# Economic Transition and the Motherhood Wage Penalty in Urban China: Investigation Using Panel Data

Nan Jia
Southwestern University of Finance and Economics, China

Xiaoyuan Dong
University of Winnipeg, Canada

February 2010

**Abstract:** It is now well documented that women in market economies experience a wage penalty for motherhood. How does motherhood affect women's wages in transition countries? In this paper we investigate the motherhood wage penalty in post-reform urban China, using data from the China's Health and Nutrition Survey (CHNS). The survey provides a national representative panel sample for the period from 1990 to 2005. Applying panel-estimation techniques, we examine how economic transition has affected the wage gap between mothers and women without children. We find that, for the sample as a whole, women with children earned about 25% less in annual wages and 22% less in hourly wages than did women without children. Comparing the wage penalties for motherhood between the two reform periods: the gradualist period from 1990 to 1996 and the radical reform period from 1999 to 2005, we find that the motherhood wage penalty is markedly larger for the latter period than for the former. We also find that while motherhood does not have significant negative effect on wages for the state sector, it imposes substantial wage losses for women in the non-state sector. Our findings suggest that economic transition has shifted part of the cost of child rearing from the state and employers back to women in the form of lower pay for working mothers.

**Key words:** Economic Transition, Gender, Motherhood Wage Gaps
**JEL：** J13　J31

# 1. Introduction

It is well recognized that women's reproductive activities, typically child bearing and rearing, are crucial for human capabilities and well-being; caring for children, through its contribution to human and social capital formation, also play a pivotal role in generating and sustaining economic growth (Folbre and Nelson 2000). However, economic institutions often fail to recognize the contribution of women's reproductive activities. Instead, women's child bearing and rearing role disadvantages them in the labor market, and is a major factor feeding into their weak position in occupations and earnings (Elson 1999). Many empirical analyses for industrialized countries find that mothers earn less than women without children.[1] Feminist economists call the wage losses associated with motherhood the motherhood wage penalty (Budig and England, 2001).

The motherhood wage penalty can be attributed to various factors. First, in the absence of labor market regulations on maternity/parental leave, child bearing and rearing interrupt women's labor force participation, and women' intermittent labor force participation reduces their human capital investment (Mincer and Polachek, 1974; Jones and Makepeace, 1996; Royalty 1998). Second, child rearing often restricts mothers to types of paid work that are easier to combine with parenting─ for example, part-time work and home-based work (Becker 1991; Polachek, 1980). Third, mothers may earn less because effort extended to child rearing inevitably reduces the

[1] A selective list of references includes Blau and Kahn (1992), Korenman and Neumark (1992), Waldfogel (1995, 1998a, 1998b, 1999), Jacobsen, Pearce III, and Rosenbloom (1999), Lundberg and Rose (2000), Budig and England (2001), Anderson, Binder and Krause (2002), Anderson, Binder and Krause (2003), and Sasse (2005) for the United States; Waldfogel (1999), Joshi, Paci and Waldfogel (1999) for the United Kingdom; Waldfogel (1999), Phipps, Burton and Lethbrigde (2001) for Canada, Waldfogel (1999) for Australia, Germany and Finland. However, the findings on the motherhood wage penalty are not unambiguous. For instance, Albrecht et al. (1999) and Gupta and Smith (2002) find no negative effect on earnings for women with children in Sweden and Demark.

amount of effort available for paid work (Becker 1991; Albrecht et al. 1999; Anderson et al. 2002). Finally, believing that mothers always allow domestic responsibilities to interrupt their paid work, employers may discriminate against mothers in hiring and promotion (Waldfogel, 1998b). The earnings losses associated with motherhood are an important source of gender earnings inequality.

In this paper we investigate the motherhood wage penalty in urban China. Over the past three decades the Chinese economy has undergone a transition from a centrally planned to a market economy. The economic transition has brought about fundamental changes to the labor market, reshaping the ways by which society values and rewards women's reproductive activities. A large body of studies has emerged examining the impacts of economic transition on women's labor market outcomes. However, most of the studies focus on such factors as human capital investment, sex segregation, and discrimination and pay little attention to the changes associated with women's reproductive activities. In this paper we examine how economic transition has affected the wage gap between mothers and women without children. To our knowledge, the present paper is the first analysis of the motherhood wage penalty for a transition country.

Our analysis is based on data from the China's Health and Nutrition Survey (CHNS). The survey provides a national representative panel sample for the period from 1990 to 2005. Thus, we are able to control for unobserved time-invariant heterogeneity among women which may bias the estimates for the motherhood effect in cross-section analyses. We first compare the wage patterns between the two periods: the gradualist reform period from 1990 to 1996 and the radical reform period from 1999 to 2005. We find that while there is no negative effect of motherhood on annual wages and nor on hourly wages for the gradualist reform period, motherhood imposes

substantial wage losses (39% of decrease in annual wages and 41% of decrease in hourly wages) for the radical reform period. We next explore the contrast between the state sector and the non-state sector. We find that motherhood has no significant negative effect on wages by any measure in the state sector; however, mothers in the non-state sector are punished severely, especially in the radical reform period. These results suggest that economic transition has increased the costs of child rearing that are borne disproportionately by mothers. Thus, our analysis sheds new light on the gender implications of economic transition and contributes to the broader literature on work-family conflicts and child-related public policies.

The rest of this paper is organized as follows: Section 2 provides an overview of economic transition and discusses the reasons as to why economic transition may increase the wage penalty for motherhood. Section 3 introduces empirical methodologies and discusses the estimated issues. Section 4 describes the data. The empirical results are presented in Section 5. The paper is concluded with a summary of the main findings and a brief discussion of policy implications.

## 2. Economic Transition and the Wage Penalty for Motherhood

Under central planning, China's urban labor market was known as an "iron rice bowl" and "everyone eating from one big pot". Workers in state enterprises were employed for life and paid according to centrally regulated wage scales which were determined predominantly on the basis of workers' education and seniority (Korzec, 1992). Inspired by the Marxist doctrine that women's emancipation is contingent on women's participation in socialized labor, women's full participation in the labor force played a key role in the leadership's attempt to alleviate discrimination against women (Croll 1983). Most working-age women were employed on a full-time basis. To

support working mothers, resources were devoted to a publicly funded childcare system which provided care to children from the earliest months of their lives until they entered primary schools. In addition to on-site childcare, the employers also provided working mothers with nursing rooms for breast-feeding and paid maternity /family leaves. These family friendly policies made it easier for mothers to combine paid work with domestic responsibilities, thereby minimizing the interruption of child bearing and rearing on women's workforce participation. While women remained the principal caregivers for children and other family members and their domestic burdens may leave them exhausted or distracted at work, the impact of work effort on earnings was limited because the wage differentials among workers were compressed. Given the institutional characteristics of the labor regime, the wage penalty for motherhood should be small or nonexistent under central planning.

In the late 1970s, China started the transition to a market-oriented economy with a gradualist approach. In the first fifteen years of reforms, the Chinese government sought reform within the socialist system, directing their efforts primarily to economic decentralization, improving the incentives of state workers and managers, and encouraging the development of non-state sectors. While the entry of rural township village enterprises (TVEs), private firms, and foreign invested firms markedly eroded the share of state-owned enterprises (SOEs) in product markets, the public sector remained the principal employers of urban workers, accounting for more than three-quarters of total urban employment by 1995. State enterprises continued to protect workers against open unemployment and shoulder the responsibility of providing social benefits and services to employees.

The pace of economic reforms accelerated after Deng Xiaoping's famous southern tour in 1992. The Chinese government initiated ownership reforms for public

enterprises. In consequence, a large number of SOEs were transformed into joint-stock companies, declared bankrupt, merged with other enterprises, or sold to private investors. In 1994, a new labor law was passed that sanctioned the right of employers to dismiss workers. In 1997, Premier Zhu Rongji announced a large-scale labor retrenchment program in an attempt to revitalize the ailing SOE sector. The SOE-sector restructuring has fundamentally changed the landscape of the urban labor market, as the share of the public sector in employment dropped drastically from 75.7 percent in 1995 to 33.4 percent in 2002, putting an end to the state as the source of employment security.

Among transition economies, China's reforms are seen as highly successful in producing impressive rates of economic growth and reducing income poverty. However, an unintended consequence of the SOE-sector restructuring is the dismantling of the institutional mechanism that internalized the costs of reproduction, permitting a more equitable gender division of labor under central planning, without putting forth adequate measures to replace it (Ding et al. 2009). The radical labor market reforms removed state protections for working mothers, especially those employed in the private sector. While the traditional family friendly policies, such as paid maternity/family leave, continue to be implemented in the public sector, there are also no effective mechanisms to protect the employment and earnings of women with children from being adversely affected by market disciplines and discriminatory practice in the private sector. Thus, women with young children may have fewer opportunities for on-job training and promotion and higher likelihood of lay-offs and receive lower pay, compared to women without children.

Another sweeping change associated with the deepening of economic reforms was the substantial cutback on the supports of government and employers for

childcare. With the drive for efficiency, the vast majority of Chinese enterprises ceased to offer subsidized childcare to employees. According to the Chinese enterprise social responsibility survey undertaken in 2006, enterprises that still ran kindergartens accounted for less than 20 percent of SOEs and only 5.7 percent of all enterprises in the sample (Du and Dong 2009). Publicly funded nurseries for children aged 0-2 years have become largely non-existent. Except for employees of the non-profits public organizations and large SOEs which continued to provide subsidized childcare, urban parents had to rely on service-for-fee commercialized childcare programs to meet their needs. Thus, it became increasingly difficult for mothers with young children to participate in paid work. Maurer-Fazio et al. (2009) present evidence that the labor force participation rate of urban women with preschool-age children fell dramatically between 1990 and 2000 and co-residence with grand-parents became increasingly important for women to stay in the labor force. Ding et al. (2009) and Du and Dong (2009) find that the sharpest labor force participation decline occurred among women with children younger than three years, especially those married to low earning husbands. The rising difficulty to combine child rearing with paid work also led to a growing number of women with young children working part-time. The workforce interruption and the changing pattern of employment are also expected to contribute to a rising wage penalty for motherhood in the post restructuring period.

## 3. Hypothesis and Empirical Methodology

In the remainder of the paper, we investigate the impact of economic transition on the motherhood wage penalty by exploring the differences between two phases of economic transition: the gradualist reform period (1990–1996) and the radical reform period (1999–2005) and the differences between the state public sector and the

non-state sector.[2] With the discussion in the previous section, we propose two hypotheses: 1. the motherhood wage penalty is greater in the radical reform period than the gradualist reform period; 2. the penalty is greater in the non-state sector than the state sector.

To test the two hypotheses above, we employ the standard wage equation, modified to incorporate a motherhood dummy variable. We consider both annual wages and hourly wages. The difference in motherhood effects between the two measures castes light on the impact of motherhood on labor hour supply. An empirical challenge to obtaining consistent estimates for the motherhood wage effect is the presence of unobserved individual characteristics that may simultaneously affect wages and childbearing decisions. For example, women with lower ability may be more likely to have children early. In this case, a negative effect of motherhood on wages may reflect a spurious effect due to unobserved heterogeneity. To control for unobserved heterogeneity, we use panel data regression model. The model is:

$$\ln w_{it} = X_{it}\beta_1 + \beta_2 Mother_{it} + v_i + \varepsilon_{it} \qquad (1)$$

where $w_{it}$ is the individual's annual wage (or hourly wage) in period t and $X_{it}$ is a vector of observable characteristics expected to affect wages. $Mother_{it}$ is a dummy variable which is equal to one for all t $t \geq \tau$ if a woman gave birth to a child in year $\tau$, and equal to zero, otherwise. $v_i$ represents unobserved time-invariant characteristics of individual i and $\varepsilon_{it}$ is the random error.

The motherhood dummy variable $mother_{it}$ is the principal independent variable of the wage equation. Defined based on the first alive birth a woman gave, $mother_{it}$ is an aggregate measure for motherhood, for all women who have had child bearing and

[2] The state sector includes government offices, public institutions such as schools and hospitals, and SOEs, while the non-state sector consists of urban collectives, private firms, foreign joint ventures and foreign firms. We divide the urban market into the state versus non-state sectors instead of the public versus private sectors because urban collectives that operate primarily in the competitive sectors and are fully responsible for their profits and losses behave more similar to private firms than SOEs.

rearing experience, regardless of what age their children were or how many children they had at the time the survey was done. Our measure for motherhood takes into account not only the direct effect of having and raising young children but also its effect felt in the later years of a mother's career. While the adverse effect of motherhood on a woman's paid work may be lessened or disappear as children grow up, its effect on earnings is long lasting, given that workforce interruption, missed on-job training opportunities or delayed promotion in the early years of career lower one's earnings in the later years, other things being equal. We do not control for the number of children because the vast majority of women in the sample, especially those in the later periods, have only one child due to China's only-child policy introduced in the late 1970s.[3] Thus, the coefficient on the motherhood dummy variable $\beta_2$ measures the average effect of motherhood on a woman's life-time earnings. If motherhood has a negative effect on wages, we expect $\beta_2 < 0$.

The covariates in X include personal characteristics such as education attainments, potential work experience and its squared term, and marital status, and job characteristics such as job status (full-time versus part-time), occupation, and ownership of one's employers. We also control for co-residence with old parents. Under the influence of traditional culture, living with parents or parents-in-law is a common phenomenon in Chinese families. Living with old parents may have two opposing effects on earnings. On the one hand, parents may help women take care of children and alleviate their domestic work burden, thereby having a positive impact on women's earnings. On the other hand, parents may need to be taken care of by their daughters or daughters-in law and increase their domestic burden, so there may

[3] Admittedly, in our sample, more women have more than one child in the early sample period from 1990 to 1996 than the later period from 1999 to 2005. As a result, our estimates may understate the impact of economic transition on the motherhood wage penalty on a per child basis when comparing the two sample periods.

be a negative impact on women's earnings. In addition, the covariate control variables also include dummy variables for time and regional variation.

Equation (1) is estimated as both random-effects and fixed-effects models. Empirically, random-effects and fixed-effects estimates are both consistent but only random-effects estimates are efficient if the unobserved individual effects $v_i$ are uncorrelated with any explanatory variable including $mother_{it}$. But only fixed-effects estimates are consistent if $v_i$ is correlated any explanatory variable. For all models, the Hausman test was conducted to assess which model is adequate.[4]

## 4. Data and Variables

This research is based on data from the six waves (1991, 1993, 1997, 2000, 2004 and 2006) of the CHNS.[5] Each survey covers about 3,800 households and about 14,000 individuals in both rural and urban areas from nine provinces, namely, Heilongjiang, Liaoning, Shandong, Henan, Jiangsu, Hubei, Hunan, Guizhou, and Guangxi. We restrict our analysis to women of prime age (between 17 and 45 years) in the urban sector which includes communities in cities and county centers and excludes villages suburban and rural areas.[6] We further limit the sample to women employed part-time or full-time during at least two of the six waves since fixed-effects models require at least two observations on each person. After deletions of person-years with missing values on one or more variables, the sample for analysis

[4] We do not perform Heckman-type selectivity corrections to the wage equation. However, if women for whom the motherhood penalty would be larger are more likely to remain out of the labor force, our estimates will understate the motherhood penalty.

[5] The CHNS is jointly sponsored by the Carolina Population Center at the University of North Carolina at Chapel Hill, the Institute of Nutrition and Food Hygiene of China and the Chinese Academy of Preventive Medicine. Detailed information about the CHNS is available at the website www.cpc.unc.edu/china/home.html. So far the CHNS has collected data for 1989, 1991, 1993, 1997, 2000, 2004 and 2006. The data collected in 1989 are excluded from the analysis because the information on some variables in that year is incompatible to the information gathered in the following six periods.

[6] Our analysis is confined to the urban sector because as a developing country the institutional features of the urban and rural labor markets in China are markedly different. Wage employment is not a major form of employment for married women in rural areas as most of them work primarily on family farms.

consists of 2,233 observations, and mothers account for 75 percent of the sample.

We construct two measures for the dependent variable: annual wage and hourly wage the respondent earned in the last year prior to the time the survey was conducted. The annual wage includes both regular wages and bonuses measured in *Yuan* and is deflated by urban consumer price index with 2006 as the base year. The hourly wage is annual wages divided by the total number of work hours in a given year. Both wage variables are in log form. Because the wage variables are based on earnings of the last year prior to the survey was done, the sample period under investigation is from the period of 1990 to 2005, which is divided into the gradualist reform period from 1990 to 1996 and the radical reform period from 1999 to 2005. We analyze the impact of economic transition by exploring the differences between the two periods and between the state and non-state sectors as well.

The definitions of explanatory variables are given below. The principal explanatory variable $mother_{it}$, defined previously, is derived from the response to the questions related to birth history from the Survey of Ever-Married Women Under Age 52—a supplementary survey of the CHNS. Education is measured by two dummy variables – one for university graduates and one for high-school graduates, and the reference group is those who did not graduate from high school. Work experience is calculated as the age minus six and years of schooling because the information on actual experience is unavailable. Marital status is a dummy variable for women who are ever married. A dummy variable is included for whether the respondent's current job is part-time work, defined as less than 30 hours per week. Occupation status is measured by seven dummy variables for senior professional and technical employees, junior professional and technical employees, administrator/executive/manager, Office staff, skilled worker, non-skilled worker, and army officer/police

officer/soldier/policeman; driver and service worker. Ownership type of the employer is measured by three dummy variables for urban collectives, domestic private firms, and foreign joint venture and foreign invested firms, and the reference group is government agency and Sues. In addition, we define government agency and state-owned enterprise as the state sector and the remaining ownership types as the non-state sector. The descriptive statistics (sample mean and standard deviation) of explanatory variables are presented in Appendix.

Figures 1 to 3, constructed based information from the CHNS, depict three major changes in the Chinese urban labor markets over the period of investigation. First, as Figure 1 shows, women's labor force participation rates fell sharply following the SOE-sector restructure in the late 1990s. The labor force participation rate of mothers with kids under age 3 was 89.3% in 1990, and fell to 70.6% in 2006; Second, the proportion of mother with kids under age 3 working part-time went up from 2.3% in 1990 to 19.2% in 2006 (see Figure 2). Lastly, as is shown in Figure 3, the proportion of women both mothers and non-mothers working in the non-state sector went up by an appreciable margin. It was 38.5% in 1990 and 49.2% in 2006. These changes are expected to have noticeable impact on the wage penalty for motherhood.

The mean values of annual and hourly wages in log form by period and by sector presented in Table 1 provide a broad picture of the changing motherhood wage penalty over the sample period. From that table, we note that the annual and hourly wages of women without children are lower than that for mothers. This is not surprising because wages are determined not only by child bearing status but also by education and experience, and childless women are, on average, much younger than mothers in the sample and therefore have less work experience. However, from the early reform period (1990-1996) to the later period (1999-2005), the wage

differentials between mothers and women without children are significantly decreased, indicating that during the radical reform period, the wages of women without children grew faster than those of mothers. The similar patterns of change are also observed when comparing the state and non-state sectors. In the state sector, the annual and hourly wages of women without children are markedly lower than those of mothers; but in the non-state sector, the wage gaps are much smaller. The contrast between the two sectors suggests that holding constant experience, the negative effect of motherhood on wages would be greater for the non-state sector than the state sector.

## 5. Empirical results

The regression equation in (1) is estimated using both random-effects and fixed-effects regression techniques. The Hausman test is undertaken to check which technique is adequate. We estimate three versions of the wage equation, with version (1) including all the explanatory variables, version (2) excluding the dummy variable for part-time, and version (3) excluding the dummies for occupation status to assess whether the rise of part-time employment or changing occupation choices are among the underlying determinants for the motherhood wage penalty. . We first estimate the three versions of wage equations for the full sample and then for each of the two sub-periods. For each sub-period, we also estimate a modified wage equation which includes a motherhood dummy variable and its interactive term with the dummy for the state sector to explore the difference between the state and non-state sector. The results are reported in Table 2-4.

Table 2 present the estimates for the full sample period from 1990 to 2005. The Hausman test result in each regression indicates that the individual fixed-effects are endogenous, and therefore the fixed effect estimates should be chosen. Turning to the

motherhood wage effect, the fixed-effects estimate all has a negative sign and is significant at the 5% level for annual wages and the 10% level for hourly wages. Specifically, the estimates of version (1) show that, holding other factors constant, motherhood reduces annual earnings of urban women by 24.6% and hourly earnings by 22.9%. The closeness of the two estimates suggests that the negative effect of motherhood on annual earnings is primarily due its impact on hourly rates not on total labor hour supply. When the "part-time" variable is excluded from the regression (version (2)), the estimate for motherhood effect goes up to 26% for annual wages and down slightly to 21.6% for hourly wages. These results suggest that the increase of part-time employment plays a role for the rising wage penalty for motherhood for annual wages not hourly wages. However, the exclusion of occupational dummy variables (version (3)) does not lead to any appreciable change to the estimate.

The results of other control variables are all consistent with economic intuitions. The estimates for educational attainment variables show that education has significant positive effect on earnings; for instance, women with a university degree earn about 47% to 54% more than women who did not graduate from high school. The two variables for experience are both highly significant, showing that earnings increases with experience but at a decreasing rate. The coefficients on marital status are not significant, indicating that marriage has no effect on earnings. Interestingly, the estimates for co-residence show that living with father or father-in-law has a significant negative effect on women's annual and hourly wages as well, whereas living with mother or mother-in-law has a significant positive effect on women's hourly earnings. These results seem suggesting that co-residence with fathers or fathers-in-law adds work burdens to women, while living with mothers or mothers-in-law helps reduce women’s domestic burdens. l difference and the variation

over time of the aggregate income. The comparison bases of province and time trend dummy variables are Liaoning Province and year 1991 separately.

The estimation results of the planned economy period (1990-1996) are reported in Table 3 in which the explanatory variables included are exactly the same as in Table 2. Referring to annual earnings, there is no significant impact of motherhood on annual earnings of women either in random effect model or fixed effect model. Referring to hourly earnings, only in the fixed effect model excluding occupation variables, there is significant negative effect of motherhood on hourly earnings of women. However, the result of Hausman test rejects that fixed effect model. Overall, therefore, motherhood affects significantly neither annual earnings nor hourly earnings of women in urban China in the planned economy era, which indicates that there is not "motherhood penalty" in the planned economy period.

The estimation results of the market economy period (1999-2005) are reported in Table 4 in which the explanatory variables included are also exactly the same as in Table 2. Similarly to Table 2, Hausman test results show that the model is suffering from endogeneity problem and the fixed effect estimates should be chosen. When including all the control variables in column (1), motherhood leads to 39% reduction of annual income and 41.7% reduction of hourly earnings of urban women. These decreases of “motherhood penalty” are far greater than in Table 2. Furthermore, the decline range of hourly earnings has increased remarkably, indicating that the “motherhood penalty” in market economy period is much more evident than in the whole sample period. Moreover, combined with the results in Table 3 that there is no distinct evidence of “motherhood penalty” in the planned economy period, we can draw a conclusion that: the “motherhood penalty” of Chinese woman exists only in the market economy period, so it is an outcome of economic transition. When

excluding "part-time" variable in column (2), motherhood may result in 45.2% reduction of hourly earnings of urban women. Compared with 41.7% reduction when including "part-time" variable in column (1), 7.7% decline of hourly earnings can be explained by “part-time” job. Similarly, when excluding occupation variables in column (3), motherhood cause annual income of urban women 39.8% lower and hourly earnings 41.2% lower. Compared with 39% decrease when including occupation variables in column (1), the changes of occupation can explain 2% decline of annual earnings.

From the above analysis, it seems that the employment forms transfer from full-time work to part-time job and the changes of occupation can interpret to some extent the channels through which motherhood negatively affects earnings of urban women in the market economy period. However, the impact of units’ ownership is not clear. Literatures have shown that, generally there is no “motherhood penalty” in the sectors with "family-friendly policy" (such as the public sector) (Nielsen, Simonsen and Verner, 2001). However, one of the characteristics of the transition economies is exactly sector transfer from this kind of "family-friendly" sectors to "family unfriendly" sectors. Specifically, the proportion of public economy keeps decreasing, while the proportion of non-public economy has been increasing. Yet in non-public economy sectors there is more absence of protection to women in aspiring efficiency. In order to examine whether the changes of ownership (sector) is a causation of "motherhood penalty" more formally, we introduce the public sector dummy variable as well as the interaction term of the public sector and motherhood dummy to the model, so that to analyze the different features of “motherhood penalty” in public sector and non-public sector. The results are reported in Table 5.

As is shown in table 5, there are no distinct differentials of the effect of

motherhood on annual income and hourly earnings of urban women between the public sector and the non-public sector in the planned economy era, regardless of random effect or fixed effect model. However, in the market economy period, both the annual income and hourly earnings of mothers working in the public sector are remarkably higher than those in the non-public sector, of which annual income is 45.4% higher and hourly earnings is 40.9% higher. This suggests that “motherhood penalty” in the non-public sector is much greater than in the public sector.

All of our findings propose that the “motherhood penalty” of Chinese urban women is largely due to economic transition. Economic transition has caused increasing competition and mobility in labor market, increasingly flexible employment forms, more non-public economy proportion as well as social security insufficiency. Therefore, the "motherhood penalty" is closely related to women’s choice of employment forms, occupation and working sectors. In the market economy system, forced by the pressure of competition, mothers more tend to choose part-time work, low-income occupations and non-public sector, which directly lead to the decline of their annual income and hourly earnings, so as to provide a new interpretation of “motherhood penalty”.

## 6. Conclusion and policy implication

In this paper, we study the characteristics and the resulting special reasons of “motherhood penalty” in transition economies. The case of China’s cities and towns serve as an example. Our findings suggest that in the planned economy period, whether women work in the public sector or non-public sector, there is no negative effect of motherhood on earnings. However, from the late 90's when market economy was basically established, the negative effect of motherhood on women’s earnings has

become quite significant. From the view of the whole sample period, motherhood leads to 24.6% decrease of annual income and 22.9% decrease of hourly income of urban female labors. Whereas only from the view of the market economy era, motherhood leads to 39% decrease of annual income and 41.7% decrease of hourly income of urban female labors. The range of the earnings decrease is much greater in market economy than in the whole sample period. Therefore, we may draw a conclusion that the Chinese urban women's "motherhood penalty" is in fact an outcome of economic transition. The reasons why the economic transition would be accompanied by a "motherhood penalty" are the increasing competition and labor mobility in labor market, increasingly flexible employment forms, more non-public economy proportion as well as social security insufficiency caused by economic transition. Those changes induce the changes of women's employment choice which enable them to choose more part-time work, low-income occupations and non-public sector, which result directly in the decrease of their long-term earnings.

Our findings not only provide a new interpretation of the "motherhood penalty", but also have strong policy implications: “motherhood penalty” caused by economic transition fully reflect that the heavy pressures in labor market and the absence of social security systems during the economic transition period. Many studies have shown that the effect of mothers on education, health and productivity of next generation is far more important than that of fathers, let alone women step up to the responsibility of breeding the next generations. Consequently, women's fertility behavior and motherhood have extremely important significance to the long-term human capital accumulation of a nation. However, with economic transition, motherhood generates a lot of new costs that did not exist before on mothers, which is not only less conducive to the intergenerational transfer of mothers to the next

generation in both material and spiritual levels, but also may reduce the fertility willing of women, thereby worsen the population aging problem. Thus, it is necessary to strengthen the protection of mothers in transition economies.

**Reference：**

1. Alicia C. Sasser, 2005. “Gender Differences in Physician Pay: Tradeoffs between Career and Family”. The Journal of Human Resources, Vol. 40, No. 2, pp. 477-504

2. Becker, Gary S. 1964. “Human Capital”. Chicago: University of Chicago Press

3. Becker, Gary S. 1985. “Human Capital, Effort, and the Sexual Division of Labour”, Journal of Labour Economics, 3: pp.33-38.

4. Deborah J. Anderson, Melissa Binder, Kate Krause, 2002, “The Motherhood Wage Penalty: Which Mothers Pay It and Why?”. The American Economic Review, Vol. 92, No. 2, Papers and Proceedings of the One Hundred Fourteenth Annual Meeting of the American Economic Association, pp. 354-358

5. Deborah J. Anderson, Melissa Binder, Kate Krause, 2003. “The Motherhood Wage Penalty Revisited: Experience, Heterogeneity, Work Effort, and Work- Schedule Flexibility”. Industrial and Labor Relations Review, Vol. 56, No. 2, pp. 273-294

6. Francine D. Blau and Lawrence M. Kahn, 1992. “Race and Gender Pay Differentials”. NBER working paper

7. H Joshi, P Paci and J Waldfogel, 1999. “The wages of motherhood: Better or worse?” Cambridge Journal of Economics 23:543-564

8. Helena Skyt Nielsen, Marianne Simonsen and Mette Verner, 2004. “Does the Gap in Family-friendly Policies Drive the Family Gap?”. Scandinavian Journal of Economics, Blackwell Publishing, vol. 106(4), pp721-744

9. Jacob A. Mincer, 1974. "Analysis of Residuals: Distributions of Earnings within Schooling and Age Groups," NBER Chapters, in: Schooling, Experience and Earnings

10. Jane Waldfogel, 1995, “The Price of Motherhood: Family Status and Women's Pay in Young British Cohort.” Oxford Economic Papers, New Series, Vol. 47, No. 4, pp. 584-610

11. Jane Waldfogel, 1998a. “The Family Gap for Young Women in the United States and Britain: Can Maternity Leave Make a Difference?” Journal of Labor Economics, Vol. 16, No. 3, pp. 505-545

12. Jane Waldfogel, 1998b, “Understanding the "Family Gap" in Pay for Women with Children”. The Journal of Economic Perspectives, Vol. 12, No. 1, pp. 137-156

13. Joyce P. Jacobsen, James Wishart Pearce III, Joshua L. Rosenbloom. 1999, “The Effects of Childbearing on Married Women's Labor Supply and Earnings: Using Twin Births as a Natural Experiment”. The Journal of Human Resources, Vol. 34, No. 3, pp. 449-474

14. James W. Albrecht, Per-Anders Edin, Marianne Sundström, Susan B. Vroman, 1999. “Career

Interruptions and Subsequent Earnings: A Reexamination Using Swedish Data". The Journal of Human Resources, Vol. 34, No. 2 , pp. 294-311

15. Michelle J. Budig; Paula England, 2001. "The Wage Penalty for Motherhood". American Sociological Review, Vol. 66, No. 2, pp. 204-225.

16. Nabanita Datta Gupta and Nina Smith, 2002. "Children and Career Interruptions: The Family Gap in Denmark". Economica, New Series, Vol. 69, No. 276, pp. 609-629

17. Shelley Phipps, Peter Burton, Lynn Lethbridge, 2001. "In and out of the Labor Market: Long-Term Income Consequences of Child-Related Interruptions to Women's Paid Work". The Canadian Journal of Economics / Revue canadienne d'Economique, Vol. 34, No. 2, pp. 411-429

18. Sanders Korenman and David Neumark, 1992. "Marriage, Motherhood, and Wages". The Journal of Human Resources, Vol. 27, No. 2, pp. 233-255

19. Shelly Lundberg and Elaina Rose, 2000. "Parenthood and the earnings of married men and women". Labour Economics. pp.689–710

20. Susan Harkness and Jane Waldfogel, 1999. "The Family Gap in Pay:Evidence from Seven Industrialised Countries" CASE working paper

**Figure 1： Labor Force Participation Rate of mothers with kids under 3**

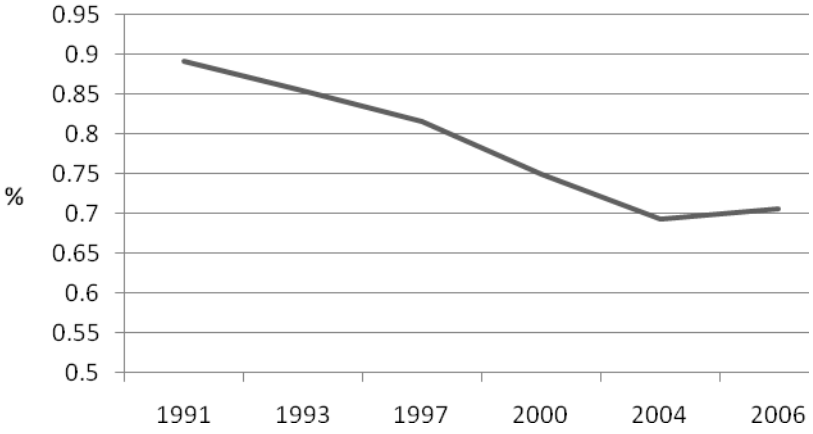


**Figure 2： Proportion of Mothers with Kids under 3 Working Parttime**

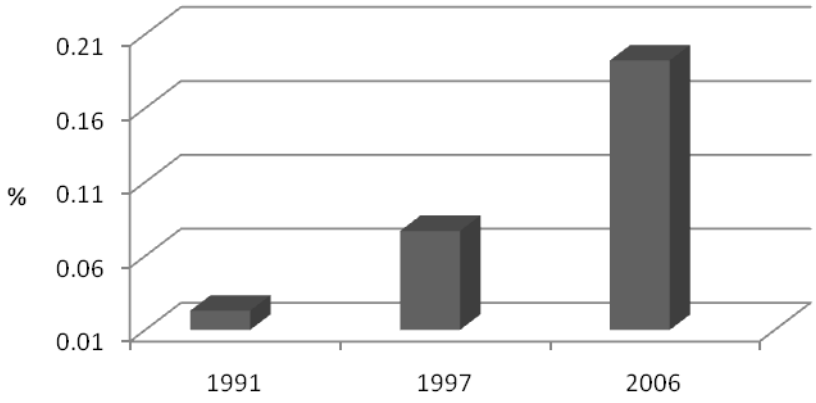

Figure 3： proportion of women working in non-state sector

Table 1：Mean Values of Annual Earnings and Hourly Earnings

| | Log Annual Earnings | | | Log Wage Rate | | |
|---|---|---|---|---|---|---|
| | No Children | Have children | Gap | No Children | Have children | Gap |
| 1990-2005 | 8.324 | 8.534 | -0.237*** | 0.633 | 0.854 | -0.220*** |
| 1990-1996 | 7.950 | 8.197 | -0.247*** | 0.237 | 0.463 | -0.226*** |
| 1999-2005 | 8.909 | 8.988 | -0.079 | 1.283 | 1.335 | -0.052 |
| Public Sector | 8.248 | 8.596 | -.348*** | 0.612 | 0.926 | -0.313*** |
| Non-public Sector | 8.395 | 8.473 | -0.078 | 0.660 | 0.729 | -0.069 |

Note：*** p<0.01, ** p<0.05, * p<0.1

Table 2：RE and FE Estimates of the Earnings Equations, 1990-2005 (robust)[⑦]

| | Log Annual Earnings | | | | | | Log Wage Rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | (2) | | (3) | | (1) | | (2) | | (3) | |
| | RE | FE | RE | FE | RE | FE | RE | FE | RE | FE | RE | FE |
| Motherhood | -0.109* | -0.246** | -0.111 | -0.260** | -0.113* | -0.240** | -0.099 | -0.229* | -0.100 | -0.216* | -0.104 | -0.221* |
| | (0.061) | (0.109) | (0.068) | (0.117) | (0.061) | (0.108) | (0.063) | (0.119) | (0.063) | (0.116) | (0.063) | (0.119) |
| Graduate from college | 0.517*** | 0.473*** | 0.583*** | 0.529*** | 0.580*** | 0.473*** | 0.573*** | 0.517*** | 0.553*** | 0.467*** | 0.650*** | 0.539*** |
| | (0.062) | (0.175) | (0.066) | (0.179) | (0.054) | (0.174) | (0.063) | (0.176) | (0.063) | (0.177) | (0.054) | (0.176) |
| Graduate from Senior High School | 0.170*** | 0.129 | 0.203*** | 0.144 | 0.203*** | 0.129 | 0.209*** | 0.142 | 0.198*** | 0.128 | 0.247*** | 0.150 |
| | (0.040) | (0.115) | (0.043) | (0.120) | (0.036) | (0.115) | (0.040) | (0.115) | (0.040) | (0.117) | (0.037) | (0.114) |
| Experience | 0.052*** | 0.079*** | 0.063*** | 0.092*** | 0.053*** | 0.078** | 0.047*** | 0.086*** | 0.044*** | 0.074** | 0.049*** | 0.089*** |
| | (0.010) | (0.031) | (0.011) | (0.032) | (0.010) | (0.030) | (0.010) | (0.031) | (0.010) | (0.031) | (0.010) | (0.030) |
| Square of Experience×100 | -0.104*** | -0.163*** | -0.131*** | -0.183*** | -0.107*** | -0.162*** | -0.094*** | -0.149*** | -0.086*** | -0.131*** | -0.097*** | -0.152*** |
| | (0.026) | (0.048) | (0.026) | (0.050) | (0.026) | (0.048) | (0.025) | (0.049) | (0.025) | (0.050) | (0.025) | (0.049) |
| Marital Status | -0.043 | -0.101 | -0.058 | -0.140* | -0.039 | -0.102 | -0.043 | -0.121 | -0.040 | -0.087 | -0.038 | -0.115 |
| | (0.045) | (0.075) | (0.046) | (0.075) | (0.046) | (0.075) | (0.047) | (0.074) | (0.047) | (0.074) | (0.048) | (0.076) |
| Part-time Work | -0.757*** | -0.492*** | | | -0.754*** | -0.506*** | 0.245*** | 0.440*** | | | 0.249*** | 0.445*** |
| | (0.084) | (0.104) | | | (0.084) | (0.103) | (0.082) | (0.103) | | | (0.082) | (0.103) |
| Collective Enterprise | -0.055 | 0.019 | -0.059 | 0.021 | -0.079** | 0.009 | -0.059 | 0.040 | -0.057 | 0.038 | -0.091** | 0.022 |
| | (0.036) | (0.058) | (0.037) | (0.059) | (0.036) | (0.059) | (0.036) | (0.058) | (0.036) | (0.059) | (0.036) | (0.059) |

[⑦] We control occupation, province and time trend dummies in all regressions of table 2-4, which results are not reported to save space.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Private, Individual | 0.087 | 0.052 | 0.078 | 0.067 | 0.054 | 0.043 | -0.048 | -0.006 | -0.045 | -0.020 | -0.110* | -0.037 |
| Enterprise | (0.061) | (0.100) | (0.062) | (0.099) | (0.058) | (0.100) | (0.062) | (0.106) | (0.062) | (0.109) | (0.059) | (0.107) |
| Three-Capital | 0.199** | 0.126 | 0.144 | 0.103 | 0.192** | 0.174 | 0.162* | 0.122 | 0.181* | 0.142 | 0.142 | 0.075 |
| Enterprise | (0.094) | (0.165) | (0.110) | (0.172) | (0.096) | (0.163) | (0.091) | (0.181) | (0.093) | (0.183) | (0.092) | (0.168) |
| Live with Father or | -0.103** | -0.241** | -0.083 | -0.249** | -0.100** | -0.237** | -0.117** | -0.323*** | -0.123*** | -0.317*** | -0.111** | -0.317*** |
| Father-in-law | (0.048) | (0.094) | (0.051) | (0.097) | (0.049) | (0.095) | (0.047) | (0.094) | (0.047) | (0.093) | (0.048) | (0.097) |
| Live with mother | 0.057 | 0.111 | 0.059 | 0.116 | 0.052 | 0.115 | 0.042 | 0.158* | 0.041 | 0.153* | 0.036 | 0.163* |
| or mother-in-law | (0.047) | (0.079) | (0.049) | (0.080) | (0.047) | (0.079) | (0.047) | (0.082) | (0.047) | (0.083) | (0.048) | (0.083) |
| Observations | 2233 | 2233 | 2233 | 2233 | 2233 | 2233 | 2233 | 2233 | 2233 | 2233 | 2233 | 2233 |
| Between R-squared | 0.465 | 0.411 | 0.384 | 0.331 | 0.461 | 0.413 | 0.483 | 0.382 | 0.485 | 0.410 | 0.477 | 0.367 |
| Overall R-squared | 0.477 | 0.439 | 0.418 | 0.376 | 0.471 | 0.439 | 0.494 | 0.417 | 0.492 | 0.433 | 0.484 | 0.400 |
| Hausman test | 53.07*** | | 41.07*** | | 44.40*** | | 46.95*** | | 34.80** | | 40.78*** | |
| P value | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.04 | | 0.00 | |

Note：(1) includes all variables, (2) without part-time, and (3) without occupations. The comparison bases of province and time trend dummy variables are Liaoning Province and year 1991 separately.

*** p<0.01, ** p<0.05, * p<0.1

Table 3：RE and FE Estimates of the Earnings Equations, 1990-1996 (robust)

| | Log Annual Earnings | | | | | | Log Wage Rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | (2) | | (3) | | (1) | | (2) | | (3) | |
| | RE | FE | RE | FE | RE | FE | RE | FE | RE | FE | RE | FE |
| Motherhood | 0.048 | -0.178 | 0.039 | -0.237 | 0.040 | -0.192 | 0.035 | -0.226 | 0.037 | -0.182 | 0.027 | -0.245* |
| | (0.068) | (0.135) | (0.072) | (0.147) | (0.068) | (0.135) | (0.068) | (0.140) | (0.067) | (0.133) | (0.069) | (0.144) |
| Graduate from college | 0.210*** | 0.335 | 0.253*** | 0.387 | 0.284*** | 0.332 | 0.265*** | 0.431* | 0.248*** | 0.392 | 0.354*** | 0.431* |
| | (0.058) | (0.264) | (0.061) | (0.276) | (0.052) | (0.253) | (0.058) | (0.239) | (0.058) | (0.241) | (0.052) | (0.234) |
| Graduate from Senior High School | 0.063* | 0.193 | 0.082** | 0.221 | 0.101*** | 0.189 | 0.111*** | 0.194 | 0.104*** | 0.173 | 0.153*** | 0.196 |
| | (0.036) | (0.170) | (0.037) | (0.176) | (0.034) | (0.163) | (0.036) | (0.161) | (0.035) | (0.162) | (0.034) | (0.156) |
| Experience | 0.031*** | 0.059 | 0.036*** | 0.074 | 0.035*** | 0.062 | 0.031*** | 0.063 | 0.029*** | 0.052 | 0.036*** | 0.074 |
| | (0.011) | (0.055) | (0.011) | (0.058) | (0.011) | (0.054) | (0.010) | (0.049) | (0.010) | (0.050) | (0.011) | (0.049) |
| Square of Experience×100 | -0.049* | -0.086 | -0.059** | -0.100 | -0.058** | -0.099 | -0.048* | -0.067 | -0.044* | -0.056 | -0.058** | -0.091 |
| | (0.027) | (0.068) | (0.028) | (0.072) | (0.027) | (0.068) | (0.026) | (0.069) | (0.026) | (0.070) | (0.026) | (0.068) |
| Marital Status | -0.106* | -0.122 | -0.098 | -0.163 | -0.102* | -0.127 | -0.107* | -0.146 | -0.111** | -0.115 | -0.106* | -0.140 |
| | (0.058) | (0.106) | (0.060) | (0.114) | (0.058) | (0.105) | (0.056) | (0.114) | (0.056) | (0.109) | (0.057) | (0.115) |
| Part-time Work | -0.732*** | -0.521*** | | | -0.731*** | -0.547*** | 0.281*** | 0.391*** | | | 0.283*** | 0.420*** |
| | (0.092) | (0.162) | | | (0.093) | (0.158) | (0.086) | (0.144) | | | (0.087) | (0.144) |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Collective | -0.049 | 0.028 | -0.052 | 0.014 | -0.070* | 0.035 | -0.075** | 0.038 | -0.073** | 0.049 | -0.100*** | 0.035 |
| Enterprise | (0.037) | (0.074) | (0.039) | (0.074) | (0.037) | (0.075) | (0.037) | (0.073) | (0.036) | (0.074) | (0.037) | (0.075) |
| Private, Individual | 0.520*** | 0.460*** | 0.496*** | 0.441*** | 0.486*** | 0.454*** | 0.367*** | 0.421*** | 0.376*** | 0.435*** | 0.318*** | 0.381*** |
| Enterprise | (0.084) | (0.158) | (0.086) | (0.161) | (0.080) | (0.154) | (0.085) | (0.153) | (0.087) | (0.163) | (0.081) | (0.146) |
| Three-Capital | 0.426*** | 0.357* | 0.466*** | 0.360 | 0.428*** | 0.454** | 0.341** | 0.354 | 0.326** | 0.352 | 0.340** | 0.265 |
| Enterprise | (0.116) | (0.203) | (0.115) | (0.219) | (0.115) | (0.200) | (0.154) | (0.230) | (0.155) | (0.222) | (0.150) | (0.223) |
| Live with Father or | -0.090* | -0.247** | -0.066 | -0.255** | -0.081 | -0.238** | -0.065 | -0.282*** | -0.075 | -0.276*** | -0.053 | -0.277*** |
| Father-in-law | (0.054) | (0.103) | (0.055) | (0.104) | (0.054) | (0.102) | (0.054) | (0.104) | (0.053) | (0.103) | (0.054) | (0.105) |
| Live with mother or | 0.023 | -0.042 | 0.017 | -0.031 | 0.015 | -0.045 | -0.003 | -0.001 | -0.002 | -0.009 | -0.014 | -0.008 |
| mother-in-law | (0.050) | (0.113) | (0.053) | (0.115) | (0.051) | (0.108) | (0.050) | (0.120) | (0.050) | (0.120) | (0.051) | (0.114) |
| Observations | 1274 | 1274 | 1274 | 1274 | 1274 | 1274 | 1274 | 1274 | 1274 | 1274 | 1274 | 1274 |
| Between R-squared | 0.379 | 0.257 | 0.295 | 0.175 | 0.364 | 0.267 | 0.404 | 0.240 | 0.395 | 0.242 | 0.385 | 0.238 |
| Overall R-squared | 0.351 | 0.269 | 0.284 | 0.196 | 0.337 | 0.273 | 0.378 | 0.260 | 0.371 | 0.263 | 0.359 | 0.254 |
| Hausman test | - | | 22.63 | | 18.76 | | 29.71* | | 30.49* | | 6.54 | |
| P value | | | 0.31 | | 0.17 | | 0.10 | | 0.06 | | 0.95 | |

Note：(1) includes all variables, (2) without part-time, and (3) without occupations
*** p<0.01, ** p<0.05, * p<0.1

Table 4：RE and FE Estimates of the Earnings Equations, 1999-2005 (robust)

| | Log Annual Earnings | | | | | | Log Wage Rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | (2) | | (3) | | (1) | | (2) | | (3) | |
| | RE | FE | RE | FE | RE | FE | RE | FE | RE | FE | RE | FE |
| Motherhood | -0.194* | -0.390* | -0.170 | -0.336 | -0.200** | -0.398* | -0.161 | -0.417** | -0.167* | -0.452** | -0.170* | -0.412* |
| | (0.102) | (0.226) | (0.116) | (0.267) | (0.100) | (0.230) | (0.098) | (0.207) | (0.097) | (0.194) | (0.098) | (0.220) |
| Graduate from | 0.631*** | 0.560* | 0.708*** | 0.631* | 0.688*** | 0.588* | 0.691*** | 0.476 | 0.672*** | 0.430 | 0.769*** | 0.559 |
| college | (0.098) | (0.321) | (0.105) | (0.326) | (0.085) | (0.325) | (0.100) | (0.356) | (0.102) | (0.360) | (0.087) | (0.344) |
| Graduate from | 0.295*** | 0.231 | 0.346*** | 0.248 | 0.319*** | 0.230 | 0.331*** | 0.168 | 0.318*** | 0.157 | 0.366*** | 0.186 |
| Senior High School | (0.073) | (0.246) | (0.081) | (0.265) | (0.069) | (0.246) | (0.073) | (0.271) | (0.075) | (0.271) | (0.070) | (0.265) |
| Experience | 0.069*** | 0.082 | 0.083*** | 0.099 | 0.066*** | 0.088 | 0.057*** | 0.065 | 0.053*** | 0.054 | 0.055*** | 0.074 |
| | (0.016) | (0.063) | (0.017) | (0.064) | (0.017) | (0.061) | (0.016) | (0.064) | (0.016) | (0.066) | (0.016) | (0.064) |
| Square of | -0.152*** | -0.126 | -0.191*** | -0.145 | -0.145*** | -0.134 | -0.126*** | -0.088 | -0.116*** | -0.076 | -0.121*** | -0.100 |
| Experience×100 | (0.043) | (0.116) | (0.043) | (0.119) | (0.043) | (0.114) | (0.042) | (0.116) | (0.042) | (0.118) | (0.041) | (0.116) |
| Marital Status | -0.035 | -0.131 | -0.057 | -0.148 | -0.025 | -0.105 | -0.021 | -0.083 | -0.016 | -0.072 | -0.007 | -0.042 |
| | (0.062) | (0.116) | (0.060) | (0.113) | (0.062) | (0.114) | (0.065) | (0.112) | (0.067) | (0.118) | (0.067) | (0.113) |
| Part-time Work | -0.816*** | -0.632*** | | | -0.807*** | -0.616*** | 0.204 | 0.410** | | | 0.216* | 0.436** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (0.119) | (0.147) | | | (0.120) | (0.142) | (0.127) | (0.202) | | | (0.127) | (0.208) |
| Collective Enterprise | -0.136* | -0.184 | -0.151* | -0.171 | -0.170** | -0.206 | -0.085 | -0.127 | -0.081 | -0.135 | -0.133* | -0.150 |
| | (0.077) | (0.139) | (0.079) | (0.148) | (0.075) | (0.141) | (0.080) | (0.149) | (0.082) | (0.151) | (0.079) | (0.154) |
| Private, Individual | -0.086 | -0.194 | -0.103 | -0.189 | -0.116* | -0.231 | -0.207** | -0.230 | -0.203** | -0.234 | -0.285*** | -0.292* |
| Enterprise | (0.078) | (0.146) | (0.082) | (0.151) | (0.068) | (0.142) | (0.081) | (0.159) | (0.080) | (0.159) | (0.070) | (0.162) |
| Three-Capital | 0.047 | 0.016 | -0.069 | -0.121 | 0.024 | -0.059 | 0.039 | 0.003 | 0.066 | 0.092 | -0.002 | -0.100 |
| Enterprise | (0.127) | (0.143) | (0.151) | (0.193) | (0.125) | (0.151) | (0.119) | (0.157) | (0.119) | (0.167) | (0.115) | (0.184) |
| Live with Father or | -0.021 | -0.027 | 0.014 | -0.023 | -0.020 | -0.043 | -0.059 | -0.158 | -0.068 | -0.160 | -0.055 | -0.156 |
| Father-in-law | (0.084) | (0.254) | (0.089) | (0.253) | (0.085) | (0.258) | (0.082) | (0.281) | (0.083) | (0.283) | (0.084) | (0.292) |
| Live with mother or | 0.039 | 0.021 | 0.031 | -0.008 | 0.030 | 0.017 | 0.014 | 0.073 | 0.016 | 0.092 | 0.003 | 0.052 |
| mother-in-law | (0.076) | (0.123) | (0.080) | (0.134) | (0.077) | (0.120) | (0.079) | (0.132) | (0.079) | (0.131) | (0.080) | (0.137) |
| Observations | 959 | 959 | 959 | 959 | 959 | 959 | 959 | 959 | 959 | 959 | 959 | 959 |
| Between R-squared | 0.290 | 0.180 | 0.192 | 0.063 | 0.284 | 0.178 | 0.229 | 0.085 | 0.227 | 0.106 | 0.221 | 0.092 |
| Overall R-squared | 0.294 | 0.195 | 0.207 | 0.087 | 0.286 | 0.187 | 0.240 | 0.108 | 0.237 | 0.126 | 0.227 | 0.107 |
| Hausman test | 168.63*** | | 166.52*** | | 143.97*** | | 99.16*** | | 94.42*** | | 77.50*** | |
| P value | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |

Note：(1) includes all variables, (2) without part-time, and (3) without occupations

*** p<0.01, ** p<0.05, * p<0.1

Table 5：RE and FE Estimates of Ownership Regressions, 1990-2005（robust）

| | Log Annual Earnings | | | | Log Wage Rate | | | |
|---|---|---|---|---|---|---|---|---|
| | 1990-1996 | | 1999-2005 | | 1990-1996 | | 1999-2005 | |
| | RE | FE | RE | FE | RE | FE | RE | FE |
| Motherhood | -0.015 | -0.234 | -0.349*** | -0.579*** | -0.026 | -0.301* | -0.311*** | -0.592*** |
| | (0.090) | (0.164) | (0.121) | (0.211) | (0.089) | (0.168) | (0.120) | (0.206) |
| Public Sector | -0.169*** | -0.177 | -0.062 | -0.267 | -0.121* | -0.203* | 0.044 | -0.239 |
| | (0.063) | (0.115) | (0.090) | (0.186) | (0.063) | (0.116) | (0.090) | (0.189) |
| the Interaction Term of Motherhood and Public Sector | 0.090 | 0.102 | 0.287*** | 0.454** | 0.094 | 0.148 | 0.236** | 0.409** |
| | (0.073) | (0.132) | (0.102) | (0.209) | (0.073) | (0.135) | (0.102) | (0.207) |
| Graduate from college | 0.213*** | 0.301 | 0.597*** | 0.539* | 0.270*** | 0.400* | 0.663*** | 0.454 |
| | (0.061) | (0.266) | (0.099) | (0.324) | (0.060) | (0.237) | (0.099) | (0.358) |
| Graduate from Senior High School | 0.062* | 0.199 | 0.267*** | 0.259 | 0.112*** | 0.201 | 0.299*** | 0.188 |
| | (0.037) | (0.170) | (0.072) | (0.247) | (0.036) | (0.158) | (0.072) | (0.270) |
| Experience | 0.028** | 0.060 | 0.065*** | 0.103* | 0.028*** | 0.065 | 0.054*** | 0.088 |
| | (0.011) | (0.055) | (0.016) | (0.060) | (0.011) | (0.049) | (0.016) | (0.063) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Square of Experience×100 | -0.043 | -0.090 | -0.138*** | -0.156 | -0.042 | -0.070 | -0.113*** | -0.126 |
| | (0.028) | (0.068) | (0.042) | (0.111) | (0.026) | (0.068) | (0.041) | (0.114) |
| Marital Status | -0.096 | -0.087 | -0.020 | -0.098 | -0.100* | -0.115 | -0.010 | -0.052 |
| | (0.063) | (0.111) | (0.060) | (0.112) | (0.059) | (0.119) | (0.064) | (0.111) |
| Part-time Work | -0.715*** | -0.520*** | -0.809*** | -0.611*** | 0.293*** | 0.391** | 0.214* | 0.428** |
| | (0.095) | (0.165) | (0.117) | (0.137) | (0.090) | (0.155) | (0.126) | (0.196) |
| Live with Father or | -0.115** | -0.259** | -0.018 | 0.021 | -0.084 | -0.295*** | -0.054 | -0.113 |
| Father-in-law | (0.053) | (0.109) | (0.085) | (0.254) | (0.053) | (0.110) | (0.083) | (0.279) |
| Live with mother or | 0.032 | -0.054 | 0.033 | 0.034 | 0.005 | -0.011 | -0.003 | 0.079 |
| mother-in-law | (0.049) | (0.111) | (0.076) | (0.121) | (0.049) | (0.118) | (0.079) | (0.134) |
| Observations | 1274 | 1274 | 959 | 959 | 1274 | 1274 | 959 | 959 |
| Between R-squared | 0.325 | 0.200 | 0.300 | 0.156 | 0.371 | 0.210 | 0.240 | 0.056 |
| Overall R-squared | 0.306 | 0.221 | 0.301 | 0.168 | 0.350 | 0.234 | 0.248 | 0.076 |
| 生育 F test | 1.09 | 0.90 | 0.39 | 0.28 | 0.90 | 1.06 | 0.61 | 0.74 |
| Hausman test | 23.74 | | 163.71*** | | - | | 91.73*** | |
| P value | 0.25 | | 0.00 | | | | 0.00 | |

Note： *** p<0.01, ** p<0.05, * p<0.1

Appendix table: Summary Statistics of the Explanatory Variables (Mean and Standard Deviation)

| | Full Sample | No Children | Have children |
|---|---|---|---|
| 1990 Dummy | 0.197 | 0.223 | 0.189 |
| | (0.397) | (0.416) | (0.392) |
| Motherhood | 0.779 | 0 | 1 |
| | (0.415) | (0) | (0) |
| Graduate from college | 0.143 | 0.194 | 0.128 |
| | (0.350) | (0.396) | (0.334) |
| Graduate from Senior High School | 0.444 | 0.439 | 0.445 |
| | (0.497) | (0.497) | (0.497) |
| age | 33.808 | 25.190 | 36.256 |
| | (6.972) | (5.282) | (5.235) |
| Experience | 17.252 | 8.036 | 19.870 |
| | (7.787) | (5.517) | (6.184) |
| Square of Experience×100 | 358.231 | 94.947 | 433.023 |
| | (273.98) | (149.09) | (254.551) |
| Marital Status | 0.788 | 0.263 | 0.943 |
| | (0.409) | (0.441) | (0.232) |
| Part-Time Work | 0.062 | 0.085 | 0.055 |
| | (0.241) | (0.279) | (0.228) |
| Junior Professional/Technical Worker | 0.129 | 0.144 | 0.125 |
| | (0.336) | (0.351) | (0.331) |
| Administrator/Executive/Manager | 0.059 | 0.028 | 0.067 |
| | (0.235) | (0.166) | (0.251) |
| Office Staff | 0.175 | 0.190 | 0.170 |
| | (0.380) | (0.393) | (0.376) |
| Skilled Worker | 0.137 | 0.130 | 0.140 |
| | (0.344) | (0.336) | (0.347) |
| Non-Skilled Worker | 0.188 | 0.198 | 0.185 |
| | (0.391) | (0.399) | (0.389) |
| Army Officer, Police Officer/Ordinary Soldier, Policeman | 0.003 | 0.006 | 0.002 |
| | (0.052) | (0.078) | (0.042) |
| Driver/Service Worker | 0.195 | 0.237 | 0.183 |
| | (0.396) | (0.426) | (0.387) |
| Collective Enterprise | 0.196 | 0.211 | 0.191 |
| | (0.397) | (0.408) | (0.394) |
| Private, Individual Enterprise | 0.149 | 0.200 | 0.135 |
| | (0.356) | (0.401) | (0.341) |
| Three-Capital Enterprise | 0.014 | 0.028 | 0.010 |

| | | | |
|---|---|---|---|
| | (0.119) | (0.166) | (0.101) |
| Public Sector | 0.606 | 0.528 | 0.628 |
| | (0.489) | (0.500) | (0.483) |
| Live with Father or Father-in-law | 0.261 | 0.719 | 0.131 |
| | (0.439) | (0.450) | (0.338) |
| Live with mother or mother-in-law | 0.344 | 0.820 | 0.209 |
| | (0.475) | (0.385) | (0.407) |
| Hei Longjiang | 0.107 | 0.014 | 0.133 |
| | (0.309) | (0.118) | (0.339) |
| Jiang Su | 0.116 | 0.036 | 0.139 |
| | (0.320) | (0.188) | (0.346) |
| Shan Dong | 0.080 | 0.020 | 0.097 |
| | (0.272) | (0.141) | (0.296) |
| He Nan | 0.103 | 0.016 | 0.128 |
| | (0.304) | (0.126) | (0.334) |
| Hu Bei | 0.095 | 0.006 | 0.120 |
| | (0.293) | (0.078) | (0.325) |
| Hu Nan | 0.067 | 0.032 | 0.077 |
| | (0.250) | (0.177) | (0.267) |
| Guang Xi | 0.107 | 0.022 | 0.131 |
| | (0.309) | (0.148) | (0.338) |
| Gui Zhou | 0.057 | 0.004 | 0.072 |
| | (0.233) | (0.063) | (0.259) |
| 1992 | 0.188 | 0.204 | 0.183 |
| | (0.391) | (0.404) | (0.387) |
| 1996 | 0.186 | 0.172 | 0.190 |
| | (0.389) | (0.378) | (0.393) |
| 1999 | 0.136 | 0.126 | 0.139 |
| | (0.343) | (0.332) | (0.346) |
| 2003 | 0.148 | 0.150 | 0.147 |
| | (0.355) | (0.357) | (0.354) |
| 2005 | 0.146 | 0.126 | 0.151 |
| | (0.353) | (0.332) | (0.358) |