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African Journal of Science, Technology, Innovation and Development

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rajs20

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Published online: 14 Jun 2013.

To cite this article: Yao Tang & Wenjin Long (2013) Gender Earnings Disparity and Discrimination in Urban China: Unconditional Quantile Regression, African Journal of Science, Technology, Innovation and Development, 5:3, 202-212, DOI: 10.1080/20421338.2013.796743

To link to this article: http://dx.doi.org/10.1080/20421338.2013.796743

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African Journal of Science, Technology, Innovation and Development, 2013
Vol. 5, No. 3, 202–212, http://dx.doi.org/10.1080/20421338.2013.796743

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Gender Earnings Disparity and Discrimination in Urban China: Unconditional Quantile Regression

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Market-oriented economic reform has gone through several key stages to bring substantial changes to the current Chinese economy. It accelerated after 1992, and ushered in the pattern transformation since 'scientific development outlook' raised in 2002. During this dramatic and complicated economic transitional process, issues regarding income distribution caught people's attention including: How does the earnings distribution change between genders from an early market economy to a post market economy? How do education, work experience, marriage and other factors affect gender earnings and what is the difference among an internal group of women? In this paper, we use data from the Chinese Household Income Projects (2002 and 2007) to analyse the earnings disparity between genders and a female inner group. The unconditional quantile regression finds that the negative effects on earnings of marriage and taking care of children has significantly decreased since 2002, especially for women. But the high return rate to education of female workers is not as significant as before, and the return rate to work experience is falling even faster. Along with the increasing gender earnings gap, the unexplained gap (gender discrimination) has also increased over time and is particularly pronounced in the female higher earnings group.

Keywords: Unconditional quantile regression; RIF functions; Earnings inequality; Gender discrimination

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Introduction

Earnings distributions and changes have attracted attention from researchers all over the world (Blau & Kahn, 2000; Oaxaca, 1973; J. Zhang et al., 2008). Some researchers have focused on how market force affects gender earnings inequality over time (Berik et al., 2004; Gustafsson & Li 2000; Maurer-Fazio & Hughes, 2002). Several other studies examine the gender earnings gap in different areas, comparing the eastern seaboard provinces with western interior provinces (Liu et al., 2000; Ng, 2007) or in various types of corporations, for example state-owned enterprises, collective, private or joint venture enterprises (Deng & Li, 2009; Zhang & Dong, 2008).

Earlier literature studying the gender wage gap consists of Ordinary Least Squares regressions and Oaxaca–Blinder decomposition. These methods concentrate on the mean of the wage distribution, hence they provide a limited understanding of gender gap (Autor et al., 2006). Later, there was surging interest in examining gender earnings gaps across an earnings distribution, not just a simple mean comparison (Albrecht et al., 2003; Barsky et al., 2002; Chi & Li, 2008; Chi et al., 2011; Ge et al., 2011; Li & Dong, 2011). These kinds of analyses can provide more information which may be hidden in the mean-level analysis and can help to test the real situation of earnings gaps among different earnings groups (Ge et al., 2011; Sakellariou, 2012). For instance, there is an extremely large gap between men and women in Sweden in the top earnings group, but when using the mean-level analysis, the average gender gap in Sweden is quite small by international standards (Albrecht et al., 2003). Similarly, findings in China demonstrate that gender discrimination has increased from 1988 to 1995, but for the higher income group of workers, it has actually decreased (Bishop et al., 2005). Therefore, extending the mean-level analysis to a distributional level analysis is essential to compare different parts of the earnings distribution.

In this paper, we will implement recent advances in methodology and use a two-stage procedure proposed by Firpo et al. (2007, 2009) to analyse the current situation of female workers in the labour market in urban China. Unconditional regression finds that compared with the past, the negative effect on earnings of marriage and taking care of children has significantly decreased, especially for women. However, the high return rate to education of female workers is not as significant as before, and the return rate to work experience the rate of work

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experience falls even faster. Along with the increasing gender earnings gap, the unexplained gap (gender discrimination) also increases over time, and is particularly pronounced for the female higher earnings group.

The following section provides information about the data used in this paper and presents some basic stylized facts on gender difference in the labour force. We then illuminate the method of unconditional quantile regression and model specification, present the major empirical results and provide graphs to make a clearer comparison before offering conclusions.

Data overview

The data used in this paper was obtained from the Chinese Household Income Projects from 2002 and 2007. Both surveys are supported by the Chinese Academy of Sciences (CAS), the Asian Development Bank (ADB), the Ford Foundation and the East Asian Institute of Columbia University. The surveys are designed to measure and estimate the distribution of personal income and related economic factors in China. The data were collected through a series of questionnaire-based interviews including both urban and rural populations in China. The whole datasets contain 151 variables and 20,632 cases from 2002, and 164 variables and 14,683 cases from 2007, which cover plenty of aspects of interviewees' personal characteristics and economic information, such as education and training, employment and social insurance situation, children's education and family and social relationships.

In order to better serve research questions, our sample is restricted to the urban population, especially to those who are aged from 16 to 55 for the females and 60 for the males (the statutory retirement age is 55 for women and 60 for men in China) or have a working income in a respective year. Some sample input mistakes or obvious competing data have been corrected, for example one's schooling year which is significantly different to his or her education level. In addition, a new variable 'earnings' here is defined as the sum of regular wages, floating wages, all kinds of bonuses, subsidies, cash income and allowances. Throughout the paper we focus on hourly earnings. Finally, it produces 10,288 observations for year 2002 and 6,899 observations for year 2007.

The main variables by gender are shown in Table 1 from which it can easily be deduced that the male–female ratio of hourly earnings has increased from 1.18 to 1.31, although the earnings of both have more than doubled since the year 2002. For the standard deviation, men are slightly larger than women in both years. The education gap has decreased to a situation that year of schooling between male and female workers is almost the same in 2007; whereas for the other aspect of human capital – work experience – the gap has increased from 2.9 years in 2002 to 3.8 years in 2007. As to marital status, married couples decreased for both male and female workers.

Changes to the occupation proportions have been witnessed over time. In 2002, the highest occupation proportions for men and women were skilled workers and clerical staff, respectively. Male workers tended to work more as directors or department directors in government, institution and enterprise, while women were commonly employed as sales clerks, service or unskilled workers. In 2007, the percentage of female technical personnel and administrative staff increased significantly, making the gender difference in occupation distribution even more uneven. In the area of administrative staff and commercial staff, 55% were female workers and the absolute quantity is much more than males. But in other occupations, the number of male workers can double the number of female workers. For example, notable male–female ratios are 2.36 and 2.07 for 'manager or boss of private firm' and 'self-employed' as a result of distinct increases in both sectors over time.

Methodology

The unconditional quantile regression model

The method used in this paper is based on the recentred influence function (RIF) developed by Firpo et al. in 2009 when they were studying the diffident effect of unionization at the lower and higher portion of wage distribution in the USA. This method provides a computational regression model to evaluate the impact of changes in the distribution of explanatory variables (such as education and union status) on quantiles of the unconditional (marginal) distribution of a dependent variable (such as earnings). The advantage of the RIF method is that it can generate Oaxaca–Blinder decompositions for quantiles instead of the mean (Koenker & Hallock, 2001; Zhu & Zhang, 2012). Here we will decompose the earnings variable at different quantiles into the 'composition effect' (the component attributable to the gender difference in productivity characteristics) and the 'structure effect' (the unexplained component due to differences in the return to workers' characteristics) (Chi & Li, 2008).

The decomposition procedure consists of two steps: the first step follows DiNardo et al. (1996), who decompose the overall changes in the earnings distribution to the change of differences in characteristics and the change of returns to these characteristics. A counterfactual earnings distribution is constructed showing what earnings women would get if they received the same returns to their work characteristics as men. If $v(Y)$ represents a quantile of the earnings distribution of Y. The overall differences can be decomposed into:

$$v(Y_m) - v(Y_f) = [v(Y_m) - v(Y_c)] + [v(Y_c) - v(Y_f)] \quad (1)$$

where Y_m *and* Y_f represent the earnings of male and female workers, respectively; Y_c is a counterfactual earnings

Table 1. Descriptive statistics of the main variables for (a) 2002 and (b) 2007.

(a) Variable	Male (2002)	Female (2002)	M/F ratio
Demography	5699	4589	
Work experience (year)	24.34 (S.D. 10.617)	21.50 (S.D. 9.857)	1.13
Years of schooling (year)	11.47 (S.D. 3.072)	11.34 (S.D. 2.910)	1.01
Married (%)	49.23	38.72	1.27
Have a child under 6 (%)	14.2	14.82	0.96
Occupation (%)			
Owner (manager) of private firm	0.57	0.29	1.97
Self-employed	4.33	4.2	1.03
Professional	20.15	22.54	0.89
Director of government, institution, private enterprise	3.78	1.02	3.71
Department director of government, institution, company	11.26	3.81	2.96
Clerical/office staff	17.75	23.52	0.75
Skilled worker	23.99	12.23	1.96
Unskilled worker	8.62	11.15	0.77
Sales clerk or service worker	7.54	18.52	0.41
Farmer	0.00	0.02	0
Other	2.02	2.70	0.75
Earnings (CNY)			
Total earnings per hour	6.13 (S.D. 5.471)	5.18 (S.D. 4.985)	1.18
(b) Variable	**Male (2007)**	**Female (2007)**	**M/F ratio**
Demography	3964	2935	
Work experience (year)	23.15 (S.D. 11.815)	19.20 (S.D. 10.797)	1.21
Years of schooling (year)	12.19 (S.D. 2.988)	12.19 (S.D. 3.015)	1.00
Married (%)	48.89	35.64	1.37
Have a child under 6 (%)	13.32	13.86	0.96
Occupation (%)			
Boss of private enterprise	9.21	4.43	2.08
Technical personnel in various industries	24.54	21.39	1.15
Administrative staff/manager	21.85	26.60	0.82
Businessman/commercial staff	17.46	28.71	0.61
Service personnel	0.85	0.46	1.85
Manufacture and transportation worker	18.77	10.70	1.75
Self-employed individuals	0.59	0.25	2.36
Labourer	5.95	6.37	0.93
Other	0.78	1.09	0.72
Earnings (CNY)			
Total earnings per hour	16.33 (S.D. 23.639)	12.41 (S.D. 18.080)	1.32

Source: Chinese Household Income Project, 2002 and 2007.

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expression.$v(Y_m) - v(Y_c)$ represents the 'composition effect' and $v(Y_c) - v(Y_f)$ represents the 'structure effect'. The counterfactual earnings Y_c can be obtained by reweighting the observations of the male (DiNardo et al., 1996; Firpo et al., 2007). The reweighting factor is defined as:

$$\psi_i = [1 - p(X_i)]p/p(X_i)(1 - p) \quad (2)$$

here $p(X_i)$ is the probability of the ith worker being a male given individual attributes X and p denotes the proportion of males in the population. In practice, $p(X)$, the probability of a male worker's propensity or characteristics on X can be derived from a logit/probit regression. Therefore the reweighted data $\psi_i Y_m$, the product of male earnings distribution and the possibility of male workers and his propensity, can be thought of as realization of the counterfactual earnings distribution Y_c. This first step of (24)[24][17] decomposition is semi-parametric because it does not assume any functional form for the earnings distribution and only employs a logit or probit specification in estimating the reweighing factor (Chi & Li, 2008).

The second step is to further decompose the 'composition effect' and 'structure effect' into the contribution of each individual covariate. As the well-known regression models that establish relationships between a response variable Y and a set of explanatory variables X cannot answer questions about the unconditional statistical properties of the response variable Y, the RIF method makes use of

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unconditional quantile regression to make up the defects (Firpo et al., 2007). A central concept of the RIF unconditional method is the influence function and assumes a linear regression, see as follows:

$$E\left[RIF(Y;q_\tau)|X\right] = X\beta_\tau \tag{3}$$

here the coefficient β_τ represents the marginal effects of the explanatory variables X at the earnings quantile q_τ. For each year, the RIF unconditional quantile regression is estimated for male, female and counterfactual earnings distribution:

$$\widehat{RIF}(Y_k;\hat{q}_\tau) = X_k\hat{\beta}_k, k = m, f, c \tag{4}$$

here the subscripts *m, f, c* represent male, female, and counterfactual earnings distributions, respectively; $\widehat{RIF}(Y_k;\hat{q}_\tau)$ denotes the RIF estimate for the τth quantile; and $\hat{\beta}$ represents the estimate of the unconditional quantile partial effect. Using the unconditional quantile regression from equation (4), the deposition can be given as follows:

$$\hat{q}_\tau(Y_m) - \hat{q}_\tau(Y_f) = [\bar{X}_f(\hat{\beta}_c - \hat{\beta}_f) + \hat{R}^s_\tau] + [(\bar{X}_m\hat{\beta}_{\hat{m}} - \bar{X}_f\hat{\beta}_c) + \hat{R}^c_\tau] \tag{5}$$

$\hat{q}_\tau(Y_m) - \hat{q}_\tau(Y_f)$ represents the gender earnings difference at the τth quantile. $\bar{X}$ represents the vector of covariate averages. $\hat{\beta}_c$ is the counterfactual variable which assumes the male returns to labour force characteristics for females. Thus $\bar{X}_f(\hat{\beta}_c - \hat{\beta}_f)$ represents the 'structure effect' and $\bar{X}_m\hat{\beta}_f - \bar{X}_f\hat{\beta}_c$ represents the 'composition effect'. $\hat{R}^s_\tau$ *and* $\hat{R}^c_\tau$ are the errors to these effects.

Model specification

Log earnings per hour will be used for males and females, respectively as a function of the following variables:

(i) Years of schooling;
(ii) Work experience and work experience square which is (age – year of schooling –6)^2;
(iii) Marriage, 1 for married, 0 for not;
(iv) Young children, 1 for having child under 6 years old, 0 for not;
(v) Indicator variable for occupation (white collar as default group);
(vi) Ownership (state owned enterprise as default group)
(vii) Industry (manufacturing as default group)

This paper is most concerned with variables (i) to (iv). Education level and work experience are commonly thought to be positively related to earnings. In China, children generally go to school at 6 years old. Work experience here is deemed as a continuous variable which is the square of years of working, because it is thought that work experience grows following the working time. For marital status, its effect on income would be different between women and men. Padavic & Reskin (2002) state that married men will have higher earnings than single and married women as they generally have the bread-winning responsibility for their family, thus they have more motivation to put more effort and energy into their work, leading to higher earnings (Pollmann-Schult 2011).

In contrast, marriage has a negative effect on women's earnings for the same reason: the majority of female workers were indeed in reality spending more time and energy on family life, especially after the couple have a child (Lundberg & Rose, 2000; Schneider, 2011; Waldfogel, 1998). In addition, the discrimination against mother workers, regarding the perceptions above that family responsibilities make them less productive and maternity benefits are too expensive, is another factor leading to lower pay for female workers (Mandel & Semyonov, 2005; Y. Zhang et al., 2008). Therefore having children, especially young children, is thought to have a negative effect on women's earnings, whereas for men, it seems to have little effect (Clark & Corcoran, 1986; Waldfogel, 1998).

Different types of occupation not only mean different kinds of human capital, which in some extent determines the income level, but also implies an occupational barrier among various types of jobs. Therefore, the effect of different occupations, ownership and industry will be controlled. The types of occupation are summarized as private enterprise owner, white collar, blue collar and others. For ownership of corporation, there are five forms classified: state owned enterprise (SOE), urban collective, private enterprise, foreign-owned or joint venture and others. As to types of industry, manufacturing is the default group, the others are construction, transportation, commerce, real estate, education, sciences and research, government, social welfare, financial sectors and other industries.

Empirical Results

Preliminary description of gender earnings distribution

The results from kernel density estimation demonstrate the log hour earnings distribution for urban male and female workers in 2002 and 2007 and are shown in Figure 1(a) and (b). The long lower tail in 2002 suggests the existence of low-earnings workers, especially for women. The unsymmetrical shape also suggests the lower half of the earning distribution is more dispersed than the upper half earnings distribution of males and females in 2002. The conclusion is opposite for female workers in 2007 where the higher earnings distribution is more dispersive. For

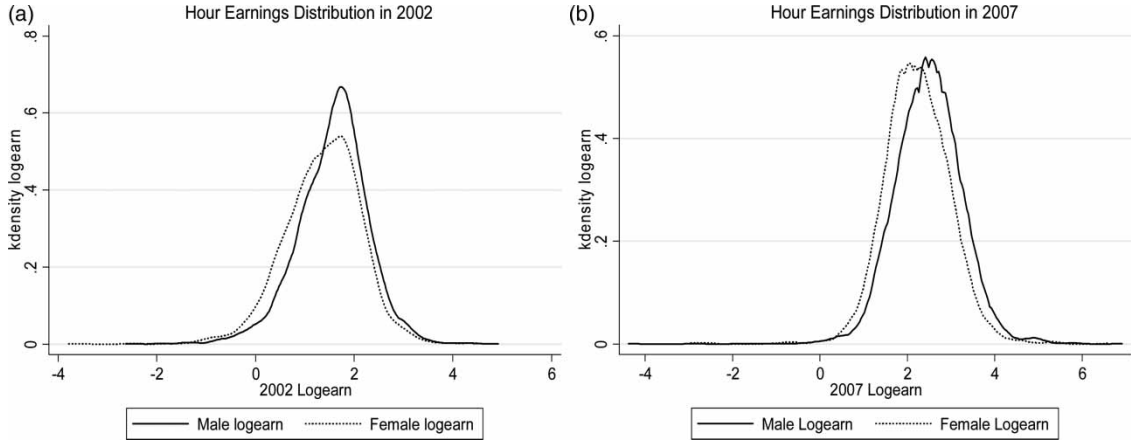

Figure 1. Hourly earnings distribution in (a) 2002 and (b) 2007.

male workers, it becomes a more uniform distribution in 2007 compared with the pointed shape in 2002.

Table 2 estimates the earnings distribution for males and females at different quantiles. The mean gender earnings gap increases from 1.18 (2002) to 1.31 (2007) and changes a lot at various quantiles. In 2002, the male–female ratio of earnings is larger in the lower paid groups – the ratio at the first decile is 1.32, while it is 1.15 at the last decile. The situation reversed in 2007 and the prominent earnings gap is larger at the last decile, where the ratio is 1.35, and the smallest one emerged at the first decile at 1.25. This upside-down ratio variation implies that for the upper income group of women, their incomes do not increase in the same way as the other groups.

The enlarged gap between inner male groups (the ratio of the first decile to the last decile rises from 5.63 in 2002 to 6.66 in 2007) is similar, with a trend which Goos and Manning (2003) characterized as a pattern of 'polarisation of labour market' with employment polarizing into high-wage and low-wage jobs at the expense of middle-wage jobs (Autor et al., 2006). In China post-economic transition, this trend seems more complicated that male workers in the upper income group are the biggest winners not only to the detriment of middle-income male workers but also to the same high-income level women workers.

RIF unconditional quantile regression result

Earnings gap decompositions

In this section, the decompositions of the male–female earnings gap are performed by RIF unconditional regression and the outcomes are shown in Table 3. It gives 'earning gap', 'unexplained gap' and 'unexplained ratio' at different quantiles (P5, P10, P25, P50, P75, P90 and P95) in 2002 and 2007. The 'unexplained ratio' represents the ratio value of the unexplained part of earnings differential to the total earnings gap. At the same time, the results from ordinary least squares (OLS) regression are also calculated to make a methodological contrast.

The findings from OLS suggest the mean earnings gap increases from 0.2458 log points in 2002 to 0.3056 log points in 2007. And the unexplained earnings gap has the same rising tendency from 0.1683 to 0.2732, which seems to show the fact that the whole situation of the earnings environment has deteriorated for female workers. This finding, according to results from Démurger et al. (2007),

Table 2. Unconditional quantile earnings distribution comparison, 2002 and 2007.

	2002			2007		
Male	**Female**	**M/F ratio**	**Male**	**Female**	**M/F ratio**	
Mean	6.13 (S.D. 5.471)	5.18 (S.D. 4.985)	1.18	16.37 (S.D. 23.639)	12.54 (S.D. 18.080)	1.31
P10	1.94	1.46	1.32	4.69	3.75	1.25
P50	5.09	4.09	1.24	12.5	9.38	1.33
P90	10.92	9.47	1.15	31.25	23.13	1.35
P90:P10	5.63	6.49	/	6.66	6.17	/
P50:P10	2.62	2.80	/	2.67	2.5	/

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Table 3. RIF earnings gaps and decomposition, 2002 and 2007.

	P5	P10	P25	P50	P75	P90	P95	OLS
2002 earnings gap	0.2634	0.3041	0.2899	0.2391	0.1499	0.1802	0.2166	0.2458
2002 unexplained gap	0.1582	0.2132	0.1975	0.1605	0.0875	0.1273	0.1687	0.1683
2002 unexplained ratio	0.6006	0.7011	0.6813	0.6713	0.5837	0.7064	0.7789	0.6851
2007 earnings gap	0.1696	0.2531	0.3087	0.3231	0.2562	0.3377	0.2560	0.3056
2007 unexplained gap	0.1504	0.2181	0.2757	0.2900	0.2158	0.3033	0.2459	0.2732
2007 unexplained ratio	0.8868	0.8617	0.8931	0.8976	0.8423	0.8981	0.9605	0.8941

Source: Chinese Household Income Project, 2002 and 2007.

shows that economic transition brought about some significant discriminatory behaviours and affected the various segments of the urban labour market differently. After looking at the various quantiles of earnings, a much more detailed conclusion about each group can be drawn.

In 2002, the biggest gender earnings gap emerges at P10 (0.3041) and the smallest is at P75 (0.1499). The unexplained gender earnings gap is highest at P95 (0.7789) and lowest at P75 (0.5837). It seems the lower earnings group bear the greatest earnings gap but the least gender discrimination. On the contrary, the higher group endures the most unexplained gap but less earnings gap. In 2007, the largest earnings gap reaches its peak at P90 (0.3377) and touches its bottom at P5 (0.1696). The differential of unexplained gap at various quantiles is not very significant and the largest is 0.9605 at P95 and the smallest is 0.8617 at P75. The outcome is much the same in 2002, except that paid environment for female is worsened wholly, as the ratio of gender discrimination enlarges at every quantile comparison given.

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Earnings return to personal characteristics

In this section, the effect of personal characteristics on earnings at different quantiles is estimated using RIF unconditional regression, as shown in Table 4. Meanwhile, outcomes from OLS are also demonstrated to make a contrast. In order to make it clearer and more easily understood, Figures 2–5 were drawn to show the comparison of returns to these personal characteristics (year of schooling, work experience, marital status and young child in the family).

Education as an important effect factor was repeatedly discussed in the research into earnings distribution (Byron & Manaloto, 1990; Wu & Xie, 2003). The data from 1995 and 2002 from the same project estimated an increased coefficient between education and earnings (Zhang et al., 2005). While in the recent period (2002 and 2007), falls in the returns to education had been perceived (Appleton et al., 2013). In this research, the results from the OLS report the same trend: education coefficients are 0.0576 and 0.0738 for men and women in 2002, 0.0544 and 0.0434 in 2007. It is easy to get the impression that the education effect on male earnings remains almost the same, while its effect for females drops.

Figure 2 shows the outcomes provided by RIF taking consideration of the earnings distribution. The smooth downward dotted line indicates that the return to education of female workers decreases with increasing earnings. While it is a curved line for men in which the highest return rate occurs at the third quartile (0.0639). It should be noticed that the female return rate to education is higher than that of males as a whole. However it is not the case in 2007, where male workers get more earnings than females from additional education below P75 and there is an increasing tendency of return rate to schooling in the lower half earnings. For the higher earnings group (quantile 75 to 95) for both sexes, the effect of education declines and the drop is more significant for women.

The return to work experience declines for both males and females with earnings increasing in 2002, as shown in Figure 3. Similarly to education, women's experience is more rewarding than men in 2002. These findings are broadly consistent with the findings of others who have looked at earnings inequality (Appleton et al., 2005; Meng & Miller, 1995; Y. Zhang et al., 2008). The female experience return curve is consistently above that of men until it intersects at the ninth decile and drops sharply at quantile 95, as the return of work experience is less notable in the highest earnings group of women (above P90).

It is a little more complicated in 2007. The overall return to work experience declines, especially for females. This drop is so significant that it reverses the fact that in 2002 the female work experience is more rewarding and positive. Although the line of male return to experience is a fluctuated curve and has a downwards tendency on the whole, it is still positive. Whereas the return rates are negative for the upper half women's earnings group, so it can be concluded that experience not only far from helps females to gain more earnings but has a negative effect.

Economic development and market formulation may gradually shift gender-role attitudes about women's roles in household work and childrearing (Zhu & Zhang, 2012). These shifts include a more egalitarian gender-role attitude in families, which may help more and more married women transfer some attention from family to

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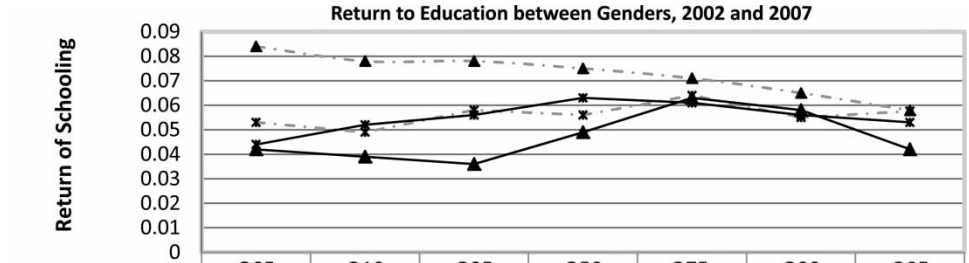
Table 4. Unconditional quantile regression estimates.

2002	τ = 0.05		τ = 0.10		τ = 0.25		τ = 0.50		τ = 0.75		τ = 0.90		τ = 0.95		**OLS**	
	M	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Education	.0533***	.0844***	.0487***	.0779***	.0583***	.0776***	.0560***	.0749***	.0639***	.0704***	.0552***	.0654***	.0576***	.0579***	.0576***	.0738***
	(.0009)	(.0001)	(.0002)	(.0004)	(.0005)	(.0000)	(.0004)	(.0000)	(.0004)	(.0002)	(.0005)	(.0004)	(.0001)	(.0000)	(.0003)	(.0002)
Experience	.0514***	.0563***	.0400***	.0468***	.0330***	.0358***	.0239**	.0291***	.0244*	.0274***	.0194***	.0195***	.0236***	.0017***	.0287***	.0293***
	(.0008)	(.0001)	(.0005)	(.0007)	(.0002)	(.0006)	(.0032)	(.0006)	(.0203)	(.0001)	(.0003)	(.0000)	(.0002)	(.0007)	(.0002)	(.0001)
Exp2	-.0008***	-.0009***	-.0005***	-.0008***	-.0004***	-.0005***	-.0002***	.0003**	-.0002***	.0003*	-.0002*	-.0001***	-.0002***	.0002***	-.0003***	-.0003***
	(.0003)	(.0004)	(.0002)	(.0002)	(.0001)	(.0001)	(.0001)	(.0092)	(.0001)	(.0231)	(.0472)	(.0001)	(.0002)	(.0002)	(.0007)	(.0005)
Marriage	.3722***	.1403**	.2636***	.0751*	.1318*	.0327*	.0753*	-.0235	.0238*	-.0546*	.0162*	-.0300**	.2662**	-.0004*	.1068**	.0130*
	(.0009)	(.0065)	(.0003)	(.0103)	(.0112)	(.0107)	(.0412)	(.0501)	(.0395)	(.0440)	(.0367)	(.0065)	(.0089)	(.0209)	(.0064)	(.0401)
Child	2.1633*	2.5789	1.6467*	1.9931*	1.1296*	1.2908*	.5229	.7482	.9852*	-.3006	.3212	-.3070	.0939	-1.132	1.0429*	0.7431
	(.0476)	(.4591)	(.0391)	(.0361)	(.0124)	(.0392)	(.1231)	(.1325)	(.0271)	(.0721)	(.0584)	(.0633)	(.1706)	(.1851)	(.0133)	(.2271)
R^2	0.2395	0.2257	0.2339	0.2304	0.2336	0.2526	0.2113	0.2523	0.2615	0.2115	0.1763	0.1758	0.1712	0.1707	0.1839	0.2173

2007	τ = 0.05		τ = 0.10		τ = 0.25		τ = 0.50		τ = 0.75		τ = 0.90		τ = 0.95		**OLS**	
	M	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Education	.0443***	.0415***	.05151***	.0386***	.0556***	.0364***	.0631***	.0492***	.0610***	.0625***	.0557***	.0578***	.0533***	.0422***	.0544***	.0434***
	(.0003)	(.0004)	(.0001)	(.0004)	(.0000)	(.0000)	(.0001)	(.0001)	(.0004)	(.0007)	(.0007)	(.0009)	(.0007)	(.0004)	(.0004)	(.0001)
Experience	.0515**	.0249**	.0250***	.0192**	.0176**	.0139**	.0251**	.0121**	.0173**	-.0019***	.0205**	-.0188**	.0088*	-.0132*	.0182**	.0032***
	(.0030)	(.0017)	(.0001)	(.0092)	(.0071)	(.0072)	(.0068)	(.0077)	(.0031)	(.0009)	(.0019)	(.0098)	(.0119)	(.0121)	(.0052)	(.0042)
Exp2	-.0005***	-.0007***	-.0005***	-.0006***	-.0003***	-.0005***	-.0005***	-.0003***	-.0003***	.0001***	-.0003***	.0004***	-.0002***	.0003***	-.0004***	-.0001***
	(.0003)	(.0003)	(.0002)	(.0002)	(.0001)	(.0001)	(.0001)	(.0002)	(.0001)	(.0002)	(.0002)	(.0002)	(.0002)	(.0002)	(.0001)	(.0001)
Marriage	.0560**	.3380*	.0940*	.2364**	.1261*	.1249*	.1261	.1269	.1254*	.1349	.0081*	.0628	-.0632	.1544	.0936*	.0130*
	(.0048)	(.0203)	(.0152)	(.0046)	(.0411)	(.0371)	(.0559)	(.0738)	(.0341)	(.0760)	(.0414)	(.0665)	(.0786)	(.0997)	(.0407)	(.0313)
Child	-.0401*	-.1673*	-.0406*	-.1981**	.0396	-.1028*	-.0130	-.0453*	-.0411*	-.0362	.0001	.0736	-.0736	.1093	-.0284	-0.6444
	(.0278)	(.0403)	(.0460)	(.0397)	(.0865)	(.0497)	(.0728)	(.0335)	(.0421)	(.0717)	(.0828)	(.0733)	(.0766)	(.0811)	(.0513)	(.0515)
R^2	0.1931	0.2012	0.1954	0.2076	0.1912	0.2082	0.1866	0.2119	0.1814	0.2031	0.1963	0.2655	0.1712	0.2402	0.1976	0.2598

Source: Chinese Household Income Project, 2002 and 2007.
Notes:
Child, the effect of having a young child in the family (under 6 years of age); M, male; F, female; OLS, ordinary least squares.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Standard errors in parentheses.



	Q05	Q10	Q25	Q50	Q75	Q90	Q95
2002 Male	0.053	0.049	0.058	0.056	0.064	0.055	0.0576
2002 Female	0.084	0.078	0.078	0.075	0.071	0.065	0.0579
2007 Male	0.044	0.052	0.056	0.063	0.061	0.056	0.053
2007 Female	0.042	0.039	0.036	0.049	0.063	0.058	0.042

Figure 2. Return to education between genders, 2002 and 2007.
Source: Chinese Household Income Project, 2002 and 2007.

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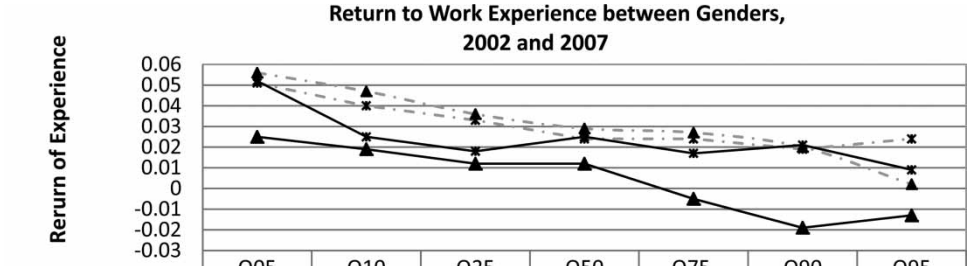
work to fulfil their competency and grasp the career promotion opportunities for higher pay (Koenker & Hallock 2001). Figure 4 shows the impact of marriage on the earnings distribution for males and females, which is accord with this statement.

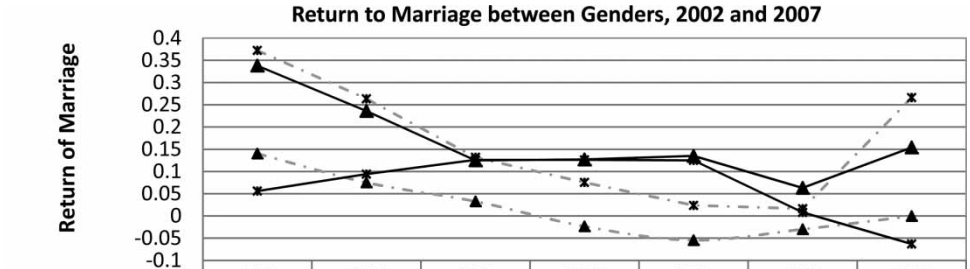
In 2002, the return curves for both men and women have an approximately similar shape, showing a declining trend as earnings improve below the third quartile, then going up first slowly to the ninth decile and more rapidly to quantile 95. It is worth mentioning that for men, although the return is declining, marriage still has a positive effect in 2002, but for women, getting married may reduce their earnings because the return rate in the upper half is less than zero. The situation seems to change when the time is right for 2007. Females gain more than males from marriage, especially in the higher (Q75) or lower (Q25) earnings groups and at least obtain almost the same rate as males in the middle-earnings group. The negative marriage coefficient (-0.0632) of the highest earning men (Q95) is in great contrasts to that in 2002, which means marriage damages their opportunities to gain more earnings.

One of the factors most damaging married women's income comes from having babies. Not similar with British mothers who appear to prefer part-time work or quit directly after pregnancy until the child goes to school (Goos & Manning, 2003), Chinese mother's career would not be interrupted by continuously giving birth because of the 'one child policy' restriction, but they still have to spend lots of time caring for their child, especially young children. So here the impact of having a child younger than 6 years old is estimated as shown in Figure 5. The rough outcomes concluded by OLS show positive coefficients (1.0429 and 0.7431) in 2002, but negative ones (-0.0284 and -0.6444) in 2007. The positive effect in 2002 may partly be attributed to experience accumulation as employees with children generally participate in work longer than those who do not, not purely because they have a child. As the effect of work experience enhancing



	Q05	Q10	Q25	Q50	Q75	Q90	Q95
2002 Male	0.051	0.04	0.033	0.024	0.024	0.019	0.024
2002 Female	0.056	0.047	0.036	0.029	0.027	0.02	0.002
2007 Male	0.052	0.025	0.018	0.025	0.017	0.021	0.009
2007 Female	0.025	0.019	0.012	0.012	-0.005	-0.019	-0.013

Figure 3. Return to work experience between genders, 2002 and 2007.
Source: Chinese Household Income Project, 2002 and 2007.



	Q05	Q10	Q25	Q50	Q75	Q90	Q95
2002 Male	0.3722	0.2636	0.1318	0.0753	0.0238	0.0162	0.2662
2002 Female	0.1403	0.0751	0.0327	-0.0235	-0.0546	-0.03	-0.0004
2007 Male	0.056	0.094	0.126	0.126	0.125	0.008	-0.063
2007 Female	0.338	0.236	0.125	0.127	0.135	0.063	0.154

Figure 4. Return to marriage between genders, 2002 and 2007.
Source: Chinese Household Income Project, 2002 and 2007.

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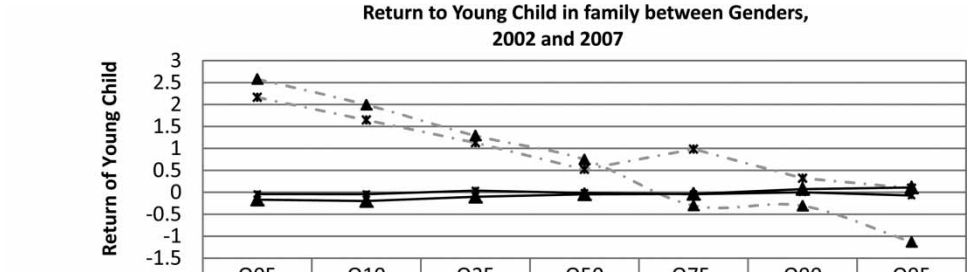
income decreased in 2007, it is not surprising to find out its effect turned out negative as having a child balances out the experience accumulation.

More detailed suggestions can be drawn from unconditional quantile research. In 2002, the shapes of the curves for males and females are much the same and both have a downward trend in the lower half earnings groups. After that, the line for the females meets with the male line and keeps going down until less than zero and reaches its bottom at Q95 (-1.132). For men, it first goes up at the third quartile (0.9852) and then goes down to its bottom, also at Q95 (0.0939). This suggests that women and men are affected differently by having a young child. Especially for higher earning women (above Q75), having a young child may decrease their earnings because the coefficient is negative. And the more they earned, the greater they will sacrifice.

In 2007, there was no significant difference between men and women: almost all of the coefficients are similar which can be understood as both men and women are equally committed to work and household chores (the highest return occurs at Q10 (0.0396) for males and Q95 (0.1093) for females, the lowest emerges at Q95 (-0.0736) for men and Q10 (-0.1981) for women). When comparing with the graph in 2002, it seems the gender egalitarian attitude prevails in families because the coefficients change enormously no matter from the absolute value or from the trend. Male workers do not have any advantage compared with females when having a young child. On the contrary, both of the effects for females and males are negative without distinct differences.

In short, the gender comparisons (Figure 2–5) provided by the RIF unconditional quantile regression demonstrate significant changes have taken place since 2002. Education, although still essential to women, is not as rewarding as it was in 2002. Similarly, the promotion effect of work experience declines largely and turns out to be negative for higher female earners (above P75). Married status no longer helps men gain more from the labour market. On the contrary, married females obtain almost the same as married males in the middle-earnings group and even more than them in



	Q05	Q10	Q25	Q50	Q75	Q90	Q95
2002 Male	2.1633	1.6467	1.1296	0.5229	0.9852	0.3212	0.0939
2002 Female	2.5789	1.9931	1.2908	0.7482	-0.3006	-0.307	-1.132
2007 Male	-0.0401	-0.0406	0.0396	-0.013	-0.0411	0.0001	-0.0736
2007 Female	-0.1673	-0.1981	-0.1028	-0.0453	-0.0362	0.0736	0.1093

Figure 5. Return to young child in family between genders, 2002 and 2007.
Source: Chinese Household Income Project, 2002 and 2007.

the higher (Q75) or lower (Q25) earnings groups. The gender differential effect of having a young child is not as significant as before, and presents a negative impact for both.

Conclusions

Market-oriented economic reform, which began in 1978, has gone through several key stages to bring substantial changes to the current Chinese economy. It accelerated after 1992 when Deng Xiaoping gave a speech in 'south cruises', and ushered in the transformation of economic development after President Hu Jintao formulated the 'scientific outlook of development' and the 'harmonious society'. During this transitional process, earnings distribution and gender inequality in the labour market kept attracting attention internationally and domestically.

In order to understand the earnings situation of women in China, we adopted the two-step procedure of RIF unconditional regression to examine the degree of gender discrimination and returns to personal characteristics at various quantiles. The advantage of this methodology is that it not only decomposes the unconditional earnings change at any quantile in the earning distribution, but also allows the contribution of individual covariates to be estimated for each component. In this research, we mainly focus on four personal characteristics, 'years of schooling', 'work experience', 'marriage' and 'having a young child in the family'.

After analysing the samples from the Chinese Income Household Project 2002 and 2007 by RIF, the results show that both the overall gender earnings gap and the unexplained gender earnings gap have increased since 2002. The earnings gap is more significant at the higher earnings group. It also features a large change in terms of contributions for different individual variables to earnings. For education, although still essential for females, it is not as rewarding as in 2002. The same trend happened with work experience, the promotion effect of which declines heavily and even turns out to be negative for females with higher earnings (above P75). For these two characteristics, the changes for males are not very noticeable.

As to the marriage effect, large gender gaps exist in the lower and higher earnings group and married status is not helping men to acquire more earnings from the labour market, whereas for middle earnings groups, the effect is almost the same. For the effect of having a young child in family, the differential returns between genders is not as significant as before, and a wholly negative effect for both is presented.

References

Albrecht, J., Björklund, A. & Vroman, S. (2003). Is there a glass ceiling in Sweden?, in *Journal of Labor Economics*, *21*(1), 145–177.

Appleton, S., Knight, J., Song, L. & Xia, Q. (2005). Has China crossed the river? The evolution of wage structure in urban China during reform and retrenchment, in *Journal of Comparative Econometrics*, *33*(4), 644–663.

Appleton, S., Song, L. & Xia, Q. (2013). Understanding urban wage inequality in China 1988–2008: Evidence from quantile analysis, IZA Discussion Paper no. 7101. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2199784##.

Autor, D. H., Katz, L. F. & Kearney, M. S. (2006). The polarization of the U.S. labor market, in *American Economic Review*, *96*, 189–194.

Barsky, R., Bound, J., Charles, K. K. & Lupton, J. P. (2002). Accounting for the black-white wealth gap: a nonparametric approach, in *Journal of the American Statistical Association*, *97*(459), 663–673.

Berik, G., Rodgers, Y. & Zveglich, J. E. (2004). International trade and gender wage discrimination: evidence from East Asia, in *Review of Development Economics*, *8*(2), 237–254.

Bishop, J. A., Luo, F. & Wang, F. (2005). Economic transition, gender bias, and the distribution of earnings in China, in *Economic of Transition*, *13*(2), 239–259.

Blau, F. D. & Kahn, L. M. (2000). Gender difference in pay, in *The Journal of Economic Perspective*, *14*(4), 75–99.

Byron, R. P. & Manaloto, E. Q. (1990). Returns to education in China, in *Economic Development and Cultural Change*, *38*, 783–796.

Chi, W. & Li, B. (2008). Glass ceiling or sticky floor? Examining the gender earnings differential across the earnings distribution in urban China, 1987–2004, in *Journal of Comparative Economics*, *36*(2), 243–263.

Chi, W., Li, B. & Yu, Q. (2011). Decomposition of the increase in earnings inequality in urban China: A distributional approach, in *China Economic Review*, *22*(3), 299–312.

Clark, S. M. & Corcoran, M. (1986). Perspectives on the professional socialization of women faculty: a case of accumulative disadvantage? in *The Journal of Higher Education*, *57*(1), 20–43.

Démurger, S., Fournier, M. & Chen, Y. (2007). The evolution of gender earnings gaps and discrimination in urban China, 1988–95, in *The Developing Economies*, *45*(1), 97–121.

Deng, Q. & Li, S. (2009). What lies behind rising earnings inequality in urban China? Regression-based decompositions, in *CESifo Economic Studies*, *55*(3–4), 598–623.

DiNardo, J., Fortin, N. M. & Lemieux, T. (1996). Labor market institutions and the distribution of wages, 1973–1992: A semiparametric approach, in *Econometrica*, *64*(5), 1001–1044.

Firpo, S., Fortin, N. M. & Lemieux, T. (2007). Decomposing wage distributions using recentered influence function regressions, Unpublished manuscript, University of British Columbia. Available at: http://www.economie.uqam.ca/pages/docs/lemieux_thomas.pdf

Firpo, S., Fortin, N. M. & Lemieux, T. (2009). Unconditional quantile regressions, in *Econometrica*, *77*, 953–973.

Ge, Y., Li, H. & Zhang, J. (2011). Gender earnings gaps in Hong Kong: Empirical evidence from across the earnings distribution in 2006, in *China Economic Review*, *22*(1), 151–164.

Goos, M. & Manning, A. (2003). Lousy and Lovely Jobs: The Rising Polarization of Work in Britain, Discussion Paper no. DP0604, London School of Economics. Available at: http://www.mitpressjournals.org/doi/pdfplus/10.1162/rest.89.1.118

Gustafsson, B. & Li, S. (2000). Economic transformation and the gender earnings gap in urban China, in *Journal of Population Economics*, *13*(2), 305–329.

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Koenker, R. & Hallock, K. F. (2001). Quantile regression: an introduction, in *Journal of Economic Perspectives*, *15*(4), 43–56.

Li, L. & Dong, X. (2011). Economic transition and the gender earnings gap in Chinese industry: the role of firm characteristics, in *Contemporary Economic Policy*, *29*(1), 67–87.

Liu, P., Meng, X. & Zhang, J. (2000). Sectoral gender wage differentials and discrimination in the transitional Chinese economy, in *Journal of Population Economics*, *13* (2), 331–352.

Lundberg, S. & Rose, E. (2000). Parenthood and the earnings of married men and women, in *Labour Economics*, *7*(6), 689–710.

Mandel, H. & Semyonov, M. (2005). Family policies, wage structures, and gender gaps: sources of earnings inequality in 20 countries, in *American Sociological Review*, *70*(6), 949–967.

Maurer-Fazio, M. & Hughes, J. (2002). The effects of market liberalization on the relative earnings of Chinese women, in *Journal of Comparative Economics*, *30*(4), 709–731.

Meng, X. & Miller, P. (1995). Occupational segregation and its impact on gender wage discrimination in China rural industrial sector, in *Oxford Economic Papers-New Series*, *47*(1), 136–155.

Ng, Y. (2007). Gender earnings differentials and regional economic development in urban China, 1988–97, in *Review of Income and Wealth*, *53*(1), 148–166.

Oaxaca, R. (1973). Male-female wage differentials in urban labor market, in *International Economic Review*, *14*(3), 693–709.

Padavic, I. & Reskin, B. F. (2002). *Women and Men at Work*, Thousand Oaks: Pine Forge Press.

Pollmann-Schult, M. (2011). Marriage and earnings: why do married men earn more than single men?, in *European Sociological Review*, *27*(2), 147–163.

Sakellariou, C. (2012). Unconditional quantile regressions, wage growth and inequality in the Philippines, 2001–2006: the contribution of covariates, in *Applied Economics*, *44*(29), 3815–3830.

Schneider, D. (2011). Market earnings and household work: new tests of gender performance theory, in *Journal of Marriage and Family*, *73*(4), 845–860.

Waldfogel, J. (1998). Understanding the "Family Gap" in Pay for Women with Children, in *The Journal of Economic Perspectives*, *12*(1), 137–156.

Wu, X. & Xie, Y. (2003). Does the market pay off? Earnings returns to education in urban China, in *American Sociological Review*, *68*(3), 425–442.

Zhang, J., Zhao, Y., Park, A. & Song, X. (2005). Economic returns to schooling in urban China, 1988 to 2001, in *Journal of Comparative Economics*, *33*(4), 730–752.

Zhang, J., Han, J., Liu, P. & Zhao, Y. (2008). Trends in the gender earnings differential in urban China, 1988–2004, in *Industrial and Labor Relations Review*, *61*(2), 224–243.

Zhang, L. & Dong, X. (2008). Male–female wage discrimination in Chinese, in *Economics of Transition*, *16*(1), 85–112.

Zhang, Y., Hannum, E. & Wang, M. (2008). Gender-based employment and income differences in urban China: considering the contributions of marriage and parenthood, in *Social Forces*, *86*(4), 1529–1560.

Zhu, P. & Zhang, Z. (2012). Unconditional quantile regression: literature review and empirical example in *Statistical Research*, *29*(3), 88–96.

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