Title: The influence of housing on family size in South Korea: Unstable housing and parity specific risk

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Abstract

Increasing housing cost is one of the major concerns among young parents in South Korea. The aim of this study is to evaluate how homeownership is associated with parity-specific birth. We use the 2009-2017 waves of the Korea Labor and Income Panel Study (n=6,934) to illustrate opt-out childbearing without the state of being a homeowner. This study uses the Cox proportional hazard model to show mutually-exclusive patterns between homeownership and childbearing. The results suggest that either short-term rent or home-ownership is negative to have a first child while only home-ownership is negative to have a second child. Also, rural areas show a slightly faster path in having a second child. The Cox proportional hazard model suggests that there is a trade-off relationship between parity-specific childbearing and housing costs intertwined with employment status and educational attainment.

Keywords: housing types, parity of birth, postponement

1. Introduction

For the first time in South Korea (hereafter Korea), total fertility rates (TFR) is estimated to have dropped below 1.0 in 2018, reaching a value of 0.977 (Korea Statistical Information Service, 2019). Since the Asian Foreign Exchange Crisis in 1997 had negative impacts on the lives of the younger generation, the lowest-low fertility has been furthered with delaying marriage and postponing childbearing in Korea (Eun, 2007; Lee & Choi, 2015).

Actual fertility outcomes in Korea show a substantial mismatch with fertility desires which is about two children even when TFR was 1.2 in 2011 (Korean General Social Survey, 2012). Recent studies highlight an increase in the age of first marriage and a trend of remaining as single, influenced by the economic conditions: unaffordable housing costs, weak public pension plans, and high childrearing costs (Kwon, 2007; Yoo, 2016). Instead of devoting lifetime resources to childrearing and ensuing costs, young generations in Korea tend to allocate more financial resources to homeownership (Lee & Choi, 2015).

The literature regarding the determinants of fertility decline sheds light on occupational instability, incompatibility between work and family, lack of efficient pro-natalist policies, emergence of the “quality” child, costs of childrearing, and difficulties of the urban environment (Becker, 1960; McDonald, 2000; Morgan, 2001; Friedman et al., 1994, Jones 2007). However, relatively few studies discuss how a specific financial determinant influences parity-specific birth; the difficulties in owning a home, the uncertainty after retirement, and occupational instability stand in the way of attaining their desired childbearing (Lee et al., 2000; Eun, 2007; Urasawa & Jones, 2014).

In Korea, not only the postponement of childbearing but also the early termination of childbearing after the first child affect lowest-low fertility (Frejka, Jones, & Sardon, 2010). This study examines how housing types and living area act as an economic cost to affect parity-specific birth outcomes. Also, this study proposes that the timing and the parity of birth

are related to homeownership and that one way in which to address the continued decline in fertility in Korea would be to address the affordability of housing within the country, with particular focus on dense urban areas. We used the 2009-2017 waves of Korea Labor and Income Panel Study (KLIPS) to describe how homeownership impede fertility, focusing on the following period after the Great Recession.

2. Backgrounds

Korean households have rooted preference for real estate properties in their asset portfolios. Liepziger et al. (2015) suggest that Korean families retain more than 75 percent of their total assets in real estate, which is far higher than that of other OECD countries. Moreover, the excessive demand for housing has engendered a dangerous level of household debt which accounts for 164 percent of the net disposable income in 2012, compared to OECD average of 133 percent (Jones & Kim, 2014). Since the economic crisis in 1997, Koreans have a sensitivity toward economic uncertainty because of growing concerns about future residential housing bubbles (Jones & Kim, 2014).

Since the housing bubble in the early 2000s, the housing costs of either owning or renting has increased substantially. The Korean public housing provision is neither public rental housing as welfare benefits nor market-oriented operation (Lee, & Ronald, 2012). Korea has a prevalent and peculiar system for renting, named “Jeon-Se,” that refers to a long-term lease with about 70 percent of down payment but no monthly rent. Still, the high costs of “Jeon-Se” from the continuous increase in house prices frustrate young Koreans because it presents a tremendous expense they must account for when they marry and before they have children (Lee & Choi, 2015).

Soaring housing costs represent a substantial economic constraint to be overcome by young Korean families, and, we propose, and which has been suggested elsewhere (Eun,

2007), that this could be a barrier to initial family formation and timing of fertility decision in Korea. Similarly, it is unequivocal that housing conditions and economic uncertainty influence the postponement of family formation in Western societies as well (Mills, Rindfuss, McDonald, & te Velde, 2011). Regional differences in housing costs can affect family size, which acts as an equilibrium mechanism; low fertility could represent a compromise to the demand for housing. Thus, the decision not to have children could result in more freedom of choices in the housing market. If the economic constraint of high housing costs could be eliminated, it could eventually motivate higher fertility (Feyrer, Sacerdote, & Stern, 2008).

Economic literature suggests that the likelihood of being apart from the parental home and living alone are lower in expensive housing markets than low housing cost areas. (Haurin et al., 1993). Enström Öst (2011) argue that among the young cohorts, there is a possible simultaneity between homeownership and the birth of the first child in Sweden. Simmon and Tamura (2009) highlight that fertility was lower in more expensive housing markets over time and across the U.S. metropolitan areas. Other than place effects, individual effects suggest that there is a concentration of populations with advanced educational attainment, high household incomes and high housing costs (Clark, 2012). Also, the increase in home price contributes to a rise in the birth rates among the current homeowners, which is not implemented for potential first-time homeowners (Dettling & Kearney, 2011).

Ceteris paribus, stable housing conditions and fertility have a positive association. In other settings, a number of government policies have aimed to increase housing availability for young people who start families: about 20 percent of total housing units are public housing in France, there are housing benefit packages for couples with one or more children in the UK, college students in Norway have housing allowance, and Austria provides financial support for low-income households (Rindfuss & Kim, 2015). Recently in Korea, national-level public housing provision focuses on the very poor as welfare policies, as well as local governments,

emphasize the young population in its public housing policies (Seo & Joo, 2018). Nevertheless, public housing in Korea has played a limited role as social welfares and more likely performed market-friendly roles (Lee & Ronald, 2012).

The importance of housing on fertility is also found in other countries similarly. Fertility outcomes vary by housing types and size in Finland, which identifies that higher fertility in single-family houses and lower fertility among living in apartments or condos. Likewise, fertility rates increase among couples who have changed housing types to single-family houses (Kulu & Vikat, 2007). Housing prices in China have skyrocketed after urbanization, which forces young Chinese to postpone family formation both in urban and rural areas (Feng, 2015). Housing policies in the Netherlands, have expanded to provide a sizeable rental provision for students and young adults, which has produced an inadvertent fertility increase (Mills, 2015). U.S. Census data shows that the price of living space calculated by rent per room has a negative correlation with the level of fertility among younger families during the period between 1940 and 2000 (Simon & Tamura, 2009). Assuming that housing is a significant portion of overall household budgetary decisions, which also include childraising costs, the increase in house prices could present an adverse effect on fertility (Mulder & Billari, 2010).

3. Data and methods

The data source for this analysis is the Korean Labor and Income Panel Study (KLIPS). The KLIPS is a longitudinal survey of the labor market and income activities at both the household and individual level modeled after the Panel Study of Income Dynamics (PSID) in the United States. The panel design of KLIPS allows for the longitudinal analysis, including economic decision-making processes and family formation. Also, the KLIPS is conducted annually on a sample of 5,000 households and members of the families, aged 15 or older.

KLIPS began the first wave of data collection in 1998 and had released the 20th wave as of 2017. For this analysis, waves from 2009 to 2017 were merged to generate a life history data set for married adults. Given that out-of-wedlock births are rare in Korea (Kwon, 2007; Rindfuss & Choe, 2015), married couples are the population at risk in the current analysis.

The analytical sample consists of adults who were married and between the ages of 15 and 45 at each wave. Married adults are merged based on their household number and the year of the data; this allows for time-varying characteristics of the husband and wife within each family to be considered. This generates a couple-centered dataset: a total of 3,279 unique families contribute a total of 17,776 person-years of time to the data.

Two outcomes are considered in this analysis. First is the time in years between marriage and the first birth. The second outcome is the interval between the first and second birth. These two timing variables are common in the fertility literature and represent important indicators of overall fertility mode and tempo. The first birth interval typically represents the couple's overall desire for a child, while the timing between first and second birth represents an important milestone for couples, where they meet replacement level fertility. Since Korea faces extremely low fertility levels, the timing and overall pace of having the second birth is an important aspect to consider.

Controlled covariates consist of demographics and financial determinants other than housing conditions. Demographic factors include females' educational attainment, age, and socioeconomic status (SES). Even though young females who age 15 to 45 have not completed fertility yet, we thus controlled for the age factor of females in the regression models. Also, we consider self-rated SES as a proxy for income status at the household level. Financial determinants other than housing factors adopt employment status of females. Controlling for the employment status of females is necessary because this study assumes that females are the primary caregivers and out-of-wedlock births are rare in Korea.

Unlike previous studies that analyze fertility outcomes depending on educational attainment and income (Jones & Urasawa, 2014; Yoo, 2016), this paper focuses on residential determinants and postponement of fertility by controlling for other socio-economic factors. Residential determinants consist of housing types and living areas in the Cox proportional hazard model. Housing type comprises ‘Homeowner’, ‘Long-term renter’, and ‘Short-term renter.’ Long-Term rent is a unique housing contract in Korea, guaranteeing two years or longer to rent by paying approximately 70 percent of the market price of a home. Although a long-term lease has less burdensome than buying a home because of lower lump-sum payment than purchasing a home, the long-term lease is still an unsecured contract because of the risk of rent-renewal every two years. Although short-term rent pays a monthly rent without large payment like long-term rent, the contract duration is usually shorter than one-year, and the renewal risk exists as well. Financially, the short-term lease is the most expensive housing type and relatively common among the poor (Lee, 2018). On the other hand, the homeowner pays the cheapest housing cost even though the lump-sum payment of house price and property tax are required.

Residential areas consist of urban and rural areas. The urban areas include the city of Seoul, the capital, and its suburban areas, Gyung-gi province, whereas the rural areas contain the rest provinces other than Seoul and Gyun-gi province. The Korean population is about 52 million as of 2017. The urban areas occupy about 45 percent of the population, and the other mid-sized cities and rural areas account for 55 percent of the total population. Not only the number of residents, but there is also a substantial gap in housing costs between urban and rural areas. Because of the frustrating housing costs of urban, most young cohorts in metropolitan areas rent an apartment or studios with a short-term rent contract.

Two main analytical methods are used in this analysis. First, descriptive statistics for each outcome are computed for each outcome for the key predictors. Secondly, Cox proportional

hazard models are used to model the birth intervals. Separate models are constructed for each outcome, and nested model specifications are used to first examine the baseline differences in timing to each birth by the key predictors. Also, demographic and socioeconomic controls are added to the models to observe the net effects of the housing variables on the risk of having a first and second birth. All analyses are weighted using the supplied population weights for the KLIPS data, so results are generalizable to the Korean population between 2009 and 2017.

4. Results

Table 1 provides the descriptive results for the two outcomes in the analysis. Descriptive statistics are stratified by whether a couple had the birth under analysis or not. All results are weighted to be representative of the adult Korean population using survey design weights provided by the KLIPS. Except for the first birth interval variable, all variables are tested for bivariate differences using survey corrected chi-square tests.

[Table 1 here]

With respect to the first birth, it is more common for couples who have a first child to be in a long term rental than those who did not have a child, and likewise it is more common for those not having children to either own their own home or live in a short term rental. So, at the baseline the differences based on housing type are mixed. Concerning demographic characteristics among ages of 20 to 50, women who had a first birth are younger than women who did not, and most fathers who had a child are more likely to be between 30 and 40 years old. 55% of women who had a first birth were unemployed, and those women who had a first birth were less likely to have a college education or more. Similarly, fathers who had a child were less likely to have college education or more. There were also differences based on SES of the household, where lower SES households were more likely to have a first child. There were no differences based on residential location within the country.

Regarding the second birth interval risk set, there were very few differences between those couples who had a second child and those which did not. Based on housing condition, the proportions of couples who had a second birth were nearly equally distributed between owning a home and long term renting, with still a small (9%) fraction of couples living in short term renting arrangements. The age variables show differences similar to those of the first birth, where both women and men are more likely to be in the 30's, and almost no parents of second children were in their 40's. No other significant differences between people who had a second birth were noted in the bivariate analysis.

Table 2 the results from the Cox regression of the first birth interval. Three nested models for the first birth interval are presented. The first model only includes the independent variable for the housing type of the couple. Model 2 includes demographic characteristics of the mother and father, and Model 3 includes the socioeconomic status variables for the mother and father and a measure of the household's SES, and urban residence.

[Table 2 here]

As suggested by the descriptive statistics, the baseline results show that couples living in long term rentals have a higher risk of having a first birth, while those in short term rentals have lower risk, than those who own a home. Model 2 includes demographic characteristics of the couple, and net of these controls, the differences between housing types persist, although the long term rental difference attenuates. Model 3 also includes socioeconomic characteristics and residential location, and the differences between the housing options persist. In this model, women's labor force participation reduces the risk of having a first birth and father's education increases the risk, suggesting that economic and housing factors are playing a role in this outcome. These results also suggest that the association between housing choice and variation in first birth intervals and in the risk of having a first birth, persists net of controls.

Table 3 presents the results of the Cox regression models for the second birth outcome. As with the analysis of the first birth interval, three nested models are presented. In this analysis, Model 3 also includes the length of the first birth interval, measured in years, as an indicator of the fecundity of the couple.

[Table 3 here]

The second birth interval analysis, as alluded to by the descriptives show no differences between housing types in the risk of having a second child, even in the baseline Model 1. Although no statistically significant risk are attributed, in Model 2 and 3, the relative risk estimates for the housing indicators, are in the same direction and of approximately the same magnitude as in the results from the first birth interval. Beside age effects, the only other variable to show significant association with having a second birth is mother's labor force participation, which, as in the first birth analysis, decreases the risk of having a birth.

5. Discussion

Half of Koreans now live in the city of Seoul and its suburban areas (here, classified as urban areas) because of the rapid urbanization and favorable labor market opportunities. The expensive housing in Seoul hinders young couples from either owning a home or even from renting an apartment with a stable contract. This housing burden makes the young generation save more money at an earlier stage of their lifetime. Furthermore, insufficient job opportunities in rural areas intertwined with housing concerns occurred with the postponement of childbearing in Korea.

This study has two large limitations in analysis of KLIPS First is that there is no information on contraceptive behavior of couples available in the KLIPS data, so there is no way to assess if the couples are actively limiting their fertility. Secondly, the KLIPS has no measure of fertility demand by couples, so the patterns seen in the data analyzed in this study

may be moot if couples themselves are not interested in having children. Also, this study has a structural limitation from housing market volatility.

Notwithstanding the above limitations, this study finds evidence of the role housing factors in childbearing in Korea. Lee et al. (2016) point out the limitation of the current policy of Korean government that heavily weights on childcare subsidy (Jones, 2009; Lee et al., 2016). Based on the mutual exclusive relationship between home-ownership and childbearing, the policy needs to consider alleviating housing concerns of young couples; providing affordable public housing or more job oppourtunies other than Seoul, the metropolitan capital .

6. Conclusion

Many researchers have described how educational attainment of females and the increase of FLFP influence lowest-low fertility in Korea (Kim, 2005; Kwon, 2007; Yoo, 2016). Also, that economic uncertainties regarding occupations and housing relates to the fertility decline (Eun, 2007; Jones, 2007; Lee & Choi, 2015; Sobotka et al., 2011). This paper contributes to those previous studies with an analysis of how a couple's housing choice influences childbearing through a parity-specific approach. Indeed, significant variation in risk is seen in the current analysis, and suggests that couples in short term rental housing show lower risk of having a child, net of other demographic and human capital indicators, including both parents' education and female labor force participation. This effect does not carry over to the second child, suggesting that the limiting factor in play here is the role of housing on the rish of having a first birth. This suggests that the family formation process itself may be delayed by the housing options available to families.

According to the Korean Ministry of Health and Welfare (2016), previous fertility policies aimed to reduce the daycare burden for a parent to achieve compatible work-and-family schedules. Recently, the Korean government admits that the previous subsidy based policies

only marginally affected fertility rates. The results identify that parity-specific childbearing seems associated with housing concerns and other human capital variables of couples. As a result, the current generation has to first focus on that housing is first, and parenthood is later because of soaring housing costs. This study found that housing types are a significant factor in family formation. We suggest that examining policies related to affordable housing for parents should be considered, with a focus on making long-term leases more easily accessible to young married couples.

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Table 1. Descriptive statistics for first and second birth interval analysis.

	First birth			Second birth		
	No first birth n=4,810	Had a first birth n=1399		No second birth n=641	Had a second birth n=143	
Housing Characteristics						
Owned a house	0.60	0.55	***	0.53	0.45	NS
Long term rental	0.29	0.38		0.41	0.46	
Short term rental	0.11	0.07		0.06	0.09	
Parent Characteristics						

Mother's Age 20 to 30	0.07	0.28	***	0.21	0.35	**
Mother's Age 30+	0.93	0.72		0.79	0.65	
Father's Age 20 to 30	0.03	0.11	***	0.09	0.14	***
Father's Age 30 to 40	0.45	0.81		0.82	0.86	
Father's Age 40+	0.51	0.07		0.09	0.01	
Mother Unemployed	0.47	0.55	***	0.57	0.68	NS
Mother greater than college education	0.59	0.48	***	0.51	0.55	NS
Father greater than college education	0.50	0.33	***	0.66	0.65	NS
Low SES Household	0.71	0.75	**	0.76	0.78	NS
High SES Household	0.29	0.25		0.24	0.22	
Urban residence	0.50	0.50	NS	0.49	0.48	NS
First birth interval (years)	-	-		3.20	3.10	NS

*** = $p < .0001$, **= $p < .01$, *= $p < .05$, NS= Not statistically significant
Results weighted to be representative of the Korean adult population

Table 2. Results from Cox Proportional Hazards model for first birth event.

	Model 1 Hazard Ratio (95% CI)	Model 2 Hazard Ratio (95% CI)	Model 3 Hazard Ratio (95% CI)
Own a home (Ref)	1	1	1
Long Term Rent	1.422*** (1.322, 1.523)	1.136* (1.034, 1.237)	1.179** (1.072, 1.286)
Short Term Rent	0.785* (0.597, 0.973)	0.645*** (0.456, 0.834)	0.711*** (0.517, 0.905)
Mother Age <30(Ref)		1	1
Mother Age 30+		0.631*** (0.509, 0.754)	0.634*** (0.511, 0.757)
Father's Age <30(Ref)		1	1
Father Age 30 - 40		1.036 (0.864, 1.208)	0.901 (0.726, 1.076)
Father Age 40+		0.120*** (-0.131, 0.372)	0.108*** (-0.144, 0.361)

Mother Employed			0.631*** (0.532, 0.730)
Mother College Edu			1.021 (0.908, 1.135)
Father College Edu			1.472*** (1.352, 1.591)
High SES Household			1.082 (0.968, 1.197)
Urban Residence			0.872** (0.770, 0.974)
<i>n</i>	6,209	6,209	6,209
AIC	26407.5	25277.6	25152.7

* p < .05; ** p < .01; *** p < .001

Table 3. Results from Cox Proportional Hazards model for second birth event.

	Model 1 Hazard Ratio (95% CI)	Model 2 Hazard Ratio (95% CI)	Model 3 Hazard Ratio (95% CI)
Own a hom (Ref)	1	1	1
LongTermRent	1.258 (0.922, 1.594)	1.072 (0.735, 1.409)	1.222 (0.866, 1.578)
ShortTermRent	1.266 (0.682, 1.849)	0.980 (0.321, 1.639)	0.928 (0.258, 1.598)
Mother Age <30(Ref)		1	1
Mother Age 30+		0.556** (0.171, 0.942)	0.585** (0.193, 0.977)
Father's Age <30(Ref)		1	1
Father Age 30 - 40		1.409 (0.825, 1.993)	1.148 (0.555, 1.740)
Father Age 40+		0.142* (-1.549, 1.832)	0.108* (-1.595, 1.810)
Mother Employed			0.494*** (0.121, 0.867)
Mother College Edu			1.021 (0.614, 1.427)
Father College Edu			1.192 (0.771, 1.612)
High SES Household			1.137 (0.729, 1.544)

Urban Residence			0.721 (0.365, 1.077)
First birth interval			1.099 (0.913, 1.285)
<i>n</i>	777	777	777
AIC	1811	1788.5	1780.5

* $p < .05$; ** $p < .01$; *** $p < .001$