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Wage Earnings of Chinese Immigrants: A Semi-Parametric Analysis*

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Abstract: This research analyzes the wage distributions of mainland Chinese immigrants in Hong Kong using a semi-parametric method that estimates the distributions of wages that would prevail if the immigrants were paid according to the local wage schedule. The semi-parametric scheme adopted is based on a simple re-weighting of the distribution of wages of the natives. Present results reveal that medium-waged Chinese immigrants are disproportionately likely to experience labour market discrimination. Newer immigrants also appear to face more obstacles in achieving higher salaries than old immigrants.

Key words: Counterfactual density, discrimination, Epanechnikov kernel, log wage

INTRODUCTION

Since the reversion of Hong Kong to Chinese sovereignty in 1997, there have been some interests in the comparison of wages between native-born Hong Kong residents and immigrants from mainland China. Hong Kong has traditionally been viewed by many mainland Chinese as a land of opportunity and a chance for better life. Between 1950 and 1980, waves of mainland Chinese immigrants and refugees came to Hong Kong to escape poverty, war and communism. Since Hong Kong has one of the world's lowest birth rates, the mainland immigrants are crucial to replenishing Hong Kong's workforce. Nonetheless, the influx has also posed many challenges to the former British colony. By 1970's, Hong Kong's population had swollen to 4 million from 1.8 million in 1947. Before 1974, immigrants from China were basically allowed free ingress into Hong Kong. Between 1974 and 1980, Hong Kong had a touch-base policy toward Chinese immigrants-those who made it to Hong Kong without being arrested at the border could stay. After touch-base ended in 1980, 75 one-way permits a day were available to mainland Chinese. That number was later raised to 105 and since July 1995, 150 a day, so that some 54,750 mainland Chinese arrived each year since 1995. The main purpose of the quota was to facilitate family reunion. Despite its reversion to China in 1997, Hong Kong still enjoys a large autonomy in many policies including immigration. Laws of both Hong Kong and China require people from other parts of China who want to come to Hong Kong to apply for approval under a strict quota system and entry is by no means automatic. Generally speaking, Chinese immigrants in Hong Kong are less educated and more likely to concentrate in blue-collar professions, but the older immigrants who fled to Hong Kong immediately after the communist victory in China in 1949 also comprise a significant number of entrepreneurs. The post 1980 immigrants are all legal and are generally better educated than the old immigrants. In terms of language abilities, only a small percentage of Chinese immigrants can speak English but a substantial number of them are fluent in Mandarin (Wan, 2006). A recent research by Law and Lee (2006) contains a good recount of the history of Chinese immigration in Hong Kong.

There is a popular belief that native Hong Kong residents at large earn substantially higher incomes than mainland Chinese immigrants. Recent mainland immigrants are frequently stereotyped by local Hong Kong residents as low-skilled workers with low income and an alien group that

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competes with the locals for jobs and welfare resources. The common contention is that role differentiation stemming from social attitudes and discrimination partly determines the wage differentials between these two groups. Generally, labour economists have held the conventional belief that immigrants' earnings will catch up with the locals' as they assimilate into the host country (Hu, 2000; Barth *et al.*, 2004; Cohen and Haberfeld, 2007). In the case of Hong Kong, however, Lam and Liu (2002) have found that immigrants from China have been unable to narrow the wage gap with respect to the locals over time. Such earnings divergence, as argued by Lam and Liu (2002), is due to the deterioration in the relative educational skill prices of the immigrants brought about by Hong Kong's economic restructuring. In a recent study, Wan (2006) applied the well-known Blinder-Oaxaca decomposition to a large sample of the 2001 Hong Kong Population Census data and found that between 22 and 47% of the logarithmic wage differential between native Hong Kong residents and Chinese immigrants can be explained by discrimination. There is also evidence that the curtailment of illegal immigration in the early 1980's play an important role in explaining wage differentials among the various subgroups of Chinese immigrants in Hong Kong.

The Blinder-Oaxaca decomposition involves estimating the average wage of the Chinese immigrants had they been paid with the wages in the local sector. As is well known, the application potential of this technique is largely restricted to situations where the object of interest is the mean wage. It is not very helpful for explaining differences in the wage distributions of population subgroups. The current article uses the semi-parametric approach developed by DiNardo *et al.* (1996) to estimate a similar counterfactual for the entire distribution, not just at the mean. This allows us to expand the discussion from the mean wage gap to comparisons at various points in the distribution. It also avoids making parametric assumptions that may result in incorrect inferences even for the average wage gap (Barsky *et al.*, 2002). Our empirical basis is the 1% sample of the 2006 Hong Kong Population By-Census. The By-Census data contain observations on 81 variables on the resident population and demographic characteristics. Observations of residents who are economically inactive, with no income or were born neither in Hong Kong nor China are excluded from the analysis. This selective exclusion of immigrants does not lead to any serious bias as according to the 2006 By-Census, Chinese immigrants account for 84.35% of the total immigrant population in Hong Kong. After these exclusions, our sample consists of 28,536 observations. The majority of these observations of individuals were born in Hong Kong (19,749) and the rest (8,787) are Chinese immigrants. For purposes of analysis we distinguish four types of Chinese immigrants: very recent Chinese immigrants (those arrived in Hong Kong for no more than 4 years), moderately recent Chinese immigrants (those arrived in Hong Kong for between 4 and 8 years), settled Chinese immigrants (those arrived in Hong Kong for between 8 and 20 years) and old Chinese immigrants (those arrived in Hong Kong for more than 20 years). The numbers of observations corresponding to these four types of immigrants are 459, 670, 1712 and 5946, respectively. Our basic wage variable is the natural logarithm of the total monthly income from all employment (LINC).

MATERIALS AND METHODS

Here, we briefly describe our semi-parametric estimation method. Our basic methodology follows that of DiNardo *et al.* (1996) with minor modifications. Let w be wages, x be the characteristics other than immigrant status, l refers to locals and m refers to immigrants. The definition of conditional probability yields the following representation of the overall distribution of wages:

$$f(w) = \int f(w | x)f(x)dx. \quad (1)$$

To consider the effect of immigration it is instructive to define two other densities. First, the observed density of wages of the locals is given by

$$f(w|l) = \int f^l(w|x)f(x|l)dx \tag{2}$$

where, $f^l(w|x) \equiv f(w|x,l)$. Likewise, the observed density of wages of the immigrants (or a given subgroup of immigrants) is given by

$$f(w|m) = \int f^m(w|x)f(x|m)dx, \tag{3}$$

where, $f^m(w|x) \equiv f(w|x,m)$. We would like to know, first, what the distribution of the overall wages would be if everyone (locals and immigrants) were paid local wages and second, what the distribution of the immigrants' wages would be if the immigrants were paid local wages. To ascertain the first question, note that

$$f^l(w) = \int f^l(w|x)f(x)dx \tag{4}$$

is the density of the overall wages if all workers were paid under the wage structure in the local sector. Equation 4 is in fact very similar to Eq. 2 except that we integrate over the distribution of the characteristics x for all workers ($f(x)$) instead of just the locals ($f(x|l)$). Now, by Bayes' Theorem:

$$f(x) = f(x|l)Pr(l)/Pr(l|x) \tag{5}$$

Substituting 5 in 4 yields

$$f^l(w) = \int \lambda_1 f^l(w|x)f(x|l)dx \tag{6}$$

where, $\lambda_1 = Pr(l) / Pr(l|x)$. So, $f^l(w)$ is virtually identical to $f(w|l)$ except for the weight λ_1 and the counterfactual density (6) is based on a simple re-weighting of the distribution of wages of the locals. Note that $Pr(l)$ is simply the proportion of locals in the sample, while $Pr(l|x)$ can be estimated by a discrete choice model such as the Logit. Similarly, to ascertain the second question, note that

$$f^m(w) = \int f^l(w|x)f(x|m)dx \tag{7}$$

is the counterfactual wage density of the immigrants if they were paid under the wage structure of the locals. By analogy to the preceding analysis we can rewrite Eq. 7 as:

$$f^m(w) = \int \lambda_2 f^l(w|x)f(x|l)dx, \tag{8}$$

where, $\lambda_2 = (Pr(l)Pr(m|x)/Pr(m)Pr(l|x))$.

Empirical Results

This section reports the empirical results of our analysis, which has been undertaken with the SHAZAM (version 10) Econometric package. Figure 1 provides the kernel density estimates of LINC

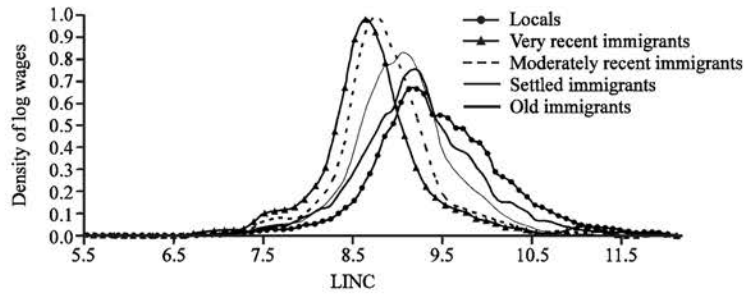


Fig. 1: Actual wage distributions

of natives and the four subgroups of Chinese immigrants. The estimation procedure uses the Epanechnikov kernel function with the bandwidth determined by Silverman’s plug-in estimate (Cameron and Trivedi, 2005): $h = 1.3643 \delta n^{-1/5} \min(s, q/1.349)$, where $\delta = 1.7188$, s and q are the standard deviation and interquartile range of the log earnings and n is the number of observations. This bandwidth is relatively robust to the skewness and kurtosis of unimodal distributions, such as the lognormal and t family of distributions and is based on the minimization of the approximate mean integrated squared error of the density estimate. The distribution of LINC for natives is centered at around 9.48 (the equivalent of \$HK13,095 per month), while for the Chinese immigrants the corresponding distributions are centered at relatively lower levels of log earnings—at around, respectively, 9.25, 9.07, 8.91 and 8.77 (the equivalent of \$HK10,405, \$HK8690, \$HK7,406 and \$HK6,428 per month) for old, settled, moderately recent and very recent Chinese immigrants. There is a general rightward shift in the immigrant wage distribution as the immigrant’s period of residence in Hong Kong increases. This observation may be taken to imply the existence of a reduction in wage disadvantage as the Chinese immigrants assimilate into Hong Kong. Also, the wage distributions of the very recent and moderately recent immigrants tend to be very peaked and highly concentrated in the first and second quartiles of the native wage distribution. Although the wage distributions of the Chinese immigrants are all to the left of the distribution of the native-born, the differences among the distributions are not as apparent at very high (>11.5) and very low (<7.0) earnings as near the middle income levels. Hence, the impact of being a Chinese immigrant appears to be far more pronounced across the middle percentiles of the earning distribution than it is at the two tails.

We then apply the methodology described in the preceding section to the combined sample of native-born and Chinese immigrants. First, we are interested in computing the density described in Eq. 6, that is, the overall wage density that would prevail if everyone were paid according to the prices of skills of the native-born. To construct this counterfactual density we first estimate a Logit model for $\Pr(I|x)$. Our initial Logit equation includes district of residence, type of accommodation occupied, ability to speak English, Mandarin and other Chinese dialects, highest educational attainment, employment by occupation and industry and marital status as observed characteristics. The final model includes only the significant variables and has a percentage of correct predictions of 80.34. The weight λ_i for each observation in the sample can be calculated by dividing the unconditional probability $\Pr(I)$ which is just the proportion of natives in the sample, by the predicted $\Pr(I|x)$. Having calculated λ_i (and normalized to sum to 1), we then compute the counterfactual density estimate by adapting the Rosenblatt-Parzen kernel density estimator to the case in which the sample weights are attached to each observation, as in

$$\hat{f}(w) = \sum_{j=1}^n (\lambda_{ij}/h) K((w - w_j)/h), \tag{9}$$

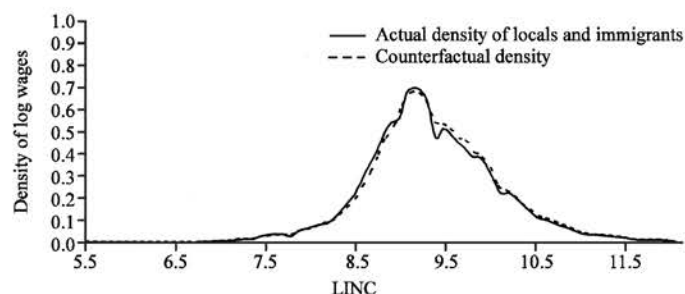


Fig. 2: Actual and counterfactual wage distributions (locals and immigrants)

where we use $j = 1, \dots, n$ workers with wages w_j . As before we adopt the Epanechnikov kernel as the Kernel function K and Silverman's plug-in estimate for the bandwidth h .

Figure 2 overlays two densities: the actual observed wage density for the entire set of native-born and Chinese immigrant workers and the counterfactual density of overall wages that would have obtained if the Chinese immigrants had been paid local wages. Figure 2 shows that counterfactual density is very close to the actual density, but the counterfactual density is slightly right-shifted compared to the actual density. Much of the difference between the two distributions is slightly below and slightly above the median. At the upper and lower tails the counterfactual density is virtually identical to the actual density. It thus appears that immigrant/native wage differential affects the wages of middle-class immigrants (i.e., those in the middle portion of the distribution) the most relative to their high-wage and low-wage counterparts. This finding supports the view that semi-skilled immigrants earning medium wages are most likely to experience labour market discrimination. The problem of work availability may also be a factor that contributes to making this contingent of immigrants subject to the largest extent of labour market discrimination. It has been suggested that semi-skilled workers often experience higher levels of unemployment or underemployment than those with characteristics associated with higher earnings, even when the economy is strong. Recent work by Carlsson and Rooth (2007) has found similar results for Sweden, i.e., a higher level of discrimination against minorities tend to occur in semi-skilled jobs compared to high-skilled jobs.

Our second set of counterfactual densities, as described in (8), is concerned with the wage distributions of subgroups of Chinese immigrants if they were paid under the wage structure of the natives. The computation of (8) differs from that of (6) in that first, we use λ_2 instead of λ_1 to weigh the observations and second, in estimating the Logit for $\Pr(l|x)$ and $\Pr(m|x)$ we use the sample containing the locals and the focused subgroup of immigrants only. Thus, when computing the counterfactual wage density of, say, settled immigrants under local wages, we use only the observations of the natives and settled immigrants in the Logit for $\Pr(l|x)$ and $\Pr(m|x)$. The Logits using observations of natives combined with those of the very recent, moderately recent, settled and old immigrants have percentages of correct predictions of 95.88, 95.74, 93.39 and 84.24, respectively. Figure 3-6 present the counterfactual density estimates. Each picture overlays the actual wage density of the immigrant subgroup, the corresponding counterfactual density along with the wage density of the natives for comparison purposes. Again, the counterfactual density of each immigrant subgroup is right-shifted compared to the corresponding actual wage density, but there is also substantial overlap. The overlap is substantially larger for the older immigrants than for the newer immigrants. For the subgroup of old immigrants (Fig. 3) the actual and counterfactual wage densities are very similar. In other words, if the old immigrants had instead been paid the wages of the locals we would nonetheless observe a very similar wage distribution. Similar to Fig. 2, Fig. 3 shows that much of the difference between the actual and counterfactual densities of the old immigrants is again slightly below

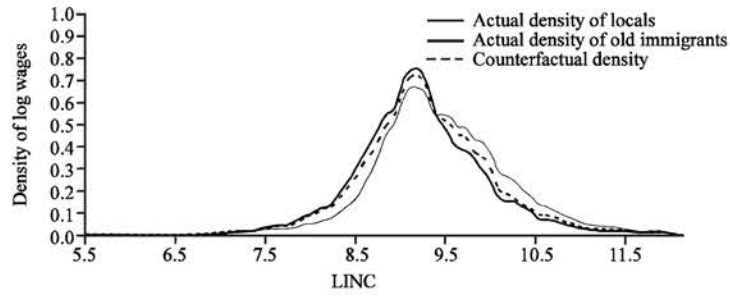


Fig. 3: Actual and counterfactual wage distributions (old immigrants)

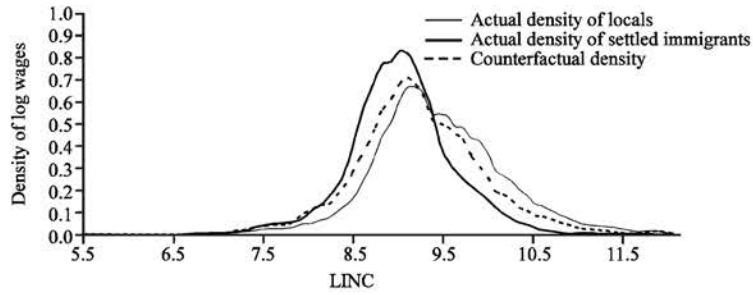


Fig. 4: Actual and counterfactual wage distributions (settled immigrants)

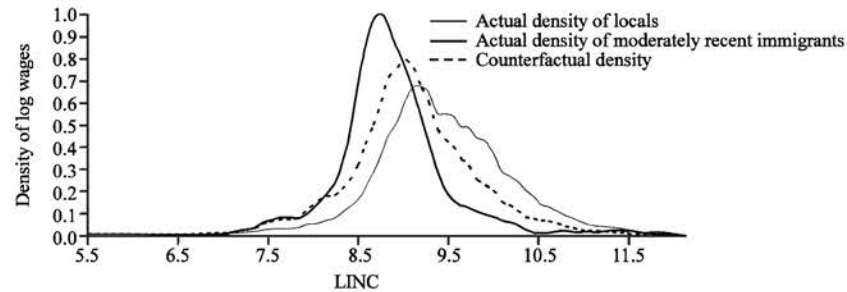


Fig. 5: Actual and counterfactual wage distributions (moderately recent immigrants)

and slightly above the median. The shift in the counterfactual wage density becomes more evident in the case of settled immigrants, as Fig. 4 shows. The corresponding counterfactual density shows a more noticeable concentration to the right of the mode, but in the tails the differences between the actual and counterfactual densities are again quite small. For the newer immigrants the gaps between the actual and counterfactual densities grow even larger. Figure 5 and 6 show that for the subgroups of moderately recent and very recent immigrants, the counterfactual densities show a much higher concentration to the right of the mode than the corresponding actual densities do and are less peaked than the actual densities. It is also interesting to note that although in all cases the counterfactual wage densities are right-shifted compared with the actual densities there are still gaps between the counterfactual wage densities of immigrants and the observed wage density of the natives, with the immigrants still relatively over-represented to the left of the mode and natives relatively over-represented to the right of the mode. This suggests that even if the immigrants were paid under the

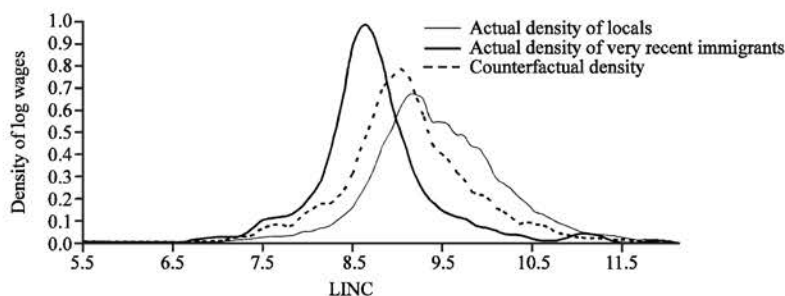


Fig. 6: Actual and counterfactual wage distributions (very recent immigrants)

wage scheme of the locals there would still be an earning gap between the two groups in the second and third quartiles of the distribution. A simple explanation is that the Chinese immigrants in Hong Kong are generally less educated than the natives and tend to concentrate in relatively low-paid occupations. This is unsurprising because under the policy that has been in force since the 1980's, family union is the main purpose of immigration from mainland Chinese as embodied in the quota system, with many of the recent immigrants being spouses and children of blue-collar Hong Kong men.

CONCLUSIONS

This study examines the differences in the distribution of wages for natives and Chinese immigrants in Hong Kong. At issue is how much of the difference is due to labour market discrimination. We approach the problem by computing counterfactuals of the distribution of wages that would prevail if the immigrants were paid according to the observed local wage schedule. Using a dataset from the 2006 Population By-Census we have found that Chinese immigrants who are medium-skilled and immigrated to Hong Kong in recent years are most likely to face discrimination in the labour market, while old immigrants or those in highly-skilled jobs tend to earn about the same as comparable locals. While this study does not settle the question of labour market discrimination definitively, it does clearly suggest that being a Chinese immigrant in the Hong Kong labour market can mean very different things at various parts of the earning distribution.

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