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Alternative boomerang kids, intergenerational co-residence, and maternal labor supply

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Abstract

This study investigates the boomerang phenomenon among adult children in Thailand. We estimate the effect of having children on co-residence between parents and adult children using Socio-Economic Survey panel data. We find that adult children who have moved out tend to move back in with their parents after having children to save time and money on childcare. The presence of young children increases the likelihood of intergenerational co-residence by over 30%. This study is the first to provide empirical evidence of alternative boomerang kids in an Asian context, which is distinctive compared with Western countries. The relationship between intergenerational co-residence and the maternal labor supply is also examined using the instrumental variable approach based on the cross-sectional Labor Force Survey, which has data covering over 30 years. Our results show that co-residence increases the female labor supply by 21% and also extend women's working hours by 10 hours.

Keywords Boomerang kids · Intergenerational co-residence · Informal childcare · Maternal labor supply · Asia · Thailand

JEL code D10 · J11 · J12 · J13 · J21 · J22 · C23 · C26

1 Introduction

In the last decade, an unprecedented increase in young adults moving back in with their parents in some developed countries has attracted the attention of researchers and policy makers (Dettling and Hsu 2018; Kaplan 2012; Stone et al. 2012). There is growing interest in the study of "boomerang kids" in Western countries; these are

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adult children who have lived on their own but make decision to move back home to co-reside with their parents again (Engelhardt et al. 2016, p. 2). The main explanation is that co-residence acts as a protective method that hedges the adult children from labor market uncertainty (Engelhardt et al. 2016; Kaplan 2009; Mykyta and Macartney 2012; Stone et al. 2014; Wiemers 2014).

In Asian countries, with their different cultural backgrounds, living arrangements, and family concepts compared to Western countries, co-residence manifests in a different way. While most parents in developed countries do not live with their adult children, no matter whether they assist in taking care of their grandchildren or not (Posadas and Vidal-Fernández 2013), adult children co-residing with their parents has been a prevalent living pattern in Asia for a long time, where, in addition to grandparenting, adult children take care of their elderly parents under the tradition of filial piety and law (Maurer-Fazio et al. 2011).

Population aging and changes in social conditions accompanying the modernization process in Asia have tended to challenge the traditional family structure, i.e., filial piety and patrilineality (Ko and Hank 2014), which makes it interesting to study adult children's choice of co-residence in the region. In Asia, apart from the prevalence of extended families, the predominance of nuclear families has been found (Demont and Heuveline 2008; Khuat 2009). However, to the best of our knowledge, no study has focused on dynamic changes in the living arrangements of adult children in the Asian context.

Thailand is the most distinctive case in Asia when it comes to family patterns (Bian et al. 1998). The matrilocal preference of Thai families means that the couples usually live with bride's family; and the tendency of Thai couples to live with parents with more resources has been found in previous literature (Chamratrithirong et al. 1988; Knodel et al. 1992; Mason 1992).

Moreover, despite the distinctive traditional features of Thai families, family structures have been affected by recent cultural and demographic changes, such as the low fertility rate, immigration, and urbanization (Knodel et al. 2013; Rittirong et al. 2014). The nuclear family is still the chief household type in Thailand, but the percentage of nuclear families has decreased from 63.1 to 44%, while the extended family type has increased from 35.2 to 51.6% over the past 30 years (NESDB—National Economic and Social Development Board 2015).

While family size has declined over time in Thailand, family structures have become more diverse (Mahaarcha and Kittisukathit 2009). Due to the decline in fertility and mortality, population aging might be the reason for the increase in extended families in Thailand. Moreover, the increase in life expectancy has also made extended families more prevalent. Knodel and Teerawichitchainan (2017) notes that according to the national Survey of Older Persons in Thailand (SOPT), nearly two-thirds of older parents either co-reside with or live next to a child. Liao and Paweenawat (2018) found that Thailand has a historically high and stable labor supply of married women, close to 80%. With this stable labor force participation, co-residence plays a small role in the form of risk sharing for labor market uncertainty for adult children, unlike in Western countries.

This study departs from the existing literature. This is the first empirical study of alternative boomerang kids in an Asian context. We investigate the "alternative boomerang phenomenon" among adult children in Thailand, where they tend to live with their parents after having children, and examine whether the presence of such

children will affect adults' living arrangements using Socio-Economic Survey (SES) data from 2005–2012.

Next, we further investigate the influence of co-residence on the maternal labor supply using the Labor Force Survey (LFS) from 1985–2016. Even though several studies of the female labor supply in Thailand have focused on the impact of wages and education (for example, Aemkulwat 2014; Paweenawat and McNown 2018; Schultz 1990), to the best of our knowledge, no studies on females have addressed the impact of intergenerational co-residence in Thailand.

Interestingly, we find a positive relationship between co-residence and the maternal labor supply under the instrumental variable approach. Moreover, the positive impact of co-residence on labor supply is robust based on the Thai SES panel data from 2005 to 2012, which enables us to explore the panel nature of the dataset and control for the health of elderly parents. The results are also robust under different disaggregations.

Note that one strong point of our work is its utilization of two main data sets to serve two main purposes. In addition to using the cross-sectional LFS data collected over 30 years, which provides a long time span and a large number of observations, we utilize SES panel data, which allow us to track the dynamic changes in living arrangements for married couples before and after they have children. The joint usage of two datasets in the paper ensured that the datasets supplemented each other's weak points.

The rest of the paper proceeds as follows. Section two provides background information and the hypotheses for this study. Section three reviews the related literature and discusses how our study contributes to the existing literature. Section four describes the data and variables used in the estimation. Section five and section six discuss the methodology and results for the hypotheses. Finally, section seven concludes the paper.

2 Background and hypothesis

Extended families have become the dominant family type in Thailand, especially in rural areas (NESDB—National Economic and Social Development Board 2015). Based on the basic statistics from the LFS, the increasing trend of co-residence for married couples from 1985 to 2016 is shown in Fig. 1. It presents the percentage of households that consisted of married and unmarried adult children who lived with their parents from 1985 to 2016. During the 30-year period, more married people lived with their parents. The percentage increased from approximately 17 to 26%, while the percentage of unmarried children remained relatively stable. The overall percentage of co-residing households among the total number of households increased, but the percentage of unmarried children in co-residing households decreased over time.

To examine the dynamic changes in the living arrangements of adult children, we tracked the number of co-residing households and the percentage of co-residence in a married and unmarried sample of individuals aged 18–23 in 2005 throughout the time periods, until aged 25–30[1] in 2012. Table 1 shows the increasing number of

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[1] According to Public Health Statistics (1990–2014), the birth rate for Thai women is highest for those aged 25–29 and the average age of Thai women having their first child is 24.8 years. Over the time, the age composition of childbearing in Thailand has not changed much.
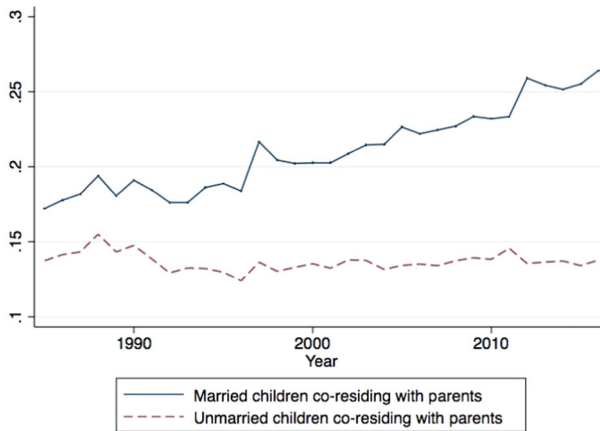
Fig. 1 Percentage of co-residence by number of households (married vs. unmarried), 1985–2016

Table 1 Co-resident households for cohort (age 18–23) using SES panel data

Year	Age	Number of co-resident households		Percentage of co-resident households	
		Married	Unmarried	Married	Unmarried
2005	18–23	228	693	63.5%	74.0%
2006	19–24	274	608	62.3%	73.3%
2007	20–25	287	530	62.7%	70.5%
2010	23–28	377	396	57.7%	66.1%
2012	25–30	417	311	61.6%	63.7%

We use the basic information of adult child including household id, relation, and marital status to count the number of household, in which we restrict the adult child's age to track their changes over time. If the adult child iln the age group satisfies the condition of following co-residing households, the adult child will be counted in Table 1 under number of co-resident household. The number of co-residing households is based on two types: (1) parent as the head of household and adult child with the relation to head of household as unmarried and married child; (2) adult child as head of household and parent with the relation to head of household as parent, and child's marital status

married children living with their parents and the lower number of unmarried children living with their parents. As age increases, more and more individuals get married, and thus fewer people are unmarried. The percentage of co-resident households among the married sample shows a decreasing pattern but bounces back at the ages of 25 to 30 (63.5 to 61.6%).[2] The percentage of co-resident households among the unmarried sample decreases over time (74 to 63.7%). The number of children in the household keeps increasing over time (not shown in the Table 1).

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[2] In Fig. 2 (in Appendix), we provide the composition of all households by co-resident (including married adults with/without child, unmarried adults) and not co-resident over time for the same age groups in Table 1.

Therefore, we hypothesize that there exist "alternative boomerang kids" in Thailand who move out of their parents' homes and then move back in again after they get married and have children, mainly in order to save time and money on childcare. Thus, the presence of children should increase the likelihood of co-residence. Boomerang kids indicate the importance of the family structure in economic decisions and outcomes, especially for women.

To understand the household formation process, Kaplan (2009) suggests that it is necessary to understand the uncertainties and opportunities for boomerang kids in the labor market. A negative relationship between fertility and maternal labor supply has been found under the standard economic model, as mothers need to allocate time for childcare (Borjas 2000). However, this effect is mitigated in intergenerational households (Li et al. 2015) because grandparents in these households free up time for mothers by providing childcare and taking care of household chores.

Next, we further investigated the role of living arrangements in labor market outcomes. The second hypothesis is that intergenerational co-residence should increase the labor supply of mothers.[3] Considering the frequent time and monetary transfers in intergenerational households, several studies have focused on the influence of this co-residence. While intergenerational co-residence in Europe and the US has becomes less frequent, grandparents' care for their grandchildren shows a rising trend (Leira et al. 2005; Tobio 2001).

Work decisions made by mothers are mainly affected by childcare arrangements, which have a substantial effect on mothers' decision to join the labor force (Arpino et al. 2010). Many studies have suggested that childcare reduces the maternal labor force participation rate (Angrist and Evans 1998), and the availability and cost of alternative childcare will affect the negative effect of childcare on the female labor supply (Albuquerque and Passos 2010; Wheelock and Jones 2002).

Suppose that a woman has a utility function depends consumption, leisure hours and quality of her children. Her consumption depends on the net income, which is the income from work minus her children's cost. The time spent on working, childcare, and leisure cannot exceed her total time endowment. The quality of children depends on the cost of childcare, which can be provided by the mother or grandparents that has the same level of quality. The cost of childcare may be affected by family characteristics (El-Attar 2013). In our case, it depends on whether or not co-residing with grandparents. If grandparents can provide childcare, the woman can use the time for work or leisure. We assume grandparenting allow women to participate in the labor market. Therefore, we expect that co-residence with parents increase the women's labor supply.

The positive impact of intergenerational co-residence on female labor supply has been found in different countries (Chun et al. 2009 in Korea; Compton and Pollak 2014 in the US; Sasaki 2002 in Japan; Shen et al. 2016 in China). Several studies in China have suggested that grandparents' assistance in childcare and housekeeping is a prevalent and common experience and is more preferable than paid childcare

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[3] Applying the fixed effect model, we investigated the relationship between labor supply and the presence of young children (under the age of six) using SES panel data. The results are presented in Table 9 in the appendix. We found that the parenthood effect is significantly negative for women (−0.022), but the effect is not significant for men.

(Goh 2009; Short et al. 2002). Adult children give money to their parents partly in order to exchange for childcare (Park 2014; Grossbard 2014). Moreover, in Western countries, the role of grandparents is also expected to grow alongside kinship networks through generations because of demographic transformation (Giarrusso and Silverstein 1996 in the US; Grundy et al. 1999 in the UK; Hoff 2007 in Germany). However, as far as we know, none of the studies in Southeast Asia touch on this matter.

3 Literature review

Intergenerational co-residence leads to frequent reciprocal exchanges within households (Chen et al. 2011; Kolodinsky and Shirey 2000; Liu and Dong 2010; Shen et al. 2016; Aparicio-Fenoll and Oppedisano 2016). Living with elderly parents can lead to married women spending more time on care and housework, which lowers their labor supply. In addition, elderly parents may contribute income to the household, further decreasing the desire for women to work (Maurer-Fazio et al. 2011). Alternatively, elderly parents in the household may help with childcare and housekeeping, or they may require medical care that increases the household's costs, which could facilitate the female labor supply.

Isengard and Szydlik (2012) explain that there are two main reasons for co-residence: financial and emotional aspects. In particular, the residents of a household can pool profits and share resources; different generations in a household can also enjoy close and frequent contact. Co-residence in adulthood may include children who never moved out and children who returned to their parents' homes after living independently for some time (boomerang kids). Studies in Western countries have examined the determinants of boomerang kids. Generally, the unemployment of adult children increases the likelihood of co-residing with parents.

McElroy (1985), who used a structural model of labor supply and household formation, suggested that there is an ordered relationship between wages, employment, and household formation. Further, co-residence acts as a form of non-employment insurance for adult children. Ermisch (1999), using data from the British Household Panel Survey, found that unemployment increases the probability of moving back home. Kaplan (2012) extended McElroy (1985) and Ermisch's (1999) frameworks and also suggested that the phenomenon of young adults moving back home in the US is affected by labor market shocks.

Engelhardt et al. (2016) further confirmed and extended the findings of Kaplan (2012) and suggested that parents use co-residence as the way to protect their adult children from labor market uncertainty; changing from full-time employment to part-time employment or unemployment increases the possibility of co-residence. Dettling and Hsu (2018) estimated a series of OLS regressions and found that indebtedness increases the likelihood of parental co-residence for young adults. Di Stefano (2017) also suggested that poor labor market condition and high cost of housing made the adult children to stay with their parents longer in Italy.

The term "boomerang kids" has been solely applied to Western cultures in the literature, starting from the time of the economic downturn in the 2000s. In the US, the portion of young adults living with their parents increased by 15% from 2005 to

2014 (Dettling and Hsu 2018). As we mentioned earlier, this boomerang phenomenon should manifest differently in an Asian context. Instead of being a form of protection from labor market uncertainty, co-residence mainly acts as a way for mothers to save time and money on childcare. In Thailand, the proportion of married couples living with their parents has increased by nearly 10% over time (Fig. 1).

Most of the previous studies found a significantly positive impact of co-residence with parents on the maternal labor supply. The related branch of studies includes the effects of informal childcare, family proximity, and grandparental care on the female labor force supply (Albuquerque and Passos 2010; Arpino et al. 2014; Compton and Pollak 2014; Dimova and Wolff 2008; Kanji 2018; Kolodinsky and Shirey 2000; Posadas and Vidal-Fernández 2013; Zamarro 2011). The results consistently show the positive impact of grandparents' childcare and their support for household chores on the labor supply of married women.

Del Boca (2002) found a positive relationship between having living grandparents and the labor market participation of Italian women. Grandparents who live nearby and are in good health have a negative impact on the decision to send children to formal childcare. García-Morán and Kuehn (2017) suggested that as the regular providers of free childcare, women in Germany residing nearby their parents have a higher likelihood to have a regular job. Chen et al. (2000) found that co-residence or nearby residence with parents significantly reduces mothers' involvement in childcare, but does not significantly affect mothers' involvement in work in China. Oishi and Oshino (2006) found a positive impact of co-residence with husbands or wives' parents on wives' labor force participation. However, the impact was highly underestimated if co-residence was assumed to be exogenous.

Since the decision to co-reside with parents and mothers' labor force supply are jointly determined, simple estimates suffer from endogeneity bias. The endogeneity of co-residence arises from unobserved preferences, correlating with both living arrangements and labor supply, such as family values, filial piety, the career ambitions of women, or the care needs of parents.

On the one hand, if women are highly attached to their families, they tend to live with their parents and spend more time taking care of household work and have a lower probability of joining the labor market or have less time to spend on market work, which leads to a downward bias in the relationship between co-residence with parents and the maternal labor supply. On the other hand, considering the lack of public childcare and the high cost of private childcare and housekeeping, mothers who want to stay in the labor force prefer to live with their parents, as they can share a large amount of household work and childcare, which incurs an upward bias (Sasaki 2002).

To solve this problem, an approach employing an instrumental variable is often used in the literature. Sasaki (2002) used wives and husbands' birth order, their number of siblings, housing property, housing type, and area as instruments for co-residence. After controlling for endogeneity biases, co-residence with parents had a significantly positive effect on married women's labor force participation in Japan. However, housing may have reflected the wealth of the family and correlated with women's decision to work (Landmann et al. 2017), which affected the validity of the instruments.

Chun et al. (2009) produced a different result by using husbands' birth order among siblings as the instrument for co-residence for married women in South

Korea. After correcting for the endogeneity problem, the positive relationship between female labor supply and co-residence disappeared, which cast doubt on the significant positive effect of co-residence on married women's labor supply.

Maurer-Fazio et al. (2011) proposed using the percentage of households with co-resident parents over the age of 70 in prefectures, the interaction of wives and husbands' ages, and a set of provincial dummies as instruments, which have been demonstrated as having strong predictive powers for co-residence, to correct for the endogeneity of co-residence. They found that co-residence with parents significantly increased the labor force participation of married women in China. As suggested by Landmann et al. (2017), if the labor supply is different across provinces, living in a specific province may affect the female labor supply.

Shen et al. (2016) found a positive relationship between co-residence and the female labor supply. They selected whether a woman had any surviving brothers or sisters and whether the woman was the youngest surviving child as instruments for co-residence with parents. Landmann et al. (2017) used being married to a youngest son as an instrument for co-residence and found that co-residence did not increase the female labor supply in Kyrgyzstan. In addition, women co-residing with parents work fewer hours than those who do not co-reside.

Distinct from the existing studies on Western developed countries and Asian countries, Thailand offers an interesting case study to explore the influence of co-residence with parents on the maternal labor supply. Thailand has changed from a low-income country to an upper-income country and has shown remarkable progress in social and economic development (World Bank 2018). Although women are still mainly responsible for household work, they tend to play a more important role in the economy, politics, and social scene. Over time, women have become less capable of managing their duties as mothers and laborers (Richter 1996).

Although the literature on Thailand does not provide much information on family childcare, the strength of extended family ties is clear (Richter 1996). Furthermore, contrary to most developed countries, Liao and Paweenawat (2018) found negative relationship between married women's labor supply and wages in Thailand, which demonstrates that this group has distinct features and is worth further study.

Hempisut and Isarapathanasakul (1997) suggested that more than 85% of babies are taken care of by grandparents or relatives in Thailand, and the government should provide more support for childcare, such as community services that care for babies. Moreover, research conducted by the Global Workforce Roundtable in 2007 suggested that flexible working arrangements (FWA) are not commonly offered in Thailand, and the nature of certain jobs does not allow for FWA. Hence, by considering these economic changes and unique features of Thailand over time, our study draws attention to the impact of co-residence with parents on the maternal labor supply in Thailand from 1985 to 2016.

4 Data and variables

Two data sets are used in this study, first to determine the existence of boomerang kids in Thailand, and second to understand the impact of intergenerational co-residence on mothers' labor supply.

4.1 First hypothesis: boomerang kids (SES panel data)

As suggested by Borsch-Supan et al. (1992), ideally, living arrangement choices should be estimated using panel data because of the unobserved person-specific attributes and time-varying disturbances. We used the Thai Socio-Economic Survey panel, conducted by the National Statistical Office of Thailand in 2005, 2006, 2007, 2010, and 2012 to analyze the living arrangements of married couples. The data contain the information of each household member, including education, income, health, marital and work status, and so forth.[4]

Individuals were assigned to three educational groups according to their education attainments: primary level (with some, or completed primary level education), secondary level (with some or completed secondary level education), and university level (with some or completed university level education). The health indicators provided by the survey had four categories: 1 = very good, 2 = good, 3 = fair, and 4 = poor. The SES data did not contain information on working hours.

Table 2 shows the summary statistics of the SES panel data. The overall sample included individuals between the ages of 18 and 50. The labor force participation rate for men was higher than for women (0.93 to 0.819). Slightly fewer men than women had only obtained a primary education, and men made up a lower proportion at the university level.

4.2 Second hypothesis: maternal labor supply (LFS cross-sectional data)

We used the annual LFS from Thailand from 1985 to 2016, which is collected by the National Statistical Office of Thailand. Following Sussangkarn and Chalamwong (1996), in order to hedge the immigration of Thai agricultural workers during the dry and rainy seasons, we only used the data from the third quarter of the year (Lekfuangfu 2017; Paweenawat and McNown 2018).

We included only married women aged 25 to 50. The information available from the survey covered individuals' basic attributes, including age, marital status, education[5], working hours, income, and relations in the household. However, the LFS did not have variables for co-residence, the number of children, and spousal information. Using the household number and relations in the household, we generated a dummy variable to indicate whether individuals lived in an intergenerational household, the age of their spouses, and their education.

There were two major types of intergenerational household structures for married couples in our analysis based on the availability of the data: (1) head of the household, spouse, married son or daughter, and son- or daughter-in-law; and (2) head of the household, spouse, and parents. Each type could include underage children.

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[4] The co-residing households is based on (1) parent as the head of household and adult child with the relation to head of household as unmarried and married child; (2) adult child as head of household and parent with the relation to head of household as parent, and child's marital status. Having child under the age of 5 is a dummy variable (=1 if the household has child under the age of 5) and other controlling variables include education, marital status, gender, parental health, age, and five regional dummies.

[5] The classification of educational levels is the same as in the first hypothesis.

	Men	Women
Labor force participation rate	0.923 (0.267)	0.819 (0.385)
Parents' health status	2.706 (0.776)	2.726 (0.774)
Age	35.140 (9.101)	35.440 (9.073)
Education		
Primary level	0.432	0.456
Secondary level	0.396	0.305
University level	0.172	0.239
Observations	18,859	21,408

Standard deviation in parentheses

The presence of young children—i.e., preschoolers—in a family will affect the female labor supply more than older children who are in school (Maurer-Fazio et al. 2011). Thus, we disaggregated children into three age groups with different time and income needs: preschoolers aged 0 to 5, young schoolers aged 6 to 13, and older schoolers aged 14 to 18. We included a full set of control variables in all regressions: age, age squared, education, spouse's age, spousal education, and three children group dummies. To account for regional differences, we also controlled for the regional labor force nonparticipation rate of women.

Table 3 shows the descriptive statistics for our sample. Over 80% of the sample participated in the labor force. Those who co-resided with parents had a higher participation rate than those who did not. The average weekly working hour for married women was 47.4 and there was not much of a difference between those who co-resided with parents and those who did not. The percentages of those with children aged 0 to 5 or 6 to 13 were higher for those co-residing with parents, but the percentage with children aged 14 to 18 was lower for this group.

Fig. 3 (in the Appendix) shows the labor force participation rates of married women with children (under the age of five), without children, and with children over the age of five, drawn from the Thailand LFS data from 1985 to 2016. There was a participation difference between the three groups over this period. The gap between mothers with young children and older children was relatively stable at nearly 6%, while the gap between mothers with young children and those without children increased over time.

Fig. 4 (in the Appendix) compares the weekly working hours for the three groups. A decline in the average working hours for all groups has been found (Liao and Paweenawat 2018), and those with young children work slightly fewer hours than the other two groups. Fig. 5 (in the Appendix) compares the labor force participation rates of married women with young children who co-reside with their parents and those who live independently. The nuclear family has a lower maternal participation rate, and this gap (approximately 10%) was present throughout the period. Fig. 6 (in the Appendix) shows the downward trend in working hours for the two groups and shows that women in multi-generational households work slightly more than those in nuclear households.

Table 3 Summary statistics for married women sample

	(1)	(2) Co-residence	(3)
	All ($n = 229{,}869$)	Yes ($n = 126{,}875$)	No ($n = 102{,}994$)
Labor force participation rate	0.816 (0.387)	0.824 (0.380)	0.806 (0.396)
Working hours	47.394 (14.233)	47.041 (13.807)	47.895 (14.801)
Children age 0–5	0.565 (0.496)	0.600 (0.490)	0.516 (0.500)
Children age 6–13	0.572 (0.495)	0.587 (0.492)	0.552 (0.497)
Children age 14–18	0.341 (0.474)	0.300 (0.458)	0.398 (0.490)
Age	36.632 (7.687)	33.495 (6.374)	40.495 (7.401)
Education			
Primary level	0.553	0.465	0.660
Secondary level	0.309	0.372	0.232
University level	0.127	0.150	0.098

Standard deviation in parentheses. Two types of co-residence are included in our analysis: (1) head of the household, spouse, married son or daughter, and son- or daughter-in-law; and (2) head of the household, spouse, and parents

5 First hypothesis: boomerang kids

5.1 Methodology

To test our first hypothesis that having children will increase the likelihood of co-residence, we used logit regression on the probability of living with parents.

The probability that an adult child chooses to live with their parents is as follows:

$$Pr(y = 1|z, x) = G(z\beta + x\gamma),$$

where y is the observed living arrangement, which is equal to 1 if an adult child chooses to live with their parents and 0 otherwise; z is a dummy for having a child under the age of five in the household, and x is a set of control variables including three levels of educational dummies, marital status, gender, parental health, age, and regional dummies.

To address the notion that residence choice may be correlated with an individual's unobserved characteristics, which may also affect their decision to have children, we also ran fixed effect regressions. As mentioned earlier, filial piety requires that children take care of their parents, which will affect the children's living arrangements. Moreover, it also ensures heirs for the family, mainly male, which is related to the decision to have children. An individual's preference of family size also correlates with their decision to co-reside and has an effect on the decision to have children.

The fixed-effect model for the alternative specification is as follows:

$$Pr(y_{it} = 1|z_{it}, x_{it}, \beta, \gamma, \alpha_i) = \Lambda(\alpha_i + z_{it}\beta + x_{it}\gamma),$$

where y_{it} is an indicator that equals 1 if an adult child lives with their parents at period t and 0 otherwise, and α_i is the individual specific effects, the unobserved

heterogeneity in children's taste for co-residence. β represents the impact on co-residence of having young children in the household.

6 Results

Table 4 presents the estimation results of the logit and fixed effect models for the three samples, men and women, only women, and only married women. Marginal effects are presented to help facilitate the interpretation. Each of the specifications shows the positive impact of having young children on co-residence. The effect of having children under five on the fixed effect model is smaller than that for the logit model, indicating an upward bias of the unobserved characteristics mentioned earlier.

Having young children increases the likelihood of adult children co-residing with their parents by approximately 32–34% under the fixed effect model. The positive coefficient of age suggests that older women are more likely to co-reside with parents, while parent health status indicates that poorer health of parent increases the likelihood of co-residence. The results supported our first hypothesis that for boomerang kids, co-residence meets their needs for childcare and household support, and the presence of grandchildren will increase the likelihood of co-residence.

To understand this distinct household formation process in Thailand, it is necessary to understand the impact of this living arrangement on women in the labor market. The work decisions by mothers are mainly affected by childcare arrangements (Arpino et al. 2010). In developing countries, the shortage of public childcare and the lack of work flexibility for mothers have pushed the childcare issue onto grandparents. Grandparents in multi-generational households provide the primary childcare and housekeeping services, which significantly reduces the time that married women spend on childcare and household chores (Chen et al. 2000). Next, we move on to our second hypothesis that co-residence increases the maternal labor supply.

Next, we move on to determine the role of living arrangements in labor market outcomes, in which our second hypothesis was that co-residence positively impacts the labor supply of mothers.

7 Second hypothesis: maternal labor supply

7.1 Methodology

To estimate the relationship between co-residence and maternal labor supply we applied a probit model for labor force participation. Tobit and Heckman's models were employed to deal with sample selection for working hours:

$$Y_i = \beta_0 + \beta_1 C_i + \beta_2 X_i + \varepsilon_i,$$

where Y_i indicates the labor supply of married women. If Y_i was the binary outcome of labor force participation, the linear probit model was applied; if Y_i was the working hours, the Tobit model and Heckman selection model were applied, as we only observed the values when the individual was employed; otherwise the working hours were 0 or missing. C_i is the dummy variable; if women co-resided with parents in the

Table 4 The impact of presence of young age children on co-residence decision

	(1) Men and women		(2) Women		(3) Married women	
	Logit	FE logit	Logit	FE logit	Logit	FE logit
Having children age 0–5 (newborn)	0.488*** (0.029)	0.343*** (0.088)	0.480*** (0.039)	0.318*** (0.117)	0.335*** (0.042)	0.337** (0.132)
Age	0.001 (0.002)	0.621*** (0.014)	0.00792*** (0.002)	0.625*** (0.019)	0.003 (0.003)	0.680*** (0.022)
Parent health status	0.962*** (0.018)	0.875*** (0.048)	0.938*** (0.025)	0.830*** (0.062)	0.935*** (0.027)	0.842*** (0.070)
Marital status	0.476*** (0.040)	0.115 (0.169)	0.455*** (0.050)	0.252 (0.212)		
Control for education and residence area	Yes	Yes	Yes	Yes	Yes	Yes
Control for spouse's income and education	No	No	No	No	Yes	Yes
Observation	29,899	12,951	16,533	7380	14,289	6468

Robust standard errors in parentheses

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

same household, it was equal to 1, if not, 0. X_i is a vector of control variables, including age, education level, the regional labor force nonparticipation rate of women, spouse's age, spouse's education level, and children dummies.

The decision to co-reside with parents is unlikely to be random. It may be affected by several unobserved factors, such as family values, filial piety, and the career ambitions of women, which cause the endogeneity problem. Previous studies have used a variety of instruments to solve the problem based on the availability of the dataset. We followed Maurer-Fazio et al. (2011) in using the percentage of households that had co-resident parents over the age of 70 in the region, a set of wives and husbands' age interactions, and a set of regional dummies as instruments for co-residence.

The valid instruments should have strong predictive power for co-residence but should not directly affect the labor supply. Shen et al. (2016) noted that age and regions may directly affect the labor supply, which challenged the validity of the instruments. Note that we performed the test of the endogeneity of co-residence and a series of tests to check the appropriateness of these instruments, overidentification, and weak instruments; the results indicated that the instruments are valid.

According to the SOPT (2011), more than half of the elderly live with at least one married child, and for those over the age of 70, the percentage is higher than for those in their 60 s. Undoubtedly, older people have a higher chance of being widows or widowers and their children are more likely to be married, indicating that those over 70 years of age are more likely to live with their children. Further, the percentage of those over the age of 70 with co-resident grandchildren is higher than that of people in their 60 s.

In addition to the base model, we separately estimated the model under different age categories, accompanied by the birth cohorts, to mitigate the age effect on the labor supply. The results were generally consistent with our main results in the following section.[6] The percentage of household types varied across regions. The difference between regional intergenerational co-residence ratios was the largest when compared to other types of household, such as nuclear families and one-person families, which showed a more than 10% gap between the northeast and south, the central region, and the Bangkok region (NESDB 2015).

As living in a specific province may affect the female labor supply, to capture the differences in labor force participation rates in different regions we calculated the regional average rate of females who did not participate in the labor force by aggregating the labor force participation information for all female regional residents (Albuquerque and Passos 2010; Maurer-Fazio et al. 2011). For working hours, the difference was very small across all regions.

We applied two-stage least-square estimation, where in the first stage (2) the endogenous variable is treated as a linear function of three sets of instruments and control variables to obtain the predicted value $\widehat{C}_i$; in the second stage (3), the

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[6] The youngest birth cohort, born after 1980 with relatively small observations, showed an insignificant impact of co-residence on the labor supply, which is consistent with the disaggregation results in Section 5, indicating that the younger generation tends to care more about their career development and react less to co-residence.

predicted value is used to obtain the IV estimates:

$$C_i = \gamma_0 + \gamma_1 Z_1 + \gamma_2 Z_2 + \gamma_3 Z_3 + \gamma_4 X_i + \nu_i,$$

$$Y_i = \alpha_0 + \alpha_1 \widehat{C}_i + \alpha_2 X_i + \eta_i,$$

where Z is the instrumental variables, which are highly correlated with the co-residence variable, C_i. Y_i is the labor supply of married women; α_1 indicates the effect of co-residence on the female labor supply.

7.2 Results

7.2.1 Basic estimation results

Table 5 shows the estimation results for the effect of co-residence on female labor force participation. Marginal effects of the explanatory variables are reported. Both the probit model and the IV (Instrument variable) model showed the positive and statistically significant impact of co-residence. The magnitude of the IV estimate on co-residence was much larger than the probit model, indicating a downward bias caused by unobserved preferences such as family values. The IV model suggested that women living with their parents are 21% more likely to participate in the labor market than those who do not live with their parents, while for the probit model the value was 4%. For the sample of parents older than 70, the marginal effect was similar to the basic estimation.

Table 6 shows the impact of co-residence on women's working hours. The OLS results suggested a negative effect of co-residence on working hours, where the co-residence was assumed to be exogenous; the IV results were positive, indicating that women who live with parents work 10.22 hours more per week on average, after correcting for the endogeneity problems. The presence of older parents in the household, over the age of 70, increased the weekly working hours of women by 6.7 hours, which was less than the basic specification (the Tobit model results were similar to the OLS and are not shown in the table).

Consistent with our hypothesis, co-residence has intensively (working hours) and extensively (labor force participation) increased the labor supply of Thai mothers. Similar findings were found in other Asian countries; for example, women who recently have children and co-reside with their parents have higher probability around 30% to join in the labor market in Japan (Nakamura and Ueda 1999); while in China, women living with parents have 28% higher probability to work than those who reside seperately, and there was an increase in women's working hours by 20 to 26 hours in China.

7.2.2 Disaggregation results

The basic results showed the impact in the average behavior of the sample, which may have been affected by the different composition of the labor. To further check the effect of co-residence on the maternal labor supply, we separated the sample into different educational attainments.

Table 5 Impact of co-residence on women's labor force participation

	Probit model	Probit model (parent age > 70)	IV model	IV model (parent age > 70)
Explanatory variables				
Coresident with parents	0.0399*** (0.007)	0.0386*** (0.012)	0.210*** (0.014)	0.230*** (0.028)
Age	0.154*** (0.005)	0.123*** (0.010)	0.0405*** (0.001)	0.0325*** (0.003)
Education level				
Primary level	−0.424*** (0.033)	−0.510*** (0.062)	−0.0774*** (0.008)	−0.0770*** (0.014)
Secondary level	−0.402*** (0.033)	−0.538*** (0.062)	−0.0856*** (0.008)	−0.0968*** (0.014)
University level	0.0662* (0.034)	−0.0701 (0.064)	0.0182** (0.008)	−0.00134 (0.014)
Childcare				
Youngest coresident children: age 0–5 (Newborn)	−0.285*** (0.009)	−0.293*** (0.018)	−0.0672*** (0.002)	−0.0715*** (0.005)
Youngest coresident children: age 6–12	0.119*** (0.009)	0.107*** (0.018)	0.0321*** (0.002)	0.0272*** (0.004)
Youngest coresident children: age 13–17	0.120*** (0.009)	0.128*** (0.018)	0.0325*** (0.003)	0.0358*** (0.004)
Observation	229,869	65,779	229,869	65,779

The Wald F-statistic for IV model is 838.19 and for IV model (parent age > 70) is 130.55, suggesting that the instruments are not weak. The test of endogeneity rejects null hypothesis that variables are exogenous (p value = 0) and the test of overidentification does not reject the null hypothesis (p value > 5%).

Robust standard errors in parentheses

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table 6 Impact of co-residence on women's working hours

	OLS	IV (Heckman)	IV (parent age > 70)
Explanatory variables			
Coresident with parents	−1.275*** (0.074)	10.22*** (0.515)	6.727*** (0.678)
Age	0.187*** (0.051)	0.936*** (0.088)	0.416** (0.172)
Education level			
Primary level	6.462*** (0.300)	6.427*** (0.349)	7.458*** (0.592)
Secondary level	4.591*** (0.299)	3.813*** (0.358)	5.264*** (0.603)
University level	0.638** (0.302)	1.871*** (0.342)	1.962*** (0.576)
Childcare			
Youngest coresident children: age 0–5 (newborn)	−0.823*** (0.069)	−2.825*** (0.185)	−1.685*** (0.341)
Youngest coresident children: age 6–12	−0.170** (0.067)	−0.322*** (0.074)	0.202 (0.135)
Youngest coresident children: age 13–17	0.222*** (0.075)	0.223*** (0.083)	0.323** (0.144)
Observation	185,201	173,013	51,258

The Wald F statistic for IV (Heckman) is 854.57 and for IV (parent age >70) is 377.86, suggesting that theinstruments are not weak. The test of endogeneity rejects null hypothesis that variables are exogenous (p value $= 0$) and the test of overidentification does not reject the null hypothesis (p value $> 5\%$)

Robust standard errors in parentheses

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table 7 shows the disaggregation results for the three education levels. Generally, with higher educational attainment, the maternal labor supply was less affected by co-residence. For the extensive margin, if they co-resided with parents, the labor supply of women with primary-level education increased by 28.4%, while the labor supply of women with secondary-level education increased by just 9.5%, and those with the highest education were not significantly affected by co-residence.

Similarly, for the intensive margin, the working hours of women with primary education increased by 8.4 hours per week if they lived with parents. The hours decreased along with the increase in educational attainment. These results are consistent with the idea that higher educated women care more about their career development and may place their careers ahead of or equal to their marriages and children (Goldin 2006). In addition, education can act as a proxy for income (Maurer-Fazio et al. 2011). Childcare should be more affordable for higher educated women, and therefore they should be less affected by co-residence.

In addition, we estimate the effect of co-residence with either maternal grandparents or paternal grandparents on female labor supply. The results show that women co-reside with own parents has a lower impact on both labor force participation and working hours than co-reside with their husbands' parents. The results are provided in Appendix Table 10.

7.2.3 Robustness check

The key advantage of LFS is that it contains a large number of observations covering a long time period. It also enables us to analyze both intensive and extensive margins. However, it lacks detailed information on married women and elderly parents, such

Table 7 Impact of co-residence on women's labor supply by education attainments

Explanatory variables	Work or not (IV)			Weekly working hours (IV)		
	Primary level	Secondary level	University level	Primary level	Secondary level	University level
Coresident with parents	0.284*** (0.018)	0.0950*** (0.025)	0.0124 (0.029)	8.469*** (0.512)	9.927*** (0.952)	5.623*** (1.118)
Age	0.0370*** (0.002)	0.0486*** (0.003)	0.0288*** (0.003)	0.151 (0.119)	1.199*** (0.159)	1.387*** (0.180)
Childcare						
Youngest coresident children: age 0–5 (Newborn)	−0.0954*** (0.002)	−0.106*** (0.003)	−0.0523*** (0.004)	−0.965*** (0.239)	−4.006*** (0.347)	−3.212*** (0.345)
Youngest coresident children: age 6–12	0.00298 (0.002)	0.0048 (0.003)	0.00185 (0.004)	−0.453*** (0.104)	−0.323** (0.134)	0.344** (0.171)
Youngest coresident children: age 13–17	0.0101*** (0.003)	−0.00129 (0.004)	0.0037 (0.005)	0.244** (0.110)	0.237 (0.153)	−0.362* (0.210)
Observation	119,594	65,295	27,027	95,318	51,582	24,010

The Wald F statistic for IV (primary level) is 943.35, for IV (secondary level) is 252.37, and for IV (university level) is 112.81, suggesting that the instruments are not weak. The test of endogeneity rejects null hypothesis that variables are exogenous (p value $= 0$) and the test of overidentification does not reject the null hypothesis (p value $> 5\%$)

Robust standard errors in parentheses

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table 8 Impact of co-residence on female labor force participation using SES panel data

	Fixed effect
Explanatory variables	
Coresident with parents	0.0168** (0.008)
Age	0.0406*** (0.004)
Parent health status	−0.0139*** (0.004)
Observation	15,709

Robust standard errors in parentheses

$*p < 0.1$; $**p < 0.05$; $***p < 0.01$

as individual health information, which may be associated with the probability of a daughter's labor supply.

Parents in good health can assist with childcare and household chores, while parents in poor health will need assistance from their adult children, thus lowering the labor supply of women. Parents' characteristics are important for the estimation but are commonly unavailable, which has been addressed in previous studies (Del Boca 2002; Maurer-Fazio et al. 2011; Oishi and Oshio 2006; Shen et al. 2016).

Therefore, we used SES panel data from 2005 to 2012, which contained information on parents' heath status, allowing us to explore its panel nature and employ a variety of estimation techniques to examine the relationship between co-residence and the maternal labor supply.

We ran individual fixed effect regressions to account for the unobserved heterogeneity related to co-residence and to also determine the labor supply. The results were statistically significant and showed the positive effect of co-residence on labor force participation by women. Under the fixed effect model, co-residing with parents increased the labor supply by 1.68% (Table 8). Considering the parents' age and health status may affect the results, we further examine the relationship for different groups by parents' age and health status[7]. The positive effect is robust for parents' age below 70 and those with better health.

8 Conclusion

This study investigated boomerang kids in the Thai context, a topic that has thus far only been addressed in Western countries as a protective method in the face of uncertainty in the labor market. We found that the presence of young children in a household increases the likelihood of intergenerational co-residence. We provided a

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[7] We re-estimate the robustness check with parent age constraints (≤70, >70 and >80). The results show significant impact co-residence on labor force participation for parent below age 70 (2.52%, which is slightly larger than 1.68% in Table 8), while for parent over 70 and over 80, the impact is insignificant with small number of observations. We also checked the estimation results for sample with poor health parent and not with poor health parent (including very good, good and fair health). Co-residence with poor health parents does not show significant impact on labor force participation, while it shows significant for not poor health parent (1.96%, comparing with 1.68% in Table 8).

new type of boomerang phenomenon in an Asian context, namely, adult children tend to move back in with their parents after having children in order to save time and money on childcare. Economic development, in association with the traditional ideology, has driven a dynamic change in living patterns in Thailand.

To understand the dynamics of living arrangements, we further examined the relationship between intergenerational co-residence and the female labor supply. Our results showed that co-residence increases the female labor force participation rate and also extends the working hours of women. Our study showed that the presence of grandparents in a household is helpful to the family, as parents in Thailand have suffered from a shortage of public childcare facilities and high cost of private childcare.

Recommendations for government policies to provide more childcare facilities for working women have appeared in several studies in Thailand (e.g., Paweenawat and McNown 2018; Podhisita and Soonthorndhada 1988; Richter et al. 1994). Aside from childcare policies, our study provides the useful information that policies to encourage intergenerational households can increase the labor supply of married women. On this point, we can draw policy lessons from other countries. For example, in Singapore, the Housing and Development Board provides a Proximity Housing Grant to people who live with or near their parents.

We temper the conclusion several caveats regarding to the study. First, the boomerang phenomenon discussed in the paper is based on the changes of adult child's living arrangement over time, which is driven by the presence of children under our hypothesis. We cannot rule out the possibility that women's decision on living arrangement may due to the delay of household formation. More solid evidence on boomerang kids requires additional information. Second, the impact of childcare from grandparent and elderly care from adult children cannot be separately identified. In addition, due to the limitation of data, we cannot control for some covariates, for example, elderly care or childcare facilities nearby, which may also affect female labor supply. Thus, further investigation to assess the mechanism can be done with more information provided.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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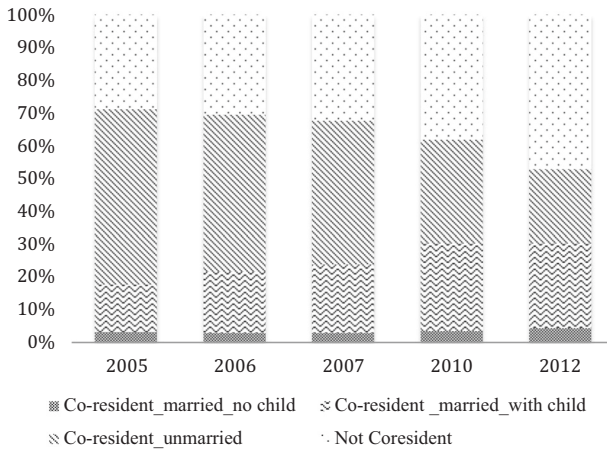
9 Appendix

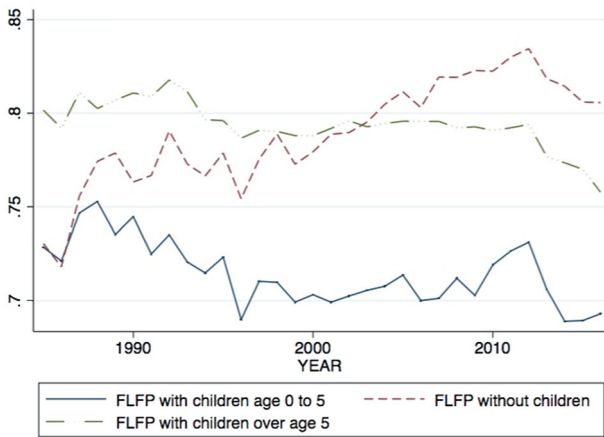Fig. 2 Share of household by co-resident and not co-resident, SES panel data

Fig. 3 Labor force participation rate of married women in three groups, 1985–2016
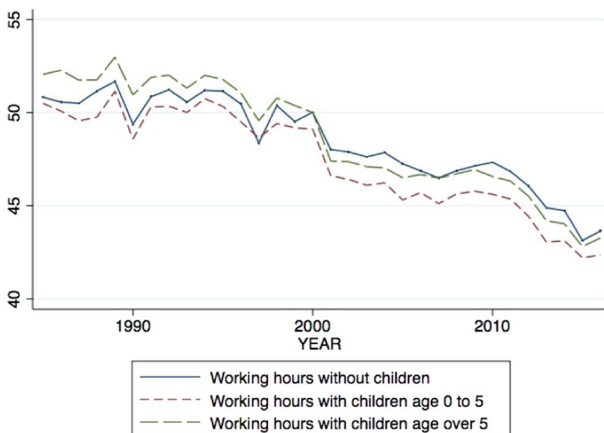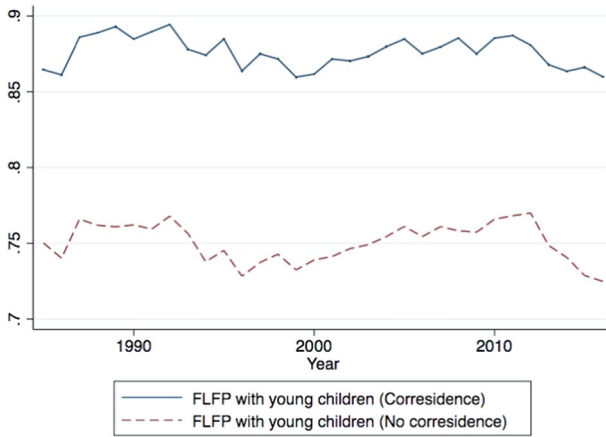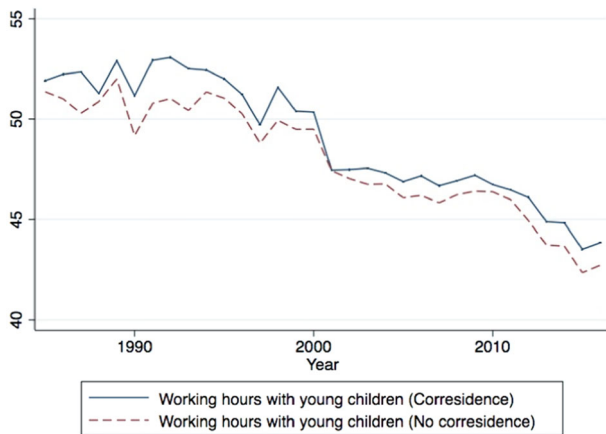

Fig. 4 Average weekly working hours of married women in three groups, 1985–2016

Fig. 5 Labor force participation rate of married women with young children in multi-generational household and nuclear household, 1985–2016

Fig. 6 Average weekly working hours of married women with young children in multigenerational household and nuclear household, 1985–2016

Table 9 Impact of presence of young-aged children on labor supply using SES panel data

	Female	Male
Presence of children (age < 6)	−0.022*** (0.006)	−0.0002 (0.002)
Birth cohort		
1955–1964	−0.0550*** (0.014)	−0.0041 (0.005)
1965–1974	−0.026*** (0.008)	0.0034 (0.002)
1975–1984	−0.004 (0.010)	0.0041 (0.004)
1985–1994	−0.072** (0.037)	−0.0086 (0.014)

Table 10 Impact of co-residence on women's labor supply by maternal grandparents or paternal grandparents

	Labor force participation		Working hours	
	Maternal	Paternal	Maternal	Paternal
Explanatory variables				
Coresident with parents	0.215*** (0.014)	0.239*** (0.025)	9.083*** (0.635)	13.63*** (0.617)
Age	0.0443*** (0.001)	0.0584*** (0.003)	1.274*** (0.121)	2.073*** (0.130)
Education level				
Primary level	−0.0788*** (0.010)	−0.0758*** (0.011)	6.839*** (0.410)	5.567*** (0.473)
Secondary level	−0.0879*** (0.009)	−0.0771*** (0.011)	4.218*** (0.424)	3.114*** (0.478)
University level	0.0143 (0.010)	0.0402*** (0.011)	2.318*** (0.399)	1.407*** (0.469)
Childcare				
Youngest coresident children: age 0–5	−0.0654*** (0.003)	−0.0659*** (0.003)	−3.392*** (0.250)	−2.661*** (0.199)
Youngest coresident children: age 6–12	0.0260*** (0.003)	0.0339*** (0.003)	−0.323*** (0.084)	−0.330*** (0.099)
Youngest coresident children: age 13–17	0.0299*** (0.003)	0.0378*** (0.003)	0.223** (0.092)	0.639*** (0.110)
Observation	168,129	134,419	136,552	106,725

The classification of maternal grandparents or paternal grandparents is based on household type (1) head of the household, spouse, married son or daughter, and son- or daughter-in-law

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