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Childcare Costs and Migrant and Local Mothers' Labor Force Participation in Urban China?*

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Abstract:

This paper empirically analyzes the impact of childcare costs on the labor force participation and childcare utilization of migrant and local mothers of preschool-aged children in urban China using data from the 2010 National Dynamic Monitoring Survey of Floating Populations. The estimates show that childcare costs have a strong negative effect on the labor force participation and childcare utilization of migrant and local mothers. Compared to local mothers, the labor force participation of migrant mothers is more sensitive to changes in childcare costs, while the opposite pattern is observed for the response of childcare utilization. The analysis indicates that the labor force participation and childcare choices of migrant mothers are more constrained by the lack of access to affordable childcare than are local mothers in China.

Key words: Childcare, Migrants, Labor force participation,

JEL codes: J16 J13 R23

1. Introduction

Rural-to-urban migration has been a major feature of China's economic

transformations over the past three decades. Initially, labor migration mainly involved individual family members, leaving behind tens of millions of young children living with mothers alone or grandparents in the native villages (Zhao 1999; Hare 1999). As the new export-driven economy took hold and the urban service sector rapidly expanded, migrant flows swelled; more and more rural couples migrated together and took their children with them to cities (Yang and Chen 2013). The 2010 China census showed that 8.98 million migrant children under 7 years of age lived with their parents in cities, representing 26.3 percent of the urban children in this age group (UNFPA and UNICEF 2013).

The entry of migrant women with young children into the urban labor market has increased demand for non-maternal childcare because in the urban setting, where the workplace is typically separate from the home, it is difficult for women to combine paid work with caregiving responsibilities. However, migrant families' access to non-parental childcare is more limited than that of local urban families. Migrant families are less likely than local urban families to have extended families living nearby to help them with childcare. Due to China's household registration system *(hukou*), migrant families do not have equal access to publicly subsidized childcare programs as local urban families, so they are more reliant on for-profit commercial services to meet their childcare needs. Furthermore, migrant workers are concentrated in the low-paying jobs sector (Meng 2012), which hinders their ability to pay for suitable childcare.

While it is well recognized that migrant women are disadvantaged in the urban

labor market (Meng 2012; Magnani and Zhu 2012), relatively little is known about the role that childcare plays in this phenomenon. Maurer-Fazio, Connelly, Chen and Tang (2011) estimated the effects of the presence of young children and of access to informal childcare on the LFP of prime-age Chinese women in cities. They found that having preschool-aged children reduced maternal LFP, whereas co-residence with grandparents increased a mother's likelihood of entering the labor market. The negative effect on LFP of having preschool-aged children in the household was much larger for migrant women than for non-migrant women, and co-residence with grandparents was more important for enabling migrant women's LFP than for non-migrant women. Kilburn and Datar (2002) and Du and Dong (2013) estimated the impact of access to formal childcare on the LFP of non-migrant mothers of preschool-aged children in urban China. They found that the presence of childcare programs in a community positively affects the LFP of these urban mothers. However, there is no rigorous empirical analysis of how the access to affordable formal childcare influences the employment decisions of Chinese migrant women.

The present paper empirically analyzes the impact of childcare costs on the LFP and childcare utilization rates of migrant mothers who co-reside with preschool-age children and their local counterparts in urban China. The analysis relies on data from China's National Dynamic Monitoring Survey of Floating Populations, which was conducted in 2010. The present paper makes three specific contributions to the literature on childcare and women's employment in China. This paper is the first to analyze the impact of formal childcare on migrant women's LFP using a nationally

representative dataset. Our analysis complements studies by Kilburn and Datar (2002) and Du and Dong (2013), which focus on childcare availability, by seeking to evaluate the effect of childcare costs. Understanding the effect of childcare costs is essential to making sound childcare policy, as the costs of childcare are central to the accessibility, affordability, and quality of childcare services that policy makers seek to address (Rachel Connelly 1991). Unlike Kilburn and Datar (2002) and Du and Dong (2013), who draw inferences from reduced-form equations, we estimate structural equations of mothers' LFP and childcare utilization. Using the structural estimates, we calculate the wage and childcare cost elasticities of maternal LFP and childcare utilization and compare the differences between migrant and local mothers.

2. Background

During the Mao era (1949-1976), China established a public childcare system in cities to promote women's LPF.[i] However, publicly funded childcare services[ii] were inaccessible to rural households due to the household registration system, which determined an individual's employment and entitlements to social welfare based on their residential registration status called *hukou*. Individuals born in cities had 'urban *hukou*', while those born in rural areas held 'rural *hukou*' (Cheng and Selden 1994).

China's transition from a planned economy to a market economy has led to a sharp decline in the supply of publicly subsidized childcare services. Public nurseries largely disappeared, and many public kindergartens were privatized. From 1998 to 2013, the share of private kindergartens increased from 17.0 to 67.2 percent.[iii] In the

post-reform period, public childcare programs in cities are operated by either local municipal governments or state-sector organizations (government agencies, non-profit organizations and large state-owned enterprises). With subsidies from local governments or organizational sponsors, public childcare programs are able to provide high-quality services at low prices. However, public childcare programs mainly benefit children who have local *hukou* and those whose parents are employees of state organizations that still operate childcare programs. Private childcare programs, which do not receive subsidies from the government, operate entirely on a fee-for-service basis. There is considerable variation in the price and quality of private childcare programs (Liu, Zhang and Li 2008). The commercialization of childcare creates cost barriers for low-income families who wish to access suitable childcare programs. As formal childcare services became more expensive and inaccessible, urban working mothers increasingly sought support from grandparents. Cook and Dong (2017) estimated that in 2010, grandparents (mostly grandmothers) were the primary daytime caregivers of 41.5 percent of urban children aged 0-2 and 30.9 percent of urban children aged 3-6 in China.

In early 1980s, restrictions on rural laborers working in cities were relaxed in response to demand for services in cities and demand for unskilled labor by export-oriented enterprises in coastal cities. However, reforms that aim to decouple social services from *hukou* status have lagged behind the labor market reform. As a result, migrant families do not have equal access to social services as local families in cities. Because public spending on early childhood education (ECE) programs was low,

there was a serious shortage of public kindergartens. Instead of building more public kindergartens, many municipal governments instructed public kindergartens to accept children with local *hukou* first and then consider migrant children if there were still vacancies.[iv] To meet the growing demand for childcare, so-called "migrant children kindergartens" have emerged in the neighborhoods where migrant families are concentrated (Yuan 2010). As other urban private childcare programs, the prices and quality of migrant children kindergartens vary widely, and many these kindergartens are unregistered and do not meet regulatory standards for safety, sanitation, teacher qualifications, and student-teacher ratios.

3. Literature Review

The impact of childcare costs on women's labor supply has been extensively studied in developed countries, with a variety of measures of childcare costs being adopted depending on the type of data available to the researcher. Heckman (1974) was the first economist to empirically analyze the effect of childcare costs on mothers' employment in the U.S. Due to the lack of information on family expenditures for childcare, Heckman measured childcare costs by setting the cost of formal childcare equal to one and the cost of informal childcare equal to a number less than one. He estimated the childcare cost for each family based on its demographic characteristics. Heckman found that the childcare costs have a significant negative effect on maternal labor supply. Assuming that the quality of childcare is constant for all families in a geographic location and that they therefore all pay the same price, Blau and Robins

(1988) measured the price of childcare by averaging the childcare expenses of families in a given geographic location. Blau and Hagy (1998) assume that the price of childcare varies with the quality of childcare services within a locality and measured childcare costs by the predicted hourly fees for childcare centers and family daycare homes based on the attributes of the childcare program. As in Heckment, the analyses by Blau and his co-authors found that childcare costs have a strong negative effect on maternal LFP in the U. S.

Connelly (1991, 1992) measured the childcare costs of a working mother in the U.S. by dividing her total childcare expenditures by her total hours worked in a given period and then used the derived measure to estimate the predicted childcare costs per hour worked for all mothers, both employed and non-employed, based on family characteristics. Connelly argued that the quality of childcare varies widely and therefore all families do not pay the same prices in the market. The measure of childcare costs adopted by Connelly (1992) has been widely applied in studies of developed countries. These studies include those by Kimmel (1995) for the U.S., Powell (1997) for Canada, Oishi (2002) for Japan, and Viitanen (2005) for the UK. The findings generated by these studies show consistently that higher childcare costs have a significant negative effect on maternal LFP.

David Ribar (1992) measured childcare costs as expenditures per hour of care per child. He estimated the predicted hourly cost of market care services for all mothers, both childcare users and non-users, assuming that the cost of market care for individual families is a function of the child's age, the average wage rate in the state,

and the households' characteristics. The analysis showed that childcare costs have a strong negative effect on the labor supply of married women and on the demand for market care services in the U.S.

While much of this research has been performed in developed countries, economists have only recently begun to research this area in developing and transition countries. In this small body of research, the childcare cost is commonly defined under the assumption that childcare quality is uniform within a locality and therefore all families face the same price. For example, Lokshin (2004) and Lokshin and Fong (2006) use the average price of childcare in a locality as a proxy for childcare costs in Russia and Romania. They both found that a decline in the price of childcare increases women's LFP in the country under investigation. In a study of Guatemala City and Accra, Hallman, Peracca, Catino and Ruiz (2006) used the median price of childcare in a community as a proxy for childcare costs and found that the price of childcare has no significant effect on mothers' LFP or on the number of hours worked. Using the median price of childcare in a city as a proxy for childcare cost, Du and Dong (2013) found that childcare costs have no effect on maternal LFP in urban China. Given the size of Chinese cities and the disparities in childcare services within a geographic location in China, the prices at the city level are not an appropriate measure of the prices Chinese families actually paid. Thus, in the present paper, we measure childcare costs as the predicted monthly expenditures on childcare per child, following the approach adopted by Ribar (1992).[v]

4. Empirical Methodology

The empirical analysis in this paper is guided by the behavior model developed by Connelly (1992) and Ribar (1992). We assume that a Chinese mother makes her employment decision and childcare choice jointly to maximize her utility over market goods, leisure, and childcare quality. The quality of childcare is a function of three types of care: maternal care, unpaid non-maternal care (informal childcare), and paid non-maternal care (formal childcare). The mother's decision in this optimization problem is constrained by a monetary constraint, constraints on the mother and children's time, and a production function for childcare services. From the optimization program, the mother's LPF and childcare utilization can be expressed as a function of the price of formal childcare, wages and other covariates. The mother's LFP increases with wages and decreases with the price of formal childcare, whereas her demand for formal childcare increases with wages and decreases with the price of formal childcare.[vi]

Guided by the conceptual framework presented above, our analysis seeks to test the following hypotheses:

Hypothesis 1: Childcare costs decrease the LFP and formal childcare utilization of both migrant and local mothers who live with preschool-aged children in cities.

Hypothesis 2: The LFP of migrant mothers is more sensitive to childcare costs than that of local mothers because, unlike local families, most migrant families have no extended families, such as grandparents, living nearby to assist with childcare. When the price of formal childcare becomes prohibitively high, migrant mothers are more

likely than local mothers to withdraw from the labor market to care for their children. Hypothesis 3: The formal childcare utilization of migrant mothers is less sensitive to childcare costs than that of local mothers because it is more difficult for the former than the latter to substitute informal childcare, such as care-provided by grandparents, for formal childcare.

We estimate two structural equations for the mother's LFP and (formal) childcare utilization decisions derived as the solution to her utility maximization problem. The estimating equations are given below:

$$L = F(W, P, Z, u) \qquad (1)$$

$$C = G(W, P, Z, \omega) \qquad (2)$$

where L stands for LFP; C is childcare utilization; W is the hourly wage; P is the price of childcare; Z is a vector of covariates, including the log of unearned income, household demographic composition, mother's *hukou* status, and city dummy variables; and u and ω represent random disturbances. Both L and C are measured by binary indicators, where L equals one for those who are in the labor force, and C equals one for those who use formal childcare. The hourly wages are derived by dividing the mother's monthly wages by the number of hours worked in a given month; the cost of childcare is the total monthly expenditure on childcare for the youngest child;[vii] and unearned income is the sum of the husband's earnings and the family's non-labor income.[viii] Due to data limitations, we do not directly estimate demand for informal care; instead, we partially control for access to informal care using household demographic composition.[ix]

Two issues need to be addressed. First, because we only observe the wages and childcare costs for those who participated in the labor force and/or used paid childcare services, we need to estimate the predicted wages and childcare costs for all mothers who live with preschool-age children. However, the wage and childcare cost equations are both subject to selection bias because mothers who participated in the labor force and/or used paid childcare may have different unobserved characteristics from those who did not (Connelly 1992). Secondly, the sample of migrant mothers who co-reside with a preschool-age child is also subject to selection bias, given that migrant mothers who took their young children to the cities are likely to be statistically different from those who left their children behind. In this regard, the selection process is more complicated for migrants than for local mothers.

We estimate the supporting equations of wage and childcare cost determination for local and migrant mothers with different approaches to address selection bias. The wage equation is specified as follows:

$$\log(W) = \beta' X + \varepsilon \qquad (3)$$

where X is a vector of explanatory variables, including maternal years of schooling, age and its squared term, *hukou* status and city dummy variables, and ϵ represents the error term.

The childcare cost equation is defined as:

$$P = \gamma' M + \nu \qquad (4)$$

where M is a vector of explanatory variables, and υ is the error term. The variables in M include maternal age and years of schooling, the age and sex of the youngest child,

a dummy variable that represents whether the mother took an ECE training class organized by the community, the mother's *hukou* status, the log of unearned income, and city dummy variables. Maternal education and attendance of an ECE class are indicative of the extent to which the childcare utilization is driven by the mother's interest in preschool education. Unearned income is a proxy for the family's ability to pay for childcare. The prices of childcare are, admittedly, determined not only by family characteristics but also by community characteristics. Due to data limitations, we use city dummy variables to control for community characteristics at the city level.[x]

To correct for sample selection bias for local mothers, we apply the Heckman two-stage procedure (Heckman 1979). For the wage equation, a reduced-form probit regression of LFP is first estimated to obtain the inverse Mills ratio. The explanatory variables in the probit equation include maternal years of schooling, age and its squared term; *hukou* status; unearned income in log form; household demographic composition; and city dummy variables. Unearned income and household composition variables, which are excluded from the wage equation, are used to identify the wage equation. Next, the wage equation, which includes the inverse Mills ratio as an explanatory variable, is estimated by OLS.

Similar to the wage equation, the childcare cost equation is estimated by the Heckman two-stage procedure.[xi] First, a reduced-form probit model of formal childcare use is estimated to obtain the inverse Mills ratio. The explanatory variables of the childcare utilization equation include all the explanatory variables from the

childcare cost equation and the household composition variables. The household composition variables are used to identify the childcare equation. The childcare cost equation, which includes the inverse Mills ratio as an explanatory variable, is then estimated by OLS.

To correct selection bias for migrant mothers, we estimate two three-equation mixed systems.[xii] For the wage equation, the selection correction process involves two interrelated decisions: the LFP decision of a migrant mother who co-resides with a preschool child and the migration decision of a migrant mother who has a preschool-age child regarding whether she should take the child with her to the city or leave the child behind. For the childcare cost equation, we take into account two decisions: the childcare utilization decision of a migrant mother who co-resides with a preschool-age child and a migrant mother's decision of whether or not she should take the child with her to the city. For the migration decision, we use the number of adult family and extended family members in the native village, a proxy for the availability of informal childcare in the native village, for identification, assuming that this variable is negatively correlated with the probability that a mother migrates together with the child to the city, but it has no effect on the LFP or childcare utilization of a migrant mother who co-resides with the child in the city. The number of left-behind adult members is assumed to be exogenous to the mother's migration decision based on the argument that the size of a family and extended family in rural China is, to a large extent, determined by cultural norms and biological factors. The LFP and childcare utilization equations are defined as those for local mothers. The explanatory variable

of the migration equation includes the number of left-behind adult members in addition to the explanatory variables of the respective LFP and childcare utilization equation. We estimate each three-equation mixed system by using a conditional mixed process (CMP) estimator. The system controls for selection bias by estimating the correlation coefficients of the error terms. By maximizes the joint likelihood function of each three-equation system, the CMP estimator is consistent and efficient (Roodman 2011).

We compute the predicted wages and childcare costs from the respective wage and childcare cost equations for all mothers who co-reside with a preschool-age child in the sample and then include the two predicted variables in the LFP and childcare utilization equations for these mothers. In the final estimation stage, probit models of LFP and childcare utilization are estimated for local mothers. For migrant mothers, we correct selection bias stemming from migration decisions by estimating the LFP and childcare utilization equation jointly with the migration equation. We estimate two two-equation mixed systems by using the CMP method. The specification of the migration equation for the structural LFP and childcare utilization equations is the same as the one for the reduced-form and supporting equations. For both local and migrant mothers, the standard errors of the estimates in both equations are computed using a bootstrap procedure.

5. Data

Our analysis relies on data from China's National Dynamic Monitoring Survey of

Floating Populations, which was conducted by the former National Population and Family Planning Committee in 2010. The survey interviewed 8,200 working-age migrants (16-59 years) in five cities (Beijing, Chengdu, Zhengzhou, Zhongshan, and Suzhou). For the sake of comparison, the survey included an equal number of working-age local residents from the same communities in which the migrants lived. Because rural migrants tend to live in areas where housing costs are relatively low, the local, urban residents interviewed for the survey are of relatively low socioeconomic status. Some of the communities with concentrations of migrant families used to be rural communities in suburban areas, so some local mothers in the comparison sample are rural *hukou* holders.

The survey covers a total of 1,407 migrant women who reported having a preschool-aged child (6 years or younger), of which 878 mothers lived with at least one preschool-aged child and 529 mothers left their children in their native villages. Our analysis focuses on the 878 migrant mothers who lived with a preschool-age child, as access to affordable non-parental childcare in the cities does not directly affect the LFP and childcare choices of migrant mothers who do not co-reside with their children. We also analyzed a sample of 819 local mothers with preschool-aged children. Summary statistics for the variables included in the regressions for migrant mothers and local mothers are presented in Tables A1 and A2, respectively.

6. Empirical Results

6. 1 Childcare utilization, childcare costs, and maternal LFP

Table 1 presents summary statistics of childcare utilization and costs for migrant and local mothers. We focus on formal childcare, which includes kindergartens and nurseries. From Table 1, the proportion of migrant mothers who used childcare is slightly lower than that of local mothers (39.2 percent versus 41.2 percent), and the utilization rate is much higher for children aged between 3 and 6 than for children under 3. Of the children in childcare, the proportion of migrant children enrolled in public childcare programs is much lower than that of local children (39 percent versus 66 percent), and migrant parents have a higher probability of paying sponsor fees than local parents (13.7 percent versus 3.3 percent). The quality of childcare is higher for local children than migrant children, as evidenced by the fact that 26 percent of local children in childcare were enrolled in extracurricular classes while the rate for migrant children was only 15 percent. Despite these differences, the mean monthly cost of childcare is essentially the same for the two types of children, although the median cost is higher for migrant children than for local children. As an indicator of childcare affordability, childcare expenditures account for an average of 16.5 percent of family income for migrant mothers and 18 percent for local mothers. Local mothers appear more interested in ECE than do migrant mothers, as evidenced by the fact that the proportion of local mothers who have attended an ECE training class is twice as large as that of migrant mothers (64.4 percent versus 31.4 percent).

- Table 1 -

Regarding maternal LFP, 63.9 percent of migrant mothers who co-reside with preschool-aged children engaged in paid work, and those who were in the labor force,

one average, worked 63.4 hours per week. Compared with migrant mothers who co-reside with a preschool-aged child, the LFP of those migrant mothers who have left their children behind is much higher, at 83 percent. The LFP of local mothers is 64.6 percent, similar to that of migrant mothers who co-reside with preschool-aged children. Local working mothers, on average, spent 46.7 hours per week on paid work, 16.7 hours fewer than the average weekly hours worked by their migrant counterparts.

For both migrant and local mothers, nearly one-half of working mothers enrolled their children in childcare. Working mothers who did not use childcare account for a disproportionate share of self-employed workers who have more flexible work schedules than do wage workers. For both types of mothers, childcare is not only a substitute for maternal care but also a means for preschool education, as more than one-quarter of non-working migrant mothers and 36 percent of non-working local mothers in the sample also enrolled their children in childcare. As it is expected, the incidence of co-residence with elderly parents is higher among local mothers than among migrant mothers (10.9 percent versus 2.6 percent). It is noteworthy that many urban grandparent caregivers do not live together with their adult children, and childcare-provided by nonresidential grandparents is also more accessible to local mothers than migrant mothers.

6.2 Results of the reduced-form and supporting regressions

Table 2 present the CMP estimates of the three-equation mixed systems for wage and

childcare cost determination for migrant mothers. The migration equations in both mixed systems show that the probability that a mother migrated together with a preschool-aged child is negatively correlated with the number of adult family and extended family members in the native village and the relationship is highly significance. Intuitively, the estimates indicate that a migrant mother is less likely to take the child with her if informal care at the native village is more available. Statistically, this result means that our identification strategy for migration selection is valid. The estimates also show that those mothers who are more educated, have higher non-earned income, and co-reside with their husband and school-aged children in the cities are more likely to migrate together with preschool-aged children. These results are in line with economic intuitions. In terms of correlations between error terms, the estimates of ρ parameters show that other things being equal, those mothers who are more likely to migrate together with a preschool-aged child have a higher likelihood to participate in the labor market, earn higher wages, and are also more inclined to use paid childcare and spend more on childcare. What's more, the wages are higher for those who participated in the labor force than those who did not participate, and childcare users spent less on childcare than non-users. Except the correlation between childcare utilization and childcare costs equations, all pairwise correlation coefficients are statistically significant. These results indicate that the reduced-form LFP and childcare utilization equations and the wage equation for migrant mothers who co-reside with preschool-aged child are subject to selection bias, although there is no evidence that childcare users and non-users have different unobserved characteristics,

which would bias the estimates of the childcare cost equation.

Turning to the reduced-form LFP and wage equations, we note that the LFP of migrant mothers increases with maternal age (at a decreasing rate) and years of schooling and decreases with non-earned income. Moreover, wages is positively correlated with maternal years of schooling and negatively with rural *hukou* status. With respect to the reduced-form childcare utilization and childcare cost equations, the estimates show that migrant mothers are more likely to use paid childcare if the child is a boy and older and those mothers who have attended an ECE training class have a higher probability to use childcare. Interestingly, non-earned income is the only significant determinant of childcare costs, which is positively correlated with childcare costs. Given that the price of childcare is indicative of the quality of childcare, the access to high quality childcare appears solely determined by the ability of migrant families to pay the services.

Table 2

Table 3 presents the Heckman two-stage estimates of the wage and childcare cost determination for local mothers. The estimates of the LFP and wage equations for local mothers are similar to those for migrant mothers. As for migrant mothers, the LFP of local mothers is positively correlated with maternal years of schooling and negatively with non-earned incomes, while the wages of local mothers is positively correlated maternal years of schooling and negatively with rural *hukou* status. Regarding the reduced-form childcare utilization and childcare equations, as migrant mothers, local mothers are more likely to use childcare for older children and those

who have attended an ECE training class have a higher probability to use childcare.

However, there are marked differences in the childcare utilization and childcare cost equations between two types of mothers. Unlike migrant mothers whose years of schooling have no significant impact on childcare utilization and childcare costs, maternal education is a significant determinant of both childcare utilization and childcare costs for local mothers. While having a boy increases the probability that a migrant mother uses childcare, such pro-boy bias is statistically insignificant for local mothers. Moreover, the child's age has no significant effect on childcare costs for migrant mothers, but it has a significant negative effect for local mothers. The difference in child age effects is attributable to the fact that kindergartens, which provide preschool education for older children, are more likely to receive subsidies than nurseries for toddlers, and publicly subsidized kindergartens are more accessible to local families than migrant families. Furthermore, while a significant positive correlation between non-earned incomes and childcare costs is observed for both migrant and local mothers, the effect is much larger for the former than the latter. Numerically, a one-percent increase in unearned income increases the childcare cost by 0.98 yuan per month for migrant mothers and by 0.23 yuan for local mothers. Evidently, compared with migrant families, local families' access to high quality childcare is less constrained by their ability to pay for the services. The finding that the wage equations of two types of mothers are more similar than the childcare cost equations suggests that China's childcare market is more segregated by *hukou* status than the labor market. Lastly, the estimates of the inverse Mills ratio (λ) in both wage

and childcare cost equations are statically insignificant for local mothers. Thus, there is no evidence that the wage and childcare cost equations of local mothers are subject to selection bias.

- Table 3 -

6.3 Estimates of the structural LFP and childcare utilization equations

Table 4 presents the CMP and probit estimates of the structural LFP and childcare utilization equations for migrant and local mothers, respectively. For migrant workers, to streamline the presentation, we only report some of the estimates of the migration equation that is jointly estimated with the structural LFP and childcare utilization equations at the bottom of Table 4. As for the reduced-form and supporting regressions presented in Table 2, the number of left-behind adult members in both two-equation systems for the structural equations is statistically significant. Specifically, other things being equal, having one additional adult family and extended family member in the native village decreases the probability that a migrant mother took a preschool-aged child with her to the city by 37 percentage points. The estimates of ρ parameters show that mothers who migrated together with preschool-aged children have a higher LFP as well as a higher likelihood to use childcare than those who left their children behind. Thus, migrant mothers who co-reside with preschool-aged children in the cities do have different unobserved characteristics from those who have left their children behind. By controlling for unobserved characteristics between two types of migrant mothers through the estimation of the

correlations of the migration equation with the LFP (and childcare utilization) equation, the CMP generates consistent and efficient estimates of the structural LFP and childcare utilization equations for migrant mothers.

Turning to the structural equations, we find that for both types of mothers, wages have a significant positive effect on LFP as well as on childcare utilization. Specifically, a 10-percent increase in wages will increase the LFP of migrant mothers by 0.8 percentage point and their probability of childcare use by 0.3 percentage point, while the effects for local mothers are 2.3 and 2.1 percentage point, respectively. Also as expected, childcare costs have a significant negative effect on LFP and childcare utilization for both migrant and local mothers. A 10-percent increase in childcare costs will decrease LFP by 1.9 percentage point for migrant mothers and 1.6 percent for local mothers and their probability of using childcare by 3.1 and 4.7 percentage point, respectively. Consistent with economic predictions, higher unearned incomes have significant negative effects on the LFP of both migrant and local mothers. A 10-percent increase in unearned income will decrease the LFP of migrant and local mothers by 1.8 and 1.7 percentage point, respectively, and increases the respective probability of using childcare by 0.5 and 0.3 percent. The estimates also show that for both types of mothers, rural *hukou* holders have a lower LFP than urban *hukou* holders, with a gap of 12.9 percentage point among migrant mothers and 12.1 percentage point among local mothers. Moreover, the presence of children aged 0-2 has a significant negative effect on childcare utilization; compared with the mothers with children aged 3-6, the probability of childcare utilization is 51.8 percentage point

lower for migrant mothers and 62 percentage point lower for local mothers. Finally, for both types of mothers, the presence of school-aged children, husband, and elderly parents has no significant effect on maternal LFP and childcare utilization.

- Table 4 -

Table 5 presents the elasticities of LFP and childcare utilization with respect to wages and childcare costs for migrant and local mothers, which are derived using the structural estimates reported in Table 4. The elasticity estimates are evaluated at the sample means for a given group. The wage elasticities of LFP and childcare utilization are 0.131 and 0.114 for migrant mothers and 0.323 and 0.647 for local mothers, respectively. Apparently, the LFP and childcare utilization rates of migrant mothers are less sensitive to changes in wages than those of local mothers. The childcare cost elasticity of migrant mothers' LFP is -0.300, which is higher than the estimate of -0.229 for local mothers in terms of absolute value. Correspondingly, the childcare cost elasticity of migrant mothers' probability to use childcare is -1.087, which is smaller than the estimate of -1.455 for local mothers in terms of absolute value. From these estimates, we obtain evidence supporting the hypotheses that childcare costs have a strong negative effect on the LFP; the LFP of migrant mothers is more sensitive to childcare costs than that of local mothers; and migrant mothers' childcare utilization is less sensitive to childcare costs than local mothers'.

It is noteworthy that the childcare cost elasticities of LFP in Table 5 are in line with the estimates of existing studies for developed countries. For instance, the

reported estimated childcare cost elasticities of LFP are -0.20 in Connelly (1992), -0.34 in Kimmel (1995), -0.38 in Blau and Robins (1988), and -0.38 in Powell (1997).

-Table 5-

7. Conclusion

Rural to urban labor migration is a major feature of China's ongoing economic transformation. Hundreds of millions of women and men from rural areas have traveled to cities in search of better economic opportunities. However, migrant women confront many obstacles in urban labor markets. In this paper, we empirically analyze how childcare costs affect the LFP and childcare utilization rates of migrant women who have migrated with their preschool-aged children to cities, as well as the LFP and childcare utilization rates of their local counterparts, in urban China. We estimate the childcare cost elasticities of LFP and childcare utilization for both types of mothers. The estimates show that childcare costs have a strong negative effect on LFP for both migrant and local mothers and the LFP decision of migrant mothers is more sensitive to changes in childcare costs than that of local mothers. These results suggest that the lack of access to affordable childcare represents a major deterrent to the LFP of migrant and local mothers who co-reside with preschool-aged children, and the effect is greater for migrant mothers than for local mothers. The estimates also show that childcare costs have a strong negative effect on childcare utilization for both migrant and local mothers, and the childcare utilization of migrant mothers is less sensitive to changes in childcare costs than that of local mothers. While both

migrant and local families of low socioeconomic status confront cost barriers to utilizing childcare services, migrant mothers' ability to substitute for costly childcare services appears more limited, compared with local mothers. Lastly, our analysis finds that increases in the wage rate have a positive effect on the LFP and childcare utilization rates of both migrant and local mothers and the wage elasticities of LFP and childcare utilization are larger for local mothers than migrant mothers. The low sensitivity of migrant mothers to changes in wages relative to local mothers is in line with the observation that the choices of the former in the labor and childcare markets are constrained by more non-economic restrictions, compared with the latter.

The findings generated by this study call for policy measures to improve the accessibility and affordability of childcare programs for migrant and other low-income families in the cities. Childcare subsidies are one of the most commonly used measures to lower cost barriers for low-income families. From our estimates, childcare subsidies could have a strong positive effect on the LFP and childcare utilization rates of migrant and local mothers. Greater participation of women from socially disadvantaged families in the labor market would reduce gender inequalities and minimize socioeconomic disparities among urban families, whereas making decent childcare programs more accessible to children from socially disadvantaged families would reduce intergenerational inequality and level the playing field for all workers in the future. Thus, ensuring equal access to subsidized childcare services for all urban families should be an essential part of China's ongoing household registration reform and inclusive urbanization programs.

Table 1 Utilization and cost of childcare for migrant and local children under 7

	Migrant children			Local children		
	Total	Aged 0-2	Aged 3-6	Total	Aged 0-2	Aged 3-6
Enrollment rate (%)						
All children	39.2	4.6	66.7	41.2	4.0	72.4
Children of working mothers	47.1	5.9	70.8	44.0	3.8	71.2
Observations	878	389	489	819	374	445
For children enrolled in childcare:						
Enrolled in public childcare (%)	39.0	27.8	39.6	65.9	46.7	66.8
Took extracurricular classes (%)	15.4	0.0	16.2	26.1	6.6	27.0
Paid sponsorship fee (%)	13.7	16.7	13.5	3.3	0.0	3.4
Childcare cost (*yuan*/month)						
Mean	617	659	615	618	611	618
Median	460	488	460	430	383	433
Childcare cost as % of household income	16.5	14.8	16.6	18.0	17.3	18.0
Observations	344	15	329	337	15	322
For all children						
% mothers attaining ECE training class	31.8	---	---	64.4	---	---
Observations	878			819		

Source: Statistics presented in all tables are derived from the 2010 National Dynamic Monitoring Survey of Floating Populations.

Table 2 CMP estimates of the Wage and Childcare cost determinations for migrant mothers

	Wage determination			**Childcare cost determination**		
	Migration dy/dx	LFP dy/dx	Wage	Migration dy/dx	Childcare utilization dy/dx	Childcare cost
	(1)	(2)	(3)	(1)	(2)	(3)
Mother's age	0.148***	0.0781**	1.239*	0.0503	-0.0620	68.42
	(0.0365)	(0.0322)	(0.717)	(0.0404)	(0.0492)	(89.12)
Mother's age square	-0.00224***	-0.000940*	-0.0135	-0.000913	0.000851	-1.046
	(0.000569)	(0.000509)	(0.0113)	(0.000622)	(0.000759)	(1.317)
Mother's years of schooling	0.0408***	0.0473***	1.159***	0.0421***	-0.00141	25.02
	(0.00947)	(0.00811)	(0.161)	(0.0107)	(0.0111)	(17.53)
Rural *Hukou*	0.0137	-0.0710	-3.365***	-0.0337	-0.0383	-178.2
	(0.0628)	(0.0503)	(1.090)	(0.0687)	(0.0741)	(115.3)
Child is a boy				-0.00223	0.0795*	-104.4
				(0.0387)	(0.0434)	(74.09)
Child's age				0.118***	0.136***	-67.22
				(0.0146)	(0.0182)	(50.71)
Attended training course				0.134***	0.104**	39.25
				(0.0438)	(0.0476)	(80.88)
Log unearned income	0.0686***	-0.0973***		0.0725***	-0.0172	**97.76****
	(0.0206)	(0.0129)		(0.0219)	(0.0262)	(40.84)
Child age 0-2 present	-	-0.00115		-	-0.441***	
	-	(0.0203)		-	(0.0832)	
Child age 7-12 present	0.430***	0.0147		0.521***	-0.0150	
	(0.0383)	(0.0275)		(0.0397)	(0.0782)	
Child age 13-17 present	0.431***	-0.00104		0.520***	0.201*	
	(0.0400)	(0.0506)		(0.0352)	(0.114)	
Husband present	0.295***	-0.0407		0.281***	-0.175	
	(0.0494)	(0.0596)		(0.0494)	(0.127)	
Elderly present	-	0.0647		-	0.0905	
	-	(0.0565)		-	(0.142)	
No. adult HH members at Home town	-0.373***			-0.383***		
	(0.0389)			(0.0481)		

ρ12	0.4505***			0.6538***		
	(0.1102)			(0.1507)		
ρ13	0.3336***			0.6933***		
	(0.1176)			(0.1014)		
ρ23	0.9913***			-0.0690		
	(0.0044)			(0.1293)		
City effects	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Constant			-28.25**			-590.6
			(11.63)			(1,652)
χ^2		516.67			815.74	
P value		0.0			0.0	
Observations	1,407	878	561	1,407	878	344

Notes: The estimates of LFP equations are marginal effects. The parameter of ρij is the correlation coefficient of the error terms of equations i and j. * p<0.1, ** p<0.05, *** p<0.01

Table 3 Heckman two-stage estimation of childcare cost and hourly wage determination for local mothers

	Wage		**Childcare costs**	
	LFP	Hourly wage	Utilization	Cost
Mother's age	0.0138	-0.1810	-0.0007	12.19
	(0.0287)	(0.7320)	(0.0199)	(58.25)
Mother's age squared	-0.0002	0.0050	0.0000	-0.216
	(0.0004)	(0.0112)	(0.0003)	(0.846)
Mother's years of schooling	0.0479***	1.1730***	0.0096**	26.60**
	(0.0074)	(0.1870)	(0.0048)	(13.55)
Rural *Hukou*	-0.0330	-2.2390*	-0.0279	-233.1***
	(0.0445)	(1.1470)	(0.0303)	(82.31)
Child is a boy			0.0056	-78.69
			(0.0230)	(63.80)
Child's age			0.0934***	-80.88**
			(0.0112)	(34.58)
Attended training course			0.0475*	-118.5
			(0.0247)	(72.99)
Log unearned income	-0.1930***		-0.0001	23.15*
	(0.0231)		(0.0053)	(12.31)
Child age 0-2 present	-0.1380***		-0.2044***	
	(0.0362)		(0.0405)	
Child age 7-12 present	0.0066		-0.0026	
	(0.0596)		(0.0412)	
Child age 13-17 present	-0.0113		-0.0292	
	(0.0857)		(0.0541)	
Husband present	0.0299		0.0802	
	(0.0798)		(0.0576)	
Elderly present	0.0555		0.0085	
	(0.0496)		(0.0368)	
City	YES	YES	YES	YES
λ		1.6620		-16.74
		(1.737)		(76.37)
χ^2	124.5		93.93	
P-value	0.0		0.0	
Observations	819	529	819	337

Notes: The estimates of LFP equations are marginal effects with heteroscedasticity-robust standard errors presented in the parentheses. λ is the inverse Mill's ratio. * p<0.1, ** p<0.05, *** p<0.01

Table 4 Structural equations for the LFP and childcare utilization determination of migrant and local mothers

	Migrant mothers		**Local mothers**	
	LFP （dy/dx）	Childcare Utilization （dy/dx）	LFP （dy/dx）	Childcare Utilization （dy/dx）
Log predicted wage	0.0818***	0.0320**	0.228***	0.207***
	(0.0119)	(0.0155)	(0.0615)	(0.0708)
Log predicted childcare cost	-0.187***	-0.306***	-0.162**	-0.466***
	(0.0681)	(0.0689)	(0.0794)	(0.141)
Log unearned Income	-0.181***	0.0543**	-0.174***	0.0269*
	(0.0301)	(0.0236)	(0.0215)	(0.0145)
Rural *hukou*	-0.129**	-0.0571	-0.121**	-0.0925
	(0.0508)	(0.0682)	(0.0576)	(0.0757)
Child age 0-2 present	0.00219	-0.518***	-0.0657	-0.620***
	(0.0553)	(0.0648)	(0.0498)	(0.0330)
Child age 7-12 present	-0.0680	-0.0363	-0.00911	-0.0354
	(0.0643)	(0.0590)	(0.0585)	(0.0775)
Child age 13-17 present	0.0768	0.0870	-0.107	-0.151
	(0.103)	(0.116)	(0.0706)	(0.0930)
Husband present	-0.0657	-0.133	0.0508	0.149
	(0.106)	(0.130)	(0.0966)	(0.0916)
Elderly present	0.0752	0.0654	0.0438	-0.0192
	(0.0975)	(0.157)	(0.0538)	(0.0518)
City	YES	YES	YES	YES
Log likelihood	-987.479	-853.397	-459.8	-299.7
χ^2	235.91	362.58	122.85	276.7
P-value	0.000	0.000	0.000	0.000
Pseudo R square			0.136	0.460
Observations	878	878	819	819
Migrating with preschool child				
No. of adults left at home	-0.3752***	-0.3730***		
	(0.0396)	(0.0475)		
ρ12	0.4020*** （0.1524）	0.1726* (0.1028)		
Observations	1,407	1,407	819	819

Notes: The LFP and childcare utilization equation of migrant mothers are estimated jointly with the migration equation by CMP. ρ12 is the correlation coefficient of the error terms of the migration equation with the LFP (and childcare utilization) equation. The estimates of marginal effects are presented with bootstrapped standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Table 5 LFP and childcare utilization elasticities of migrant and local mothers

	LFP		Childcare utilization	
	w.r.t. hourly wage	w.r.t. childcare cost	w.r.t. hourly wage	w.r.t childcare cost
Migrant mothers	0.131***	-0.3004***	0.1136***	-1.0865***
Local mothers	0.3233***	-0.2294**	0.6469***	-1.4552***

Notes: * p<0.1, ** p<0.05, *** p<0.01

Appendix:

Table A1 Descriptive statistics for the variables included in the regression for migrant mothers

	Mothers leaving child behind	Mothers co-residing with child				
		All mothers	Non-working mothers		Working mothers	
			Use childcare	Do not use childcare	Use childcare	Do not use childcare
Weekly hours worked					64.1	62.7
Wage (yuan/month)					2,518	2,983
Wage (yuan/hour)					10.09	13.49
Mother's age	29.6	30.0	31.0	28.0	31.0	30.0
Mother's years of schooling	9.3	10.2	9.7	10.0	9.7	10.8
Child's age	3.47	2.92	4.38	1.57	4.60	2.13
Child's sex (1=boy)	0.558	0.563	0.575	0.506	0.640	0.535
Rural *hukou*	0.913	0.836	0.840	0.852	0.883	0.781
Child age 0-2 present	0.000	0.443	0.075	0.751	0.046	0.650
Child age 3-6 present	0.000	0.617	0.925	0.346	0.962	0.444
Child age 7-12 present	0.011	0.162	0.263	0.135	0.155	0.162
Child age 13-17 present	0.4	5.8	11.3	0.84	9.5	5.1
Husband present	0.737	0.954	0.988	0.975	0.917	0.963
Elderly present	0.0	0.026	0.025	0.025	0.023	0.030
Unearned income (1000 yuan/month)	2.67	4.20	4.53	5.42	2.92	4.27
Attended training program	0.197	0.318	0.386	0.249	0.394	0.286
Number of adult HH members left at hometown	0.956	0.656	0.588	0.662	0.655	0.670
Observations	529	878	80	237	264	297

Table A2 Descriptive statistics of the variables included in the regression for local mothers

	All mothers	Non-working mothers		Working mothers	
		Use childcare	Do not use childcare	Use childcare	Do not use childcare
Weekly hours worked				47.7	45.9
Wages (yuan/month)				1,925	1,922
Wage (yuan/hour)				10.40	10.41
Childcare cost (yuan/month)		495		673	
Mother's age	30.5	32.4	29.1	31.5	29.9
Mother's years of schooling	11.4	10.4	10.8	11.7	12.0
Child's age	2.89	4.46	1.46	4.48	1.98
Child's sex (1=boy)	0.529	0.500	0.538	0.553	0.514
Rural *hukou*	0.575	0.644	0.683	0.541	0.510
Child age 0-2 present	0.457	0.67	0.828	0.034	0.693
Child age 3-6 present	0.574	0.933	0.231	0.970	0.351
Child age 7-12 present	0.111	0.154	0.124	0.086	0.108
Child age 13-17 present	0.057	0.115	0.054	0.047	0.047
Husband present	0.943	0.952	0.962	0.957	0.916
Elderly present	0.109	0.115	0.113	0.129	0.088
Unearned income (1000 yuan/month)	3.34	3.48	4.17	3.38	2.75
Attended training program	0.644	0.664	0.484	0.760	0.645
Observations	819	104	186	233	296

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[i] See Fenglian Du and Xiao-yuan Dong (2013) for a review of the evolution of childcare

policy in China during the economic transition.

[ii] In this paper, the term "childcare services" include the services provided by both nurseries and kindergartens. The former refer to center-based childcare for children aged 0-2 and the latter refer to center-based childcare, including preschool programs, for children aged 3-6. Center-based childcare is termed "formal childcare".

[iii] The website of the Ministry of Education in China, August 2013 年 8 月.

http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s7567/201308/156409.html

[iv] Education Bureau of Zhabei District, Shanghai, "The instructions for the enrollment of migrant children in Zhabei District March 12, 2014, http://xxgk.zb.edu.sh.cn/gongkai/3101080000/45036. Education Bureau of Xiamen, "Opinions of education bureau of Xiamen for Kindergarten Enrollment in 2014" on June 11, 2014, http://www.xmedu.gov.cn/publish/portal0/tab38/info38220.htm

[v] The five cities covered by the survey, namely Beijing, Chengdu, Zhengzhou, Zhongshan, and Suzhou, all have a population of more than five million. We are unable to derive average childcare cost at the community level because the survey does not provide information that can be used to identify neighborhood communities. We do not apply the approach of Connelly (1991, 1992), which relates childcare costs to a mother's work hours because in our sample, many non-working mothers also enrolled their children in childcare programs for preschool education.

[vi] This model assumes that childcare services are available as long as users can afford to pay for the services. This assumption is valid for urban China in the 2010s where the private childcare market has grown rapidly in response to the rising demand. As in other market economies, the essence of childcare accessibility in urban China is the lack of

access to affordable childcare among families of low-socioeconomic status.

[vii] Less than 10 percent of migrant mothers and less than 5 percent of local mothers have more than one preschool-aged child in the sample.

[viii] Husbands' earnings are assumed to be exogenous to a mother's LFP decision. This assumption is plausible, given the influence of traditional gender norms in Chinese society. Despite women emancipation movements during Mao's era, the husband is still deemed the primary earner and the wife the secondary earner in the post-reform period.

[ix] Arguably, some of the household composition variables, such as the presence of a child aged 0-2 and the presence of an elderly parent, may be endogenous if a mother's LFP decision is made jointly with the family's fertility and co-residence decisions. Due to data limitations, we are unable to address the potential endogeneity bias of these variables. Nevertheless, as pointed out by Connelly, DeGraff, Levison and McCall (2006), the endogeneity of fertility is a matter of degree. Biologically speaking, fertility cannot be planned exactly and therefore always contains exogenous elements. China's birth-control policies bring additional exogenous variations in fertility, thereby weakening its simultaneous association with maternal LFP decisions. With respect to the presence of elderly parents, the variable is statistically insignificant in most cases and its exclusion does not bring about noticeable changes to the estimates.

[x] One shortcoming of using family expenditures on childcare as a proxy for the price of childcare is that it does control for variations in childcare quality.

[xi] By measuring childcare costs as expenditures on childcare per hour worked, Connelly (1992) and Power (1997) corrected for selection bias in the childcare cost equation by estimating a bivariate probit model that takes into account two decisions: the use of paid

care decision and the LFP decision. Our selection equation limits our attention to the decision to use paid childcare, as our measure of childcare costs takes into account the decisions of mothers who did not participate in the labor market but did enroll their children in childcare for preschool education.

[xii] The estimation procedure is inspired by Wahba (2015).