Socialist Workers in Market Transition: Voluntary and Involuntary Job Mobility and Earnings Inequality in Urban China, 1993-2000

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(Abstract)

This paper develops a model of selective mobility of workers from the state sector to the market sector to illustrate how the market transition has led to earnings inequality in former state socialist countries. Analysis of the sample data collected in 2000 from 10 Chinese cities reveals that, recent entrants into the market are driven by two different institutional processes – some are self-selected for higher economic returns and some are pushed into the market in massive layoffs, resulting in a more heterogeneous body of workers in the market sector than before. Propensity score analyses show that an early market entry has no causal effect on earnings, whereas the effect of a later market entry on earnings is negatively associated with the propensity of making such transition. Those who would otherwise do well in the state sector and therefore have lower propensity of entering the market benefit more from the entry. The commonly observed higher earnings in the market sector are limited to a subgroup of later entrants who are self-selected into the market.

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Empirical studies of stratification deal primarily with the stratification outcomes, namely, the inequalities in education, occupation, and income among different social groups. The underlying processes, through which such inequalities are produced, however, are generally missing in the literature (Blalock 1991). Hence, when sociologists attempt to make the intellectual leap from the observed pattern of inequality to the underlying process - the causal mechanisms of inequality which are typically of their theoretical interests, they have to rely on many overly simplistic and untested assumptions, which often lead to substantial bias and misleading conclusion.

Current research in social inequality and stratification in former state socialist countries serves as a good example to illustrate to the problem. The institutional transition to market economies in those countries has re-stimulated scholars' theoretical interests in how macro-level social transformations reshape the structure of inequality (Nee 1989; Szelenyi 1978). Early empirical research in this field mainly relied on the investigation of income inequality, particularly on returns to human capital and political power, to infer the change in the mechanisms of social stratification (e.g., Bian and Logan 1996; Gerber and Hout 1998; Nee 1989, 1991, 1996; Parish and Michelson 1996; Rona-Tas 1994; Xie and Hannum 1996). Such an "intellectual leap" from the observed income inequality to the underlying causal mechanisms has led to an unresolved debate on social consequence of the market transition in the 1990s (Cao and Nee 2000; Zhou 2000).

Recent studies have shifted the theoretical paradigm by specifying concrete institutional settings or intermediate processes through which income inequality is produced (Gerber 2002;

Walder 2002, 2003; Wu 2002; Wu and Xie 2003; Zhou 2000). Scholars emphasized the structural change in the emerging labor markets and workers' mobility. For example, rural China's rapid economic expansions in the 1980s have created a lot of opportunities for wage employment other than farming and entrepreneurship; as a result, ordinary peasants' incomes from these sources substantially altered the income distribution among different social groups (Walder 2002). In post-Soviet Russia, the "shock therapy" has led to sweeping structural changes in labor market opportunities, driving individuals' labor market transitions (Gerber 2002), and affecting income inequalities (Gerber and Hout 1998).

The emphasis on the effect of structural changes in labor markets on social stratification has moved a further step towards understanding the process of how variant stratification outcomes are produced in the context of macro social change in post-socialist countries. This approach also links the studies of social stratification in transition economies to a broad literature on labor market processes in developed capitalist economies (e.g., DiPrete 1993; DiPrete and Nonnemaker 1997). However, we are told only a one-sided story. Unless we make the fundamental assumption either that individual behaviors or nearly completely determined by structural factors or that, if not, individual differences may be simply cancelled out in some sort of aggregation process, it is difficult to account for structural change without examining the more micro- or individual-level process that undergird them (Blalock 1991; Blau 1977).

In this perspective, Wu and Xie (2003) argue that workers are dynamic social actors who are not simply affected by the market, but rather respond to it by actively situating themselves in the labor market. Based on individuals' mobility history in urban China, they characterize four types of workers: those who were in the state sector initially and have continued to stay there ("stayers"), those who entered the market early and have stayed there ("early birds"), those who

began in the state sector but later transferred to the market sector ("later entrants."), and who initially were in the market sector but later retreated to the state sector ("market losers"); and examine differential earnings returns to education among early birds and later entrants in the market sector against stayers in the state sector.[1]

Wu and Xie's (2003) contribution is primarily conceptual, and their empirical analyses are incomplete in two respects. First, while the typology of workers they developed is based on the assumption that entrants into the market sector varied in different reform stages, the differential mobility processes from the state sector to the market sector have never been empirically demonstrated. Second, based on the evidence that early birds and stayers did not differ in average earnings and earnings returns to education, Wu and Xie (2003) challenged the prevailing wisdom that higher earnings returns to education are caused by the market mechanism. However, the advantages that later entrants enjoyed over stayers were left unexplained, confusing some readers (Jann forthcoming).

In this paper we offer a micro perspective on individual workers' labor market transition and its effect on earnings. Based on the sample data collected in 2000 in urban China, we examine the patterns of entry into the market sector, with special attention to voluntary and involuntary entries in the late reform stage since 1993. To assess the *causal* effect of labor market transition on earnings, we employ the propensity score matching method in causal inference.

Individuals' Labor Market Transition, Group Heterogeneity, and Earnings Inequality

For decades, economic reforms in former state socialist countries have led to the emergence of a

[1] Only a few cases belong to the group of market losers, which are excluded in Wu and Xie's (2003) analysis.

market sector in the redistributive economy. The market has offered "a new window of opportunity" for social mobility, thus yielded important implications on the change in social stratification order (Nee 1989). In a dual structure of opportunities, "one could climb the rank order of the bureaucratic hierarchy, or one could try the market" (Szelényi 1988: 65). The question in debate - who wins and who loses in the course of market transition – to a much extent is contingent upon whom indeed has stayed in the hierarchy and whom has switched to the market sector (Szelényi and Kostello 1996).

Workers are dynamic social actors who would not passively let their destination be determined by the market reform, but rather respond to it by actively situating themselves in the labor markets (Wu and Xie 2003). The rate of job mobility, particularly from the redistributive state sector to the market sector, has been increasing dramatically in reform-era China. Workers' labor market transition is an integral part of transition from state socialism to market capitalism. In 1978 only 150,000 Chinese workers in the entire country were employed in the market sector; in 1999, the employed workers in the market sector climbed to 62,410,000, with an increase by 416 times within 2 decades (National Bureau of Statistics 2000).

Such dramatic changes in labor mobility were by no means a random process, but reflected individuals' selective mobility in response to the changing opportunity structures in the pace of market reforms. There were some anecdotal and contradictory accounts of how different social groups associate themselves with the new market opportunities. In his early study of Hungarian rural entrepreneurship, Szelényi (1988) found that cadres were less likely to participate in market-oriented businesses and the new economic elite more likely to emerge from the less privileged groups. Various surveys conducted in urban China in the mid-1980s have

shown that most private entrepreneurs and individual business owners (*getihu*) were migrant peasants, unemployed youth, dismissed workers, former criminals released from prisons, and retirees, who were unable to get into the state sector (Davis 1999; Gold 1990; Li 1993: 323-30). Zhou, Tuman, and Moen (1997) reported minimal mobility from the state sector to the market sector in urban China, especially among those with high human capital and political capital (also see Gold 1991; Li 1993).

However, in post-1989 Hungary after the collapse of the communist regime, the communist elites became more likely than ordinary workers to convert themselves into corporate entrepreneurs and to maintain their economic advantages (Rona-Tas 1994). In China, while the Communist Party is still firmly holding the power, the market economy had gained full legitimacy since 1992, when the paramount leader Deng Xiaoping made his trip to southern China and called for further economic reform. More and more cadres and professionals started giving up their career opportunities within the state sector and sought new advantages in the market sector. A Chinese new word *xia hai* ("jumping into the sea") was coined to refer to the new phenomena in the historical period (Wu and Xie 2003; Wu 2004).

Szelényi and Kostello (1996) compromised different observations on the entry into the market sector by relating them to the process of marketization. According to them, in early stages of economic reform when participation in the market was highly risky and required little skill, entrants to the market sector tended to be those in the low tiers of the social hierarchy, who were not at risk of losing privileges like those enjoyed by workers in the state sector. However, as marketization proceeded and risks in the market were further reduced, workers with more marketable skills started to grasp the new opportunities in the market there. Communist cadres also learned to embrace the market to cash in their political and social capital. In the face of

competition from these groups "with more to lose but also more to gain," the early market pioneers were marginalized or even wiped out in certain circumstances (Szelényi and Kostello 1996:1089). Hence, workers are fluid in the labor markets and their mobility into the market sector is unlikely to be exogenous to the process of marketization. It is this underlying social process that was directly responsible for different stratification outcomes observed by many scholars.

Not all workers were rational actors who could control their own fate and maximize their benefits in the course of market transition. Market transitions have brought not only new opportunities that people can take advantages of, but also the sufferings of job loss and downward mobility, particularly in the late reform stage. Gerber and Hout (1997) presented a transition scenario that was clearly at odds with the claims by Nee's market transition theory. After the sudden collapse of the Soviet Union, the sweeping transition to capitalism did not increase returns to human capital and professionals in post-socialist Russia. Since the mid-1990s in China, the growth of private economy has gained a new momentum, which, on one hand, attracted more talents from the state sector, and on the other hand, pushed many state-owned enterprises to bankruptcy in market competitions. Many workers were laid off (*xiagang*) and thrown into the market for living. The *xiagang* workers in the state-owned enterprises surged in the late 1990s (Lee 1999).

Hence, the fact that workers recently entered the market sector through two qualitatively different mechanisms – through the state layoff to be pushed into the market involuntarily or through the self-selection to voluntarily "jump" into the market sector for new opportunities – further enhanced the heterogeneity of workers in the market sector and complicated our investigation on the impact of market transition on social stratification outcomes. Compared to

those stayed in the state sector, the early market entrants came mostly from disadvantaged backgrounds, who had few chances in the state sector; among the recent market entrants, those who were forced to leave the state sector might possess less human capital, political capital or other unobserved characteristics negatively associated with potential earnings, whereas those who were self-selected might possess certain characteristics, observable or unobservable, that were positively associated with potential earnings.

Such differential sorting processes of workers into the market sector are endogenous to the pace of marketization, and thus should be incorporated in analyzing the change in earnings inequality in the context of market transition. Previous research in this field has largely ignored these varying processes, and relied on comparisons among highly heterogeneous groups to make causal inference on the effects of the political or market institutions on the creation of income inequality. Without knowing how individuals are sorted into different groups, the estimates of group difference in earnings based on aggregate data are likely to be biased, and the interpretation of the group difference as being caused by the group membership is unwarranted (Gerber 2000; Wu and Xie 2003).

Research Designs and Methodology

We defy the simplistic approach to conducting aggregate group comparisons, even some careful comparisons among stayers, early birds, and later entrants by Wu and Xie (2003), to address the cause effect of the market transition on earnings inequality (Jann 2005). The approach assumes that the groups under comparison were symmetric, like those of an experimental design in which the only difference is being treated or not, with all other factors controlled. However, in the observational data we deal with, our central concerns are the between-group and within-group

heterogeneity generated by differential *social processes*. The earnings regimes for workers in the market sector result from a *cumulative,* historical process that is clearly asymmetrical and thus should be treated as such in an analysis.

[FIGURE 1 ABOUT HERE]

In Figure 1 we borrow the typology of workers in Wu and Xie (2003) but re-draw a schematic flow chart of Chinese workers' mobility from the state sector to the market sector in the 1990s. The Y-axis represents employment sector (state versus market), and the X-axis represents historical time. We make the convenient assumption that the market sector is an absorbing state so that there is no reverse transition from the market sector to the state sector. We employed 1993 as the cutoff year – a year after Deng Xiaoping's famous southern trip in 1992 that initiated a new wave of market reforms - to define early birds and later entrants in the market sector. In a micro perspective, we examine whether or an individual's labor market transition has a *causal* effect in earnings in 2000, the year when the data to be analyzed were collected (see more details below).

To advance this inquiry of the sequential mobility process, we re-conceptualize the substantive problem with explicit counterfactuals in the language of causal inference (Heckman 2005; Holland 1986; Manski 1995; Winship and Morgan 1999). Suppose we are interested in the causal impact of the entry to the market sector on (potential) future earnings in 2000. Conceptually, there are two causal questions in this setup: (1) what is the effect of an early transition (i.e., d=1), and (2) what is the effect of a late transition (i.e., d=2). Of course, as we have previously pointed out, these two questions are inherently asymmetric. The second is sensible only for those workers who did not experience an early transition, while the first involves the counterfactual comparison between those who experienced an early transition and

those who did not, regardless what happened to them later.

To borrow the notation for casual inference with time-varying treatments (Brand and Xie 2005), let Y_i^d denote the *i*th person's potential outcome if the person has made a transition at time *d* (*d*=1, 2, ∞), with *d*=∞ denoting that the person has not made a transition by the end of the study (i.e., a stayer). Note that for an individual worker who has made an early transition (*d*=1), the counterfactual outcome should follow the principle of "forward looking sequential expectation" (Brand and Xie 2005) — a combination of a late transition (*d*=2) and staying (*d*=∞). We thus define the average causal effect for the first question as:

$$E(Y^{d=1}) - E(Y^{d>1}) = E(Y^{d=1}) - [E(Y^{d=2})P_2 + E(Y^{d=\infty})(1-P_2)]. \quad (1)$$

Note that the transition probabilities are conditional so that $P_2 = P(d = 2 \mid d > 1)$. For the second question, the comparison is simpler, involving two regime-specific means:

$$E(Y^{d=2}) - E(Y^{d>2}) = E(Y^{d=2}) - E(Y^{d=\infty}), \quad (2)$$

It is never possible to compute quantities defined by equations (1) and (2), as we can observe only one of the three potential outcomes for each individual worker. To infer causality, it is necessary to introduce the ignorability assumption, which must be taken as provisional, since it is unlikely to hold in reality. The ignorability assumption states that all systematic differences associated with the transitions can be summarized by a set of observed covariates (*X*) (Rosenbaum and Rubin 1984).

Given this assumption, one may estimate the expected earnings based on the observed covariates, including human capital, political capital, as well as other relevant ones. As shown in equations (1) and (2), we need four conditional expectations for the causal analyses: $E(Y^{d=1} \mid X)$,

$E(Y^{d>1} \mid X)$ for the first question, and $E(Y^{d=2} \mid X)$, $E(Y^{d>2} \mid X)$ for the second question. The ignorability assumption means that $E(Y^{d=1} \mid X)$ can be estimated among early birds, $E(Y^{d=2} \mid X)$ among later entrants, and $E(Y^{d>2} \mid X)$ among stayers. However, $E(Y^{d>1} \mid X)$, being a weighted sum of two conditional expectations, should be estimated from both later entrants and stayers.[2]

To illustrate the utility of this re-conceptualization, we perform propensity score analyses (Dehejia and Wahba 1999). To borrow the jargon from the causal inference literature, we consider two "treatments" in our study: an early entry to the market sector and a late entry to the market sector. For the first treatment, the "control" group consists of workers who did not make an early entry and thus includes stayers as well as later entrants. For the second treatment, the "control" group consists of stayers only. The propensity score method allows us to summarize all the differences between the treatment and control groups with a single dimension — the probability of receiving a particular treatment. We then compute the average treatment effect on earnings within each propensity score stratum.

We focus on the causal effect of second treatment – a late entry – on earnings, for which Wu and Xie (2003) have reported higher average earnings and returns to education. While we speculate that the heterogeneity of the group that consists of both voluntary and involuntary later entrants may contribute the results, we have no direct measures on individual workers' intention when they decide on a market entry. Combining the propensity score analysis and the substantive information on layoff experience, we treat voluntary and involuntary entry as a

[2] Given that the majority for workers still stay in the state sector, a crude approximation of $E(Y^{d>1} \mid X)$ can be estimated from stayers (i.e., giving a full weight to stayers). This

continuum, and calculate each individual's propensity of entering the market sector. We interpret those who have lower propensity scores of entering the market but indeed have made the transition as voluntary entrants to larger extent than those who have higher propensity of entry.

Data and Variables

1. Data

The empirical analyses we analyze are from the survey on "Life Changes in Urban China since Reform," which was conducted in 2000 in 10 Chinese cities from five provinces (Jilin, Shaanxi, Henan, Hunan, and Guandong) and a province-level municipality (Tianjin).[3] These provinces represent three different geographic regions and also levels of economic development in China. The capital city of each province and Tianjin, one of the four municipalities directly under the central government's jurisdiction, were chosen to represent the large cities. In addition, a medium size city was randomly selected in four of the five provinces (except Shaanxi). The procedure result in a selection of 10 cities: Changchun, Changsha, Guangzhou, Jilin, Kaifeng, Tianjin, Xi'an, Xiangtan, Zhenzhou, and Zhongshan (see Figure 2). Within each city the multi-stage stratified probability sampling method was used to choose individuals aged from 18 to 65 years old. As a result, 4307 individuals were selected, of which 2631 held a paid job in 2000. The survey contains rich information on respondents' job mobility histories concerning work organization, occupation, and income at 1965, 1976, 1985, 1993, and 2000.

[FIGURE 2 ABOUT HERE]

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approximation is an interpretation of Wu and Xie's (2003) analysis strategy.

[3] We thank Dr. Liu Jingming, Department of Sociology at Renmin University of China, for making the data available to us.

In this paper, we investigate the process of labor market transitions in the period between 1993 and 2000. We select 1993 as the benchmark year for both substantive and methodological reasons. First, the year of 1992 marks a milestone in the history of China' economic reform, when Deng Xiaoping made his famous tour to southern China to push for further market reform after the Tiananmen crackdown. We use one year lag to gauge the impact of the new policy on workers' transition in labor markets. Second, retrospective information in 1993 is subject to few recall errors than that in earlier years. Lastly, focusing on a relatively short period would avoid a high sample attrition rate and provide more sample cases in the labor force in both 1993 and 2000. The young cohort who entered into the labor force after 1993 is excluded in the analysis.

We use workers' status in 1993 and 2000 to characterize four types of workers in China's urban labor markets ─ namely, those in the state sector in both 1993 and 2000 are defined as "stayers;" those in the market sector in both 1993 and 200 are defined as "early birds;" and those in the state sector in 1993 but in the market sector in 2000 are defined as "late entrants." After eliminating those not active in the labor force in either 1993 or 2000, we obtained 1941 respondents for the analysis.

2. Variables

Distinguishing the market sector from the state sector is crucial to the typology of workers. We employ two criteria: respondent's affiliated work organization and respondent's occupation. Concerning the first criterion, we code workers in the newly emerging types of work organizations such as "domestic private enterprise," "joint ventures/foreign invested firms" (*sanzi qiye*), "individual-owned business" (*geti hu*), and "other self-employed businesses" organizations, as in the market sector, and workers in "government agencies," "state

institutions," "state-enterprises," and "collective enterprises" as in the state (public) sector. Concerning the second criterion, we code workers whose occupations are "individual business owners" (*getihu*), "private enterprise owner" (*siying qiye zhu*), and "other self-employed occupation" as in the market sector.

We combine the two criteria to define the market sector vs. the state sector by coding workers in the market sector if they meet any of the two criteria – so as to give us an adequate number of cases for analysis. This is corresponding to the broad measure employed in Wu and Xie (2003). As Table 1 shows, in 1993, 271 of 1941 respondents in the labor force worked in the market sector; as of 2000, 253 of them ("early birds") still worked in the market sector, whereas 18 retreated to the state sector ("market losers"). During the same period, 182 of 1670 workers in the state sector in 1993 moved into the market sector by 2000 ("later entrants), with the rest continuing to stay in the state sector ("stayers"). The later entrants and early birds constituted workers in the market sector, accounting from 23 percent of all workers in 2000, a dramatic increase from 14 percent in 1993. As expected, mobility from the market sector to the state sector is rare, and 18 "market losers" are excluxed in the following analysis.

[TABLE 1 ABOUT HERE]

We use earnings as the major indicator of social stratification outcomes. The survey collected information on the total monthly income earned in both 1993 and 2000, measured in RMB yuan. We include individual characteristics commonly used in the studies of earnings determination: education, party membership, age, gender. Education, which denotes human capital, is a continuous variable measured with years of schooling. Whether the respondent is a party member or not measures political capital. It is coded as a dummy variable (yes=1). Age is measured as a continuous variable, and gender is coded as a dummy variable, with male as 1 and

female as 0.

State layoff is a crucial process driving many workers' entry into the market sector in the late 1990s. The survey asked respondents whether they had laid-off experience, and if they had, when it happened for the first and most recent layoff. We create a dummy variable to indicate whether one had layoff experience between 1993 and 2000 (yes=1). Many observers reported that those who were sent down to rural areas in the Maoist era, continued to be disadvantaged in labor markets in the reform era after they returned to cities (Zhou and Hou 1999). This important life course event may have a negative impact in subsequent layoff and entry into the market sector. We code whether one had such sent-down experience as a dummy variable (yes=1).

Job satisfaction in 1993 affects workers tendency for mobility. The more satisfied with their job in the state sector, the less likely worker are to change job and enter the market sector. Job satisfaction is measured with a scale from 1 to 4, and treated as a continuous variable in analysis.

As we choose 1993 as the baseline year, those who entered the labor force after 1993 are excluded from the analysis. Our "early birds," however, cover all workers who entered in the labor force in different years before 1993, many of who came from disadvantaged backgrounds and were unable to locate a formal job in the state sector. We create a dummy variable to indicate whether the respondent was already in the market sector in 1985. We refer them as "early birds" relative to those who entered the market after 1993.

Finally, because large regional variations in economic structure and the pace of reform have created varying opportunities for entering the market sector and consequently income inequality, we create 5 dummy variables represent provinces from which the sample was drawn.

As shown in the flow chart of labor market transitions in Figure 1, by the year of 1993, among 1923 workers in the labor force, 253 had made an early transition and worked in the market sector (d=1), who were characterized as early birds in Table 1. Of the remaining 1670 workers in the state sector, 182 workers had switched into the market sector since1993.

Table 2 presents descriptive statistics for the entire sample and the comparisons among three types of workers. For instance, early birds on average earned 1558 RMB yuan per month and later entrants earned 1412 yuan per month, compared to stayers who earned a monthly income of 949 yuan. In 1993, their respective monthly earnings are 1347 yuan, 456 yuan and 532 yuan. It seems that later entrants have gained more income from 1993 to 2000 by entering the market.

[TABLE 2 ABOUT HERE]

For the two variables – education and party membership - that are of particular interests to some scholars, stayers have the highest years of schooling, whereas early birds are least educated. Party members constitute 28.5 percent of stayers, but only 6 percent of early birds and 13.7 percent of later entrants. Such observations are consistent with the early findings reported: as the reform proceeded, while the redistributive state in China continued to be the dominant provider of career opportunities for both professional and political elites (Walder, Li and Treiman 2000), the market started offering more opportunities and increasingly attracted the same group of people with more human capital, political capital, or both (Wu 2004).

Of all the workers in 2000, 10 percent had laid-off experience between 1993 and 2000. They are highly concentrated among later entrants in the market sector, of which 49 percent had such experience. Of course, laid-off workers can also find a job in the state sector; they

constitute 6 percent of all stayers in the sector.

Our empirical analyses contain two major parts. In the following, we first examine, via logistic regressions, the determinants of the likelihood of having layoff experience, and the patterns of entry into the market sector before 1993 and after 1993. Then we employ the propensity score matching methods to estimate the causal effects of an early market entry and a late market entry on earnings gains in 2000, with a particular attention to the voluntary and involuntary later entrants among those who switched from the state sector to the market sector after 1993. In model estimations, data are weighted to represent the general population of the selected cities.

Results from Logistic Regressions

Table 3 presents estimates for binary logit models predicting the likelihood of having layoff experience for state workers between 1993 and 2000. We first include years of schooling, party membership, age, and gender as covariates in Model 1, then further introduce in Model 2 the sent-down experience, job satisfaction in 1993, logged earnings in 1993, and province dummies.

In both models, years of schooling are negatively associated with the likelihood of being laid off, and party members are also less likely to be laid off than non-party members. In Model 2, an additional year of schooling decreases the net odds of being laid off by 10.8 percent ($e^{-0.114}$-1) ($p<.001$); and a party member's odds of being laid off are only 62.2 percent ($e^{-0.475}$) of those of a non-party member, controlling for other variables ($p<.10$). Age, a proxy of work experience, is also negatively associated with the likelihood of being laid off. A year increase in age brings down the net odds of being laid off by 4.1 percent ($e^{-0.042}$-1) ($p<.001$). Men and women, however, do not differ significantly in layoff experience.

[TABLE 3 ABOUT HERE]

We confirm that the sent-down youth in the Maoist era are also more likely to suffer from layoff experience in the market reform era – their net odds of being laid off are 66 percent ($e^{0.506}$-1) higher than those had no sent-down experience (Zhou and Hou 1999). Meanwhile, one point increase in job satisfaction scale is associated with 61.7 percent ($e^{-0.959}$-1) decrease in the net odds of being laid off, and the relation is highly significant ($p<.001$). We suspect that it is due to the nature of the job itself (e.g., job security), which both affects workers' satisfaction but also the likelihood of being laid off in the process of the economic restructuring.

We use the logarithm of monthly earnings in 1993 to capture one's earning power. Those with more earning power are less likely to be laid off. If logged earnings in 1993 increase by 1 unit, the net odds of being laid off after 1993 decrease by 26.7 percent ($e^{-0.311}$-1) ($p<.05$). We found no significant variations among workers across different provinces in the likelihood of being laid off.

Hence, the analyses suggest that the laid-off workers tended to be those who lacked human and political capital, and who have lower earnings powers than those who had been able to keep their jobs in the state sector in 1993. These workers, if laid off and pushed into the market sector, would be less likely to do well financially.

We follow the flow chart of workers in Figure 1 and estimate two sequential logit models predicting the likelihoods of an early entry into the market sector in or before 1993 and of a late entry into the market sector after 1993. The models are sequential in the sense that an early entry before 1993 is contrast to those in the state sector by that year, regardless of whether they made transition to the market sector later or continued to stay in the state sector. A late entry is contrasted to those who stayed in the state sector by 2000.

Table 4 reports the estimated coefficients for the two logit models. In both models we include years of schooling, party membership, age and age square, and gender as covariates; we also include in Model 1 whether an individual was in the market sector in 1985 to predict the early market entry; and in Model 2 job satisfactory and layoff experience since 1993 to predict a late market entry.

[TABLE 4 ABOUT HERE]

Consistent to our earlier discussion, we found that both education and party membership prevent one from entering the market sector before 1993. An additional year of schooling decreases the net odds of an early entry into the market sector by 8.8 percent ($e^{-0.092}$-1), and a party member's odds of entering the market sector are only 45 percent of the odds of a non-party member, net of the other factors. Both effects are statistically significant ($p<.05$). The effect of age on the likelihood of an early entry is curvilinear, first decreases and then, after 48.5 years old increases. There is no significant difference in the likelihood of entry between men and women, and to a large extent, across provinces.

We include a dummy variable on whether the respondent had already been in the market in 1985. The result shows that the net odds of being in the market sector in 1993 for those in the market sector in 1985 are 39 times ($=e^{3.669}$) the odds for those who were, which suggests that a large portion of workers in the market in 1993 indeed entered the market sector quite early.

The effects of both education and party membership on entry into the market, however, have changed since 1993. While a separate analysis (not shown here) with only education, party membership, age and gender indicates that more educated workers are still significantly less likely to enter the market, and that party members are significantly less likely to enter the market than non-party members, the absolute values of the estimated coefficients are much smaller than

the corresponding ones for an early entry before 1993. In Model 2 of Table 4 after we introduce layoff experience, both coefficients for education and party membership become insignificant. Combining with the analysis in Table 3, this result suggests that those who lack human and political capital are more likely to be pushed into the market by layoffs.

Indeed, as Model 2 shows, the layoffs are much more likely to end up in the market sector between 1993 and 2000. The net odds of switching to the market sector after 1993 for workers with layoff experience are 22.5 times ($e^{3.115}$) the odds for those without the experience. On the other hand, job satisfaction in the state sector in 1993 negatively affects the likelihood of entering the market sector. A point increase in the satisfaction scale decreases the net odds of entry by 68.8 percent ($e^{-1.166}$-1). Both effects are highly significant ($p<.001$). We found no variations in the likelihood of a late market entry among workers in different provinces.

The results of logistic regression analyses suggest that those who entered the market sector in the early period were apparently disadvantaged in human capital and political capital compared to those who stayed in the state sector, whereas such disadvantages were reduced among those who entered the market in the late period. We identify one process through which human capital and political capital affect a worker entry in to the market in the late reform era – those lacking human and political capital are more likely to be laid off in the period; and laid off workers are more likely to enter the market than workers without such experience.

Results from Propensity Score Analyses

Our central concern is how the change in the process of workers' entry into the market sector affects earnings inequality at macro-level, and our specific interest lies in the heterogeneity of later entrants in the market sector generated by two mechanisms – those who entered voluntarily

due to self-selection and those who entered involuntarily due to state layoffs. To address these issues, we employ the propensity score matching method in causal inference.

In the propensity score analysis, we consider two "treatments" in our study: an early entry to the market sector and a late entry to the market sector. For the first treatment, the "control" group consists of workers who did not make an early entry and thus includes stayers as well as later entrants. For the second treatment, the "control" group consists of stayers. The propensity score method allows us to summarize all the differences between the treatment and control groups with propensity scores, which are estimated from binary logit models. We then stratify the propensity scores, and compute the average treatment effect on earnings within each stratum balancing both propensity scores and observed covariates. A large literature shows that the propensity score stratification method can remove large amounts of biases in causal inferences with observational data (e.g., Becker and Ichino 2002; Dehejia and Wahba 1999; Winship and Morgan 1999), affording us an easy way to examine differences in observed covariates and compare the groups flexibly and non-parametrically.

In this framework for causal inference, the focus is explicitly on the cross-group differences in outcomes. Group differences in observed covariates (including education) are encompassed by propensity scores. We estimate the propensity score P_1 for the first transition based on Model 1 of Table 4, and P_2 for the second transition, conditional on a worker still being in the state sector as of 1993, based on Model 2 of Table 4.

We then group the respondents into 8 strata of estimated propensity scores to balance both estimated propensity score and covariates between the treatment and comparison groups ($p<.001$) (Becker and Ichino 2002). The number of cases in each stratum, separately by

treatment and control groups, is shown in Figure 3 for the first transition.[4] The figure demonstrates vividly how early birds differ from other workers in observed covariates. Among workers who did not make the transition to become early birds, most of them have very low (0.143 or lower) propensities of making such a transition. In contrast, workers who did make the transition have relatively high predicted propensity scores. Without the balance achieved through propensity score stratification, the two groups would be incomparable.

[FIGURE 3A ABOUT HERE]

The propensity model for the second transition differs from that for the first transition because the mechanisms for making the transition changed, particularly in terms of the role played by human capital and political capital, which we have previously discussed. In Figure 3b, we present the distributions of later entrants and stayers across 8 propensity score strata, within which both the propensity score and observed covariates are balanced. [5]

[FIGURE 3B ABOUT HERE]

Under the ignorability assumption (Rosenbaum and Rubin 1984), there are no systematic differences between the treatment group (entrants to the market sector at a given time) and the control group (stayers in the state sector at a given time). The average earnings differences within a propensity score stratum can thus be interpreted as the average causal effect of market entry for that stratum.

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[4] We use **pscore** command in STATA to implement the stratification matching (Becker and Ichino 2002). The values on X-axis are the inferior boundary of the 8 propensity score strata. The 336 workers in the control group whose estimated propensity score is less than the minimum estimated propensity score for the treatment group are discarded.

[5] The 92 workers in the control group whose estimated propensity score is less than the minimum estimated propensity score for the treatment group are discarded.

To answer the question whether the transition to the market has caused an increase in earnings, we conduct detailed analyses of the treatment effect of a market entry in three steps. First, we estimate the treatment effects specific to propensity score strata. Second, we pool the results across strata under the assumption of a homogeneous treatment effect. Finally, we allow for heterogeneous treatment effects through estimating a hierarchical-linear model (HLM) (Raudenbush and Bryk 2002).

In Figure 4a we present the summary findings from the analysis of treatment effects of an early transition. The dots are point estimates of stratum-specific treatment effects, with corresponding *t* values given nearby for the null hypothesis that the treatment effect is zero. The results are clear. In only one stratum – the first stratum with lowest propensity score – can we detect a significant effect of an early transition. If we assume the treatment effect to be homogeneous across the strata and pool the estimates to improve precision, the overall treatment effect is estimated to be 102 RMB yuan, with a standard error of 244, resulting in an insignificant *t* value at 0.42.6 Finally, we allow the treatment effects to vary by strata in a hierarchical-linear model (HLM) to examine whether the treatment effect varies systematically with propensity score (Raudenbush and Bryk 2002). The integer-score rank of a propensity score stratum is used as the predictor of the treatment effects across strata. The HLM results are represented by the linear line in Figure 4a. While it appears that the treatment effect increases positively with the propensity of being treated, this relationship is not statistically significant (t=1.87, p=0.11).

[FIGURE 4A ABOUT HERE]

6 We use **atts** command in STATA to estimate the average treated effect on the treated using stratification matching of propensity scores (Becker and Ichino 2002).

Results for a late transition, summarized in Figure 4b, are quite different in several important ways. First, the treatment effect of making a late transition is relatively large and significantly different from zero for the four lowest propensity score strata. If we pool the different strata together for an overall treatment effect under the homogeneous effect assumption, the estimate is 682 RMB yuan with a standard error of 180, resulting in a highly significant *t* value of 3.78. However, the assumption of the homogeneous treatment effect seems to be violated, as there is clearly a downward trend in Figure 4b. The HLM model reveals that the size of the treatment effect strongly and negatively depends on propensity score, with a unit change in stratum rank (i.e., crossing a propensity score stratum) associated with a reduction of 191 RMB yuan in the treatment effect (a significant relationship with t=-4.1). That is, the benefit of a late transition into the market sector is the greatest among those who were *least* likely to make the transition and diminishes with the propensity of making the transition.

[FIGURE 4B ABOUT HERE]

Summary and Discussion

To summarize, we found that the pattern of entry in the market sector in urban China has altered since 1993. While early entrants to the market tend to come from the lower ties of the social hierarchy, the negative effect of human capital and political capital on the late entry into has become less evident. We believe that the later entrants are generated by two processes, in which both education and party membership play opposite roles. On the one hand, as the market reform proceeded, state layoff took place and workers lacking education and political connections were thrown into the market for survival; on the other hand, the growth of the market economy also

attracted increasingly more capable workers from the state sector, who had been able to cash their human capital and political capital for even greater economic advantages.

The effect of the market on earnings varies, in two dimensions. First, confirming Wu and Xie's (2003) earlier findings, we do not find a premium to an early transition to the market sector, but a late transition into the market sector is associated with higher earnings. Furthermore, we also show that even among later entrants, the benefit of working in the market sector sharply decreases with the propensity of having made the transition. Hence, the key finding of our propensity score analysis is that the market premium is only limited to late entrants who otherwise have a low likelihood of making a transition to the market sector.

Who are these people? In all likelihood, these low-propensity later entrants are workers who could have been doing especially well in the state sector but indeed have ended up in the market sector. We name them as the voluntary later entrants in contrast to involuntary later entrants who are pushed into the market through state layoff. Indeed, as plotted in Figure 5, in the two strata with the lowest propensity scores, none of the workers has been laid off, whereas in the three strata with the highest propensity scores, all workers have layoff experience. Workers who do well in the state sector and thus are unlikely to lose their jobs have a low likelihood of entering the market. For them, the attraction of the market sector needs to be large enough to overcompensate for the advantages they already enjoy in the state sector. Higher earnings of this subgroup of later entrants lift the average earnings for the workers in the market sector as a single group.

[FIGURE 5 ABOUT HERE]

Hence, without attending to the process through which individuals are allocated or sorted to a group, it is highly questionable to rely on the comparison of group means to address the

causal effect of being in that group. In Figure 6, we illustrate how aggregating data inappropriately would likely lead to wrong conclusions. A comparison in earnings between workers in the market sector and in the state sector would find that the former enjoys significantly higher earnings and returns to schooling than the latter, which has been commonly attributed to the market mechanism at work (e.g., Bian and Logan 1996; Nee 1989; Zhou 2000). Wu and Xie (2003) questioned this causal explanation. By dividing the workers in the market sector into two subgroups based on their mobility history in the labor markets, they reported that the advantages were limited to later entrants only. Our propensity analysis score analysis has further disaggregated the later entrants and demonstrated that higher earnings and higher returns to schooling are only limited among some later entrants, who entered the market sector voluntarily in the late reform stage.

[FIGURE 6 ABOUT HERE]

The problem, then, is turned to investigating why a subgroup of later entrants perform so well, rather than why workers in the market sector earn more than their counterparts in the state sector. Our propensity score analysis illustrate a classic violation of the ignorability assumption, the problem of endogeneity: individuals select their "treatment" based on the anticipated outcome, which is *not* homogeneous across workers. We suggest that there is a strong self-selection mechanism at work: when workers with a low (latent) propensity of making a transition indeed did make a late transition to the market sector, they benefit the most from the transition. In other words, it is a story about what drives workers migrate to the market sector, and our research should be devoted to understanding this micro process and its economic consequence. During the economic reform in China, workers move from the state sector to the market sector for different reasons, and not always voluntarily. That is the reason why they have also fared

differently.

Conclusion

There is an intellectual gap in the literature in modern social stratification in general and post-socialist stratification in particular. Scholars often jump from the observed structure of inequality to the causal mechanisms on the theory of social stratification, without a solid knowledge of the underlying social processes that generate the stratification products. Commenting on this gap, the late Hubert M. Blalock (1991) advises that researchers shall delimit their theories to what he refers to as *allocation* processes, through which individuals are assigned or sorted into positions by a series of micro-level decisions. "Without benefit of more micro analyses, such macro theories are likely to require so many untested assumptions, and to ignore such huge data gaps, our intellectual and ideological biases are likely to predominate, resulting in unanswerable theoretical disputes that merely hamper the process of arriving at a cumulative body of knowledge" (Blalock 1991: 27).

In this paper we proposed a micro perspective to shed new lights on relationship between the institutional transition to a market economy and the changes in earnings inequality in China. We emphasized the differential sorting processes of workers in the emerging labor markets in understanding how earnings inequalities are produced during China's economic transition. Using the propensity score method in causal inference, we examined the causal effect of an individual worker's entry into the market sector on earnings gains, and found that an early market entry has no effect on earnings, whereas the effect of a late market entry on earnings is negatively associated with the propensity of making such transition. Those who would otherwise do well in the state sector and therefore have lower propensity of entering the market have benefited more

from the entry. We highlighted a group of workers' self-selection process of generating earnings inequality in post-socialist urban China.

To the theoretical question of "does the market pay off?"(Wu & Xie 2003), our results from propensity score analysis show that there is no simple answer. We do not find a generic market effect on earnings; instead, the observed higher earnings in the market sector is limited only to a subgroup of later entrants, who are self-selected into the sector for even greater economic gains. We cautioned the danger in reliance on group comparisons to make theoretical causal inference, without fully acknowledging the process of how individuals are sorted into a group and thereby the heterogeneity within the group.

While the exercise in this paper is focused on the sector difference in earnings, our methodological advice is equally applicable to the study of earnings inequality between party members and non-party members (e.g., Gerber 2000), between cadres and non-cadres (Nee 1996; Walder 2002), and among different types of work organizations (Zhou 2000). We reject the simplistic causal explanations of post-socialism earnings inequality in term of the redistributive state or the market, and call for further research on the underlying micro process of individuals' mobility between social positions, constrained and influenced by macro-level institutional transitions, and its aggregate outcomes in the change of inequality structure (Blau 1977). Identifying these processes is a challenging task but a necessary step towards constructing a solid theory on the changing stratification mechanism in post-socialist transition.

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Table 1 Types of Chinese Workers in Labor Market Transition, 1993 (N=1941)

	Current State Sector (2000)	Current Market Sector (2000)
Initial State Sector (1993)	Stayers (1488)	Later Entrants (182)
Initial Market Sector (1993)	Market Losers (18)	Early Birds (253)

Table 2. Unweighted Summary Statistics of Variables for 3 Types of Workers in 10 Selected Chinese Cities

Variables	Overall [a]	Early Birds	Later Entrants	Stayers
Monthly earnings 2000 (RMB)	1064.4 (1467.4) [b]	1558.4 (2485.2)	1411.7 (2337.5)	948.8 (1055)
Monthly earnings 1993 (RMB)	626.0 (1997.0)	1347.4 (5438.2)	455.5 (575.1)	531.6 (733.2)
Years of schooling	11.35 (3.437)	9.785 (3.442)	10.86 (3.103)	11.69 (3.394)
Party membership (yes=1)	0.242	0.063	0.137	0.285
Male	0.554	0.585	0.527	0.552
Age	41.69 (9.337)	38.71 (9.002)	38.96 (8.382)	42.57 (9.341)
Layoff experience after 1993 (yes=1)	0.102	-	0.489	0.040
Sent-down (yes=1)	0.206	0.158	0.165	0.219
1993 job satisfaction	2.825 (0.568)	2.755 (0.605)	2.464 (0.663)	2.882 (0.528)
Market sector in 1985 (yes=1)	0.224	0.368		
Province				
Guangdong	0.195	0.312	0.187	0.173
Hu'nan	0.173	0.075	0.137	0.194
He'nan	0.150	0.154	0.203	0.144
Tianjin	0.142	0.095	0.126	0.154
Jilin	0.171	0.158	0.181	0.174
Shanxi	0.169	0.206	0.165	0.162
N of cases	1938	253	182	1485

[a] Including 18 workers who were in the market sector in 1993 but in the state sector in 2000 (market losers).
[b] Figures in parentheses are standard deviations for continuous variables.

Table 3 Binary Logit Models of Being Laid Off Between 1993 and 2000 on Selected Independent Variables: Workers in 10 Chinese Cities

Variable	Model 1	Model 2
Years of schooling	-0.125***	-0.114***
	(0.026)	(0.029)
Party membership	-0.517*	-0.475†
	(0.289)	(0.277)
Age	-0.041***	-0.042***
	(0.010)	(0.011)
Sex	0.067	-0.056
	(0.173)	(0.189)
Ever sent-down (yes=1)	-	0.506*
		(0.234)
1993 job satisfaction	-	-0.959***
		(0.151)
1993 logged earnings	-	-0.311*
		(0.128)
Province (Guangdong omitted)		
Hu'nan	-	0.250
		(0.379)
He'nan	-	0.270
		(0.384)
Tianjin	-	-0.203
		(0.385)
Jilin	-	-0.029
		(0.374)
Shanxi	-	0.131
		(0.373)
Constant	0.932	5.211***
	(0.551)	(1.178)
Pseudo R^2	0.041	0.109
Wald χ^2	48.66	107.08
Degree of freedom	4	12

Notes: the data are weighted. Figures in parentheses are standard errors.
*** p<.001 ** p<.01 * p<.05 † p<.10

Table 4. Binary Logit Models on Early Entry and Later Entry into the Market Sector: Chinese Workers in 10 Selected Chinese Cities, 1993-2000

	Model 1 Early Birds vs. Stayers & Later Entrants		Model 2 Later Entrants vs. Stayers	
Years of schooling	-0.116	***	-0.030	
	(0.034)		(0.037)	
Party membership	-1.533	***	-0.206	
	(0.327)		(0.314)	
Age	-0.291	***	-0.229	*
	(0.075)		(0.092)	
Age^2	0.003	**	0.002	*
	(0.001)		(0.001)	
Sex	0.298		-0.104	
	(0.196)		(0.235)	
Market sector in 1985 (yes=1)	3.699	***	-	
	(0.375)			
1993 job satisfaction	-		-1.162	***
			(0.191)	
Layoff experience since 1993 (yes=1)	-		3.155	***
			(0.270)	
Province (Guangdong omitted)				
Hu'nan	-1.180	**	-0.312	
	(0.351)		(0.445)	
He'nan	-0.344		0.781	†
	(0.336)		(0.449)	
Tianjin	-0.509		0.644	
	(0.351)		(0.449)	
Jilin	-0.131		0.590	
	(0.304)		(0.415)	
Shanxi	0.039		0.423	
	(0.293)		(0.414)	
Constant	6.503		5.922	**
	(1.585)		(2.105)	
Pseudo R^2	0.249		0.318	
Wald χ^2	155.07		188.25	
Degree of freedom	11		12	

Notes: the data are weighted. Figures in parentheses are standard errors.
*** p<.001 ** p<.01 * p<.05 † p<.10

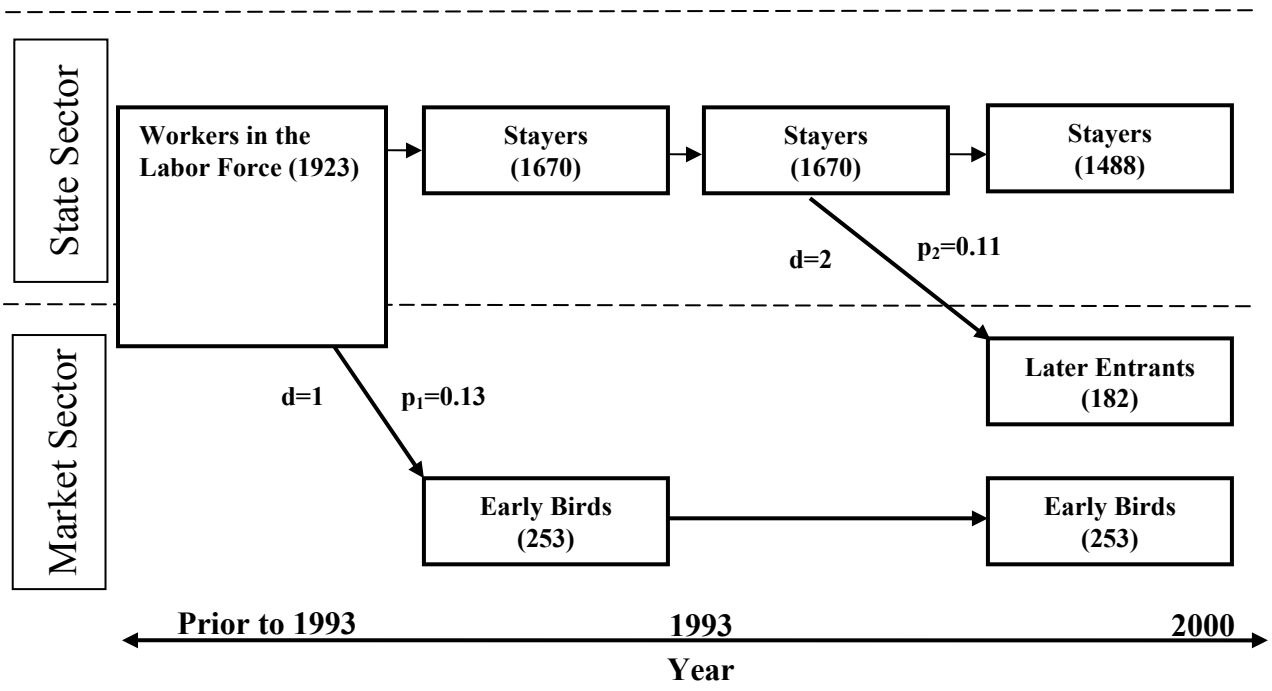

Figure 1. Flow Chart of Labor Market Transitions in China, 1993 - 2000.

Notes: workers not active in 1993 who entered in the labor force between 1993 and 2000 are not included in analysis of late transition from the state sector to the market sector.

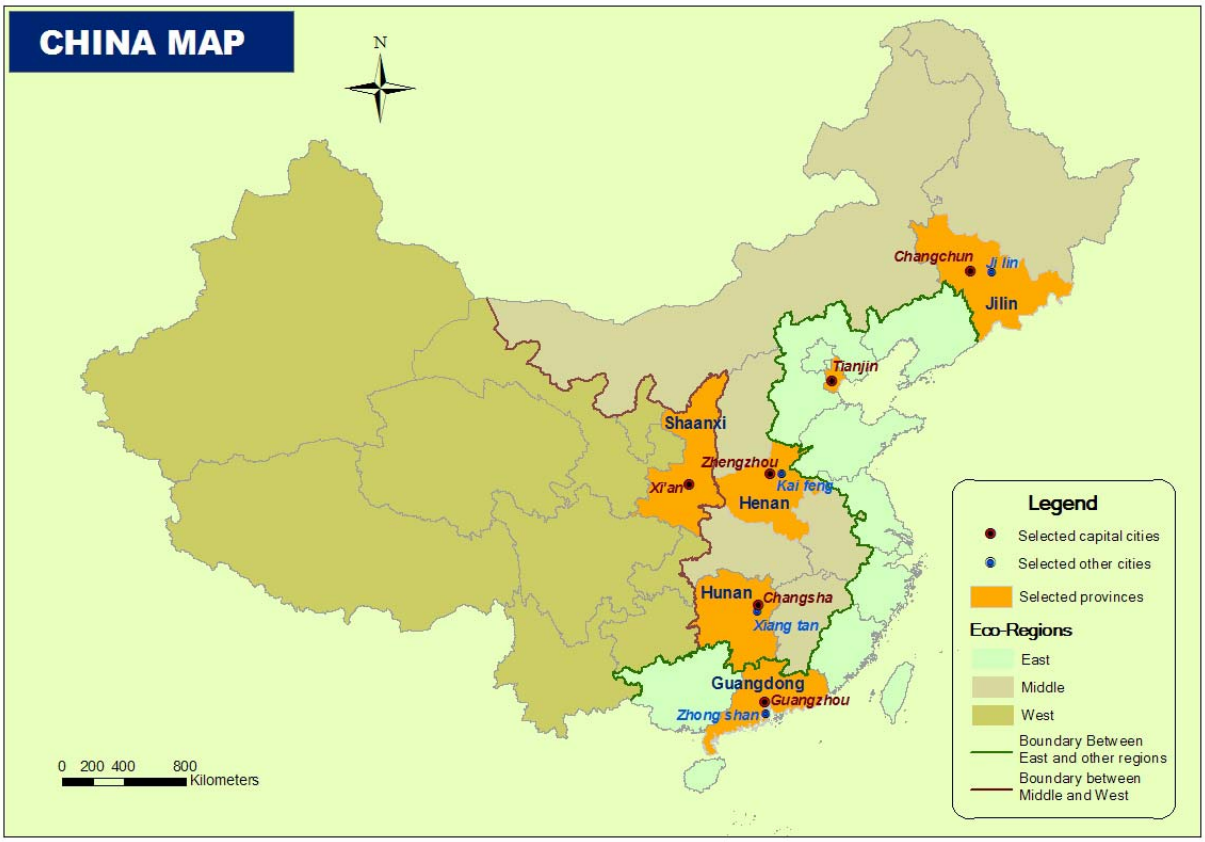

Figure 2. Selected City Sites in the *2000 Urban China Social Change Survey*

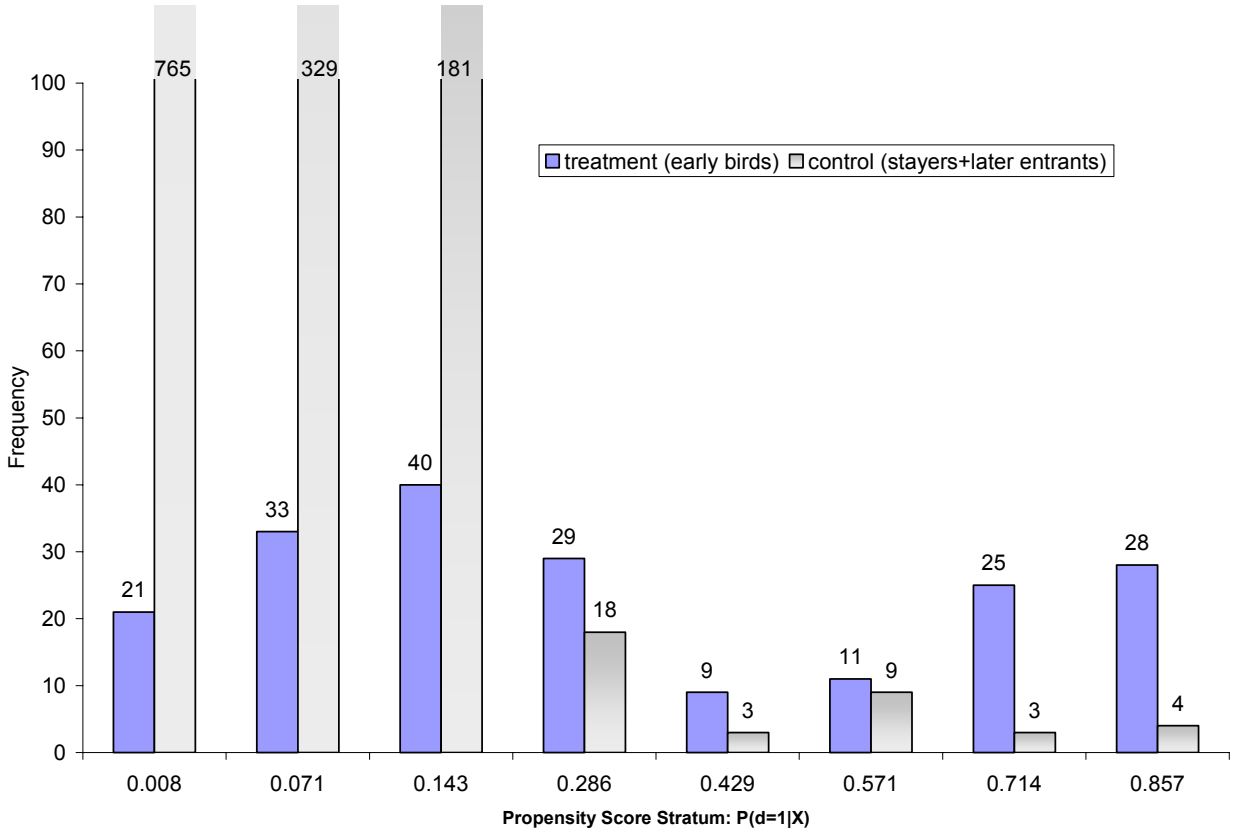

Figure 3a. Histogram of the Estimated Propensity Scores for Early Birds (Treatment Group) and Stayers /Later Entrants (Control Group)

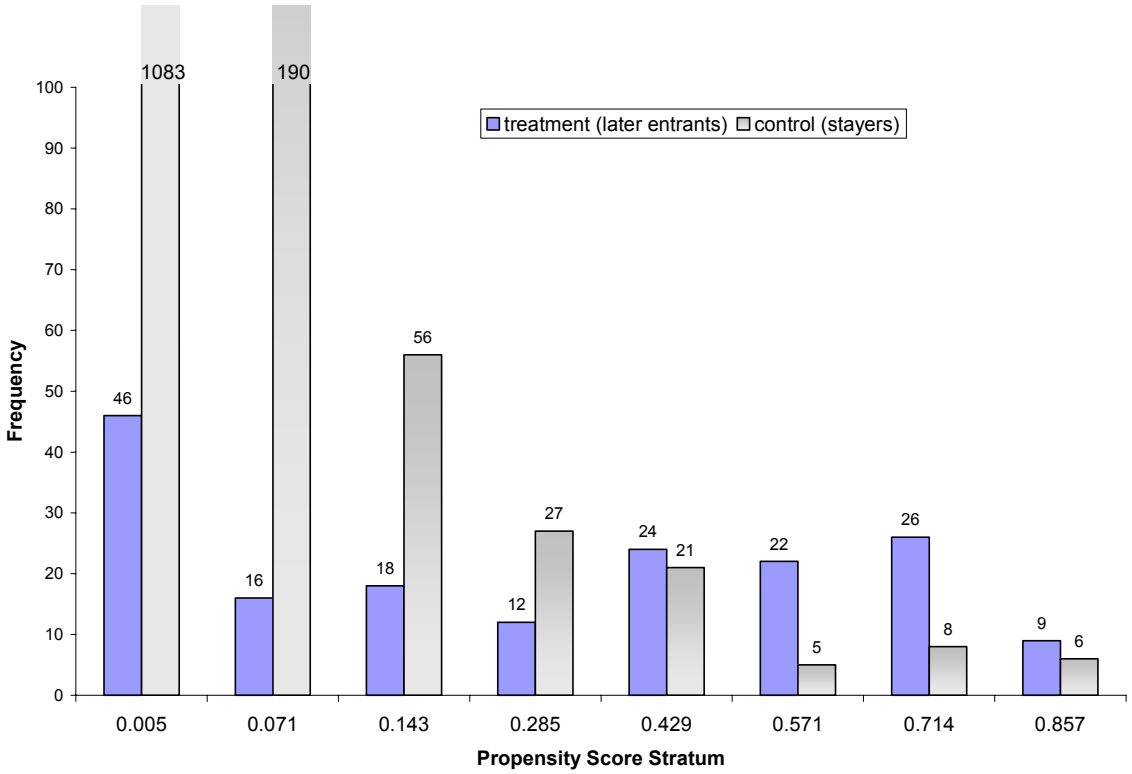

Figure 5. Histogram of the Estimated Propensity Score for Later Entrants (Treatment Group) and Stayers (Control Group)

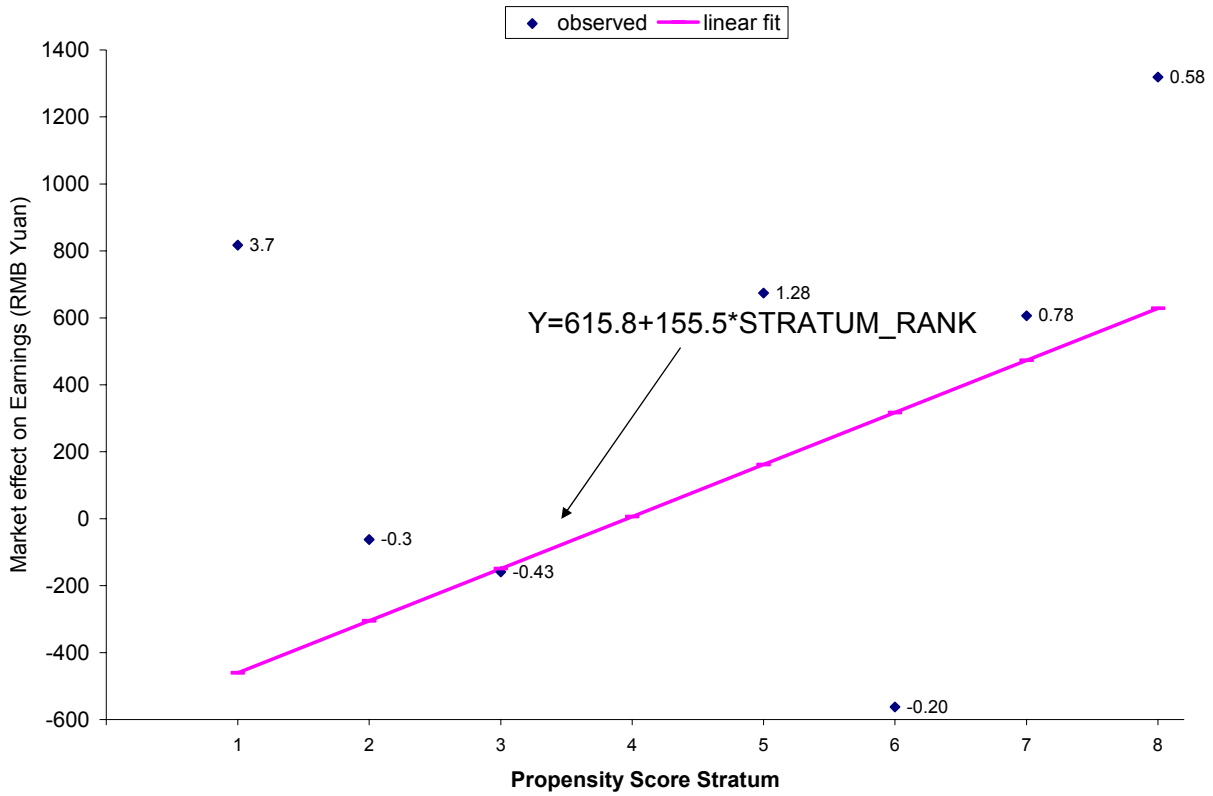

Figure 4a. Market Treatment Effect on Earnings by Propensity Strata: Later Entrants vs. Stayers

Notes:

a. Numbers in the scatterplot are *t* values for earnings comparison between late entrants (treatment group) and stayers (control group). A *t* value less than 1.96 indicates there is no significant difference in earnings between the treatment and control groups within a propensity score stratum.

b. The linear plot is based on the hierarchical linear model (HLM) estimates (level-2 model with slopes from level-1 model as outcomes regressed on propensity stratum rank). The effect of propensity stratum rank is statistically insignificant (*t*=-0.17).

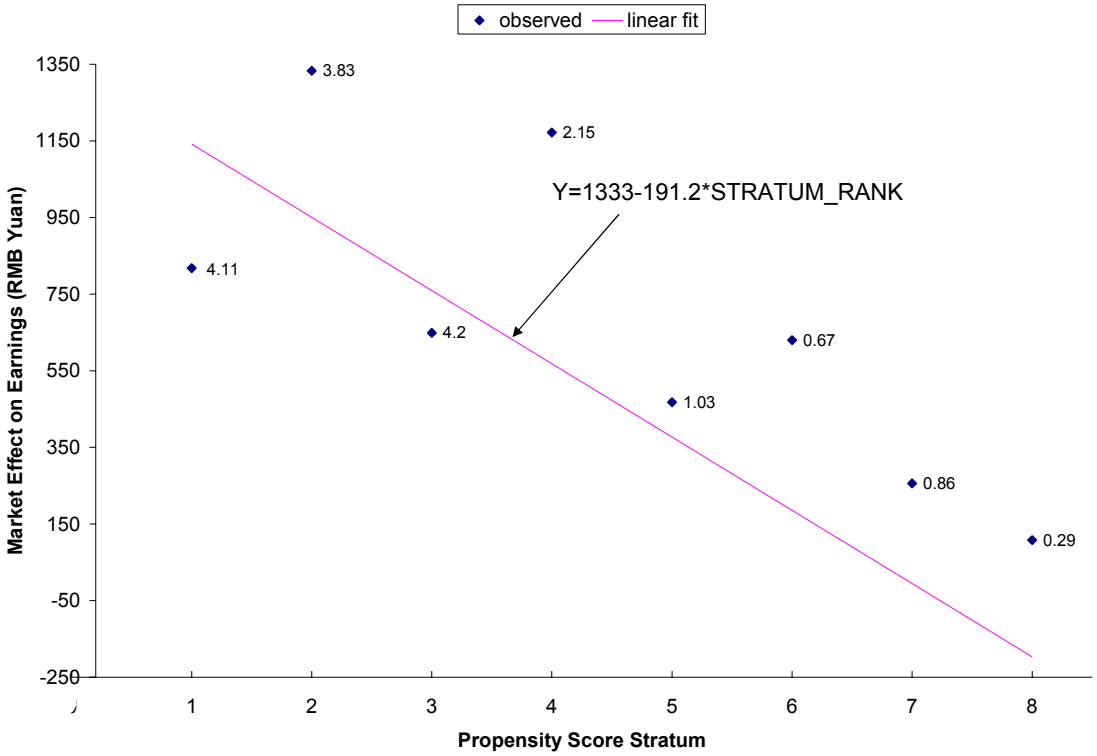

Figure 4b. Market Treatment Effect on Earnings by Propensity Strata: Later Entrants vs. Stayers

Notes:

c. Numbers in the scatterplot are *t* values for earnings comparison between later entrants (treatment group) and stayers (control group). A *t* value less than 1.96 indicates there is no significant difference in earnings between the treatment and control groups within a propensity score stratum.

d. The linear plot is based on the hierarchical linear model (HLM) estimates (level-2 model with slopes from level-1 model as outcomes regressed on propensity stratum rank). The effect of propensity stratum rank is statistically significant (t=-2.72).

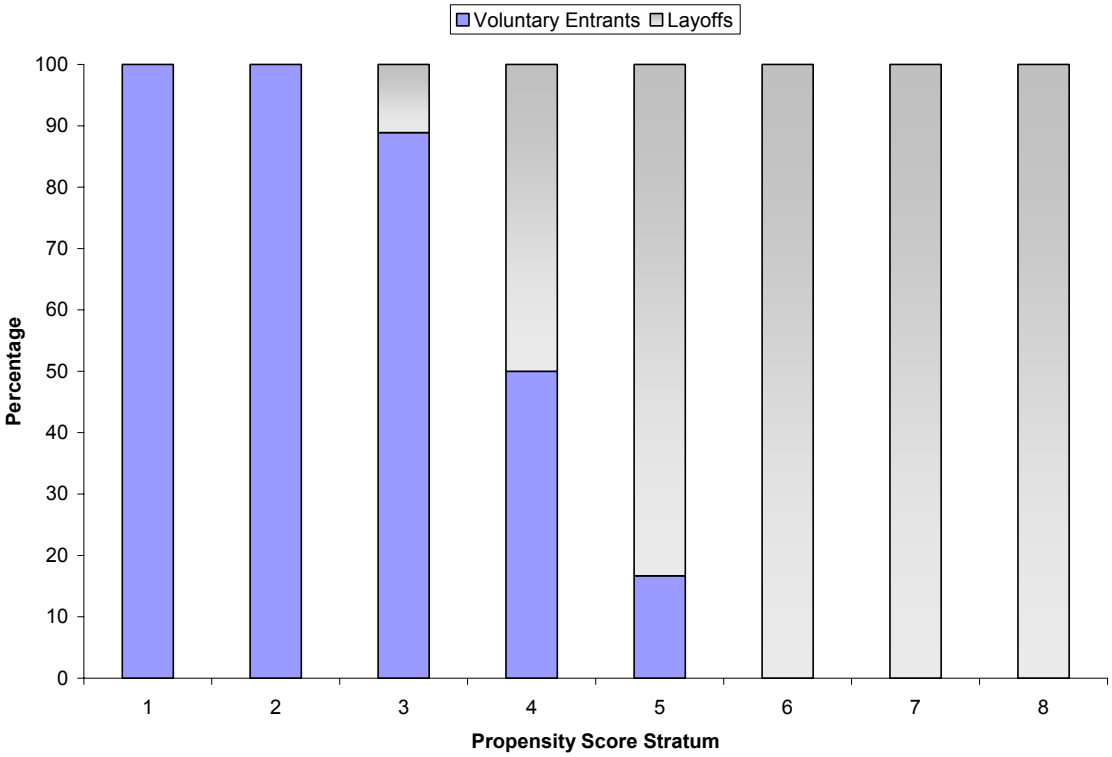

Figure 5. The Composition of Two-Types of Later Entrants by Propensity Score Strata

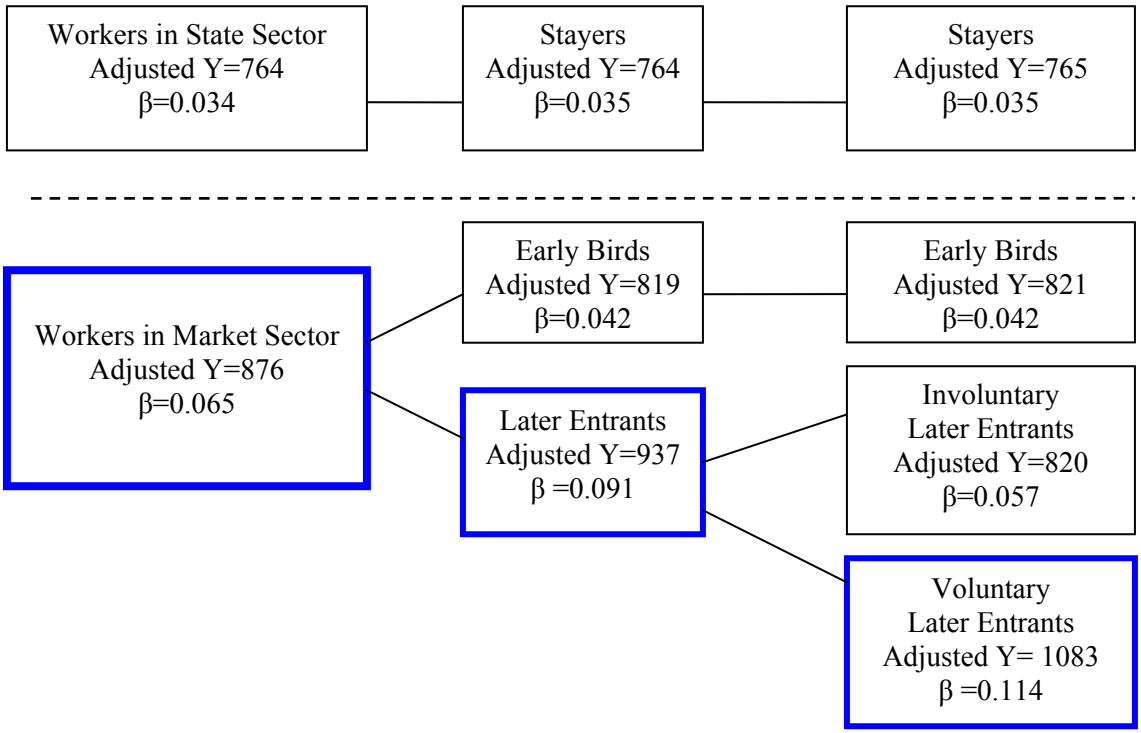

Figure 6. Earnings and Returns to Schooling among Workers in the State Sector and Workers in the Market Sector at Different Disaggregated Levels

Notes:

1. OLS regression of logged monthly income in 2000 (Y) on Years of schooling, Age and Age^2, Gender, Party member, logged monthly income in 1993, and Sector/worker type. The mean Y (in RMB Yuan) by sector/worker type is adjusted based on an additive model; returns to schooling are based on a model with interaction term(s) between sector/worker type and schooling.

2. The highlighted groups enjoy significantly high earnings and returns to schooling than workers in the state sector, namely, stayers ($p<.05$).