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Understanding Urban Wage Inequality in China 1988–2008: Evidence from Quantile Analysis

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Summary. — This paper examines change in wage gaps in urban China from 1988 to 2008 by estimating quantile regressions on CHIPS data. It applies the Machado and Mata (2005) decomposition, finding sharp increases in inequality largely due to changes in the wage structure. During 2002–08, changes in the returns to education and experience have been equalizing. However, changes in other categories of wage differential—by sex, occupation, ownership, industrial sector, and province—widened inequality. The gender gap continued to rise, as did the gap between white collar and blue collar workers, and between manufacturing and other sectors.

Key words — China, labor, wages, quantile regression, inequality

1. INTRODUCTION

Rising inequality is a serious concern for China. Over the last few decades, China has experienced soaring GDP growth but at the same time, widening income inequalities. Conventionally, rising income inequality in transitional economies has been viewed as a necessary trade-off for increased efficiency, with pre-reform China emphasizing an egalitarian distribution of earnings the expense of incentives and rewards for private initiative. Yet widening inequality may destabilize the economy—fostering socio-political discontent from the "losers" and thereby engendering instability.

The rise of wage inequality in urban China has been analyzed by a number of authors. However, most analysis of wages has used conventional regression analysis, implicitly focusing on wage differentials at the mean—see, for example, Ge and Yang (2012) and Meng, Shen and Xue (2012). Conventional regression analysis is limited since inequality depends on the entire distribution of wages—not merely what is happening to the middle of the distribution—and the parameters of a regression model may vary across the distribution. Instead, one contribution of this paper is to apply quantile analysis in order to map differentials across the entire distribution of wages from 1988 to 2008. This approach, pioneered by Buchinsky (1994) for the US, has been used to track the evolution of wage structures in many different countries. Early applications to urban China have been conducted by Knight and Song (2003) and Bishop, Luo, and Wang (2005). However, both these studies are restricted to comparing the urban labor markets in 1988 and 1995, based on the Chinese Household Income Project surveys (CHIPS). This paper goes further by extending the analysis to cover CHIPS data up to 2008.

A second contribution of our paper is to use the results of the quantile analysis to formally decompose changes in earnings inequality from 1988 to 2008 using the method of Machado and Mata (2005). This technique attributes changes in inequality into two broad sources. The first is changes in the wage structure—the coefficients of the quantile regressions. The second is changes in the covariates determining earnings—i.e., worker and job characteristics. Within these two broad categories, the decomposition also quantifies the contribution of specific determinants of earnings—for example, education—to inequality. We can thus estimate the effect of changing returns to education and a changing stock of education on the Gini coefficient for earnings in urban China. Similar estimates are provided for other factors such as experience, gender, Communist Party membership, ethnicity, ownership sector, occupation, and industrial sector. Our paper is similar in objectives to a study by Xing and Li (2012), who look at residual wage inequality in China using CHIPS data from 1995 to 2007. We differ in starting from 1988 and by focusing on the Machado and Mata (2005) method, rather than the alternative DiNardo et al. (1996) decomposition. To anticipate our findings, both decomposition methods agree in attributing most of the rise in urban wage inequality in China to changes in the wage structure rather than to changes in the covariates of wages. However, beyond corroborating an existing finding in the literature, our decomposition goes further in disaggregating the changes in the wage structure into the effects of changes in the returns to specific worker and job characteristics.

The rest of the paper is structured as follows. Section 2 provides background, first providing an analytical framework for understanding wage differentials and then describing the institutional changes that occurred in China during the three sub-periods between the surveys. Section 3 introduces the data and econometric methods. Section 4 gives the result of the quantile analysis, focusing on how the returns to various observed worker characteristics changed in the period and how that varied across the conditional wage distribution. Section 5 presents the decomposition of wage inequality using the Machado–Mata method. Section 6 summarizes and concludes.

2. BACKGROUND

(a) *Analytical framework*

There are several potential broad explanations for the rise in wage inequality in China—notably, capital accumulation, skill

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biased technological progress, rural–urban migration, and the transition from a command to market economy. We briefly discuss these explanations—and any contrary equalizing forces—before turning to look in more detail at the specific institutional and policy changes within China during the period that may have played a role.

Much of the literature on wage inequalities starts from the premise that these reflect skill premia (see Acemoglu, 2002). While some skills may be proxied by observable worker characteristics such as education, others may be unobserved. Over time, the returns to skills may change due to changes in complementary factors or technology. Physical capital is typically thought to be more complementary to skilled labor than unskilled labor. China's exceptional economic growth has been driven in part by extremely high rates of investment in physical capital (for example, gross fixed capital formation rose from 31% of GDP in 1988 to 41% in 2007). Consequently, this accumulation of physical capital may be one factor behind the rise in wage inequality in China—an effect that will be amplified to the extent that capital goods embody skill-biased technical change.

The debate on the causes of rising wage inequalities in countries such as the US and the UK in recent decades has focussed on technology and trade as rival explanations for a rise in the price of skills. Technological progress such as computerization has been characterized as "skill-biased", complementing the productivity of skilled workers more than unskilled ones. Increased international trade may also benefit skilled workers in the West, following the Heckscher Ohlin theory. While the skill-biased technological change story may also apply to China, the Heckscher–Ohlin theory has the opposite implications for China to those for the West. Being abundant in unskilled labor, increased trade should reduce the premium enjoyed by skilled workers according to the simple theory (Chinese exports increased from 15% of GDP in 1988 to 35% in 2008). However, in practice, this effect of increased trade is complicated by the fact that openness is an important route for technological innovation in China. It allows imports of capital goods that embody advanced technologies and is associated with increased foreign direct investment, which may also transfer technology.

While skilled workers in urban China may have benefited more from technical change, they are also more likely to have protected been from competition from rural–urban migration. Since rural–urban migrants tend to be less educated than urban residents, they will have exerted more of a downward pressure on the wages of less skilled urban workers than on the wages of skilled workers. Many of the jobs of skilled workers are still effectively closed to rural–urban migrants, having a requirement of an urban household registration (*hukou*). Educational expansion may have served as a contrary supply side change, reducing the scarcity value of skills, but—as will be explained below—this may have been confined to the later part of the period under study.

The increase in rural–urban migration in China in the period in part reflects an institutional change: the reduction in official restrictions on labor mobility for rural households. There have been several other such changes during China's transition from a planned economy since 1978 which are likely to have influenced wage determination. Since planned economies are run on egalitarian Marxist principles, transitions to market-oriented economic systems are often expected to be disequalizing. In general, it has been argued that the transition from a planned economy to a market one will see a rise in the remuneration of productive characteristics and a fall in the importance of non-productive ones (Nee, 1989). The economic forces affecting the returns to skills will come to predominate in setting wages and so the wages paid by profit-maximizing firms will vary more than under administratively set pay schemes. However, there are at least two caveats to this general presumption. First, in China, the initial urban enterprise reforms gave managers of state-owned enterprises the freedom to vary the earnings of their employees through bonuses. In practice what this tended to mean was that the enterprise profitability became a major determinant of wages, contrary to the predictions of a competitive labor market. Within firms, bonuses were often allocated equally, an allocation likely to have been seen as equitable by workers given prevailing egalitarian beliefs and thus perhaps reflecting a managerial preference for a quiet life. Indeed, a rent-sharing model of wage determination seems at least as plausible in the Chinese context as a competitive one. Second, the market may allow an increase in wage discrimination by observed characteristics that are not *prima facie* productive, such as gender. Moreover, in the process of transition, the labor market may come to be more segmented. For example, certain industries or occupations may be effectively protected from entry by rural–urban migrants. In the next section, we describe in more detail the institutional changes in China during the period and how they are likely to have affected urban wage inequality.

(b) *Institutional changes in China, 1988–2008*

Given that our data consist of cross-sectional surveys taken in 1988, 1995, 2002, and 2008, it is useful to consider the major changes that took place in each of the three sub-periods between the surveys. The surveys were timed to give fairly equal intervals between them and to some extent align with notable changes in the Chinese economy and, to some extent, political leadership.

The first sub-period, from 1988 to 1995, can be characterized as the transition of a socialist economy from an administered system of wages to one with more competition but still within the framework of state ownership. In 1988, it can be questioned whether a labor market even existed in urban China (Knight & Song, 2005). Most workers were centrally allocated to their employment, basic wages were administratively determined, job security was guaranteed and there was almost no labor mobility. There was virtually no private employment in 1988, so it cannot be presumed that employers set wages competitively to reflect labor productivity. However, while there was minimal labor market competition, there was growing product market competition. Growing out of the plan, state-owned enterprises firms could more freely compete with each other and also faced a challenge from the low-cost rural enterprise sector that had emerged in the 1980s (Naugton, 1996). Moreover competition was no longer restricted to domestic markets, with the onset of trade liberalization after Deng Xiaou Ping's "southern tour" in 1992. This increased product market competition is likely to have affected wage determination due to the freedom already given to managers in the 1990s to set worker remuneration. This often took the form of paying bonuses on top of basic salaries. As in rent-sharing models of wage determination, workers in firms with profits could expect to share in this good fortune, but an increasing number of SOEs were becoming loss-making and so received no bonuses. Increased wage inequality in the period may therefore have partly been a reflection of increased variation in firm performance.

The second sub-period, 1995–2002, can be characterized as a period of retrenchment within the urban state sector, as it coincides with the period of radical urban reforms known as