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Abstract

In China urban residents have traditionally been protected against labour market competition from rural-urban migrants. Over the period of urban economic reform, rural-urban migration was allowed to increase in order to fill the employment gap as growth of labour demand outstripped that of the resident labour force in urban areas. However, as reforms gained pace and controls were lifted, it is plausible that migrants and urban residents increasingly competed. The paper examines whether the relationship is one of complementarity in a still segmented labour market or of substitutability in an increasingly competitive labour market. It uses attitudinal responses from two urban surveys and a panel data set covering the 30 provinces over the period 1994-2000. We obtain very different results from cross-section, random effects and fixed effects panel estimates, raising interesting methodological issues. The findings are consistent with the presence of continued labour market segmentation but suggest also that competition between the two groups may be increasing.

1. Introduction

In China urban residents have traditionally been protected against labour market competition from rural-urban migrants. Over the period of urban economic reform – beginning in the mid-1980s and accelerating in the 1990s – rural-urban migration was allowed by government to increase in order to fill the employment gap when growth of labour demand outstripped that of the resident labour force in the urban economy. However, as the reform process gained pace and controls were lifted, it is plausible that migrants and urban residents increasingly competed. It is therefore important to discover whether the relationship between the two groups of workers is one of complementarity in a still segmented labour market or of substitutability in an emerging competitive labour market.

This paper attempts to answer that question. In section 2 we provide the relevant historical and institutional background. Section 3 presents evidence from two urban surveys that, inter alia, contain questions on the attitudes of firms and workers. Section 4 sets out the alternative hypotheses that flow from sections 2 and 3. To conduct the empirical analysis, we constructed a panel data set from official published statistics on the labour market, covering the 30 provinces over the seven-year period 1994-2000. Section 5 explains the data set and the variables to be used, and section 6 outlines our estimation strategy. Section 7 presents and interprets the results of the panel estimations. Section 8 concludes.

2. Urban Insiders and Rural Outsiders in the Reform Process

During the period of the communes and central planning, the movement of labour in China was tightly controlled and restricted. During the period of economic reform and transition to a market economy, rural-urban migration became important, reflecting a growing urban need

for migrant labour but also a weakening in the power of the authorities to control labour. Despite their greater freedom, it remains difficult for rural workers to acquire urban registration (*hukou*) and thus permanent urban residence. Government attempts to maintain continuing control over the 'floating' population of temporary rural-urban migrant workers. Generally, migrants have been permitted only in the 'residual' urban wage jobs not wanted by residents. These tend to be the lowest wage, lowest skill, least pleasant jobs. Although rural households have a strong economic incentive to send out workers to the cities and towns as temporary workers (Knight and Song, 2003) we expect that migrants are still at a considerable disadvantage in the urban labour market by comparison with urban workers, with respect both to job opportunities and to terms and conditions of employment.

Knight, Song and Jia (1999) conducted an analysis of a survey of migrants employed in urban enterprises, conducted in 1996 and relating mainly to 1995. They found the large wage disadvantage of migrants that remained after standardisation for differences in characteristics to reflect labour market segmentation and lack of competition between migrants and non-migrants. Migrants were more subject to market forces. Moreover, their frequent lack of information, contacts and alternatives served to depress their supply prices. Urban residents were protected by preferential access to urban employment, institutional determination of wages and benefits in kind, and the job security of their 'iron rice bowls'.

Knight, Song and Jia (1999) found that migrant and non-migrant workers were highly imperfect substitutes or even complements: migrants did jobs that non-migrants shunned. Estimates of enterprise production functions implied that the marginal product of migrants was more than three times their wage whereas that of non-migrants was well below their wage. Urban enterprises were thus generally constrained in the number of migrants and non-migrants they

could employ: too few migrants and too many non-migrants. Although many enterprises had surplus urban workers, they found it beneficial to hire migrant workers as well and were prevented from employing as many migrants as they would choose. Government at various levels restricted the employment of 'floating' migrants by imposing fees and controls on enterprises, and by erecting a labyrinthine system of permissions and fees through which rural migrants had to pass.

The urban labour market changed rapidly from the mid-1990s onwards. Table 1, comparing 1994 and 2000, shows the changes. Registered urban unemployment was very low in 1994 (2.8% of the urban labour force) and redundant workers (not classified as unemployed) negligible (0.9%). Central and city governments preferred to keep unemployment off the streets, where it could take an open form, and to keep it instead in the factories, where it took a disguised form. Economic reform brought the state-owned enterprise sector under increasing pressure, with the growth of competition from rural industry, the urban non-state sector, and imports. The profitability of state enterprises declined, and many of them began to make losses. The initial response – permitting soft budgets and increasing public subsidies – threatened the public finances. Reform of the state sector was forced upon government.

One policy response was the imposition of labour redundancies, known as *xia gang*, on trial from 1994 and extended in 1997. A quarter or more of state workers were to be laid off within the four years 1997-2000. By the end of 2000, the official figure of the accumulated laid-off workers was 41.13 million, representing 28% of the workers who had been at risk. By that date, 9.11 million workers remained *xia gang*, implying that 32.02 million had, after three years, ceased to enjoy *xia gang* status or had been re-employed – mainly in the private and self-

employment sector, which grew by 18.47 million over the period. The sum of registered plus *xia gang* unemployment at the end of 2000 was 15.05 million (7.8% of the urban labour force).

In 2000 urban employment totalled 212.74 million, having risen, by 28.61 million, from 184.13 million in 1994. However, at the end of 2000 only 116.13 million were recorded as being employed in urban 'registered employment units'. Urban units mainly comprised the state-owned and collective enterprises which traditionally contained surplus labour. In the face of the redundancy policy, their employment fell sharply, by 36.46 million, from 152.59 million in 1994. There was a large transfer of workers away from urban units, partly into unemployment but also into new activities and enterprises. There is information on the number of 'rural employees' recorded in urban units. This figure fell from 13.72 million (9.0% of employment in urban units) in 1994 to 8.97 million (7.7%) in 2000. The decline of 4.75 million may have reflected a policy of tightening controls on the recruitment and re-employment of migrants in response to the plight of unemployed urban residents.

Appleton et al (2002) examined a fairly representative survey of urban residents conducted in 1999 to analyse the incidence and extent of redundancy and re-employment among them. 11% of urban workers had been retrenched since 1992. Certain personal characteristics were associated with a greater risk of redundancy – including having little education, being female, being middle-aged, and having a manual or unskilled occupation. The typical retrenched worker could be expected to remain unemployed for about 4 years, but the young, the healthy and the educated were likely to endure shorter spells of unemployment.

Appleton et al (2004) used the same 1999 survey to investigate whether the urban labour market comprises three tiers – non-retrenched urban residents, retrenched urban residents, and migrants. They did indeed find evidence of three tiers, the highest paid of which comprised those

workers who were not made redundant during the 1990s.[1] It was less clear how the two lower tiers of the labour market – migrants and re-employed workers – stood in relation to each other. Their average wage rates were quite similar but they appeared to be paid according to different wage structures. Whereas for the re-employed there were low returns to education and occupational skill - suggesting that the labour market they faced was a fierce one which was not working well for them - for migrants the returns to human capital resembled those estimated for non-retrenched urban workers. Analysis of (recall) panel data showed that the real wages of non-retrenched workers had risen substantially over the period 1995-1999 despite the potential competition from retrenched and migrant workers. This appeared to be the result of rent sharing: the retrenchment of surplus labour by firms raised the profit available to them and some of this rise was shared with the remaining employees through higher pay.

The rent sharing interpretation is supported by Knight and Li (2004), which analysed the same 1999 survey data and data from an earlier, comparable, 1995 survey. In both years the wage of urban residents was found to be positively responsive to the perceived profitability of the enterprise, and the sensitivity increased substantially over that period. This is consistent with there being an increase in the bargaining power of non-retrenched employees, despite the rise in urban unemployment.

3. Attitudinal Evidence

We have two sources of attitudinal evidence: one based on the views of urban employers of migrant labour at the start of the redundancy programme, and the other based on the views of urban workers after the programme was in full swing and its effects were apparent. The former came from a 1996 survey (relating to 1995) of 118 enterprises located in four cities, all of which

[1] Their advantage remained even after standardising for personal characteristics and testing for selectivity.

employed migrants as well as urban workers (Knight, Song and Jia, 1999). Within each city, enterprises were chosen from a sample frame stratified by ownership and by sector. Various attitudinal questions were asked of management in the questionnaire addressed to enterprises; these are reported in Table 2.

The managerial responses suggest that migrants and urban residents were not in competition. Two-thirds of respondents denied that rural workers could be replaced with redundant urban workers, the main reasons being that urban workers did not want the jobs and that the work was too hard for them. These reasons, rather than cost cutting, were also cited as the motive for recruiting migrants. Although most managers were satisfied with the quality of their rural employees, and many stressed the need for training them and employing them on a long term basis, the migrants were perceived as complementary to, rather then substitutes for, their urban employees.

The second source is the urban household survey conducted in 2000 (relating largely to 1999) that is referred to above (used by Appleton et al, 2002; Appleton et al, 2004, Knight and Li, 2004). The survey covers 13 cities in six provinces, chosen to be as nationally representative as possible. Various attitudinal questions were asked of urban *hukou* workers. The relevant results are shown in Table 3. In addition to the sample as a whole, those who had been continuously employed and those who were made redundant or became unemployed are distinguished. In fact there are no notable differences in the responses of these two groups.

There are signs that, by 1999, migrants were being viewed as potential competitors. Over 70% of urban workers regarded possession of an urban *hukou* as being less important for job search than in the past; over 80% considered migrants to be no less efficient than urban workers in the same position; more than 80% said that they were prepared to work alongside migrants

rather than remain unemployed or *xia gang*; and over 50% said yes to the statement: "Migrants are competitors and should leave when unemployment is high". It is true, however, that only a third of the respondents saw migrants as the cause of the high redundancy rate.

We conducted a logit analysis of the characteristics of workers who regard migrants as "competitors who should leave when unemployment is high" (Table 4). The dependent variable takes a value of one if migrants are perceived as competitors and of zero if not. Length of employment experience, being female, and having experienced unemployment are the characteristics that significantly increase the probability of taking the competitive view. By contrast, years of age (but with a much smaller coefficient than years of employment experience) and years of education reduce the probability of holding this view. These results correspond well to those on the determinants of redundancy in the same sample (Appleton et al, 2002), i.e. the greater the risk that urban workers will be made redundant, the more likely they are to fear the potential competition of rural migrants.

We conclude from this attitudinal evidence that, in the mid-1990s, firms perceived urban workers and migrants to be complements rather than substitutes. Towards the end of the decade, however, an element of competition for jobs had emerged, at least in the minds of urban workers; the more so, the more reason they had to fear redundancy.

4. Hypotheses

The foregoing discussion suggests the following alternative hypotheses for testing. Of course, they are not mutually exclusive since the one might apply to a part of the labour market, represented by time, location or labour type, and the other to another part. What we might observe, therefore, is the average, and thus the preponderant, relationship.

Insider-outsider models of the labour market distinguish between entrenched insiders, who have influence over the wage setting process and are protected against competition from outside, and outsiders, whose wages are governed by market forces (Cain 1976). Thus insiders are in 'good' jobs, enjoying wages above the market-clearing level, whereas outsiders are in 'bad' jobs, with wages, although market-determined, depressed below the level that would prevail were the market not segmented. The segmentation can arise because insiders use their bargaining power to protect and separate themselves from the outsiders.

Segmented labour market theory suggests that insiders and outsiders are employed in different segments of the labour market or, if employed by the same firm, on different terms and often in different jobs. An increase in the demand for labour is likely to raise the demand for both insiders and outsiders. In that sense they are complements. They can also be substitute factors of production (similar to capital and labour, or skilled and unskilled labour) if they perform different functions. However, they cannot be substitute individuals if institutional segmentation prevents an outsider from taking the job of an insider. The substitution of individuals requires that the barriers to labour market competition be eliminated or at least eroded.

We apply these ideas to the Chinese labour market. Urban *hukou* workers can be treated as insiders and rural *hukou* workers as outsiders in a segmented labour market characterised by institutional barriers. The protection of urban workers stems partly from their membership of the (mainly state-owned) work unit (the *danwei*) and partly from the underlying political economy that creates 'urban bias' and protects urban residents as a group (Knight and Song, 1999). We hypothesise that a redundancy programme has two potential effects on real wage behaviour. By improving the profitability of enterprises, it can strengthen the bargaining power of remaining

employees. By raising urban unemployment, however, it can weaken their bargaining power within the enterprise. In fact, the real wage of 'staff and workers' grew on average by no less than 9.0 % per annum between 1995 and 2000 (PRC, MOLSS 2001, pp. 35, 50). This remarkable increase in real wages over the period of the redundancy programme suggests that the former effect is more powerful than the latter.

Our concern is to predict the relationship between the employment of urban residents and the employment of rural migrants. The fact that total employment in urban units fell by more than five times the fall in migrant employment in urban units, with the proportion of migrant employment falling only slightly (Table 1), superficially suggests a positive rather than a negative relationship.

A positive relationship between the employment levels of the two types of labour can arise in various ways. First, it can be obtained from a model in which urban workers and migrants are complementary to each other. An increase in the general demand for inputs into production requires an increase in both of the factors of production, urban resident labour and migrant labour. A decrease in general demand can have the same effect. A fall in demand for urban workers need have no effect on migrant employment if the reason for the fall is the retrenchment of surplus labour that exists only among urban residents. Nevertheless, the underlying political economy of urban bias can generate a policy response to the redundancy programme and the ensuing rise in the unemployment of urban residents. As urban workers are made redundant, city governments restrict the employment and re-employment of migrant workers, so giving redundant workers more opportunities to find alternative jobs. In that case, migrants continue to be residual employees, permitted only into the jobs that urban workers do not want. Moreover, insofar as the successful retrenchment programme raises the bargaining

power of the remaining urban employees, this may strengthen their protection against migrant competition for jobs.

Alternatively, the relationship between resident and migrant employment can be one of competition. As the institutional policies imposing segmentation are dismantled, the relaxation of restrictions on migrants increases competition in the labour market. The loosening of controls over migration and migrant employment thus generates a substitution of migrants for urban employees. Such increased competition for jobs means that a rise in the employment of migrants can produce a fall in the employment of urban workers and increased unemployment among them.

This analysis can be explained heuristically by Figure 1. The labour market is initially at point *a,* with urban resident employment *Oz* and migrant employment *Ox*. This combination is institutionally imposed. The two forms of labour are complementary, being employed in fixed proportions as indicated by the rectangular isoquant defined by point *a*. A redundancy programme reduces urban resident employment by the length *ab*; urban unemployment rises by the same amount. As this is assumed to be surplus labour, the new rectangular isoquant is defined by the point *b*.

Now introduce the possibility of substitution between the two sorts of labour (the downward-sloping isoquant through *b*). There are three possible forms of substitution. First, growth in the production of urban units requires more employment of migrants – in jobs that were previously done by urban workers. Provided that urban workers are not displaced, governments permit migrant employment to rise from *b* to *c*; there is a new, higher, isoquant, passing through *c*. Second, governments favour unemployed urban workers, and thus restrict the employment of migrants so as to provide jobs for the unemployed. This involves a move from *c*

to *d*. Third, the loosening of labour market restrictions increases competition between the two groups, resulting in employers' substitution of migrants for more costly urban workers. This can be depicted as a move from *d* to *e*.

The final outcome, combining all four of these contemporaneous processes, is a move from the initial point *a* to point *e*. As the figure is drawn, this involves a net rise in urban unemployment equal to *yz* and a net fall in migrant employment equal to *vx*. In principle, however, *vx* could be either positive or negative.

5. Methodology

We choose to analyse the relationship of migrant employment with the unemployment of urban workers rather than with their employment. We have information on the employment of migrants only in the formal sector: the corresponding variable for urban workers would be their employment in that sector. However, given the growth of non-formal employment, we expect government to be sensitive to the unemployment of urban workers rather than to just their formal sector employment.

There are three possible estimation procedures to investigate the relationship between migrant employment and urban unemployment in our data set: cross-section, fixed effects and random effects models. We shall use all three, examining their differences, the reasons for these differences, and the choice among them.

The cross-section, in its simplest form, can be estimated using the OLS equation:

$$m_{i,t} = \beta_o + \beta_1 u_{i,t} + \mathbf{x}_t\boldsymbol{\beta} + \varepsilon_{i,t}, \qquad (1)$$

where $m_{i,t}$ is the proportion of employees who are migrants, $u_{i,t}$ is the unemployment rate, $\boldsymbol{x}_{i,t}$ is a vector of other explanatory variables, $\varepsilon_{i,t}$ is the error term, assumed to have the usual properties,

for province *i* and year *t*. A potential problem with this specification is that, despite the inclusion of the vector $\mathbf{x_t}$, there can be unobserved province characteristics which influence $m_{i,t}$ and are correlated with the observed explanatory variables, so causing the OLS estimates to be biased and inconsistent.

A possible solution to this problem is provided by the fixed effects model, based on:

$$m_{i,t} = \beta_o + \beta_1 u_{i,t} + \mathbf{x_t}\boldsymbol{\beta} + \alpha_i + v_{i,t}, \qquad (2)$$

where α_i is the province fixed effects and $v_{i,t}$ is the idiosyncratic error. Estimation using time-demeaned data (*e.g.*, $\dot{m}_{i,t} = m_{i,t} - \bar{m}_i$) eliminates, or 'sweeps out', the fixed effects and thus this source of bias:

$$\dot{m}_{i,t} = \beta_1 \dot{u}_{i,t} + \dot{\mathbf{x}}_\mathbf{t}\boldsymbol{\beta} + \dot{v}_{i,t}. \qquad (3)$$

The alternative, random effects model is also based on (2) but involved quasi-demeaned data and GLS estimation:

$$m_{i,t} - \lambda\bar{m}_i = \beta_0(1-\lambda) + \beta_1\left(u_{i,t} - \lambda\bar{u}_i\right) + \left(\mathbf{x_t} - \lambda\bar{\mathbf{x}}\right)\beta + \left(z_{i,t} - \lambda z_i\right), \qquad (4)$$

where $z_{i,t} = \alpha_i + v_{i,t}$, the composite error term, and λ is in the range from 0 to 1 and depends on $\sigma^2_{\alpha_i}, \sigma^2_{v_{i,t}}$, and the number of years. This is precisely equivalent to the pooled OLS model when $\lambda = 0$ and to the fixed effects model when $\lambda = 1$. Thus, when there is a difference among the three estimates, the random effects estimate (given $0 < \lambda < 1$) can be expected to lie between the other two. Like the pooled OLS model, the random effects model is subject to potential unobserved heterogeneity bias.

A test of the pooled OLS specification is provided by Breusch and Pagan (1980), the null hypothesis that $\sigma^2_{\alpha_i} = 0$. Failure to reject null implies that $\lambda = 0$ and that pooled OLS estimation can be used. There are various criteria for choosing between the fixed and random effects models. One is a test provided Hausman (1998), the null hypothesis being that the α_i are not correlated with the explanatory variables $u_{i,t}$ and $\boldsymbol{x_t}$. Rejection of the null favours the fixed effects over the random effects model, for which the avoidance of unobserved heterogeneity bias requires zero correlation.

Deaton (1997, pp. 108-110) warns that there is no clear-cut test for choosing between estimation in levels (pooled cross-section) and estimation in differences (fixed effects). Difference estimation avoids omitted heterogeneity bias, but it suffers more acutely from measurement error than does levels estimation. This gives rise to greater attenuation bias, *i.e.,* the coefficient on a variable measured with error is biased towards zero (although it cannot change sign). The relevant question is whether differencing raises the variance in the noise relative to the variance of the signal such that the attenuation bias in the difference estimate is more severe than the combined attenuation and omitted heterogeneity bias in the levels estimate. Thus, '… we must be careful never to assume that the use of panel data will automatically improve our inference… much can be learned by comparing different estimates' (Deaton, 1997, p. 109). We shall approach our empirical analysis in that spirit.

6. The Data

The data that are used to test these hypotheses are a well-suited panel. Panel data are still rare for China, and we constructed our own panel using province-level statistics, covering the thirty provinces, for the seven years 1994-2000 inclusive. The source is the *China Labour Statistical Yearbooks* (PRC, MOLSS, 1995,…, 2001). We list, define and discuss each of the

variables available to us from the *Statistical Yearbooks*. Each variable has a subscript *i* to represent province *i* and a subscript *t* to represent year *t*. We show notation in upper case when it represents an absolute value and in lower case when it represents a percentage or a logarithm. The precise specification of our equations is necessarily adapted to the variables available.

Rural migrants employed in registered 'urban employment units' are shown by *M* and, expressed as a percentage of total employment in urban employment units (*E*), by *m*. Urban *hukou* employees of urban employment units are *H* and, expressed as a percentage of the total, *h*. *E* does not, however, correspond to total urban employment (*N*) as the latter includes employment other than in registered employment units.

Registered unemployment is denoted by *U* and, expressed as a percentage of the urban labour force, by *u*. Only unemployed urban *hukou* workers whose employers had contributed to an official unemployment insurance scheme on their behalf are registered. *Xia gang* employment (*X*) becomes *x* when expressed as a percentage of the urban labour force. Only urban *hukou* workers who had been made redundant from jobs guaranteed for life are accorded *xia gang* status. They remain on the books of the firm and receive a low income (funded in three parts – by the employer, the local government, and the unemployment insurance scheme) but do not have to attend work. *Xia gang* employees retain their status for three years, or for less if they are recruited by another registered urban employment unit. Total unemployment (*R*), when expressed as a rate, is the sum of the registered unemployment rate and the *xia gang* employment rate ($r = u + x$). It is our best annual measure of unemployment in the urban economy. However, *r* falls short of the true level of unemployment because it excludes job-seeking school-leavers, workers becoming unemployed but qualifying neither for registered unemployment nor for *xia gang* employment, and unemployed rural migrants.

We have two other proxies for the state of the urban labour market at a particular time and place. One is annual average earnings expressed in logarithmic form (w). The inter-provincial urban wage disparity has diverged during the period of economic reform, according to the growth and prosperity of the provincial economies (Knight, Zhao and Li, 2001). Our second proxy is total employment in registered urban units (E), or its proportionate rate of change (Δe). It would be desirable to condition also on output in logarithmic form (y) or its change (Δy) in order to standardise for complementarity in demand for the two types of labour. Unfortunately, data on output in the 'urban unit' sector are not available.

This data set is used to estimate the following equation:

$$m_{i,t} = \beta_0 + \beta_1 u_{i,t} + \beta_2 x_{i,t} + \beta_3 w_{i,t} + \beta_4 \Delta e_i + \varepsilon_{i,t}, \qquad (1')$$

and the equivalent fixed and random effects models, (3') and (4').

7. Empirical Results

7.1 Cross-section estimates

We begin with the cross-section estimates of equation (1). These are presented for each of the seven years in Table 5. The coefficient on the registered unemployment rate is substantial (ranging from -0.61 to -1.04), consistently negative, and statistically significantly so in four of the six years. At the average value of the coefficient (-0.89), an increase in registered unemployment by one percentage point decreases the migrant share of employment by nine-tenths of a percentage point. There is no discernable trend in the coefficient over the period.

The *xia gang* employment rate also has a consistently negative coefficient, statistically significant in four of the six years, but declining in importance (averaging -1.27 in the first three years and -0.28 in the last three). It is interesting that the employment of migrants became less,

rather than more, sensitive to the *xia gang* rate as the redundancy programme gathered pace. It may be that the early *xia gang* policy had the most significant impact because it took time for the labour market to adjust in other ways, or that the restrictions on migrant employment were whittled away by increasing labour market competition over that period.

When the two separate rates are replaced by their sum, the total unemployment rate, the other coefficients are effectively unaltered but the coefficient on the total unemployment rate is significantly negative in five of the six years and, with one minor exception, falls monotonically over the period.

The implication of these cross-section results is that the growth of urban unemployment in its various forms has indeed elicited a policy response from provincial or city governments. Local governments use their powers to control the urban employment of rural migrants. In that way they protect employment urban *hukou* residents from the actual or potential competition of rural *hukou* workers. Our hypothesis of a policy response to urban unemployment is supported. However, the effect may have become weaker over the six years.

We expect provincial and city governments to permit the inflow of migrant workers when the urban labour market is tight. Urban wages have increased faster in the rapidly growing (mainly coastal) provinces than in the less rapidly growing (mainly interior) provinces. We therefore use the mean real wage from urban employment as a proxy for high urban demand for labour in relation to supply. The logged average wage does indeed have a consistently positive effect, and it is significantly greater than zero in four of the six years. The mean value of the coefficient (+ 0.05) implies that a 10% rise in the average wage of a province is associated with a rise in the migrant share of employment by 0.5 percentage points.

It is plausible that enterprises are allowed to take on more migrant workers – normally on one-year contracts – when labour demand is high. It would be inappropriate in a cross-section regression to enter the level of employment in a province as a measure of its labour demand. Instead, we used the recent growth of employment in urban units as a proxy, and experimented with different lengths of period. The table shows the annual average change in employment over the previous three years. This has a positive coefficient in five of the six years, and it is significantly so in two of them.

In summary, the cross-section results suggest that provincial and city governments regulate the urban employment of rural migrants, in particular restricting migrant employment in urban enterprises when there are more unemployed urban workers and possibly also easing restrictions in response to growing urban demand for labour.

7.2 Panel estimates

Using the panel data, we first estimated the random effects model. The negative effect of unemployment on migrant employment was again found, but the effect was weaker than in the cross-section case.[2] However, we do not report the resultant equations, for the reason that the assumptions required by the random effects model are not supported.. The Breusch–Pagan test rejects the null hypothesis that the standard deviation of the ρ [i] terms equal zero (over the four cases, χ^2 (1) ranges from 106 to 178). The Hausman test rejects the null hypothesis that there is no correlation between the independent variables and the error terms (over the four cases, χ^2 (4) ranges from 23 to 137). A fixed effects model is called for.

Table 6 shows fixed effects estimates of the panel in four specifications: registered unemployment and *xia gang* employment separately and together; current employment level and

[2] As could be predicted, the results lie between those for the OLS and fixed effects models.

employment change over the previous three years. The only significant unemployment coefficient is that for registered unemployment in the employment change equation. This coefficient is positive, i.e., a higher registered unemployment rate raises the migrant employment rate, *ceteris paribus*. Similarly, the wage and employment level variables have significantly negative, signs in the employment level equation. Higher wages and higher employment both appear to reduce migrant employment, *ceteris paribus*. However, in the employment change equations, the wage variable is not at all significant and the employment change variable is significantly positive.

7.3 Interpretation of the estimates

The cross-section results are generally consistent with the hypothesis that local governments regulate the inflow of migrant workers according to the state of the labour market. The danger of the cross-section analysis is that there may be unobserved characteristics of provinces which explain, or are correlated with, both the dependent and the independent variables, so giving rise to biased coefficients and non-causal associations. This criticism is the more persuasive, the more plausibly it can be argued that such unobserved heterogeneity exists. One possibility is that the negative relationship arises because of unobserved provincial variations in prosperity or level of development. However, our measures of unemployment and of labour demand pressure are intended to reflect such variation.

In principle, the fixed effects panel analysis avoids this problem by sweeping out province fixed effects (effectively equivalent to coefficients on province dummy variables) and showing the effects of annual changes in the explanatory variables on annual changes in the migrant employment rate. Two issues arise with the panel approach. First, the use of differences increases the importance of measurement error. Such error is all too likely in these

administratively collected data. How reliable are the measured changes in, say, unemployment from one year to another? The question is whether the errors in variables bias in the difference-estimator is more severe than the combined errors in variables and omitted variables bias in the cross-section regression. Deaton (1997, p.109) argues that much can be learned by comparing cross-section and panel estimates. For instance, if the two methods show a different sign on a coefficient, there must be omitted variable bias: measurement error alone results in attenuation of a coefficient but cannot change its sign. Attenuation bias cannot therefore explain the significant positive coefficient on unemployment that we obtained in one of the fixed effects equations. However, this result is consistent with the substitution hypothesis, i.e. the employment of migrants instead of urban workers has displaced some urban workers. It is also possible that the creation of redundancies in urban units has so spurred production that they have needed additional migrants to fill the new jobs that urban resident workers shun. The negative effect of wages on migrant employment in the employment levels equations is consistent with segmented labour market theory, *e.g.,* if high wages represent increased bargaining power for urban workers or if they induce more effort from urban workers. The negative effect of employment level again suggests that migrants have been substituted for urban resident workers, whereas the positive effect of employment growth is consistent with booming labour demand raising employment.

Another potential qualification of the panel results concerns the speed of government response. If there is a lag between the time of a policy pronouncement and the effects of that decision, then a panel estimation which looks at changes over time may not be able accurately to estimate such relationships A fixed-effects model controls for inter-provincial differences for each year but may be less accurate over the years. The normal length of contract for a rural migrant is one year. Thus, a rise in unemployment or a loosening of the labour market can have

an effect only as posts filled by migrants begin to fall vacant. The response can be delayed further by the need for government first to perceive a need to act and then to take action. Such lags could mask the true effect of annual variations in the explanatory variables on migrant unemployment.

8. Conclusions

Whereas employment in 'urban units' fell by 36 million between 1994 and 2000, total urban employment rose by 29 million, i.e., by 2.4 per cent per annum. Given that the urban *hukou* labour force grew by less than 1.0 per cent per annum, migrant employment clearly grew, although not in urban units but in small scale wage employment and self-employment. Our interest in this paper was to explain migrant employment in urban units, which fell by 5 million, i.e., by 7 per cent per annum, over the period.

Our province cross-section results show a strong negative effect of urban unemployment on migrant employment. Because unemployment rose over the period under consideration, migrant employment could be expected to fall. This finding is consistent with there being a policy response to rising unemployment in the form of new curbs on migrant employment in urban units. However, we cannot rule out the possibility that unobserved heterogeneity among provinces is responsible for the negative association. For instance, it may be due to differing levels of economic activity among provinces rather than to policy responses to unemployment. The negative association remains in the panel random effects estimates but disappears in the, preferred, fixed effects estimates. We cannot rule out the possibility that measurement error in the differenced explanatory variables causes sufficient attenuation bias as to mask the true effect and produce generally insignificant results. However, the significant results from the fixed effects panel suggest that the positive effect of urban unemployment on migrant employment is

produced in one of two ways. In a segmented labour market, rising unemployment in the preferred segment can be accompanied by rising employment in the less preferred, segment because more migrant labour is needed to fill new jobs shunned by urban workers. Alternatively, the positive relationship may represent the weakening of segmentation so that migrant workers are substituted for more expensive urban workers.

In these circumstances it is helpful to turn to institutional and attitudinal evidence. Some city governments did indeed make arrangements to restrict migrant employment in order to protect their unemployed and *xia gang* citizens. At the start of the period under consideration, enterprise managers tended to perceive migrants as complementary to, and not competitive substitutes for, their urban employees – filling the jobs that urban workers did not want. By the end of the period, there were signs that some urban workers did view migrants as potential competitors, especially those at greater risk of being made redundant. It is likely that there were by then elements of both complementarity and competition in China's urban labour market.

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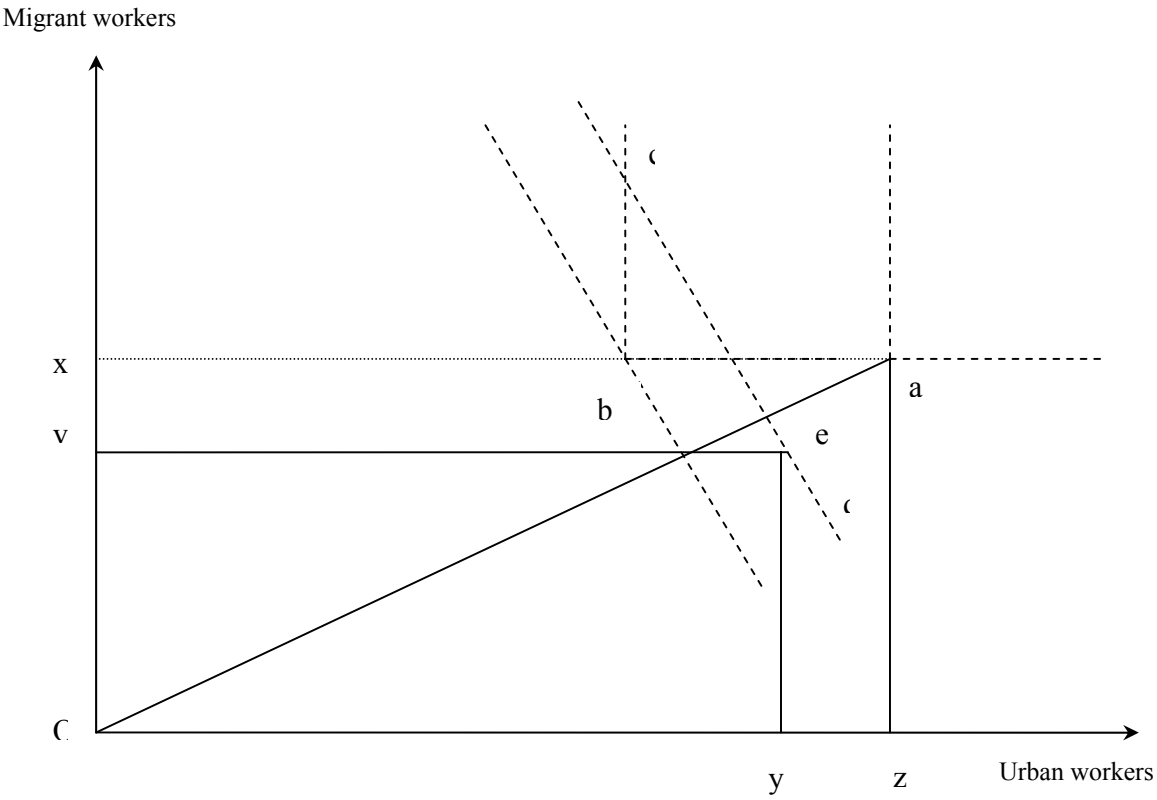


Figure 1

Table 1

Change in the Urban Labour Market, 1994-2000: Descriptive Statistics

	1994	2000	Increase 1994-2000	2000 (1994 = 100)
Registered urban unemployment:				
million	4.76	5.95	1.19	125.0
% of urban labour force	2.8	3.1	0.3	110.7
Xia gang employment:				
million	1.58	9.11	7.53	576.6
% of urban labour force	0.9	4.7	3.8	522.2
Total urban unemployment:				
million	6.34	15.06	8.72	237.5
% of urban labour force	3.7	7.8	4.1	210.8
Total urban employment: Million	184.13	212.74	28.61	115.5
Employment in urban units:				
million	152.59	116.1	-36.46	76.1
% of total urban employment	82.9	54.6	-28.3	65.9
Migrant employees of urban units:				
million	13.72	8.97	-4.75	65.4
% of employment in urban units	9.0	7.7	-1.3	85.6

Source: National Bureau of Statistics and Ministry of Labour and Social Security, *China Labour Statistical Yearbook*, 1995 and 2001, various tables.

Table 2

Managerial Attitudes towards Migrants, 1995

	Percentages of respondents
Why do you recruit rural workers?*	
can bear hardship	61
urban workers not available	40
they are more manageable	33
lower cost	30
Can rural workers be replaced with redundant urban workers?	
yes	35
no	65
If not, why not?*	
the work is too hard for urban workers	51
urban workers do not want the job	49
urban workers are inadequate for the job	15
Are you satisfied with the quality of migrant workers?	
yes	61
no	39
Training of migrant workers:	
must be trained strictly before starting	47
short term training is enough	40
no training is needed	13

Source: Survey of Urban Enterprises, 1996, enterprise questionnaire; Knight, Song and Jia (1999, table 13).

Notes: * denotes that figures may add up to more than 100% because more than one answer was permitted.

Table 3

Urban Worker Attitudes towards Migrants, 1999

Percentage answering yes to each question	Total	Never unemployed	Been unemployed
Possession of an urban *hukou* is less important now for job search	73.6	73.3	74.7
Migrants are no less efficient than urban workers in the same position	80.8	80.4	82.5
I would rather stay unemployed/*xia gang* than work alongside migrants	17.9	17.5	19.9
Migrants are competitors and should leave when unemployment is high	57.8	57.5	58.9
Migrants caused the high redundancy rate	32.3	31.9	34.0

Source: Urban Household Survey, 1999, urban *hukou* worker sample.

Notes: 1. There are somewhat different response rates to different questions. The overall sample is roughly 4,400, of whom 3,500 have not been unemployed and 900 have been unemployed.

2. Non-responses are excluded: the percentage who answered no to a question can be derived as a residual.

Table 4

Logit Estimation of the Determinants of Urban Worker Belief that Migrants are Competitors.

	Coefficient (t-statistic)
Intercept	-1.404 (-4.218)***
Female	0.5220 (9.877)***
Experienced unemployment	0.3340 (3.740)***
Years of employment experience	0.0433 (9.374)***
Years of age	-0.0091 (-2.307)***
Years of education	-0.0250 (-2.717)***
Communist Party member	0.0467 (0.768)
Type of ownership of employer	0.0057 (0.331)
Cities	*yes*
Psuedo- R^2	0.0396
LR χ^2 (21)	385.59***
Number of observations	8540

Source: Urban Household Survey, 1999, urban *hukou* worker sample.

Notes:
1. The dependent variable = 1 if migrants are viewed as competitors and = 0 otherwise.
2. The omitted dummy variables are: male, never experienced unemployment, not Communist Party member, and sownership sector of employer is urban collectives.
3. *** denotes statistical significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 5
The Determinants of Migrant Employment in Urban Enterprises, Province Analysis, Cross-sections, 1995-2000
(unemployed and *xia gang* estimated separately with employment growth over 3 years)

	1995	1996	1997	1998	1999	2000
Intercept	-46.7836	-0.2275	-0.1100	-0.3785	-0.2953	-0.5146
	(-1.854)*	(-0.87)	(-0.47)	(-1.78)*	(-1.75)*	(-2.82)***
Unemployment rate	-0.9399	-1.0428	-0.6135	-0.9912	-0.7947	-0.9181
	(-2.230)**	(-2.56)***	(-1.79)*	(-1.78)*	(-1.46)	(1.45)
Xia gang rate	-1.6469	-1.2176	-0.9707	-0.2370	-0.4107	-0.1802
	(-3.795)***	(-3.35)***	(-3.95)***	(-1.00)	(-2.27)**	(-1.30)
Log of average wages	6.9565	0.0397	0.0258	0.0545	0.0450	0.0678
	(2.448)	(1.41)	(1.03)	(2.37)**	(2.45)**	(3.41)***
Growth in employment	0.2951	0.0049	0.0041	0.0056	0.0031	0.0028
in previous three years	(1.609)	(2.20)**	(2.08)**	(2.52)**	(1.35)	(1.21)
R^2	0.5360	0.5357	0.5978	0.6072	0.6568	0.5547
Adjusted R^2	0.4586	0.4584	0.5307	0.5417	0.5996	0.4805
F(4, 24)	6.93***	6.92***	8.92***	9.27***	11.48***	7.47***
Mean of dep. variable	7.7484	6.8451	6.2147	5.3939	5.6018	5.4859
Number of observations	29	29	29	29	29	29

Source: Labour Statistical Yearbook, 1995-2001.

Notes: (1) Dependent variable: Rural-urban migrants employed in urban enterprises expressed as a percentage of the urban labour force, which consists of employed, unemployed and laid-off persons. Mean is 6.5357.

(2) Independent variables: Registered unemployment rate as a percentage of urban labour force, *xia gang* rate as a percentage of urban labour force, the logarithm of annual average wages, and the average annual growth in employment over the previous three years.

(3) Coefficients are followed by t-statistics, where *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

(4) The equation for 1995 uses growth in employment in the previous two years as data for the earlier were not available.

Table 6
The Determinants of Migrant Employment in Urban Enterprises, Province Analysis, Fixed Effects Panel, 1995-2000

	Employment level in current year (1)		Employment growth in previous 3 years (4)	
Intercept	0.4967	0.5185	0.0830	0.1001
	(11.83)***	(13.28)***	(0.91)	(1.08)
Unemployment rate	0.1249	---	0.2086	---
	(1.07)		(2.09)**	
Xia gang rate	-0.0438	---	-0.0319	---
	(-1.25)		(-1.02)	
Total unemployment rate	---	-0.0294	---	-0.0178
		(-0.88)		(-0.57)
Log of average wages	-0.0458	-0.0472	-0.0037	-0.0049
	(-10.86)***	(-11.51)***	(-0.36)	(-0.47)
Employment level in current year	-0.0001	-0.0001	---	---
	(-3.66)***	(-4.54)***		
Employment growth in previous 3 years	---	---	0.0007	0.0006
			(2.14)**	(1.94)*
F(4, 168)	41.84***			
F(4, 141)				
F(3, 112)			7.55***	
F(3, 169)		54.85***		
F(3, 142)				
F(3, 113)				7.84***
Number of observations	202	202	145	175

Source: *Labour Statistical Yearbook, 1995-2001.*
Notes: (1) Dependent variable: Rural-urban migrants employed in urban enterprises expressed as a percentage of the urban labour force, which consists of employed, unemployed and laid-off persons. Mean is 6.5357.
(2) Independent variables: Registered unemployment rate as a percentage of urban labour force, *xia gang* rate as a percentage of urban labour force, total unemployment rate is the sum of the registered unemployment rate and *xia gang* rate, the logarithm of annual average wages from employment, the current level of employment, and the average annual growth in employment over the previous one, two and three years.
(3) Coefficients are followed by t-statistics, where *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.