeneity. The decomposition results show that below the high-wage level, workers in safe jobs are compensated by wage premiums while those in risky jobs are not. Comparatively, workers at the high-wage level are compensated for undertaking risky jobs, and the wage premiums account for between 14.71 and 35.97 per cent of workers' wages in safe jobs. The decomposition of income differentials show that workers in risky jobs incur an income penalty at the low-income level. In contrast, workers above the low income level receive an income premium, accounting for 15.13 to 59.41 per cent of workers' income in safe jobs. Both the income penalty and income premium exhibit an inverted U-shape with the increment of quantile. The results indicate that workers in risky jobs are largely compensated in the forms of overtime wages, bonuses and other income. In addition, workers at the medium wage/income level are further compensated by employee benefits, while those at the high income level are further compensated by medical reimbursement.

The reforms in China's urban labour market and in the *hukou* system since the 1990s have accelerated socio-economic development and improved the working conditions of migrants in some respects. Nonetheless the present study indicates that the urban labour market is still relatively informal and that migrant workers working in low-tier, risky jobs still suffer discrimination in the cities. Their disadvantaged socio-economic status, coupled with a developing labour market, means that only a small proportion of migrant workers are compensated by wage or income premiums or by other forms of benefits for undertaking potentially hazardous jobs. This result suggests that there is a need to further reform the urban labour market and to establish effective and fair compensation arrangements for migrant workers, especially for those at low-wage/income levels.

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Table 1 Sample distribution

City	Safe jobs		Risky jobs		Total	
	Frequencies	Percentage	Frequencies	Percentage	Frequencies	Percentage
Guangzhou	296	16.16	126	18.72	422	16.85
Shenzhen	433	23.64	176	26.15	609	24.31
Zhuhai	116	6.33	38	5.65	154	6.15
Foshan	191	10.43	52	7.73	243	9.70
Zhaoqing	97	5.29	23	3.42	120	4.79
Dongguan	404	22.05	122	18.13	526	21.00
Huizhou	92	5.02	47	6.98	139	5.55
Zhongshan	111	6.06	40	5.94	151	6.03
Jiangmen	92	5.02	49	7.28	141	5.63
Total	1,832(73.13%)	100	673 (26.87%)	100	2,505	100

Table 2 Summery statistics

Variable	Definition	Risky jobs	Safe jobs	T-test
Hourly wage	RMB	4.7524 (3.3478)	5.2769 (3.7401)	z=4.0560 P=0.0000
Hourly income	including hourly wage, overtime wage, bonuses and other income; RMB	6.7675 (3.9944)	7.0790 (4.8344)	z=0.6710 P=0.5022
Father's education	Illiterate=0; Primary=6; Junior high school=9; Senior high school=12; College or above=16; Years	7.9877 (3.3359)	7.9790 (3.2683)	t=-0.0573 p=0.9543
Gender	Male/female (Reference: Male)	0.3730 (0.4840)	0.4520 (0.4978)	t=3.5472 p=0.0004
Age	Years	27.1679 (8.1631)	27.9710 (9.1723)	t=1.9989 p=0.0457
Education	The same as father's education	9.8452 (2.4121)	10.0956 (2.7361)	t=2.0924 p=0.0365
Marital status	Married/unmarried (Reference: Married)	0.5646 (0.4962)	0.5508 (0.4976)	t=-0.6190 p=0.5360
Hukou	Rural/urban (Reference: Rural)	0.1582 (0.3652)	0.1644 (0.3707)	t=0.3702 p=0.7113
Occupational certificate	No/Yes (Reference: Yes)	0.7649 (0.4244)	0.7424 (0.4374)	t=-1.1453 p=0.2522
Training	No/Yes (Reference: Yes)	0.7355 (0.4414)	0.7073 (0.4551)	t=-1.3845 p=0.1663
Labour law	Not at all familiar=1; Unfamiliar=2; Moderately familiar=3; Relatively familiar=4; Extremely familiar=5	2.5067 (0.8301)	2.4596 (0.8912)	t=-1.1935 p=0.2328
Trade union	No/Yes (Reference: No)	0.0656 (0.2477)	0.0689 (0.2533)	t=0.2918 p=0.7705
Job change	Number of job changes	3.0046 (3.6910)	2.5561 (3.1602)	t=-2.9632 p=0.0031
Overtime	No/Yes (Reference: No)	0.2098 (0.4075)	0.3519 (0.4777)	t=6.8496 p=0.0000
Experience	Tenure at present job; Months	31.9134 (40.8342)	32.0361 (39.8533)	t=0.0677 p=0.9460
Contract	No/Yes (Reference: No)	0.6508 (0.4771)	0.5800 (0.4937)	t=-3.2103 p=0.0013
Migration time	Migration duration; months	79.2414 (66.6506)	77.1043 (68.3642)	t=-0.6949 p=0.4872
Meal and accommodation	The employer provides neither meal nor housing=0; either meal or housing=1; both meal and housing=2	1.2679 (0.7891)	1.2699 (0.8143)	t=0.0573 p=0.9543
Medical insurance	No/Yes (Reference: No)	0.4449 (0.4973)	0.4402 (0.4965)	t=-0.2117 p=0.8323
Injury insurance	No/Yes (Reference: No)	0.5320 (0.4993)	0.4992 (0.5001)	t=-1.4566 p=0.1454

Variable	Definition	Risky jobs	Safe jobs	T-test
Job1	Administrative staff	0.0596	0.0630	
		(0.2369)	(0.2431)	
Job2	Professionals and technicians	0.1729	0.1179	
		(0.3784)	(0.3225)	t=2.7404
Job3	Manual workers	0.7303	0.7516	p=0.0062
		(0.4442)	(0.4322)	
Job4	Clerks	0.0373	0.0674	
		(0.1895)	(0.2508)	
Ind1	Manufacturing	0.8239	0.6438	
		(0.3812)	(0.4790)	
Ind2	Construction	0.0522	0.0460	
		(0.2227)	(0.2096)	
Ind3	Business and service	0.1045	0.2789	t=8.9351
		(0.3061)	(0.4486)	p=0.0000
Ind4	Agriculture	0.0164	0.0290	
		(0.1272)	(0.1680)	
Ind5	Others	0.0030	0.0022	
		(0.0546)	(0.0468)	
Com1	State-owned and collective enterprise	0.0586	0.0651	
		(0.2351)	(0.2468)	
Com2	Private enterprise	0.4481	0.4581	
		(0.4977)	(0.4984)	t=0.5882
Com3	Individual entrepreneur (*getihu*)	0.3609	0.3052	p=0.5565
		(0.4806)	(0.4606)	
Com4	Others	0.1053	0.1369	
		(0.3071)	(0.3438)	
Scale1	Small enterprises (less than 100 employees)	0.2840	0.3881	
		(0.4513)	(0.4875)	
Scale2	Medium-sized enterprises (100-1000 employees)	0.4275	0.3715	t=-4.3310
		(0.4951)	(0.4833)	p=0.0000
Scale3	Large enterprises (more than 1000 employees)	0.2885	0.2404	
		(0.4534)	(0.4275)	
City	2=Guangzhou, Shenzhen; 1=Zhouhai, Dongguan, Foshan; 0=Zhaoqing, Huizhou, Jiangmen, Zhongshan	1.2125	1.1840	t=-0.8205
		(0.8005)	(0.7605)	p=0.4120
Children	No/Yes (Reference: No)	0.3655	0.3996	t=1.5479
		(0.4819)	(0.4899)	p=0.1218
Family income	The income of whole family, RMB	33805.8900	34714.7400	t=0.6381
		(29006.5400)	(30295.3600)	p=0.5235
Family	The size of the family, persons	4.3138	4.2343	t=-0.9765
		(1.8153)	(1.7907)	p=0.3289
Uniperson	The number of family members at university, persons	0.1850	0.2406	t=2.9405
		(0.3886)	(0.4276)	p=0.0033

Note: Wilcoxon test is used to test for the difference in distributional wages/income.

Table 3 Probit estimates of working in risky jobs

	Coefficients	Standard error
Father's education	0.0048	0.0109
Gender (Reference: Male)	-0.1975***	0.0722
Age	0.0103	0.0310
Age^2	-0.0002	0.0004
Education	-0.0427***	0.0156
Marital status (Reference: Married)	-0.2878**	0.1449
Hukou (Reference: Rural)	0.2125**	0.0925
Certificate (Reference: Yes)	0.0118	0.0816
Training (Reference: Yes)	0.0503	0.0741
Labour law	0.0475	0.0391
Union (Reference: No)	-0.1167	0.1305
Job change	0.0193*	0.0105
Overtime (Reference: No)	-0.2565***	0.0760
Experience	0.0001	0.0010
Contract (Reference: No)	0.1238	0.0813
Migration time	-0.0003	0.0008
Meal and accommodation	-0.0684*	0.0401
Occupation (Reference: Job1)		
Job2	0.1070	0.1481
Job3	-0.0713	0.1339
Job4	-0.1509	0.1881
Industry (Reference: Ind3)		
Ind1	0.5599***	0.0943
Ind2	0.7327***	0.1692
Ind4	0.3543	0.2281
Ind5	0.2815	0.6659
Employer (Reference: Com1)		
Com2	0.0025	0.1245
Com3	0.0626	0.1246
Com4	-0.0452	0.1516
Scale of enterprises (Reference: Scale2)		
Scale1	-0.1287	0.0825
Scale3	0.0170	0.0836
City	-0.0183	0.0426
Children (Reference: No)	-0.3949***	0.1351
Family	0.0233	0.0186
Uniperson	-0.1532*	0.0810
Medical insurance (Reference: No)	-0.1119	0.0791
Injury insurance (Reference: No)	0.0158	0.0755
Family income	0.0000	0.0000
Constant	-0.4446	0.6029

Observations	1976
Log likelihood	-1073.9109

Note: * P < 0.1, ** P < 0.05, *** P<0.01. For full definition of each variable see Table 2.

Table 4 The estimated hedonic wage equations of workers in risky and safe jobs

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Panel A: Risky jobs									
Father's education	-0.0015	0.0021	0.0047	0.0123	0.0029	0.0038	0.0007	-0.0154	0.0039
Gender (Reference: Male)	0.0549	-0.1102	-0.0194	-0.0554	-0.0535	-0.1815**	-0.2110***	-0.2895**	-0.2141*
Age	0.0018	0.0111	0.0347	0.0586**	0.0557**	0.0546**	0.0529*	0.1025**	0.0483
Age^2	-0.0001	-0.0002	-0.0004	-0.0008**	-0.0008**	-0.0008**	-0.0008**	-0.0014**	-0.0007
Education	0.0197	0.0112	0.0154	0.0358**	0.0244	0.0254	0.0287	0.0566*	0.0062
Marital status (Reference: Married)	0.0116	0.0387	0.0650	0.0232	0.0718	0.0812	0.1594	0.3281**	0.1587
Hukou (Reference: Rural)	-0.1460	-0.1221	-0.1276	-0.0961	-0.0692	0.0195	0.0583	0.1013	0.0778
Certificate (Reference: Yes)	-0.0596	-0.0710	-0.0883	0.0076	-0.0522	-0.0521	-0.1255	-0.1553	-0.0917
Training (Reference: Yes)	-0.0934	-0.0982	-0.0610	-0.0495	-0.0727	-0.0499	0.0223	0.0945	0.0194
Labour law	0.0479	0.0396	0.0596*	0.0557*	0.0533	0.0859**	0.1274***	0.1896***	0.1257*
Union (Reference: No)	0.0225	0.1888**	0.2590***	0.0747	-0.0700	-0.0287	0.0132	0.0615	0.3336
Job change	-0.0034	-0.0131	-0.0153	-0.0162*	-0.0170*	-0.0101	-0.0069	-0.0219	-0.0100
Overtime (Reference: No)	0.1658**	0.2013**	0.2836***	0.3217***	0.2803***	0.2360**	0.1923*	0.2042	0.1426
Experience	0.0012	-0.0001	-0.0009	-0.0006	0.0005	-0.0001	0.0009	0.0025	0.0024
Contract (Reference: No)	-0.0039	-0.0839	-0.1227*	-0.1463**	-0.1541**	-0.0975	-0.1040	-0.1513	-0.0871
Migration time	0.0010	0.0012*	0.0009	0.0005	0.0004	0.0008	0.0013*	0.0017	0.0015
Meal and accommodation	0.0156	-0.0180	0.0215	0.0288	0.0217	-0.0276	-0.0113	-0.0254	-0.0592
Occupation (Reference: Job1)									
Job2	0.0840	-0.0047	-0.1229	-0.1264	-0.0209	0.0157	0.0457	0.1036	-0.1116
Job3	0.0725	-0.0162	-0.1046	-0.1229	-0.1155	-0.1767	-0.2249	-0.3077	-0.5361**
Job4	0.1548	0.1063	0.0385	0.0062	0.0678	0.1511	0.1525	0.4258	-0.1777
Industry (Reference: Ind3)									
Ind1	-0.1706	-0.2477	-0.3528**	-0.3002**	-0.2752*	-0.1337	-0.0026	-0.0114	0.2419
Ind2	0.0268	-0.0990	-0.1266	-0.0326	0.1194	0.4463**	0.9041***	1.1779***	1.0527**
Ind4	0.3584**	0.2772*	-0.2398	-0.1722	-0.2249	-0.1147	-0.1428	-0.4241	-0.1125
Ind5	0.5261**	0.5118***	0.4964***	0.3720**	0.4690***	0.6595***	1.1237***	-0.5411*	-0.2512
Employer (Reference: Com1)									
Com2	0.3704**	0.3183**	0.1646	0.0066	0.1127	0.0678	0.1341	0.4017**	0.1075

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Com3	0.3827**	0.3796***	0.2417**	0.1144	0.1309	0.0466	0.0406	0.1927	0.0781
Com4	0.4706***	0.3425**	0.2394*	0.0006	0.1270	-0.0373	0.1593	0.4204*	0.2330
Scale of enterprises (Reference: Scale2)									
Scale1	-0.0343	0.0373	0.0605	0.1149	0.1679**	0.1051	0.0670	0.0205	-0.0134
Scale3	0.0370	-0.0429	0.0190	-0.0053	0.0440	0.0305	0.0830	0.1345	0.0727
City	0.1437***	0.1035***	0.0889**	0.0712**	0.0732**	0.0128	-0.0439	-0.0243	-0.0035
Lambda	-0.1563	-0.1415	-0.3089	-0.4965*	-0.4702*	-0.2239	-0.0807	0.1478	0.4552
Constant	0.2619	0.6923	0.7260	0.5697	0.8154	0.6717	0.3156	-1.1590	0.5032
Observations	488	488	488	488	488	488	488	488	488
R^2	0.1021	0.1265	0.1495	0.1729	0.1854	0.2472	0.3237	0.3110	0.2094
Panel B: Safe jobs									
Father education	0.0038	0.0076	0.0022	0.0026	0.0042	0.0071	0.0040	-0.0122	-0.0102
Gender (Reference: Male)	-0.0644	-0.1388***	-0.1552***	-0.1639***	-0.1716***	-0.1786***	-0.2228***	-0.2104***	-0.2897***
Age	0.0398*	0.0316**	0.0409***	0.0536***	0.0481***	0.0603***	0.0806***	0.0668***	0.0891***
Age^2	-0.0006**	-0.0005**	-0.0006***	-0.0008***	-0.0008***	-0.0009***	-0.0012***	-0.0010***	-0.0012***
Education	0.0010	0.0003	0.0060	0.0108	0.0141*	0.0170**	0.0309**	0.0443***	0.0461***
Marital status (Reference: Married)	-0.0034	0.0676	0.0896**	0.0884**	0.0720*	0.0605	0.0122	0.0108	0.1709*
Hukou (Reference: Rural)	0.0775	0.1009**	0.0966**	0.0789**	0.1166***	0.1516***	0.2269***	0.2097***	0.2829***
Certificate (Reference: Yes)	-0.0327	-0.0103	0.0150	-0.0006	0.0078	-0.0194	-0.0982*	-0.1313**	-0.0912
Training (Reference: Yes)	-0.0075	0.0222	0.0233	0.0032	-0.0194	-0.0144	0.0045	-0.0041	0.0056
Labour law	0.0102	0.0411**	0.0354**	0.0238	0.0186	0.0136	0.0298	0.0379	0.0661**
Union (Reference: No)	0.0732	-0.0039	-0.0313	0.0082	0.0169	-0.0185	-0.0919	-0.0495	-0.1871
Job change	0.0061	0.0024	-0.0006	0.0016	0.0067	0.0072	0.0207**	0.0179**	0.0223**
Overtime (Reference: No)	0.0661	0.0618	0.0857**	0.1120***	0.1086***	0.1395***	0.1331**	0.1281*	-0.0021
Experience	-0.0001	-0.0002	0.0004	0.0006	0.0003	0.0005	-0.0003	0.0007	0.0005
Contract (Reference: No)	0.0110	0.0071	0.0286	0.0077	0.0282	0.0557	0.1079**	0.0883	0.0196
Migration time	-0.0002	0.0004	0.0004	0.0005	0.0008***	0.0007**	0.0010**	0.0007	-0.0002
Meal and accommodation	-0.0498**	-0.0658***	-0.0722***	-0.0600***	-0.0573***	-0.0719***	-0.1068***	-0.1153***	-0.1885***
Occupation (Reference: Job1)									
Job2	-0.0579	-0.0503	-0.0836	-0.0732	-0.0690	-0.0583	-0.0437	0.0143	-0.3923**

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Job3	-0.2128***	-0.2164***	-0.2449***	-0.2771***	-0.3404***	-0.4053***	-0.6297***	-0.5383***	-0.6819***
Job4	-0.0378	-0.0113	-0.0486	-0.0627	-0.0485	-0.0924	-0.1406	-0.1158	-0.4589**
Industry (Reference: Ind3)									
Ind1	0.1441*	0.1213*	0.1410**	0.1179**	0.1737***	0.2284***	0.4229***	0.3833***	0.6052***
Ind2	0.3669***	0.3740***	0.4103***	0.4071***	0.5209***	0.6811***	1.1219***	1.3572***	1.2265***
Ind4	0.2168*	0.2516***	0.1505	0.1773*	0.0993	0.1435	-0.0244	-0.0332	0.1577
Ind5	0.4303***	-0.2845	-0.3695*	-0.1973	0.0014	0.1319	0.0275	0.1310	0.2603
Employer (Reference: Com1)									
Com2	0.0475	0.0403	0.0513	0.0026	-0.0241	-0.0067	0.1374*	0.1153	0.0158
Com3	0.1607**	0.0771	0.0354	-0.0093	0.0155	0.0022	0.1094	0.1297	0.0812
Com4	-0.0155	-0.0733	-0.1494**	-0.1380**	-0.0837	-0.0847	0.0267	0.0160	-0.0382
Scale of enterprises (Reference: Scale2)									
Scale1	-0.0153	-0.0277	-0.0190	0.0330	0.0243	-0.0008	0.0288	0.0875	0.1250*
Scale3	-0.0830	0.0178	-0.0336	-0.0037	-0.0391	-0.0532	-0.0326	0.0000	0.0709
City	0.0724**	0.0579**	0.0486**	0.0557***	0.0310*	0.0389*	0.0265	0.0427	0.0625*
Lambda	0.4629	0.6633***	0.5676***	0.4275**	0.5310**	0.5897**	1.0802***	0.8858**	1.7093***
Constant	0.4577	0.7731**	0.7641***	0.6391**	0.8386***	0.7437***	0.6362	0.8948**	1.1550**
Observations	1338	1338	1338	1338	1338	1338	1338	1338	1338
R^2	0.0573	0.1055	0.1605	0.2020	0.2406	0.2710	0.3043	0.2864	0.2034

Notes: 1. * P < 0.1, ** P < 0.05, *** P<0.01; 2. Standard errors are omitted due to space limitations.

Table 5 The estimated hedonic income equations of workers in risky and safe jobs

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Panel A: Risky jobs									
Father education	0.0074	0.0067	0.0033	0.0010	-0.0024	-0.0011	-0.0025	0.0069	-0.0060
Gender (Reference: Male)	0.0293	-0.1452**	-0.2162***	-0.2315***	-0.2300***	-0.2511***	-0.2734***	-0.2401***	-0.1654
Age	0.0835***	0.0712***	0.0609***	0.0510**	0.0675***	0.1055***	0.0642***	0.0541**	-0.0003
Age^2	-0.0013***	-0.0011***	-0.0009***	-0.0009***	-0.0011***	-0.0016***	-0.0010***	-0.0009**	-0.0001
Education	-0.0234	0.0007	0.0064	-0.0026	0.0084	-0.0017	0.0135	0.0297	0.0414
Marital status (Reference: Married)	0.0871	0.1218	0.0576	0.0205	0.0639	0.1943**	0.1402*	0.0222	-0.0686
Hukou (Reference: Rural)	-0.0261	-0.0610	-0.0832	-0.0536	-0.0293	-0.0491	0.0073	0.0096	0.1120
Certificate (Reference: Yes)	-0.0380	-0.0360	-0.0503	-0.0969*	-0.1199**	-0.1285*	-0.1444*	-0.1211	-0.0868
Training (Reference: Yes)	0.0039	0.0106	-0.0413	-0.0170	-0.0159	-0.0419	0.0008	-0.1503*	-0.1612*
Labour law	0.0365	0.0432	0.0848***	0.1159***	0.1270***	0.1900***	0.1734***	0.0998**	0.1349**
Union (Reference: No)	0.0410	-0.0189	-0.0360	-0.0212	0.0580	0.0467	0.0719	0.1086	0.1415
Job change	-0.0144	-0.0181*	-0.0026	-0.0052	-0.0116	-0.0109	0.0003	-0.0049	0.0038
Overtime (Reference: No)	0.0790	0.0447	-0.0125	-0.0578	0.0687	0.0429	0.0734	0.1848*	0.4089**
Experience	0.0007	0.0003	0.0008	-0.0003	0.0002	0.0011	0.0023**	0.0032***	0.0049***
Contract (Reference: No)	-0.0178	-0.0829	0.0086	-0.0098	0.0151	0.0085	-0.0074	-0.0910	-0.0688
Migration time	0.0007	0.0012*	-0.0002	0.0004	0.0005	0.0003	0.0004	0.0010	0.0005
Mealhouse	-0.0696**	-0.0408	-0.0724**	-0.0650**	-0.0593*	-0.0598*	-0.0832**	-0.0344	-0.0441
Occupation (Reference: Job1)									
Job2	0.0349	0.0396	0.0155	-0.0327	-0.0912	0.0632	-0.0063	-0.0621	-0.4423*
Job3	-0.1264*	-0.1087	-0.1730**	-0.2437***	-0.3077***	-0.3109***	-0.3208**	-0.3162**	-0.6564***
Job4	0.1392	0.2443**	0.2380**	0.0066	0.0050	-0.1859	-0.2489	-0.3429	-0.3273
Industry (Reference: Ind3)									
Ind1	0.0089	-0.0108	0.1146	0.1854	0.1501	0.2669*	0.2713*	0.1985	0.1282
Ind2	0.1935	0.1980	0.4332***	0.6505***	0.6234***	0.8870***	0.9522***	0.7176**	0.3337
Ind4	-0.3324	-0.3801	-0.2343	0.0248	0.1177	0.3178*	-0.0046	0.0219	-0.0191
Ind5	0.3364**	0.3286**	0.3225**	0.5532***	0.6672***	0.8626***	1.1858***	1.6671***	-0.0645
Employer (Reference: Com1)									
Com2	-0.0252	0.0065	-0.0942	-0.0680	-0.1082	-0.0716	0.0576	-0.0061	0.0025

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Com3	0.0083	0.1797*	0.0986	0.1258	0.0991	0.0646	0.0719	0.0646	0.1578
Com4	-0.0119	-0.0604	-0.1114	-0.0376	-0.0687	-0.0667	0.0443	0.0554	0.0701
Scale of enterprises (Reference: Scale2)									
Scale1	-0.1362*	-0.0311	0.0025	-0.0839	-0.0839	-0.1166*	-0.1119	-0.1313	-0.1094
Scale3	0.1227**	0.0844	0.0577	0.0764	-0.0153	0.0606	0.1361*	0.0672	-0.0036
City	0.0780**	0.0805**	0.0228	0.0079	0.0452	0.0206	-0.0098	0.0364	0.1252**
Lambda	0.0577	-0.0236	0.1944	0.4430*	0.2814	0.6069**	0.6918**	0.4349	0.2078
Constant	0.0867	0.1416	0.2901	0.4068	0.3100	-0.7684	-0.2377	0.5317	1.8433**
Observations	519	519	519	519	519	519	519	519	519
R2	0.1439	0.1850	0.2261	0.2397	0.2960	0.3493	0.3478	0.3074	0.2549
Panel B: Safe jobs									
Father education	-0.0020	-0.0028	0.0013	0.0052	0.0077*	0.0089*	0.0026	0.0012	0.0038
Gender (Reference: Male)	-0.1215**	-0.1279***	-0.1414***	-0.1729***	-0.2138***	-0.1935***	-0.2079***	-0.2726***	-0.3240***
Age	0.0424**	0.0493***	0.0438***	0.0481***	0.0448***	0.0506***	0.0526***	0.0695***	0.0661***
Age^2	-0.0008**	-0.0009***	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0010***	-0.0010***
Education	0.0035	0.0143*	0.0123	0.0145*	0.0145*	0.0311***	0.0285***	0.0393***	0.0597***
Marital status (Reference: Married)	0.0799	0.0012	0.0293	0.0850*	0.0527	0.0382	0.0684	0.1241*	0.0282
Hukou (Reference: Rural)	0.0041	0.0140	0.0785**	0.1118***	0.1488***	0.1283***	0.2134***	0.2692***	0.2704***
Certificate (Reference: Yes)	-0.0366	-0.0250	-0.0246	-0.0163	-0.0138	-0.0460	-0.0898**	-0.0749	-0.1281*
Training (Reference: Yes)	-0.0412	-0.0394	-0.0292	-0.0312	-0.0449	-0.0561	-0.0784*	-0.0965**	-0.0364
Labour law	0.0692***	0.0350**	0.0447***	0.0439***	0.0401**	0.0583***	0.0412**	0.0511**	0.0743**
Union (Reference: No)	-0.0096	0.0604	0.0464	0.0587	0.0840	0.0295	0.0118	-0.0921	-0.0416
Job change	0.0123**	-0.0016	0.0010	0.0035	0.0071	0.0090	0.0137**	0.0162**	0.0202**
Overtime (Reference: No)	-0.0786	-0.0659*	-0.0325	-0.0492	-0.0583	0.0306	-0.0340	-0.0281	-0.1051
Experience	0.0005	0.0001	0.0003	-0.0003	-0.0006	0.0000	0.0006	0.0014**	0.0006
Contract (Reference: No)	0.1755***	0.1220***	0.1580***	0.2168***	0.2027***	0.1616***	0.1111***	0.0553	0.0464
Migration time	0.0006	0.0011***	0.0010***	0.0012***	0.0011***	0.0008**	0.0006*	0.0000	0.0003
Mealhouse	-0.1198***	-0.0901***	-0.0938***	-0.1192***	-0.1311***	-0.1097***	-0.1269***	-0.1719***	-0.2375***
Occupation (Reference: Job1)									
Job2	-0.0487	-0.0357	-0.0464	-0.0167	-0.0442	-0.1374**	-0.1738*	-0.2267*	-0.8116***

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Job3	-0.1315***	-0.1401***	-0.2481***	-0.3289***	-0.3964***	-0.4643***	-0.5882***	-0.6436***	-1.0902***
Job4	0.0479	0.0629	0.0587	0.0362	0.0150	-0.1041	-0.3144***	-0.4717***	-1.0666***
Industry (Reference: Ind3)									
Ind1	0.1491*	0.0925	0.1139**	0.1883***	0.2498***	0.2007***	0.2853***	0.3524***	0.3910***
Ind2	0.4480***	0.3774***	0.4206***	0.4990***	0.6415***	0.6896***	0.6943***	0.6875***	0.6854***
Ind4	0.2857**	0.3148***	0.1857**	0.1153	0.0764	0.1315	0.1444	0.2027*	0.4528**
Ind5	-0.2205	0.0912	-0.3480	-0.1644	-0.0288	-0.2135*	-0.1224	0.0401	-0.0446
Employer (Reference: Com1)									
Com2	0.0016	-0.0418	-0.0487	0.0067	0.0058	0.0240	-0.0358	0.0162	-0.1310
Com3	0.0381	0.0713*	0.0631	0.1072**	0.0757	0.0705	0.0447	0.0808	-0.0306
Com4	-0.2538***	-0.1907***	-0.1059*	0.0166	-0.0041	0.0196	-0.0642	-0.0614	-0.1707
Scale of enterprises (Reference: Scale2)									
Scale1	-0.1002**	0.0062	0.0116	0.0192	-0.0177	0.0251	0.0281	0.1323***	0.0512
Scale3	-0.0263	0.0245	0.0196	0.0301	0.0468	0.0950**	0.0503	0.1166**	0.0797
City	0.0246	0.0399**	0.0445**	0.0788***	0.0637***	0.0596***	0.0695***	0.0659***	0.0754**
Lambda	0.5847**	0.3644*	0.4569**	0.5862***	0.7888***	0.6015**	0.9600***	1.2094***	1.4479***
Constant	0.8167**	0.8354***	0.9702***	0.8632***	1.2674***	1.0203***	1.5554***	1.4340***	2.3516***
Observations	1399	1399	1399	1399	1399	1399	1399	1399	1399
R2	0.1475	0.2231	0.2587	0.3123	0.3272	0.3317	0.3078	0.3019	0.2462

Notes: 1. * P < 0.1, ** P < 0.05, *** P<0.01; 2. Standard errors are omitted due to space limitations.

Table 6 FFL decomposition results of wage/income differentials between risky and safe jobs

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Wage									
Risky jobs	0.8584	1.0338	1.1708	1.2869	1.3935	1.5211	1.6580	1.9040	2.2158
Safe jobs	0.9535	1.1580	1.2879	1.3785	1.4775	1.5984	1.7605	1.9834	2.2543
Composition effects									
Personal	-0.0070	-0.0032	-0.0175	-0.0134	-0.0081	0.0130	0.0183	0.0088	0.0227
Employment	-0.0498	-0.0815	-0.1161	-0.1201	-0.1131	-0.0633	-0.0281	-0.0253	0.0446
Lambda	-0.2421	-0.2191	-0.4784	-0.7690	-0.7282	-0.3468	-0.1250	0.2289	0.7050
Total	-0.2989	-0.3038	-0.6121	-0.9025	-0.8493	-0.3971	-0.1347	0.2124	0.7723
Wage structure effects									
Personal	-0.4333	-0.3821	0.0940	0.5137	0.1952	0.0447	-0.1820	1.3232	-0.7527
Employment	0.5740	0.3061	0.0726	-0.0196	0.1749	0.0069	0.0495	0.1303	0.0695
Lambda	0.2588	0.3364	0.3664	0.3862	0.4185	0.3401	0.4853	0.3085	0.5242
Constant	-0.1958	-0.0808	-0.0381	-0.0694	-0.0232	-0.0720	-0.3206	-2.0539	-0.6518
Total	0.2038	0.1796	0.4950	0.8109	0.7654	0.3198	0.0321	-0.2918	-0.8108
Income									
Risky jobs	1.2664	1.4026	1.5414	1.6405	1.7527	1.8895	2.0216	2.2035	2.4253
Safe jobs	1.2444	1.4328	1.5331	1.6477	1.7926	1.9090	2.0428	2.2173	2.4947
Composition effects									
Personal	0.0128	0.0157	0.0278	0.0362	0.0259	0.0371	0.0391	0.0223	0.0081
Employment	0.0192	0.0140	0.0456	0.0798	0.0494	0.0898	0.0808	0.0367	-0.0221
Lambda	0.0894	-0.0366	0.3013	0.6868	0.4363	0.9409	1.0725	0.6743	0.3221
Total	0.1214	-0.0069	0.3748	0.8029	0.5115	1.0678	1.1924	0.7334	0.3081
Wage structure effects									
Personal	0.3930	0.4428	0.2031	-0.2609	0.2617	0.6651	0.2252	-0.4201	-1.2422
Employment	0.0155	0.0642	0.0000	-0.1531	-0.0695	0.0386	0.2413	0.2490	0.8507
Lambda	0.2220	0.1635	0.1106	0.0603	0.2137	-0.0022	0.1130	0.3263	0.5224
Constant	-0.7301	-0.6939	-0.6801	-0.4564	-0.9574	-1.7887	-1.7931	-0.9024	-0.5084
Total	-0.0995	-0.0233	-0.3665	-0.8101	-0.5515	-1.0873	-1.2136	-0.7472	-0.3775

Table 7 T-test results on the differences in employee benefits between risky and safe Jobs

	0.1-0.3		0.4-0.6		0.7-0.9	
	t	Pr(|T|>|t|)	t	Pr(|T|>|t|)	t	Pr(|T|>|t|)
	Log wage					
Medical insurance	-1.4494	0.1476	-2.3350	0.0198	2.3480	0.0191
Industrial injury insurance	-0.8635	0.3881	-2.3364	0.0197	-0.4431	0.6578
Reimbursement	0.5335	0.6006	-1.2103	0.2371	-2.2996	0.0264
	Log income					
Medical insurance	0.2957	0.7675	-0.6250	0.5321	-0.1362	0.8917
Industrial injury insurance	0.2825	0.7776	-2.0775	0.0381	-0.8114	0.4173
Reimbursement	0.1265	0.9009	-1.1799	0.2496	-2.0934	0.0419

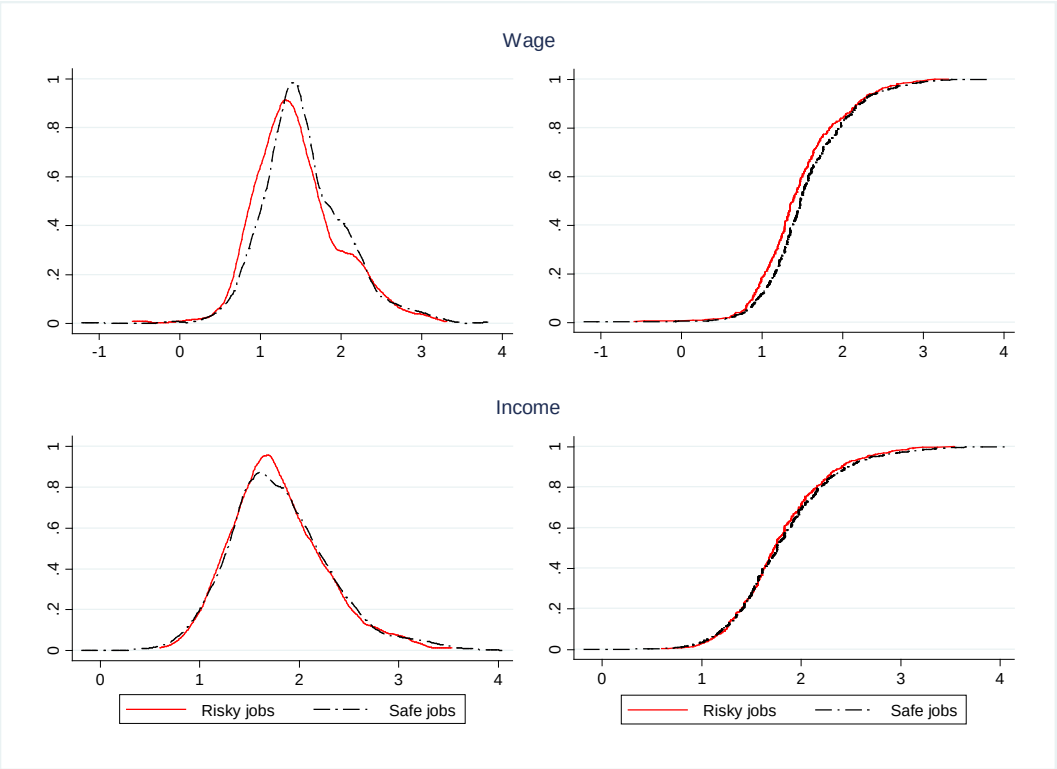

Fig. 1 Density and cumulative density function of logarithmic wage/income in risky and safe jobs