

The Impact of Intergenerational Coresidence on Female Labor Supply in Urban China

Jinning Wang*

November 30, 2022

Abstract

The female labor force participation rate in China has experienced a significant decline since the 1980s despite the rise in the level of education that women receive. Traditionally, extended families are the most common living arrangements in Chinese society. On the one hand, grandparents serve as the dominant substitutes in childcare and household duties due to limited alternatives to parental childcare and domestic duties. On the other hand, typical young Chinese couples tend to shoulder the responsibility of supporting four seniors as a result of the one-child policy implemented in the late 1970s. In this paper, I investigate the impact of intergenerational living arrangements on maternal labor supply in urban China. I employ an instrumental variables approach to overcome the endogeneity associated with intergenerational living arrangements. Using the data from the China Family Panel Studies, both OLS and IV estimates yield similar results that women living in coresiding families are about 7 percentage points more likely to participate in the labor market. In particular, I find a significant impact of coresidence for the high-educated women in both extensive and intensive margins. Moreover, having an old parent in the household reduces the time that a married woman spent on household chores by two and a half hours per week. As the Chinese population ages, identifying residence models of the elderly and their impacts on the coresiding female are critical for making future family planning and social inclusion policies.

JEL Classification: J12, J13, J16, J21

Keywords: family structure, female labor force participation, intergenerational coresidence

*Department of Economics, University of Connecticut, Mansfield Road, Unit 1603, Storrs, CT 06269-1063;
Email: Jinning.Wang@Uconn.edu.

1 Introduction

In recent decades, economists have paid great attention to female labor force participation, as it is considered one of the most important measures of the improvement of women's socioeconomic standing and the advancement of gender equality. Before economic reform in the 1980s, China was one of the top countries in terms of its female labor force participation rate. Following the economic reforms, China has experienced tremendous economic growth. In the meanwhile, the central government of China initiated a series of family planning policies that largely reduced the number of births in the majority of Chinese families. Despite the reduced fertility and an increased average level of education among women that accompanied it, China's female labor force participation rate has declined significantly in recent decades.

According to the key labor market indicators from the International Labour Organization (ILO) presented in Table 1, the labor force participation rate for women in China aged 15-64 significantly decreased from 79 to 70 percent from 1990 to 2010, while the male labor force participation rate only dropped by 4.5 percentage points. In contrast to the declining trend in the female labor force participation rate in China, it remained stable in the U.S., and the rates steadily increased in Japan and Korea over the past 20 years.

Table 1: A global comparison on the labor force participation rates for age 15-64 for China, U.S., Japan, and Korea. The data is obtained from ILO. The numbers are in percentage.

Country	1990		2000		2010	
	Male	Female	Male	Female	Male	Female
China	88.87	79.14	87.8	76.68	84.32	70.3
US	85.59	67.84	83.92	70.71	79.55	68.4
Japan	82.8	57.1	85.33	59.53	84.83	63.14
Korea	76.18	49.92	77.29	52.64	77.19	54.92

The sharp decline in China's female labor force participation has drawn attention from economists in recent years. Some existing studies attribute the decline to market-driven

economic reform. (Cooke et al., 2019, Dong and Pandey, 2012, and Bian, 2002) They claim that women with the responsibility of caring for children and the elderly are vulnerable to job loss or face discrimination in finding jobs due to increased pressure in the labor market after economic reform. While those studies provide a plausible explanation for a falling female labor force participation rate from the demand side, they fail to account for key factors driving women's labor supply.

In traditional Chinese families, a mother's role is to fulfill domestic duties and take care of their family. Therefore, coresidence with the husband's parents is a common living arrangement for married couples. This pattern is common in other countries, particularly in Southern Europe, and is seen as arising from traditional investments in older sons as a method of maintaining the continuity of the family across generations. In that region of the world. This form of family organization and related behaviors are referred to as the Mediterranean Family Model (Calzada and Brooks, 2013 Viazzo, 2013).

Coresidential grandparents can readily serve as primary substitutes for the mother's time spent performing childcare and household duties. This is important due to limited alternatives to parental childcare and domestic duties in China. China emphasizes a family-based support system for older people and adult children are not only seen as ethically responsible for caring for their frail parents but Chinese law requires parental contact with elder parents by their children. Rigid social norms that control gender roles, however, leave women with disproportionate responsibilities in caregiving and domestic tasks. Understanding the overall impact of the demands placed on women within this multi-generational family structure is critical to understanding the steep decline in female labor force participation in recent decades.

A woman's decisions about the use of their time are made in the context of the family. A major influence on family structure in China has been the implementation of the one-child policy in the late 1970s. People who were the only child born into their family have married, had children and their parents have grown older.

Across three generations, this gives rise to what is known as the "4-2-1" family which consists of four seniors (each of their parents), one child, and the couple themselves, which is prevalent in Chinese society. This structure which implies reduced caregiving resources in the family is driven by the restriction on childbearing. The middle-aged adults as described in this example are a sandwiched generation since they are caught between taking care of four seniors and at least one kid in the family with no siblings to share the elderly care duties.

Previous research has shown a strong relationship between intergenerational living arrangements and female labor supply; However, findings are inconsistent across studies. For example, Yang et al., 2016 finds that living with own parents significantly decreases women's labor force participation by 14 percent. Similar results are found in the studies in Kyrgyzstan (Landmann et al., 2018) and in Canada (Compton, 2015). On the contrary, some studies in China (Shen et al., 2012, and Maurer-Fazio et al., 2011) and Japan (Ogawa and Ermisch, 1996, Sasaki, 2002, Oshio, 2006, and Aydinbakar, 2020) suggest a strong positive effect of the presence in the household of elderly on women's likelihood of participating in market work. Thus, there is no consistent conclusion on the relationship between intergenerational coresidence and female labor supply.

Furthermore, there have been very few attempts to establish a causal impact of coresidence on female labor participation due to endogeneity of the coresidence decision. Studies in the Asian context, such as Maurer-Fazio et al., 2011, Sasaki, 2002, Oshio, 2006, Yang et al., 2016, and Shen et al., 2016 have made use of an instrumental variable approach to overcome this identification challenges. However, their selected instruments including sibling information (the number of surviving brothers and sisters) and housing information (home ownership, house type, and house size) may affect a woman's labor decision through channels other than intergenerational coresidence, thus violating the exclusion restriction. The use of this instrument is also not feasible in China in the context of the one-child policy.

Two additional studies that also made use of an instrumental variable approach exploit

the combined effect of exogeneity of birth order and coresidence tradition in Asian families.

¹ The instrumental variables used in their studies could resolve the endogeneity issue of coresidence; however, with the implementation of the one-child policy, the instrumental variable for birth order loses its predictive power in the first stage since the vast majority of sample members are only children.

This paper investigates the causal impact of paternal coresidence on women’s labor supply in China. The analysis focuses on urban areas as they are most similar to the industrialized countries where the Mediterranean Family Model is prevalent. Given that the ”4-2-1” family structure is common in China, the paper also provides a useful look at women in sandwiched generation similar to the situation American women faced in an aging society.

Similar to previous literature, the analysis makes use of an instrumental variable approach using the survival of each parent-in-law in the two-stage estimation procedure to control for endogeneity. Using this identification strategy, the paper analyzes the impact of the coresidence with the husband’s parents on female labor supply, which is a common living arrangement in China.² The study examines two different measures related to women’s labor market engagement, employment, and hours of work. Additionally, other uses of a woman’s time are explored to see whether changes in labor market activity are associated with alterations in time spent caring for children or doing housework. The study also update the existing literature by making use of more recent data that covers the period from 2010 to 2018.³

I find that coresiding with parents of the husband significantly increases the likelihood

¹One conventional living arrangement is that the youngest son and his wife stay in the large family and are responsible for the well-being of the parents. Under this living arrangement setting, Landmann et al., 2018 shows that coresidence has no significant effect on women’s labor force participation and the number of working hours using the husband being the youngest son as an IV. The other common family arrangement is that the oldest son serves as the household head and takes over the responsibility for taking care of the old parents. By instrumenting coresidence by whether the husband is the oldest kid in the family, Aydinbakar, 2020 finds that coresiding or proximate-residing grandmothers increases the probability of a wife being in employment.

²Yang et al., 2016 and Yang et al., 2016 evaluate the impact of coresiding with their own parents using China Health and Retirement Longitudinal Studies (CHARLS).

³Yang et al., 2016 and Yang et al., 2016 used the date from CHARLS in 2002 and 2011, respectively. Maurer-Fazio et al., 2011 used Chinese Population Census data from 1982, 1990, and 2000.

of a woman’s participation in the labor market, but does not significantly increase weekly working hours. Also, women who live in multi-generational households with parents of their husbands spend significantly less time on housework and no more time on caregiving.

2 Descriptive Statistics

The empirical analysis utilizes five waves of the China Family Panel Studies (CFPS) covering the time period from 2010 to 2018 in biannual surveys (2010, 2012, etc). The CFPS contains information on a nationally representative sample of Chinese residents including information such as age, education, employment history, birth history, and geographic identifiers for the municipality of residence. The survey also records information about family members, including an individual’s parents, spouse, and children. Hence, each married woman can be matched to her parents-in-law through her husband’s family relationship. The baseline 2010 wave of the CFPS surveyed 14,960 households with 42,590 individuals selected from 25 provinces⁴, representing 95 percent of the population.

The sample used for this study includes women living in urban areas who are married and have at least one child under the age of 18. The sample is further restricted to women who are age 20 and older since the minimum age for marriage is 20 for women in China by law. Due to the prevalence of married women living with their parents-in-law as well as the limitations of the instrumental variables approach in this paper, the sample excludes women living with their own parents. After matching each married woman with information on corresponding in-laws, the primary sample of analysis includes 10,401 pairs of married adults and the husband’s parents.

Table 2 presents the distribution of the outcome variables and key explanatory variables in the sample. We measure women’s labor market outcomes in two ways: 1) employment, equal to 1 if a woman engages in the labor market (extensive margin), and 2) weekly work-

⁴Beijing, Tianjin, Hebei, Shanxi, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhenjiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Chongqing Sichuan, Guizhou, Yunnan, Shaanxi, Gansu

ing hours (intensive margin).⁵ The descriptive statistics show that on average 70 percent of married women are employed, and the average hours of work are about 47 hours per week. Women from families characterized by coresidence with their in-laws have a higher average employment rate and work longer than their counterparts who do not coreside.

Table 2: Summary statistics on female labor supply, instrumental variables, and explanatory variables

	Overall Sample		Coresiding Family		Non-coresiding Family	
	mean	std. dev.	mean	std. dev.	mean	std. dev.
Outcome Variables:						
Employment	0.7	0.46	0.72	0.45	0.69	0.46
Hours of working (per week)	47.14	20.47	47.78	20.28	47.17	20.92
Time on household chores (per week)	15.19	10.29	14.42	10.71	16.24	9.87
Time on caring for families (per week)	14.28	8.68	14.7	9.45	14.35	8.33
Coresidence and Instrumental Variables:						
Coresiding parent-in-law	0.41	0.49	1	0	0	0
Father-in-law alive	0.46	0.5	0.77	0.42	0.27	0.44
Mother-in-law alive	0.54	0.5	0.92	0.28	0.3	0.46
Wife's Characteristics:						
Age	35.65	7.14	33.3	6.64	37.91	6.96
Educational Attainment	3.38	1.37	3.32	1.29	3.34	1.41
Husband's Characteristics:						
Age	37.47	7.27	35.04	6.61	39.69	7.2
Educational Attainment	3.5	1.3	3.41	1.21	3.52	1.33
Family Conditions:						
Spouse living at home	0.92	0.27	0.9	0.3	0.94	0.24
No. of children under 18	1.34	0.57	1.42	0.62	1.29	0.53
House ownership	0.82	0.38	0.89	0.31	0.75	0.42
Household income per person (log)	9.16	1.2	9.02	1.17	9.22	1.24

To explore some of the channels through which intergenerational coresidence affects female labor force participation, the paper also investigates the uses of women's time in housework and care giving.⁶ Based on Table 2.1, women who live with their in-laws spend 1.8 fewer hours per week on average on household chores than those who do not. Yet, we do not observe a meaningful difference in time spent on caring for families between the two groups.

We define coresidence as living with at least one paternal parent. In China, this living

⁵CFPS defines being employed as "have worked for at least one hour in the previous week for agricultural work, waged job, self-employment, or private business." People who are on vacation and off-season are treated as employed as long as they will return to their original job position within six months. However, home production, such as housework and unpaid help do not count.

⁶Records for housework are available for waves 2010, 2014, 2016, and 2018, and records on caregiving is only available in 2010.

arrangement is very common, and this is reflected in the sample where more than 40 percent of women live with their husband's parent(s). Roughly half of the women's in-laws are alive in our sample, and the survival rate is much higher in the coresidential families.

In addition to coresidence, several other factors potentially drive women's labor market decisions. Following the conventions of the earlier literature, I include the couples' educational attainment⁷ which is related to wage rate and the opportunity cost of time out of work. Age and age squared are included to control for women's potential working experience. More than half of the married women and their husbands have completed middle school, and there is no substantial difference in educational attainment between the coresidential and other families. In addition, the adult children living with their parents are about 4.5 years younger than those living in nuclear families on average. This likely reflects the reality that as people get older, their parents are less likely to survive. Moreover, middle-aged couples are more likely to own a home.

To control for family resources, I include home ownership and household income per person. These factors affect a woman's labor market decisions through an income effect; that is, women tend to have less incentive to work in the labor market when the family has more financial resources. The descriptive statistics in Table 2.1 suggest that the home is more likely to be owned by the family members in multi-generational families, whereas income per person tends to be higher in a nuclear family.

I also control for the number of children and whether the husband lives at home in the analysis since they affect women's labor decisions through substitution effects. When a family has more underage children who demand care and fewer adults to provide care. This makes the mother's time spent at home more valuable. This increases women's reservation wage and would be expected to make them less likely to work in the labor market. When the husband works in another city for higher financial compensation, the "left-behind" woman generally has to bear more domestic burdens, putting her at a disadvantage in pursuing a

⁷1=no degree, 2=primary school, 3=middle school, 4=high school, 5=technical school, 6=college, 7=master degree, 8=doctor's degree

career. If they coreside with elderly parents to get help in these types of situations, this will affect coresidential patterns and women’s labor market decisions at the same time.

3 Empirical Strategy

Prior studies have discussed the potential biases for OLS and logit estimation in this context. One potential source of bias is endogeneity due to the unobserved preferences of married women relating both to living arrangement decisions and labor market outcomes. For example, Pezzin and Schone, 1999 indicates that living arrangement choices are jointly determined by the characteristics of daughters and older parents in the family and how the daughters value family-specific public goods. Family-oriented women may prefer living with parents and children in the same household and spending more time in domestic work but less time in market work. As a result, unobserved preferences introduce a downward bias in the relationship between intergenerational coresidence and female labor supply. However, it might also be true that in some cases married women who want to work are more likely to reside with the husband’s parents so that they can share the burden. If this is the case, OLS estimates tend to be biased upwards.

Bias may also result from selection into coresidence due to considerations of the parents’. Ma and Wen, 2016 shows that when parents can help children with housework, they will coreside with more highly educated children whose opportunity cost of housework is higher. On the other hand, when parents need help from children with housework, they will coreside with lower-educated children whose opportunity cost of housework is lower. Thus, unobserved characteristics of the parents may also induce bias in OLS estimations.

Despite the identification challenges mentioned above, several attempts have been made to establish the causal impact of inter-generational coresidence on female labor market outcomes. Maurer-Fazio et al., 2011 employs a two-stage inclusion method, using a set of prefecture information and age interaction dummies as additional instrumental variables.

They find that the presence of older parents or relatives in the family significantly increases prime-age women’s likelihood of participating in market work. Although the authors successfully establish a strong first-stage relationship of the selected instrumental variables to coresidence, they fail to show the prefectural characteristics, which also capture the local economic conditions, do not affect female labor force participation through local labor market demand.

Other research has employed the instrumental variable method utilizing the information on siblings and housing characteristics as instruments. Sasaki, 2002 used birth order and the number of siblings for married women and their husbands and housing characteristics as instrumental variables. Their analysis reveals that living with parents or in-laws has a significantly positive impact on women’s labor force participation. Oshio, 2006 arrives at a similar conclusion, applying a set of instrumental variables including the age and education of husbands. However, housing conditions ⁸, husband’s education as a proxy for available unearned income, as well as the number of siblings ⁹ largely determine the resource allocation of a family, which may influence the female labor supply directly. Thus, the exogeneity condition for valid instruments may be a concern in this approach.

Two additional articles discuss the impact of family living arrangements on female labor force participation in China. Yang et al., 2016 select whether a woman has a brother as an instrumental variable, and conclude that coresidence with their own parents decreases the female labor participation rate by 14 percentage points. Similarly, Shen et al., 2016 uses this instrument along with sibling structures (whether the woman has any surviving brothers, whether the woman has any surviving sisters, and whether the woman is the youngest surviving child in the family). Their study shows that women coresiding with their maternal parents are 27.9 percent more likely to work than those living apart. However, some empirical evidence suggests that the number of siblings affects women’s labor decisions not only through parental coresidence but also through parental investment and interactions

⁸See Huang et al., 2022 and Zhao and Liu, 2022, for example.

⁹See Hannum et al., 2009 and Lei et al., 2017, for example.

among siblings (Gugl and Welling, 2012, Kramarz and Skans, 2014). One concern with this approach is that in the wake of the one-child policy in China, data on siblings is most often not available in the data. Additionally, given that patrilocal coresidence is much more common in China, their results focusing on women living with their own parents are more limited in their implications provided without further evidence of similarities between the women in these two types of families.

To control for the potential endogeneity of coresidence with parents-in-law, I also employ an instrumental approach. A valid instrument should influence the decision to reside with one’s parent-in-law but not directly affect the decision of married women to participate in the labor market. In addition, the exclusion restriction requires that any effect of the instrument on the outcome variable must operate via its effect on coresidence. The instruments used in this paper are whether each individual parent-in-law is still alive or not. The selected pair of instrumental variables affect the probability of coresidence directly since only the surviving parents are available to live with their adult children. The survival status of the paternal parents, however, does not directly affect the women’s working status. The study by Arpino et al., 2014 employed a similar instrumental variable. The difference is that their study focuses on the availability of grandparental childcare in the female labor supply in Italy.

This paper investigates the overall impacts of paternal coresidence in urban China for several reasons. First, the impact of intergenerational coresidence on women’s labor supply is ambiguous because several channels can be at play and might counteract one another. The coresiding parents might demand care, and women are typically caregivers in the family, reducing the female labor supply. (Liu et al., 2010) Second, coresiding parents might contribute to the family income and other assets like housing, thus discouraging women to participate in the labor market. (Fu et al., 2016) Third, coresiding parents could take over domestic responsibilities and therefore raise the women’s propensity to work. For example, Du et al., 2019, Garcia-Moran and Kuehn, 2017, and Li, 2017 show that grandparental childcare tends to increase female labor force participation.

Second, as shown here in Table 3, there are many more married females living with their parents-in-law than maternal ones. In the sample used for this analysis, about half of married women live in a nuclear family. About 41 percent of married women live with their parents-in-law, but less than 8 percent live with their maternal parents. Thus, I abstract from coresidence with maternal parents in this analysis as it is an uncommon living arrangement and has been the focus of other scholars.

Table 3: Distribution of family structure types, measured in percentage

Family Structure	Percentage
Nuclear family	51.79
Coresidence with maternal parents	7.46
Coresidence with paternal parents	40.74
no. of observations	11982

I estimate the effect of coresidence with paternal parents on women’s labor market outcomes using two-stage least squares estimation. To be precise, I conduct the following instrumental variable approach using the indicators of the survival status of each paternal parent as instruments:

$$Coresidence_i = \alpha_1 + \gamma_1^f Alive_{if} + \gamma_1^m Alive_{im} + \gamma_2 X_i + v_i \quad (3.1)$$

$$y_i = \alpha_2 + \beta_1 \hat{Coresidence}_i + \beta_2 X_i + \lambda_p + \gamma_w + u_i \quad (3.2)$$

In equation (1), the first stage of the estimation procedure, $Coresidence_i$ is the endogenous variable that equals 1 if a woman is living with either paternal parent. $Alive_i$ is the set of instrumental variables indicating whether each paternal parent is alive or not. In the second-stage equation (2), y_i denotes the outcome variables, including the women’s employment and total weekly working hours. X_i is a vector of control variables. Precisely, I include age, age squared, and level of education for a woman and her husband. As for family

conditions, we consider home ownership, family income per person, the number of underage children, and whether the husband lives with the family. To control for time-specific and province-specific economic conditions that might affect labor market outcomes, we include λ_p and γ_w for sets of the province and wave dummies, respectively.

Although we cannot test whether our instruments satisfy the exclusion restriction directly, we offer a comparison in observable characteristics between two groups to rule out the selection. Table 4 shows the mean comparison in age, degree, and the number of children living in the family. We conclude that the educational attainment and the number of children presented by the married couple are not correlated with the parent-in-law's survival status at a 95 percent significance level.

Table 4: Difference in married couple's characteristics

	Either paternal parent is alive		Neither paternal parent is alive		t Statistic
	Mean	Std. dev.	Mean	Std. dev.	
Wife:					
age	35.65	7.14	38.13	7.20	33.00
degree	3.38	1.31	3.39	1.46	0.71
No. of children	1.34	0.57	1.28	0.53	2.26
Husband:					
age	35.65	6.53	40.12	7.47	33.86
degree	3.49	1.24	3.52	1.37	1.57

Critical Values of t distribution: $t_{0.95} = 1.96$, $t_{0.95} = 2.576$.

Since China is relatively homogeneous culturally with strong expectations that married firstborn sons will live with their parents. As a consequence of the one-child policy, the availability of living with paternal parents increases. However, for some married couples, this is not an option due to the fact that their parents not being alive. Living with the woman's in-laws can affect time resources available in the household either through expanding the availability of care from the in-laws or increasing caregiving burdens due to their presence. The data show that characteristics of women who live with in-laws in terms of their education and number of children do not seem to vary suggesting that based on observable, similar

women wind up living both with the in-laws and separate from them. This suggests that the availability of the husband’s parents would serve as a valid instrument for the impact of coresidence on women’s labor market choices. While this may operate through wealth channels such as home ownership or per-capita income in the household, in all my estimation, I control for the household financial conditions including home ownership and household income per person. Given that the old parents tend to help out the married couples when the woman and children are left behind at home, I also include whether the husband is available at home and the number of underage children as control variables to isolate their impacts of coresidence itself on women’s choices.

4 Results

Columns (1) and (4) in Table 5 contain the OLS estimates of the impact of coresidence on employment and hours of work, respectively. The OLS estimates show that living with the parents-in-law is associated with a 6.64 percentage point increase in female employment. The presence of an older adult at home is not associated with a statistically significant increase in the hours of work for married women.

Columns (2) and (5) present the first-stage estimations for the IV model. I include a set of indicator variables for whether each paternal parent is alive as the instruments in the first-stage equation for coresidence. The first-stage results reveal that having a living parent-in-law has a positive and significant effect on intergenerational coresidence, and the impact is much larger if the woman’s mother-in-law is alive. I test for the strength of the instruments and report the relevant F statistics. The F-statistics used for the weak IV test are 1902 and 860.3, respectively, both exceeding the critical value of 10. Therefore, the instrumental variables are not weak in predicting coresidence in the first stage.

The second-stage IV estimates are shown in Columns (3) and (6) in Table 5. The impact of intergenerational coresidence using the IV method is similar to what was found with

OLS. The IV estimates indicate that a woman's likelihood of participating in the labor force increases by 7.6 percentage points on average when she is living with her parents-in-law. This estimate is statistically significant at the .01 level. However, there is no meaningful increase in hours of work for the women living with their parents-in-law.

Comparison of the IV and the OLS estimates suggests that when accounting for the endogeneity of family coresidence, the two estimations yield similar results in terms of the extensive margin and the intensive margin of labor supply. However, the OLS estimates yield slightly smaller estimates of the effect of coresidence with the older parents on employment but those differences would not be statistically different at conventional levels.

Table 5: Estimation results: female labor market outcomes

	Employment			Hours of work (per week)		
	(1) OLS	(2) IV - 1st Stage	(3) IV - 2nd Stage	(4) OLS	(5) IV - 1st Stage	(6) IV - 2nd Stage
Mother-in-law alive		0.514*** (0.0138)			0.517*** (0.0157)	
Father-in-law alive		0.177*** (0.0223)			0.168*** (0.0246)	
Coresiding parent-in-law	0.0664*** (0.0149)		0.0760*** (0.0262)	0.816 (0.511)		0.844 (1.116)
Mean of Y	0.7		0.7	47.14		47.14
Observations	11,087	11,087	11,087	6,900	6,900	6,900
R-squared	0.148		0.148	0.030		0.030
First-stage F stat		1902			860.3	

Standard errors in parentheses are clustered at province level in parentheses

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

4.1 Channels

The results in Table 5 show that coresidence with parents has substantial positive effects on labor force participation among Chinese married women. Previous studies propose that a major reason why intergenerational coresidence increases female labor supply is substantive parental assistance in housekeeping and childcare.

To examine this proposition, I explore the channels through which coresidence may influence women’s labor market outcomes. In particular, I exploit information on women’s time use in the estimation sample. The CFPS documents a woman’s time spent on housework and care giving¹⁰. I expect that coresidence leads to less time women spent on housework. Since the older parents are heavily involved in childcare and they may also demand elderly care from their adult children, coresidence leads to an ambiguous result with regard to care giving. Table 6 presents the estimates of the impact of intergenerational living arrangements on women’s time use. Both OLS and IV estimates suggest that living with in-laws significantly reduces the time women spend on household duties. OLS and IV estimates indicate that the presence of old parents reduces women’s time in housework by 1 and 1.5 hours per week, respectively. The OLS estimates are significant at the 0.01 level and the IV estimates are significant at the .05 level. Both the OLS and IV estimations also suggest that living with older parents reduces the time a woman spent on caregiving. The OLS estimates ($p < 0.1$) suggest that a woman will spend about one hour less on average if she lives with her parents-in-law. The IV estimates, although statistically insignificant, are associated with a larger reduction in caregiving hours with the presence of parents-in-law in the same household. The results clearly support the proposition that intergenerational coresidence allows women to share the burden of housework with their parents, leading to increased female labor force participation. The estimates are also consistent with coresidence reducing the time spent by women on caregiving but the IV estimates are not precisely estimated. Therefore, I conclude that there is no evidence suggesting that living with parents-in-law discourages women from participating in the labor market due to additional caregiving.

¹⁰Due to data limitation, time spent on housework is available in 2010, 2014, 2016, and 2018; time spent on caregiving is available in 2010. The time in caregiving is the total time a woman spends on both childcare and elderly care.

Table 6: Estimation results: women's time use

	Time on housework(per week)			Time on care giving (per week)		
	(1) OLS	(2) IV - 1st Stage	(3) IV - 2nd Stage	(4) OLS	(5) IV - 1st Stage	(6) IV - 2nd Stage
Mother-in-law alive		0.469*** (0.0148)			0.186*** (0.0171)	
Father-in-law alive		0.144*** (0.0237)			0.0168 (0.0317)	
Coresiding parent-in-law	-1.029*** (0.3521)		-1.484** (0.6195)	-0.924* (0.4662)		-2.646 (0.2.219)
Mean of Y	15.19		15.19	14.28		14.28
Observations	8,783	8,783	8,783	2,342	2,342	2,342
R-squared	0.100		0.100	0.143		0.136
First-stage F stat		613.8			66.6	

Standard errors in parentheses are clustered at province level in parentheses

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

4.2 Sub-Group Analysis

I test for heterogeneity in the effect of intergenerational coresidence on each outcome variable including employment, hours of work, hours of housework, and hours of caregiving among different groups of women. Table 7 presents the results of the OLS and IV estimates for the three subgroups based on the woman's age, their children's age, and the woman's educational attainment.

Panel 1 and Panel 2 in Table 7 suggest that sub-group analysis for the women's and children's age groups yields similar results. Women in the older age group (age 35-39) coresiding with their parents are about 10 percentage points more likely to work than those living apart from their parents-in-law. If she has a school-age child, she is also about 10 percentage points more likely to work when coresiding with the in-laws. OLS estimates also indicate that younger women (ages 20-34) and those with preschool aged children work more hours but the IV estimates are not statistically significant. Both the OLS and IV estimates reveal that younger women spend less time doing housework and caregiving. Similarly, those with preschool aged children who coreside with in-laws spend less time on housework

A woman tends to spend more time working if she is from the younger age group or

has a preschool-aged child. This may be due to the fact that the childcare service is not available or very expensive to most families. Moreover, young couples tend to over-invest in the only child in the house since each family is limited to having one birth as a result of the one-child policy (Du and Dong, 2013). In this case, coresiding with older parents would not have much impact on the likelihood of participating in the labor market if a woman values early childcare more than her own career. The channel analysis in Panel 2 confirms the hypothesis that women from a coresiding family tend to spend less time on housework but not the time in caregiving if she has a preschool-aged child.

One of the noteworthy findings in the sub-group analysis is that intergenerational coresidence has a positive and statistically significant impact on female labor outcomes at both the extensive and intensive margins for women holding a college or higher degree. Coresiding with parents significantly increases their labor market activity. More highly educated women are estimated to work 2 hours longer on a weekly basis than those who do not coreside with their older parents.

Table 7: Estimation results: sub-group analysis based on the woman's age, their children's age, and the woman's educational attainment

	Employment		Hours of work (per week)		Housework (hrs/day)		Care giving (hrs/day)	
	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Panel 1A: Age 20-34								
Coresiding with either parent-in-law	0.0698*** (0.0203)	0.0459 (0.0444)	1.274** (0.550)	1.232 (1.227)	-0.226*** (0.0370)	-0.306*** (0.104)	-0.272*** (0.0856)	-1.464** (0.617)
Panel 1B: Age 35-49								
Coresiding with either parent-in-law	0.0628*** (0.0184)	0.0999*** (0.0200)	0.584 (0.968)	0.272 (1.487)	-0.0852 (0.0732)	-0.135 (0.119)	-0.0539 (0.0881)	0.0166 (0.389)
Panel 2A: Pre-school children								
Coresiding with either parent-in-law	0.0597*** (0.0187)	0.0378 (0.0384)	1.703** (0.741)	2.504 (1.661)	-0.179*** (0.0470)	-0.249** (0.125)	-0.170 (0.117)	0.249 (0.736)
Panel 2B: Children age 7-18								
Coresiding with either parent-in-law	0.0694*** (0.0176)	0.105*** (0.0239)	0.134 (0.968)	-0.667 (1.563)	-0.105 (0.0762)	-0.169 (0.128)	-0.0918 (0.0710)	-0.347 (0.267)
Panel 3A: College degree or higher								
Coresiding with either parent-in-law	0.0587*** (0.0126)	0.0662** (0.0277)	1.645* (0.818)	2.104* (1.205)	-0.181** (0.0671)	-0.266* (0.140)	-0.137 (0.164)	-3.017 (5.190)
Panel 3B: High school degree or lower								
Coresiding with either parent-in-law	0.0737*** (0.0174)	0.0835*** (0.0309)	0.284 (0.663)	-0.200 (1.402)	-0.135** (0.0592)	-0.193* (0.104)	-0.126* (0.0736)	-0.213 (0.347)

Standard errors in parentheses are clustered at province level in parentheses

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

5 Conclusion

Using five waves of CFPS data, I make use of an IV estimation approach to investigate the impact of coresidence with paternal parents on female labor market activity in urban China. The instrumental variables used in this analysis are the indicators of whether each individual paternal parent is alive or not. The study provides new evidence on the impact of intergenerational coresidence on female labor force participation focusing on the "4-2-1" family structure that resulted from the one-child policy in China. I find that women living with their paternal parents are more likely to participate in the labor market by 7.7 percentage points; however, I do not find significant effects on the average hours of work related to coresidence. The OLS and IV estimations yield very similar results.

Moreover, I investigate the role of intergenerational coresidence on women's time allocation. The IV estimations suggest that living with old parents significantly reduces the time women spent on household duties. Although the IV estimates are not statistically significant, they do not indicate that coresidence results in an increasing time spent taking care of the family members. This finding suggests that although women may spend more time taking care of their parents-in-law, in return they receive substantial assistance as well, which leads to a higher chance of participating in the labor market.

Some of the largest impacts are found among women with college educations who are both more likely to work and spend more time at their jobs. This is consistent with the greater earnings they can expect in the labor market raising the costs of staying at home or working less. Also, if they have a greater ability to earn money at work, other family members such as the in-laws should be more willing to support them by taking care of other responsibilities in the home.

Also, women who are somewhat older in the sample (ages 35-49) and who have school-aged children experience large increases in their probability of work associated with coresidence, on the order of 10 percentage points. Beyond normal childbearing years, as the kids grow up, women would like to return to work and the care of other family members is easier

to substitute for the mother. From this viewpoint, the large impact of coresidence on these subgroups is understandable.

The main results of the analysis are comparable with those of previous studies such as Shen et al., 2016 and Maurer-Fazio et al., 2011, which confirm the positive impacts of intergenerational coresidence on female labor market activity. However, our findings suggest a much smaller impact using a more recent data set¹¹. Given that the decline of female labor force participation is a concern from perspectives of both the demographic dividend aspect and social inclusion, this study offers an additional explanation of the drop in female labor force participation in China since 1990, the declining impact of coresidence on women's labor market activity.

¹¹Shen, Yang, and Zeng (2016) use the Chinese Longitudinal Healthy Longevity Survey in 2002 and concludes that living with maternal old parents increases women's likelihood of participating in the labor market by 27 percentage points. Maurer-Fazio et al. (2011) using 1982, 1990, and 2000 Population censuses of China, estimates the positive effects to be 12.4 percent.

References

- Arpino, B., Pronzato, C. D., & Tavares, L. P. (2014). The effect of grandparental support on mothers' labour market participation: An instrumental variable approach. *European Journal of Population*, 30, 369–390.
- Aydinbakar, A. (2020). Living arrangement and mothers' employment in japan. *Ege Academic Review*, 20, 319–331.
- Bian, Y. (2002). Chinese social stratification and social mobility. *Annual review of sociology*, 91–116.
- Calzada, I., & Brooks, C. (2013). The myth of mediterranean familism: Family values, family structure and public preferences for state intervention in care. *European Societies*, 15, 514–534.
- Compton, J. (2015). Family proximity and the labor force status of women in canada. *Review of Economics of the Household*, 13, 323–358.
- Cooke, D., Fernandes, A. P., & Ferreira, P. (2019). Product market competition and gender discrimination. *Journal of Economic Behavior & Organization*, 157, 496–522.
- Dong, X.-y., & Pandey, M. (2012). Gender and labor retrenchment in chinese state owned enterprises: Investigation using firm-level panel data. *China Economic Review*, 23, 385–395.
- Du, F., & Dong, X.-y. (2013). Women's employment and child care choices in urban china during the economic transition. *Economic Development and Cultural Change*, 62, 131–155.
- Du, F., Dong, X.-y., & Zhang, Y. (2019). Grandparent-provided childcare and labor force participation of mothers with preschool children in urban china. *China Population and Development Studies*, 2, 347–368.
- Fu, S., Liao, Y., & Zhang, J. (2016). The effect of housing wealth on labor force participation: Evidence from china. *Journal of Housing Economics*, 33, 59–69.

- Garcia-Moran, E., & Kuehn, Z. (2017). With strings attached: Grandparent-provided child care and female labor market outcomes. *Review of Economic Dynamics*, 23, 80–98.
- Gugl, E., & Welling, L. (2012). Time with sons and daughters. *Review of Economics of the Household*, 10, 277–298.
- Hannum, E., Kong, P., & Zhang, Y. (2009). Family sources of educational gender inequality in rural china: A critical assessment. *International journal of educational development*, 29, 474–486.
- Huang, N., Ning, G., & Rong, Z. (2022). Destination homeownership and labor force participation: Evidence from rural-to-urban migrants in china. *Journal of Housing Economics*, 55, 101827.
- Kramarz, F., & Skans, O. N. (2014). When strong ties are strong: Networks and youth labour market entry. *Review of Economic Studies*, 81, 1164–1200.
- Landmann, A., Seitz, H., & Steiner, S. (2018). Patrilocal residence and female labor supply: Evidence from kyrgyzstan. *Demography*, 55, 2181–2203.
- Lei, X., Shen, Y., Smith, J. P., & Zhou, G. (2017). Sibling gender composition’s effect on education: Evidence from china. *Journal of population economics*, 30, 569–590.
- Li, Y. (2017). The effects of formal and informal child care on the mother’s labor supply—evidence from urban china. *China Economic Review*, 44, 227–240.
- Liu, L., Dong, X.-y., & Zheng, X. (2010). Parental care and married women’s labor supply in urban china. *Feminist Economics*, 16, 169–192.
- Ma, S., & Wen, F. (2016). Who coresides with parents? an analysis based on sibling comparative advantage. *Demography*, 53, 623–647.
- Maurer-Fazio, M., Connelly, R., Chen, L., & Tang, L. (2011). Childcare, eldercare, and labor force participation of married women in urban china, 1982–2000. *Journal of human resources*, 46, 261–294.

- Ogawa, N., & Ermisch, J. F. (1996). Family structure, home time demands, and the employment patterns of japanese married women. *Journal of Labor Economics*, 14, 677–702.
- Oshio, T. (2006). Coresidence with parents and a wife’s decision to work in japan akiko s. oishi’. *The Japanese Journal of Social Security Policy*, 5.
- Pezzin, L. E., & Schone, B. S. (1999). Intergenerational Household Formation, Female Labor Supply and Informal Caregiving: A Bargaining Approach. *The Journal of Human Resources*, 34, 475–503.
- Sasaki, M. (2002). The causal effect of family structure on labor force participation among japanese married women. *Journal of human Resources*, 429–440.
- Shen, K., Yan, P., & Zeng, Y. (2016). Coresidence with elderly parents and female labor supply in china. *Demographic Research*, 35, 645–670.
- Shen, K., Zhang, Y., & Yan, P. (2012). Family structure and female labor force participation in china. *Population Research*, 36, 15–27.
- Viazzo, P. P. (2013). Three: An ageing population, institutional context and family values in southern europe. In *Ageing in the mediterranean* (pp. 57–74). Policy Press.
- Yang, C., Fu, H., & Li, L. (2016). The effect of family structure on female labor participation—empirical analysis based on the 2011 china health and retirement longitudinal study. *Asian Social Work and Policy Review*, 10, 21–33.
- Zhao, X., & Liu, Y. (2022). Effects of housing demolition on labor supply: Evidence from china. *Review of Development Economics*.