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Time at Home, Fertility Intention and Housework Change*

Da Eun Kwan | KDI School of Public Policy and Management
Seulki Choi | KDI School of Public Policy and Management

We examine the effect of the increase in time spent at home on married individuals' fertility intention in South Korea. Against the backdrop of the COVID-19 pandemic, social distancing measures have led to the overall increase of the time spent at home, which offers a valuable opportunity to examine its effects on fertility intention. Employing the second wave of the survey on Koreans' values regarding marriage and family in the COVID-19 era, carried out in June 2022, we tested the relationship controlling the potential effects of the COVID-19. The analysis reveals that when time spent at home increases, individuals are more likely to give up or delay their fertility plan. A mechanism of the adverse relationship is found to be the increased housework burden. The mediating effects of the increase of the housework are observed prominently among women, dual-earning couples, and those who have one child. This study provides that the adverse effect of the increased housework burden outweighs the potential positive effects of the increase of time spent at home, giving suggestive implications for the low fertility in South Korea.

Keywords: *housework burden, fertility intention, increase of time at home, COVID-19*

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Introduction

How would an individual's fertility intentions change when their time spent at home increases? Limited time at home is generally thought to be negatively correlated with fertility intention and behavior. This motivated the South Korean government's effort to address the country's low fertility issue by improving work and family compatibilities, such as the "Family Love Day" campaign, which encourages employees to spend more time with their family by leaving their workplace on time every Wednesday. The campaign assumes that spending more time with family at home alleviates dual burden of family and work. Yet, the empirical evidence is surprisingly limited as to whether the fertility intention would increase when the individuals spend more time at home.

Theoretically, the consequence of the increase in time spent at home on fertility can be both positive and negative. Fertility would increase if the additional time with partner and family improves the spousal relationships (Ahmed et al. 2020; Szabo et al. 2020). In cases where the increase in time at home is driven by the availability of remote work, it can also have positive effects on fertility as it lowers the opportunity costs of having another baby for women (Andrew et al. 2020; Chung et al. 2020). On the other hand, negative impacts are expected to outweigh the positive ones if the additional time spent at home is accompanied by the increased burden of household labor, deteriorating the spousal relationships (Chin et al. 2020; Fegert et al. 2020; Waddell et al. 2021). Marital conflicts or domestic violence are also reported to increase as a consequence of the increase of time spent at home (Campbell, 2020).

Given the diverging consequences of the increase in time spent at home, this study aims to answer the question of whether the increase in time spent at home has influenced fertility intentions in Korea during the COVID-19 pandemic, and if so, how. In order to net out the time increase effects on fertility intention change during the pandemic, we controlled the potential effects of the pandemic such as economic shock and health crisis based on the previous literature (Voicu and Bădoi 2021). As for a mechanism, the change in the division of housework will be examined as a mediator in the association between the increase of time at home and fertility intention change.

Building upon the existing literature on housework division and fertility, this study is expected to contribute at least three aspects.

First, this study identifies the effect of the increase in time spent at home on fertility intention changes, alleviating the endogeneity issue. Usually, the effect of the time increase at home on fertility intention is hard to identify because various other factors, such as individual's norms and values, can influence both. For example, ample evidence has been documented on the positive association between a husband's participation in housework and fertility (Kim and Luke, 2020; Mills et al. 2008; Torr and Short, 2004), or on changes in the division of housework and fertility (Baxter et al. 2008) in case of the employment status (Zamberlan et al. 2021). Yet, the issue of endogeneity remains in that decisions on employment, housework division, and fertility intention are all affected by other factors, including but not limited to gender norms. In this regard, the COVID-19 pandemic provides a valuable opportunity to observe the influence of changes in time spent at home since the time spent at home has increased overall due to social distancing measures.

Secondly, this study provides empirical evidence of the effects of changes in the division of housework on fertility intention in South Korea during the COVID-19 pandemic. Much research has been done on changes in the division of household labor and gender equality during the pandemic (Chin et al. 2020; Chung et al. 2021; Costoya et al. 2021; Petts et al. 2021; Shafer et al. 2020; Zamberlan et al. 2021). Yet, empirical evidence is limited regarding changes in fertility intention as a consequence of changes in the division of housework in Korea during the period, contrary to the context of European countries (A. Aassve et al. 2020; Malicka et al. 2021). Also, most studies on the division of housework during the pandemic were carried out at the early stages of the pandemic, less than a year into the spread. As the pandemic grows protracted, this study aims to enhance previous findings by examining if the changes in the division of domestic work still holds.

Lastly, this study provides suggestive implications regarding the dual burden of paid work and unpaid domestic work to address low fertility in Korea. One of the reasons Korea's total fertility rate has persistently declined to be the world's lowest level is that women are avoidant or hesitant to marry and have children due to the dual burden of work and family (Hwang et al. 2018). The link between the gendered division of housework and fertility intentions or behavior has well been investigated (Kan et al. 2019; Miettinen et al. 2015; Okun and Raz-Yurovich 2019), but evidence on the correlation between *changes* in housework division and *changes* in fertility intention is limited. In this regard, drawing on the existing studies, this study takes a further step to assess the influence of changes in the division of housework

on changes in fertility intention when time spent at home increased during the COVID-19 pandemic. The findings on the link between the housework division changes and changes in childbearing intentions can shed light on the direction that population policy should go.

The next section will explore the existing studies regarding the increase in time at home, changes in fertility intention, and changes in housework division during the pandemic. An explanation of our data, measurements, and estimation strategy is introduced in the third section, followed by the main findings. Further analysis and sensitivity check results are presented in the subsequent section. Discussions and implications conclude the study.

Background

Increase of Time Spent at Home and Fertility Intention Change

When time spent at home increases, individuals are expected to react to readjust their fertility intentions either in a positive or negative direction. On the one hand, the fertility intention can be positively affected if family cohesion increases and personal growth is achieved. During the COVID-19 pandemic, social distancing measures were found to have such benefits as it increased the overall time spent at home (Andrew et al. 2020; Szabo et al. 2020). Also, the enhanced flexibility of work during the pandemic was shown to have possible positive impacts on women's fertility intention by lowering the opportunity costs of having another child and improving work and family compatibility (Chung et al. 2020). On the other hand, fertility intention can be negatively affected if the spousal relationship worsens. Fegert et al. (2020) reported that mental health issues arose during the pandemic due to the changes in family life and relationships. Waddell et al. (2021) provides empirical evidence of the exacerbated gendered division of housework, which undermines women's satisfaction. Chin et al. (2020) also showed that the marital stress could increase as a result of the increased housework burden in South Korea.

Given the contested possibility of changes in intention to have children as a consequence of the increase of time spent sat home, this study employs the Korean Values Survey to test the fertility intention change in South Korea.

In order to show that the correlation between the increased time at home and change in fertility intention is not spurious, we will control the potential impacts of the COVID-19 pandemic. Previous literature has

suggested three channels of pandemic impacts: economic crisis, health crisis, and social distancing effects. In terms of economic crisis, the increased unemployment rate or the overall downturn generates a climate of uncertainty that can depress fertility intentions (A. Aassve et al. 2020; Malicka et al. 2021; Fahlén and Oláh 2018; Matysiak et al. 2021; Vignoli et al. 2020). As for the health crisis, individuals can delay the fertility due to concerns of the limited access to health services or potential side effects (Stone 2020; Hall et al. 2020). Historically, as shown in the cases of the Spanish flu or the Zika epidemic, the fertility rate has been observed to decline (Marteleto et al. 2020; Vrachnis et al. 2014).

Thus, this study aims to test the correlation between the time increase and fertility intention change, controlling the prescribed channels of the COVID-19 impacts in South Korea. Hypothesizing that the time increase at home is negatively associated with fertility intention change, this study focuses on the housework division as a mediator to explain the correlation.

Changes in Housework Division During the COVID-19 Pandemic

Has the division of domestic work changed for married couples during the COVID-19 pandemic in Korea? On one hand, it is reported that the pandemic has had disproportionate effects according to gender and widened the gender gap as the increased domestic load generally fell on the woman. Social distancing measures and at-home isolation have prompted additional unpaid domestic labor, of which a large proportion is reportedly shouldered by women (Costoya et al. 2021; Kristal and Yaish 2020; Meraviglia and Dudka 2021). If so, gender inequality has been exacerbated due to setbacks to the equal division of household work. On the other hand, based on the needs exposure hypothesis, presence and physical availability at home encourage men to take up the unpaid domestic work (Shafer et al. 2020). Though it is women who still take up the greater portion of the unpaid domestic work, a general positive association between time availability of the husband and participation in housework was observed in case of the Great Recession (Aguiar et al. 2013). Shafer et al. (2020) suggested that social distancing orders during the pandemic pushed husbands to be more available at home and shift toward a more equal division of housework.

There are three theoretical approaches to explain how the unpaid household labor is divided among married couples in terms of time, money, and ideology (Greenstein, 2000; Horne et al. 2018; Perry-Jenkins and Gerstel 2020; Zamberlan et al. 2021). The time availability perspective emphasizes

the significance of time constraints and time availability of each partner in the division of household tasks (Presser 1994). According to the time availability perspective, a partner who spends fewer hours doing paid work or spends more time at home takes on more responsibilities in household labor. According to this theory, it can be expected that when husbands spend more time at home, it will be associated with an increase in their share of the housework.

On the contrary, the relative resource perspective, or dependency model, is based on an economic framework that assumes that household labor is an undesirable task. It purports that each partner uses their power, formed with either educational status, occupational prestige or income, to shy away from domestic responsibilities (Brines 1994; Greenstein 2000). According to the relative resource theory, greater power and less dependency mean other alternatives to the marital relationship and current arrangement. Thus, it reduces the cost of leaving the arrangement, providing leverage in negotiating the distribution of the house chores (Baxter 2000; Lennon and Rosenfield 1994). Thus, according to the relative resource perspective, despite or regardless of increased time at home, the increased domestic responsibilities during the pandemic are more likely to be taken up by the one with lower resources in terms of income or education.

Finally, gender perspectives assert that gender identities and gender role attitudes are central to the division of household labor (Carriero and Todesco 2018), asserting that couples' ideology and attitudes are what decide the housework distribution regardless of who has more time or more financial power. Gender ideology is "a belief about the appropriate role for females and males" across various life spheres (McHugh and Frieze 1997). For example, if a husband believes that doing housework runs contrary to masculinity and it's "women's work," then he would not be willing to share domestic responsibilities regardless of time availability or relative power. Such traditional gender norms have been particularly prominent in East Asian countries influenced by the prevailing legacy of Confucianism, and a burgeoning body of research notes gender norms as an impediment to domestic gender equality (Hudde et al. 2021; Lachance-Grzela and Bouchard, 2010; Nitsche and Grunow, 2016).

Among these perspectives, this study focuses on the time availability perspective. Existing studies mostly measure the time availability using weekly working hours or employment status, whether the wife is working full-time, part-time, or not working (Arnstein Aassve et al. 2014; Bianchi et al. 2000). Yet, housework division and decisions for working hours have

endogeneity issues in that both can be influenced by other factors. In addition, it has reversal causality issue. This study alleviates such issue employing the change of the time spent at home during the pandemic.

Housework Division and Fertility Intention

The association between the division of household tasks and fertility has been drawing intensive interest in fertility studies. What Hochschild described as the "stalled revolution" in 1989, a lag in change in domestic sphere which marks a sharp contrast to a dramatic growth of women's representation in the public sphere has been a major impediment to fertility and women's labor force participation. Tensions caused by women's double burden of juggling a first shift at work and a "second shift" at home (Hochschild and Machung 2012) have prompted the question whether it's possible to kill two birds with one stone, leading women to make a choice between family and work.

According to the survey on Korean's values regarding marriage and family in the COVID-19 era (hereafter "Korea Values Survey"), a mere 23.2% of dual-earning couples reported having an equal division of household work, while 49.2% of respondents answered that the woman is shouldering more domestic duties. In particular, in the context of the continuing plummet in the fertility rate in spite of decades-long all-out endeavors by the South Korean government, public and academic attention are being directed toward gender equality in the realm of unpaid domestic labor.

In regard to the link between housework division and fertility, a general consensus has been reached that the husband's contribution to the household labor is positively associated with the having a second child (Kim and Luke 2020; Mills et al. 2008; Torr and Short 2004). A growing body of research has documented the association between reallocation of housework division and fertility such as a transition to parenthood (Baxter et al. 2008) or change in employment status (Zamberlan et al. 2021). However, those transitions are usually planned and expected based on the couple's gender ideologies (Sánchez et al. 2021), thus it is hard to tell the causality of such transitions on fertility intention and behavior. Holding more traditional gender role attitude affects a decision on labor market participation, types of job, housework division, and having a child or further children (Hudde et al. 2021). Also, gender role attitudes are reshaped and influenced by such life course events (Beringer et al. 2022).

On the contrary, the COVID-19 pandemic was unexpected and abruptly interrupted across almost all sectors of life, providing a valuable opportunity

to observe the effect of situational change on the gendered division of household labor and childbearing intentions.

Hypotheses

Based on our literature review, the hypotheses of this study are as follows:

H1: Increase of time spent at home is negatively associated with fertility intention change.
H2: The association between the time increase at home and fertility intention change is mediated by the housework change.

Methodology

Data

In order to assess the influence of the increase in time spent at home and change of housework division in the change of short-term fertility intention during the COVID-19 pandemic, we use the Korea Values Survey. It has a nationally representative sample of 2,000 Korean individuals, aged between 25 and 49, stratified by age, sex, and region. Samples are selected randomly from the Embrain internet panel, one of the major internet panels in Korea, consisting of approximately 1.58 million individuals as of June 2022.

There is a risk that an internet panel has different characteristics from the population. Yet, a range of the sample's age between 25 and 49 alleviates such concern of representativeness, as a disparity in digital appliances use or digital literacy is not significantly different among the group of these ages comparing to older age groups. Additionally, the internet survey has a strength of reducing the measurement error in terms of the socially desirable answers compared to a telephone survey or face-to-face survey (Berzelak and Vehovar 2018). For example, to questions regarding the division of housework in our survey, respondents could be less inclined to answer in support of egalitarian division rather than the actual division on an internet survey as compared to a telephone or face-to-face survey.

The analytical sample of this study is 598 married individuals who have not yet realized their ideal fertility. The logic is that those who have already realized the ideal number of children are less likely to change their plans to have further child regardless of any environmental changes. Thus, we limited

our analytical sample to those who have children less than their ideal fertility in order to exclude those who are not exposed to the probability of fertility change.

Measurement

To examine associations between increase in time spent at home, changes in the division of unpaid work, and changes in fertility intention during the pandemic, the survey questions are designed in a pair, one is the current level and the other is a change during the pandemic in the format of "Has there been changes in _____ since the COVID-19 pandemic?" Being aware of the possibility that all changes are not necessarily caused by the pandemic, we controlled the potential impact of the pandemic including concern about becoming infected and decreasing income during the spread of COVID-19.

1) Dependent Variables

(1) Fertility Intention Change

Out dependent variable is the change in short-term fertility intention. Theoretically, fertility intention within a short time window, such as two or three years is the most precise predictor of fertility behaviors compared to other measures of fertility desire, such as the ideal number of children or the desired number of children (Bernardi, et al. 2013; Malicka et al. 2021). Thus, our study uses respondents' fertility plans according to the various measures of fertility desire asked by the survey. Respondents were asked to answer the question "Has your plan to have a child changed after the COVID-19 pandemic?" with responses including 1) Not changed, more or less the same 2) Decided to have fewer children or gave up altogether 3) Decided to have children or have more children 4) Decided to postpone having a child 5) Decided to have a child sooner. We dichotomized the answer to measure the change of short-term fertility plan, recoding 1 in case of positive change or no change during the pandemic. If a respondent has decided to reduce the number of children or delay or forego childbearing, it is coded as 0.

2) Independent Variables

(1) Time Spent at Home

The key explanatory variable is the change of time spent at home during the COVID-19 pandemic. The survey includes a statement "I now spend more

time at home after the COVID-19 outbreak" and asks respondents to answer from "strongly disagree" to "strongly agree" on a scale of 1 to 5. We dichotomized the key variable for easier interpretation. A majority of respondents (63.88%, n = 382) answered the time spent at home has increased, while 21.74% of respondents experienced no change in time at home, as shown in Table1. Those who have answered the time at home decreased the amount to 14.4% (n = 86).

3) Mediating Variables

(1) Housework Division Change

The mediator is the change in housework during the COVID-19 pandemic. This study uses the change of a relative share in the housework compared to one's partner.

Change in relative share in the housework is inquired as "Have there been changes in the distribution of household tasks between you and your spouse/partner since the COVID-19 pandemic?" Possible responses are a 1-5 scale, from 1) There is a lot less work that I do, 2) There is a little less work that I do, and 3) Not changed, to 4) There is a little more work that I do, 5) There is a lot more work that I do.

Measurement errors are a possibility due to the self-reported perception in housework division (Charles et al. 2018; Shafer et al. 2020) and, in particular, a tendency of men to overestimate their involvement in housework under the pressure of producing socially desirable answers (Mikelson, 2008). Even though the dataset is not a dyadic structure, we checked the distributions of the perception of the housework division change by gender. It reveals that the self-reported relative increase is greater than the self-reported relative decrease by the other gender, indicating that both men and women both are prone to perceive their own shares of the housework have increased during the pandemic. Nevertheless, a strand of literature focuses on the importance of subjective perceptions of the housework division rather than the objective measure (Gillespie et al. 2019; Lennon and Rosenfield, 1994; Roh 2021). Therefore, this study uses the self-reported housework division change measure.

4) Control Variables

(1) Egalitarian Gender Norm

According to the previous literature (Carriero and Todesco, 2018), gender

norms are controlled to explain the housework division. The egalitarian gender norm is constructed using three survey items: "The main responsibility for household living still lies with the husband even if both of them work," "The main responsibility for housework still lies with the wife even if the couple shares the housework," "The main responsibility for childcare still lies with the wife even if the couple takes care of the children together." Respondents are asked to rate their level of agreement with each statement on a scale of 1 to 4 where 1 indicates that they strongly disagree, and 4 indicates that they strongly agree. The answers were reverse-coded and added up. The total sum of variable ranges from 3 to 12, 3 indicating a traditional gender attitude while 12 indicates more egalitarian gender norms. The variable is normalized to range from 0 to 1.

(2) Relative Resources

As another determinant for the division of housework among the married couples, the relative resources are included based on the previous literature (Baxter 2000; Lennon and Rosenfield 1994). This study measures the relative resources in terms of income level, following previous studies (Arnstein Aassve et al. 2014; Bianchi et al. 2000; Evertsson and Nermo 2007). Relative income is constructed using the measure for monthly income of each respondent and spouse. To construct the relative income variable, first, all missing values of income which indicates nonparticipation in economic activity are imputed as 0. We compared the monthly income level between respondent and their spouse, and coded cases where partner has higher monthly income level than the respondent as 1, 2 when the respondent and their spouse have the same income level, and 3 in cases where respondent's income level is higher than their spouse. According to the relative resources theory, the a person leverages his/her relative power to negotiate the division of housework. Thus, one can expect that the higher relative resources will be associated with a lower share of housework.

(3) COVID-19 Effect

The potential impacts of the COVID-19 pandemic on childbearing intention change are controlled based on previous studies. The pathways of the COVID-19 pandemic effects are suggested as health emergency, social distancing, and economic crisis (Voicu and Bădoi, 2021). To control for health emergency and economic crisis, we included measures of the income fall and infection worries during the spread. The income fall variable is controlled as a binary variable to indicate if there has been a household

income decrease. Infection worries are surveyed as "How much did you worry about you and your family members getting infected with COVID-19?" with respondents answering on a scale of 1 to 4 where 1 indicates that they were not at all worried, and 4 indicates that they were very much worried.

Descriptive Statistics

Table 1 presents the descriptive statistics of the variables used in our study. Among the total analytical sample (n = 598), 19.9% of respondents reported that they had postponed or given up on their childbearing plan during the COVID-19 pandemic. The majority of respondents (63.9%) reported an increase in time spent at home, although 21.7% of respondents perceived no change, and 14.4% of respondents reported a decrease in time spent at home. The mean of housework load change 0.635 indicates the overall increase of the amount of the housework. In terms of change in housework division, while the majority of respondents perceived no change (71.7%, n = 425), among those who did perceive changes, the relative increase is greater than the relative decrease. Relative resource in terms of the income level provides that 42.5% of the respondents have higher income level than their spouse, 19.2% have the same level, and 38.3% earn less than their spouse. Overall, the gender norm leans slightly in favor of the egalitarian, as the mean 0.58 provides. Regarding the impact of the COVID-19 pandemic, 34.95% of respondents experienced a fall in income, while a majority of respondents report no change or even an increase in household income during the pandemic (65.1%).

In terms of the sociodemographic characteristics such as age, sex, the number of children, the sample is distributed in a balanced manner. That there are fewer respondents in their 20s compared to the other age groups reflects the increase in the average age of the first marriage in Korea, which was 31.1 years old for women, 33.4 years old for men as of 2021 (Statistics Korea, 2022).

Table 1
Descriptive Statistics (n = 598)

Variable	Obs.	Distribution or mean	Min.	Max.
Fertility plan change				
Negative change	119	19.90%	0	1

Positive or no change	479	80.10%	0	1
Time increase at home				
Strongly disagree	19	3.18%	0	1
Disagree	67	11.20%	0	1
Neither disagree nor agree	130	21.74%	0	1
Agree	246	41.14%	0	1
Strongly agree	136	22.74%	0	1
Housework division change				
A lot less work	7	1.17%	0	1
A little bit less work	47	7.86%	0	1
Not changed	425	71.07%	0	1
A little bit more work	99	16.56%	0	1
A lot more work	20	3.34%	0	1
Housework load change	598	.635	0	1
Relative resources (income)				
Partner higher	229	38.29%	0	1
Similar	115	19.23%	0	1
Respondent higher	254	42.47%	0	1
Egalitarian gender norms	598	.580	0	1
Income fall during the COVID-19				
Income fall	209	34.95%	0	1
No income fall	389	65.05%	0	1
Infection worries				
Not at all worried	35	5.85%	0	1
Rather unworried	92	15.38%	0	1
A little bit worried	292	48.83%	0	1
Very much worried	179	29.93%	0	1
Age groups				
25-29	27	4.52%	0	1
30-34	93	15.55%	0	1
35-39	151	25.25%	0	1
40-44	160	26.76%	0	1
45-49	167	27.93	0	1
Sex				
Female	289	48.33%	0	1
Male	309	51.67%	0	1

Children number				
Childless	207	34.62%	0	1
One child	272	45.48%	0	1
Two or more	119	19.90%	0	1
Dual earning				
Single income	237	39.63%	0	1
Dual income	361	60.37%	0	1

Model Specification

To estimate the mediation effects of the housework change in the influence of time increase at home on fertility intention change, first, we will test a set of equations following the standard approach (Imai et al. 2011).

$$reg(HouseworkChg)=\alpha_1+\beta_1\ Timelncrs+\delta_1 X+\varepsilon \quad (1)$$

$$logit(IntentionChg)=\alpha_2+\beta_2\ Timelncrs+\delta_2 X+\varepsilon \quad (2)$$

$$logit(IntentionChg)=\alpha_3+\beta_3\ Timelncrs+\gamma_3\ HouseworkChg+\delta_3 X+\varepsilon \quad (3)$$

To examine the indirect effect of the time increase on the fertility intention through the housework division change, the effect of the time increase on the housework division is tested in the equation (1). $\widehat{\beta_2}$ in the equation (2) represents direct effects of the time increase on fertility intention change, $\widehat{\beta_3}$ in the equation (3) represents total effects. The average causal mediation effects can be obtained through the difference of coefficients method, $\widehat{\beta_2}$ - $\widehat{\beta_3}$.

In equation (1), in order to assess the housework change, relative resource and egalitarian gender norms are controlled based on the prior studies (Greenstein, 2000; Horne et al. 2018; Perry-Jenkins and Gerstel, 2020; Zamberlan et al. 2021). A set of sociodemographic characteristics controls consists of age, sex, dual income status and children number following the previous literature (Baxter, 2000).

Since the outcome variable is a dichotomized measure, logistic regression is used in the equations (2) and (3).[1]

[1] Considering that the fertility intention change is measured with a 1-5 Likert scale in the survey, the multinomial logit regression is also implemented for robustness check, recoding the variable as three categories: -1 negative change, 0 no change, 1 positive change. The result for the predicted probability for the negative change is consistent with binary logit regression, while no significant

As potential impacts of the COVID-19 on childbearing plan, we controlled the income fall during the COVID-19 and infection worries following the prior studies (Voicu and Bădoi, 2021).

Main Findings

Housework Change During the Pandemic

The regression results of the equation (1) on the housework change during the pandemic are visualized in Figure 1. Time increase is observed to be positively associated with the increased amount of the housework.

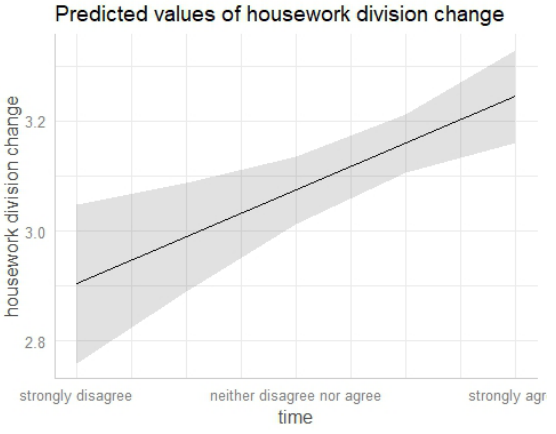

Fig. 1.—Increase of Time at Home and Housework Change

Mediating Effects of Housework Change

Results of the logistic regression on the predicted probability of fertility intention change are presented in Table 2. Model (1) provides the result of equation (2) regarding the correlation of the time increase at home and

finding is observed for the positive change, presumably due to the small sample size of the positive change, which is 15. Thus, in the main analysis, the logit regression model is employed for the sake of convenience of the presentation of the result.

fertility intention change, while model (2) provides the evidence of the mediating role of housework change (equation (3)).

Table 2
Logistic Regression on the Predicted Probability of Fertility Intention Change

	(1) Intention change	(2) Intention change
Time increase	-0.301**	-0.270*
	(0.114)	(0.116)
Division change		-0.308+
		(0.173)
Income change	0.232+	0.225
	(0.138)	(0.138)
Infection worry	-0.388**	-0.362*
	(0.143)	(0.144)
Male	0.0348	0.0617
	(0.224)	(0.225)
Dual	-0.0937	-0.0801
	(0.226)	(0.228)
Age	-0.387	-0.377
	(0.245)	(0.245)
Age square	0.00671*	0.00660*
	(0.00325)	(0.00325)
Children number	-0.118	-0.0979
	(0.161)	(0.162)
Constant	8.005+	8.552+
	(4.624)	(4.639)
N	598	598
Pseudo R^2	0.106	0.111

Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Supporting hypothesis 1, when time spent at home increase, fertility intention is more likely to fall in model (1). The coefficient size becomes smaller in model (2), indicating that the negative correlation is explained by housework division change. As the self-rated share of the housework increases, the predicted probability of fertility intention is more likely to fall.

The marginal effects on the fertility intention change are presented in Table 3. For the easier interpretation, the increase of time at home is dichotomized here as 1 to indicate the increase and 0 no change or decrease of time spent at home. Our findings show that when time spent at home increases, the probability of a couple delaying or giving up on childbearing is 22.8% (the predicted probability of positive or no change is 77.2%) in model (1). When the housework division measure is introduced, the predicted probability becomes 22.4%. The difference between these probabilities is explained by the change in the division of housework.

Table 3
Marginal Effects of the Time Increase on Fertility Intention Change

Increase of time spent at home	(1) Direct effect	(2) Total effect
No increase	0.858***	0.852***
	(0.240)	(0.025)
Increase	0.772***	0.776***
	(0.020)	(0.020)

Our analysis provides that even though the mediating effect of the housework division is statistically significant, only very minorly. To address this, we employed an alternative measure of changes in housework in further analysis.

Further Analysis

Alternative Measure of Housework Change

Despite the perceived changes in housework division, still, women bear many more responsibilities when it comes to housework than do their husbands.

The distribution of housework is visualized both in histogram and kernel density plots in Figure 2. The housework division is a normalized total sum of housework division measured through five tasks, where 0 indicates a case when the housework is always done by the husband, and 1 means the housework is always done by the wife. The plots reveal that the distribution is slightly skewed to left, indicating women are still more likely to take on the greater amount of domestic labor despite however much the division has changed between couples.

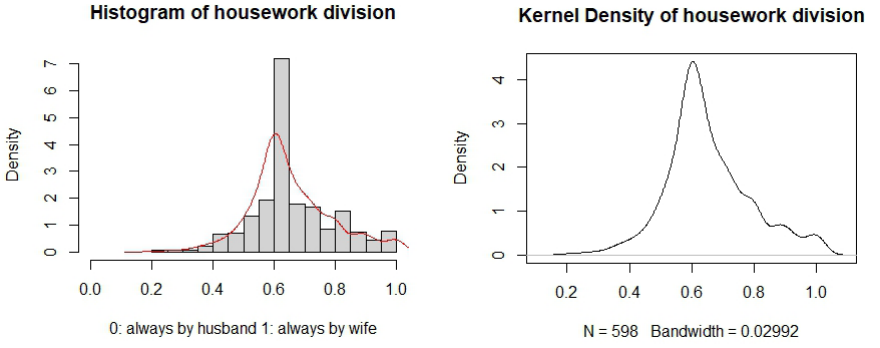

Fig. 2.—Distribution of Housework Division

Thus, instead of the relative change in burden of housework compared to that of their partner, we will examine changes in housework using changes in the housework load compared to before the pandemic.

The housework load change was surveyed with the question, "Have there been changes in the time spent doing the following household tasks since the COVID-19 pandemic?" The question distinguishes each task: preparing a meal, washing dishes, cleaning the house, garbage disposal and recycling, laundry and organizing clothes. Respondents are asked to answer to each task on scales of 1 to 5 where 1 means decreased considerably, and 5 means increased considerably. We made a total sum of values and normalized it from 0 to 1, where 0 indicates a case when the total sum of housework decreased considerably while 1 indicates the considerable increase. The mean of a normalized value is 0.635 (standard deviation 0.177).

Analysis results using the housework load change in Table 4 reports the significant mediating effects. The Wald test result for the nested model also provides the statistical significance (8.03**).

Table 4
Logistic Regression on the Predicted Probability of Fertility Intention Change

	(1) Intention change	(2) Intention change
Time increase	-0.301**	-0.232*
	(0.114)	(0.117)
Housework load change		-1.798**
		(0.634)
Income change	0.232+	0.213
	(0.138)	(0.139)
Infection worry	-0.388**	-0.396**
	(0.143)	(0.143)
Male	0.0348	0.0374
	(0.224)	(0.226)
Dual	-0.0937	-0.111
	(0.226)	(0.229)
Age	-0.387	-0.400
	(0.245)	(0.247)
Age square	0.00671*	0.00685*
	(0.00325)	(0.00327)
Children number	-0.118	-0.0587
	(0.161)	(0.164)
Constant	8.005+	9.217*
	(4.624)	(4.695)
N	598	598
Pseudo R^2	0.106	0.120

Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5
Predicted Probabilities of Fertility Intention Change by Sex

	Male		Female		Dual earner		Single earner		Child = 0		Child = 1		Child > = 2	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Time increase	-0.371*	-0.321+	-0.271+	-0.185	-0.408*	-0.338*	-0.193	-0.127	-0.592**	-0.580**	-0.192	-0.0232	-0.132	-0.0957
	(0.174)	(0.177)	(0.158)	(0.164)	(0.159)	(0.162)	(0.170)	(0.178)	(0.213)	(0.214)	(0.158)	(0.171)	(0.335)	(0.348)
Housework change		-1.569		-2.155*		-2.316**		-1.485		-0.887		-3.207***		-0.801
		(1.011)		(0.838)		(0.811)		(1.124)		(1.046)		(0.974)		(1.886)
Constant	12.47	12.92	5.459	7.128	5.888	7.798	9.534	9.839	16.76+	17.51+	5.729	6.102	-10.69	-7.820
	(7.920)	(7.935)	(6.129)	(6.253)	(6.108)	(6.268)	(7.261)	(7.237)	(10.02)	(10.07)	(6.106)	(6.220)	(20.11)	(21.18)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	309	309	289	289	361	361	237	237	207	207	272	272	119	119
Wald Chi^2	2.41		6.61+		8.15**		1.75		0.72		10.83***		0.18	
Pseudo R^2	0.121	0.130	0.121	0.143	0.122	0.143	0.074	0.081	0.178	0.181	0.083	0.123	0.174	0.177

Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Logistic regression results by different subgroups in Table 5 suggest that the negative influences of time increase at home on fertility intention are prominent among women, dual earning couples, and those who have a child.

Causal Mediation Analysis

The conventional mediation analysis of comparing the coefficient between nested models is criticized for its limitation in non-linear model (Imai et al. 2011). Thus, we additionally implemented the causal mediation analysis.

$$\bar{\delta}_i(t) \equiv Y_i(t, M_i(1)) - Y_i(t, M_i(0)) \quad (4)$$

$$\bar{\xi}_i(t) \equiv Y_i(1, M_i(t)) - Y_i(0, M_i(t)) \quad (5)$$

In model (4), $\bar{\delta}_i(t)$ represents average causal mediation effects. In our study, it estimates the indirect effects of the time increase on the fertility intention change through the housework change. Model (4) isolates the hypothesized mechanism by fixing the time increase effects and changing housework change effects.

In model (5), $\bar{\xi}_i(t)$ represent the average direct effects of the time increase on the fertility intention change. Here, the direct effect of the time increase is not mediated by the hypothesized mediator.

$$\{Y_i(t', m), M_i(t)\} \perp T_i \mid X_i = x, \quad (6)$$

$$Y_i(t', m) \perp M_i(t) \mid T_i = t, X_i = x, \quad (7)$$

$$\textit{where } 0 < Pr(T_i = t \mid X_i = x) \textit{ and } 0 < p(M_i = m \mid T_i = t, X_i = x)$$

$$\textit{for } t = 0, 1, \textit{ and all } x \textit{ and } m \textit{ in the support of } X_i \textit{ and } M_i, \textit{ respectiveely}$$

The key difference of the causal mediation analysis from the conventional method lies at the sequential ignorability assumption in equations (6) and (7). Under the assumption of a random assignment of treatment in the standard mediation analysis, it is rather the average treatment effects rather than average causal mediation effects or average direct effects since both the direct and indirect effects yield potential outcome that would never be realized (Imai et al. 2011). On the contrary, by assuming the random treatment assignment in a sequence in the equation (6), and the exogeneity of mediator in the equation (7), the causal mediation analysis provides the causal mediation effect rather than the causal effect of the mediator (ibid.). The causal mediation analysis result is presented in

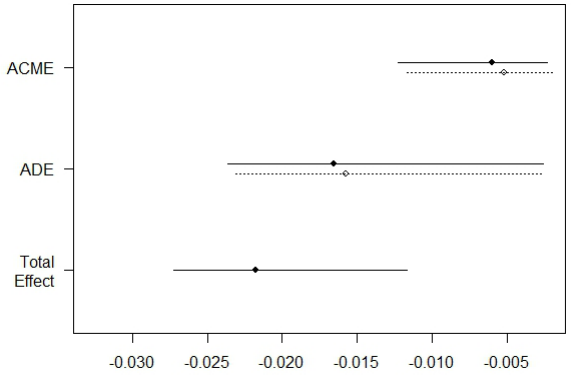

Fig. 3.—The Causal Mediation Analysis

Figure 3.

Out of the total effects of the time increase on fertility intention, -0.022, the estimated average direct effect if -0.016 and the average causal mediation effect is -0.006. All are significant at the 0.1% level, consistent with the main analysis results.

Discussion

It is generally assumed that the increase in time spent at home would positively influence a couple's fertility intention. It is on this foundation that the South Korean government instituted policies such as the "Family Love Day" campaign to encouraging parents to cut down on overtime work and spend more time with family. Yet, surprisingly, empirical evidence is limited as to whether the fertility intention would increase when the time spent at home increases. In our study, we examined the effect of the time increase at home on the fertility intention change against the backdrop of the COVID-19 pandemic. The social distancing measures introduced during the pandemic offered a valuable chance to test the effects of the time increase at home. Using the Korea Values Survey, we tested the effect of the time increase at home on changes in fertility intention of married individuals. Our analysis reveals that individuals are more likely to give up on or delay a childbearing plan when their time at home increases, with the economic shock of the pandemic and COVID-19 infection worries taken into consideration. To explain the channel of negative correlation, this study focused on changes in

the division of housework. The increased burden of housework as a consequence of the increase of time spent at home is observed to mediate the effect of time increase on fertility intention change. The mediating effects of the increased housework burden are significant both statistically and substantially among women, dual earning couples, and those who have one child.

This study provides a suggestive policy implication regarding the low fertility rate in South Korea. Even though time spent at home increases, the adverse effects of the increased housework burden are observed to outweigh the potential positive effects, such as improved family cohesion. Aligning with previous studies, the increased burden of housework depresses individuals' fertility intention of women and dual earning couples, while also discouraging the birth of a second child.

This study is not without its limitations. In order to control for the effects of COVID-19 on the fertility intention change, the economic crisis and the health crisis are controlled, following the previous literature. Yet, there's a possibility that the effects of COVID-19 are not perfectly controlled. For example, the economic crisis was measured with the change in monthly household income compared to the pre-pandemic period. This might not fully capture the dynamics of the income change over the course of the pandemic as well as the change of respondent's own employment status or income. Also, the health crisis, measured with the overall infection worries during the COVID-19, might not reflect other health-related concerns such as fears for potential adverse effects during pregnancy or for prospective newborn babies. In terms of the changes in housework, the self-reported measurement is known to be imprecise or exaggerated compared to the time-diary data (Charles et al. 2018; Shafer et al. 2020). Yet, recent research trends shift from the objective distribution of household tasks to subjective perceptions of division, emphasizing the significance of subjective perceptions over the actual measure (Baxter, 2000; Lennon and Rosenfield, 1994). Despite such limitations, this study examined the correlation of the time increase and the fertility intention change using the available data.

Recently, a burgeoning body of research focuses on the perceived fairness in the housework division despite the objective division itself (Baxter, 2000; Gillespie et al. 2019; Hiekel and Ivanova, 2022; Lennon and Rosenfield, 1994). This study concludes here, leaving the investigation of the nexus between the perceived fairness and a family formation motivation as another interesting avenue for the future research.

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Seulki Choi is a professor at KDI School of Public Policy and Management, South Korea. He is interested in population, generation and quality of life. His recent works have been published in the *Korea Journal of Population Studies* (2021, 2022), *Health and Social Welfare Review* (2019), and *Family and Culture* (2019). [*E-mail:* chois@kdischool.ac.kr]

Da Eun Kwan has recently received her Ph.D degree from the KDI School of Public Policy and Management. Her thesis focused on family formation and social mobility. Her recent work has been published at *Korean Governance Review* (2022). [*E-mail:* dekwan20@kdis.ac.kr]