

## Dynamics of the Gender Earnings Inequality in Reform-Era Urban China

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### Abstract

This article examines the differential impacts of marketisation and economic development on gender earnings inequality in reform-era urban China. Based on data from the 2005 population mini-census with prefecture-level statistics, we distinguish the effect of economic development from that of marketisation on the gender earnings gap. Multi-level analyses reveal that marketisation and economic development have affected gender inequality in different ways: whereas market forces have exacerbated gender earnings inequality, economic development has reduced it. Overall, marketisation appears to be the main driver of the increase in gender earnings inequality in urban China. Implications for policies promoting gender equality in China are discussed.

### Keywords

China, earnings inequality, economic development, gender, marketisation

### Introduction

China has experienced tremendous economic and social changes over the past decades. The country has seen rapid growth in its total gross domestic product (GDP) and GDP per capita and a profound transformation of its economic structure and ownership, especially since the mid-1990s. Accompanying this economic miracle, however, has been a sharp rise in income inequality: the Gini coefficient – a common measure of income distribution

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– increased from 0.317 in 1978 to over 0.5 in 2012 (Xie and Zhou, 2014). Behind this growing inequality are different social and economic forces that have been shaping labour market processes and outcomes in China.

The social consequences of these macro-level changes, namely, ‘who wins and who loses’, are a subject of considerable interest for many sociologists. Since the 1990s, scholars have debated the changing role of human capital and political capital in Chinese social stratification, notably under the theoretical framework of the ‘market transition debate’ (Bian and Logan, 1996; Nee, 1989; Szelenyi and Kostello, 1996; Walder, 2002; Xie and Hannum, 1996; Zhou, 2000). As an important dimension of social stratification, gender inequality over the course of China’s economic transition has received little attention, both empirically and theoretically.

However, even the limited literature on changing gender inequality in China has yielded inconsistent findings. For instance, while some scholars have reported that gender earnings inequality remained unchanged in urban China from 1988 to 1995 (Shu and Bian, 2003), others have revealed that women who held non-farm jobs contributed more substantially to household income as marketisation progressed (Matthews and Nee, 2000). Evidence from urban household surveys indicates that the female–male income ratio in China decreased from 86.3% in 1988 to 76.2% in 2004 (Zhang et al., 2008a).

Two main factors may account for these seemingly contradictory findings and controversial interpretations. Empirically, the data used in the analyses are fragmented, covering not only different time spans but also varying institutional environments. While Shu and Bian (2003) use only two points in time to derive temporal trends in urban labour market inequality between men and women (1988 and 1995), Zhang et al. (2008a) examine an extended period of multiple years from 1988 to 2004. Unlike both studies, Matthews and Nee (2000) deal strictly with non-farm employment and household income in a rural context.

Theoretically, scholars have often construed the change in inequality as resulting solely from marketisation, the process through which the influence of the redistributive state has declined and the influence of market forces has increased since the late 1970s. Due to the difficulty of operationalising the process of marketisation in an empirical analysis, a commonly used measure is the passage of time (Bian and Logan, 1996; Nee, 1989; Shu and Bian, 2003; Zhou, 2000), and temporal changes are thus often attributed to marketisation. However, marketisation may be confounded with temporal trends in other socio-economic forces that can also shape patterns in social inequality. For instance, China’s marketisation has been accompanied by rapid economic development. Economic development, referring to not only growth in economic output but also a structural transformation from an economy based on agriculture to one based on industry and services and a corresponding improvement in quality of life, is a process distinct from marketisation that can conceptually yield differential impacts on stratification outcomes (Walder, 2002). Moreover, neither marketisation nor economic development necessarily increases linearly over time among different countries (Szelenyi and Kostello, 1996). Unlike in China, Russia’s market transition in the 1990s led to recession rather than growth (e.g. Gerber and Hout, 1998, 2004; Gerber and Mayorova, 2006); likewise, Van der Lippe and Fodor (1998) find no change in gender inequality in six Eastern European countries between 1988 and 1993 and thus suggest that economic structural changes, particularly

the growth of the service sector, in which women are overrepresented, played an important role.

An alternative approach in previous literature has been to approximate the local context of marketisation either by developing a typology of regions, often on the basis of provinces (Cohen and Wang, 2009; Nee, 1996; Parish and Michelson, 1996) or by using specific regional statistics (e.g. the regional economic growth rate as in Xie and Hannum (1996)).<sup>1</sup> Based on a large sample of data from the 2005 Chinese mini-census together with social and economic indicators at the prefectural level, we improve on this approach by further adopting an explicit and concrete measure of marketisation and differentiate its effect from that of economic development on gender inequality in the urban China's labour market.

In the following, we first elaborate how marketisation and economic development can differentially affect women's labour market status and derive two hypotheses for empirical tests. We then define a proxy for the pace of reform with regional (prefectural) variations in marketisation and economic development and employ multi-level models to examine their respective effects on gender earnings inequality. Finally, we summarise the empirical findings and discuss their theoretical implications for understanding dynamic gender inequality amid China's economic transition.

## **Economic development, marketisation and gender inequality in urban China**

### *Economic development and women's status*

The twentieth century has witnessed a dramatic increase in women engaged in paid employment, especially after the Second World War (Costa, 2000; Goldin, 1990; Juhn and Potter, 2006). The rate of labour force participation for women aged 16 years or above in the United States, for instance, increases from 33.9% in 1950 to 66.9% in 2015 (Fullerton, 1999: 4). Scholars have also observed a decline in gender earnings inequality over time, and this temporal change has been closely associated with other secular trends such as economic development and educational expansion (Reskin, 2003).

Economic development broadly refers to the historical process through which a nation increases its economic wealth and social well-being. While this process is often traced to the evolution of capitalism and the demise of feudalism, often termed as modernisation and industrialisation, economic development has been more frequently used since the Second World War as a concept that encompasses not only economic growth, that is, increases in per capita income, but also structural changes from an economy primarily driven by agriculture to a more urbanised, industry- and service-led economy (Arndt, 1981; Lewis, 1954). In particular, economic tertiarisation, namely, the decline of the manufacturing sector and the expansion of the service sector in developed western countries, has had profound implications for social inequality.

As far as gender inequality is concerned, economic development can help reduce women's disadvantages in labour markets for several reasons. First, productivity in non-agricultural sectors tends to be higher than in the agricultural sector, and economic development can promote women's participation in non-agricultural employment

(Duflo, 2012). Accordingly, female labour force participation begins to rise in the 1950s in developed western countries (e.g. Fullerton, 1999). Second, economic development and industrial upgrading (tertiarisation) have generated increased demand for an educated labour force and facilitated educational expansion, which also typically favours women (Hout and DiPrete, 2006; Shavit and Blossfeld, 1993). Increased educational levels among women have increased their chances of entering into higher-paying professional occupations in the service sector, thus reducing the gender gap in labour market outcomes. Finally, the expansion of the tertiary sector has boosted demand for female workers. A service economy in which non-manual jobs with less physically demanding working environments are more prevalent than in a manufacturing-based economy is likely to enable women to utilise their comparative advantages to compete for jobs, thereby alleviating their disadvantage in the labour market (Pitt et al., 2010; Rosenzweig and Zhang, 2012).

Notwithstanding the huge progress made in achieving educational equality, gender pay gaps persist in labour markets in almost all developed countries (e.g. Blau and Kahn, 2007; Hausmann et al., 2009). Occupational differences explain a sizeable portion of these pay gaps (Kim and Sakamoto, 2008; Mouw and Kalleberg, 2010). Economists and sociologists make a distinction between two sources of gender pay gap: occupational gender segregation and intra-occupation gender discrimination. Occupational gender segregation refers to the fact that men and women tend to be engaged in different occupations, with empirical studies showing that workers in occupations with a high percentage of women tend to be paid less, leading to a gender disparity in overall earnings (Charles and Grusky, 2004; Petersen and Morgan, 1995). On the other hand, intra-occupation gender earnings disparity (known as 'unequal pay for equal work') is often cited as evidence of gender discrimination. The economic theory of 'statistical discrimination' proposes that, even if employers are rational and non-prejudiced, discrimination based on stereotypes can nevertheless persist. Women are perceived to be less committed to work and more likely than men to quit for family reasons, a pattern that appears to be statistically valid (Kmec et al., 2013). Accordingly, employers tend to base their employment and remuneration decisions partly on gender, paying lower salaries to women than men with similar duties within the same occupation (Arrow, 1998; Becker, 1957; Gerson, 1985; Phelps, 1972).

This characterisation of gender earnings inequality and the underlying process is undoubtedly based on the assumption that they are produced through market mechanisms based on supply and demand and subject to the maximisation of productivity. In other words, the market is implicitly a generator of gender inequality in western capitalist economies, reflecting autonomous decisions, rational calculation and the pursuit of economic efficiency by employers. The state, on the other hand, plays an important role in alleviating women's disadvantage in labour markets through not only legal regulations that prohibit open discrimination against women (e.g. Beller, 1982) but also social policies such as maternal leave and subsidised childcare. These measures help ease the conflict between paid work and housework among women with children, thus facilitating female labour force participation and alleviating gender inequality in the workplace (Esping-Andersen, 1990; Orloff, 1996).

### *Marketisation and changing gender stratification in China*

The socialist state plays a similar role, perhaps even more visibly and directly, in promoting gender equality in China (Sørensen and Trappe, 1995; Whyte and Parish, 1984). The Constitution of 1954 clearly stipulates gender equality and encourages women to work. As a result, starting in the late 1950s and throughout the Maoist period, over 90% of married Chinese women participate in paid work, a much higher percentage than in western countries at the time (Wolf, 1985; Zuo and Bian, 2001). By virtue of the work unit (*danwei*) system and the unified wage system under the socialist planned economy, the government successfully implemented various policies aiming to achieve 'equal pay for equal work' and strictly prohibited discrimination against women (Wu, 2002). The gender earnings inequality, if any, is mainly attributable to women's lower education levels and occupational gender segregation (Honig and Hershatler, 1988).

The introduction of market forces into the planned economy has reduced the role of the state in gender stratification. As the traditional *danwei* system was gradually dismantled, working women lost the institutional protection afforded by the state. Most state-owned enterprises (SOEs) are forced to compete in the market, and with the increased competitiveness of urban labour markets, these enterprises are granted increased autonomy in terms of recruitment, remuneration and dismissal of employees. At the same time, workers also gain the autonomy to choose jobs (Wu, 2002). In particular, the restructuring of SOEs in the late 1990s resulted in large-scale layoffs, with the main victims being less-educated, middle-aged workers and women. Most of these laid-off workers were forced to either enter the private sector or withdraw from the labour market altogether (Wu, 2010).

On the other hand, the private sector has grown rapidly to become the most dynamic part of the Chinese economy, offering myriad job opportunities for school leavers and laid-off workers. A significant proportion of private enterprises in the sector consist of light industries manufacturing clothes, shoes and consumer electronics, as well as service industries. These industries have absorbed a large number of low-wage female workers and, prioritising economic efficiency over egalitarianism, often hire workers at their own discretion with little government intervention (Wu, 2002).

With such new practices in the rapidly growing private sector, the state sector is no longer monolithic. Recent analyses show that the most salient differences in income and benefits now exist between government/public institutions and all other sectors rather than between state and non-state sectors or between the public and private sectors (Wu, 2013). SOEs now behave similarly to private enterprises, whereas government agencies and public institutions continue their redistributive role in providing public goods and promoting social equality (Wu and Song, 2014; Zhang et al., 2008b).

These policy changes have fundamentally transformed the Chinese urban labour market. Job mobility has surged since the mid-1990s (Li, 2013): the proportion of urban employees in the state and collective sectors fell from 81.5% in 1990 to 23.5% in 2008, whereas the proportion of those employed by the private sector rose from 14.9% to 64.5% during the same period, with the remainder self-employed (National Bureau of Statistics, 2009). Such substantial changes in urban labour markets have had a profound impact on economic opportunities for Chinese women in the new era. With less direct

intervention from the state and limited labour market regulation, Chinese women now find themselves in an even more disadvantaged position and face greater discrimination than before.

## Research questions and hypotheses

The impact of marketisation on gender stratification in China has nevertheless been intertwined with that of economic development. The institutional reforms over the past decades have transformed the Chinese economy from one primarily based on agriculture and the primary sector to one dominated by the secondary and tertiary sectors. The share of GDP of the tertiary industry rises sharply from 17.3% in 1990 to 45% in 2012 (National Bureau of Statistics, 2013). Accordingly, nine-year compulsory education had been fully implemented by the 1990s, and beyond the compulsory level, the enrolment rate for senior high school reached 60% in 2005, double the rate in the 1980s (Bauer et al., 1992; Hannum, 2005; Lavelly et al., 1990). Higher education enrolment has also expanded substantially since 1998 and has been favouring women, whose disadvantages have continued to shrink over time (Wu and Zhang, 2010; Yeung, 2013), a trend that has also been observed in many developed countries (DiPrete and Buchmann, 2013). Economic development is thus likely to advance women's socio-economic status relative to that of men.

Over the course of China's socio-economic transformation, patterns in gender inequality have been shaped by a range of different macro-level forces, some of which operate in diametrically opposite manners. In this article, we identify two driving forces, namely marketisation and economic development, and empirically differentiate their respective effects. We argue that marketisation can exacerbate gender earnings inequality and the disadvantages facing women in transitional labour markets, whereas the upgrading of the economic structure and the expansion of education arising from economic development can conversely reduce gender earnings gaps and elevate the socio-economic status of women.

As discussed earlier, these two processes are closely interrelated and related with time, and it is difficult to operationalise each process and separate them empirically. Some scholars have examined the uneven social and economic development across regions (aggregation of provinces) and estimated regional variations in the pace of reform using either the typology of regions/cities (e.g. Cohen and Wang, 2009; Nee, 1996; Parish and Michelson, 1996) or specific regional statistics (e.g. the rate of regional economic growth as in Xie and Hannum, 1996). Nevertheless, measures even at the provincial level remain crude because of substantial intra-provincial variations. This approach is improved by adopting explicit and concrete measures at the prefecture level differentiating the effect of marketisation from that of economic development at that level. Prefecture-level statistics are employed to construct a composite index of marketisation and economic development, and specifically measure local labour market conditions across prefectures. This approach leads to the following testable hypothesis:

- Hypothesis 1: The more marketised a prefecture is, the larger the gender earnings gap in that prefecture.

Marketisation is highly correlated with the level of economic development in China. From our earlier discussion on the relationship between economic development and gender inequality, we predict the following:

- Hypothesis 2: The more economically developed a prefecture is, the smaller the gender earnings gap in that prefecture.

These two hypotheses are tested with a large subsample of the 1% population census in 2005 (known as the ‘mini-census’), which contains individuals from 281 prefectural-level jurisdictions in 29 provinces and socio-economic statistics of these prefectures.

## Data, variables and measures, and methods

### Data

The mini-census was a multi-stage stratified clustering probability sampling survey conducted by the National Bureau of Statistics to collect social and demographic information on the national population between two censuses. Unlike previous censuses and mini-censuses, the 2005 survey collected information on respondents’ earnings (for those aged 15 or above), work unit sector, working hours and fringe benefits, in addition to employment status, detailed occupation (two-digit code), household registration status (*hukou*), place of *hukou* registration, current place of residence, education level and other demographics (Wu and He, 2015). The mini-census had a much larger sample size than the academic survey data collected by research institutes, enabling researchers to link individuals to the small geographic units where they resided (prefectures in this study).

The analysis here was restricted to the non-farm working population in urban areas who were in their prime working age between 25 and 54 at the time of the survey. The individual-level data from the mini-census were matched to prefecture-level statistics.

### Variables and measures

The main research interest in this article was gender inequality. The mini-census solicited information on monthly income using the item ‘income in the last month’ (October 2005), which included positive wages/salaries and other sources of income such as transferred earnings. Income derived from rental properties was excluded. In this analysis, the self-employed were excluded, and the income here, primarily wages, was almost identical to earnings. As labour markets and employment had become increasingly flexible and working hours now varied substantially, the hourly wage (the monthly wage divided by four times weekly working hours) was computed and we took its logarithm as the dependent variable of the following analysis. The analysis is focused on prime working age (25 to 54) individuals engaging in non-farm employment, as they had clearly defined working hours, and monthly wages. To rule out possible outliers that could distort the results, the top and bottom 1% of wage earners were further omitted, resulting in 509,784 observations. After dropping cases with missing data at either the individual or the prefectural levels, 460,692 observations were left for analyses.<sup>2</sup>

At the individual level, the key independent variable was gender, coded as a dummy (1 if female and 0 otherwise). Other individual characteristics included years of schooling, work experience, as well as marital status, *hukou* status, ethnicity, work unit sector and occupation. Education levels were quantified based on the number of years of schooling: illiterate = 0; primary school = 6; junior high school = 9; senior high school = 12; specialised college = 15; university = 16; and graduate school = 19. To measure work experience, each respondent's age was subtracted 7, added the number of years of schooling, and also added a squared term to capture the curvilinear relationship between work experience and earnings (Mincer, 1974). Marital status and *hukou* status were both coded as dummies (1 if married and 0 otherwise; 1 if rural *hukou* and 0 otherwise), as was ethnicity (1 indicates non-Han Chinese ethnicity and 0 otherwise). Work unit sector was coded into three categories: 1 = government/public institutions; 2 = public enterprises; and 3 = private sector. Occupation is coded into 5 categories: 1 = managers; 2 = professionals/associate professionals, 3 = office clerks; 4 = service workers; and 5 = manual workers. Both sector and occupation were treated as dummy variables in multivariate analyses. A variable indicating the probability of being employed was also created by running a binary logit model with whether a respondent was employed at the time of the survey as the dependent variable and age, age squared, number of years of schooling, gender, rural *hukou*, marital status and co-residence with a child under seven years old as independent variables. The probability of being employed is controlled to adjust for data censorship in our analytical sample (Dubin and Rivers, 1989).

At the prefectural level, the key contextual variables of interest were marketisation and economic development. The share of employment in the private sector was first used as a proxy for marketisation and GDP per capita to denote the level of local economic development, and then a comprehensive index was constructed to measure the two dimensions of the local economy based on an exploratory factor analysis (EFA) of social and economic indicators at the prefectural level collected from the *China City Statistical Yearbook* in 2005. Two common factors were identified, and the Varimax rotation method was applied to maximise the variance on the two dimensions to enable each factor to be as distinct as the other.<sup>3</sup> As the result shown, the share of employment in the private sector directly entered the first factor, along with other indicators with high loadings ( $\geq 0.5$ ), such as GDP per capita, local average wages and the share of domestic enterprises in GDP output, whereas GDP per capita and gross industry output value (GIOV) directly entered the second factor along with other indicators with high loadings ( $\geq 0.5$ ), such as the share of employment in the tertiary sector, educational expenditure and the share of the fiscal budget in local GDP and local average income of employed people. Conceptually, these two factors were referred to as marketisation and economic development respectively.<sup>4</sup>

To construct an index of marketisation and an index of economic development, all of the variables that entered the two extracted factors were standardised, and then the scale for variables with negative loadings was reversed so that they all acted in the same direction conceptually; third, for each factor, equal weight was assigned to the variables that belonged to the factor (Treiman, 2009). To allow the index to vary from 0 to 1, in the last step, the minimum value of the index was subtracted from the figures obtained from the second step and then divided by the difference between the maximum and minimum

**Table 1.** Top 10 prefecture-level cities by index of economic development and index of marketisation.

Exploratory factor analysis (EFA)						
Marketisation			Economic development			
	Code	Name	Value	Code	Name	Value
1	4403	Shenzhen	1.000	3101	Shanghai	1.000
2	3205	Suzhou	0.815	1101	Beijing	0.817
3	3502	Xiamen	0.788	4403	Shenzhen	0.749
4	3302	Ningbo	0.782	4401	Guangzhou	0.563
5	4420	Zhongshan	0.779	3205	Suzhou	0.466
6	3304	Jiaxing	0.778	1201	Tianjin	0.456
7	4404	Zhuhai	0.777	3301	Hangzhou	0.429
8	3505	Quanzhou	0.769	3302	Ningbo	0.392
9	4413	Huizhou	0.764	3201	Nanjing	0.381
10	3306	Shaoxing	0.720	3202	Wuxi	0.370

values. It is believed that such a composite index of marketisation could provide a more fine-tuned measure of the local economy and labour market situations than a single indicator could.

To check whether or not the constructed indexes were in line with our understanding of variations across cities, Table 1 listed the top 10 prefectural cities in terms of either index. Notwithstanding the significant and positive correlations between marketisation and economic development, the prefectures with the highest degree of marketisation might not necessarily enjoy the highest levels of economic development, and vice versa.

### *Models and analytical strategy*

Two-level linear models were employed to investigate the differential effects of marketisation and economic development on gender earnings inequality. As the intra-class correlation coefficient (ICC) of the null model shows, about 7.76% of the variance could be explained by income differences across prefectures (not shown here).<sup>5</sup> Therefore, it was necessary to take regional heterogeneity into account when analysing gender inequality.<sup>6</sup>

In multi-level models, the Level 1 model was an individual-level model, and the Level 2 model was a prefecture-level model. To show regional variations in the gender effect and the educational effect at the individual level while taking into account the covariance structure of the two-level model, the Level 1 residuals and coefficients of female and schooling were allowed to vary with a regional characteristic of our interest.<sup>7</sup>

The models were specified as follows:

Level 1 (Individual-level):

$$\begin{aligned} \ln(\text{Earnings})_{ij} = & \beta_{0j} + \beta_{1j}\text{Female}_{ij} + \beta_{2j}\text{Schooling}_{ij} + \beta_{3j}\text{Exp}_{ij} + \\ & \beta_{4j}\text{Exp}^2_{ij} + \beta_{5j}\text{Rural}_{ij} + \beta_{6j}\text{Minority}_{ij} + \beta_{7j}\text{Marry}_{ij} + \\ & \beta_{8j}\text{Workhour}_{ij} + \beta_{9j}\text{Danwei}_{ij} + \beta_{10j}\text{Occup}_{ij} + \beta_{11j}\text{Prob}[\text{Work}]_{ij} + \varepsilon_{ij} \end{aligned} \quad (2)$$

Level 2 (Prefecture-level):

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\text{Marketisation}_j + \gamma_{02}\text{EconDevelop}_j + u_{0j} \quad (3)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}\text{Marketisation}_j + \gamma_{12}\text{EconDevelop}_j + u_{1j} \quad (4)$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}\text{Marketisation}_j + \gamma_{22}\text{EconDevelop}_j + u_{2j} \quad (5)$$

$$\beta_{3j} = \gamma_{30} \quad (6)$$

$$\beta_{4j} = \gamma_{40} \quad (7)$$

$$\beta_{5j} = \gamma_{50} \quad (8)$$

$$\beta_{6j} = \gamma_{60} \quad (9)$$

$$\beta_{7j} = \gamma_{70} \quad (10)$$

$$\beta_{8j} = \gamma_{80} \quad (11)$$

$$\beta_{9j} = \gamma_{90} \quad (12)$$

$$\beta_{10j} = \gamma_{100} \quad (13)$$

$$\beta_{11j} = \gamma_{110} \quad (14)$$

where  $j$  indexes the  $j$ th prefectures.  $u_{0j}$  and  $u_{1j}$  were prefecture-level residual terms, which were assumed to follow a multivariate normal distribution, and the Level 1 residuals were also assumed to be normally distributed, that is,  $\varepsilon_{ij}^{iid} \sim N(0, \sigma^2)$ . In this specification, the parameter  $\beta$  represented a 'return' to an independent variable in 2005.

In the Level 1 model, the coefficient  $\beta_{1j}$  represented gender differences in the logarithm of hourly wages; in the Level 2 model,  $\gamma_{11}$  referred to the change associated with marketisation, and  $\gamma_{12}$  referred to the amount of change associated with economic development. Similarly, the coefficient  $\beta_{2j}$  represented a return to schooling, and  $\gamma_{21}$  and  $\gamma_{22}$  captured how returns to schooling varied with marketisation and economic development respectively, although this was not a focus of this study.  $u_{1j}$  referred to prefectural differences that were not captured by the multi-level model.

## Results

### *Descriptive statistics*

Table 2 presented descriptive statistics for selected variables to be included in the analysis. The upper panel was for individual-level variables. The average monthly wage was 1278.24 yuan for men and 1021.84 yuan for women. In other words, men earned an average of 25.1% more than women per month. After accounting for gender differences in weekly work hours, the average hourly wage for men was 21.2% higher than for women. This disparity might be explained by demographic differences between men and women associated with earnings, and indeed, as shown in Table 2, men tended to have had more years of schooling and greater work experience than women. In addition, there was a clear gender disparity in the distributions of employment sectors and occupation (also see He and Wu, 2017). Women were more likely than men to work in government/public institutions and the private sector as well as to work as professionals and service workers. The lower panel summarised the statistics for different prefectural-level indexes that measured marketisation and economic development.

### *Findings from multi-level models*

To address the questions pertaining to Hypotheses 1 and 2, multi-level models were employed to take into account the regional heterogeneity in analysing gender inequality. A series of nested multi-level models were estimated by relaxing model restrictions step by step. To test the hypotheses at the regional level, as previously mentioned, a single measure of marketisation (employment share of the private sector) and of economic development (GDP per capita) were first used in estimating the model and then replicated with the constructed indices of marketisation and economic development to check the robustness of the results.

Model 1 in Table 3 only included individual-level variables: gender, years of schooling, other demographic characteristics (i.e. marital status, rural or urban *hukou*, ethnicity, years of experience, years of experience squared), work unit sector and occupational category. Consistent with the results from Table 2, women earned significantly less than men, holding all other variables constant. In Model 2, at the prefectural level, the share

**Table 2.** Descriptive statistics of selected variables, sample of prime working age (25–54).

National sample	Total	Mean		Diff	p
		Male	Female		
Individual					
Monthly wage (yuan)	1175.662 (1106.899)	1278.24 (1194.059)	1021.843 (940.774)	256.397 (3.307)	.000
Weekly work hours	48.98 (11.145)	49.374 (11.196)	48.39 (11.042)	0.984 (0.033)	.000
Hourly wage	6.437 (6.514)	6.921 (6.965)	5.712 (5.695)	1.209 (0.020)	.000
Years of schooling	10.915 (3.205)	10.954 (3.099)	10.87 (3.302)	0.084 (0.010)	.000
Work experience	20.483 (8.665)	21.020 (8.767)	19.677 (8.446)	1.343 (0.026)	.000
Married %	89.497	89.103	90.086	-0.983	.000
Rural hukou %	35.752	37.27	33.477	3.793	.000
Ethnicity (minority=1)	3.834	3.768	3.935	-0.167	.004
Work sector %					
Government/public institutions	17.743	16.678	19.334	-2.656	.000
State/collectively owned enterprises	26.302	27.481	24.534	2.947	.000
Private/self-employed	55.955	55.84	56.126	-0.286	.055
Occupation %					
Manager	4.200	5.488	2.267	3.221	.000
Professional/associate professional	17.589	13.715	23.398	-9.683	.000
Office clerk	11.624	12.96	9.621	3.339	.000
Service worker	28.827	24.282	35.643	-11.361	.000
Manual worker	37.760	43.555	29.07	14.485	.000
N	460,692	276,381	184,311		
Prefecture-level city					
Single indicator					
Employment share of private sector					0.324 (0.497)
GDP per capita/10,000 yuan					1.693 (2.135)
Constructed index					
Index of marketisation					0.441 (0.116)
Index of economic development					0.127 (0.112)
N					281

Note: Numbers in parentheses are standard deviations.

**Table 3.** Hierarchical linear model predicting logged hourly wage in urban China ( $N = 460,692$ ).

	Single indicator measure			Constructed index measure	
	Model 1	Model 2	Model 3	Model 4	Model 5
Individual level					
Female	-0.173*** (0.003)	-0.174*** (0.003)	-0.180*** (0.011)	-0.197*** (0.005)	-0.158*** (0.018)
Schooling	0.062*** (0.000)	0.062*** (0.000)	0.037*** (0.003)	0.062*** (0.000)	0.025*** (0.004)
Prefectural level					
Marketisation		1.402*** (0.136)	1.421*** (0.230)	1.300*** (0.131)	0.648*** (0.157)
Economic development		0.407*** (0.043)	-0.099 (0.072)	0.417*** (0.041)	-0.123 (0.161)
Interaction					
Marketisation*Female			-0.275*** (0.070)		-0.159*** (0.046)
Economic development*Female			0.049* (0.021)		0.116* (0.046)
Marketisation*Schooling			0.004 (0.017)		0.023* (0.011)
Economic development*Schooling			0.045*** (0.005)		0.080*** (0.011)
Occupation	Yes	Yes	Yes	Yes	Yes
Work sector	Yes	Yes	Yes	Yes	Yes
Other demographics	Yes	Yes	Yes	Yes	Yes
Constant	1.899*** (0.017)	1.617*** (0.023)	1.915*** (0.036)	1.648*** (0.023)	1.845*** (0.062)
Log-likelihood	-323311.03	-323196.52	-315240.21	-322396.63	-315187.76
d.f.	15	17	21	17	21

Note: \*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ .

of employment in the private sector and GDP per capita, denoting marketisation and economic development respectively, were added. The results showed that the estimated  $\gamma_{01}$  for marketisation and  $\gamma_{02}$  for economic development were both significantly positive ( $p < .001$ ), suggesting that average earnings were higher in more marketised or more economically developed prefectures.

Numbers in parentheses are robust standard errors; only the results from the fixed part are displayed here. Models 1, 2 and 4 are random intercept models. Models 3 and 5 are random coefficient models, where both the coefficients for female and schooling are set as random. Employment share of the private sector and GDP per capita (100,000 yuan) are employed as the single measure of marketisation and economic development, respectively.

Differences in wages may arise from differences in productivity associated with geographic features and local institutions. Education was a commonly used measure of productivity whose effects could vary by region due to regionally specific factors such as the market size, labour market structure and access to natural resources, contributing to gender differences in earnings. In Model 3,  $\beta_{1j}$  for gender and  $\beta_{2j}$  for education were allowed to vary with marketisation and economic development at the prefectural level by adding their interaction terms to these two variables.

As shown in Model 3 in Table 3, the coefficients of the interaction term between schooling and marketisation and between schooling and economic development,  $\gamma_{21}$  and  $\gamma_{22}$ , were both positive, although only  $\gamma_{22}$  is statistically significant ( $p < .001$ ), suggesting that returns to schooling increased as the prefecture's level of economic development increases (also see Note 7).

The coefficient of the interaction term between gender and marketisation  $\gamma_{12}$  was negative and statistically significant ( $p < .001$ ), whereas the coefficient of the interaction term between gender and economic development  $\gamma_{11}$  was positive and statistically significant ( $p < .05$ ). The coefficient  $\gamma_{11}$  was  $-0.275$ , and given that the employment share of the private sector varied from 0.1 to 0.86,  $\gamma_{12}$  contributed between  $-0.028$  ( $= -0.275 \times 0.1$ ) and  $-0.236$  ( $= -0.275 \times 0.86$ ) to the baseline gender effect of  $-0.180$ . Similarly, the estimated coefficient  $\gamma_{12}$  contributed between 0.0098 and 0.133 to the baseline gender effect given that GDP per capita ranged from 0.02 to 2.72 (in units of 100,000 yuan).

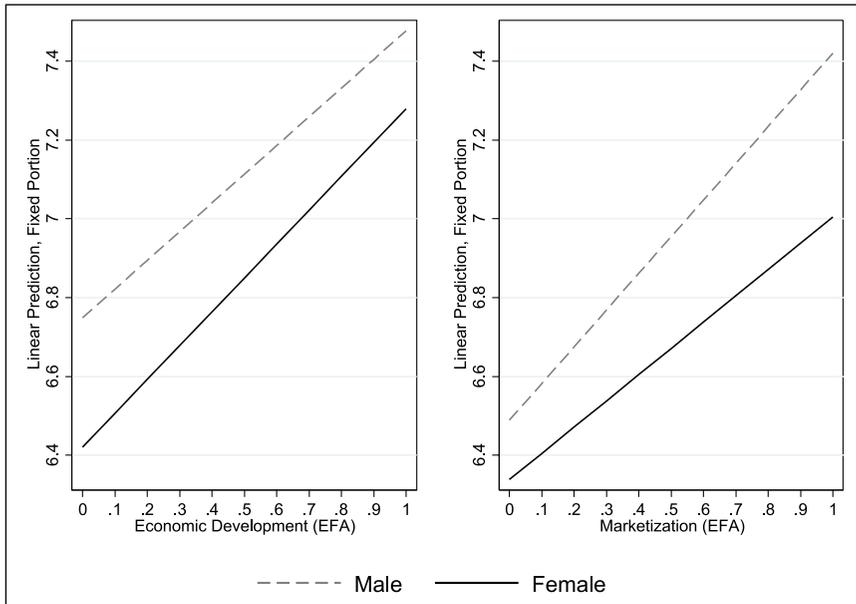
Confirming Hypothesis 1, gender earnings inequality was greater in prefectures where the private sector accounts for a greater percentage of employment, suggesting that marketisation tended to exacerbate gender inequality and made women worse off. In contrast, the higher the GDP per capita of a prefecture, the lower its gender earnings inequality was, lending support to Hypothesis 2. In other words, women tended to benefit from economic development to a certain extent.

To check the robustness of the results, Model 2 and Model 3 were replicated using alternative measures of marketisation and economic development – the indices derived from factor analysis in Models 4 and 5. The results remained largely the same.

Figure 1 presents the results more intuitively based on the estimated results from Model 5. As predicted by Hypotheses 1 and 2, the gender earnings gap increased with marketisation but decreases with economic development.

## Conclusion and discussion

The introduction of market forces into a socialist redistributive economy and their subsequent expansion have provided scholars with a unique opportunity to examine the institutional dynamics of the state and the market in reshaping social stratification in China. While numerous studies have focused on the changing effects of political and human capital on social stratification in the 1990s (Bian and Logan, 1996; Nee, 1989; Szelenyi and Kostello, 1996; Xie and Hannum, 1996), the effects of marketisation on gender inequality – an important aspect of social stratification – has not been specifically examined. Moreover, dramatic social and economic changes are multi-dimensional, involving not only marketisation but also other social forces, notably including economic development.



**Figure 1.** Change in expected logged earnings by economic development and marketisation using constructed *indices*.

It is thus important to determine the processes behind these changes and their complex mechanisms to understand the dynamics of gender inequality in urban China.

From an institutionalist perspective, the state and the market are two distinctive mechanisms of resource allocation and social stratification in modern societies. In capitalist economies, where the market is implicitly a major agent creating gender inequality, the state can institute legal anti-discrimination legislation or social policies to facilitate female labour force participation and reduce women's disadvantage in the labour market (Esping-Andersen, 1990; Orloff, 1996). Gender earnings gaps, for instance, are much lower in Scandinavian countries than in other western capitalist countries as a result of family-friendly social policies (Esping-Anderson, 1999). On the contrary, gender stratification dynamics in former socialist countries evolves from a different starting point: the state played a visible and direct role in promoting gender equality by virtue of its redistributive economic system, such as the work unit in urban China (Whyte and Parish, 1984). As reforms progress and the redistributive state gradually retreats from the economic sphere to give way to a competitive labour market, Chinese women have lost the institutional protections that were once backed up by the work unit system and now face greater disadvantages in the labour markets. Notably, unlike in developed countries, no government regulations/laws have been instituted in China to prohibit gender discrimination in the labour market, nor have social policies been instituted to ease the increasing conflicts between work and family.

It is argued that marketisation can push women into more marginal positions in labour markets and increase gender earnings inequality, whereas the industrial upgrading and educational expansion brought forth by economic development can improve women's

economic status and reduce the gender earnings gap. Taking advantage of regional heterogeneity in China, the article differentiates between measures of marketisation and economic development at the prefectural level and examines their respective impacts on gender earnings disparities in local labour markets.

The results show that, at the prefectural level, once the differential returns to education across regions are taken into account, while both marketisation and economic development increase earnings in local labour markets, women and men appear to benefit differently. Multi-level analyses confirm that marketisation tends to enlarge gender earnings disparities (Hypothesis 1), whereas economic development can help reduce such inequality (Hypothesis 2). These findings reveal the different mechanisms and processes affecting gender inequality during urban China's economic transition.

While the prefectural analyses do not imply that the impacts of different driving forces on gender earnings inequality necessarily change linearly over time, many scholars have estimated changes over time across spatial variations (e.g. Hammond and Kolasa, 2014; Xie and Hannum, 1996). Incidentally, predictions on how marketisation affects gender inequality in urban China are consistent with the temporal trends identified during a specific period from 1988 to 2003 (e.g. Zhang et al., 2008a). In multi-dimensional transformation processes, overall patterns of gender earnings inequality can reflect the influence of different social forces. The recent increase in gender inequality suggests that marketisation may be the main agent shaping patterns of gender stratification in post-socialist labour markets in urban China.

It is important to note that the impact of market transition on gender inequality varies substantially between countries with different macroeconomic conditions. For instance, Brainerd (2000) shows that gender wage inequality has increased in Ukraine and Russia since the market reform but has decreased in other Eastern European countries. This can be explained by each country's distinct economic experience of the transition, as the economic recession was much more severe in the former Soviet Union than elsewhere in Eastern Europe (Gerber and Hout, 1998; Van der Lippe and Fodor, 1998). In China, marketisation has been accompanied by rapid economic growth, which may have allowed Chinese women to compensate for their increased disadvantages. We distinguish between two types of forces that affect gender inequality in opposite directions and show that marketisation has yielded more profound consequences than observed for women and gender relations in labour markets, marriage markets and in private family life (He and Wu, 2015; Ji et al., 2017). Unsurprisingly, urban China has witnessed a decline in female labour force participation and an increasing gender earnings gap since 1990 despite the significant progress that women have made in education in recent decades (Wu and Zhou, 2015). Marketisation has led to not only more open discrimination against women in the labour market but also increased tensions between women's paid work and unpaid household work, thereby increasing the obstructive role of marriage and family in women's career advancement and socio-economic attainment (He and Wu, 2016); for other former state socialist countries, see Gerber and Perelli-Harris (2012); Glass and Fodor (2011); Trappe and Rosenfeld (2000). As a result, delayed marriage and remaining single have rapidly become increasingly prominent among career-seeking women in many Chinese cities (e.g. Ji, 2015). On the other hand, without effective family policies to alleviate the work-and-family conflict after the collapse of the urban Chinese work unit system, childbirth

continues to hinder married women's career development, and the implications of the recent relaxation of the one-child policy for gender inequality call for further investigation.

Lastly, while two types of forces shaping gender stratification over decades of massive social and economic changes in China have been identified, other social processes at the macro level, such as population migration and economic globalisation, may also have had a profound impact on gender stratification. Moreover, regionally specific factors such as gender ideology and norms and institutional arrangements on women's roles in paid work and housework also considerably influence gender inequality. Further empirical analyses are thus needed to account for regional variations in patterns of gender inequality in China.

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### Notes

1. An alternative approach to the special case of Germany has been to compare the former East Germany and West Germany (e.g. Trappe and Rosenfeld, 2000).
2. Given such a large sample size, the list-wise deletion of 9.63% of sample with missing values was very unlikely to bias our results.
3. The number of factors identified is generally based on whether or not the eigenvalues are greater than 1, and most variance can be explained by the factors identified.
4. Here, GDP per capita was loaded on both factors, a result not surprising, as it implied the correlated feature between marketisation and economic development, which were conceptually distinct but not completely independent of each other. Indeed, the regional differentials in GDP per capita could be seen as the outcomes of both marketisation and economic development, but GDP per capita had the highest factor loading on economic development, which justified it as a proxy for local economic development in the single indicator approach in the first step of our subsequent analysis.
5. The ICC can be calculated based on `sd(_cons)` and `sd(Residual)` in the output of the null model using the `xtmixed` command in STATA.

$$ICC = \frac{sd(_cons)^2}{sd(_cons)^2 + sd(Residual)^2}$$

6. Three tests were conducted to justify the use of random effects models. The Breusch-Pagan statistic test examined the null hypothesis and estimates whether the Level 2 variance was equal to 0. The likelihood-ratio test compared the fitting variance-components model to one

without a random intercept. The score test was based on a quadratic approximation of the likelihood at  $\psi = 0$ . All three tests consistently showed significant results ( $p < .001$ ) (results available upon request). Hence, prefectural random effects needed to be taken into account.

7. Here the model strategies followed Xie and Hannum (1996: 963), in which they reported a positive coefficient for cross-level interaction between schooling and the economic growth of cities, and interpreted the evidence as showing that returns to education increase with marketisation. Indeed, one of the major concerns in the market transition debate is about the changing role of human capital in China's economic transition (Szelenyi and Kostello, 1996). However, scholars have not reached consensus on how to measure marketisation. As Nee (1996: 944) criticised, the city indicator that Xie and Hannum (1996) used is a proxy of industrial growth rather than a measure of the extent of the shift to markets. This research has made conceptual distinction between marketisation and economic development and included both in the model specifications to address the issue concerning returns to human capital.

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