

# Analysis of wage distortion based on ability in China

While there has been a continual rise in the wages paid by China's enterprises, the wage inequality gap has also increased. Dr Qiao Wang, from the Capital University of Economics and Business, Beijing, analyses wage distortion based on ability in the Chinese labour market. Her revised signalling model includes regressive wage incentives to describe the non-competitive Chinese labour market. She uses non-parametric measurement-error techniques to reveal the underlying conditional distributions. Using data from the China Health and Nutrition Survey, she uncovers empirical evidence confirming that when compared with ability levels, wages are generally lower, especially for medium ability female workers.

In recent years, the wages paid by China's enterprises have been continuously increasing. This has been accompanied, however, by wage inequality in the Chinese labour market. The inequality gap between skilled and unskilled labour widens further with free trade and foreign direct investment. It has been shown that the increase in trade liberalisation has contributed to an increase in the wage inequality between skilled and unskilled workers in China's manufacturing sector. On the other hand, researchers have found that the increasing market competition can alleviate the disparity between skilled and unskilled wages, and that world price competition lessens China's growing income disparity.

Questions are raised as to whether high ability workers receive higher wages, even if their productivity is low. Alternatively, are higher ability workers receiving lower wages? If so, is this despite their high productivity, or because of their low productivity?

To answer these questions, Dr Qiao Wang, from the Capital University of Economics and Business in Beijing, analyses wage distortion based on ability in the Chinese labour market.

## WAGE DISTORTION BASED ON ABILITY

Dr Wang describes three scenarios characterising wage distortion based on ability. Firstly, as ability increases, the workers' wages decrease because of their

declining productivity, therefore overall productivity is low. Secondly, as ability increases, wages decrease despite the workers' increased productivity, making it difficult for high-ability workers to sustain high productivity. Thirdly, as ability increases, wages increase even though workers' productivity decreases, resulting in low productivity and high labour costs. These scenarios establish that wages are not allocated efficiently. Moreover, wage distortion does occur based on ability. This can lead to low productivity and highlights the need to analyse wage distortion based on ability in the Chinese labour market.

## A SIGNALLING MODEL

In a standard job-market signalling model, potential employees send a signal regarding their ability level, in terms of their education credentials, to their potential employer. The employer believes that the possession of such credentials is related to having greater ability and that they are difficult for low ability employees to obtain. The credentials therefore enable the employer to distinguish between low and high ability workers.

Using the characteristics of the Chinese labour market, Dr Wang extends the standard signalling game model. Workers with different levels of ability and productivity choose an education level and a level of productivity to be observed by the employer. The employer observes the education level and the level of productivity and determines the workers' wages. The Chinese

labour market is non-competitive as employers cannot fully observe workers' real productivity. To describe this non-competitive labour market, Dr Wang adds regressive wage incentives to the model's wage equation.

Dr Wang explains how her new signalling game model demonstrates that incomplete information on workers' actual productivity can lead to the three types of wage distortion described above. In order to estimate the unknown model parameters, she analysed the three types of wage distortion based on ability to recover the wage distribution relating to the workers' unobserved ability level.

## NON-PARAMETRIC IDENTIFICATION AND ESTIMATION

Non-parametric statistics can be either distribution-free or their distribution can be specified, but the distribution's parameters, such as the mean and variance, remain unspecified. Non-parametric identification methods are used to estimate a model independently of any parametric specification.

Applying recently developed non-parametric measurement-error techniques, Dr Wang's analysis reveals that the conditional distribution of the workers' wages based on their unobserved ability level can be non-parametrically identified and estimated using the observed variables: wages, highest education level, and the number of completed years of formal education in regular school. She is also able to use the non-parametric measurement error method to identify and estimate the distribution of the

The research considered education levels.



Incomplete information on productivity can lead to three types of wage distortion.



Dr Wang analyses wage distortion based upon three observed variables: hourly wages from primary occupation, level of education, and number of years in formal higher education.

**In general, wages are lower for a large number of workers. Moreover, their productivity is low too.**

workers' observed productivity in relation to their unobserved ability level, based on the observed variables of the average number of pieces completed per hour, the highest education level, and the number of completed years of formal education in regular school.

Institute for Nutrition and Health at the Chinese Centre for Disease Control and Prevention. They use a multistage random cluster process to draw a sample of over 30,000 individuals in approximately 7,200 households within 15 provinces and municipal cities that vary in their geography, economic development, public resources, and health indicators.

## EMPIRICAL ANALYSIS

Dr Wang applies this new signalling game model to data collected from the China Health and Nutrition Survey. The China Health and Nutrition Survey is an international collaborative project carried out by the Carolina Population Centre at the University of North Carolina and the National

Based on the observed Chinese labour market data, she analyses wage distortion by structurally estimating the signalling game model based on three observed variables: the individual's hourly wages obtained from their primary occupation, their highest level of education, and the



Maxx-Studio/Shutterstock.com





Wage discrimination by gender was observed, regardless of ability.

imphoto/Shutterstock.com

number of years completed by the individual in formal education in regular school. In addition, Dr Wang identifies the conditional variables: the worker's age and gender and the type of work unit they're employed in. The Chinese labour market is made up of seven types of work units: government offices, state institutes, state-owned enterprises, small collective enterprises, large collective enterprises, private or individual enterprises, and three-capital (foreign investment) enterprises.

#### FINDINGS

Using the dataset from the China Health and Nutrition Survey, Dr Wang provides empirical evidence that wages are lower for a large number of workers relative to their ability levels.

This study confirms that three types of wage distortion based on ability exist

### Wage discrimination by gender is observed among workers with the same ability levels, particularly female workers with medium ability levels.

in the Chinese labour market because of incomplete information on workers' actual productivity. Low ability workers are receiving high wages despite their low productivity; low and medium ability workers are receiving low wages because of their low productivity; and high ability workers receive high wages despite their low productivity.

In general, wages are lower for a large number of workers. Moreover, their productivity is low too.

#### DISCRIMINATION BY GENDER

The findings also divulged that wage discrimination against women exists in the Chinese labour market. Wage discrimination by gender is observed among workers with same ability levels, particularly female workers with medium ability levels. Further analysis revealed that the wage gap between female and male workers of the same ability is due to differences in their productivity levels.

#### RECOMMENDATIONS

The key finding of this research is that generally wages are low for Chinese workers when compared to their ability levels because of their low productivity. Considering the empirical

analysis results, Dr Wang offers three suggestions to Chinese employers. Monitoring efficiency should be promoted. Improving monitoring technology allows employers to observe the actual productivity of their workers much more clearly. It also enables the observation of productivity at a low cost to the

employer. Promoting monitoring efficiency includes establishing sound rules and regulations, particularly for female workers. Sound management mechanisms should also be put in place to monitor both quantity and quality of products.

Incentive wages should be increased. Increasing incentive wages can reduce moral hazard behaviour and increase productivity. Increasing the percentage of incentive payments in wages can further promote productivity.

Intellectual property rights should be protected, and innovation should be encouraged. Employers should look to establish sound rules and mechanisms to protect intellectual property rights as this can increase innovation. They should also establish sound mechanisms to transform innovation into products, with the intention of further increasing both innovation and productivity.

Dr Wang remarks that the key contribution of her research is its non-parametric approach to analysing wage distortion based on ability. Her work also uncovers evidence that wages and productivity lag behind ability. Furthermore, this new extended signalling game model provides a theoretical foundation for the choice of measurements of the latent variables, as well as the identification and estimation of the unobserved ability level using the non-parametric measurement-error method.



# Behind the Research

## Dr Qiao Wang

E: wangqiao@cueb.edu.cn T: 0086-13522891927

### Research Objectives

Qiao Wang has developed a model to assess wage distortion in relation to employee ability and productivity in the Chinese labour market.

### Detail

#### Address

Qiao Wang, No.121, ZhangJia Road, HuaXiang FengTai District, Beijing, 100070 China

#### Bio

The research of Qiao Wang focuses on non-parametric econometrics and non-parametric estimation of game theory models. Her application research focuses on labour economics. She has published many studies focusing on wage distortion, insufficient wage incentives, and moral hazard problems in the Chinese labour market.

### References

Wang, Q. (2021). The non-parametric analysis of wage distortion based on ability in the Chinese labour market. *Applied Economics*, [online] 53(15), 1694-1715. <https://doi.org/10.1080/00036846.2020.1841883>

Wang, Q. (2021). Is the moral hazard in the Chinese labour market serious? Empirical evidence from a semi-parametric analysis. *Applied Economics*, 53(27), 3131-3170. <https://doi.org/10.1080/00036846.2021.1875121>

Wang, Q. (2020). A nonparametric analysis of insufficient wage incentives in the Chinese health industry. *Applied Economics*, [online] 52(9), 951-969. <https://doi.org/10.1080/00036846.2019.1646877>

### Personal Response

#### What inspired you to use the recently proposed non-classical measurement-error methodologies to find the conditional distributions?

During my post-doctoral experience in Texas A&M University, professor Yonghong An lectured the recently proposed non-classical measurement-error methodologies and its applications in labour economics and panel data. His lecture inspired me to use the methodologies to find the conditional distributions and further to find the conditional distribution of unobserved ability in the labour market.



Natalia Garduew/Shutterstock.com